BECKHOFF New Automation Technology

Main Catalog 2019
Volume 1 | IPC, Motion, Automation

Industrial PC
Embedded PC

Drive Technology

TwinCAT
TwinSAFE

Please find information on all Beckhoff IPC, Motion and Automation products in Volume 1:

Industrial PC, Control Panel
Embedded PC
Drive Technology
TwinCAT
TwinSAFE

Please find information on all Beckhoff I/O products in Volume 2:

EtherCAT
EtherCAT Terminal
EtherCAT Box
EtherCAT Plug-in Modules
Bus Terminal
Fieldbus Box
Infrastructure Components
Accessories

▶ **www.beckhoff.com**

Beckhoff New Automation Technology
System overview and worldwide presence

IPC

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PC Control for all applications

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Modular DIN rail IPCs and Industrial Motherboards

I/O

262 **Fieldbus Components**
I/Os for all common fieldbus systems

Motion

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The drive system for highly dynamic positioning tasks

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PLC and Motion Control on the PC

542 **TwinSAFE**
Open and scalable safety technology

572 **Support, Service, Training**

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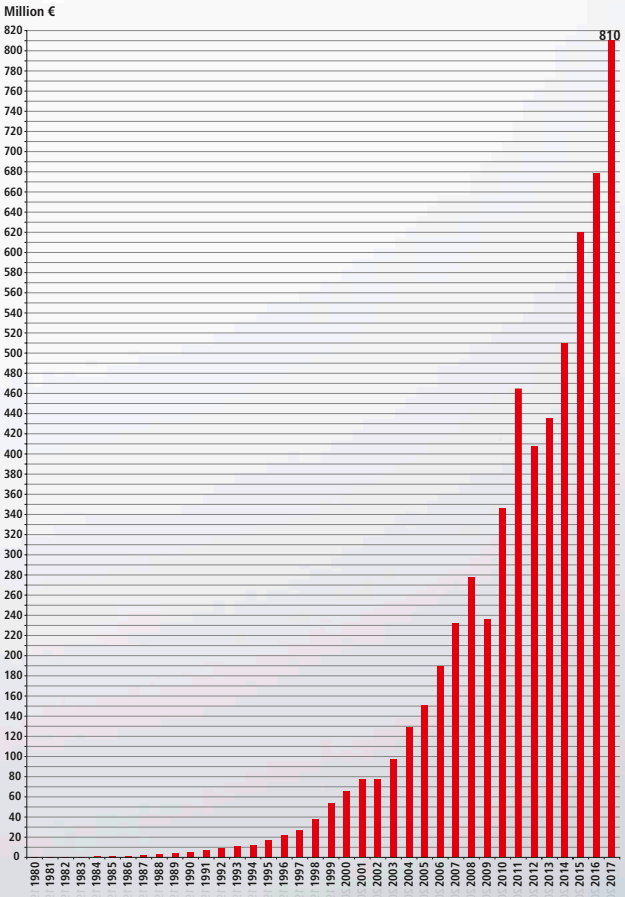
New Automation Technology

Beckhoff implements open automation systems based on PC Control technology. The product range covers Industrial PCs, I/O and Fieldbus Components, Drive Technology and automation software. Products that can be used as separate components or integrated into a complete and seamless control system are available for all industries. The Beckhoff New Automation Technology philosophy represents universal and open control and automation solutions that are used worldwide in a wide variety of different applications, ranging from CNC-controlled machine tools to intelligent building automation.



Sales trend

Worldwide presence on all continents

The central divisions of Beckhoff, such as development, production, administration, distribution, marketing, support and service are located at the Beckhoff Automation GmbH & Co. KG headquarters in Verl, Germany. Rapidly growing presence in the international market is taking place through subsidiaries and branch offices. Through worldwide co-operation with partners, Beckhoff is represented in more than 75 countries.

Beckhoff Automation

- Headquarters: Verl, Germany
- Sales 2017: **810 million € (+19 %)**
- Staff worldwide: **3,900 (+16 %)**
- Sales Offices Germany: **22**
- Subsidiaries/Branch Offices worldwide: **37**
- Distributors worldwide: **75**

(as of 04/2018)

PC-based control technology

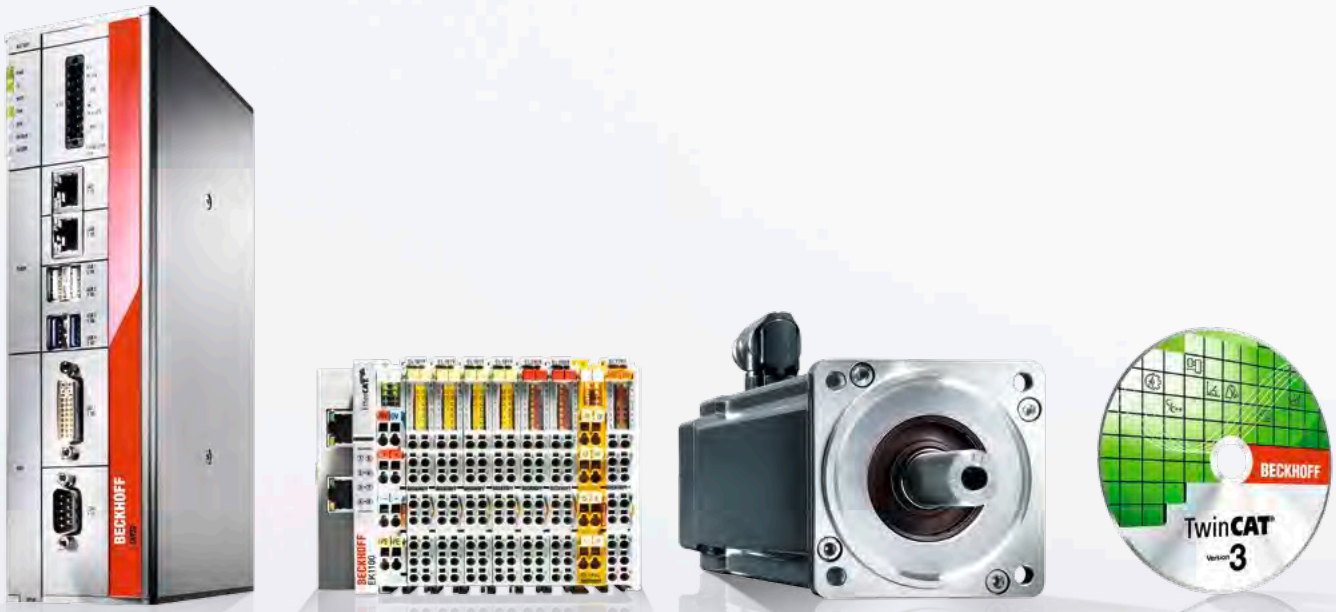
Since the foundation of the company in 1980, continuous development of innovative products and solutions using PC-based control technology has been the basis for the continued success of Beckhoff. Many automation technology standards that are taken for granted today were conceptualised by Beckhoff at an early stage and successfully introduced to the market.

The Beckhoff PC Control philosophy and the invention of the Lightbus system, the Bus Terminals and TwinCAT automation software represent milestones in automation technology and have become accepted as high-performance alternatives to traditional control technology. EtherCAT, the real-time Ethernet solution, makes forward-looking, high-performance technology available for a new generation of leading edge control concepts.

Milestones

1982 P1000 – single-board motion controller
1986 PC Control – first PC-based machine controller
1988 S1000 – software PLC/NC on PC (DOS)
1989 Lightbus – high-speed fieldbus utilising optical fibre
1990 All-in-one PC motherboard
1995 Bus Terminal – fieldbus technology in terminal block format
1996 TwinCAT – real-time software package under Windows with PLC and motion control functions
1998 Control Panel – remote IPC Control Panels
1999 Fieldbus Box – the I/O system in IP 67
2002 CX1000 – modular Embedded PCs for DIN rail mounting
2003 EtherCAT – real-time Ethernet fieldbus system
2005 TwinSAFE – the compact safety solution
2005 AX5000 – EtherCAT Servo Drives
2007 Industrial Motherboards – made in Germany
2008 XFC – eXtreme Fast Control Technology
2009 HD Bus Terminals – 16-channel terminals in 12 mm
2010 TwinCAT 3 – eXtended Automation Technology
2011 AM8000 – Synchronous Servomotors with One Cable Technology
2012 2nd generation of Control Panels – Panel PCs and Control Panels with multi-touch technology
2012 XTS – eXtended Transport System
2014 Many-core control – Industrial server maximises industrial computing power
2014 AX8000 – multi-axis servo system
2014 EtherCAT Plug-in Modules – Bus Terminals for circuit boards
2015 EtherCAT P – One Cable Automation
2015 TwinCAT HMI – for platform-independent user interfaces
2015 TwinCAT IoT – for simple cloud communication
2015 TwinCAT Analytics – recording and analysis of process data
2016 EtherCAT measurement modules – system-integrated high-end measurement technology
2017 Process technology – system-integrated solutions for explosion protection requirement
2017 C60xx – the generation of ultra-compact IPCs
2017 AMP8000 – Distributed Servo Drive system
2017 TwinCAT Vision – machine vision integrated into automation technology

Four components, one system



The IPC Company

Beckhoff supplies the right Industrial PC for every application. High-quality components based on open standards and the rugged construction of the device housings mean that the Industrial PCs are ideally equipped for all control requirements. Embedded PCs make modular IPC technology available in miniature format for DIN rail mounting. In addition to their application in automation, Beckhoff Industrial PCs are also ideally suited to other kinds of tasks – wherever reliable and robust PC technology is required.

The I/O Company

Beckhoff has the right technology for every signal and every fieldbus. Beckhoff supplies a complete range of Fieldbus Components for all common I/Os and fieldbus systems. With the Bus Terminals in protection class IP 20, and the Fieldbus Box modules in IP 67, a complete range is available for all important signal types and fieldbus systems. In addition to conventional bus systems, Beckhoff offers a complete EtherCAT I/O range for the high-speed Ethernet fieldbus based on EtherCAT Terminals and the EtherCAT Box.

The Motion Company

In combination with the Motion Control solutions offered by the TwinCAT automation software, Beckhoff Drive Technology represents an advanced and complete drive system. PC-based control technology from Beckhoff is ideally suited for single and multiple axis positioning tasks with highly dynamic requirements. The AX5000 and AX8000 Servo Drive series with high-performance EtherCAT communication offer maximum performance and dynamics. Servomotors with One Cable Technology, which combines power and feedback system in a standard motor cable, reduce material and commissioning costs. The drive system XTS (eXtended Transport System) replaces classic mechanical systems by innovative mechatronics. It enables individual product transport applications with a continuous flow of material.

The Automation Company

Beckhoff offers comprehensive system solutions in different performance classes for all areas of automation. Beckhoff control technology is scalable – from high-performance Industrial PCs to mini PLCs – and can be adapted precisely to the respective application. TwinCAT automation software integrates real-time control with PLC, NC and CNC functions in a single package. All Beckhoff controllers are programmed using TwinCAT in accordance with the globally-recognised IEC 61131-3 programming standard. With TwinCAT 3, C/C++ and MATLAB®/Simulink® are available as programming languages in addition to IEC 61131-3.

System overview

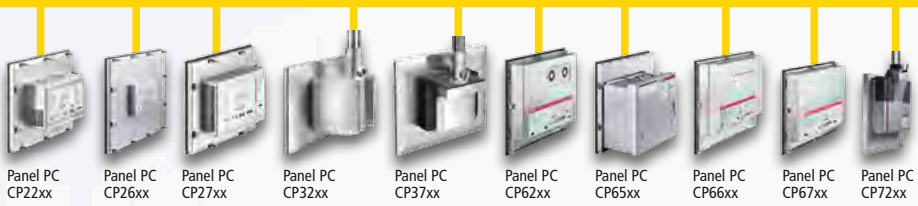
Ethernet

Automation

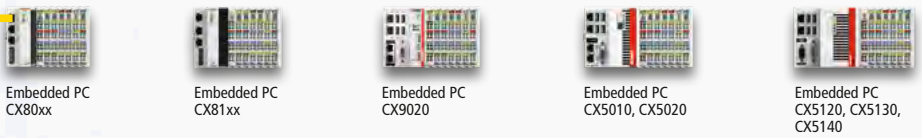
456 **TwinCAT**

IPC

16 **Industrial PC**



184 **Embedded PC**



I/O

2 610 **Infrastructure Components**

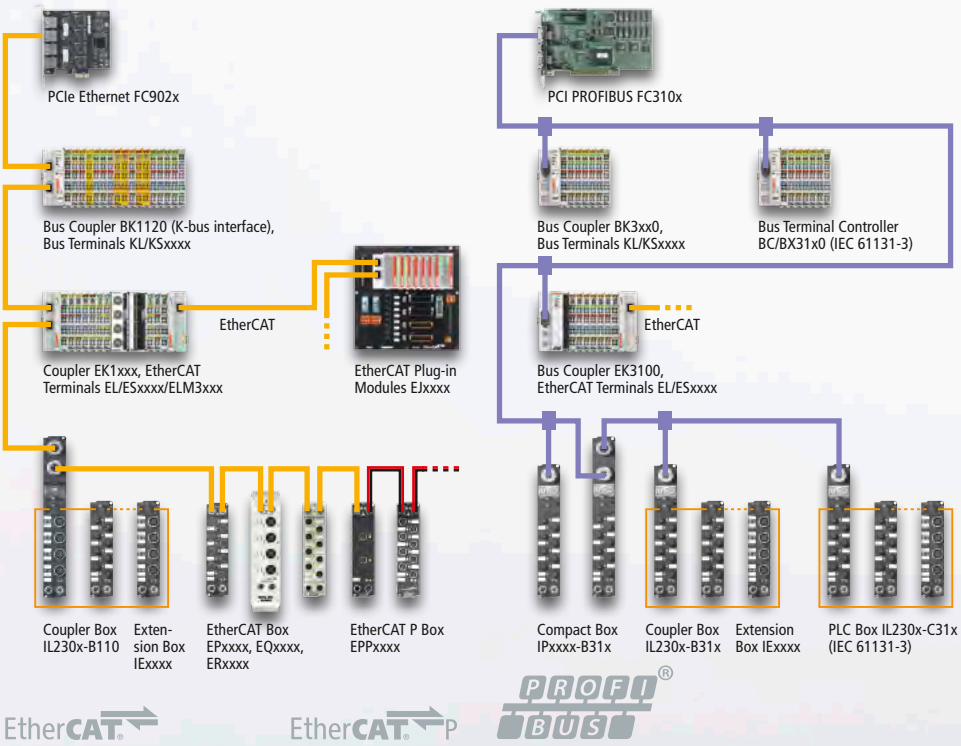
2 396 **Bus Terminal**

2 70 **EtherCAT Terminal**

2 364 **EtherCAT Plug-in Modules**

2 546 **Fieldbus Box**

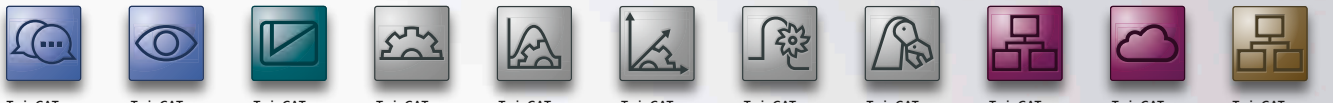
2 252 **EtherCAT Box**



Motion

306 **Drive Technology**

Detailed system and fieldbus information from page 2 24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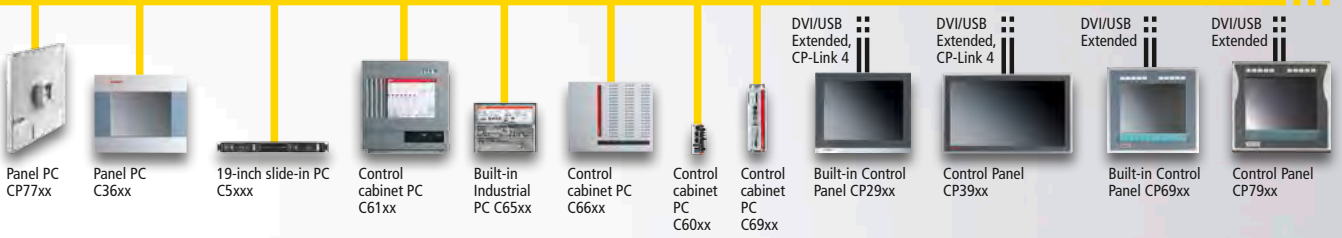
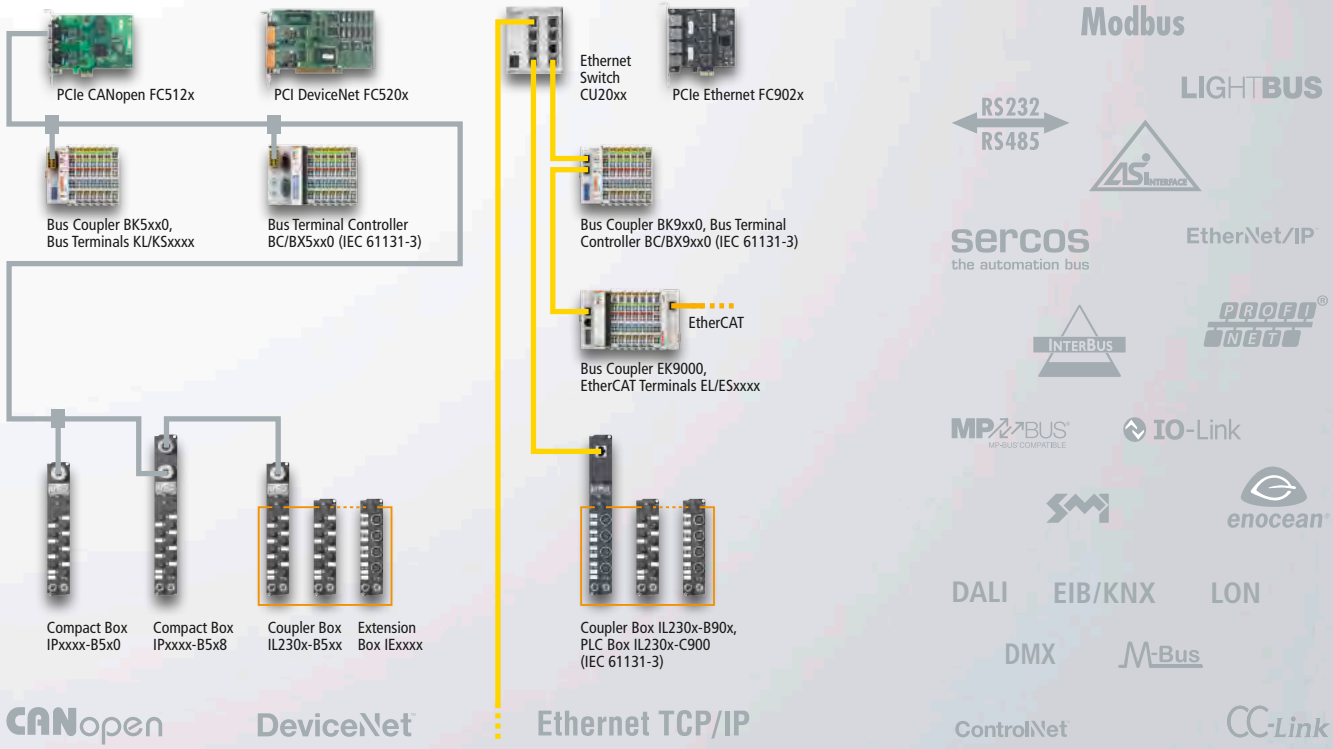
TwinCAT Vision
TwinCAT Control
TwinCAT Motion
TwinCAT PTP
TwinCAT NC I
TwinCAT CNC
TwinCAT Robotics
TwinCAT Connectivity
TwinCAT Industrie 4.0
TwinCAT Industry specific


Panel PC CP77xx
Panel PC C36xx
19-inch slide-in PC C5xxx
Control cabinet PC C61xx
Built-in Industrial PC C65xx
Control cabinet PC C66xx
Control cabinet PC C60xx
Control cabinet PC C69xx
DVI/USB Extended, CP-Link 4
Built-in Control Panel CP29xx
DVI/USB Extended, CP-Link 4
Control Panel CP39xx
DVI/USB Extended
Built-in Control Panel CP69xx
DVI/USB Extended
Control Panel CP79xx

Embedded PC CX2020, CX2030, CX2040
Embedded PC CX2042, CX2062, CX2072


PCIe CANopen FC512x
PCI DeviceNet FC520x
Ethernet Switch CU20xx
PCIe Ethernet FC902x
Bus Coupler BK5xx0, Bus Terminals KL/KSxxxx
Bus Terminal Controller BC/BX5xx0 (IEC 61131-3)
Bus Coupler BK9xx0, Bus Terminal Controller BC/BX9xx0 (IEC 61131-3)
EtherCAT
Bus Coupler EK9000, EtherCAT Terminals EL/ESxxxx
Compact Box IPxxxx-B5x0
Compact Box IPxxxx-B5x8
Coupler Box IL230x-B5xx
Extension Box IExxxx
Coupler Box IL230x-B90x, PLC Box IL230x-C900 (IEC 61131-3)
CANopen
DeviceNet
Ethernet TCP/IP
Modbus
LIGHTBUS
RS232
RS485
AS-i
sercos
the automation bus
EtherNet/IP
INTERBUS
PROFINET
MP-BUS
IO-Link
SMI
enocean
DALI
EIB/KNX
LON
DMX
M-Bus
ControlNet
CC-Link

Stainless steel servomotors AM88xx
Linear Servomotors ALxxxx
Compact Drive Technology
XTS | eXtended Transport System

Beckhoff worldwide

Headquarters

Beckhoff Automation GmbH & Co. KG
Hülshorstweg 20
33415 Verl
Germany
Phone: +49 52469630
Fax: +49 5246963198
info@beckhoff.com
www.beckhoff.com

St Petersburg
Moscow
Vladimir
Yekaterinburg
Novosibirsk
Samara
Ankara
ASIA
Shenyang
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Tianjin
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AUSTRALIA
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Johannesburg
Durban
Port Elizabeth
Sydney
Melbourne
Auckland
Headquarters
Subsidiary
Headquarters distributor

Beckhoff worldwide

Headquarters

Beckhoff Automation GmbH & Co. KG
Hülshorstweg 20
33415 Verl
Germany
Phone: +49 52469630
info@beckhoff.de
www.beckhoff.de

Europe

Germany

Subsidiary Balingen
Beckhoff Automation GmbH & Co. KG
72336 Balingen
Phone: +49 7433260240
balingen@beckhoff.de
www.beckhoff.de

Subsidiary Berlin
Beckhoff Automation GmbH & Co. KG
10623 Berlin
Phone: +49 308871160
berlin@beckhoff.de
www.beckhoff.de

Sales office Crailsheim
Beckhoff Automation GmbH & Co. KG
74564 Crailsheim
Phone: +49 7951297670
crailsheim@beckhoff.de
www.beckhoff.de

Sales office Deggendorf
Beckhoff Automation GmbH & Co. KG
94469 Deggendorf
Phone: +49 99138312160
deggendorf@beckhoff.de
www.beckhoff.de

Sales office Dresden
Beckhoff Automation GmbH & Co. KG
01067 Dresden
Phone: +49 3514383320
dresden@beckhoff.de
www.beckhoff.de

Subsidiary Frankfurt
Beckhoff Automation GmbH & Co. KG
60327 Frankfurt
Phone: +49 696809880
frankfurt@beckhoff.de
www.beckhoff.de

Sales office Fulda
Beckhoff Automation GmbH & Co. KG
36037 Fulda
Phone: +49 6619015260
frankfurt@beckhoff.de
www.beckhoff.de

Subsidiary Hanover
Beckhoff Automation GmbH & Co. KG
30655 Hanover
Phone: +49 5118757580
hannover@beckhoff.de
www.beckhoff.de

Subsidiary Lübeck
Beckhoff Automation GmbH & Co. KG
23552 Lübeck
Phone: +49 4512039880
luebeck@beckhoff.de
www.beckhoff.de

Sales office Mannheim
Beckhoff Automation GmbH & Co. KG
68165 Mannheim
Phone: +49 6217185220
frankfurt@beckhoff.de
www.beckhoff.de

Sales office Marktheidenfeld
Beckhoff Automation GmbH & Co. KG
97828 Marktheidenfeld
Phone: +49 9391912700
marktheidenfeld@beckhoff.de
www.beckhoff.de

Subsidiary Moers
Beckhoff Automation GmbH & Co. KG
47445 Moers
Phone: +49 2841908166
rhein-ruhr@beckhoff.de
www.beckhoff.de

Sales office Monheim
Beckhoff Automation GmbH & Co. KG
40789 Monheim
Phone: +49 2173686730
monheim@beckhoff.de
www.beckhoff.de

Subsidiary Munich
Beckhoff Automation GmbH & Co. KG
82194 Gröbenzell
Phone: +49 8142410590
muenchen@beckhoff.de
www.beckhoff.de

Subsidiary Münster
Beckhoff Automation GmbH & Co. KG
48155 Münster
Phone: +49 2501963990
muenster@beckhoff.de
www.beckhoff.de

Subsidiary Nuremberg
Beckhoff Automation GmbH & Co. KG
90482 Nuremberg
Phone: +49 911540560
nuernberg@beckhoff.de
www.beckhoff.de

Sales office Pforzheim
Beckhoff Automation GmbH & Co. KG
75181 Pforzheim
Phone: +49 7231417650
balingen@beckhoff.de
www.beckhoff.de

Sales office Ravensburg
Beckhoff Automation GmbH & Co. KG
88212 Ravensburg
Phone: +49 7515693690
ravensburg@beckhoff.de
www.beckhoff.de

Sales office Regensburg
Beckhoff Automation GmbH & Co. KG
93051 Regensburg
Phone: +49 94128040780
regensburg@beckhoff.de
www.beckhoff.de

Austria

Headquarters
Beckhoff Automation GmbH
Hauptstraße 4
6706 Bürs
Phone: +43 5552688130
info@beckhoff.at
www.beckhoff.at

Sales office Greinbach
Beckhoff Automation GmbH
8230 Greinbach
Phone: +43 3332646350
steiermark@beckhoff.at
www.beckhoff.at

Sales office Hagenberg
Beckhoff Automation GmbH
4232 Hagenberg
Phone: +43 7236209250
oberoesterreich@beckhoff.at
www.beckhoff.at

Sales office Innsbruck
Beckhoff Automation GmbH
6020 Innsbruck
Phone: +43 512236043
tirol@beckhoff.at
www.beckhoff.at

Sales office Salzburg
Beckhoff Automation GmbH
5081 Anif
Phone: +43 6246743600
salzburg@beckhoff.at
www.beckhoff.at

Sales office Vienna
Beckhoff Automation GmbH
1220 Vienna
Phone: +43 1263223840
wien@beckhoff.at
www.beckhoff.at

Belgium, Luxembourg

Headquarters
Beckhoff Automation bvba
Klaverbladstraat 11.2/2
3560 Lummen
Phone: +32 13252200
info@beckhoff.be
www.beckhoff.be

Sales office Kortrijk
Beckhoff Automation bvba
8500 Kortrijk
Phone: +32 56202037
info@beckhoff.be
www.beckhoff.be

Bulgaria

Distributor
Kastiva GmbH
68-72 Ami Bue Street
1612 Sofia
Phone: +359 29504431
office@kastiva.com
www.kastiva.com

Croatia

Distributor
Krovel d.o.o.
Barutanski jarak 114
10000 Zagreb
Phone: +385 12305788
beckhoff@krovel.hr
www.krovel.hr

Czech Republic, Slovac Republic

Headquarters
Beckhoff Česká republika s.r.o.
Sochorova 23
61600 Brno
Phone: +420 511189250
info.cz@beckhoff.com
www.beckhoff.com/cz

Denmark, Iceland

Headquarters
Beckhoff Automation ApS
Birkemose allé 25
6000 Kolding
Phone: +45 43201570
info@beckhoff.dk
www.beckhoff.dk

Sales office Hobro
Beckhoff Automation ApS
9500 Hobro
Phone: +45 43201570
info@beckhoff.dk
www.beckhoff.dk

Sales office Solrød
Beckhoff Automation ApS
2680 Solrød
Phone: +45 43201570
info@beckhoff.dk
www.beckhoff.dk

Estonia

Representative office
Beckhoff Automation Oy
Valukoja 8, Õpiku 2
11415 Tallinn
Phone: +372 55971011
info@beckhoff.fi
www.beckhoff.fi

Finland

Headquarters
Beckhoff Automation Oy
Hakakalliontie 2
05460 Hyvinkää
Phone: +358 207423800
info@beckhoff.fi
www.beckhoff.fi

Sales office Oulu
Beckhoff Automation Oy
90590 Oulu
Phone: +358 207423800
info@beckhoff.fi
www.beckhoff.fi

Sales office Seinäjoki
Beckhoff Automation Oy
60320 Seinäjoki
Phone: +358 207423800
info@beckhoff.fi
www.beckhoff.fi

Sales office Tampere
Beckhoff Automation Oy
33720 Tampere
Phone: +358 207423800
info@beckhoff.fi
www.beckhoff.fi

France

Headquarters
Beckhoff Automation Sarl
19 bis, avenue du Québec
91140 Villebon-sur-Yvette
Phone: +33 169298370
info@beckhoff.fr
www.beckhoff.fr

Sales office Annecy
Beckhoff Automation Sarl
74940 Annecy
Phone: +33 450635000
info@beckhoff.fr
www.beckhoff.fr

Sales office Bras-sur-Meuse
Beckhoff Automation Sarl
55100 Bras-sur-Meuse
Phone: +33 384274604
info@beckhoff.fr
www.beckhoff.fr

Sales office Orvault
Beckhoff Automation Sarl
44700 Orvault
Phone: +33 228250815
info@beckhoff.fr
www.beckhoff.fr

Greece, Cyprus

Distributor
Industrial Automation Systems
241 EL. Venizelou
17673 Kallithea
Phone: +30 2109510260
info@ias.gr

Hungary

Headquarters
Beckhoff Automation Kft.
Gubacsi út 6.
1097 Budapest
Phone: +36 15019940
info@beckhoff.hu
www.beckhoff.hu

Italy

Headquarters
Beckhoff Automation S.r.l.
Via Luciano Manara, 2
20812 Limbiate
Phone: +39 029945311
info@beckhoff.it
www.beckhoff.it

Sales office Bologna
Beckhoff Automation S.r.l.
40033 Casalecchio di Reno
Phone: +39 05119939200
bologna@beckhoff.it
www.beckhoff.it

Sales office Padua
Beckhoff Automation S.r.l.
35129 Padua
Phone: +39 0498073758
padova@beckhoff.it
www.beckhoff.it

Lithuania, Latvia

Distributor
UAB Santavilte
Europos pr. 121
46339 Kaunas
Phone: +370 37211360
info@santavilte.lt
www.santavilte.lt

Malta

Distributor
JMartans Automation ltd
F10B Mosta Technopark
MST 3000 Mosta
Phone: +356 21420655
info@jmartans.com
www.jmartans.com

Netherlands

Headquarters
Beckhoff Automation B.V.
Küppersweg 71
2031 EB Haarlem
Phone: +31 235185140
sales@beckhoff.nl
www.beckhoff.nl

Sales office Eindhoven
Beckhoff Automation B.V.
5652 AM Eindhoven
Phone: +31 403032650
sales@beckhoff.nl
www.beckhoff.nl

Norway
Headquarters
Beckhoff Automation AS
Raveien 205
3184 Borre
Phone: +47 33504690
info@beckhoff.no
www.beckhoff.no

Poland
Headquarters
Beckhoff Automation Sp. z o.o.
Żabieniec, ul. Ruczajowa 15
05500 Piaseczno
Phone: +48 227504700
info@beckhoff.pl
www.beckhoff.pl

Sales office Katowice
Beckhoff Automation Sp. z o.o.
40476 Katowice
Phone: +48 727722700
info@beckhoff.pl
www.beckhoff.pl

Sales office Wrocław
Beckhoff Automation Sp. z o.o.
54616 Wrocław
Phone: +48 727722800
info@beckhoff.pl
www.beckhoff.pl

Portugal
Distributor
Bresimar Automação, S.A.
Quinta do Simão, EN109, Esgueira
3800230 Aveiro
Phone: +351 234303320
bresimar@bresimar.pt
www.bresimar.pt

Romania
Distributor
Kreatron Automation S.R.L.
Str. Octavian Fodor nr. 113, ap. 13
400434 Cluj-Napoca
Phone: +40 364401612
office@kreatron.ro
www.kreatron.ro

Russia, Belarus
Headquarters
Beckhoff Automation OOO
Staraya Basmannaya 14/2, Str. 2
105064 Moscow
Phone: +7 4957778366
russia@beckhoff.com
www.beckhoff.ru

Sales office Novosibirsk
Beckhoff Automation OOO
630054 Novosibirsk
Phone: +7 3833559951
novosibirsk@beckhoff.com
www.beckhoff.ru

Sales office Samara
Beckhoff Automation OOO
443010 Samara
Phone: +7 8462698067
samara@beckhoff.com
www.beckhoff.ru

Sales office St Petersburg
Beckhoff Automation OOO
199178 St Petersburg
Phone: +7 8123326205
st.petersburg@beckhoff.com
www.beckhoff.ru

Sales office Vladimir
Beckhoff Automation OOO
600000 Vladimir
Phone: +7 4922464180
vladimir@beckhoff.com
www.beckhoff.ru

Sales office Yekaterinburg
Beckhoff Automation OOO
620049 Yekaterinburg
Phone: +7 3433799873
ekaterinburg@beckhoff.com
www.beckhoff.ru

Slovenia, Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro, Serbia
Headquarters
Beckhoff Avtomatizacija d.o.o.
Zbiljska cesta 4
1215 Medvode
Phone: +386 13613080
info@beckhoff.si
www.beckhoff.si

Spain
Headquarters
Beckhoff Automation S.A.
Avda. Alcalde Barnils, 64-68
08174 Sant Cugat
Phone: +34 935844997
info@beckhoff.es
www.beckhoff.es

Sales office Madrid
Beckhoff Automation S.A.
28290 Madrid
Phone: +34 916364357
centro@beckhoff.com
www.beckhoff.es

Sales office Zamudio
Beckhoff Automation S.A.
48170 Zamudio
Phone: +34 944314075
norte@beckhoff.com
www.beckhoff.es

Sweden
Headquarters
Beckhoff Automation AB
Stenåldersgatan 2A
21376 Malmö
Phone: +46 406808160
info@beckhoff.se
www.beckhoff.se

Sales office Gothenburg
Beckhoff Automation AB
43360 Sävedalen
Phone: +46 406808160
info@beckhoff.se
www.beckhoff.se

Sales office Piteå
Beckhoff Automation AB
94141 Piteå
Phone: +46 406808160
info@beckhoff.se
www.beckhoff.se

Sales office Stockholm
Beckhoff Automation AB
16250 Vällingby
Phone: +46 406808160
info@beckhoff.se
www.beckhoff.se

Switzerland
Headquarters
Beckhoff Automation AG
Rheinweg 7
8200 Schaffhausen
Phone: +41 526334040
info@beckhoff.ch
www.beckhoff.ch

Sales office Arbon
Beckhoff Automation AG
9320 Arbon
Phone: +41 714401141
info@beckhoff.ch
www.beckhoff.ch

Sales office Losone
Beckhoff Automation AG
6616 Losone
Phone: +41 917922440
ticino@beckhoff.ch
www.beckhoff.ch

Sales office Lyssach
Beckhoff Automation AG
3421 Lyssach
Phone: +41 344474480
info@beckhoff.ch
www.beckhoff.ch

Sales office Yverdon-les-Bains
Beckhoff Automation AG
1400 Yverdon-les-Bains
Phone: +41 244472700
yverdon@beckhoff.ch
www.beckhoff.ch

Sales office Zürich
Beckhoff Automation AG
8052 Zürich
Phone: +41 526334040
info@beckhoff.ch
www.beckhoff.ch

Turkey, Azerbaijan
Headquarters
Beckhoff Otomasyon Ltd. Şti.
Gardenya-3 Plaza No: 18-19-20
34758 Istanbul
Phone: +90 2165809830
info@beckhoff.com.tr
www.beckhoff.com.tr

Sales office Ankara
Beckhoff Otomasyon Ltd. Şti.
06378 Ankara
Phone: +90 3123940346
info@beckhoff.com.tr
www.beckhoff.com.tr

Sales office Bursa
Beckhoff Otomasyon Ltd. Şti.
16110 Bursa
Phone: +90 2245010017
info@beckhoff.com.tr
www.beckhoff.com.tr

Sales office İzmir
Beckhoff Otomasyon Ltd. Şti.
35530 İzmir
Phone: +90 2324860350
info@beckhoff.com.tr
www.beckhoff.com.tr

United Kingdom, Ireland
Headquarters
Beckhoff Automation Ltd.
Station Road
Henley-on-Thames RG9 1AZ
Phone: +44 1491410539
info@beckhoff.co.uk
www.beckhoff.co.uk

Sales office Glasgow
Beckhoff Automation Ltd.
Glasgow G75 0QD
Phone: +44 1418471411
scotland@beckhoff.com
www.beckhoff.co.uk

Sales office Huntingdon
Beckhoff Automation Ltd.
Huntingdon PE29 6UA
Phone: +44 1491410539
info@beckhoff.co.uk
www.beckhoff.co.uk

North America

Canada
Headquarters
Beckhoff Automation Ltd.
2900 Argentia Road
Mississauga ON L5N 7X9
Phone: +1 2896271900
canada@beckhoff.com
www.beckhoff.ca

Sales office London
Beckhoff Automation Ltd.
London ON
Phone: +1 5194947262
canada@beckhoff.com
www.beckhoff.ca

Sales office Montreal
Beckhoff Automation Ltd.
Laval QC
Phone: +1 5149223282
canada@beckhoff.com
www.beckhoff.ca

Sales office Toronto
Beckhoff Automation Ltd.
Toronto ON
Phone: +1 9054664371
canada@beckhoff.com
www.beckhoff.ca

Sales office Vancouver
Beckhoff Automation Ltd.
Surrey BC
Phone: +1 6043584782
canada@beckhoff.com
www.beckhoff.ca

Mexico
Distributor
Integra Automation, SA de CV
Av. Industrias 1482
San Luis Potosí
Phone: +52 4448222615
mexico@beckhoff.com
www.integra-automation.com

United States of America
Headquarters
Beckhoff Automation LLC
13130 Dakota Avenue
55378 Savage MN
Phone: +1 9528900000
beckhoff.usa@beckhoff.com
www.beckhoffautomation.com

Sales office Atlanta
Beckhoff Automation LLC
Atlanta GA
Phone: +1 7704038868
georgia.sales@beckhoff.com
www.beckhoffautomation.com

Sales office Austin
Beckhoff Automation LLC
Austin TX
Phone: +1 5122509809
southwest.sales@beckhoff.com
www.beckhoffautomation.com

Sales office Baltimore
Beckhoff Automation LLC
Havre de Grace MD
Phone: +1 4109379638
northeast.sales@beckhoff.com
www.beckhoffautomation.com

Sales office Boston
Beckhoff Automation LLC
Boston MA
Phone: +1 5087767167
newengland@beckhoff.com
www.beckhoffautomation.com

Sales office Charlotte
Beckhoff Automation LLC
Charlotte NC
Phone: +1 7049104367
southeast.usa@beckhoff.com
www.beckhoffautomation.com

Sales office Chicago
Beckhoff Automation LLC
Woodridge IL
Phone: +1 6306318467
midwest.usa@beckhoff.com
www.beckhoffautomation.com

Sales office Cincinetti
Beckhoff Automation LLC
Mason OH
Phone: +1 5132045861
ohio.sales@beckhoff.com
www.beckhoffautomation.com

Sales office Dallas
Beckhoff Automation LLC
Plano TX
Phone: +1 9725332585
southwest.sales@beckhoff.com
www.beckhoffautomation.com

Sales office Denver
Beckhoff Automation LLC
Denver CO
Phone: +1 3034290758
mountain.sales@beckhoff.com
www.beckhoffautomation.com

Sales office Detroit
Beckhoff Automation LLC
Detroit MI
Phone: +1 2488285310
michigan@beckhoff.com
www.beckhoffautomation.com

Sales office Fond du Lac
Beckhoff Automation LLC
Fond du Lac WI
Phone: +1 9202512777
wisconsin@beckhoff.com
www.beckhoffautomation.com

Sales office Houston
Beckhoff Automation LLC
Houston TX
Phone: +1 8326104034
southwest.sales@beckhoff.com
www.beckhoffautomation.com

Sales office Los Angeles
Beckhoff Automation LLC
Los Angeles CA
Phone: +1 3109250006
losangeles@beckhoff.com
www.beckhoffautomation.com

Sales office Mechanicsburg
Beckhoff Automation LLC
Mechanicsburg PA
Phone: +1 8886160859
northeast.sales@beckhoff.com
www.beckhoffautomation.com

Sales office Milwaukee
Beckhoff Automation LLC
Milwaukee WI
Phone: +1 4146402112
wisconsin@beckhoff.com
www.beckhoffautomation.com

Sales office Nashville
Beckhoff Automation LLC
Nashville TN
Phone: +1 9315103629
tennessee.sales@beckhoff.com
www.beckhoffautomation.com

Sales office Phoenix
Beckhoff Automation LLC
Phoenix AZ
Phone: +1 3858311520
arizona@beckhoff.com
www.beckhoffautomation.com

Sales office Raleigh
Beckhoff Automation LLC
Raleigh NC
Phone: +1 9524287350
southeast.sales@beckhoff.com
www.beckhoffautomation.com

Sales office Rochester
Beckhoff Automation LLC
Rochester NY
Phone: +1 5855455696
ny.sales@beckhoff.com
www.beckhoffautomation.com

Sales office Rogers
Beckhoff Automation LLC
Rogers AR
Phone: +1 9522123343
south.usa@beckhoff.com
www.beckhoffautomation.com

Sales office San Diego
Beckhoff Automation LLC
Carlsbad CA
Phone: +1 7605049780
sandiego@beckhoff.com
www.beckhoffautomation.com

Sales office San Francisco
Beckhoff Automation LLC
San Francisco CA
Phone: +1 4084790185
norcal@beckhoff.com
www.beckhoffautomation.com

Sales office San Jose
Beckhoff Automation LLC
San Jose CA
Phone: +1 8778946228
norcal@beckhoff.com
www.beckhoffautomation.com

Sales office Seattle
Beckhoff Automation LLC
Mill Creek WA
Phone: +1 4254514444
northwest.sales@beckhoff.com
www.beckhoffautomation.com

Sales office Tiffin
Beckhoff Automation LLC
Tiffin OH
Phone: +1 4193575112
ohio.sales@beckhoff.com
www.beckhoffautomation.com

South America

Argentina
Distributor
eFALCOM
Alcorta 2411
Moreno
Phone: +54 2374631151
info@efalcom.com
www.efalcom.com

Brazil
Headquarters
Beckhoff Automação Industrial Ltda.
Rua Caminho do Pilar, 1362
Santo André
Phone: +55 1141263232
info@beckhoff.com.br
www.beckhoff.com.br

Sales office Campinas
Beckhoff Automação Industrial Ltda.
Campinas
Phone: +55 1141263232
info@beckhoff.com.br
www.beckhoff.com.br

Sales office Joinville
Beckhoff Automação Industrial Ltda.
Joinville
Phone: +55 4734390908
info@beckhoff.com.br
www.beckhoff.com.br

Sales office Novo Hamburgo
Beckhoff Automação Industrial Ltda.
Novo Hamburgo
Phone: +55 5130356233
info@beckhoff.com.br
www.beckhoff.com.br

Chile
Distributor
ELECDRIVE S.A.
Avenida Americo Vespucio 2680
Conchalí
Phone: +562 26226472
elecdrive@elecdrive.cl
www.elecdrive.cl

Colombia
Distributor
SENTRONIC S.A.S.
Calle 112 70-B-18
Bogotá
Phone: +57 15334323
sensores@sentronic.com.co
www.sentronic.com.co

Ecuador
Distributor
TCS Industrial
Pasaje A y Carlos Dousdebes
sector Tanda
EC170157 Quito
Phone: +593 22889040
ingenieria@tcsindustrial.com
www.tcsindustrial.com

Peru
Distributor
TECHPRO S.A.C.
Jr. Contralmirante Montero
(Alberto del Campo) N°414
Lima
Phone: +51 989435854
techpro.peru@techprocorp.net
www.techprocorp.net

Uruguay
Distributor
Comando Ltda.
Dr. J. de Salterain 1142
11200 Montevideo
Phone: +598 24007923
comando@comandonet.com
www.comandonet.com

Africa

Egypt
Representative office
Beckhoff Automation Contact
11/6 Said Zakaria Street
11471 Cairo
Phone: +20 1009156261
egypt@beckhoff.com
www.beckhoff.com

South Africa, Sub-Saharan
Headquarters
Beckhoff Automation (Pty) Ltd
7 Ateljee Street
2169 Gauteng
Phone: +27 117952898
info@beckhoff.co.za
www.beckhoff.co.za

Sales office Cape Town
Beckhoff Automation (Pty) Ltd
Cape Town
Phone: +27 117952898
info@beckhoff.co.za
www.beckhoff.co.za

Sales office Durban
Beckhoff Automation (Pty) Ltd
Durban
Phone: +27 117952898
info@beckhoff.co.za
www.beckhoff.co.za

Sales office Port Elizabeth
Beckhoff Automation (Pty) Ltd
Port Elizabeth
Phone: +27 117952898
info@beckhoff.co.za
www.beckhoff.co.za

Asia

China
Headquarters
Beckhoff Automation
(Shanghai) Co., Ltd.
No. 163 JiangChang San Road
200436 Shanghai
Phone: +86 2166312666
info@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Beijing
Beckhoff Automation
(Shanghai) Co., Ltd.
Beijing
Phone: +86 1082200036
beijing@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Changsha
Beckhoff Automation
(Shanghai) Co., Ltd.
Changsha
Phone: +86 73189608950
changsha@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Chengdu
Beckhoff Automation
(Shanghai) Co., Ltd.
Chengdu
Phone: +86 2886202581
chengdu@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Chongqing
Beckhoff Automation
(Shanghai) Co., Ltd.
Chongqing
Phone: +86 2367398175
chongqing@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Guangzhou
Beckhoff Automation
(Shanghai) Co., Ltd.
Guangzhou
Phone: +86 2038010300
guangzhou@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Hangzhou
Beckhoff Automation
(Shanghai) Co., Ltd.
Hangzhou
Phone: +86 57187652786
hangzhou@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Hefei
Beckhoff Automation
(Shanghai) Co., Ltd.
Hefei
Phone: +86 55165543513
hefei@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Jinan
Beckhoff Automation
(Shanghai) Co., Ltd.
Jinan
Phone: +86 53167897552
jinan@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Kunming
Beckhoff Automation
(Shanghai) Co., Ltd.
Kunming
Phone: +86 87163550636
kunming@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Nanjing
Beckhoff Automation
(Shanghai) Co., Ltd.
Nanjing
Phone: +86 2585862271
nanjing@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Ningbo
Beckhoff Automation
(Shanghai) Co., Ltd.
Ningbo
Phone: +86 57487203335
ningbo@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Qingdao
Beckhoff Automation
(Shanghai) Co., Ltd.
Qingdao
Phone: +86 53282842199
qingdao@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Shenyang
Beckhoff Automation
(Shanghai) Co., Ltd.
Shenyang
Phone: +86 2422788896
shenyang@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Shenzhen
Beckhoff Automation
(Shanghai) Co., Ltd.
Shenzhen
Phone: +86 75523603232
shenzhen@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Suzhou
Beckhoff Automation
(Shanghai) Co., Ltd.
Suzhou
Phone: +86 51262852207
suzhou@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Tianjin
Beckhoff Automation
(Shanghai) Co., Ltd.
Tianjin
Phone: +86 2258291112
tianjin@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Wuhan
Beckhoff Automation
(Shanghai) Co., Ltd.
Wuhan
Phone: +86 2787711992
wuhan@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Wuxi
Beckhoff Automation
(Shanghai) Co., Ltd.
Wuxi
Phone: +86 51085819306
wuxi@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Xi'an
Beckhoff Automation
(Shanghai) Co., Ltd.
Xi'an
Phone: +86 2988499908
xian@beckhoff.com.cn
www.beckhoff.com.cn

Sales office Zhengzhou
Beckhoff Automation
(Shanghai) Co., Ltd.
Zhengzhou
Phone: +86 37161732582
zhengzhou@beckhoff.com.cn
www.beckhoff.com.cn

India
Headquarters
Beckhoff Automation Pvt. Ltd.
Suyog Platinum Tower
Naylor Road, Sangamvadi
411001 Pune
Phone: +91 2040004800
info@beckhoff.co.in
www.beckhoff.co.in

Sales office Ahmedabad
Beckhoff Automation Pvt. Ltd.
380015 Ahmedabad
Phone: +91 7940084800
info@beckhoff.co.in
www.beckhoff.co.in

Sales office Bangalore
Beckhoff Automation Pvt. Ltd.
560004 Bangalore
Phone: +91 8040824800
info@beckhoff.co.in
www.beckhoff.co.in

Sales office Chennai
Beckhoff Automation Pvt. Ltd.
600042 Chennai
info@beckhoff.co.in
www.beckhoff.co.in

Sales office Coimbatore
Beckhoff Automation Pvt. Ltd.
641009 Coimbatore
Phone: +91 4224508499
info@beckhoff.co.in
www.beckhoff.co.in

Sales office New Delhi
Beckhoff Automation Pvt. Ltd.
201301 New Delhi
info@beckhoff.co.in
www.beckhoff.co.in

Sales office Thane
Beckhoff Automation Pvt. Ltd.
400604 Thane
Phone: +91 2249718200
info@beckhoff.co.in
www.beckhoff.co.in

Indonesia
Representative office
Beckhoff Automation Pte. Ltd.
The Vida Office Tower
Jl. Raya Perjuangan No. 8, Rt.01/Rw.07
11530 Jakarta
Phone: + 62 2129661363
sales@beckhoff.co.id
www.beckhoff.co.id

Israel
Headquarters
Beckhoff Automation Ltd.
Beit Golan
Golan St.
7010000 Lod
Phone: +972 37764445
info@beckhoff.co.il
www.beckhoff.co.il

Japan
Headquarters
Beckhoff Automation K.K.
Nisseki Yokohama Building
1-1-8 Sakuragicho, Naka-ku
2310062 Yokohama
Phone: +81 456501612
info@beckhoff.co.jp
www.beckhoff.co.jp

Sales office Nagoya
Beckhoff Automation K.K.
4536123 Nagoya
Phone: +81 524332256
info@beckhoff.co.jp
www.beckhoff.co.jp

Lebanon, Jordan, Syria
Distributor
Industrial Technologies (itec) S.A.L.
Blvd Fouad Chehab
Beirut
Phone: +961 1491161
info@iteclb.com
www.iteclb.com

Malaysia, Brunei
Headquarters
Beckhoff Automation Sdn. Bhd.
(889044-H)
Surian Tower
No. 1 Jalan PJU 7/3
47810 Petaling Jaya
Phone: +60 377318388
info@beckhoff.com.my
www.beckhoff.com.my

Sales office Kuching
Beckhoff Automation Sdn. Bhd.
(889044-H)
93450 Kuching
Phone: +60 377318388
info@beckhoff.com.my
www.beckhoff.com.my

Sales office Penang
Beckhoff Automation Sdn. Bhd.
(889044-H)
11950 Penang
Phone: +60 46460388
info@beckhoff.com.my
www.beckhoff.com.my

Singapore, Philippines, Vietnam
Headquarters
Beckhoff Automation Pte. Ltd.
#05-07/08 Nordic European Centre
609927 Singapore
Phone: +65 66976220
info@beckhoff.com.sg
www.beckhoff.com.sg

South Korea
Distributor
Tri-TEK Corp.
115 Gasan Digital2Ro
153772 Seoul
Phone: +82 221073242
info@tritek.co.kr
www.tritek.co.kr

Sri Lanka
Distributor
Techmast Automation (Pvt) Ltd
312A, Kandy Road
Kadawatha
Phone: +94 112929999
techmast@sltnet.lk
www.techmast-automation.com

Taiwan
Headquarters
Beckhoff Automation Co., Ltd.
Xitun District
No. 213 Chaofu Road
40757 Taichung
Phone: +886 422529900
info@beckhoff.com.tw
www.beckhoff.com.tw

Distributor
JI-DIEN Co., Ltd.
No. 312, Sec. 2, New Taipei Blvd.
24250 New Taipei City
Phone: +886 285223237
jidien-taipei@jidien.com
www.jidien.com

Thailand, Cambodia, Laos, Myanmar
Representative office
Beckhoff Automation Pte. Ltd.
SJ Infinite One
349 Vibhavadi Rangsit Road
10900 Bangkok
Phone: +66 021174900
sales@beckhoff.co.th
www.beckhoff.co.th

United Arab Emirates, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia
Headquarters
Beckhoff Automation FZE
C# 608, Dubai Silicon Oasis
P.O. Box No. 341007
Dubai
Phone: +971 45015480
info@beckhoff.ae
www.beckhoff.ae

Australia and Oceania

Australia, Melanesia
Headquarters
Beckhoff Automation Pty. Ltd.
23 Edward Street
3166 Oakleigh
Phone: +61 399125430
info@beckhoff.com.au
www.beckhoff.com.au

Sales office Sydney
Beckhoff Automation Pty. Ltd.
2113 North Ryde
Phone: +61 280692333
info@beckhoff.com.au
www.beckhoff.com.au

New Zealand, Fiji, Polynesia
Headquarters
Beckhoff Automation Limited
59 Apollo Drive
0632 Auckland
Phone: +64 92812736
info@beckhoff.co.nz
www.beckhoff.co.nz

Highlights

- Designed for machine-oriented use
- Long-term availability of components
- Developed in accordance with the requirements of automation technology
- Appealing industrial design housings

Industrial PC

PC Control for all applications

▸ **www.beckhoff.com/IPC**

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(Industrial PCs with display)

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Industrial PCs

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166 Built-in Control Panels CP69xx
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172 Accessories

Product overview Industrial PC

Industrial PCs

	Compact motherboard Intel® Core™	Compact motherboard Intel® Atom™	3½-inch motherboard Intel® Core™	3½-inch motherboard Intel® Atom™/ Celeron® ULV	3½-inch motherboard ARM Cortex™-A8	ATX motherboard Intel® Core™	Control Panel
Multi-touch Panel PCs/Control Panels			CP22xx 34 CP32xx 46	CP27xx 42 CPX27xx 43 CP37xx 50 CPX37xx 51	CP26xx 38		CP29xx 150 CPX29xx 152 CP39xx 154 CPX39xx 153
Single-touch Panel PCs/Control Panels		CP77xx 80	CP62xx 54 CP72xx 76	CP67xx 70	CP66xx 64	CP65xx 60 C36xx 84	CP69xx 166 CP79xx 170
19-inch slide-in Industrial PCs			C5210 90			C5240 91	
Control cabinet Industrial PCs	C6030 96	C6015 94 C6017 95	C6920 122 C6930 125 C6515 108 C6525 110	C6905 120 C6915 121 C6925 124		C6140 100 C6150 101 C6240 104 C6250 105 C6640 114 C6650 115	

Control cabinet industrial server

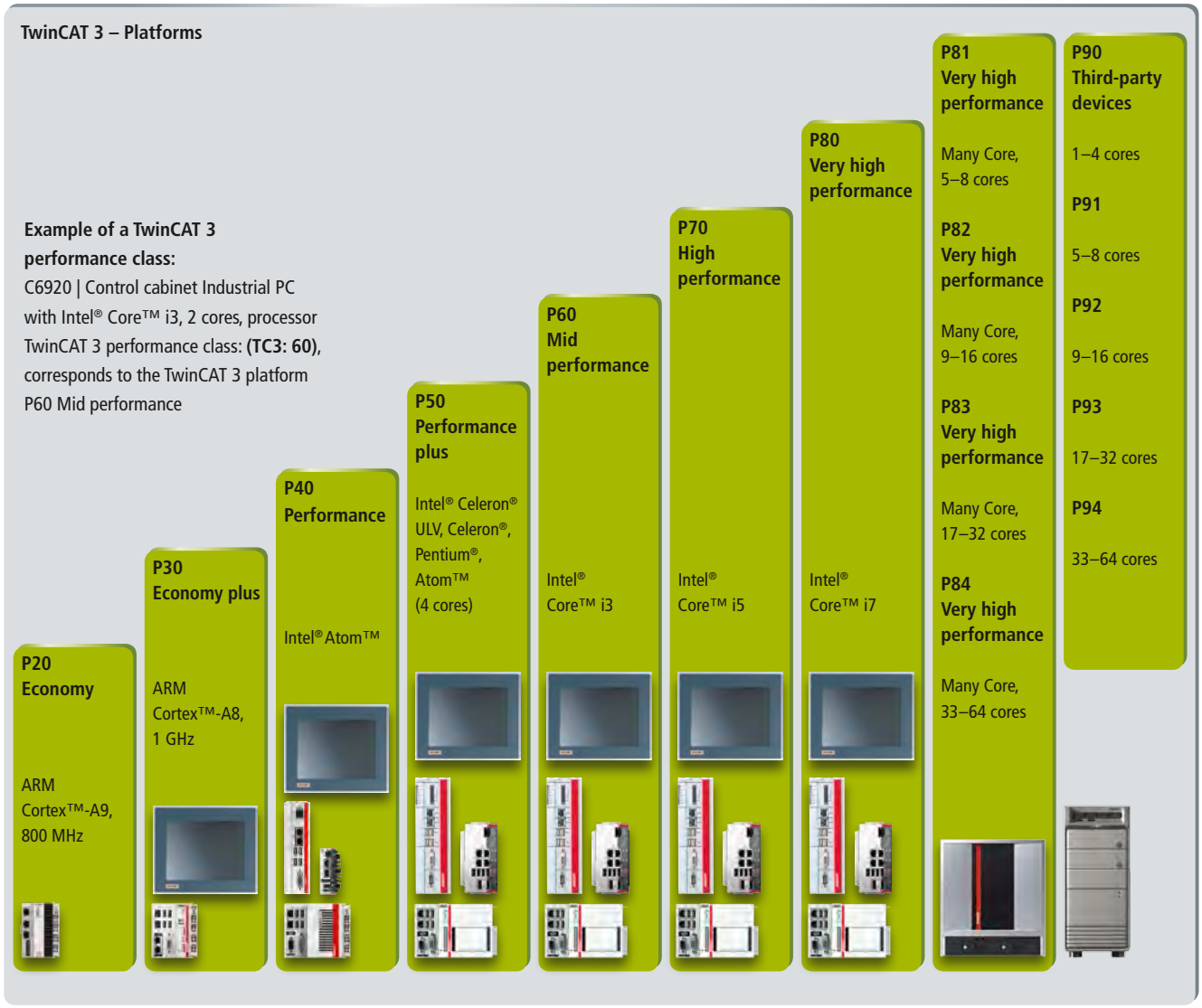
	SSI EEB motherboard 2 x Intel® Xeon®
C6670	117

We reserve the right to make technical changes.

Product overview TwinCAT 3

The TwinCAT 3 runtime components are available for different platforms. The platform levels correspond to the various TwinCAT 3 performance classes of the Beckhoff PCs. The TwinCAT 3 performance class of a Beckhoff PC depends on the configuration and the technical data of the PC (including the processor).

The following overview shows the various TwinCAT 3 platforms. The controllers integrated in the platform classifications represent sample configurations. The TwinCAT 3 performance class required for a TwinCAT 3 Runtime component can be found in the product description of the respective Beckhoff PC.



The controllers integrated in the platform categorisation are only example configurations.

For further information on TwinCAT 3 see page 470 or ▶ **www.beckhoff.com/TwinCAT3**

Product overview multi-touch Panel PCs

CP22xx

CP26xx

CP27xx

CP32xx

CP37xx

Multi-touch built-in Panel PCs, front side IP 65

	Display Resolution Format	7-inch 800 x 480 5:3	12-inch 800 x 600 4:3	12.1-inch 1280 x 800 16:9	15-inch 1024 x 768 4:3	15.6-inch 1366 x 768 16:9	18.5-inch 1366 x 768 16:9	19-inch 1280 x 1024 5:4	21.5-inch 1920 x 1080 16:9	24-inch 1920 x 1080 16:9	
CP22xx – up to Intel® Core™ i3/i5/i7	multi-finger touch screen		**CP2212**		**CP2215**	**CP2216**	**CP2218**	**CP2219**	**CP2221**	**CP2224**	34
CP26xx – ARM Cortex™-A8	dual-finger touch screen	**CP2607**	**CP2612**	**CP2613**	**CP2615**	**CP2616**	**CP2618**	**CP2619**	**CP2621**	**CP2624**	38
CP27xx – Intel® Celeron™ ULV or Atom™	multi-finger touch screen, only horizontal		**CP2712**	**CP2713**	**CP2715** **CPX2715**	**CP2716**	**CP2718**	**CP2719** **CPX2719**	**CP2721** **CPX2721**	**CP2724**	42 43

Multi-touch Panel PCs, all sides IP 65

	Display Resolution Format	7-inch 800 x 480 5:3	12-inch 800 x 600 4:3	12.1-inch 1280 x 800 16:9	15-inch 1024 x 768 4:3	15.6-inch 1366 x 768 16:9	18.5-inch 1366 x 768 16:9	19-inch 1280 x 1024 5:4	21.5-inch 1920 x 1080 16:9	24-inch 1920 x 1080 16:9	
CP32xx – up to Intel® Core™ i3/i5/i7	multi-finger touch screen, only horizontal		**CP3212**		**CP3215**	**CP3216**	**CP3218**	**CP3219**	**CP3221**	**CP3224**	46
CP37xx – Intel® Atom™	multi-finger touch screen, only horizontal		**CP3712**	**CP3713**	**CP3715** **CPX3715**	**CP3716**	**CP3718**	**CP3719** **CPX3719**	**CP3721** **CPX3721**	**CP3724**	50 51

We reserve the right to make technical changes.

Product overview multi-touch Control Panels

CP29xx

CP39xx

Multi-touch built-in Control Panels, front side IP 65

	Display Resolution Format	7-inch 800 x 480 5:3	12-inch 800 x 600 4:3	12.1-inch 1280 x 800 16:9	15-inch 1024 x 768 4:3	15.6-inch 1366 x 768 16:9	18.5-inch 1366 x 768 16:9	19-inch 1280 x 1024 5:4	21.5-inch 1920 x 1080 16:9	24-inch 1920 x 1080 16:9	
CP29xx-0000 – DVI/USB Extended interface*	multi-finger touch screen	CP2907-0000	CP2912-0000	CP2913-0000	CP2915-0000 CPX2915-0000	CP2916-0000	CP2918-0000	CP2919-0000 CPX2919-0000	CP2921-0000 CPX2921-0000	CP2924-0000	150 152
CP29xx-0010 – CP-Link 4*	multi-finger touch screen	CP2907-0010	CP2912-0010	CP2913-0010	CP2915-0010	CP2916-0010	CP2918-0010	CP2919-0010	CP2921-0010	CP2924-0010	150

Multi-touch Control Panels, all sides IP 65

	Display Resolution Format	7-inch 800 x 480 5:3	12-inch 800 x 600 4:3	12.1-inch 1280 x 800 16:9	15-inch 1024 x 768 4:3	15.6-inch 1366 x 768 16:9	18.5-inch 1366 x 768 16:9	19-inch 1280 x 1024 5:4	21.5-inch 1920 x 1080 16:9	24-inch 1920 x 1080 16:9	
CP39xx-0000 – DVI/USB Extended interface*	multi-finger touch screen	CP3907-0000	CP3912-0000	CP3913-0000	CP3915-0000	CP3916-0000	CP3918-0000	CP3919-0000	CP3921-0000	CP3924-0000	154
CP39xx-0010 – CP-Link 4*	multi-finger touch screen	CP3907-0010	CP3912-0010	CP3913-0010	CP3915-0010 CPX3915-0010	CP3916-0010	CP3918-0010	CP3919-0010 CPX3919-0010	CP3921-0010 CPX3921-0010	CP3924-0010	154 153

*For further information on CP-Link 4 see page 147, for further information on DVI/USB Extended see page 164

Product overview single-touch panels

CP62xx

CP65xx

CP66xx

CP67xx

C36xx

Single-touch built-in Panel PCs, front side IP 54/65

	Display	5.7-inch	6.5-inch	7-inch	10.1-inch	12-inch	15-inch	19-inch	
	Resolution	640 x 480	640 x 480	800 x 480	1024 x 600	800 x 600	1024 x 768	1280 x 1024	
	Format	4:3	4:3	5:3	17:10	4:3	4:3	5:4	
	Protect. class front	IP 65	IP 65	IP 54	IP 54	IP 65	IP 65	IP 65	
CP62xx	without keys					**CP6201**	**CP6202**	**CP6203**	54
– 3½-inch motherboard	function keys					**CP6211**	**CP6212**	**CP6213**	
– up to Intel® Core™ i3/i5/i7	numerical					**CP6221**	**CP6222**	**CP6223**	
	alphanumerical					**CP6231**	**CP6232**	**CP6233**	
							CP6242		
CP65xx	without keys					**CP6501**	**CP6502**	**CP6503**	60
– ATX motherboard	function keys					**CP6511**	**CP6512**	**CP6513**	
– up to Intel® Core™ i3/i5/i7	numerical					**CP6521**	**CP6522**	**CP6523**	
– 7 slots free	alphanumerical					**CP6531**	**CP6532**	**CP6533**	
							CP6542		
CP66xx	without keys	**CP6607**	**CP6609**			**CP6601**	**CP6602**	**CP6603**	64
– 3½-inch motherboard	function keys		**CP6619**			**CP6611**	**CP6612**	**CP6613**	
– ARM Cortex™-A8	numerical		**CP6629**			**CP6621**	**CP6622**	**CP6623**	
	alphanumerical					**CP6631**	**CP6632**	**CP6633**	
CP6606, CP6600 – 3½-inch motherboard – ARM Cortex™-A8	without keys			**CP6606**	**CP6600**				67
CP67xx	without keys	**CP6707**				**CP6701**	**CP6702**	**CP6703**	70
– 3½-inch motherboard	function keys					**CP6711**	**CP6712**	**CP6713**	
– Intel® Celeron™ ULV or Atom™	numerical					**CP6721**	**CP6722**	**CP6723**	
	alphanumerical					**CP6731**	**CP6732**	**CP6733**	
							CP6742		
CP6706, CP6700 – 3½-inch motherboard – Intel® Celeron™ ULV or Atom™	without keys			**CP6706**	**CP6700**				73
C36xx – ATX motherboard – up to Intel® Core™ i3/i5/i7 – 7 slots free	without keys					**C3620**	**C3640**		84

We reserve the right to make technical changes.

Without keys

Function keys

Numeric keyboard

Alphanumeric keyboard

With PLC keys on the sides

CP72xx

CP77xx

CP69xx

CP79xx

CP790x-14xx, stainless steel

Single-touch Panel PCs, all sides IP 65

	Display	5.7-inch	6.5-inch	7-inch	10.1-inch	12-inch	15-inch	19-inch	
	Resolution	640 x 480	640 x 480	800 x 480	1024 x 600	800 x 600	1024 x 768	1280 x 1024	
	Format	4:3	4:3	5:3	17:10	4:3	4:3	5:4	
CP72xx – 3½-inch motherboard – up to Intel® Core™ i3/i5/i7	without keys					CP7201	CP7202	CP7203	76
	function keys					CP7211	CP7212	CP7213	
	numerical					CP7221	CP7222	CP7223	
	alphanumerical					CP7231	CP7232 CP7242	CP7233	
CP77xx – CP motherboard – Intel® Celeron® ULV	without keys					CP7701	CP7702	CP7703	80
	function keys					CP7711	CP7712	CP7713	
	numerical					CP7721	CP7722	CP7723	
	alphanumerical					CP7731	CP7732	CP7733	

Single-touch built-in Control Panels, front side IP 54/65

	Display	5.7-inch	6.5-inch	7-inch	10.1-inch	12-inch	15-inch	19-inch	
	Resolution	640 x 480	640 x 480	800 x 480	1024 x 600	800 x 600	1024 x 768	1280 x 1024	
	Format	4:3	4:3	5:3	17:10	4:3	4:3	5:4	
	Protect. class front	IP 65	IP 65	IP 54	IP 54	IP 65	IP 65	IP 65	
CP69xx – DVI/USB Extended interface*	without keys	CP6907	CP6909	CP6906	CP6900	CP6901	CP6902	CP6903	166
	function keys		CP6919			CP6911	CP6912	CP6913	
	numerical		CP6929			CP6921	CP6922	CP6923	
	alphanumerical					CP6931	CP6932 CP6942	CP6933	

Single-touch Control Panels, all sides IP 65

	Display	5.7-inch	6.5-inch	7-inch	10.1-inch	12-inch	15-inch	19-inch	
	Resolution	640 x 480	640 x 480	800 x 480	1024 x 600	800 x 600	1024 x 768	1280 x 1024	
	Format	4:3	4:3	5:3	17:10	4:3	4:3	5:4	
CP79xx – DVI/USB Extended interface*	without keys		CP7909			CP7901	CP7902	CP7903	170
	function keys		CP7919			CP7911	CP7912	CP7913	
	numerical		CP7929			CP7921	CP7922	CP7923	
	alphanumerical					CP7931	CP7932 CP7942	CP7933	
CP79xx-14xx – DVI/USB Extended interface*	without keys, stainless steel housing					CP7901-14xx	CP7902-14xx	CP7903-14xx	170

*For further information on DVI/USB Extended see page 164

Product overview control cabinet Industrial PCs

C5210

C65x5
basic configuration

C65x5
with PCIe module slots

C6525
with plug-in card slots

C69xx

C69x0
with plug-in card slots

C60xx

Control cabinet Industrial PCs with 3½-inch motherboard

	Processor	Intel® Atom™	Intel® Celeron® ULV	Intel® Celeron®, Intel® Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Intel® Core™ i3/i5/i7 6th/7th Generation	
C5210, 19-inch slide-in Industrial PCs	1 rack unit			**C5210-0020**	**C5210-0030**	90
C65xx	fanless			**C6515-0050**	**C6515-0060**	108
	RAID			**C6525-0050**	**C6525-0060**	110
C69xx, compact Industrial PCs, connectors on front	fanless	**C6905-0010**				120
	fanless, 1 CFast card slot	**C6915-0010**				121
	fanless, 2 PCIe module slots	**C6925-0030**	**C6925-0020**			124
	optional plug-in card slots			**C6920-0050**	**C6920-0060**	122
	2 PCIe module slots, optional plug-in card slots			**C6930-0050**	**C6930-0060**	125

Ultra-compact control cabinet Industrial PCs with compact industrial motherboard

	Processor	Intel® Atom™	Intel® Celeron®, Intel® Pentium®, Intel® Core™ i3/i5/i7 6th/7th Generation	
C60xx, ultra-compact Industrial PCs	fanless, without slots	**C6015-0010**		94
	optional interfaces and/or an optional 1-second UPS	**C6017-0010**		95
	up to 2 M.2 SSDs		**C6030-0060**	96

Embedded PCs see page 184

We reserve the right to make technical changes.

C5240

C6140

C6150

C6240

C6250

C6640

C6650

C6670

Control cabinet Industrial PCs with ATX motherboard

	Processor	Intel® Pentium®, Intel® Core™ i3/i5/i7 4th Generation	Intel® Pentium®, Intel® Core™ i3/i5/i7 6th/7th Generation	
C5240, 19-inch slide-in Industrial PCs	7 slots, 4 rack units	**C5240-0000**	**C5240-0010**	91
C61xx, connectors on top	7 slots	**C6140-0060** **C6150-0060**	**C6140-0070** **C6150-0070**	100 101
C62xx, connectors on front	7 slots	**C6240-0060** **C6250-0070**	**C6240-0070** **C6250-0080**	104 105
C6640/C6650, connectors on top	7 slots	**C6640-0040**	**C6640-0050**	114
	7 slots, 2 removable frames	**C6650-0040**	**C6650-0050**	115

Control cabinet industrial server with SSI EEB motherboard

	Processor	2 x Intel® Xeon®	2 x Intel® Xeon® Scalable	
C6670	6 slots, 2 removable frames	**C6670-0000**	**C6670-0010**	117

The right Industrial PC for every application

Panel PCs

A Beckhoff Panel PC consisting of a Control Panel and an Industrial PC is suitable for control cabinet installation (CP2xxx, CP6xxx) or mounting arm installation (CP3xxx, CP7xxx). High-performance components make machine-level operation, control and monitoring one of the strengths of the Beckhoff Panel PCs, whose elegant housings are designed for easy accessibility of all components and optimal space utilisation. Different display sizes between 5.7-inch and 24-inch and various add-on PCs with processors ranging from Intel® Atom™ to Core™ i7 can be combined to form tailored high-performance platforms for machine construction and plant engineering applications.

See page 30

▶ www.beckhoff.com/Panel-PC

Control cabinet Industrial PCs

Beckhoff Industrial PCs for control cabinet installation can be scaled in size (bus coupler format up to ATX PC) and performance class (Intel® Atom™ to Core™ i7), depending on the application. The Industrial PC technology represents a balance between the latest PC technology and long-term component availability. In addition, the different product lines are characterised by adaptation to the special circumstances in industrial applications.

See page 86

▶ www.beckhoff.com/Control-cabinet-PC

We reserve the right to make technical changes.

Control Panels

The Beckhoff Control Panels used as human-machine interfaces in conjunction with the high-performance Industrial PCs round off a system through their elegant design and the latest PC technology. The display sizes between 5.7-inch and 24-inch meet almost any industrial application requirements and are suitable for mounting arm installation (CP3xxx and CP7xxx) or wall installation (CP2xxx and CP6xxx). A wide range of different push-button extensions in conjunction with custom housing designs enable the Control Panel as the visual front end of a system or machine to be tailored to match the corporate identity.

See page 142

▶ **www.beckhoff.com/ControlPanel**

Accessories

Beckhoff accessories complement the Industrial PCs while complying with industrial standards: CP-Link 3 desktop transfer software, DVI splitters, USB extensions and hubs, USB CFast slot, USB Ethernet controllers, battery packs, USB sticks, PCIe modules, plug-in cards.

Industrial PC accessories see page 127

Extensions for Control Panels and Panel PCs: push-button extensions (with electromechanical buttons, switches and indicator lamps), auxiliary keyboards, keyboard shelves, touch screen pens, RFID readers

Multi-touch Control Panel accessories see page 156
Single-touch Control Panel accessories see page 172

▶ **www.beckhoff.com/IPC-accessories**

Requirements for PC-based control technology

Balance between latest PC technology and long-term availability of control components

The personal computer has experienced an unprecedented success story and has become a firmly established part of everyday life, including industrial environments. Together with associated software, PCs in different shapes and forms are at the core of a wide range of diverse automation tasks such as control of machines, processes or logistics systems, networking of system components, data acquisition, or image processing. For classic control tasks, PC-based control technology offers excellent scalability and flexibility and is therefore increasingly used in place of hardware PLCs.

Beckhoff is one of the pioneers of PC-based automation: the first PC control system was delivered as early as 1986. Beckhoff Industrial PCs are characterised by a wealth of technology know-how accumulated over recent years. In combination with the TwinCAT automation software, they offer a high-performance control system for PLC, NC and CNC functionalities.

An important feature of the Beckhoff product philosophy is the use of advanced, high-performance components and processors for the development and design of Industrial PCs: they integrate the latest developments offered by the technology market and are used successfully worldwide. Fine scaling is provided for through processor incrementing from Intel® Atom™ and Intel® Core™ i7 to Intel® Xeon®. Due to the low processor power dissipation, Intel® Atom™ processors enable extremely small, fanless controllers and are to be found in the lower price range.

In addition to long-standing experience, another factor driving the development of our comprehensive IPC product portfolio is customer-orientation. More than ten Industrial PC series with a wide range of basic PC types form the basis of our product range. The optimally tailored control computer can be found for every application from the large choice of devices and options.

The PC housing varies in size between Bus Coupler format and ATX PC, depending on the device type. In addition to long-term availability of the built-in processors and motherboards, Beckhoff also offers full commissioning of all integrated components, including software and different drives. Customised solutions can also be realised for optimum adaptation to the respective task.

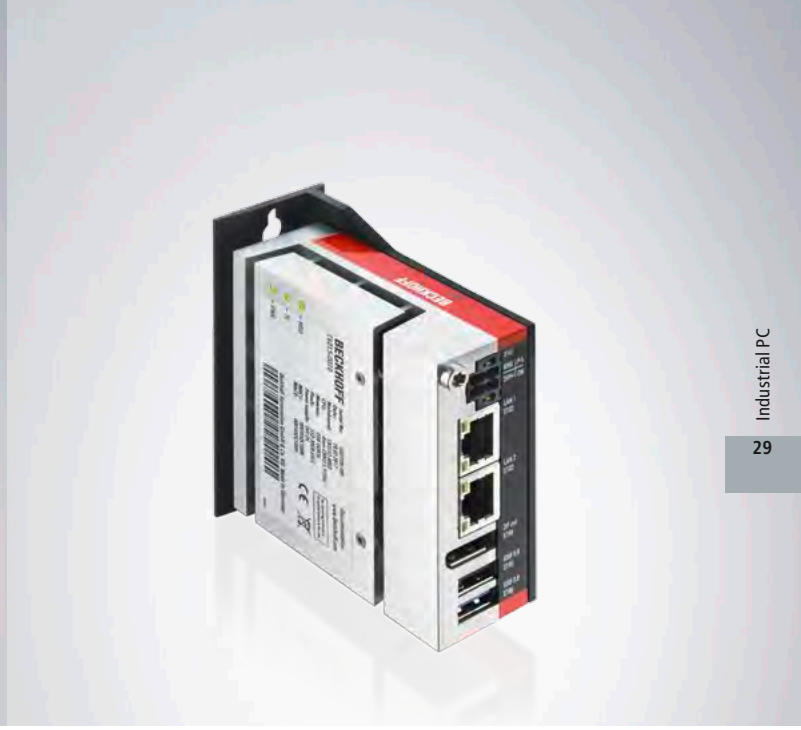
Elegant Control Panels and Panel PCs

The Industrial PC is complemented by a Control Panel for the machine operator. The Beckhoff Control Panels and Panel PCs are the visual front end for machines or plants. Spatial separation of display/control unit and control computer offers maximum flexibility. Appealing design, robustness and suitability for industrial applications were important criteria in the development of the Control Panel series, which comes with display sizes between 5.7" and 24".

All displays can be fully tailored to customer requirements: options include visual adaptation to the corporate design or application of a customer logo a wide range of special mechanical keys, emergency stop switches, card scanners or RFID readers.

The Control Panel housing is made from high-quality solid aluminium and is suitable for protection class IP 65, as usually required in industrial environments. Thorough development and integration of electronic modules, displays, touch screens and front membranes ensure high availability and reliability during operation. All Beckhoff Control Panels can optionally be operated as:

We reserve the right to make technical changes.



- stand-alone device (Panel PC with Windows 7, Embedded Standard 7, Embedded Compact 7 or Windows 10 IoT Enterprise)
- DVI/USB Extended Control Panel for direct or indirect operation at the PC (distance up to 50 m)
- CP-Link 3 (Panel PCs connected to the host PC via Ethernet), see page 140
- CP-Link 4 Control Panel for operation at the PC with a distance of up to 100 m, see page 147

Careful selection of components

A great deal of attention and care is put into the development and choice of the IPC components used, their compatibility, their long-term availability, mechanical loading capacity and industrial suitability. In developing electronic modules, Beckhoff fulfils the high requirements for Industrial PC components that are necessary in order to ensure permanent reliable operation.

Beckhoff is the developer and manufacturer of the motherboards in the Industrial PCs. The BIOS for the motherboards even has its own development department.

In addition to that, 24 V DC power supplies with integrated UPS, Ethernet adapters and Ethernet switches, Fieldbus Cards, DVI display interfaces, DVI/USB extensions and USB hubs are produced by Beckhoff's own development and manufacturing facilities. International standards and experience in the application of PC systems under difficult industrial conditions provide the basis for Beckhoff system integration. Only a few LC displays, plug-in cards or hard disks are suited to use in tough industrial environments. Experience and detailed testing are therefore required for checking whether the components meet the stringent requirements in terms of temperature resistance, resistance to vibration, and electromagnetic compatibility. Prior to delivery, all Industrial PCs are subjected to comprehensive quality control procedures in order to verify that they are fit for the purpose. Beckhoff Industrial PCs satisfy the Machine Guidelines and carry the CE mark: all PC components are checked for electromagnetic compatibility (EMC) and comply with the relevant standards.

Robust industrial design PCs with highest performance components

Beckhoff Industrial PCs satisfy industry's demands:

- the right Industrial PC for every controller
- highest performance PCs with Intel® Atom™ up to Intel® Xeon® processors
- open standards following the norm ATX
- components carefully tested to ensure appropriateness for industrial applications
- appealing industrial design housings
- CPX for use in hazardous areas, Zone 2/22
- easy access to PC components
- Individual housing construction allows optimum adaptation to controller requirements.
- integration of electromechanical buttons, switches, scanners, handwheels and other components in the Control Panel
- designed for machine-oriented use
- long-term availability of components

Panel PCs

▶ www.beckhoff.com/Panel-PC

C36xx | **ATX built-in Panel PC, Intel® Celeron®, Pentium® or Core™**
– display sizes: 12- or 15-inch

See page 82

CP32xx | **Multi-touch Panel PC with mounting arm, Intel® Celeron® or Core™**
– display sizes: 12-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch
– IP 65 protection

See page 44

CP22xx | **Multi-touch built-in Panel PC, Intel® Celeron® or Core™**
– display sizes: 12-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch

See page 32

CP65xx | **ATX built-in Panel PC, Intel® Celeron®, Pentium® or Core™**
– display sizes: 12-, 15- or 19-inch

See page 58

CP72xx | **Panel PC with mounting arm, Intel® Celeron® or Core™**
– display sizes: 12-, 15- or 19-inch
– IP 65 protection

See page 74

CP62xx | **Built-in Panel PC, Intel® Celeron® or Core™**
– display sizes: 12-, 15- or 19-inch

See page 52

We reserve the right to make technical changes.

CP37xx | **Multi-touch Panel PC with mounting arm, Intel® Atom™**
- display sizes: 12-, 12.1-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch
- IP 65 protection
- display sizes CPX37xx: 15-, 19- or 21.5-inch

See page 48

CP27xx | **Multi-touch built-in Panel PC, Intel® Celeron® ULV or Atom™**
- display sizes: 12-, 12.1-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch
- display sizes CPX27xx: 15-, 19- or 21.5-inch

See page 40

CP26xx | **Built-in Panel PC, ARM Cortex™-A8**
- display sizes: 7-, 12-, 12.1-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch

See page 36

CP77xx | **Panel PC with mounting arm, Intel® Celeron® ULV**
- display sizes: 12-, 15- or 19-inch
- IP 65 protection

See page 78

CP67xx | **Built-in Panel PC, Intel® Celeron® ULV or Atom™**
- display sizes: 5.7-, 12-, 15- or 19-inch
- display sizes CP6706: 7-inch; CP6700: 10.1-inch

See page 68

CP66xx | **Built-in Panel PC, ARM Cortex™-A8**
- display sizes: 5.7-, 6.5-, 12-, 15- or 19-inch
- display sizes CP6606: 7-inch; CP6600: 10.1-inch

See page 62

CP22xx | Multi-touch built-in Panel PC

▶ **www.beckhoff.com/CP22xx**

The CP22xx built-in Panel PC series is characterised by a modern operating concept with multi-touch display as well as an advanced, elegant device design. It is designed for installation in the front of a control cabinet. The CP22xx combine reliable Beckhoff Control Panel design with state-of-the-art Industrial PC technology. The right display size is available for every application – in landscape or portrait orientation (horizontal/vertical). With their highly integrated 3½-inch motherboards, the CP22xx built-in Industrial PCs represent a high-performance platform for machine construction and plant engineering applications that can be used in conjunction with TwinCAT automation software under Windows 10 IoT Enterprise.

CP22xx Panel PCs are equipped with Intel® Celeron® or Intel® Core™ i3/i5/i7 processors and have one or two hard disks, SSDs or CFast cards or combinations thereof. With the

We reserve the right to make technical changes.

Display sizes

12-inch | 15-inch | 15.6-inch | 18.5-inch | 19-inch | 21.5-inch | 24-inch

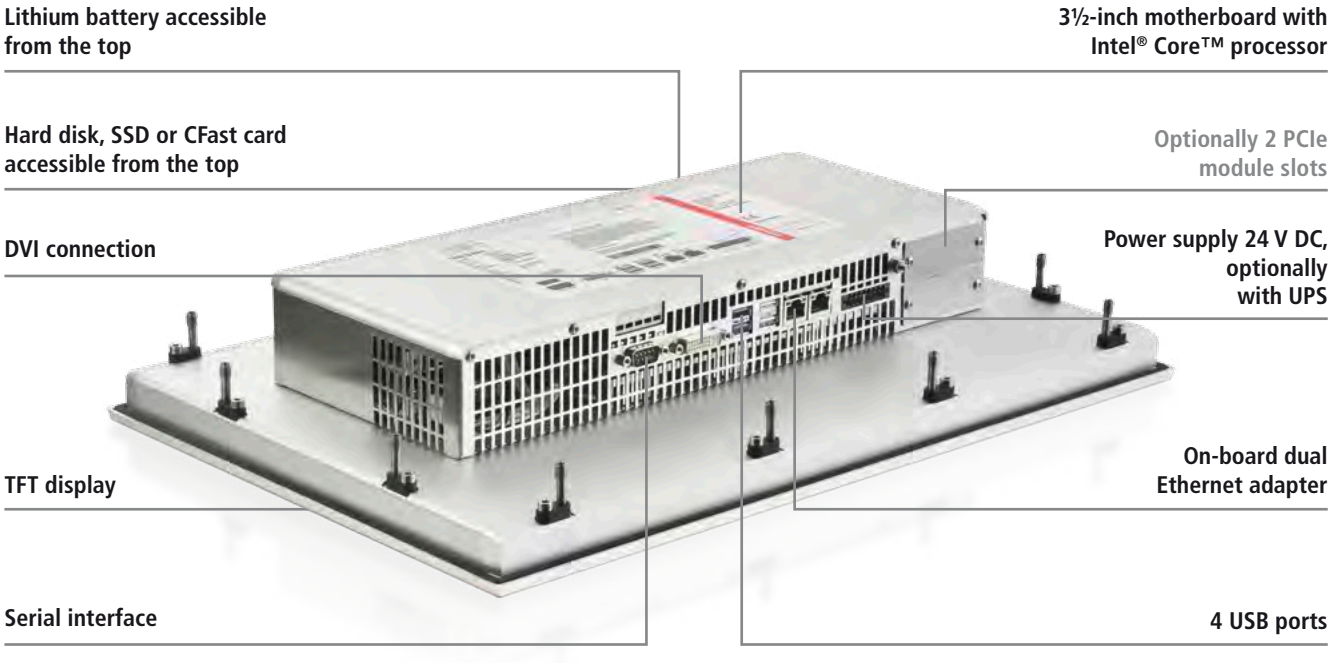
on-board RAID controller, two same hard disks, SSDs or CFast cards can be mirrored.

CP22xx are supplied with a 24 V power supply unit, optionally also with an integrated uninterruptible power supply (UPS). A battery pack can be connected externally and installed on a DIN rail close to the PC.

Data media, the fan and the lithium battery of the system clock are accessible from the rear under the fan cover.

Due to its two independent Ethernet interfaces the CP22xx is ideally suited as a compact central processing unit for an EtherCAT control system.

Two free slots for PCIe modules can be optionally integrated in the PC housing, offering the possibility to extend the PC, e.g. with additional Ethernet interfaces, USB ports or PROFIBUS. NOVRAM for failsafe data storage can also be plugged as PCIe module.



Rear view of CP22xx-0010 for 12-inch, 15-inch and all portrait orientations

CP22xx | Panel PC with Intel® Core™ i processor

The high-performance multi-touch built-in Panel PC

CP2212 CP2215 CP2216 CP2218 CP2219 CP2221 CP2224

Ordering information	Multi-finger touch screen
12-inch display 800 x 600	CP2212
15-inch display 1024 x 768	CP2215
15.6-inch display 1366 x 768	CP2216
18.5-inch display 1366 x 768	CP2218
19-inch display 1280 x 1024	CP2219
21.5-inch display 1920 x 1080	CP2221
24-inch display 1920 x 1080	CP2224

We reserve the right to make technical changes.

Rear view of CP22xx-0010
for all landscape orientations
from 15.6-inch

CP22xx	CP22xx-0010, -0020
Housing	aluminium housing with glass front
	all connectors at the bottom of the rear side
	PC to be opened from the back side
	all components easily accessible
	1 slot for one 2½-inch hard disk or SSD and 1 slot for one CFast card, accessible from outside
	2 connector brackets to lead out interfaces of the motherboard at the connection section
	fan cartridge at the PC top side, accessible from outside
	pull-out clamping levers for fast installation without loose parts
	protection class front side IP 65, rear side IP 20
	operating temperature 0…55 °C

Features	CP22xx-0010	CP22xx-0020
Display	12-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch display	12-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch display
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	3½-inch	3½-inch
Slots	1 Mini PCI slot, optionally 2 PCIe modules	–
Free slots	1 Mini PCI slot, optionally 2 PCIe modules	–
Max. card length	Mini PCI	–
Memory	2…16 GB DDR3L RAM	4…32 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1 or 2 x 2½-inch HDD, SSD or CFast	1 or 2 x 2½-inch HDD, SSD or CFast
RAID 1	2 x 2½-inch HDD, SSD or CFast	2 x 2½-inch HDD, SSD or CFast
Power supply	24 V DC	24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP22xx	

CP26xx | Dual-touch built-in Panel PC

▶ **www.beckhoff.com/CP26xx**

The CP26xx built-in Panel PC series is characterised by a modern operating concept with dual-touch display as well as an advanced, elegant device design. It is designed for installation in the front of a control cabinet. The CP26xx combine reliable Beckhoff Control Panel design with state-of-the-art Industrial PC technology. The right display size from 7 to 24 inches is available for every application – in landscape or portrait orientation (horizontal/vertical). With their highly integrated 3½-inch motherboards, the CP26xx built-in Industrial PCs represent a high-performance platform for machine construction and plant engineering applications that can be used in conjunction with TwinCAT automation software under Windows Embedded Compact 7.

We reserve the right to make technical changes.

Display sizes

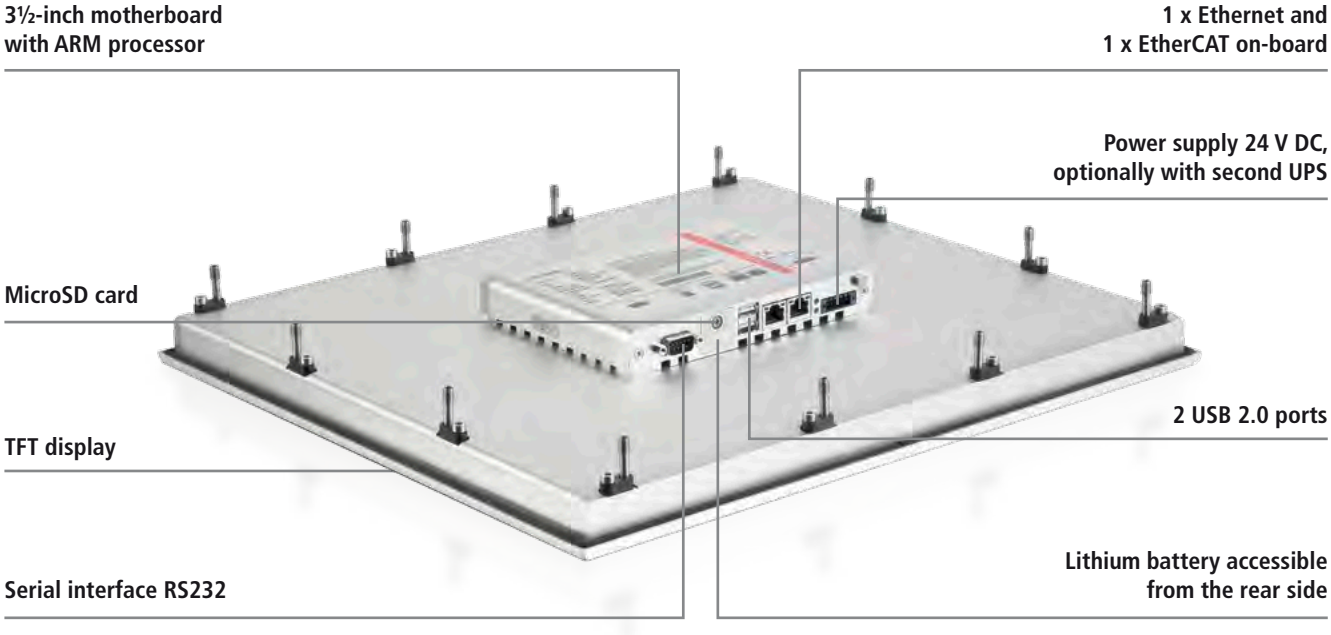
7-inch 12-inch 12.1-inch 15-inch 15.6-inch 18.5-inch 19-inch 21.5-inch 24-inch

CP26xx Panel PCs are equipped with an ARM Cortex™-A8 processor. They are equipped with a microSD card and have no rotating parts.

CP26xx are supplied with a 24 V power supply unit, optionally also with a capacitive uninterruptible power supply (second UPS).

The microSD card and the lithium battery of the system clock are accessible from the rear in the connector bracket.

Due to its independent Ethernet and EtherCAT interfaces the CP26xx is ideally suited as a compact central processing unit for an EtherCAT control system. NOVRAM for fail-safe data storage is integrated on the motherboard.



CP26xx | Panel PC with ARM Cortex™-A8

The compact dual-touch built-in Panel PC

CP2607 CP2612 CP2613 CP2615 CP2616 CP2618 CP2619 CP2621 CP2624

Ordering information		Dual-finger touch screen
7-inch display	800 x 480	CP2607
12-inch display	800 x 600	CP2612
12.1-inch display	1280 x 800	CP2613
15-inch display	1024 x 768	CP2615
15.6-inch display	1366 x 768	CP2616
18.5-inch display	1366 x 768	CP2618
19-inch display	1280 x 1024	CP2619
21.5-inch display	1920 x 1080	CP2621
24-inch display	1920 x 1080	CP2624

We reserve the right to make technical changes.

CP26xx	CP26xx-0000
Housing	aluminium housing with glass front
	all connectors at the bottom of the rear side
	PC to be opened from the back side, all components easily accessible
	1 slot for a microSD flash card, accessible from outside
	protection class front side IP 65, rear side IP 20
	operating temperature 0…55 °C

Features	CP26xx-0000
Display	7-, 12-, 12.1-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch display
Processor	ARM Cortex™-A8, 1 GHz
Motherboard	3½-inch
Slots	–
Memory	1 GB DDR3 RAM
Graphic adapter	integrated in the processor
Ethernet	1 x Ethernet and 1 x EtherCAT on-board
Hard disks/flash	microSD flash card
Power supply	24 V DC
Recommendation	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP26xx

CP27xx | Fanless multi-touch built-in Panel PC

▶ **www.beckhoff.com/CP27xx**

The CP27xx built-in Panel PC series is characterised by a modern operating concept with multi-touch display as well as an advanced, elegant device design. It is designed for installation in the front of a control cabinet. The CP27xx combine reliable Beckhoff Control Panel design with state-of-the-art Industrial PC technology. The right display size is available for every application. With their highly integrated 3½-inch motherboards, the CP27xx built-in Industrial PCs represent a high-performance platform for machine construction and plant engineering applications that can be used in conjunction with TwinCAT automation software under Windows 7 Professional, Windows 7 Ultimate, Windows Embedded Standard 7, Windows Embedded Compact 7 or with Intel® Atom™ also under Windows 10 IoT Enterprise.

CP27xx Panel PCs are equipped with Intel® Celeron® ULV 1.4 GHz or with Intel® Atom™ with up to four cores and have one or two CFast cards. With the on-board RAID controller, two same CFast cards can be mirrored in the CP27xx-0000.

CP27xx are supplied with a 24 V power supply unit, optionally also with an integrated uninterruptible power supply (UPS). A battery pack can be connected externally and installed on a DIN rail close to the PC.

Data media and the lithium battery of the system clock are accessible from the rear.

Due to its two independent Ethernet interfaces the CP27xx is ideally suited as a compact central processing unit for an EtherCAT control system. A third independent Ethernet interface is available as an option.

An optional PCIe module slot offers the possibility to extend the PC, e.g. with additional Ethernet interfaces.

We reserve the right to make technical changes.

Display sizes

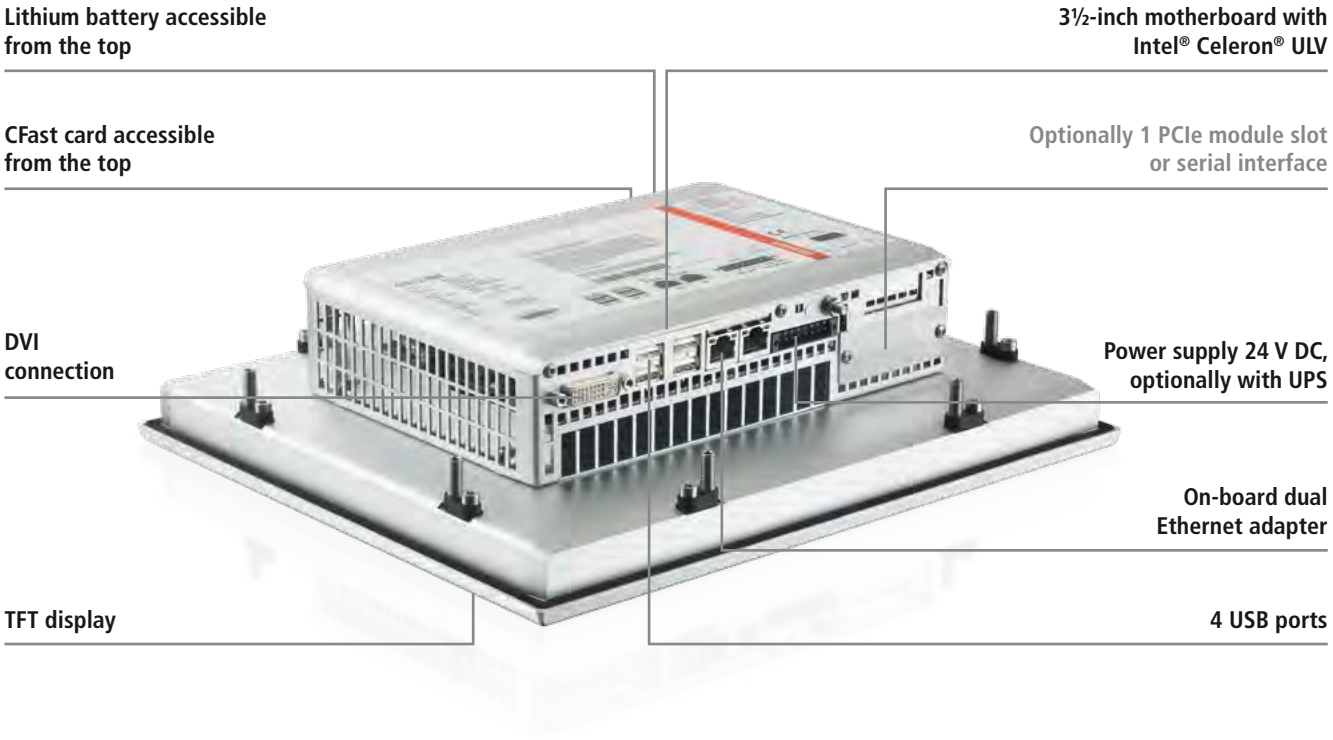
12-inch | 12.1-inch | 15-inch | 15.6-inch | 18.5-inch | 19-inch | 21.5-inch | 24-inch

CPX27xx for application in hazardous areas, Zone 2/22

With the CPX Panel PC series, the proven multi-touch technology of Beckhoff Panel PCs is available in particularly robust versions, complying with the requirements for use in hazardous areas classified Zone 2/22. The high level of functionality and excellent build quality ensure the reliability of CPX panels even under harsh environmental conditions. The capacitive touch technology provides the typical convenient operation of all Beckhoff multi-touch panels. The aesthetically pleasing appearance of the panel and the look and feel of the aluminium housing are maintained, making them visual highlights in explosion-proof environments. The devices are available with three different displays in the sizes 15, 19 and 21.5 inches.

The CPX27xx features an Intel® Atom™ processor with up to four cores, one CFast card and no rotating parts. The CPX27xx comes with a 24 V power supply unit. The CFast card is accessible from the rear in the plug connector panel. Optionally, a third Ethernet interface and a 2½-inch hard disk/SSD can be integrated instead of the CFast card.

CPX27xx



CP27xx | Fanless multi-touch built-in Panel PC

Ordering information	Multi-finger touch screen
12-inch display 800 x 600	CP2712
12.1-inch display 1280 x 800	CP2713
15-inch display 1024 x 768	CP2715
15.6-inch display 1366 x 768	CP2716
18.5-inch display 1366 x 768	CP2718
19-inch display 1280 x 1024	CP2719
21.5-inch display 1920 x 1080	CP2721
24-inch display 1920 x 1080	CP2724

CP27xx	CP27xx-0000, -0010
Housing	aluminium housing with glass front
	all connectors at the bottom of the rear side
	PC to be opened from the back side
	all components easily accessible
	2 slots for CFast cards, accessible from outside
	1 connector bracket to lead out interfaces of the motherboard at the connection section
	pull-out clamping levers for fast installation without loose parts
	protection class front side IP 65, rear side IP 20
	operating temperature 0…55 °C

Features	CP27xx-0000	CP27xx-0010
Display	12-, 12.1-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch display	12-, 12.1-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch display
Processor	Intel® Celeron® ULV	Intel® Atom™
Motherboard	3½-inch	3½-inch
Slots	optionally 1 PCIe module	optionally 1 PCIe module
Memory	2…8 GB DDR3 RAM	2…8 GB DDR3L RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1 or 2 x CFast	1 or 2 x CFast
RAID 1	2 x CFast	–
Power supply	24 V DC	24 V DC
Recommendation	not recommended for new projects	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP27xx	

We reserve the right to make technical changes.

CPX27xx | Fanless multi-touch built-in Panel PC

For use in hazardous areas, Zone 2/22

Ordering information	Multi-finger touch screen
15-inch display 1024 x 768	CPX2715
19-inch display 1280 x 1024	CPX2719
21.5-inch display 1920 x 1080	CPX2721

CPX27xx	CPX27xx-0010
Housing	aluminium housing with glass front
	for use in hazardous areas, Zone 2/22
	all connectors at the bottom of the rear side
	PC to be opened from the back side
	all components easily accessible
	1 slot for one CFast card, accessible from outside
	pull-out clamping levers for fast installation without loose parts
	solid clamping frame for even pressure distribution on the seal
	protection class front side IP 65, rear side IP 20
	operating temperature 0…55 °C

Features	CPX27xx-0010
Display	15-, 19- or 21.5-inch TFT display
Processor	Intel® Atom™
Motherboard	3½-inch
Memory	2…8 GB DDR3L RAM
Graphic adapter	integrated in the processor
Ethernet	2 on-board
Hard disks/flash	4 GB CFast card
Power supply	24 V DC
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CPX27xx

CP32xx | Multi-touch Panel PC

▶ **www.beckhoff.com/CP32xx**

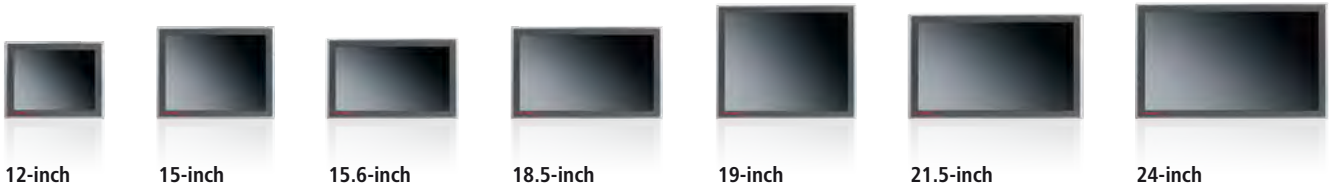
With the CP32xx series, a high-end Panel PC with multi-touch can be used directly in the field. The devices in a slender aluminium housing feature complete IP 65 protection and are designed for mounting arm installation. The Panel PCs offer maximum computing power with processors of the latest generation, such as Intel® Celeron® or Core™ i3/i5/i7.

A choice of seven different multi-touch TFT displays in sizes between 12-inch and 24-inch and 4:3, widescreen, landscape or portrait formats are available. Cooling is achieved by means of cooling fins on the outer wall as well as fans inside the closed housing. The operating temperature range is 0 to 45 °C.

The Panel PC features an integrated rotatable and tiltable mounting arm adapter for a 48 mm diameter mounting arm tube. There is a choice of attaching the mounting arm from above or below. The connecting cables are laid through the mounting arm. The Industrial PC connections (up to six) with IP 65 connectors are positioned in the large wiring space and are easily accessible. The wiring area

We reserve the right to make technical changes.

Display sizes

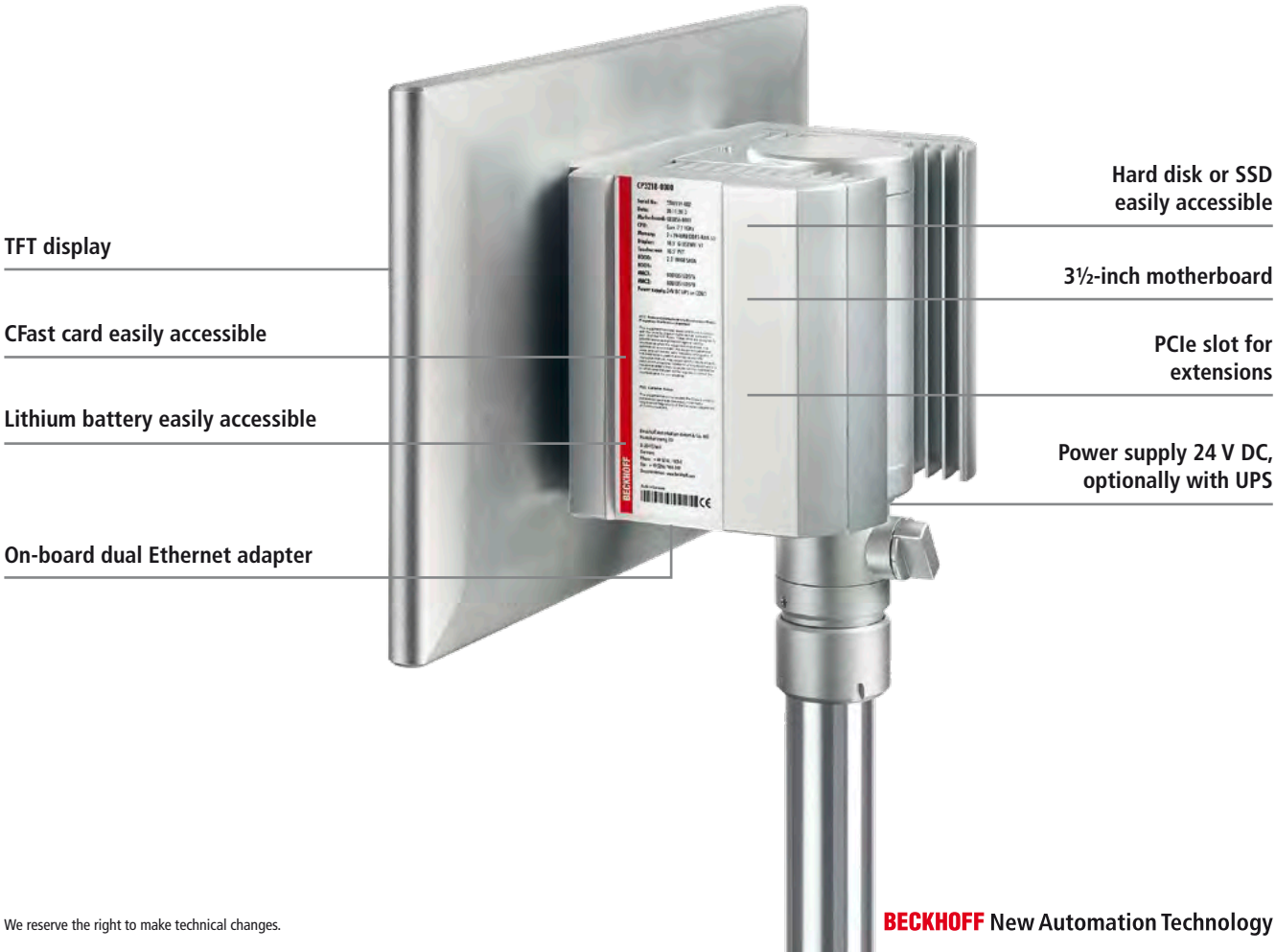


12-inch | 15-inch | 15.6-inch | 18.5-inch | 19-inch | 21.5-inch | 24-inch

can be opened easily without dismounting the device from the mounting arm, offering fast access to the IP 65 connectors for power supply, Ethernet and optional fieldbus or USB. Prefabricated cables in various lengths are available for all connections.The C32xx series Panel PCs are supplied with a 24 V power supply unit, optionally with integrated uninterruptible power supply (UPS). A battery pack can be connected externally and installed on a DIN rail in the control cabinet.

The CP32xx Panel PCs are equipped with one or two hard disks, SSDs or CFast cards or combinations thereof. With the on-board RAID controller, two same hard disks, SSDs or CFast cards can be mirrored. The data media and the lithium battery of the system clock are accessible from the rear under the cover.

There is a PCI slot in the CP32xx. A factory-fitted FC9062 PCIe module with two additional Ethernet ports can be added. NOVRAM is also available as PCIe module for fail-safe data storage.



CP32xx | Multi-touch Panel PC

The high-performance multi-touch Panel PC

CP3212 CP3215 CP3216 CP3218 CP3219 CP3221 CP3224

Ordering information	Multi-finger touch screen
12-inch display 800 x 600	CP3212
15-inch display 1024 x 768	CP3215
15.6-inch display 1366 x 768	CP3216
18.5-inch display 1366 x 768	CP3218
19-inch display 1280 x 1024	CP3219
21.5-inch display 1920 x 1080	CP3221
24-inch display 1920 x 1080	CP3224

We reserve the right to make technical changes.

CP32xx	CP32xx-0010, -0020
Housing	Industrial PC with Control Panel for mounting arm installation
	rotatable and tiltable mounting arm adapter for Rittal and Rolec mounting arm systems with 48 mm tube from top
	wiring area for up to 6 IP 65 connectors
	1 slot for a 2½-inch hard disk or SDD and 1 slot for CFast
	lithium battery of the system clock changeable from outside
	passive cooling through heat sink structure, internal fans for equal heat distribution to all the walls of the housing
	20 cm free space required around the PC for air circulation
	protection class IP 65
	operating temperature 0…45 °C

Features	CP32xx-0010	CP32xx-0020
Display	12-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch display	12-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch display
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	3½-inch	3½-inch
Slots	1 Mini PCI slot	–
Free slots	1 Mini PCI slot	–
Max. card length	Mini PCI	–
Memory	2…16 GB DDR3L RAM	4…32 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board, one of these is led out in the wiring area	2 on-board, one of these is led out in the wiring area
Hard disks/flash	1 or 2 x 2½-inch HDD or SSD, 1 x 2½-inch HDD or SSD and 1 x CFast or 2 x CFast	1 or 2 x 2½-inch HDD or SSD, 1 x 2½-inch HDD or SSD and 1 x CFast or 2 x CFast
RAID 1	2 x 2½-inch HDD, SSD or CFast	2 x 2½-inch HDD, SSD or CFast
Power supply	24 V DC	24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP32xx	

We reserve the right to make technical changes.

CP37xx | Multi-touch Panel PC

▶ **www.beckhoff.com/CP37xx**

With the CP37xx series, a Panel PC with multi-touch can be used directly in the field. The devices in a robust aluminium housing feature complete IP 65 protection and are designed for mounting arm installation. The Panel PCs offer high computing power with Intel® Atom™ processors with up to four cores.

A choice of seven different multi-touch TFT displays in sizes between 12-inch and 24-inch in 4:3, 5:4 or widescreen formats are available. Cooling is achieved by means of cooling fins on the outer wall as well as fans inside the closed housing. The operating temperature range is 0 to 45 °C.

The Panel PC features an integrated rotatable and tiltable mounting arm adapter for a 48 mm diameter mounting arm tube. There is a choice of attaching the mounting arm from above or below. The connecting cables are laid through the mounting arm. The Industrial PC connections (up to four) with IP 65 connectors are positioned in the large wiring space and are easily accessible. The wiring area can be opened easily without dismounting the device from the mounting arm, offering fast access to the IP 65 connectors for power supply, Ethernet and optional USB or RS232. Prefabricated cables in various lengths are available for all connections. The C37xx series Panel PCs are supplied with a 24 V power supply unit, optionally with integrated uninterruptible power supply (UPS). A battery pack can be connected externally and installed on a DIN rail in the control cabinet.

The CP37xx Panel PCs are equipped with one or two CFast cards. The data media and the lithium battery of the system clock are accessible from the rear under the cover.

We reserve the right to make technical changes.

Display sizes

12-inch | 12.1-inch | 15-inch | 15.6-inch | 18.5-inch | 19-inch | 21.5-inch | 24-inch

CPX37xx for application in hazardous areas, Zone 2/22

With the CPX Panel PC series, the proven multi-touch technology of Beckhoff Panel PCs is available in particularly robust versions, complying with the requirements for use in hazardous areas classified Zone 2/22. The high level of functionality and excellent build quality ensure the reliability of CPX panels even under harsh environmental conditions. The capacitive touch technology provides the typical convenient operation of all Beckhoff multi-touch panels. The aesthetically pleasing appearance of the panel and the look and feel of the aluminium housing are maintained, making them visual highlights in explosion-proof environments. The devices are available with three different displays in the sizes 15, 19 and 21.5 inches.

The CPX37xx features an Intel® Atom™ processor with up to four cores, one CFast card and no rotating parts. The CPX37xx comes with a 24 V power supply unit. The CFast card is accessible from the side. Optionally, a 2½-inch hard disk/SSD can be integrated instead of the CFast card. The device is mounted via 4 x M6 threaded holes at the rear.

CPX37xx

CP37xx | Multi-touch Panel PC

Intel® Atom™ with up to four cores

Ordering information	Multi-finger touch screen
12-inch display 800 x 600	CP3712
12.1-inch display 1280 x 800	CP3713
15-inch display 1024 x 768	CP3715
15.6-inch display 1366 x 768	CP3716
18.5-inch display 1366 x 768	CP3718
19-inch display 1280 x 1024	CP3719
21.5-inch display 1920 x 1080	CP3721
24-inch display 1920 x 1080	CP3724

CP37xx	CP37xx-0010
Housing	Industrial PC with Control Panel for mounting arm installation
	rotatable and tiltable mounting arm adapter for Rittal and Rolec mounting arm systems with 48 mm tube from top
	wiring area for up to 4 IP 65 connectors
	2 slots for CFast cards
	CFast cards and lithium battery of the system clock, changeable from outside
	passive cooling through heat sink; internal fan for equal heat distribution to all the walls of the housing
	20 cm free space required around the PC for air circulation
	protection class IP 65
	operating temperature 0…45 °C

Features	CP37xx-0010
Display	12-, 12.1-, 15-, 15.6-, 18.5-, 19-, 21.5- or 24-inch display
Processor	Intel® Atom™
Motherboard	3½-inch
Slots	optionally 1 PCIe module
Memory	2…8 GB DDR3L RAM
Graphic adapter	integrated in the processor
Ethernet	2 on-board, one of these is led out in the wiring area
Hard disks/flash	1 or 2 x CFast
Power supply	24 V DC
Recommendation	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP37xx

We reserve the right to make technical changes.

CPX37xx | **Multi-touch Panel PC**

For use in hazardous areas, Zone 2/22

Ordering information	Multi-finger touch screen
15-inch display 1024 x 768	CPX3715
19-inch display 1280 x 1024	CPX3719
21.5-inch display 1920 x 1080	CPX3721

CPX37xx	CPX37xx-0010
Housing	Industrial PC with Control Panel for mounting arm installation
	for use in hazardous areas, Zone 2/22
	For mounting four M6 threaded holes are provided at a distance of 100 x 100 mm in the connection block on the rear panel. The connectors for connecting the Control Panel are plugged into the connection block from the rear.
	1 slot for one CFast card
	CFast card and lithium battery of the system clock, changeable from outside
	passive cooling
	protection class IP 65
	operating temperature 0…45 °C

Features	CPX37xx-0010
Display	15-, 19- or 21.5-inch TFT display
Processor	Intel® Atom™
Motherboard	3½-inch
Memory	2…8 GB DDR3L RAM
Graphic adapter	integrated in the processor
Ethernet	2 on-board, one of these is led out in the wiring area
Hard disks/flash	4 GB CFast card
Power supply	24 V DC
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CPX37xx

CP62xx | “Economy” built-in Panel PC

▶ **www.beckhoff.com/CP62xx**

The CP62xx built-in Panel PC-series is designed for installation in the front of a control cabinet. The CP62xx series combines the Beckhoff Control Panel design with state-of-the-art Industrial PC technology. The right display size and keyboard are available for every application. With their highly integrated 3½-inch motherboards, the CP62xx built-in Industrial PCs represent a high-performance platform for machine construction and plant engineering applications that can be used in conjunction with TwinCAT automation software under Windows 10 IoT Enterprise.

The CP62xx Panel PCs are available with a choice of Intel® processors. The CP62xx Panel PCs can be equipped with a CFast card and a 2½-inch hard disk or SSD. A fan cartridge with speed-controlled fans supported by dual ball bearing is integrated in the rear panel. In front of the fan cartridge a 2 cm space is required for ventilation. In each configuration the Panel PCs of this series are approved for ambient temperatures between 0 and 55 °C.

We reserve the right to make technical changes.

Front laminates

Without keys

Function keys

Numeric keyboard

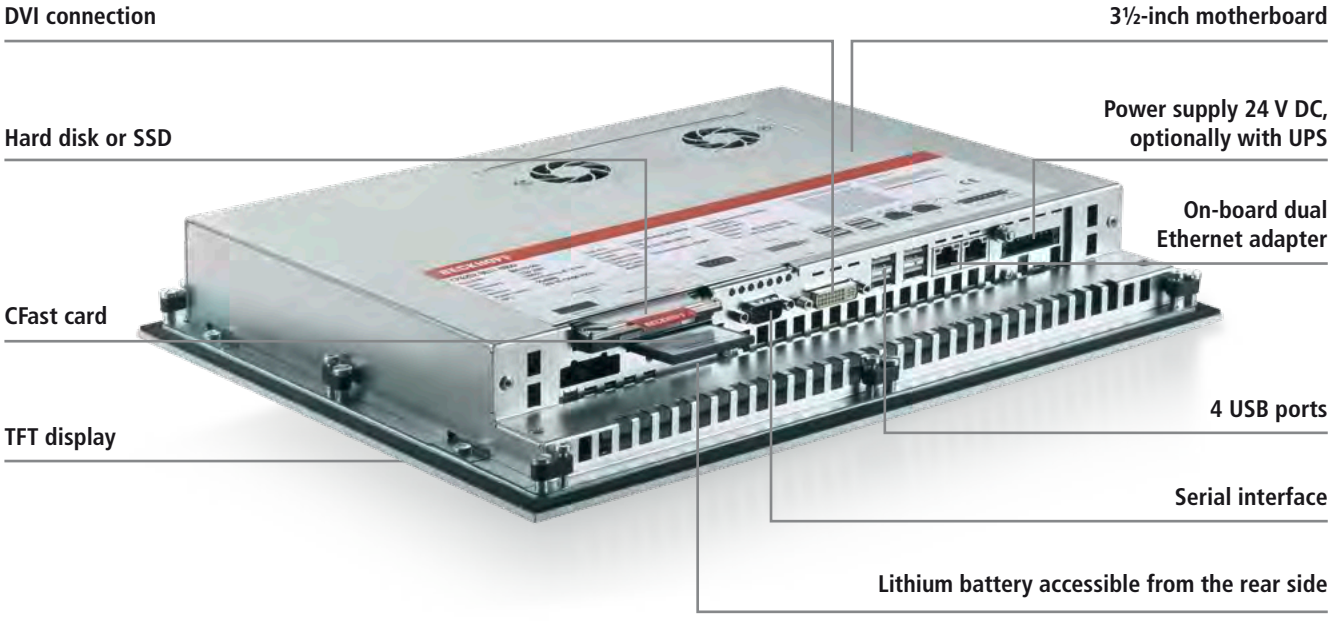
Alphanumeric keyboard

With PLC keys on the sides

The CP62xx are supplied with a 24 V power supply unit, optionally also with an integrated uninterruptible power supply (UPS). A battery pack can be connected externally and installed on a DIN rail close to the PC.

Due to its two independent Ethernet interfaces the CP62xx is ideally suited as a compact central processing unit for an EtherCAT control system. Two free slots for PCIe modules can be optionally integrated into the PC housing, offering the possibility to extend the PC, e.g. with additional Ethernet interfaces, USB ports or PROFIBUS. NOVRAM for fail-save data storage can also be plugged as PCIe module.

The CP62xx can optionally be extended with PCIe module or plug-in card slots.



CP62xx | “Economy” built-in Panel PC

The slimline built-in Industrial PC with 3½-inch motherboard

Ordering information	without touch screen	with single-touch screen	with touch pad
Display only			
12-inch display 800 x 600	CP6201-0000-00xx	CP6201-0001-00xx	
15-inch display 1024 x 768	CP6202-0000-00xx	CP6202-0001-00xx	
19-inch display 1280 x 1024	CP6203-0000-00xx	CP6203-0001-00xx	
Display only, USB A socket in the front			
12-inch display 800 x 600	CP6201-0020-00xx	CP6201-0021-00xx	
15-inch display 1024 x 768	CP6202-0020-00xx	CP6202-0021-00xx	
19-inch display 1280 x 1024	CP6203-0020-00xx	CP6203-0021-00xx	
With function keys			
12-inch display 800 x 600	CP6211-0000-00xx	CP6211-0001-00xx	
15-inch display 1024 x 768	CP6212-0000-00xx	CP6212-0001-00xx	
19-inch display 1280 x 1024	CP6213-0000-00xx	CP6213-0001-00xx	
Numeric keyboard			
12-inch display 800 x 600	CP6221-0000-00xx	CP6221-0001-00xx	CP6221-0002-00xx
15-inch display 1024 x 768	CP6222-0000-00xx	CP6222-0001-00xx	CP6222-0002-00xx
19-inch display 1280 x 1024	CP6223-0000-00xx	CP6223-0001-00xx	CP6223-0002-00xx
Alphanumeric keyboard			
12-inch display 800 x 600	CP6231-0000-00xx	CP6231-0001-00xx	CP6231-0002-00xx
15-inch display 1024 x 768	CP6232-0000-00xx	CP6232-0001-00xx	CP6232-0002-00xx
19-inch display 1280 x 1024	CP6233-0000-00xx	CP6233-0001-00xx	CP6233-0002-00xx
Alphanumeric keyboard with PLC keys on the sides			
15-inch display 1024 x 768	CP6242-0000-00xx	CP6242-0001-00xx	

We reserve the right to make technical changes.

Without keys

Function keys

Numeric keyboard

Alphanumeric keyboard

Alphanumeric keyboard with PLC keys on the sides

CP62xx	CP62xx-xxxx-0060, -0070
Housing	aluminium front with steel sheet rear cover
	drives easily accessible
	all connectors at the bottom of the rear side
	1 slot for 2½-inch hard disk and 1 slot for a CFast card accessible from the rear side
	fan cartridge at the rear side, accessible from outside
	lithium battery of the system clock accessible from the rear side
	pull-out clamping levers for fast installation without loose parts
	protection class front side IP 65, rear side IP 20
	operating temperature 0…55 °C

Features	CP62xx-xxxx-0060	CP62xx-xxxx-0070
Display	12-, 15- or 19-inch TFT display	12-, 15- or 19-inch TFT display
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	3½-inch	3½-inch
Slots	1 Mini PCI, optionally 2 PCIe modules or 2 PCI/PCIe plug-in card slots	–
Free slots	1 Mini PCI and optionally 2 PCIe modules or 2 PCI/PCIe plug-in card slots	–
Max. card length	Mini PCI, optionally 2 PCIe modules or 2 x 190 mm plug-in cards	–
Memory	2…16 GB DDR3L RAM	4…32 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	2½-inch HDD or SSD and/or 1 x CFast or 2 x CFast	2½-inch HDD or SSD and/or 1 x CFast or 2 x CFast
RAID 1	2 x CFast	2 x CFast
Power supply	24 V DC	24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP62xx	

CP62xx with PCIe module slots C9900-B500

Extension for PCIe modules

The Panel PCs CP62xx can be expanded by two additional PCIe module slots. The rear cover is constructed 30 mm deeper for PCIe modules (see above). The module slots can accept Beckhoff PCIe modules, for example, the FC9062 dual gigabit Ethernet module.

PCIe module FC9062, dual gigabit Ethernet

Ordering information	Options for CP62xx
C9900-B500	2 PCIe module slots integrated inside CP62xx, to plug-in Beckhoff PCIe modules or to lead out interfaces of the motherboard ex factory. The depth of the back cover is increased by 30 mm (1.2“).

We reserve the right to make technical changes.

CP62xx with plug-in card slots
C9900-B504, -B508 or -B512

Extension for PCI and PCIe plug-in cards

The Panel PCs CP62xx can be expanded by two slots for standard PC plug-in cards. They can accept conventional PC plug-in cards up to 190 mm in length. The 66 mm deeper hood at the rear (see above) covers a backplane that provides a choice of two PCI slots, two PCI Express slots or one PCI and one PCI Express slot. Card holders ensure the secure fixation of large cards.

Ordering information	Options for CP62xx
C9900-B504	2 PCIe plug-in card slots on the passive backplane integrated inside CP62xx, to plug-in PCIe x1 cards up to 190 mm length. The depth of the back cover is increased by 66 mm (2.6“).
C9900-B508	2 PCI plug-in card slots on the passive backplane integrated inside CP62xx, to plug-in PCI cards up to 190 mm length. The depth of the back cover is increased by 66 mm (2.6“).
C9900-B512	1 PCI and 1 PCIe plug-in card slot on a passive backplane integrated inside CP62xx, to plug-in one PCI and one PCIe x1 card up to 190 mm (6.3“) length. The depth of the back cover is increased by 66 mm (2.6“).

CP65xx | Built-in Panel PC

▶ **www.beckhoff.com/CP65xx**

The Panel PC series CP65xx is designed for installation in the front of a control cabinet. A built-in Control Panel with DVI and USB interface is the front of the Panel PC. The correct display size and keyboard are thus available for every application. The CP65xx built-in Industrial PCs represent a powerful platform for machine construction and plant engineering applications, for example with the TwinCAT automation software under Windows 10 IoT Enterprise.

The 7-slot ATX Panel PCs CP65xx can be equipped with 12-, 15- or 19-inch TFT display, as a monitor without keys or with different

We reserve the right to make technical changes.

Front laminates

Without keys

Function keys

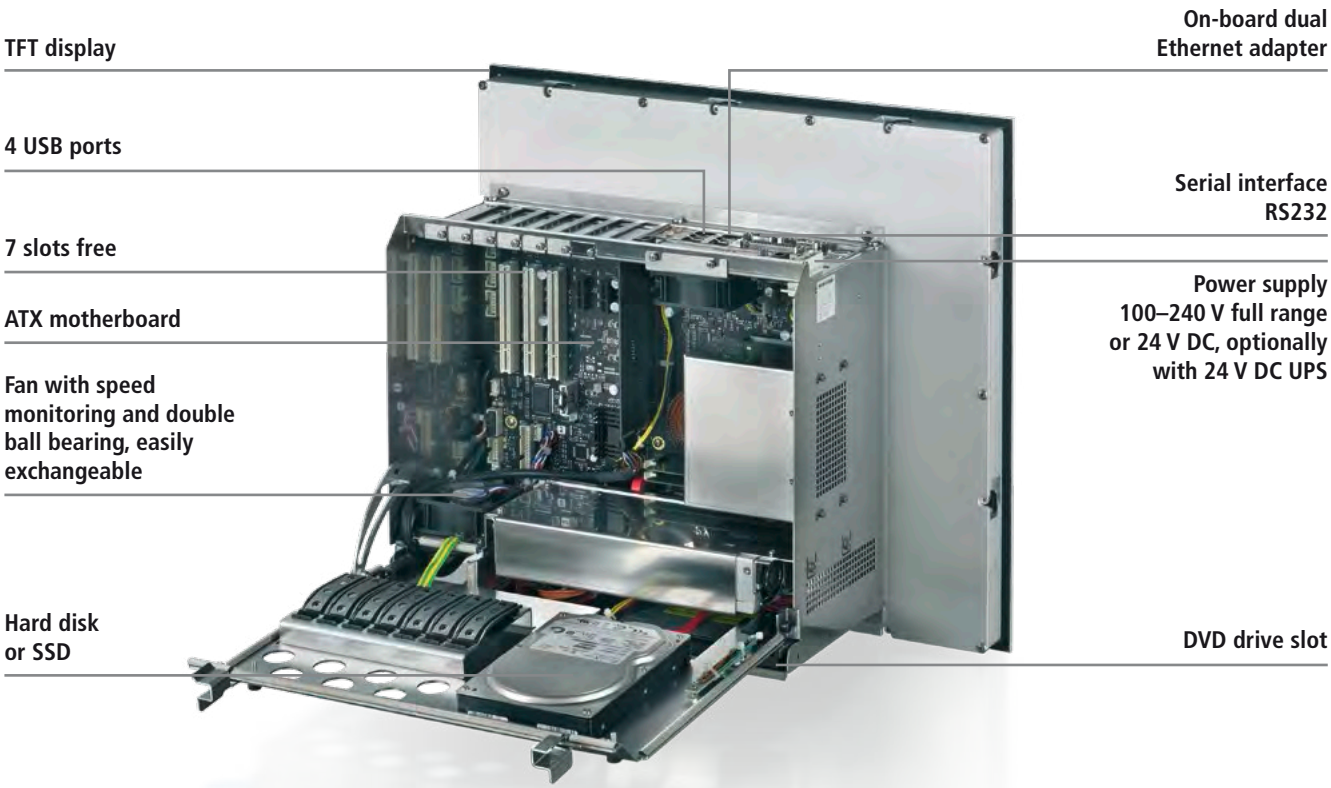
Numeric keyboard

Alphanumeric keyboard

With PLC keys on the sides

types of keyboards. A touch screen or touch pad is optionally available. A large number of push-button extensions are also available.

The CP65xx are equipped with Intel® Celeron®, Pentium® or Core™ i3/i5/i7 processors on an ATX motherboard and have PCI and PCI Express slots. A multi DVD drive can be installed. A 100 to 240 AC full range power supply or a 24 V DC power supply is used in the PC. The Control Panel is connected to the PC via DVI and USB. The PC deals with the power supply for the Control Panel. The cables are installed in the PC housing.



CP65xx | Built-in Panel PC

The universal built-in Industrial PC with ATX motherboard

Ordering information	without touch screen	with single-touch screen	with touch pad
Display only			
12-inch display 800 x 600	CP6501-0000-00xx	CP6501-0001-00xx	
15-inch display 1024 x 768	CP6502-0000-00xx	CP6502-0001-00xx	
19-inch display 1280 x 1024	CP6503-0000-00xx	CP6503-0001-00xx	
Display only, USB A socket in the front			
12-inch display 800 x 600	CP6501-0020-00xx	CP6501-0021-00xx	
15-inch display 1024 x 768	CP6502-0020-00xx	CP6502-0021-00xx	
19-inch display 1280 x 1024	CP6503-0020-00xx	CP6503-0021-00xx	
With function keys			
12-inch display 800 x 600	CP6511-0000-00xx	CP6511-0001-00xx	
15-inch display 1024 x 768	CP6512-0000-00xx	CP6512-0001-00xx	
19-inch display 1280 x 1024	CP6513-0000-00xx	CP6513-0001-00xx	
Numeric keyboard			
12-inch display 800 x 600	CP6521-0000-00xx	CP6521-0001-00xx	CP6521-0002-00xx
15-inch display 1024 x 768	CP6522-0000-00xx	CP6522-0001-00xx	CP6522-0002-00xx
19-inch display 1280 x 1024	CP6523-0000-00xx	CP6523-0001-00xx	CP6523-0002-00xx
Alphanumeric keyboard			
12-inch display 800 x 600	CP6531-0000-00xx	CP6531-0001-00xx	CP6531-0002-00xx
15-inch display 1024 x 768	CP6532-0000-00xx	CP6532-0001-00xx	CP6532-0002-00xx
19-inch display 1280 x 1024	CP6533-0000-00xx	CP6533-0001-00xx	CP6533-0002-00xx
Alphanumeric keyboard with PLC keys on the sides			
15-inch display 1024 x 768	CP6542-0000-00xx	CP6542-0001-00xx	

We reserve the right to make technical changes.

Without keys

Function keys

Numeric keyboard

Alphanumeric keyboard

Alphanumeric keyboard with PLC keys on the sides

CP65xx	CP65xx-xxxx-0080, -0090
Housing	7-slot ATX housing
	all slots for plug-in cards with a length of up to 190 mm
	drives and plug-in cards easily accessible
	all connectors on the top
	detailed PC configuration information on the housing
	card holders, actuated without tools
	status LEDs and protected reset key
	pull-out clamping levers for fast installation without loose parts
	protection class front side IP 65, rear side IP 20
	operating temperature 0…55 °C

Features	CP65xx-xxxx-0080	CP65xx-xxxx-0090
Display	12-, 15- or 19-inch TFT display	12-, 15- or 19-inch TFT display
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	ATX	ATX
Slots	7	7
Free slots	3 PCI, 2 PCIe x1, 1 PCIe x4 and 1 PCIe x16	2 PCI, 2 PCIe x1, 2 PCIe x4 and 1 PCIe x16
Max. card length	7 x 190 mm	7 x 190 mm
Memory	2…32 GB DDR3L RAM	4…64 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1 x 3½-inch HDD or 2½-inch SSD	1 x 3½-inch HDD or 2½-inch SSD
Possible disk drives	multi DVD	multi DVD
Power supply	100…240 V AC or 24 V DC	100…240 V AC or 24 V DC
Recommendation	available	available
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP65xx	

CP66xx | Built-in Panel PC

▶ **www.beckhoff.com/CP66xx**

The built-in Panel PCs of the CP66xx series have a wide range of uses including remote desktop display or CP-Link 3 client. They are available in five display sizes: 5.7, 6.5, 12, 15 or 19 inches.

CP66xx Panel PCs are equipped with an ARM Cortex™-A8 processor. They are equipped with a microSD card and have no rotating parts.

CP66xx are supplied with a 24 V power supply unit, optionally also with a capacitive uninterruptible power supply (second UPS).

We reserve the right to make technical changes.

Front laminates

Without keys

Function keys

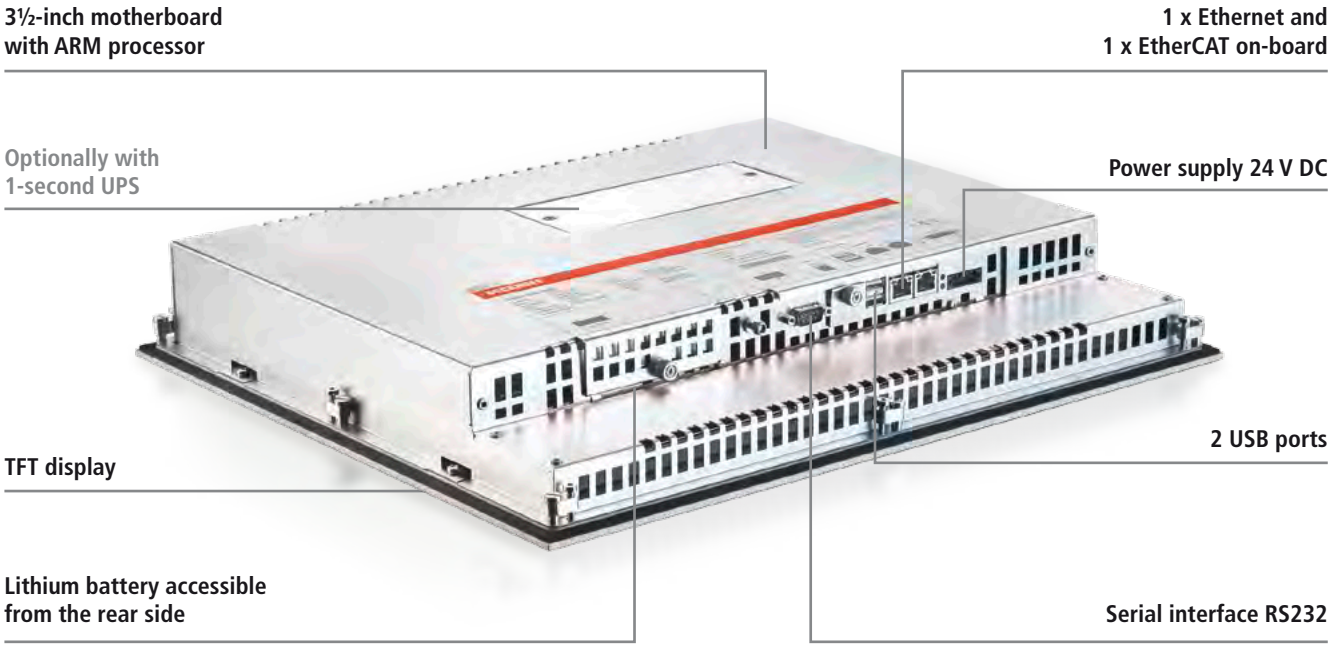
Numeric keyboard

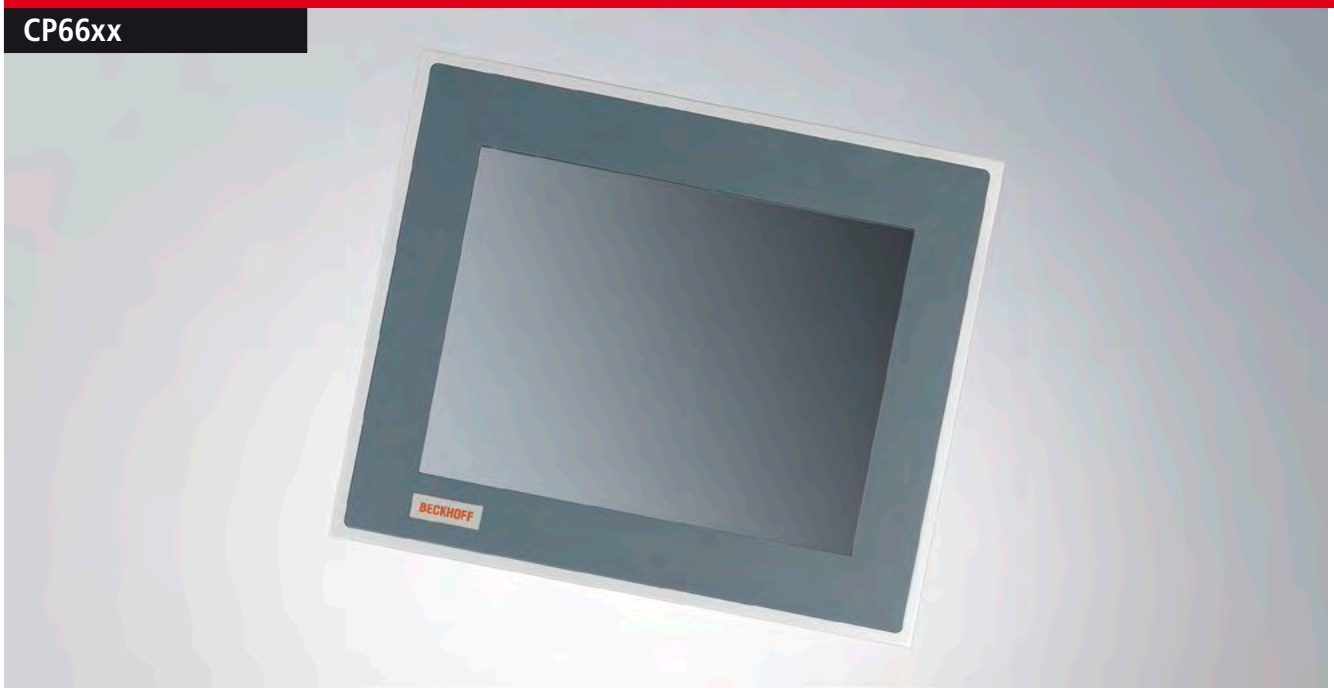
Alphanumeric keyboard

The microSD card and the lithium battery of the system clock are accessible from the rear in the connector bracket.

These devices are ideally suited as small controllers for machine construction and plant engineering applications in conjunction with TwinCAT automation software under Windows Embedded Compact 7.

Due to its independent Ethernet and EtherCAT interfaces the CP66xx is ideally suited as a compact central processing unit for an EtherCAT control system. NOVRAM for fail-safe data storage is integrated on the motherboard.





CP66xx | Panel PC with ARM Cortex™-A8

The “Economy” built-in Panel PC

Ordering information	without touch screen	with single-touch screen	with touch pad
Display only			
5.7-inch display 640 x 480	CP6607-0000-0020	CP6607-0001-0020	
6.5-inch display 640 x 480	CP6609-0000-0020	CP6609-0001-0020	
12-inch display 800 x 600	CP6601-0000-0020	CP6601-0001-0020	
15-inch display 1024 x 768	CP6602-0000-0020	CP6602-0001-0020	
19-inch display 1280 x 1024	CP6603-0000-0020	CP6603-0001-0020	
Display only, USB A socket in the front			
12-inch display 800 x 600	CP6601-0020-0020	CP6601-0021-0020	
15-inch display 1024 x 768	CP6602-0020-0020	CP6602-0021-0020	
19-inch display 1280 x 1024	CP6603-0020-0020	CP6603-0021-0020	
With function keys			
6.5-inch display 640 x 480	CP6619-0000-0020	CP6619-0001-0020	
12-inch display 800 x 600	CP6611-0000-0020	CP6611-0001-0020	
15-inch display 1024 x 768	CP6612-0000-0020	CP6612-0001-0020	
19-inch display 1280 x 1024	CP6613-0000-0020	CP6613-0001-0020	
Numeric keyboard			
6.5-inch display 640 x 480	CP6629-0000-0020	CP6629-0001-0020	
12-inch display 800 x 600	CP6621-0000-0020	CP6621-0001-0020	CP6621-0002-0020
15-inch display 1024 x 768	CP6622-0000-0020	CP6622-0001-0020	CP6622-0002-0020
19-inch display 1280 x 1024	CP6623-0000-0020	CP6623-0001-0020	CP6623-0002-0020
Alphanumeric keyboard			
12-inch display 800 x 600	CP6631-0000-0020	CP6631-0001-0020	CP6631-0002-0020
15-inch display 1024 x 768	CP6632-0000-0020	CP6632-0001-0020	CP6632-0002-0020
19-inch display 1280 x 1024	CP6633-0000-0020	CP6633-0001-0020	CP6633-0002-0020

We reserve the right to make technical changes.

Without keys

Function keys

Numeric keyboard

Alphanumeric keyboard

CP66xx	CP66xx-xxxx-0020
Housing	aluminium front with steel sheet rear cover
	all connectors at the bottom of the rear side
	1 slot for microSD flash card, accessible from the rear side
	lithium battery of the system clock, accessible from the rear side
	pull-out clamping levers for fast installation without loose parts
	protection class front side IP 65, rear side IP 20
	operating temperature 0…55 °C

Features	CP66xx-xxxx-0020
Display	5.7-, 6.5-, 12-, 15- or 19-inch TFT display
Processor	ARM Cortex™-A8, 1 GHz
Motherboard	3½-inch
Slots	–
Free slots	–
Max. card length	–
Memory	1 GB DDR3 RAM
Graphic adapter	integrated in the processor
Ethernet	1 x Ethernet and 1 x EtherCAT on-board
Hard disks/flash	microSD flash card
Power supply	24 V DC
Recommendation	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP66xx

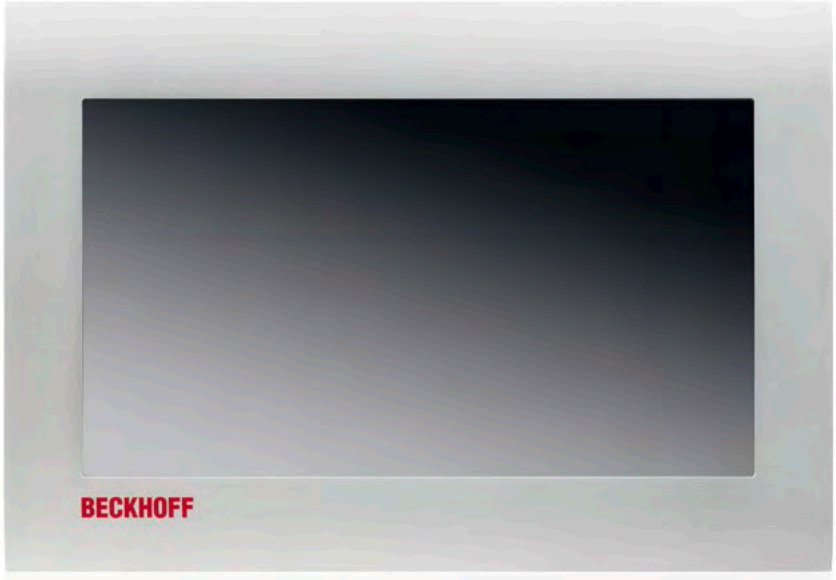
CP6606, CP6600 | "Economy" built-in Panel PC

▶ **www.beckhoff.com/CP6606**
▶ **www.beckhoff.com/CP6600**

With its highly integrated 3½-inch motherboard, the CP6606 and CP6600 built-in Panel PCs are ideally suited for use in mechanical engineering, for example with TwinCAT automation software under Windows Embedded Compact 7 or as a CP-Link 3 client or Ethernet Control Panel.

They are designed for installation in the front of a control cabinet and have a 7-inch, respectively 10.1-inch touch screen displays. Equipped with a fanless ARM Cortex™-A8 processor and a MicroSD card the CP66xx contain no rotary components.

The CP66xx are supplied with a 24 V power supply unit. The microSD card and the lithium battery of the system clock are accessible from the rear in the connector bracket.



CP6600

We reserve the right to make technical changes.

CP6606, CP6600 | **Panel PC with ARM Cortex™-A8**

Ordering information	with single-touch screen
7-inch display 800 x 480	CP6606-0001-0020
10.1-inch display 1024 x 600	CP6600-0001-0020

CP6606, CP6600	CP66xx-0001-0020
Housing	aluminium front with steel sheet rear cover
	all connectors at the bottom of the rear side
	1 slot for microSD flash card, accessible from the rear side
	lithium battery of the system clock, accessible from the rear side
	pull-out clamping levers for fast installation without loose parts
	protection class front side IP 54, rear side IP 20
	operating temperature 0…55 °C

Features	CP66xx-0001-0020
Display	7-, 10.1-inch TFT display
Processor	ARM Cortex™-A8, 1 GHz
Motherboard	3½-inch
Slots	–
Free slots	–
Max. card length	–
Memory	1 GB DDR3 RAM
Graphic adapter	integrated in the processor
Ethernet	1 x Ethernet and 1 x EtherCAT on-board
Hard disks/flash	microSD flash card
Power supply	24 V DC
Recommendation	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP6606

CP67xx | “Economy” built-in Panel PC

▶ **www.beckhoff.com/CP67xx**

The CP67xx built-in Panel PC series is designed for installation in the front of a control cabinet or control housing. The CP67xx series combines the Beckhoff Control Panel design with state-of-the-art Industrial PC technology. The right display size and keyboard are available for every application.

With their highly integrated 3½-inch motherboard the CP67xx built-in Industrial PCs represent a high-performance platform for machine construction and plant engineering applications running the TwinCAT automation software under Windows Embedded Compact Standard 7, Windows Embedded Standard 7, Windows 7 Professional, Windows 7 Ultimate or Windows 10 IoT Enterprise. The PC can be equipped with a 5.7-, 12-, 15- or 19-inch LC display, or as a monitor without keys or with different types of keyboard. Optionally, a touch screen or touch pad is available. In addition, a large

We reserve the right to make technical changes.

Front laminates

Without keys

Function keys

Numeric keyboard

Alphanumeric keyboard

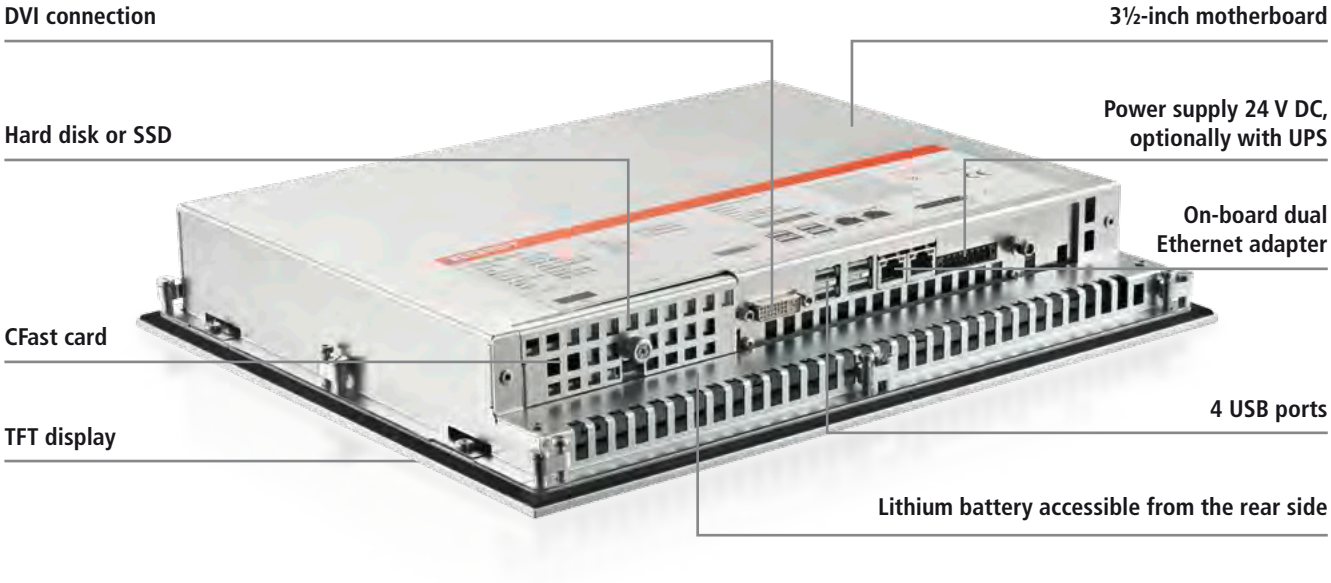
With PLC keys on the sides

number of push-button extensions are available.

A CP67xx Panel PC is equipped with an Intel® Celeron® ULV 1.4 GHz or with Intel® Atom™ with up to four cores and a CFast card. It contains no rotating parts. In each configuration the fanless Panel PCs of this series are approved for ambient temperatures between 0 and 55 °C.

The CP67xx Panel PCs are supplied with a CFast card and a 2½-inch hard disk or SSD. The CP67xx have a 24 V power supply unit. The data media and the lithium battery for the system clock are accessible from the rear.

Due to its two independent Ethernet interfaces, the CP67xx is ideally suited as a compact central processing unit for an EtherCAT control system.



CP67xx | “Economy” built-in Panel PC

The slimline built-in Industrial PC with 3½-inch motherboard

Ordering information	without touch screen	with single-touch screen	with touch pad
Display only			
5.7-inch display 640 x 480	CP6707-0000-0050	CP6707-0001-0050	
12-inch display 800 x 600	CP6701-0000-00xx	CP6701-0001-00xx	
15-inch display 1024 x 768	CP6702-0000-00xx	CP6702-0001-00xx	
19-inch display 1280 x 1024	CP6703-0000-00xx	CP6703-0001-00xx	
Display only, USB A socket in the front			
12-inch display 800 x 600	CP6701-0020-00xx	CP6701-0021-00xx	
15-inch display 1024 x 768	CP6702-0020-00xx	CP6702-0021-00xx	
19-inch display 1280 x 1024	CP6703-0020-00xx	CP6703-0021-00xx	
With function keys			
12-inch display 800 x 600	CP6711-0000-00xx	CP6711-0001-00xx	
15-inch display 1024 x 768	CP6712-0000-00xx	CP6712-0001-00xx	
19-inch display 1280 x 1024	CP6713-0000-00xx	CP6713-0001-00xx	
Numeric keyboard			
12-inch display 800 x 600	CP6721-0000-00xx	CP6721-0001-00xx	CP6721-0002-00xx
15-inch display 1024 x 768	CP6722-0000-00xx	CP6722-0001-00xx	CP6722-0002-00xx
19-inch display 1280 x 1024	CP6723-0000-00xx	CP6723-0001-00xx	CP6723-0002-00xx
Alphanumeric keyboard			
12-inch display 800 x 600	CP6731-0000-00xx	CP6731-0001-00xx	CP6731-0002-00xx
15-inch display 1024 x 768	CP6732-0000-00xx	CP6732-0001-00xx	CP6732-0002-00xx
19-inch display 1280 x 1024	CP6733-0000-00xx	CP6733-0001-00xx	CP6733-0002-00xx
Alphanumeric keyboard with PLC keys on the sides			
15-inch display 1024 x 768	CP6742-0000-00xx	CP6742-0001-00xx	

We reserve the right to make technical changes.

Without keys

Function keys

Numeric keyboard

Alphanumeric keyboard

Alphanumeric keyboard with PLC keys on the sides

CP67xx	CP67xx-xxxx-0040, -0050
Housing	aluminium front with steel sheet rear cover
	drives easily accessible
	all connectors at the bottom of the rear side
	1 slot for one CFast card accessible from the rear side
	lithium battery of the system clock accessible from the rear side
	pull-out clamping levers for fast installation without loose parts
	protection class front side IP 65, rear side IP 20
	operating temperature 0…55 °C

Features	CP67xx-xxxx-0040	CP67xx-xxxx-0050
Display	12-, 15- or 19-inch TFT display	5.7-, 12-, 15- or 19-inch TFT display
Processor	Intel® Celeron® ULV	Intel® Atom™
Motherboard	3½-inch	3½-inch
Slots	optionally 2 PCIe modules or 2 PCI/PCIe plug-in card slots	optionally 2 PCIe modules or 2 PCI/PCIe plug-in card slots
Free slots	optionally 2 PCIe modules or 2 PCI/PCIe plug-in card slots	optionally 2 PCIe modules or 2 PCI/PCIe plug-in card slots
Max. card length	optionally 2 PCIe modules or 2 x 190 mm plug-in cards	optionally 2 PCIe modules or 2 x 190 mm plug-in cards
Memory	2…8 GB DDR3 RAM	2…8 GB DDR3L RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1 or 2 x 2½-inch HDD, SSD or CFast	1 or 2 x 2½-inch HDD, SSD or CFast
RAID 1	2 x 2½-inch HDD, SSD or CFast	–
Power supply	24 V DC	24 V DC
Recommendation	not recommended for new projects	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP67xx	

We reserve the right to make technical changes.

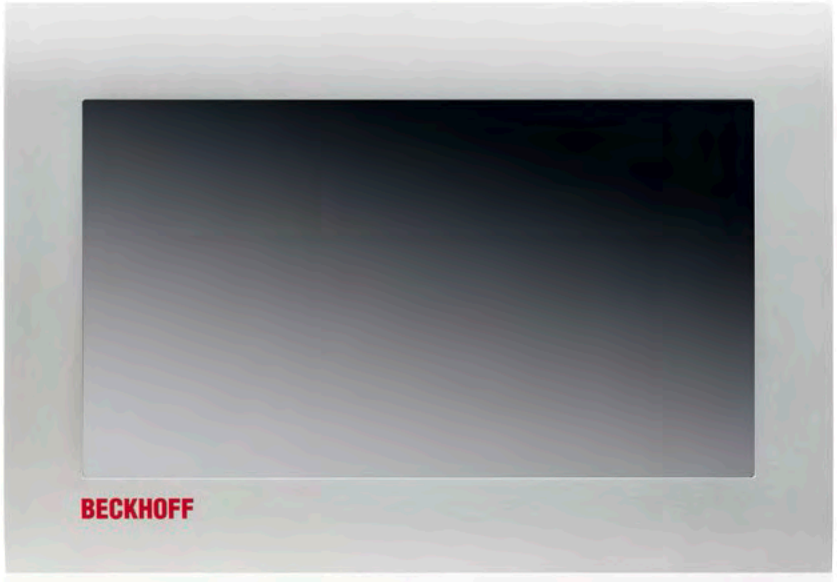
CP6706, CP6700 | "Economy" built-in Panel PC

▶ **www.beckhoff.com/CP6706**
▶ **www.beckhoff.com/CP6700**

With its highly integrated 3½-inch motherboard, the CP6706 and CP6700 built-in Panel PC series is ideally suited for use in mechanical engineering, for example with TwinCAT automation software under Windows Embedded Compact 7, Windows Embedded Standard 7, Windows 7 Professional, Windows 7 Ultimate or Windows 10 IoT Enterprise.

They are designed for installation in the front of a control cabinet and have a 7-inch or 10.1-inch touch screen display. Equipped with an Intel® Atom™ with up to four cores and a CFast card, the CP67xx contain no rotary components.

The CP67xx are supplied with a 24 V power supply unit. The CFast card and the lithium battery of the system clock are accessible from the rear in the connector bracket.



CP6700

We reserve the right to make technical changes.

CP6706, CP6700 | **Panel PC with Intel® Atom™ with up to four cores**

Ordering information			with single-touch screen
7-inch display	800 x	480	CP6706-0001-0050
10.1-inch display	1024 x	600	CP6700-0001-0050

CP6706, CP6700	CP67xx-0001-0050
Housing	aluminium front with steel sheet rear cover
	all connectors at the bottom of the rear side
	1 slot for one CFast card accessible from the rear side
	lithium battery of the system clock, accessible from the rear side
	pull-out clamping levers for fast installation without loose parts
	protection class front side IP 54, rear side IP 20
	operating temperature 0…55 °C

Features	CP67xx-0001-0050
Display	7-, 10.1-inch TFT display
Processor	Intel® Atom™
Motherboard	3½-inch
Slots	–
Free slots	–
Max. card length	–
Memory	2…8 GB DDR3L RAM
Graphic adapter	integrated in the processor
Ethernet	2 on-board
Hard disks/flash	CFast card
Power supply	24 V DC
Recommendation	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP6706

Ordering information	Option
C9900-U214	internal, capacitive 1-second UPS

CP72xx | "Economy" Panel PC with mounting arm

▶ **www.beckhoff.com/CP72xx**

The CP72xx "Economy" Panel PC series is designed for mounting arm installation. Control Panels form the front of the IP 65 Panel PC. The right display size and keyboard are thus available for every application. The CP72xx Industrial PCs represent a powerful platform for use in machine and plant construction, for example using the TwinCAT automation software under Windows 10 IoT Enterprise.

The PC can be equipped with a 12-, 15- or 19-inch LC display as a monitor without keys or with different types of keyboards. Optionally, a touch screen or touch pad is available. In addition, a large number of push-button extensions are available.

Cooling is achieved via cooling ribs between the Control Panel and the add-on PC. A fan inside the closed housing ensures that the heat is distributed evenly. The PC can be operated at up to 45 °C ambient temperature.

The housing is designed for installation on a mounting arm. There is a choice of attaching the mounting arm from above or below. The Panel PC features an integrated rotatable mounting arm adapter for a 48 mm diameter mounting arm tube. Optionally, a rotatable and tiltable mounting arm adapter can be integrated in the Panel PC.

We reserve the right to make technical changes.

Front laminates

Without keys

Function keys

Numeric keyboard

Alphanumeric keyboard

With PLC keys on the sides

The connecting cables are laid through the mounting arm.

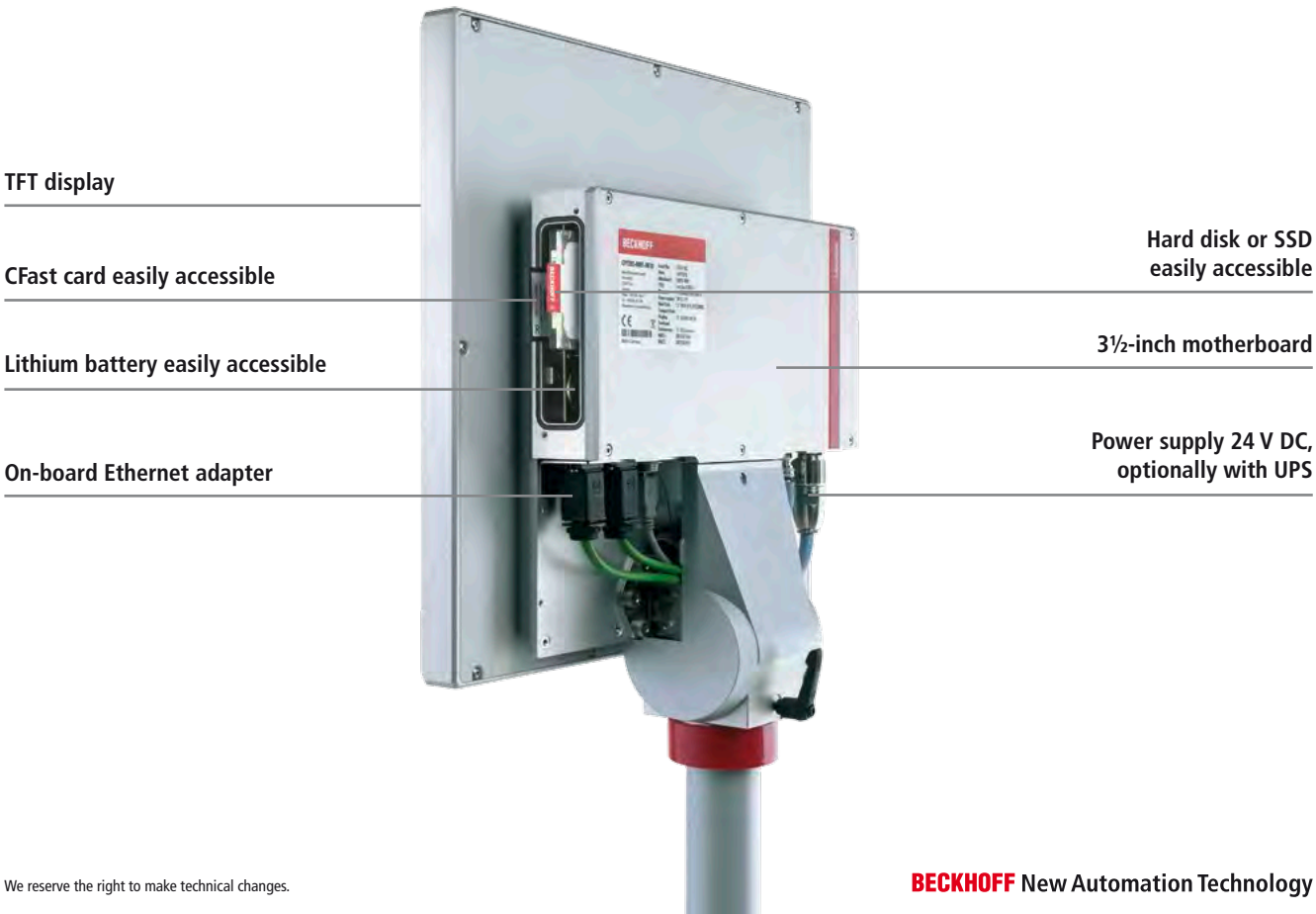
The compact aluminium housing of the CP72xx Panel PCs is equipped with a 3½-inch Beckhoff Motherboard for Intel® Core™ i3/i5/i7 processors of the latest generation.

The Industrial PC connections (up to six) with IP 65 connectors are positioned in the large wiring space and are easily accessible. The wiring area can be opened easily without dismounting the device from the mounting arm, offering fast access to the IP 65 connectors for power supply, Ethernet and optional USB. Prefabricated cables in various lengths are available for all connections.

Due to its two independent Ethernet interfaces the CP72xx is ideally suited as a compact central processing unit for an EtherCAT control system.

The CP72xx series Panel PCs are supplied with a 24 V power supply unit, optionally with integrated uninterruptible power supply (UPS). A battery pack can be connected externally and installed on a DIN rail in the control cabinet.

One or two CFast cards or up to two hard disks or SSDs, as well as the lithium battery for the system clock, are accessible from the rear side underneath a cover. Two hard disks, two SSDs or two CFast cards can be mirrored using the on-board SATA RAID 1 controller.



CP72xx | “Economy” Panel PC

The Industrial PC with mounting arm and 3½-inch motherboard

Ordering information	without touch screen	with single-touch screen	with touch pad
Display only			
12-inch display 800 x 600	CP7201-0000-00xx	CP7201-0001-00xx	
15-inch display 1024 x 768	CP7202-0000-00xx	CP7202-0001-00xx	
19-inch display 1280 x 1024	CP7203-0000-00xx	CP7203-0001-00xx	
Display only, USB A socket in the front			
12-inch display 800 x 600	CP7201-0020-00xx	CP7201-0021-00xx	
15-inch display 1024 x 768	CP7202-0020-00xx	CP7202-0021-00xx	
19-inch display 1280 x 1024	CP7203-0020-00xx	CP7203-0021-00xx	
With function keys			
12-inch display 800 x 600	CP7211-0000-00xx	CP7211-0001-00xx	
15-inch display 1024 x 768	CP7212-0000-00xx	CP7212-0001-00xx	
19-inch display 1280 x 1024	CP7213-0000-00xx	CP7213-0001-00xx	
Numeric keyboard			
12-inch display 800 x 600	CP7221-0000-00xx	CP7221-0001-00xx	CP7221-0002-00xx
15-inch display 1024 x 768	CP7222-0000-00xx	CP7222-0001-00xx	CP7222-0002-00xx
19-inch display 1280 x 1024	CP7223-0000-00xx	CP7223-0001-00xx	CP7223-0002-00xx
Alphanumeric keyboard			
12-inch display 800 x 600	CP7231-0000-00xx	CP7231-0001-00xx	CP7231-0002-00xx
15-inch display 1024 x 768	CP7232-0000-00xx	CP7232-0001-00xx	CP7232-0002-00xx
19-inch display 1280 x 1024	CP7233-0000-00xx	CP7233-0001-00xx	CP7233-0002-00xx
Alphanumeric keyboard with PLC keys on the sides			
15-inch display 1024 x 768	CP7242-0000-00xx	CP7242-0001-00xx	

We reserve the right to make technical changes.

Without keys

Function keys

Numeric keyboard

Alphanumeric keyboard

Alphanumeric keyboard with PLC keys on the sides

CP72xx	CP72xx-xxxx-0050, -0060
Housing	Industrial PC with Control Panel for mounting arm installation
	rotatable mounting arm adapter for Rittal and Rolec mounting arm systems with 48 mm tube from top
	wiring area for up to 6 IP 65 connectors
	1 slot for one 2½-inch hard disk or SSD and 1 slot for one CFast card
	lithium battery of the system clock, changeable from outside
	passive cooling through heat sink structure between Control Panel and add-on PC, internal fan for equal heat distribution to all the walls of the housing
	20 cm free space required around the PC for air circulation
	protection class IP 65
	operating temperature 0…45 °C

Features	CP72xx-xxxx-0050	CP72xx-xxxx-0060
Display	12-, 15- or 19-inch TFT display	12-, 15- or 19-inch TFT display
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	3½-inch	3½-inch
Slots	1 Mini PCI slot	–
Free slots	1 Mini PCI slot	–
Max. card length	Mini PCI	–
Memory	2…16 GB DDR3L RAM	4…32 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board, one of these is led out in the wiring area	2 on-board, one of these is led out in the wiring area
Hard disks/flash	1 or 2 x 2½-inch HDD or SSD, 1 x 2½-inch HDD or SSD and 1 x CFast or 2 x CFast	1 or 2 x 2½-inch HDD or SSD, 1 x 2½-inch HDD or SSD and 1 x CFast or 2 x CFast
RAID 1	2 x 2½-inch HDD or 2 x CFast	2 x 2½-inch HDD or 2 x CFast
Power supply	24 V DC	24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP72xx	

CP77xx | “Economy” Panel PC

▶ **www.beckhoff.com/CP77xx**

The CP77xx Panel PC series is designed for mounting arm installation. Control Panels form the front of the IP 65 Panel PC. The right display size and keyboard are thus available for every application. The CP77xx Industrial PCs represent a powerful platform for use in machine and plant construction, for example using the TwinCAT automation software.

The PC can be equipped with a 12-, 15- or 19-inch LC display, as a monitor without keys or with different types of keyboard. Optionally, a touch screen or touch pad is available. In addition, a large number of push-button extensions are available.

Cooling is achieved directly via the rear panel of the Control Panel. No fan is required. The PC can be operated at up to 45 °C ambient temperature.

We reserve the right to make technical changes.

Front laminates

Without keys

Function keys

Numeric keyboard

Alphanumeric keyboard

The housing is optionally designed for direct wall mounting or for mounting arm installation. The mounting arm can be attached from above or below. If a mounting arm is used, the connection cables are fed through the mounting arm adapter attached centrally at the rear. Prefabricated cables in various lengths are available for the Ethernet connections.

The compact aluminium housing of the Panel PCs CP77xx is equipped with a Beckhoff motherboard for Intel® Celeron® ULV.

Due to its two independent gigabit Ethernet interfaces, the CP77xx are ideally suited as a compact central processing unit for an EtherCAT control system.

The CP77xx series Panel PCs are supplied with a 24 V power supply unit. The CFast card and the lithium battery for the system clock are located under a cover and accessible from the rear.

CP77xx | “Economy” Panel PC

The compact Industrial PC with mounting arm

Ordering information	without touch screen	with single-touch screen	with touch pad
Display only			
12-inch display 800 x 600	CP7701-0000-0040	CP7701-0001-0040	
15-inch display 1024 x 768	CP7702-0000-0040	CP7702-0001-0040	
19-inch display 1280 x 1024	CP7703-0000-0040	CP7703-0001-0040	
Display only, USB A socket in the front			
12-inch display 800 x 600	CP7701-0020-0040	CP7701-0021-0040	
15-inch display 1024 x 768	CP7702-0020-0040	CP7702-0021-0040	
19-inch display 1280 x 1024	CP7703-0020-0040	CP7703-0021-0040	
With function keys			
12-inch display 800 x 600	CP7711-0000-0040	CP7711-0001-0040	
15-inch display 1024 x 768	CP7712-0000-0040	CP7712-0001-0040	
19-inch display 1280 x 1024	CP7713-0000-0040	CP7713-0001-0040	
Numeric keyboard			
12-inch display 800 x 600	CP7721-0000-0040	CP7721-0001-0040	CP7721-0002-0040
15-inch display 1024 x 768	CP7722-0000-0040	CP7722-0001-0040	CP7722-0002-0040
19-inch display 1280 x 1024	CP7723-0000-0040	CP7723-0001-0040	CP7723-0002-0040
Alphanumeric keyboard			
12-inch display 800 x 600	CP7731-0000-0040	CP7731-0001-0040	CP7731-0002-0040
15-inch display 1024 x 768	CP7732-0000-0040	CP7732-0001-0040	CP7732-0002-0040
19-inch display 1280 x 1024	CP7733-0000-0040	CP7733-0001-0040	CP7733-0002-0040

We reserve the right to make technical changes.

Without keys

Function keys

Numeric keyboard

Alphanumeric keyboard

CP77xx	CP77xx-xxxx-0040
Housing	TFT display in three sizes
	aluminium housing, protection class IP 65
	front laminate in four variants
	special keys identified by slide-in labels
	for mounting 4 M6 x 18 mm threaded holes in the backplane
	operating temperature 0…45 °C

Features	CP77xx-xxxx-0040
Display	12-, 15- or 19-inch TFT display
Processor	Intel® Celeron® ULV 1.4 GHz
Motherboard	CP format
Memory	2 GB DDR3 RAM
Graphic adapter	integrated in the processor
Ethernet	2 on-board
Hard disks/flash	CFast card
Power supply	24 V DC
Recommendation	available
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP77xx

C36xx | Panel PC series

▶ **www.beckhoff.com/C36xx**

The Panel PC series C36xx, fitted with Intel® Celeron®, Pentium® or Core™ i3/i5/i7 processors of the latest generation on an ATX motherboard, offers controllers of the highest performance class with 12- or 15-inch TFT display, as a display/computer unit optionally with touch screen. The housing is opened from the rear. All components can be reached quickly and easily.

An optional multi DVD drive for commissioning, data backup and software updates are accessible from the rear side. The drives can be removed without tools once the housing has been opened. Card holders for the plug-in cards generate insensitivity to shocks and vibrations. The card holders can be fixed and removed without tools.

The type plate on the rear provides detailed information regarding the PC's configuration. Data on the function and type is listed for the fitted plug-in cards. Data about

We reserve the right to make technical changes.

C3620

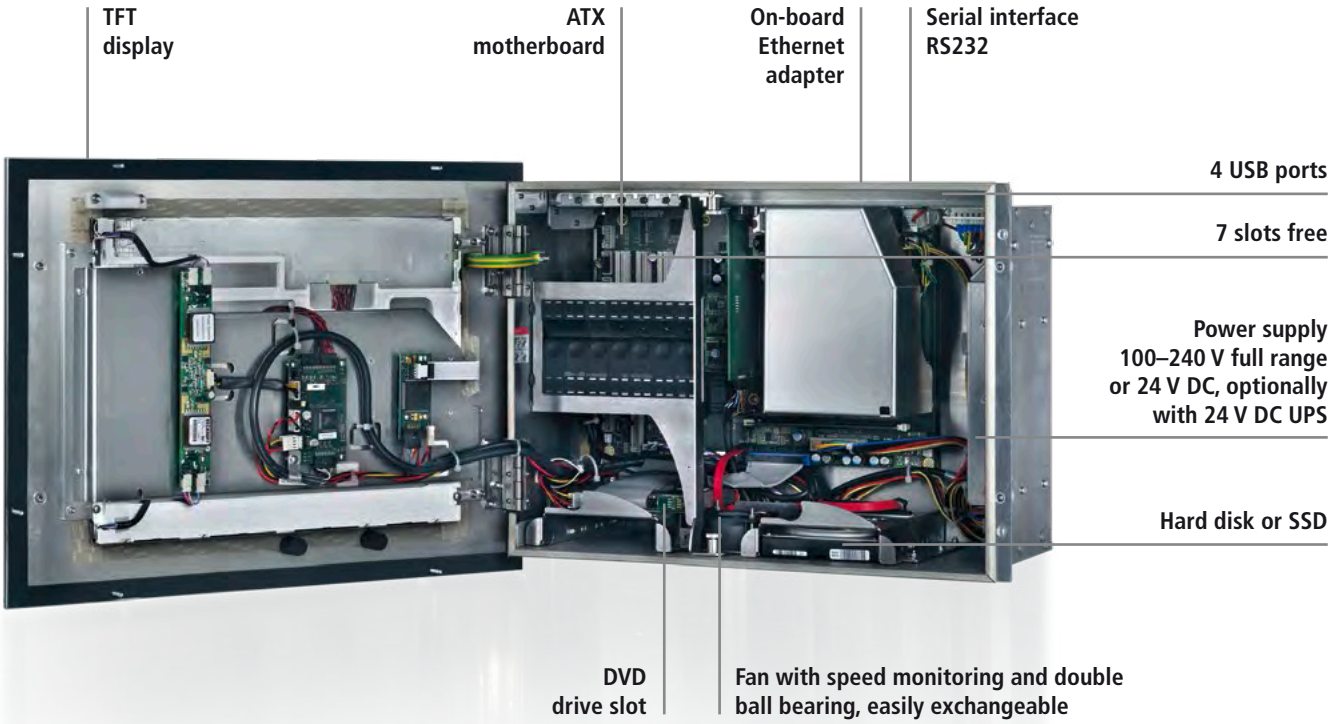
C3640

drives indicates not just the manufacturer and type, but also provides information about type of connection and jumpers.

The construction of the housing of the C36xx series accords with the ATX standard, thus ensuring long-term compatibility with any PC components that will appear in the next few years.

Customer-specific design

For the Industrial PC series represented here, customer-specific designs are available that will be created according to individual requirements, for example with an individual logo on the front or a completely different design of the front laminate.



C3620

C3620 | **Panel PC**

C3620	C3620-0060, -0070
Housing	built-in housing, 388 x 324 mm
	7-slot processor core for ATX motherboard
	PC to be opened from the back side
	all components easily accessible
	7 slots for up to 220 mm long plug-in cards
	card holders, actuated without tools
	protection class front side IP 65, rear side IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 11.5 kg (25.4 lbs)
	dimensions (W x H x D) 388 x 324 x 201 mm (15.3" x 12.8" x 7.9"), depth behind front 193 mm (7.6")

Features	C3620-0060	C3620-0070
Display	12-inch TFT display, resolution 800 x 600	12-inch TFT display, resolution 800 x 600
Touch screen	single-touch as an option	single-touch as an option
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	ATX	ATX
Slots	7	7
Free slots	3 PCI, 2 PCIe x1, 1 PCIe x4 and 1 PCIe x16	2 PCI, 2 PCIe x1, 2 PCIe x4 and 1 PCIe x16
Max. card length	7 x 220 mm	7 x 220 mm
Memory	2…32 GB DDR3L RAM	4…64 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1 x 3½-inch HDD or 2½-inch SSD	1 x 3½-inch HDD or 2½-inch SSD
RAID 1	–	–
Possible disk drives	multi DVD	multi DVD
Power supply	100…240 V AC or 24 V DC	100…240 V AC or 24 V DC
Recommendation	available	available
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C3620	

We reserve the right to make technical changes.

C3640 | **Panel PC**

C3640	C3640-0060, -0070
Housing	built-in housing, 470 x 348 mm
	7-slot processor core for ATX motherboard
	PC to be opened from the back side
	all components easily accessible
	7 slots for up to 235 mm long plug-in cards
	card holders, actuated without tools
	protection class front side IP 65, rear side IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 14.1 kg (31.1 lbs)
	dimensions (W x H x D) 470 x 348 x 199 mm (18.5" x 13.7" x 7.8"), depth behind front 191 mm (7.5")

Features	C3640-0060	C3640-0070
Display	15-inch TFT display, resolution 1024 x 768	15-inch TFT display, resolution 1024 x 768
Touch screen	single-touch as an option	single-touch as an option
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	ATX	ATX
Slots	7	7
Free slots	3 PCI, 2 PCIe x1, 1 PCIe x4 and 1 PCIe x16	2 PCI, 2 PCIe x1, 2 PCIe x4 and 1 PCIe x16
Max. card length	7 x 235 mm	7 x 235 mm
Memory	2…32 GB DDR3L RAM	4…64 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1–2 x 3½-inch HDD or 2½-inch SSD	1–2 x 3½-inch HDD or 2½-inch SSD
RAID 1	2 x 3½-inch HDD	2 x 3½-inch HDD
Possible disk drives	multi DVD	multi DVD
Power supply	100…240 V AC or 24 V DC	100…240 V AC or 24 V DC
Recommendation	available	available
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C3640	

Control cabinet Industrial PCs

▶ www.beckhoff.com/Control-cabinet-PC

C6670 | **Control cabinet industrial server, 2 x Intel® Xeon®**

See page 116

C61xx | **ATX control cabinet Industrial PC, Intel® Celeron®, Pentium® or Core™**

See page 98

C62xx | **ATX control cabinet Industrial PC, Intel® Celeron®, Pentium® or Core™**

See page 102

C52xx | **19-inch slide-in Industrial PC, Intel® Celeron® or Core™**

See page 88

We reserve the right to make technical changes.

C6640/C6650 | **ATX control cabinet Industrial PC, Intel® Celeron®, Pentium® or Core™**

See page 112

C65xx | **Built-in Industrial PC, Intel® Celeron® or Core™**

See page 106

C6920/C6930 | **Compact Industrial PC, Intel® Celeron® or Core™**

See page 118

C60xx | **Ultra-compact Industrial PC, Intel® Atom™**

See page 92

C6905/C6915/C6925 | **Compact Industrial PC, Intel® Celeron® ULV or Atom™**

See page 118

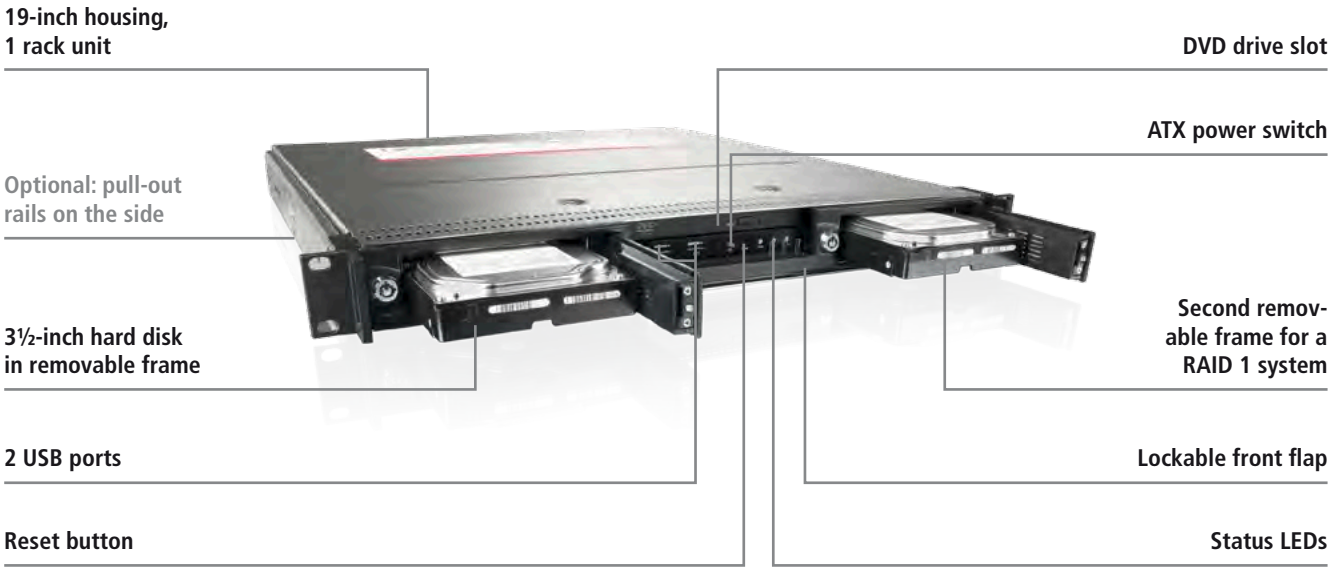
C52xx | Industrial PC series for 19-inch rack installation

▶ **www.beckhoff.com/C52xx**

The C5210 19-inch slide-in Industrial PC measures only one height unit. This IPC has an Intel® Celeron® or Core™ i3/i5/i7 processor of the latest generation on a 3½-inch motherboard with on-board RAID controller and two 3½-inch hard drive removable frames.

The combination of industrially-capable performance and functionality with an extremely flat design makes the C5210 particularly well-suited for space-saving applications. The low installation height is made possible with the Beckhoff 3½-inch motherboards. The motherboard is equipped with a multitude of on-board interfaces, such as two Gigabit Ethernet ports, a DVI and a COM port as well as four USB ports.

The C5210 can be extended with two PCIe modules. A multi DVD drive can be optionally installed behind the front flap. The following operating systems are offered for the 19-inch Industrial PC depending on the CPU: Windows 7 Professional, Windows 7 Ultimate, Windows Embedded Standard 7 or Windows 10 IoT Enterprise.



We reserve the right to make technical changes.

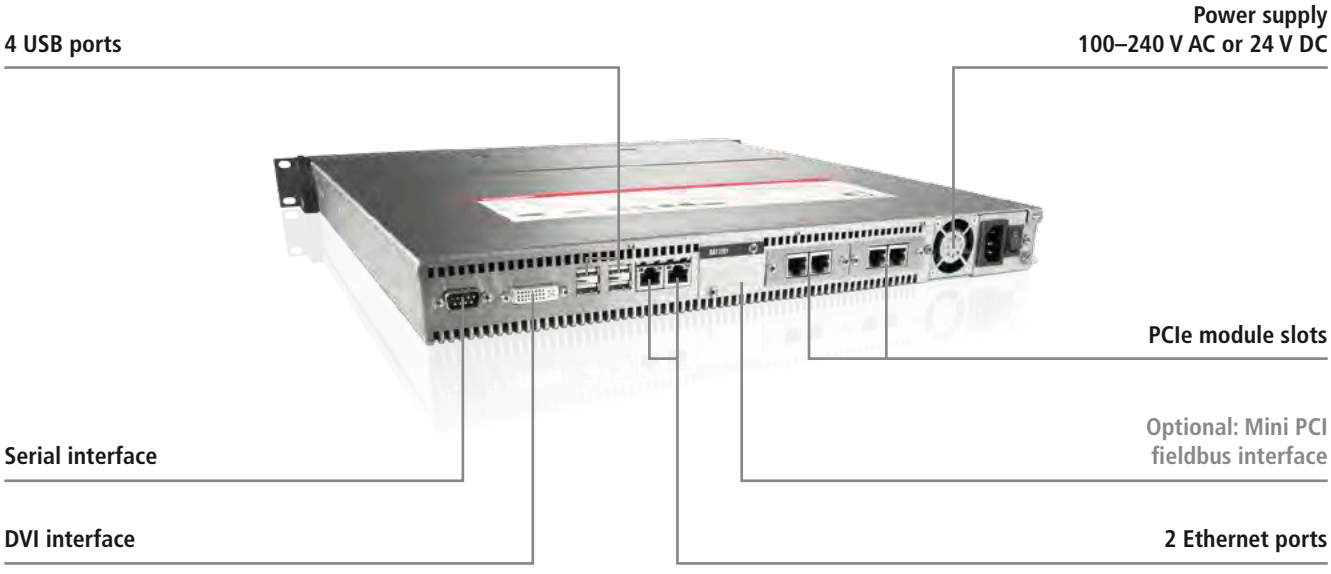
C5210

C5240

The C5240 Industrial PC expands the Industrial PC series by a version with four height units and seven PCI and PCIe plug-in card slots in 24 V DC or 110 to 230 V AC versions. The basic configuration includes three 5¼-inch drive bays behind the front flap. As an option, three additional 5¼-inch drive bays are available ex factory. It is designed for installation in a 19-inch rack and is equipped with components of the highest performance class according to the ATX standard.

A Beckhoff industrial motherboard is used with Intel® Celeron®, Pentium®, Core™ i3/i5/i7 fourth, sixth or seventh generation processors. The seventh generation requires a Windows 10 64-bit operating system. With the fourth and sixth generation, Windows 7 32-bit or 64-bit can be used too.

The C5240 is ideally suited for use in machine and plant engineering, for example with TwinCAT automation software.



C5210

C5210 | 19-inch slide-in Industrial PC

C5210	C5210-0020, -0030
Housing	slide-in housing for 19-inch racks, 1 rack unit
	all drives accessible from the front
	2 removable frames for hard disks
	1 DVD drive slot, 2 USB sockets, reset key and ATX key behind a lockable front flap
	status LEDs
	all connectors at the rear side
	2 PCIe module slots to plug-in Beckhoff PCIe modules or to lead out interfaces of the motherboard ex factory
	protection class IP 20
	operating temperature 0…55 °C
	dimensions (W x H x D) 482.7 x 44 x 493.8 mm (19″ x 1.7″ x 19.44″)
	depth behind the front 471.3 mm (18.56″)

Features	C5210-0020	C5210-0030
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	3½-inch	3½-inch
Slots	1 Mini PCI and 2 PCIe modules	–
Free slots	1 Mini PCI and 2 PCIe modules	–
Max. card length	Mini PCI/PCIe module	–
Memory	2…16 GB DDR3L RAM	4…32 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1–2 x 3½-inch HDD or 2½-inch SSD	1–2 x 3½-inch HDD or 2½-inch SSD
RAID 1	2 x 3½-inch HDD	2 x 3½-inch HDD
Possible disk drives	multi DVD	multi DVD
Power supply	100…240 V AC or 24 V DC	100…240 V AC or 24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C5210	

We reserve the right to make technical changes.

C5240 | 19-inch slide-in Industrial PC

C5240	C5240-0000, -0010
Housing	7-slot slide-in housing ATX for 19-inch racks, 4 rack units
	all slots for full-length plug-in cards
	lockable front flap
	card holders
	protection class IP 50
	operating temperature 0…55 °C
	weight of the basic configuration 17.0 kg (37.5 lbs)
	dimensions (W x H x D) 482 x 177 x 511 mm (19″ x 7″ x 20.1″)
	depth behind the front 471.3 mm (18.56″)

Features	C5240-0000	C5240-0010
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	ATX	ATX
Slots	7	7
Free slots	3 PCI, 2 PCIe x1, 1 PCIe x4 and 1 PCIe x16	2 PCI, 2 PCIe x1, 2 PCIe x4 and 1 PCIe x16
Max. card length	7 x fullsize	7 x fullsize
Memory	2…32 GB DDR3L RAM	4…64 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1–6 x 3½-inch HDD or 2½-inch SSD	1–6 x 3½-inch HDD or 2½-inch SSD
RAID 1	2 x 3½-inch HDD	2 x 3½-inch HDD
Possible disk drives	CD/DVD ROM or multi DVD	CD/DVD ROM or multi DVD
Power supply	100…240 V AC or 24 V DC	100…240 V AC or 24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C5240	

C60xx | Ultra-compact Industrial PC series

▶ **www.beckhoff.com/C60xx**

The series of ultra-compact Industrial PCs that was launched with the C6015 has been highly successfully positioned in the market because of its flexible application possibilities. With the addition of the C6030 ultra-compact Industrial PC, the many benefits of the series such as low space requirements, universal applicability for almost any automation and visualisation task as well as flexible installation are also available for complex applications with the highest performance requirements. Intel® Core™ i processors of the 6th and 7th Generation are used. In this compact size they offer previously unattained CPU performances of up to 3.9 GHz with two cores or 3.4 GHz with four cores. For fine-granular scalability there is a choice of eight different CPU types available.

As the latest addition to the product family, the C6017 multi-core device offers further optional interfaces (up to 2 x RJ45, 2 x USB 2.0), an optional 1-second UPS, or a combination of additional interfaces and UPS, all in a housing that still measures only 82 x 82 x 66 millimeters.

Besides an excellent price-performance ratio, the PCs offer all common industry

We reserve the right to make technical changes.

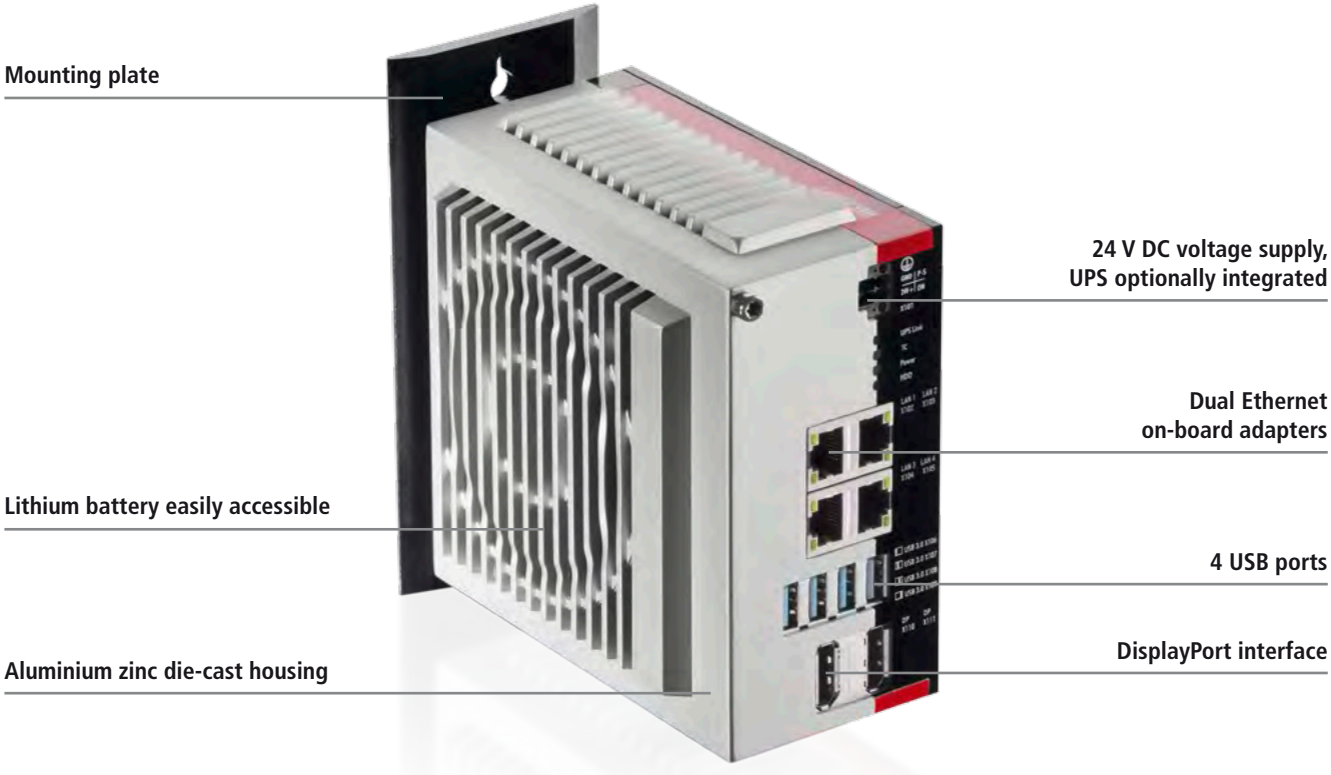
C6015

C6017

C6030

standard features such as a high temperature range, EtherCAT compatibility and high resistance to vibration and shocks. Only processors with long-term availability are used in the C60xx series, ensuring a future-proof investment for the user. Both the new compact motherboard and the combined die-cast zinc and aluminium housing have been developed to ensure the high quality Beckhoff is well-known for, such as industrial compatibility, reliability and products made in Germany.

The extremely flexible mounting concept of the C60xx enables both vertical and horizontal rear wall mounting in the control cabinet. In addition, the symmetrical heat sink of the C6015 allows it to be freely positioned in the corresponding mounting frame. This makes a versatile range of mounting scenarios possible, even in the tightest of mounting spaces, with free orientation of the connection level concentrated on one side, which can be aligned in this way precisely to the direction of the incoming cables.



C6015

C6015 for installation at the rear wall

C6015 for installation at the side wall

C6015 | **Ultra-compact Industrial PC**

C6015	C6015-0010
Housing	fanless industrial PC for space-saving control cabinet installation
	mounting sheet at the rear wall
	all connectors on the same level
	flexible mounting mechanism for the free alignment of the connecting area
	aluminium zinc die-cast housing
	status LEDs
	lithium battery easily accessible
	1 slot for one M.2 SSD easily accessible
	passive, fanless cooling with one-sided cool plate
	5 cm (2″) free space on top and bottom of the PC necessary for air circulation
	protection class IP 20
	operating temperature 0…55 °C
	compact dimensions (W x H x D) 82 x 82 x 40 mm (3.2″ x 3.2″ x 1.6″) without mounting plate

Features	C6015-0010
Processor	Intel® Atom™
Motherboard	compact motherboard
Slots	–
Free slots	–
Max. card length	–
Memory	2…4 GB DDR3L RAM
Graphic adapter	integrated in the processor
Ethernet	2 on-board
Hard disks/flash	M.2 SSD
Power supply	24 V DC
Recommendation	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6015

We reserve the right to make technical changes.

C6017 for installation at the rear wall

C6017 for installation at the side wall

C6017 | **Ultra-compact Industrial PC**

C6017	C6017-0010
Housing	fanless industrial PC for space-saving control cabinet installation
	housing prepared for ex work installation of further configurations
	mounting plate on the rear wall
	all connectors on the same level
	flexible mounting mechanism for the free alignment of the connecting area
	aluminium zinc die-cast housing
	status LEDs
	lithium battery easily accessible
	1 slot for one M.2 SSD easily accessible
	passive, fanless cooling with one-sided cool plate
	5 cm (2") free space on top and bottom of the PC necessary for air circulation
	protection class IP 20
	operating temperature 0…55 °C
	compact dimensions (W x H x D) 82 x 82 x 66 mm (3.2" x 3.2" x 2.6") without mounting plate

Features	C6017-0010
Processor	Intel® Atom™
Motherboard	compact motherboard
Slots	–
Free slots	–
Max. card length	–
Memory	2…4 GB DDR3L RAM
Graphic adapter	integrated in the processor
Ethernet	2 on-board
Hard disks/flash	M.2 SSD
Power supply	24 V DC
Recommendation	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6017

C6030

C6030 | **Ultra-compact Industrial PC**

C6030	C6030-0060
Housing	Industrial PC for space-saving control cabinet installation
	mounting plate on the rear wall for the free alignment of the connecting area
	all connectors on the same level
	flexible mounting mechanism for the free alignment of the connecting area
	aluminium zinc die-cast housing
	status LEDs
	lithium battery easily accessible under the side cover
	2 slots for M.2 SSDs easily accessible under the side cover
	controlled fan with speed monitoring and double ball bearings, exchangeable
	5 cm (2") free space required around the PC for air circulation
	protection class IP 20
	operating temperature 0…50 °C
	compact dimensions (W x H x D) 129 x 133 x 76 mm (5.2" x 5.2" x 2.6") without mounting plate

Features	C6030-0060
Processor	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	compact motherboard
Slots	–
Free slots	–
Max. card length	–
Memory	4…32 GB DDR4 RAM
Graphic adapter	integrated in the processor
Ethernet	2 on-board
Hard disks/flash	2 x M.2 SSD
Power supply	24 V DC
Recommendation	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6030

We reserve the right to make technical changes.

BECKHOFF
GND
24V
P-S
ON
X101
UPS Link
TC
Power
HDD
LAN 1
X102
LAN 2
X103
LAN 3
X104
LAN 4
X105
USB 3.0 X106
USB 3.0 X107
USB 3.0 X108
USB 3.0 X109
DP
X110
DP
X111

C61xx | Industrial PC series for control cabinet installation

▶ **www.beckhoff.com/C61xx**

The C61xx control cabinet PC is equipped with maximum performance class components with Intel® Celeron®, Pentium® or Core™ i3/i5/i7 of the latest generation on an ATX motherboard. The PCs in the C61xx series are constructed according to a uniform plan, optimised for the exploitation of available space and easy accessibility of all components.

The construction of the housing for the C61xx series ensures long-term compatibility with any new PC components that appear over the next few years. If, in a few years, the Industrial PC needs to be upgraded, you swap the motherboard, the processor, the memory or the hard disk, but the housing remains unchanged and is compatible with the technology of the future.

All the PC's connections face upwards, so that the connecting cable can be taken directly to the wiring channel. The side walls are completely passive and allow the Industrial PC to be fitted immediately next to other control cabinet devices.

The housing permits fast access to the fitted components. After removing the front cover, plug-in cards and drives are freely

We reserve the right to make technical changes.

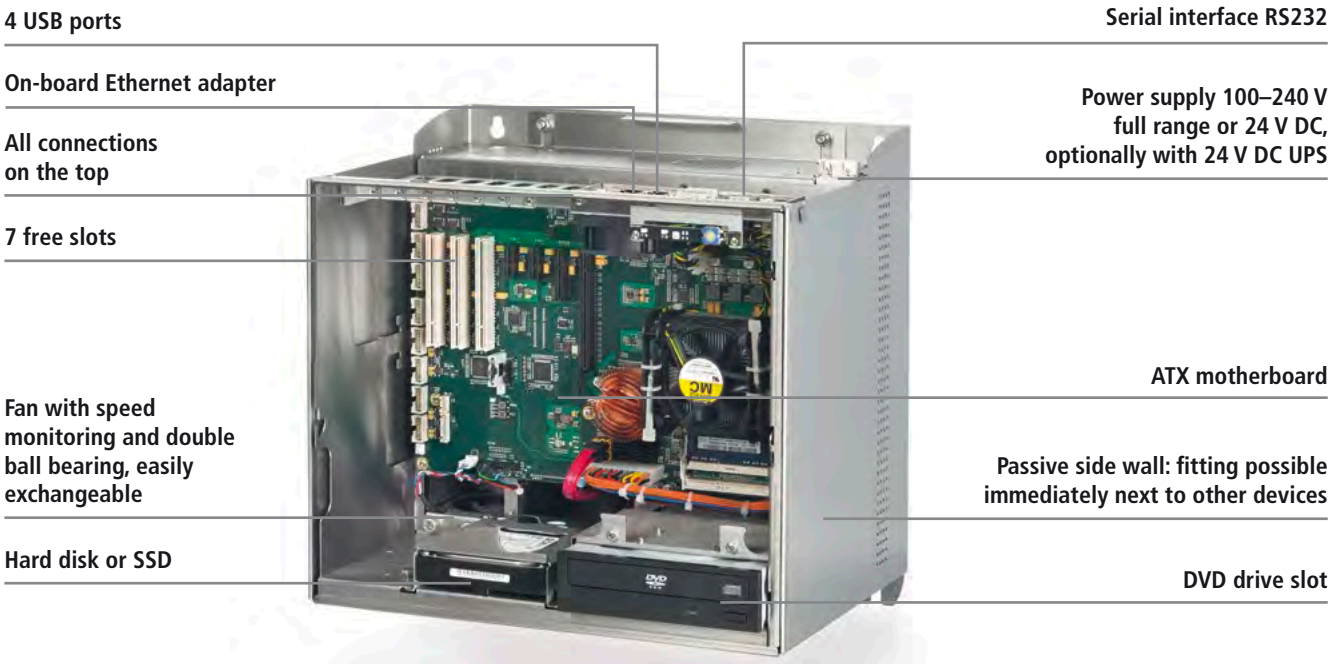
C6140

C6150

accessible. Hard disks are held by spring-loaded ball catches and can be removed in a single action. Three screws must be undone, after which the PC's inner chassis, to which all the components are attached, can be removed from the outer housing. The inner chassis can be placed on a table in any orientation for maintenance purposes. When removed, the inner chassis still has the full function of a PC and can be operated with a standard monitor and a standard keyboard.

The C61xx series PCs are supplied with a 100 to 240 V AC full range or 24 V DC power supply unit. An industrial latching socket strip is used for the power supply. A CD/DVD ROM or multi DVD drive can be fitted. Card holders for the plug-in cards generate insensitivity to shocks and vibrations. The card holders can be fixed and removed without tools.

A type plate is located on the front cover behind an inspection window, giving detailed information about the configuration of the PC. The construction of the housing has been designed to allow individual adaptation, and many features can be adjusted for your application.



C6140 | **Control cabinet Industrial PC**

C6140	C6140-0060, -0070
Housing	7-slot ATX Industrial PC for control cabinet installation
	3 slots for plug-in cards with a length of up to 270 mm and 4 slots for plug-in cards with a length of up to 240 mm
	drives and plug-in cards easily accessible
	all connectors on the top
	detailed PC configuration information on the front
	status LEDs and protected reset key
	card holders, actuated without tools
	protection class IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 14 kg (30.9 lbs)
	dimensions (W x H x D) 383 x 362 x 265 mm (14.9″ x 14.1″ x 10.5″)

Features	C6140-0060	C6140-0070
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	ATX	ATX
Slots	7	7
Free slots	3 PCI, 2 PCIe x1, 1 PCIe x4 and 1 PCIe x16	2 PCI, 2 PCIe x1, 2 PCIe x4 and 1 PCIe x16
Max. card length	3 x 270 mm and 4 x 240 mm	3 x 270 mm and 4 x 240 mm
Memory	2…32 GB DDR3L RAM	4…64 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1–3 x 3½-inch HDD or 2½-inch SSD	1–3 x 3½-inch HDD or 2½-inch SSD
RAID 1	2 x 3½-inch HDD	2 x 3½-inch HDD
Possible disk drives	CD/DVD ROM or multi DVD	CD/DVD ROM or multi DVD
Power supply	100…240 V AC or 24 V DC	100…240 V AC or 24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6140	

We reserve the right to make technical changes.

C6150 | **Control cabinet Industrial PC**

C6150	C6150-0060, -0070
Housing	7-slot ATX Industrial PC for control cabinet installation
	all slots for full-length plug-in cards
	drives and plug-in cards easily accessible
	all connectors on the top
	detailed PC configuration information on the front
	status LEDs and protected reset key
	card holders, actuated without tools
	protection class IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 15 kg (33.1 lbs)
	dimensions (W x H x D) 383 x 423 x 265 mm (15.1″ x 16.7″ x 10.5″)

Features	C6150-0060	C6150-0070
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	ATX	ATX
Slots	7	7
Free slots	3 PCI, 2 PCIe x1, 1 PCIe x4 and 1 PCIe x16	2 PCI, 2 PCIe x1, 2 PCIe x4 and 1 PCIe x16
Max. card length	7 x fullsize	7 x fullsize
Memory	2…32 GB DDR3L RAM	4…64 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1–3 x 3½-inch HDD or 2½-inch SSD	1–3 x 3½-inch HDD or 2½-inch SSD
RAID 1	2 x 3½-inch HDD	2 x 3½-inch HDD
Possible disk drives	CD/DVD ROM or multi DVD	CD/DVD ROM or multi DVD
Power supply	100…240 V AC or 24 V DC	100…240 V AC or 24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6150	

C62xx | Industrial PC series for control cabinet installation

▶ **www.beckhoff.com/C62xx**

The control cabinet PC series C62xx is equipped with maximum performance class components: with Intel® Celeron®, Pentium® or Core™ i3/i5/i7 of the latest generation on an ATX motherboard. The PCs in the C62xx series are constructed according to a uniform plan, optimised for the exploitation of available space and easy accessibility of all components.

The construction of the housing for the C62xx series ensures long-term compatibility with any new PC components that appear over the next few years. If, in a few years, the Industrial PC needs to be upgraded, you swap the motherboard, the processor, the memory or the hard disk, but the housing remains unchanged, and is compatible with the technology of the future.

All the PC's connections face to the front. The inner chassis can be drawn out forward on telescopic rails, thus offering free access to all the fitted components.

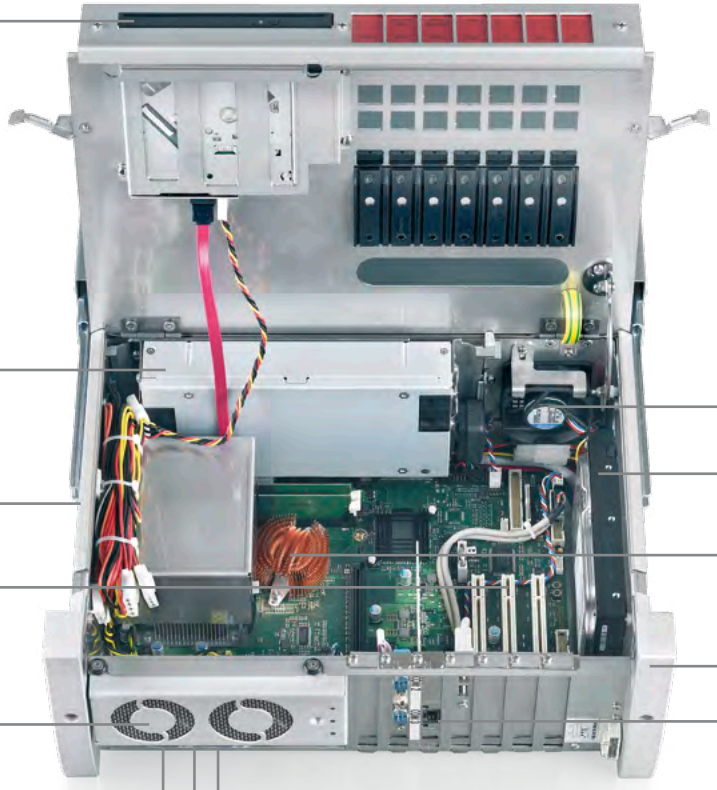
The C62xx series PCs are offered with a 100 to 240 V AC full range or 24 V DC power supply unit. An industrial latching socket strip is used for the power supply.

We reserve the right to make technical changes.

C6240

C6250

Card holders for the plug-in cards generate insensitivity to shocks and vibrations. The card holders can be fixed and removed without tools. Data describing the function and type for the fitted plug-in cards is listed on the front.



DVD drive slot

Power supply 100–240 V full range or 24 V DC, optionally with 24 V DC UPS

Passive side wall: fitting possible immediately next to other devices

7 free slots

Fan with speed monitoring and double ball bearing, easily exchangeable

Serial interface RS232

Fan with speed monitoring and double ball bearing, easily exchangeable

Hard disk or SSD

ATX industrial motherboard

Inner chassis can be pulled forward

All connections on the front

On-board Ethernet adapter

4 USB ports

C6240 | **Control cabinet Industrial PC**

C6240	C6240-0060, -0070
Housing	7-slot ATX Industrial PC for control cabinet installation
	mounting sheet for horizontal PC installation
	all slots for plug-in cards with a length of up to 190 mm
	drives and plug-in cards easily accessible
	all connectors on the front
	detailed PC configuration information on the front
	status LEDs and protected reset key
	card holders, actuated without tools
	protection class IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 12.3 kg (27.2 lbs)
	dimensions (W x H x D) 430 x 170 x 274 mm (16.9" x 6.7" x 10.8")

Features	C6240-0060	C6240-0070
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	ATX	ATX
Slots	7	7
Free slots	3 PCI, 2 PCIe x1, 1 PCIe x4 and 1 PCIe x16	2 PCI, 2 PCIe x1, 2 PCIe x4 and 1 PCIe x16
Max. card length	7 x 190 mm	7 x 190 mm
Memory	2…32 GB DDR3L RAM	4…64 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1 x 3½-inch HDD or 2 x 2½-inch HDD or SSD	1 x 3½-inch HDD or 2 x 2½-inch HDD or SSD
RAID 1	2 x 2½-inch HDD	2 x 2½-inch HDD
Possible disk drives	multi DVD	multi DVD
Power supply	100…240 V AC or 24 V DC	100…240 V AC or 24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6240	

We reserve the right to make technical changes.

C6250 | Control cabinet Industrial PC

C6250	C6250-0070, -0080
Housing	7-slot ATX Industrial PC for control cabinet installation
	mounting sheet for horizontal installation
	4 slots for plug-in cards with a length of up to 220 mm and 3 slots for plug-in cards with a length of up to 190 mm
	drives and plug-in cards easily accessible
	all connectors on the front
	detailed PC configuration information on the front
	status LEDs and protected reset key
	card holders, actuated without tools
	protection class IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 19.8 kg (43.7 lbs)
	dimensions (W x H x D) 680 x 184 x 270 mm (26.8" x 7.2" x 10.7")

Features	C6250-0070	C6250-0080
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	ATX	ATX
Slots	7	7
Free slots	3 PCI, 2 PCIe x1, 1 PCIe x4 and 1 PCIe x16	2 PCI, 2 PCIe x1, 2 PCIe x4 and 1 PCIe x16
Max. card length	7 x 190 mm	7 x 190 mm
Memory	2…32 GB DDR3L RAM	4…64 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1–3 x 3½-inch HDD or 2½-inch SSD	1–3 x 3½-inch HDD or 2½-inch SSD
RAID 1	2 x 3½-inch HDD	2 x 3½-inch HDD
Possible disk drives	CD/DVD ROM or multi DVD	CD/DVD ROM or multi DVD
Power supply	100…240 V AC or 24 V DC	100…240 V AC or 24 V DC
Recommendation	available	available
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6250	

C65xx | Industrial PC series for control cabinet installation

▶ **www.beckhoff.com/C65xx**

The C65xx Industrial PC series is designed to be installed in control cabinet walls or in the rear panel of a control housing or console housing. The heat sink of the Industrial PC is fed to the outside through a suitable cut-out in the panel or wall of the control cabinet. Power dissipation from the processor and chipset takes place directly to ambient.

Integrated seals provide for an IP 65 closure. This enables high thermal stability and at the same time fanless operation. Industrial PCs of type C65xx are thus completely without rotating parts. Installation in a control housing in combination with a Beckhoff Control Panel results in a fanless Panel PC that can be operated at ambient temperatures up to 45 °C.

The compact housing is equipped with a 3½-inch motherboard for Intel® Celeron® or Core™ i3/i5/i7 of the latest generation. All of the PC's connectors are located on the top of the housing. The C65xx series PCs are supplied with an integrated power supply unit with 24 V DC input voltage, optionally with integrated uninterruptible power

We reserve the right to make technical changes.

C6515
basic configuration

C6515
with PCIe module slots

C6525
basic configuration

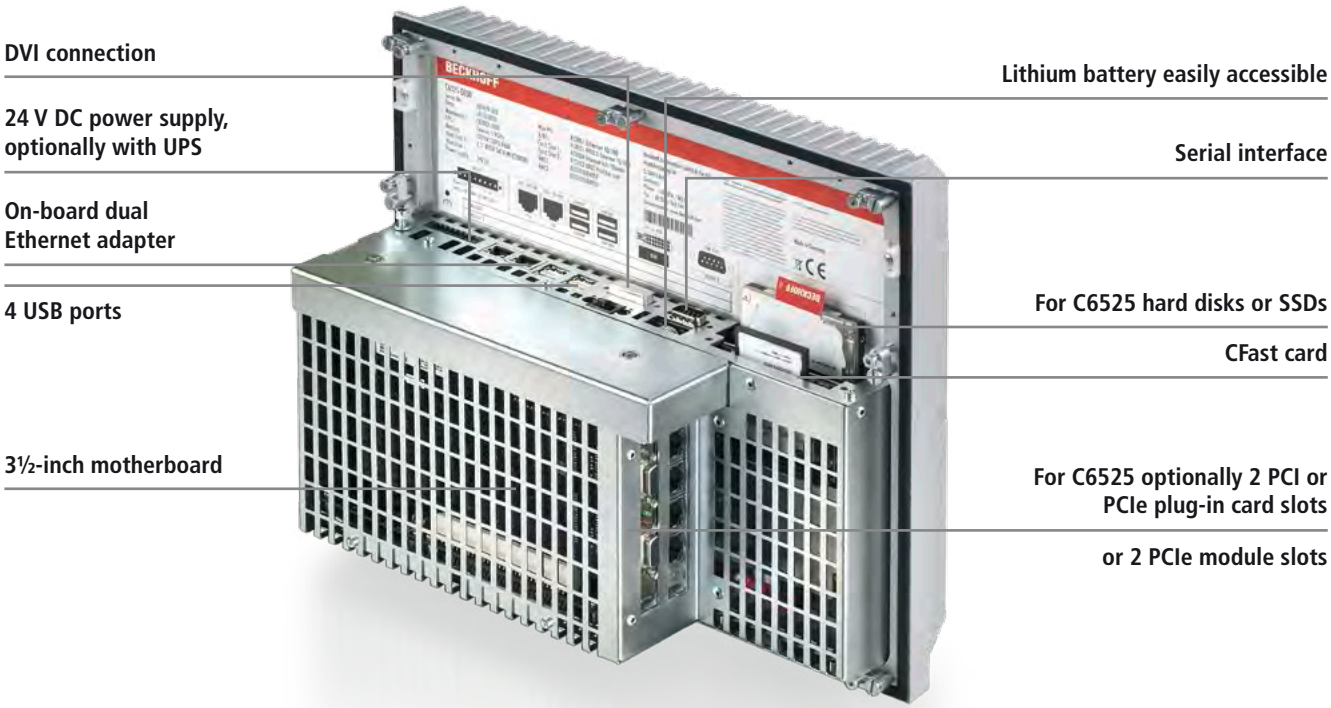
C6525
with PCIe module slots

C6525
with plug-in card slots

supply (UPS). A battery pack can be connected externally and installed on a DIN rail close to the PC.

Industrial PCs from this series and Beckhoff Control Panels as control units make an ideal combination for high-performance control platforms in mechanical engineering applications, particularly in conjunction with TwinCAT automation software under Windows 10 IoT Enterprise. Due to their two independent Ethernet interfaces the C6515 and C6525 Industrial PCs are ideally suited as compact central processing units for an EtherCAT control system.

The on-board SATA RAID 1 controller can mirror two hard disks, two SSDs or two CFast cards. If one of the RAID disks fails, the system continues to run. The faulty data medium can be replaced and mirrored during operation.



C6515 | Fanless built-in Industrial PC

C6515	C6515-0050, -0060
Housing	built-in Industrial PC with external cooling to be mounted in the back panel of a control housing or in the wall of a control cabinet
	2 slots for CFast
	CFast and lithium battery of the system clock easily exchangeable
	passive cooling through heat sink structure outside
	20 cm free space required around the heat sink of the PC for air circulation
	protection class outside IP 65, inside IP 20
	operating temperature outside 0…45 °C, inside 0…55 °C
	weight of the basic configuration 3 kg (6.61 lbs)
	dimensions (W x H x D) 240 x 230 x 81 mm (9.5″ x 9.1″ x 3.2″)

Features	C6515-0050	C6515-0060
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	3½-inch	3½-inch
Slots	1 Mini PCI, optionally 2 PCIe modules	–
Free slots	1 Mini PCI for NOVRAM and optionally 2 PCIe modules	–
Max. card length	Mini PCI, optionally 2 PCIe modules	–
Memory	2…16 GB DDR3L RAM	4…32 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1 or 2 x CFast	1 or 2 x CFast
RAID 1	2 x CFast	2 x CFast
Power supply	24 V DC	24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6515	

We reserve the right to make technical changes.

C6515 with PCIe module slots

Extension for PCIe modules

The built-in PCs C6515 can be expanded by two additional PCIe module slots. The inner enclosure cover has a 26 mm deep recess to accomodate PCIe modules (see above).

The module slots can accept Beckhoff PCIe modules, for example, the FC9062. Module slots also enable the usage of field bus cards e.g. FC3161 or FC9361.

PCIe module FC9062, dual gigabit Ethernet

Ordering information	Options for C6515
C9900-B502	2 PCIe module slots integrated inside C6515, to plug-in Beckhoff PCIe modules or to lead out interfaces of the motherboard ex factory. The depth of the inner enclosure cover is increased by 26 mm (1 “).

C6525 | Fanless built-in Industrial PC

C6525	C6525-0050, -0060
Housing	built-in Industrial PC with external cooling to be mounted in the back panel of a control housing or in the wall of a control cabinet
	1 slot for a 2½-inch hard disk or SSD and 1 slot for CFast
	hard disk, SSD, CFast and lithium battery of the system clock easily exchangeable
	passive cooling through heat sink structure outside
	20 cm free space required around the heat sink of the PC for air circulation
	protection class outside IP 65, inside IP 20
	operating temperature outside 0…45 °C, inside 0…55 °C
	weight of the basic configuration 5.9 kg (13.0 lbs)
	dimensions (W x H x D) 330 x 275 x 82 mm (13″ x 10.8″ x 3.2″)

Features	C6525-0050	C6525-0060
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	3½-inch	3½-inch
Slots	1 Mini PCI, optionally 2 PCIe modules or 2 plug-in card slots	–
Free slots	1 Mini PCI and optionally 2 PCIe modules or 2 PCI/PCIe plug-in card slots	–
Max. card length	Mini PCI, optionally 2 PCIe modules or 2 x 190 mm plug-in cards	–
Memory	2…16 GB DDR3L RAM	4…32 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	2½-inch HDD or SSD and/or CFast or 2 x CFast or 2 x 2½-inch HDD or SSD	2½-inch HDD or SSD and/or CFast or 2 x CFast or 2 x 2½-inch HDD or SSD
RAID 1	2 x 2½-inch HDD or 2 x CFast	2 x 2½-inch HDD or 2 x CFast
Power supply	24 V DC	24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6525	

We reserve the right to make technical changes.

C6525 with PCIe module slots

C6525 with plug-in card slots

Extension for PCIe modules

The built-in PCs C6525 can be expanded by two additional PCIe module slots. The inner enclosure cover has a 27 mm deep recess to accommodate PCIe modules (see above). The module slots can accept Beckhoff PCIe modules, for example, the FC9062. Module slots also enable the usage of field bus cards e.g. FC3161 or FC9361.

Ordering information	Options for C6525
C9900-B503	2 PCIe module slots integrated inside C6525, to plug-in Beckhoff PCIe modules or to lead out interfaces of the motherboard ex factory. The depth of the inner enclosure cover is increased by 27 mm (1.1“).

Extension for PCI and PCIe plug-in cards

The built-in PCs C6525 can be expanded by two slots for standard PC plug-in cards. They can accept conventional PC plug-in cards up to 190 mm in length. The 58 mm deeper hood at the rear (see above) covers a backplane that provides a choice of two PCI slots, two PCI Express slots or one PCI and one PCI Express slot. Card holders ensure the secure fixation of large cards.

Ordering information	Options for C6525
C9900-B505	2 PCIe plug-in card slots on the passive backplane integrated inside C6525, to plug-in PCIe x1 cards up to 190 mm (6.3“) length. The depth of the inner enclosure cover is increased by 58 mm (2.3“).
C9900-B509	2 PCI plug-in card slots on the passive backplane integrated inside C6525, to plug-in PCI cards up to 190 mm (6.3“) length, the depth of the inner enclosure cover is increased by 58 mm (2.3“).
C9900-B513	1 PCI and 1 PCIe plug-in card slot on a passive backplane integrated inside C6525, to plug-in one PCI and one PCIe x1 card up to 190 mm (6.3“) length. The depth of the back cover is increased by 58 mm (2.3“).

C6640/C6650 | Industrial PC series for control cabinet installation

▶ **www.beckhoff.com/C66xx**

The C6640/C6650 control cabinet PC series includes two devices, both of which are equipped with top-performance components with Intel® Celeron®, Pentium® or Core™ i3/i5/i7 of the latest generation on an ATX motherboard. All slots are available for plug-in cards with a length of up to 210 mm. Graphics and Ethernet adapters are already available on-board, without taking up a slot.

All PC connections face upwards, so that the connecting cable can be taken directly to the wiring channel. The side walls are completely passive, and allow the Industrial PC to be fitted immediately next to other control cabinet devices.

The C6640/C6650 series is designed for optimum space utilisation and easy accessibility of all components. The C6640 is the most compact PC with ATX motherboard but nevertheless offers convenient access to drives, memory and plug-in cards.

The C6650 features hard drive removable frames which, together with the on-board

We reserve the right to make technical changes.

C6640

C6650

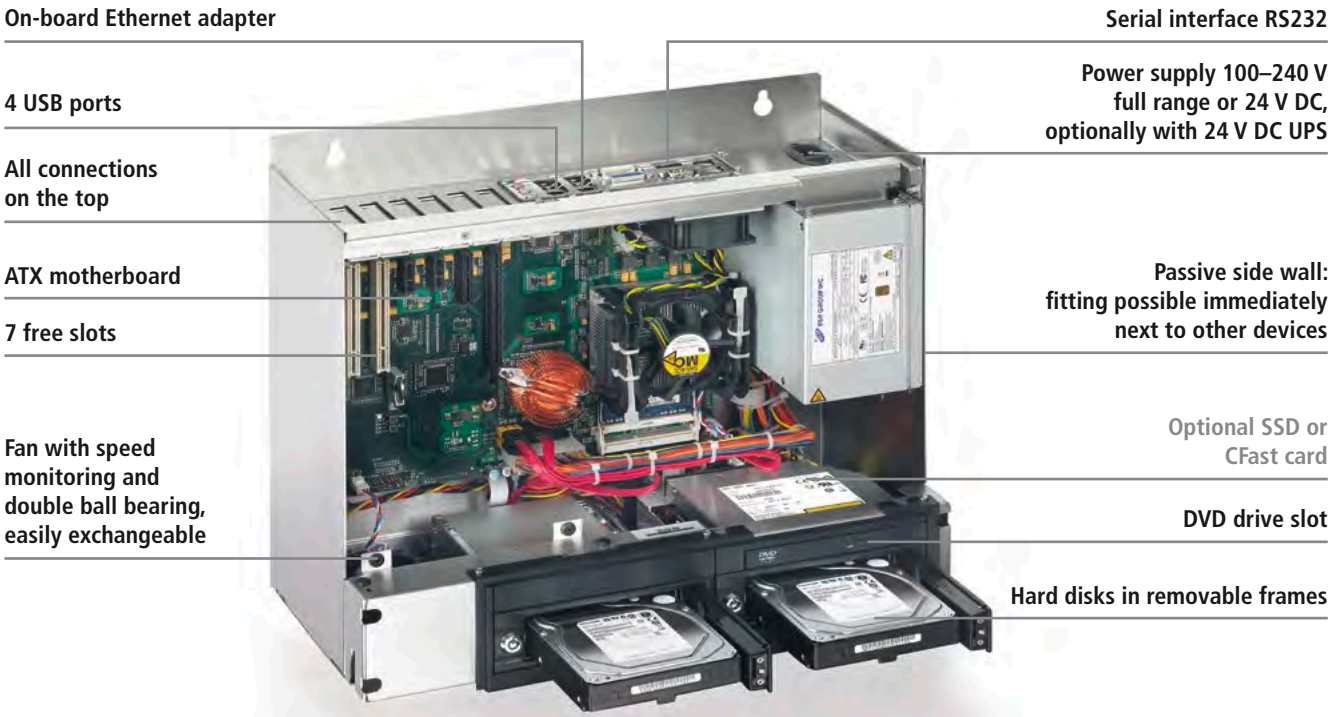
RAID controller, form a RAID 1 system with two mirrored hard disks. This ensures high data security. Hard disks which failed can easily be exchanged during operation.

The housing design of the C6640/C6650 series ensures long-term compatibility with new PC components. The motherboard, processor, memory or hard disk are upgradable, while the same housing can be used for years to come.

The device can be equipped with a multi DVD drive. A choice of a CFast socket or a 2½-inch SSD slot is offered for a flash disk. Card holders for the plug-in cards ensure resistance to impacts and vibrations. The C6640/C6650 series PCs are supplied with 100 to 240 V AC full range or 24 V DC power supply unit.

A type plate is located on the top of the front cover, giving detailed information about the PC configuration.

The housing design offers plenty of scope for adjustment to the respective application.



C6640 | **Control cabinet Industrial PC**

C6640	C6640-0040, -0050
Housing	7-slot ATX Industrial PC for control cabinet installation
	all slots for up to 210 mm long plug-in cards
	drives and plug-in cards easily accessible
	2 brackets to led out serial interfaces
	all connectors on the top
	detailed PC configuration information on the front
	card holders, actuated without tools
	protection class IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 11 kg (24.3 lbs)
	dimensions (W x H x D) 371 x 336 x 198 mm (14.6″ x 13.2″ x 7.8″)

Features	C6640-0040	C6640-0050
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	ATX	ATX
Slots	7	7
Free slots	3 PCI, 2 PCIe x1, 1 PCIe x4 and 1 PCIe x16	2 PCI, 2 PCIe x1, 2 PCIe x4 and 1 PCIe x16
Max. card length	7 x 210 mm	7 x 210 mm
Memory	2…32 GB DDR3L RAM	4…64 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1 x 3½-inch and 1 x 2½-inch HDD or SSD or CFast	1 x 3½-inch and 1 x 2½-inch HDD or SSD or CFast
RAID 1	–	–
Possible disk drives	multi DVD	multi DVD
Power supply	100…240 V AC or 24 V DC	100…240 V AC or 24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6640	

We reserve the right to make technical changes.

C6650 | Control cabinet Industrial PC

C6650	C6650-0040, -0050
Housing	7-slot ATX Industrial PC for control cabinet installation
	all slots for up to 210 mm long plug-in cards
	2 removable frames for hard disks
	drives and plug-in cards easily accessible
	3 brackets to led out serial interfaces
	all connectors on the top
	detailed PC configuration information on the front
	card holders, actuated without tools
	protection class IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 12 kg (26.5 lbs)
	dimensions (W x H x D) 410 x 360 x 201 mm (16.1" x 14.2" x 7.9")

Features	C6650-0040	C6650-0050
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	ATX	ATX
Slots	7	7
Free slots	3 PCI, 2 PCIe x1, 1 PCIe x4 and 1 PCIe x16	2 PCI, 2 PCIe x1, 2 PCIe x4 and 1 PCIe x16
Max. card length	7 x 210 mm	7 x 210 mm
Memory	2…32 GB DDR3L RAM	4…64 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1–2 x 3½-inch and 1 x 2½-inch HDD or SSD or CFast	1–2 x 3½-inch and 1 x 2½-inch HDD or SSD or CFast
RAID 1	2 x 3½-inch HDD	2 x 3½-inch HDD
Possible disk drives	multi DVD	multi DVD
Power supply	100…240 V AC or 24 V DC	100…240 V AC or 24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6650	

C6670 | Industrial server for control cabinet installation

▶ **www.beckhoff.com/C6670**

The C6670 and a Beckhoff Control Panel with DVI and USB connection make an ideal combination, representing a powerful platform for machine construction and plant engineering applications with the TwinCAT automation software.

In combination with TwinCAT 3, two Intel® Xeon® processors, each with 6, 8, 12, 16 or 20 cores on one motherboard with two Gigabit Ethernet controllers and a powerful graphics card produce a machine or plant controller that offers computing power for completely new ideas. Apart from the extremely high performance, up to 1024 GB DDR4 RAM, 5 or 6 free plug-in card slots are also available for several camera interface cards for video evaluation.

All connections of the industrial server face upwards, so that the connecting cables can be taken directly to the wiring channel. The side walls are completely passive, and allow the industrial server to be fitted immediately next to other control cabinet devices.

The C6670 features two hard drive removable frames which, together with the on-board RAID controller, form a RAID 1 system with two mirrored hard disks or SSDs. This ensures high data security. Hard disks or SSDs which failed can easily be exchanged during operation.

The device can be equipped with a multi DVD drive. Card holders for the plug-in cards ensure resistance to impacts and vibrations. The C6670 offers convenient access to drives, memory and plug-in cards. The industrial server is supplied with a 100 to 240 V AC full range power supply unit.

A type plate is located on the top of the front cover, giving detailed information about the server configuration.

We reserve the right to make technical changes.

C6670 | **Control cabinet industrial server**

C6670	C6670-0000, -0010
Housing	6-slot SSI EEB industrial server for control cabinet installation
	all slots for full-size plug-in cards
	2 removable frames for hard disks
	drives and plug-in cards easily accessible
	all connectors on the top
	detailed PC configuration information on the front
	protection class IP 20
	operating temperature 0…45 °C
	weight of the basic configuration 16 kg (35.3 lbs)
	dimensions (W x H x D) 410 x 480 x 201 mm (16.1″ x 18.9″ x 7.9″)

Features	C6670-0000	C6670-0010
Processor	2 x Intel® Xeon® with 6 or 12 cores per processor	2 x Intel® Xeon® with 8, 12, 16 or 20 cores per processor
Motherboard	SSI EEB	SSI EEB
Slots	6	6
Free slots	1 PCIe x4 Gen2.x, 1 PCIe x8 Gen3 and 3 PCIe x16 Gen3	3 PCIe x8 and 3 PCIe x16
Max. card length	6 x fullsize	6 x fullsize
Memory	64…1024 GB DDR4 RAM ECC	64…1024 GB DDR4 RAM ECC
Graphic adapter	graphic card, 1 DVI-I and 1 DVI-D connector, occupies a PCIe x16 slot	graphic card, 1 DVI-I and 1 DVI-D connector, occupies a PCIe x16 slot
Ethernet	2 on-board	2 on-board
Hard disks/flash	1–2 x 3½-inch HDD or 1–2 x 2½-inch HDD or SSD	1–2 x 3½-inch HDD or 1–2 x 2½-inch HDD or SSD
RAID 1	2 x 3½-inch HDD or 2 x 2½-inch HDD or SSD	2 x 3½-inch HDD or 2 x 2½-inch HDD or SSD
Possible disk drives	multi DVD	multi DVD
Power supply	100…240 V AC	100…240 V AC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6670	

C69xx | Industrial PC series for control cabinet installation

▶ **www.beckhoff.com/C69xx**

The compact aluminium housing of the C69xx Industrial PCs is equipped with a 3½-inch motherboard. All PC connections are on one side of the housing. The PC can optionally be equipped with mounting plates on two sides and fastened with screws in the control cabinet. Installation is possible at the rear panel or on the right-hand side panel.

The C69xx series PCs are supplied with a 24 V DC power supply unit, optionally with integrated uninterruptible power supply (UPS). A battery pack can be connected externally and installed on a DIN rail close to the PC. Cooling fins behind the right-hand side panel enable fanless operation of the PC at temperatures up to 55 °C. The four types of Industrial PCs in the C69xx series differ in their processors and data storage devices.

Cooling of the C6915 with Intel® Atom™ with up to four cores and the C6925 with Intel® Celeron® ULV or Intel® Atom™ with up to four cores requires no fan. The basic configuration of the C6915 and C6925 features a flash disk, thus creating PCs without moving parts. A hard disk or a second flash card can be integrated in all of the PCs from this series as an option.

The C6920 with Intel® Celeron® or Core™ i3/i5/i7 of the latest generation has an easily exchangeable fan cartridge on the underside

C6905

We reserve the right to make technical changes.

C6915

C6920
basic configuration

C6920
with plug-in card slots

C6925

C6930
basic configuration

C6930
with plug-in card slots

of the housing. The C6930 Industrial PC is also offered with Intel® Celeron® or Core™ i3/i5/i7 of the latest generation. It has a SATA RAID controller for mirroring two hard disks, SSDs or CFast cards. In the basic configuration, one of the two hard disk slots is equipped with a 2½-inch drive. A second hard disk is offered as an option. In addition, a CFast slot is accessible behind the front cover.

Industrial PCs of this series and a Beckhoff Control Panel with DVI and USB connection make an ideal combination and offer a high-performance control platform for mechanical engineering applications, particularly in conjunction with the TwinCAT automation software under Windows 10 IoT Enterprise, up to the 6th generation of Core processor also under Windows 7 Professional, Windows 7 Ultimate, Windows Embedded Standard 7, with Intel® Atom™ also under Windows Embedded Compact 7. Due to its two independent Ethernet interfaces, the C69xx is ideally suited as a compact central processing unit for an EtherCAT control system.

C6905 | “Economy” control cabinet Industrial PC

C6905	C6905-0010
Housing	fanless industrial PC for space-saving control cabinet installation
	mounting sheet at the rear wall
	all connectors on the front
	status LEDs
	passive cooling without fan
	5 cm (2”) free space on top and bottom of the PC necessary for air circulation
	protection class IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 0.9 kg (1.9 lbs)
	compact dimensions (W x H x D) 45 x 163 x 115 mm (1.8” x 6.4” x 4.5”) without mounting plate

Features	C6905-0010
Processor	Intel® Atom™
Motherboard	3½-inch
Slots	–
Free slots	–
Max. card length	–
Memory	2…8 GB DDR3L RAM
Graphic adapter	integrated in the processor
Ethernet	2 on-board
Hard disks/flash	1 x 2½-inch HDD or SSD or CFast
Power supply	24 V DC
Recommendation	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6905

Ordering information	Option
C9900-U214	internal, capacitive 1-second UPS

We reserve the right to make technical changes.

C6915 | **Control cabinet Industrial PC**

C6915	C6915-0010
Housing	fanless industrial PC for space-saving control cabinet installation
	mounting sheet at the rear wall
	all connectors on the front
	status LEDs
	lithium battery accessible behind the front flap
	1 slot for one Compact Flash card behind the front flap
	passive cooling without fan
	5 cm (2") free space on top and bottom of the PC necessary for air circulation
	protection class IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 1.25 kg (2.8 lbs)
	compact dimensions (W x H x D) 48 x 164 x 119 mm (1.9" x 6.5" x 4.7") without mounting plate

Features	C6915-0010
Processor	Intel® Atom™
Motherboard	3½-inch
Slots	–
Free slots	–
Max. card length	–
Memory	2…8 GB DDR3L RAM
Graphic adapter	integrated in the processor
Ethernet	2 on-board
Hard disks/flash	2½-inch HDD or SSD or 1 x CFast or 2 x CFast
Power supply	24 V DC
Recommendation	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6915

C6920 | **Control cabinet Industrial PC**

C6920	C6920-0050, -0060
Housing	Industrial PC for space-saving control cabinet installation
	mounting sheet at the rear wall
	all connectors on the front
	status LEDs
	lithium battery accessible behind the front flap
	1 slot for one 2½-inch hard disk or SSD behind the front flap
	1 slot for one CFast card behind the front flap
	fan cartridge with speed control and double ball bearing fans, accessible from the front
	5 cm (2") free space above and under the PC required for air circulation
	protection class IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 1.9 kg (4.2 lbs)
	compact dimensions (W x H x D) 65 x 235 x 121 mm (2.6" x 9.3" x 4.8") without mounting plate

Features	C6920-0050	C6920-0060
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	3½-inch	3½-inch
Slots	1 Mini PCI, optionally 2 plug-in card slots	–
Free slots	1 Mini PCI and optionally 2 PCI/PCIe plug-in card slots	–
Max. card length	Mini PCI, optionally 2 x 190 mm plug-in cards	–
Memory	2…16 GB DDR3L RAM	4…32 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	2½-inch HDD or SSD and/or 1 x CFast or 2 x CFast	2½-inch HDD or SSD and/or 1 x CFast or 2 x CFast
RAID 1	2 x CFast	2 x CFast
Power supply	24 V DC	24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6920	

We reserve the right to make technical changes.

C6920 with plug-in card slots

Extension for PCI and PCIe plug-in cards

The control cabinet PCs C6920 can be expanded by two slots for standard PC cards with a length of up to 190 mm. The 70 mm wider PC (see above) housing includes a backplane that provides a choice of two PCI slots, two PCI Express slots or one PCI and one PCI Express slot. The plug-in card connectors are located on the top side of the PC. The plug-in card slots are arranged on the right side of the PC. An aluminium cover on the front of the slot expansion enables easy installation of the plug-in cards without having to open the housing of the computer core. The slots are powered internally by the PC power supply.

Ordering information	Options for C6920
C9900-B506	2 PCIe plug-in card slots on the passive backplane integrated inside C6920, to plug-in PCIe x1 cards up to 190 mm (6.3") length. The connectors of the plug-in cards are located at the top side of the PC on the right. The width of the PC housing is increased by 70 mm (2.76"), the depth is increased by 18 mm (0.7").
C9900-B510	2 PCI plug-in card slots on the passive backplane integrated inside C6920, to plug-in PCI cards up to 190 mm (6.3") length. The connectors of the plug-in cards are located at the top side of the PC on the right. The width of the PC housing is increased by 70 mm (2.76"), the depth is increased by 18 mm (0.7").
C9900-B514	1 PCI and 1 PCIe plug-in card slot on a passive backplane integrated inside C6920, to plug-in one PCI and one PCIe x1 card up to 190 mm (6.3") length. The connectors of the plug-in cards are located at the top side of the PC on the right. The width of the PC enclosure is increased by 70 mm (2.76"), the depth is increased by 18 mm (0.7").

C6925 | Fanless control cabinet Industrial PC

C6925	C6925-0020, -0030
Housing	fanless Industrial PC for space-saving control cabinet installation
	mounting sheet at the rear wall
	all connectors on the front
	status LEDs
	lithium battery accessible behind the front flap
	1 slot for one CFast flash card behind the front flap
	2 PCIe module slots to plug-in Beckhoff PCIe modules or to lead out interfaces of the motherboard ex factory
	passive cooling without fan with a heat sink
	5 cm (2") free space on top and bottom of the PC necessary for air circulation
	protection class IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 1.75 kg (3.9 lbs)
	compact dimensions (W x H x D) 65 x 223 x 121 mm (2.6" x 8.8" x 4.8") without mounting plate

Features	C6925-0020	C6925-0030
Processor	Intel® Celeron® ULV	Intel® Atom™
Motherboard	3½-inch	3½-inch
Slots	2 PCIe modules	2 PCIe modules
Free slots	2 PCIe	2 PCIe
Max. card length	PCIe module	PCIe module
Memory	2…8 GB DDR3 RAM	2…8 GB DDR3L RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	2½-inch HDD or SSD and/or 1 x CFast or 2 x CFast	2½-inch HDD or SSD and/or 1 x CFast or 2 x CFast
RAID 1	2 x CFast	–
Power supply	24 V DC	24 V DC
Recommendation	not recommended for new projects	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6925	

We reserve the right to make technical changes.

C6930 | **Control cabinet Industrial PC**

C6930	C6930-0050, -0060
Housing	Industrial PC for space-saving control cabinet installation
	mounting sheet at the rear wall
	all connectors on the front
	status LEDs
	lithium battery accessible behind the front flap
	2 slots for 2½-inch hard disks or SSDs behind the front flap
	1 slot for one CFast flash card behind the front flap
	2 PCIe module slots to plug-in Beckhoff PCIe modules or to lead out interfaces of the motherboard ex factory
	fan cartridge with speed control and double ball bearing fans, accessible from the front
	5 cm (2") free space above and under the PC required for air circulation
	protection class IP 20
	operating temperature 0…55 °C
	weight of the basic configuration 2.1 kg (4.6 lbs)
	compact dimensions (W x H x D) 90 x 235 x 121 mm (3.5" x 9.3" x 4.8") without mounting plate

Features	C6930-0050	C6930-0060
Processor	Intel® Celeron®, Core™ i3/i5/i7 4th Generation	Intel® Celeron®, Pentium®, Core™ i3/i5/i7 6th/7th Generation
Motherboard	3½-inch	3½-inch
Slots	1 Mini PCI and 2 PCIe modules, optionally 2 plug-in card slots	–
Free slots	1 Mini PCI and 2 PCIe modules, optionally 2 PCI/PCIe plug-in card slots	–
Max. card length	Mini PCI and 2 PCIe modules, optionally 2 x 190 mm plug-in cards	–
Memory	2…16 GB DDR3L RAM	4…32 GB DDR4 RAM
Graphic adapter	integrated in the processor	integrated in the processor
Ethernet	2 on-board	2 on-board
Hard disks/flash	1 or 2 x 2½-inch HDD or SSD and/or 1 x CFast or 2 x CFast	1 or 2 x 2½-inch HDD or SSD and/or 1 x CFast or 2 x CFast
RAID 1	2 x 2½-inch HDD or 2 x CFast	2 x 2½-inch HDD or 2 x CFast
Power supply	24 V DC	24 V DC
Recommendation	available	recommended for new projects
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/C6930	

C6930

C6930 with plug-in card slots

Extension for PCI and PCIe plug-in cards

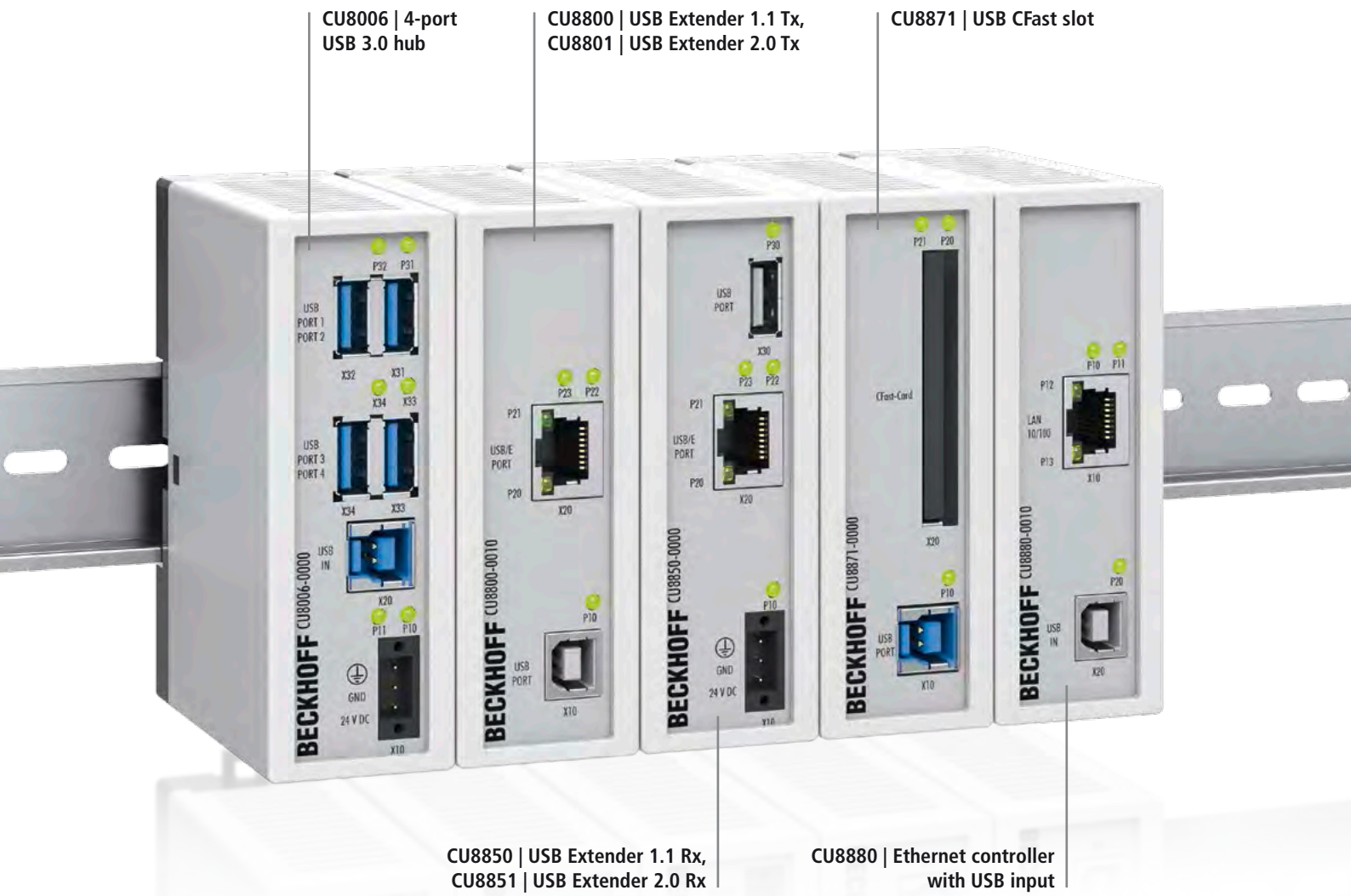
The control cabinet PCs C6930 can be expanded by two slots for standard PC cards with a length of up to 190 mm. The 70 mm wider PC housing (see above) includes a backplane that provides a choice of two PCI slots, two PCI Express slots or one PCI and one PCI Express slot. The plug-in card connectors are located on the top side of the PC. The plug-in card slots are arranged on the right side of the PC. An aluminium cover on the front of the slot expansion enables easy installation of the plug-in cards without having to open the housing of the computer core. The slots are powered internally by the PC power supply.

Ordering information	Options for C6930
C9900-B507	2 PCIe plug-in card slots on the passive backplane integrated inside C6930, to plug-in PCIe x1 cards up to 190 mm (6.3") length. The connectors of the plug-in cards are located at the top side of the PC on the right. The width of the PC housing is increased by 70 mm (2.76"), the depth is increased by 18 mm (0.7").
C9900-B511	2 PCI plug-in card slots on the passive backplane integrated inside C6930, to plug-in PCI cards up to 190 mm (6.3") length. The connectors of the plug-in cards are located at the top side of the PC on the right. The width of the PC housing is increased by 70 mm (2.76"), the depth is increased by 18 mm (0.7").
C9900-B515	1 PCI and 1 PCIe plug-in card slot on a passive backplane integrated inside C6930, to plug-in one PCI and one PCIe x1 card up to 190 mm (6.3") length. The connectors of the plug-in cards are located at the top side of the PC on the right. The width of the back cover is increased by 70 mm (2.76"), the depth is increased by 18 mm (0.7").

We reserve the right to make technical changes.

Industrial PC accessories

▶ **www.beckhoff.com/IPC-accessories**



CU8800, CU8850, C9900-E270 | **USB Extended, the USB 1.1 extension**

The USB specification allows a distance of 5 m between the PC and the USB devices. A further 5 m of cable can be added by using a USB hub. In the construction of machines and plants, larger distances must be bridged without having to insert a USB hub every 5 m. The CU8800 USB Extender sends the USB signal via a Cat.5 cable that can be up to 50 m long to the CU8850 USB Extended receiver or the CP69xx or CP79xx Control Panels, which convert the signal back to USB. The USB Extender boxes are designed for DIN rail mounting. The CU8800 transmitter is supplied with power by the PC via USB. The CU8850 receiver has an integrated 24 V DC power supply unit. Data rates of up to 12 Mbit/s can be transmitted.

Technical data	CU8800 | USB Extender Tx	CU8850 | USB Extender Rx
	USB Extended transmitter box	USB Extended receiver box
	1 USB input with USB B socket to be connected to the PC in maximum 1 m distance	1 USB Extended input with RJ45 socket for up to 50 m Cat.5 cable
	1 USB Extended output with RJ45 socket for up to 50 m Cat.5 cable	1 USB output with USB A socket to be connected to a USB device in maximum 5 m distance
	–	quick error analysing with diagnostic LEDs
	plastic housing for DIN rail installation	plastic housing for DIN rail installation
	USB transfer rate up to 12 Mbit/s for USB 1.1, downwards compatible to USB 1.0	
	IP 20	IP 20
	0…+55 °C	0…+55 °C
	34 mm x 98 mm x 77 mm	34 mm x 98 mm x 77 mm
	power supply via USB	24 V DC power supply

Technical data	C9900-E270 | USB Extender Tx PCIe module
	USB Extended transmitter module
	1 USB Extended output with RJ45 socket for up to 50 m Cat.5 cable for connecting a Control Panel with DVI/USB Extended interface CP69xx or CP79xx
	for ex factory mounting in PCs with Beckhoff PCIe module slot
	USB transfer rate up to 12 Mbit/s according to USB 1.1

We reserve the right to make technical changes.

CU8801, CU8851, C9900-E271 | **USB Extended 2.0, the USB 2.0 extension**

The USB specification allows a distance of 5 m between the PC and the USB devices. A further 5 m of cable can be added by using a USB hub. In the construction of machines and plants, larger distances must be bridged without having to insert a USB hub every 5 m. The CU8801 USB Extender sends the 2.0 USB signal via a Cat.5 cable that can be up to 50 m long to the CU8851 USB Extended receiver, which converts the signal back to USB. Data rates of up to 480 Mbit/s can be transmitted. Both USB Extender boxes are designed for DIN rail mounting. The CU8801 transmitter is powered by the PC. The CU8851 receiver has an integrated 24 V DC power supply unit. The USB Extended 2.0 receiver is already integrated into the Control Panels from the CP29xx and CP39xx series.

Technical data	CU8801 | USB Extender 2.0 Tx	CU8851 | USB Extender 2.0 Rx
	USB Extended 2.0 transmitter box	USB Extended 2.0 receiver box
	1 USB input with USB B socket to be connected to the PC in maximum 1 m distance	1 USB Extended 2.0 input with RJ45 socket for up to 50 m Cat.5 cable
	1 USB Extended 2.0 output with RJ45 socket for up to 50 m Cat.5 cable	1 USB output with USB A socket to be connected to a USB device in maximum 5 m distance
	–	quick error analysing with diagnostic LEDs
	plastic housing for DIN rail installation	plastic housing for DIN rail installation
	USB transfer rate up to 480 Mbit/s for USB 2.0	USB transfer rate up to 480 Mbit/s for USB 2.0
	IP 20	IP 20
	0…+55 °C	0…+55 °C
	34 mm x 98 mm x 77 mm	34 mm x 98 mm x 77 mm
	power supply via USB	24 V DC power supply

Technical data	C9900-E271 | USB Extender 2.0 Tx PCIe module
	USB Extended 2.0 transmitter module
	1 USB Extended 2.0 output with RJ45 socket for up to 50 m Cat.5 cable for connecting a Control Panel with DVI/USB Extended 2.0 interface CP29xx-0000 or CP39xx-0000
	for ex factory mounting in PCs with Beckhoff PCIe module slot
	USB transfer rate up to 480 Mbit/s according to USB 2.0

CU8802, CU8803, C9900-E276 | **CP-Link 4 transmitter modules**

With CP-Link 4, operating panels can be located up to 100 m away from the Industrial PC. The one cable solution can be used to transfer video signals, USB 2.0 and the power supply in a Cat.6A cable, thus reducing cable and installation costs. A further benefit is the use of purely passive displays. The CP-Link 4 technology is supported by the new Beckhoff multi-touch panel series CP29xx-0010 (built-in version) and CP39xx-0010 (mounting arm version).

CP-Link 4 – The Two Cable Display Link
The CP29xx-0010 multi-touch built-in panels and the CP39xx-0010 multi-touch panels for mounting arm installation can be operated up to 100 m away from the PC. CP-Link 4 – The Two Cable Display Link – transfers DVI and USB together via a Cat.6A cable. The CU8802 CP-Link 4 transmitter box is connected to the PC via DVI and USB, or else the C9900-E276 PCIe module for CP-Link 4 is installed in the PC.

CP-Link 4 – The One Cable Display Link
The power supply for the Control Panel can also be provided via CP-Link 4 – The One Cable Display Link. The CU8803 CP-Link 4 transmitter box is used instead of the CU8802 or the PCIe module. The Control Panel remains unchanged. The CU8803 transmitter box provides power to the Control Panel via the Cat.6A cable, which also transfers DVI and USB. The power supply socket of the panel is not used.

We reserve the right to make technical changes.

Technical data	CU8802 | Transmitter box for CP-Link 4 – The Two Cable Display Link	CU8803 | Transmitter box for CP-Link 4 – The One Cable Display Link
	CP-Link 4 Extender Tx for connecting a Control Panel with CP-Link 4 interface CP29xx-0010 or CP39xx-0010	CP-Link 4 Extender Tx for connecting a Control Panel with CP-Link 4 interface CP29xx-0010 or CP39xx-0010
	1 USB input with USB B socket to be connected to the PC in maximum 1 m distance	1 USB input with USB B socket to be connected to the PC in maximum 1 m distance
	1 DVI input with DVI-D socket to be connected to the PC in maximum 1 m distance	1 DVI input with DVI-D socket to be connected to the PC in maximum 1 m distance
	1 CP-Link 4 output with RJ45 socket for up to 100 m Cat.6A cable for connecting a Control Panel with CP-Link 4 interface CP29xx-0010 or CP39xx-0010	1 CP-Link 4 output with RJ45 socket for up to 100 m Cat.6A cable for connecting a Control Panel with CP-Link 4 interface CP29xx-0010 or CP39xx-0010
	power supply for the Control Panel with connection of 24 V at the Control Panel	power supply of the Control Panel with CU8803 via the Cat.6A cable
	metal housing for DIN rail installation	metal housing for DIN rail installation
	CP-Link 4 transfers USB 2.0 with 100 Mbit/s and DVI.	CP-Link 4 transfers USB 2.0 with 100 Mbit/s and DVI.
	24 V input for power supply of the CU8802 transmitter box	24 V input for power supply of the CU8803 transmitter box and the Control Panel
	IP 20	IP 20
	0…+55 °C	0…+55 °C
	45 mm x 100 mm x 80 mm	70 mm x 100 mm x 80 mm
	1 m USB connecting cable	1 m USB connecting cable
	1 m DVI connecting cable	1 m DVI connecting cable

Technical data	C9900-E276 | PCIe module for CP-Link 4 – The Two Cable Display Link
	CP-Link 4 Extender Tx PCIe module
	CP-Link 4 transmitter module for ex factory installation in PCs with Beckhoff PCIe module slots
	1 CP-Link 4 output with RJ45 socket for up to 100 m Cat.6A cable for connecting a Control Panel with CP-Link 4 interface CP29xx-0010 or CP39xx-0010
	CP-Link 4 transfers USB 2.0 with 100 Mbit/s and DVI.
	power supply for the Control Panel with connection of 24 V at the Control Panel

▶ **www.beckhoff.com/CP-Link4**

C9900-H3xx | **USB sticks**

USB sticks are used for data exchange between PCs or for data backup. For data backup operating system and application programs of a PC are saved as an image on a USB stick once the PC has been configured. In the event of a data loss on the PC the data can be restored from the USB stick.

As a data backup device the USB stick must be able to store the data reliably and for many years. In contrast to USB sticks with MLC or TLC flash memory, the high-quality SLC flash memory in the Beckhoff USB stick ensures long-term data integrity.

Ordering information	USB sticks
C9900-H356	4 GB USB stick, USB 3.0
C9900-H359	8 GB USB stick, USB 3.0
C9900-H376	16 GB USB stick, USB 3.0
C9900-H390	32 GB USB stick, USB 3.0

Ordering information	USB sticks with Beckhoff Service Tool (BST) and Acronis™ Backup & Recovery
C9900-H371	4 GB USB stick, USB 3.0, with Beckhoff Service Tool (BST) and Acronis™ Backup, English, for PCs with at least 2 GB RAM and with USB 2.0 or higher
C9900-H372	8 GB USB stick, USB 3.0, with Beckhoff Service Tool (BST) and Acronis™ Backup, English, for PCs with at least 2 GB RAM and with USB 2.0 or higher
C9900-H377	16 GB USB stick, USB 3.0, with Beckhoff Service Tool (BST) and Acronis™ Backup, English, for PCs with at least 2 GB RAM and with USB 2.0 or higher
C9900-H391	32 GB USB stick, USB 3.0, with Beckhoff Service Tool (BST) and Acronis™ Backup, English, for PCs with at least 2 GB RAM and with USB 2.0 or higher

CU8006 | **4-port USB 3.0 hub**

The CU8006 DIN rail-mount USB hub has four ports and supports the USB 3.0 data transfer rate of up to 5 Gbit/s, but is also compatible with slower USB standards. USB 3.0 devices can be connected at a distance of up to 3 m. Connection to USB 2.0 devices is possible with 5-m cables. An 1-m USB cable is provided for connecting the USB hub with the PC. 3-m USB 3.0 cables are permitted between PC and CU8006.

Technical data	CU8006 | 4-port USB 3.0 hub
	1 USB 3.0 input with USB B socket
	4 USB 3.0 outputs with USB A socket
	delivers up to 1 A supply current at each USB port
	USB transfer rate up to 5 Gbit/s, compatible to all USB standards
	plastic housing for DIN rail installation
	IP 20
	0…+55 °C
	34 mm x 98 mm x 77 mm
	24 V DC power supply
	1 m USB connecting cable

We reserve the right to make technical changes.

CU8810 | **DVI splitter with USB extender for CP69xx and CP79xx**

A common application in machine and plant construction is the simultaneous display of a PC screen on several monitors. Up to four CP69xx or CP79xx DVI/USB Control Panels can be connected to a PC via the CU8810 DVI splitter. Thanks to DVI/USB extension technology, the Control Panels can each be connected at distances of 50 m from the DVI splitter. PCs with two DVI outputs, which are configured as extended desktops, generate two different screen contents. Both DVI outputs can be fed into the DVI splitter. Using DIP switches, the four DVI outputs can each be assigned to one of the two DVI inputs, so that the Control Panels show either the left or the right half of the desktop, as selected.

Technical data	CU8810 | DVI splitter for CP69xx and CP79xx
	metal housing for DIN rail installation
	compact industrial design
	2 DVI-D inputs
	4 DVI-D outputs
	assignment of the 4 DVI outputs to the 2 inputs freely configurable via DIP switches
	DVI inputs and outputs with full DVI data range up to 1.65 Gbit/s
	unused DVI input and outputs can be switched off to save energy
	1 USB input with USB B socket
	4-port USB hub with 4 USB Extended outputs as RJ45 connectors
	USB transfer rate up to 12 Mbit/s for USB 1.1, downwards compatible to USB 1.0
	IP 20
	0…+55 °C
	146.5 mm x 100 mm x 38 mm
	24 V DC power supply

CU8815 | **DVI splitter**

A common application in machine and plant construction is the simultaneous display of a PC screen on several monitors. Up to four CP29xx, CP39xx, CP68xx, CP69xx, CP79xx or CP79xx DVI/USB Control Panels can be connected to a PC via the CU8815 DVI splitter. PCs with two DVI outputs, which are configured as extended desktops, generate two different screen contents. Both DVI outputs can be fed into the DVI splitter. Using DIP switches, the four DVI outputs can each be assigned to one of the two DVI inputs, so that the Control Panels show either the left or the right half of the desktop, as selected.

Technical data	CU8815 | DVI splitter without USB extender
	metal housing for DIN rail installation
	compact industrial design
	2 DVI-D inputs
	4 DVI-D outputs
	assignment of the 4 DVI outputs to the 2 inputs freely configurable via DIP switches
	DVI inputs and outputs with full DVI data range up to 1.65 Gbit/s
	unused DVI input and outputs can be switched off to save energy
	IP 20
	0…+55 °C
	146.5 mm x 100 mm x 38 mm
	24 V DC power supply

CU8871 | **USB CFast slot**

The CU8871 offers a CFast socket with USB connector in a compact housing for DIN rail mounting. CFast cards are used in the industrial environment as data memory for process and control data. The CFast cards are hot-plug capable in the CU8871 and can hence be plugged and unplugged like removable data storage devices for exchanging data with other PCs during operation. The USB 3.0 connection offers the highest data transfer rate possible with a CFast card, but the CFast adapter can also be connected to PCs with a USB 2.0 interface. Power is also supplied via USB. Status LEDs indicate whether the CU8871 is connected, signal data accesses and provide information as to whether a CFast card is inserted.

Technical data	CU8871 | USB CFast slot
	CFast slot
	front LED indicators for PWR (power), LOCK (only read permission) and CFast (access)
	1 USB 3.0 input with USB B socket
	compatible to all USB standards
	plastic housing for DIN rail installation
	IP 20
	0…+55 °C
	34 mm x 98 mm x 77 mm
	power supply via USB
	1 m USB connecting cable

CU8880 | **Ethernet controller with USB input**

With the CU8880 USB-to-LAN adapter, Industrial PCs can be extended with an additional industrially-suited and independent Ethernet interface. The CU8880 is used for necessary IT communication. It is not suitable for EtherCAT or real-time Ethernet communication. However, the on-board Ethernet interfaces of the respective Industrial PCs are available for this.

Technical data	CU8880 | Ethernet controller with USB input
	Ethernet controller box
	1 USB 2.0 input with USB B socket
	1 Ethernet interface with 1 x 10/100BASE-T connector RJ45
	not suitable for real-time Ethernet or EtherCAT
	plastic housing for DIN rail installation
	1 m USB connecting cable
	IP 20
	0…+55 °C
	34 mm x 98 mm x 77 mm
	power supply via USB

We reserve the right to make technical changes.

FC9071 | **Gigabit Ethernet PC interface card**

The FC9071 Ethernet PCIe network card can be used in office and automation networks. It is installed in the PC's connecting area and is wired to the 3½-inch motherboard by a flexible PCIe cable. Compared to the Mini PCI bus, the PCIe bus offers a faster transfer rate and a better long time availability. The Mini PCI slot, if still present, remains free for the use of NOVRAM cards. The FC9071 can also be operated with TwinCAT drivers – and therefore in real-time.

Ordering information	
FC9071-0000	Gigabit Ethernet PC interface card, 10/100/1000 Mbit/s, 1-channel, PCIe interface

FC9062 | **PCIe module**

The compact PC expansion card with industrial form factor

Beckhoff PCIe modules are highly integrated PCI Express plug-in cards and follow the trend towards ever smaller PCs. The function of PC plug-in cards is integrated in a compact format that is suitable for harsh industrial environments.

Compared with PCI or PCIe plug-in cards, which require a special card holder in the Industrial PC, the Beckhoff PCIe module is a industrially compatible plug-in card that is firmly screwed to the inside of the PC via the plug connector bracket. The PCIe modules can be retrofitted on site without special PC knowledge. The PC housing does not have to be opened.

The 3½-inch motherboard offers four PCI Express lanes to be distributed to the PCIe module slots or standard plug-in card slots. The result are PCs with module slots and/or slots for plug-in cards. A PCIe module is connected to the motherboard via one PCI Express lane with a data transfer rate of 5 Gigabit. A module can therefore provide two Gigabit Ethernet interfaces, for example.

Ordering information	PCI Express module
FC9062	Gigabit Ethernet PCIe module for PCs with Beckhoff PCIe module slots, 2-channel, PCI Express x1 bus

FC3161 | PCIe modules with PROFIBUS master and/or NOVRAM

Beckhoff PCIe modules are highly integrated PCI Express plug-in cards and follow the trend towards ever smaller PCs. The function of PC plug-in cards is integrated in a compact format that is suitable for harsh industrial environments.

The PCIe modules for Beckhoff Industrial PCs allow the use of a PROFIBUS master without NOVRAM (FC3161-0000) or with 512 kB NOVRAM for easy data backup (FC3161-0002).

In TwinCAT, PROFIBUS and NOVRAM are available. Other applications also benefit from the diverse features: general PROFIBUS drivers for different Windows versions and convenient configuration tools are included in the TwinCAT I/O software package. High-level language programs use the DLL, Visual Basic applications the ActiveX interface. Applications with OPC interface can access process data and parameters via an OPC server.

Technical data	FC3161-0000	FC3161-0002
Fieldbus	PROFIBUS DP (standard), PROFIBUS DP-V1	PROFIBUS DP (standard), PROFIBUS DP-V1
Number of fieldbus channels	1	1
Data transfer rates	9.6 kbaud…12 Mbaud	9.6 kbaud…12 Mbaud
Interface to the PC	PCIe (PCI Express)	PCIe (PCI Express)
Bus interface	1 x D-sub socket, 9-pin, galvanically decoupled	1 x D-sub socket, 9-pin, galvanically decoupled
Communication	master and slave functionality	master and slave functionality
Bus device	max. 125 slaves with up to 244 bytes input, output, parameter, configuration or diagnostic data per slave	
Hardware diagnosis	2 LEDs per channel	2 LEDs per channel
NOVRAM	–	512 kB
Driver	TwinCAT 2.11 R3 and higher	TwinCAT 2.11 R3 and higher

Ordering information	PCI Express module
C9900-R266	memory PCIe module for PCs with Beckhoff PCIe module slots, NOVRAM for fail-safe storage of process data, 512 kB, PCI Express x1 bus

We reserve the right to make technical changes.

C9900-E277 | **USB 3.0 PCIe module**

The C9900-E277 PCIe module for USB 3.0 has two ports and supports the USB 3.0 data transfer rate of up to 5 Gbit/s, but is also compatible with slower USB standards. PCIe modules can be used in 3½-inch motherboard Beckhoff PCs with a PCIe module slot. The C9900-E277 USB module can also be plugged in later. USB 3.0 devices can be connected at a distance of up to 3 m. Connection to USB 2.0 devices is possible with 5-m cables.

Technical data	C9900-E277 | USB 3.0 PCIe module
	2-port USB 3.0 interfaces
	delivers up to 1 A supply current at each USB port
	USB transfer rate up to 5 Gbit/s for USB 3.0
	compatible to all USB standards

C9900-E301 | **RS232 PCIe module**

PCIe modules from Beckhoff are highly integrated PCI Express plug-in cards that respond to the current trend towards increasingly smaller IPC devices.

The C9900-E301 PCIe module can be used to complement Industrial PCs with Beckhoff PCIe module slot by two serial RS232 interfaces. Due to the small dimensions of the module, two Harting ix Type B connectors are integrated into the front plate of the PCIe modules instead of the D-sub connectors commonly used with RS232. For adaptation to 9-pin D-sub connectors, the C9900-K920 adapter cable is available.

Technical data	C9900-E301 | RS232 PCIe module
	2 serial interfaces RS232
	transfer rate up to 921,600 bps
	2 sockets Harting ix Type B
	requires 2 adapter cables C9900-K920 Harting ix Type B to D-sub 9-pin

Ordering information	
C9900-K920	adapter cable Harting ix Type B to D-sub 9-pin for C9900-E301 RS232 PCIe module, length 45 cm

C9900-E2xx | **Slotbox for extending Industrial PCs with two plug-in card slots**

The slotbox makes PCI Express and PCI slots available outside the IPC as well. The PCI Express bus is fed via a plug connector and cable to a slotbox located up to 7 m (23-ft) away. Users can use the installation space in the control cabinet flexibly and locate further plug-in cards locally.

Both PCI and PCI Express card slots are available by using different versions of the slotbox. The slotbox is made of sturdy aluminium and ideal for use in industrial environments.

PCIe module C9900-E239 for installation in the PC

C9900-E2xx	C9900-E249	C9900-E250	C9900-E251
Technical data	fanless aluminium housing for control cabinet installation		
	2 slots for up to 190 mm long plug-in cards		
	all connectors on the top	all connectors on the top	all connectors on the top
	PCIe x1 input for connection with an Industrial PC with PCIe module C9900-E236 or -E239		
	max. 7 m distance between Industrial PC and slotbox		
	1 PCI and 1 PCIe x1 slot	2 PCIe x1 slots	2 PCI slots
	IP 20	IP 20	IP 20
	0…+55 °C	0…+55 °C	0…+55 °C
	1.7 kg without plug-in cards	1.7 kg without plug-in cards	1.7 kg without plug-in cards
	94 mm x 222 mm x 132 mm without mounting plate		
	24 V DC power supply	24 V DC power supply	24 V DC power supply

C9900-E23x	PCIe modules
C9900-E236	PCIe modules with external PCIe x1 connector for CP22xx, CP62xx, C5210 or C65xx with PCIe module slot
C9900-E239	PCIe modules with external PCIe x1 connector for C6930

C9900-K50x	Connecting cables for the slotbox
C9900-K501	connecting cable PCIe x1 external, 1 m
C9900-K502	connecting cable PCIe x1 external, 3 m
C9900-K503	connecting cable PCIe x1 external, 5 m
C9900-K504	connecting cable PCIe x1 external, 7 m

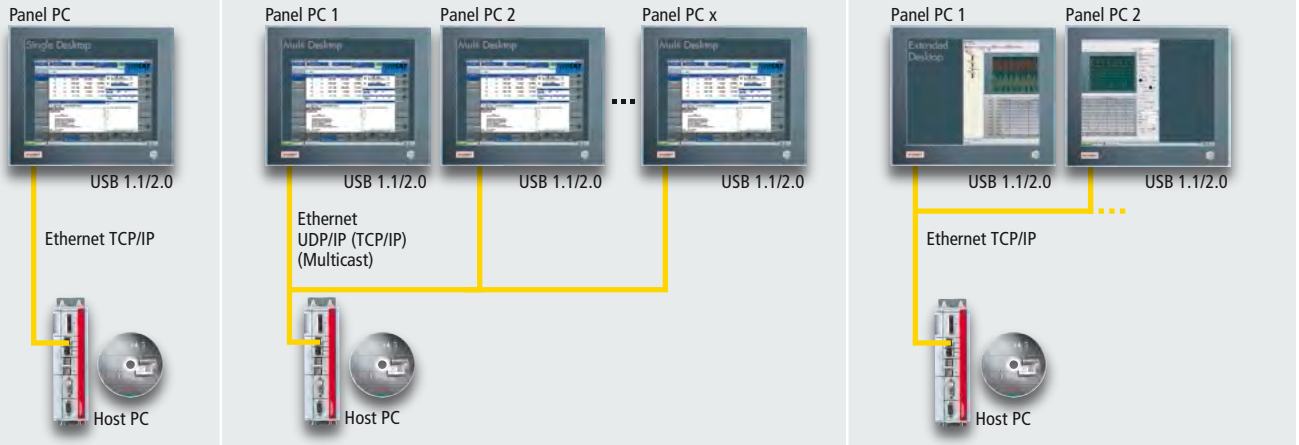
We reserve the right to make technical changes.

C9900-U33x | **Battery pack**

All Industrial PCs can be equipped with a 24 V power supply unit and an integrated UPS. The UPS supplies the PC with power if the mains power fails. This allows data to be saved on the hard disk or Flash, after which the PC can be shut down properly. A battery pack, which serves as the energy storage device, is mounted on a DIN rail outside the PC.

Rated at 3.4 Ah, the maintenance-free C9900-U330 24 V battery pack offers a very high nominal capacity in a compact package. With its rated capacity of 1.3 Ah, the very compact 24 V C9900-U332 battery pack is designed for PCs with Intel® Atom™ processor.

Technical data	C9900-U330	C9900-U332
	battery pack for PCs with 24 V power supply with intergrated UPS	
	metal housing for mounting on norm rail TS35x15 2.3	metal housing for mounting on norm rail TS35x15 2.3
	24 V nominal voltage	24 V nominal voltage
	3.4 Ah nominal capacity (20 h discharge)	1.3 Ah nominal capacity (20 h discharge)
	two 12 V batteries in series connection	two 12 V batteries in series connection
	VRLA AGM Technology = valve regulated lead acid batteries with glass fiber mat inside the separator (VRLA = valve regulated lead acid, AGM = absorbed glass mat technology)	
	maintenance-free	maintenance-free
	9 A fuse by PTC element	9 A fuse by PTC element
	operating temperature 0…50 °C	operating temperature 0…50 °C
	weight 3.3 kg (7.3 lbs)	weight 2.1 kg (4.63 lbs)
	dimensions (W x H x D) 157 x 70 x 175 mm (6.2" x 2.8" x 6.9")	dimensions (W x H x D) 68.7 x 106.6 x 143.8 mm (4.2" x 2.8" x 5.66")



Single Desktop **Multi Desktop** **Extended Desktop**

CP-Link 3 | **Ethernet- and IP protocol-based desktop transfer software**

CP-Link 3 transfers the desktop of a PC via Ethernet to several Panel PCs and the operator mouse and keyboard entries to the host PC. The screen contents are captured by a virtual graphic adapter in the host PC and sent using Ethernet to one or more Panel PCs with Windows operating systems (CE, XP, Windows 7 or Windows Embedded Standard). Networking can be done using cost-effective standard Ethernet cables (Cat.5) which are suitable for drag chains.

Since the data and image transfer are based on TCP/IP, the operating and display functions can be extended using the Internet. Panel PCs can be integrated using the Internet via VPN (Virtual Private Network). A VPN service must be available for the Internet security functions.

Keyboard entries, touch screen and special key functions are transferred from the client to the host PC via Virtual USB. USB devices connected to a Panel PC appear in the host PC like locally plugged-in devices and can be used in the normal way.

Virtual USB emulates a USB root hub in the host PC. If a USB device is plugged into a Panel PC, then the virtual hub logs the device on to the operating system of the host PC and transparently transmits the ensuing communication. For the operating system, the USB device behaves as though it was directly connected to the PC. Virtual USB transfers the standards USB 1.1 and USB 2.0. As communication takes place using 100 Mbit/s Ethernet, the USB 2.0 transmission performance (480 Mbit/s) is restricted.

Additional input/output devices on the Panel PCs, such as rotary switches, buttons, etc., are read in by the host PC using an additional communication channel. Printers and webcams, which are connected to a Panel PC by means of USB, can be used from the host PC.

The scope of delivery for CP-Link 3 includes host and client software. The host PC may have Windows XP, Windows 7 or Windows Embedded Standard installed. Panel PCs with Windows CE, Windows XP, Windows 7 or Windows Embedded Standard are used as clients. As the application software (PLC/NC, HMI, etc.), once started, runs on the host PC, any necessary software licenses are only payable once for the host PC. The client Panel PCs only receive image data. Apart from the operating system and CP-Link 3, no other software license is required for the clients. Even for PCs with more than one graphics card only one license per application software is necessary. For host PCs of other vendors an upgrade license is required.

The CP-Link 3 software is available in three versions:

- Single Desktop
- Multi Desktop
- Extended Desktop

License upgrades are available for third-party host PCs.

▶ **www.beckhoff.com/CP-Link3**

We reserve the right to make technical changes.

Single Desktop

A Panel PC is connected with a host PC via Ethernet and shows the image of the host PC. Communication takes place using TCP/IP.

Keyboard entries, touch screen and special key functions are transferred from the client to the host PC via Virtual USB. USB devices connected to a Panel PC appear in the host PC just like locally connected devices.

Ordering information	CP-Link 3 Single Desktop
	Ethernet and IP protocol-based desktop transfer software CP-Link 3
	transfers the desktop of a PC via Ethernet to one Panel PC
	transmission of mouse and keyboard inputs of the client user to the host PC
	connection by Ethernet or Internet, TCP/IP
	1 virtual graphic adapter
	Virtual USB
	USB devices connected at the client are found by the host PC like a local USB device.
	1 client controllable
	The client shows the screen of the host PC.
	host software for PCs with Windows XP, Windows 7 or Windows Embedded Standard
	client software for Beckhoff Panel PCs with Windows CE, Windows XP, Windows 7 or Windows Embedded Standard

Multi Desktop

Several Panel PCs are connected with a PC via Ethernet and display the image of the host PC. All connected client Panel PCs show the same image.

Communication takes place using TCP/IP (up to 10 Panel PCs) or via UDP Multicast (up to 255 Panel PCs). The benefit of Multicast lies in the fact that messages can be transferred to several Panel PCs simultaneously without the transmitter bandwidth multiplying by the number of receivers.

Ordering information	CP-Link 3 Multi Desktop
	Ethernet and IP protocol-based desktop transfer software CP-Link 3
	transfers the desktop of a PC via Ethernet to Panel PCs
	transmission of mouse and keyboard inputs of client users to the host PC
	connection by Ethernet or Internet, TCP/IP or UDP/IP (Multicast)
	1 virtual graphic adapter
	Virtual USB
	USB devices connected at a client are found by the host PC like a local USB device.
	Up to 255 clients are controllable in UDP/IP mode, up to 10 clients in TCP/IP mode.
	All clients show the same picture, the screen of the host PC.
	The input devices can be locked at any client by TwinCAT PLC or via application programming interface (API).
	host software for PCs with Windows XP, Windows 7 or Windows Embedded Standard
	client software for Beckhoff Panel PCs with Windows CE, Windows XP, Windows 7 or Windows Embedded Standard

Extended Desktop

One or several virtual graphic adapters are used to extend the host PC desktop. The program windows of the application software can be moved to additional monitors covered by the extended desktop. Applications may be started on a specific monitor. The desktop can be extended to up to 9 monitors. CP-Link 3 can transfer the data via Ethernet to several client Panel PCs.

The mouse and keyboard entries of individual clients can be locked via TwinCAT PLC or a software interface (API), in order to prevent interference between several users.

Ordering information	CP-Link 3 Extended Desktop
	Ethernet and IP protocol-based desktop transfer software CP-Link 3
	transfers up to 9 screens of the extended desktop of a PC via Ethernet to Panel PCs
	transmission of mouse and keyboard inputs of client users to the host PC
	connection via Ethernet or Internet, TCP/IP or UDP/IP (Multicast)
	Up to 9 virtual graphic adapters extend the desktop of the host PC.
	Virtual USB
	USB devices connected at a client are found by the host PC like a local USB device.
	Up to 255 clients are controllable in UDP/IP mode, up to 10 clients in TCP/IP mode.
	Each client shows 1 of maximally 9 screens of the extended desktop of the host PC.
	The input devices can be locked at any client by TwinCAT PLC or via application programming interface (API).
	Applications are allocable to one of the additional screens of the extended desktop.
	host software for PCs with Windows XP, Windows 7 or Windows Embedded Standard
	client software for Beckhoff Panel PCs with Windows CE, Windows XP, Windows 7 or Windows Embedded Standard

Control Panels

▶ www.beckhoff.com/ControlPanel

Multi-touch Control Panels
- built-in or mounting arm devices
- also for use in hazardous areas, Zone 2/22
- multi-finger touch screen
- 7-, 12-, 12.1-, 15-, 15.6-, 18.5-, 19-, 21.5- and 24-inch displays
- vertical or horizontal orientation (portrait/landscape)
- DVI/USB Extended interface
- CP-Link 4 – The One Cable Display Link

See page 144

Single-touch Control Panels
- built-in or mounting arm devices
- without touch screen, with single-finger touch screen or touch pad
- 5.7-, 6.5-, 7-, 10.1-, 12-, 15- and 19-inch displays
- DVI/USB Extended interface

See page 160

We reserve the right to make technical changes.

Built-in Control Panels, front side IP 65

CP2907 7-inch | CP2912 12-inch | CP2913 12.1-inch | CP2915 15-inch | CP2916 15.6-inch | CP2918 18.5-inch | CP2919 19-inch | CP2921 21.5-inch | CP2924 24-inch

Control Panels, IP 65 on all sides

CP3907 7-inch | CP3912 12-inch | CP3913 12.1-inch | CP3915 15-inch | CP3916 15.6-inch | CP3918 18.5-inch | CP3919 19-inch | CP3921 21.5-inch | CP3924 24-inch

Built-in Control Panels, front side IP 65

CP6907 5.7-inch | CP6919 6.5-inch | CP6911 12-inch | CP6922 15-inch | CP6933 19-inch

Control Panels, IP 65 on all sides

CP7909 6.5-inch | CP7911 12-inch | CP7922 15-inch | CP7933 19-inch | CP790x-14xx 12-, 15-, 19-inch

Multi-touch Control Panels CP29xx and CP39xx

▶ **www.beckhoff.com/multi-touch**

With Windows 10 the multi-finger touch screens are becoming increasingly popular for use with PCs. Industrial applications are using the projected capacitive multi-touch technology. An anti-reflective glass plate forms the display front. The operation with gloves is possible. Ten fingers are detected separately.

The CP29xx built-in Panel series for control cabinet installation is implemented with IP 65 protection at the front and IP 20 at the rear. The CP39xx Control Panels for mounting arm installation feature all-round IP 65 protection. The panels CP29xx-0000 and CP39xx-0000 with DVI/USB Extended interface can be operated up to 50 m away from the Industrial PC. With CP-Link 4 – The One Cable Display Link – and CP29xx-0010 and CP39xx-0010 Control Panels the distance between Industrial PC and operating panel can be increased to 100 m.

Beckhoff offers the following display sizes:

Wide screen (16:9)

– 7-inch, resolution 800 x 480
– 12.1-inch, resolution 1280 x 800
– 15.6-inch, resolution 1366 x 768
– 18.5-inch, resolution 1366 x 768
– 21.5-inch, full HD resolution 1920 x 1080
– 24-inch, full HD resolution 1920 x 1080

Further display sizes

– 12-inch, resolution 800 x 600 (4:3)
– 15-inch, resolution 1024 x 768 (4:3)
– 19-inch, resolution 1280 x 1024 (5:4)

With the option C9900-M575 all of the displays are also available in portrait format.

Customer-specific adaptations for push-button extension individualise the multi-touch Control Panel series.

CP39xx

We reserve the right to make technical changes.

CP29xx

CP39xx

CPX29xx and CPX39xx for application in hazardous areas, Zone 2/22
With the CPX Control Panel series, the proven multi-touch technology of Beckhoff Control Panels is available in particularly robust versions, complying with the requirements for use in hazardous areas classified Zone 2/22. The high level of functionality and excellent build quality ensure the reliability of CPX Control Panels even under harsh environmental conditions. The capacitive touch technology provides the typical convenient operation of all Beckhoff multi-touch panels. The aesthetically pleasing appearance of the panel and the look and feel of the aluminium housing are maintained, making them visual highlights in explosion-proof environments. The devices are available with three different displays in the sizes 15, 19 and 21.5 inches.

CPX29xx

Modern, elegant device design

Multi-touch for 5-finger touch

Vertical or horizontal variants

Use of aluminium for extremely robust design

Continous glass surface – highest resistance to environmental influences

Display formats 4:3, 5:4 or wide-screen 16:9

LED backlight

Narrow housing edges

High protection class IP 65

Push-button extension with emergency stop, also in customer-specific design

DVI/USB Extended 2.0

With the DVI/USB Extended technology, Control Panel and Industrial PC can be operated at distances of up to 50 m. The DVI graphics signal from the PC is directly transmitted via a DVI-E cable. The Control Panel is equipped with a signal processor, which restores the DVI signal after 50 m.

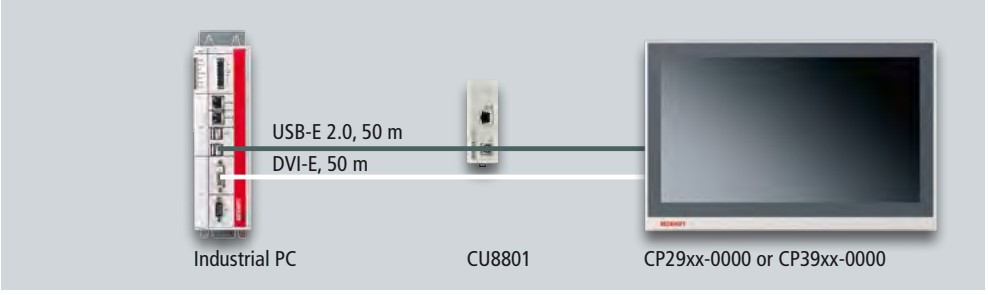
For the connection of CP29xx-0000 and CP39xx-0000 Control Panels, the CU8801 USB Extender box is connected to a USB port of the PC. The CU8800 converts the USB signal coming from the PC to USB Extended 2.0 (USB-E 2.0) and transmits it via up to 50 m of Cat.5 cable to the Control Panel, where it is reconverted to USB 2.0 with data rates of 480 Mbit/s.

A USB hub in the Control Panel enables the connection of external USB devices such as a keyboard or USB stick in addition to touch screen and push-button extension. It is not possible, however, to connect an additional USB hub to the Control Panel.

The CU8801 USB Extender box does not require auxiliary power supply. It has a USB input and an RJ45 USB Extended output. The box is available in a set with all required cables in various lengths to bridge distances of up to 50 m between PC and Control Panel.

For smaller distances of up to 5 m, CP29xx-0000 Control Panels and PC can be directly connected via USB cable, whereas the CP39xx-0000 Control Panels have to be connected by means of the CU8801 USB Extender no matter what distance.

DVI/USB Extended 2.0 for CP29xx-0000 or CP39xx-0000 via the CU8801 transmitter box



We reserve the right to make technical changes.

CP-Link 4 | The One Cable Display Link

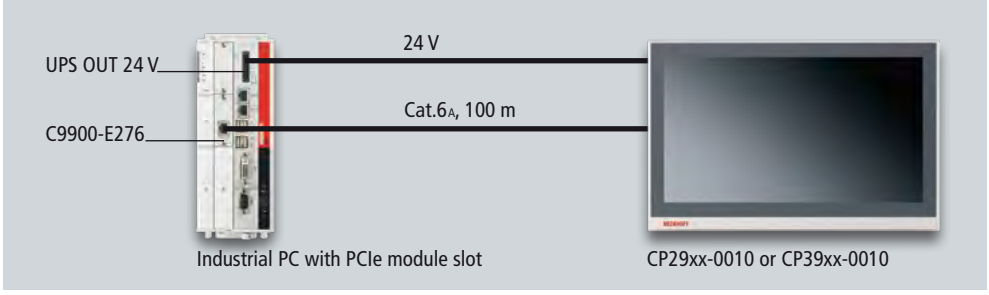
▶ www.beckhoff.com/CP-Link4

With CP-Link 4 operating panels can be located up to 100 m away from the Industrial PC. The one cable solution can be used to transfer video signals, USB 2.0 and the power supply in an industrial Cat.6A cable, thus significantly reducing cable and installation costs. A further benefit is the use of purely passive displays. The CP-Link 4 technology is supported by the new Beckhoff multi-touch panel series CP29xx-0010 (built-in version) and CP39xx-0010 (mounting arm version).

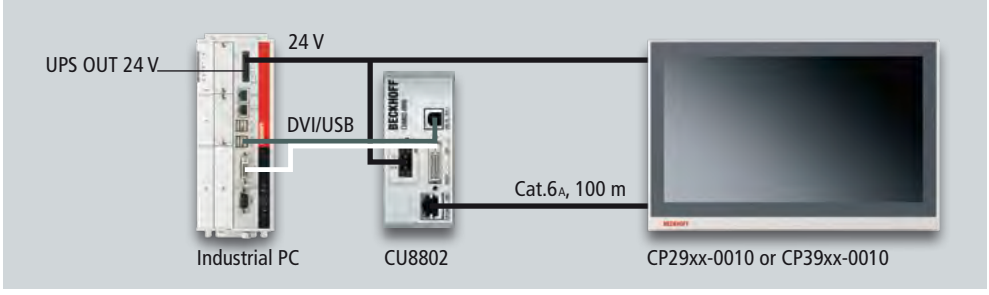
CP-Link 4 – The Two Cable Display Link
The CP29xx-0010 multi-touch built-in panels and the CP39xx-0010 multi-touch panels for mounting arm installation can be operated up to 100 m away from the PC. CP-Link 4 – The Two Cable Display Link – transfers DVI and USB together via a Cat.6A cable. The CU8802 CP-Link 4 transmitter box is connected to the PC via DVI and USB, or else the C9900-E276 PCIe module for CP-Link 4 is installed in the PC.

CP-Link 4 – The One Cable Display Link
The power supply for the Control Panel can also be provided via CP-Link 4 – The One Cable Display Link. The CU8803 CP-Link 4 transmitter box is used instead of the CU8802 or the PCIe module. The Control Panel remains unchanged. The CU8803 transmitter box provides power to the Control Panel via the Cat.6A cable, which also transfers DVI and USB. The power supply socket of the panel is not used.

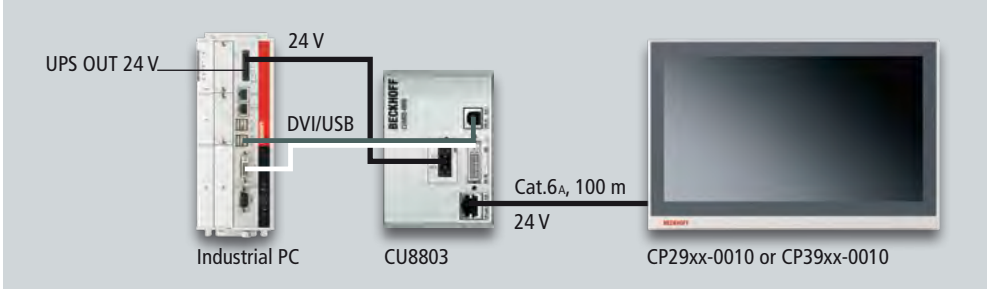
CP-Link 4 – The Two Cable Display Link: via C9900-E276 PCIe module integrated in the PC



CP-Link 4 – The Two Cable Display Link: via CU8802 transmitter box



CP-Link 4 – The One Cable Display Link: DVI, USB and 24 V via CU8803 transmitter box



Beckhoff multi-touch Control Panels in customer-specific features and designs

Beckhoff Control Panels can be designed and built for customer-specific requirements. The spectrum of options is exceptionally broad and ranges from company logos or special labels and individualised functions to IPCs built in total accordance with the customer's corporate design.

Multi-touch Control Panel in portrait orientation with customised push-button extension

15-inch multi-touch Control Panel with RFID reader, emergency stop and 3 RGB illuminated ring keys

Multi-touch Control Panel with RGB illuminated ring keys

Multi-touch Control Panel with emergency stop, electromechanical keys and graycode switch

Multi-touch Control Panel with emergency stop, start/stop keys and membrane keys with slide-in labels

21.5-inch multi-touch Control Panel for machine tools

We reserve the right to make technical changes.

Multi-touch Control Panel with company logo and keyboard shelf

Multi-touch Control Panel in the customer's corporate design

Multi-touch Control Panel with push-button extension

18.5-inch multi-touch Control Panel with emergency stop and 3 buttons, connection alternatively via USB or directly wired

Multi-touch Control Panel in the customer's corporate design

Multi-touch Control Panel with individualised functions

CP29xx | Multi-touch built-in Control Panel

CP2907 CP2912 CP2913 CP2915 CP2916 CP2918 CP2919 CP2921 CP2924

Ordering information		Multi-finger touch screen with DVI/USB Extended	Multi-finger touch screen with CP-Link 4
7-inch display	800 x 480	CP2907-0000	CP2907-0010
12-inch display	800 x 600	CP2912-0000	CP2912-0010
12.1-inch display	1280 x 800	CP2913-0000	CP2913-0010
15-inch display	1024 x 768	CP2915-0000	CP2915-0010
15.6-inch display	1366 x 768	CP2916-0000	CP2916-0010
18.5-inch display	1366 x 768	CP2918-0000	CP2918-0010
19-inch display	1280 x 1024	CP2919-0000	CP2919-0010
21.5-inch display	1920 x 1080	CP2921-0000	CP2921-0010
24-inch display	1920 x 1080	CP2924-0000	CP2924-0010

We reserve the right to make technical changes.

CP29xx	CP29xx-0000	CP29xx-0010
Features	TFT display in nine sizes	TFT display in nine sizes
	aluminium housing with glass front, front side IP 65, rear side IP 20	aluminium housing with glass front, front side IP 65, rear side IP 20
	multi-finger touch screen – multi-finger touch screen driver for Windows 7 – single-finger touch screen driver for Windows XP and Windows CE 6	multi-finger touch screen – multi-finger touch screen driver for Windows 7 – single-finger touch screen driver for Windows XP and Windows CE 6
	integrated DVI/USB extension technology – DVI-E and USB-E 2.0 enable remote panel operation at a distance of up to 50 m from the PC. – USB-E 2.0 transmits USB 2.0 with 480 Mbit/s. – DVI-E input is compatible to the standard DVI output of a PC.	integrated CP-Link 4 connection technology – CP-Link 4 enables remote panel operation at a distance of up to 100 m from the PC via a Cat.6$_A$ cable with integrated or separate 24 V DC power supply depending on the transmitter module. – CP-Link 4 transmits USB 2.0 with 100 Mbit/s and DVI.
	USB 3.0 input for the direct connection to a standard USB output of a PC with distances of up to 3 m	connection via an RJ45 connector for CP-Link 4 in the backplane
	2-port USB 3.0 socket inside the Control Panel backplane, for USB-E 2.0 limited to USB 2.0	additional pin contact strip, for optional 24 V power supply
	all connectors at the lower rear side	2-port USB 2.0 socket inside the Control Panel backplane
	24 V power supply	all connectors at the lower rear side
	operating temperature 0…55 °C	operating temperature 0…50 °C
	pull-out clamping levers for fast installation without loose parts	pull-out clamping levers for fast installation without loose parts
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP29xx	

CPX29xx | Multi-touch built-in Control Panel with DVI/USB Extended interface

For use in hazardous areas, Zone 2/22

Ordering information	Multi-finger touch screen
15-inch display 1024 x 768	CPX2915-0000
19-inch display 1280 x 1024	CPX2919-0000
21.5-inch display 1920 x 1080	CPX2921-0000

CPX29xx	CPX29xx-0000
Features	TFT display in three sizes
	aluminium housing with glass front, front side IP 65, rear side IP 20
	for use in hazardous areas, Zone 2/22
	multi-finger touch screen – multi-finger touch screen driver, included in Windows 7 and Windows 10 – single-finger touch screen driver, available for Windows XP and Windows CE 6
	integrated DVI/USB extension technology – DVI-E and USB-E 2.0 enable remote panel operation at a distance of up to 50 m from the PC. – USB-E 2.0 transmits USB 2.0 with 480 Mbit/s. – DVI-E input is compatible to the standard DVI output of a PC.
	USB 3.0 input for the direct connection to a standard USB output of a PC with distances of up to 3 m
	2-port USB 3.0 socket inside the Control Panel backplane, for USB-E 2.0 limited to USB 2.0
	all connectors at the lower rear side
	24 V power supply
	operating temperature 0…55 °C
	pull-out clamping levers for fast installation without loose parts
	solid clamping frame for even pressure distribution on the seal
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CPX29xx

We reserve the right to make technical changes.

CPX39xx | Multi-touch Control Panel with CP-Link 4 – The One Cable Display Link

For use in hazardous areas, Zone 2/22

Ordering information	Multi-finger touch screen
15-inch display 1024 x 768	CPX3915-0010
19-inch display 1280 x 1024	CPX3919-0010
21.5-inch display 1920 x 1080	CPX3921-0010

CPX39xx	CPX39xx-0010
Features	TFT display in three sizes
	aluminium housing with glass front, protection class IP 65
	for use in hazardous areas, Zone 2/22
	multi-finger touch screen – multi-finger touch screen driver, included in Windows 7 and Windows 10 – single-finger touch screen driver, available for Windows XP and Windows CE 6
	integrated CP-Link 4 connection technology – CP-Link 4 enables remote panel operation at a distance of up to 100 m from the PC via a Cat.6A cable with integrated or separate 24 V DC power supply depending on the transmitter module. – CP-Link 4 transmits USB 2.0 with 100 Mbit/s and DVI.
	connection via M12 round connector (IP 65) for CP-Link 4 in the backplane
	additional M12 round connector for optional 24 V power supply
	operating temperature 0…50 °C
	For mounting four M6 threaded holes at a distance of 100 x 100 mm in the connection block on the rear wall. The plug connectors for connecting the Control Panel are plugged into the connection block from underneath.
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CPX39xx

CP39xx | Multi-touch Control Panel

CP3907 CP3912 CP3913 CP3915 CP3916 CP3918 CP3919 CP3921 CP3924

Ordering information		Multi-finger touch screen with DVI/USB Extended	Multi-finger touch screen with CP-Link 4
7-inch display	800 x 480	CP3907-0000	CP3907-0010
12-inch display	800 x 600	CP3912-0000	CP3912-0010
12.1-inch display	1280 x 800	CP3913-0000	CP3913-0010
15-inch display	1024 x 768	CP3915-0000	CP3915-0010
15.6-inch display	1366 x 768	CP3916-0000	CP3916-0010
18.5-inch display	1366 x 768	CP3918-0000	CP3918-0010
19-inch display	1280 x 1024	CP3919-0000	CP3919-0010
21.5-inch display	1920 x 1080	CP3921-0000	CP3921-0010
24-inch display	1920 x 1080	CP3924-0000	CP3924-0010

We reserve the right to make technical changes.

Mounting arm adapter
C9900-M751

Connection block of the basic configuration with optional USB socket

CP39xx	CP39xx-0000	CP39xx-0010
Features	TFT display in nine sizes	TFT display in nine sizes
	aluminium housing with glass front, protection class IP 65	aluminium housing with glass front, protection class IP 65
	multi-finger touch screen – multi-finger touch screen driver, included in Windows 7 and Windows 10 – single-finger touch screen driver, available for Windows XP and Windows CE 6	multi-finger touch screen – multi-finger touch screen driver, included in Windows 7 and Windows 10 – single-finger touch screen driver, available for Windows XP and Windows CE 6
	integrated DVI/USB extension technology – DVI-E and USB-E 2.0 enable remote panel operation at a distance of up to 50 m from the PC. – USB-E 2.0 transmits USB 2.0 with 480 Mbit/s. – DVI-E input is compatible to the standard DVI output of a PC.	integrated CP-Link 4 connection technology – CP-Link 4 enables remote panel operation at a distance of up to 100 m from the PC via a Cat.6A cable with integrated or separate 24 V DC power supply depending on the transmitter module. – CP-Link 4 transmits USB 2.0 with 100 Mbit/s and DVI.
	connection via 3 round connectors (IP 65) for DVI, USB-E 2.0 and 24 V power supply unit in the backplane	connection via M12 round connector (IP 65) for CP-Link 4 in the backplane
	24 V power supply	additional M12 round connector for optional 24 V power supply
	operating temperature 0…55 °C	operating temperature 0…50 °C
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP39xx	

Accessories for CP2xxx and CP3xxx multi-touch Control Panels and Panel PCs

► www.beckhoff.com/IPC-accessories

We reserve the right to make technical changes.

C9900-M406 | **Keyboard shelf for CP3xxx multi-touch Control Panels and Panel PCs**

The keyboard shelf at a Beckhoff Panel PC or Control Panel permits a standard PC keyboard to be placed in front of the Control Panel, allowing convenient operation during commissioning or software updates. During normal production, the machine operator can rest tools and other items here while using the multi-finger touch screen.

A USB socket is integrated at the back of the keyboard shelf for connecting the keyboard. Any keyboard USB cable excess can be wrapped around a bracket at the underside of the keyboard shelf.

The shelf is made of coated aluminium, and its design matches that of the Control Panel. The keyboard shelf has a width of 468 mm.

Ordering information	Keyboard shelf for CP3xxx
C9900-M406	Toolboard for keyboard or tools, mounted under a Control Panel or Panel PC CP3xxx, with integrated USB socket IP 65 at the back side, can only be ordered in combination with the Control Panel or Panel PC.

CP2912 with C9900-G002 and CP2924 with C9900-G007

C9900-G00x, -G01x | Push-button extension for built-in CP2xxx multi-touch panels

C9900-G00x, -G01x	Push-button extension for built-in multi-touch panels
Features	push-button extension below
	push-button keys with signal lamp, type RAFI RAFIX 22FS+, round, 30 mm
	1 emergency stop key, type RAFI RAFIX 22FS+
	labels for push-button caps for individual marking of each push-button
	All push-buttons are transmitted via USB with one normally-open contact.
	Additionally, all push-buttons are directly wireable with a second normally-open contact via a terminal row.
	All signal lamps are transmitted via USB only.
	Selector switches and keylock switches as well as other elements from the series RAFIX 22FS+ are integrateable.
Further information	www.beckhoff.com/C9900-G00x

Ordering information	Push-button extension for built-in multi-touch panels
C9900-G002	push-button extension for CP2x12 12" landscape: 4 push-button keys and 1 emergency stop key
C9900-G009	push-button extension for CP2x13 12.1" landscape: 4 push-button keys and 1 emergency stop key
C9900-G003	push-button extension for CP2x15 15" landscape: 7 push-button keys and 1 emergency stop key
C9900-G004	push-button extension for CP2x16 15.6" landscape: 8 push-button keys and 1 emergency stop key
C9900-G005	push-button extension for CP2x18 18.5" landscape: 10 push-button keys and 1 emergency stop key
C9900-G006	push-button extension for CP2x19 19" landscape: 9 push-button keys and 1 emergency stop key
C9900-G008	push-button extension for CP2x21 21.5" landscape: 12 push-button keys and 1 emergency stop key
C9900-G007	push-button extension for CP2x24 24" landscape: 13 push-button keys and 1 emergency stop key
C9900-G012	push-button extension for CP2x12 12" portrait: 3 push-button keys and 1 emergency stop key
C9900-G013	push-button extension for CP2x15 15" portrait: 4 push-button keys and 1 emergency stop key
C9900-G014	push-button extension for CP2x16 15.6" portrait: 4 push-button keys and 1 emergency stop key
C9900-G015	push-button extension for CP2x18 18.5" portrait: 4 push-button keys and 1 emergency stop key
C9900-G016	push-button extension for CP2x19 19" portrait: 7 push-button keys and 1 emergency stop key
C9900-G018	push-button extension for CP2x21 21.5" portrait: 6 push-button keys and 1 emergency stop key
C9900-G017	push-button extension for CP2x24 24" portrait: 6 push-button keys and 1 emergency stop key

We reserve the right to make technical changes.

CP3919 with C9900-G026 and CP3921 with C9900-G028

C9900-G02x, -G03x | Push-button extension for CP3xxx multi-touch panels with mounting arm

C9900-G02x, -G03x	Push-button extension for multi-touch panels with mounting arm
Features	push-button extension below
	push-button keys with signal lamp, type RAFI RAFIX 22FS+, round, 30 mm
	1 emergency stop key, type RAFI RAFIX 22FS+
	labels for push-button caps for individual marking of each push-button
	All push-buttons are transmitted via USB with one normally-open contact.
	Additionally, all push-buttons are directly wireable with a second normally-open contact via a terminal row.
	All signal lamps are transmitted via USB only.
	aluminium cable channel to the mounting arm adapter on the backside
	Selector switches and keylock switches as well as other elements from the series RAFIX 22FS+ are integrateable.
Further information	www.beckhoff.com/C9900-G02x

Ordering information	Push-button extension for multi-touch panels with mounting arm
C9900-G022	push-button extension for CP3912 12″ landscape: 4 push-button keys and 1 emergency stop key
C9900-G029	push-button extension for CP3913 12.1″ landscape: 4 push-button keys and 1 emergency stop key
C9900-G023	push-button extension for CP3915 15″ landscape: 7 push-button keys and 1 emergency stop key
C9900-G024	push-button extension for CP3916 15.6″ landscape: 8 push-button keys and 1 emergency stop key
C9900-G025	push-button extension for CP3918 18.5″ landscape: 10 push-button keys and 1 emergency stop key
C9900-G026	push-button extension for CP3919 19″ landscape: 9 push-button keys and 1 emergency stop key
C9900-G028	push-button extension for CP3921 21.5″ landscape: 12 push-button keys and 1 emergency stop key
C9900-G027	push-button extension for CP3924 24″ landscape: 13 push-button keys and 1 emergency stop key
C9900-G032	push-button extension for CP3912 12″ portrait: 3 push-button keys and 1 emergency stop key
C9900-G033	push-button extension for CP3915 15″ portrait: 4 push-button keys and 1 emergency stop key
C9900-G034	push-button extension for CP3916 15.6″ portrait: 4 push-button keys and 1 emergency stop key
C9900-G035	push-button extension for CP3918 18.5″ portrait: 4 push-button keys and 1 emergency stop key
C9900-G036	push-button extension for CP3919 19″ portrait: 7 push-button keys and 1 emergency stop key
C9900-G038	push-button extension for CP3921 21.5″ portrait: 6 push-button keys and 1 emergency stop key
C9900-G037	push-button extension for CP3924 24″ portrait: 6 push-button keys and 1 emergency stop key

Single-touch Control Panels CP6xxx and CP7xxx

▶ **www.beckhoff.com/singletouch-control-panel**

What frame does an image need?
The carefully planned use of design elements gives the Control Panel its reserved and elegant appearance.

The open design possibilities of a membrane keyboard are fully exploited here. The robust keyboard ensures that the IP 65 protection class is retained as if new, even after long use in a tough industrial environment.

Light emitting diodes are integrated into the keys, while slide-in labels mean that exchangeable key identification can match the needs of the plant.

The emergency stop at the Control Panel
Push-button extensions in the design of the Control Panel make it thicker, but permit the application-specific arrangement of electromechanical keys and other components such as all kinds of switches, barcode scanners, graycode switches and handwheels. External housings can be attached to either side of the Control Panel. The signal leads may be laid separately or can be operated via USB.

Assembly
The back plate of the Control Panel series CP7xxx offers a free surface for a variety of assembly methods, for example a mounting arm system.

We reserve the right to make technical changes.

Mounting arm

Additional keyboard in IP 65

Touch pad

USB socket in IP 65

Control Panel for installation in the control cabinet door

The built-in Control Panels CP6xxx are designed for control cabinet installation. Only 4 mm of the front are visible in front of the control cabinet wall. Installation via pull-out clamping levers makes the process very simple without loose parts.

The built-in Control Panels CP69xx are available with 5.7-, 6.5-, 12-, 15-inch or 19-inch TFT display, with touch screen or touch pad, as a monitor without keyboard or with different membrane keyboard models up to full alphanumeric keyboards with 10 PLC special keys and 10 LEDs. The same range of push-button extensions with electromechanical keys as for the CP7xxx series is available.

The Control Panels are connected to the PC with a DVI/USB Extended interface for distances up to 50 m.

The Control Panel toolkit

A housing that can be dimensioned precisely in line with the needs of the particular application according to the customer's wishes can be combined with an individually designed membrane keyboard. This puts customisation on a wide footing at Beckhoff. Hardly one Control Panel is like another.

The Bus Terminal interface integrated into the Control Panel permits the connection of standard Beckhoff Bus Terminals to realise handwheels, graycode switches, buttons, switches, indicator lamps or other components without any additional wiring. Such elements can be integrated into the Control Panel and connected to the PC via USB.

Customised Beckhoff CP6xxx/CP7xxx Control Panels

- cost-effective implementation of company logos in form of a slide-in label for standard Control Panels
- complete revision of the colour scheme of the front membrane based on the corporate design of the company
- customised keyboard extensions according to customer specifications
- realisation of customer-specific bracket adapter plates for integrating different bracket systems
- realisation of complex operating terminals with fieldbus connections (PROFIBUS, Lightbus, CANopen, Ethernet, …)
- modification of the mechanical/electrical connection of the devices according to the local situation
- joint development and realisation of the design

Stainless steel Panel PC

Customer-specific front laminate

Individual housing construction

Individual housing adaptation

Modified membrane keypad colour scheme and keypad matrix

Individual housing construction for flush-mounted installation

We reserve the right to make technical changes.

Individual housing design, colour scheme and key shape/layout according to customer requirements

Individual housing construction

Push-button extension with hand wheel

Panel PC for injection molding applications

Control solution for blow molding machines

Extension with additional display, incremental encoders and switch elements

Integration of a barcode scanner and signal transducer

Extension with joystick, graycode switch and incremental encoder

Keyboard with larger number and higher density of membrane keys

Front membrane design with modified colour scheme and different size membrane keys

CP69xx, CP79xx | "Economy" Control Panels with DVI/USB Extended interface

▶ **www.beckhoff.com/CP69xx**
▶ **www.beckhoff.com/CP79xx**

The digital visual interface (DVI), defined as successor to analog VGA connections, digitally transfers the PC image to the display. The universal serial bus (USB) enables connection of input devices and drives to the PC. DVI/USB Extended enables CP69xx and CP79xx "Economy" Control Panels to be operated at a distance of up to 50 metres from the PC. Apart from a graphics card or a motherboard with DVI output and the USB port available with every motherboard, no additional card is required in the PC.

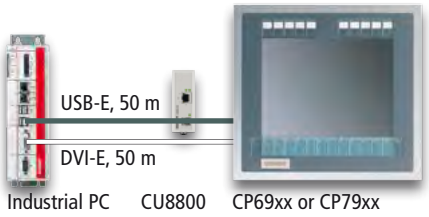
CP79xx Control Panels are designed for mounting arm installation. They offer all-round IP 65 protection. To this end they are equipped via industrial IP 65 round connectors for DVI or USB Extended and the 24 V power supply.

The CP69xx built-in Control Panels are connected via standard USB and DVI connectors and feature an industrial pin contact strip for the 24 V power supply. A 2-port USB socket in the rear panel enables connection of keyboard, mouse, USB stick or CD/DVD drive. USB Extended transfers the data with 12 Mbit/s according to USB 1.1.

We reserve the right to make technical changes.

CP69xx | "Economy" built-in Control Panel

CP79xx | "Economy" Control Panel



DVI/USB Extended

DVI/USB Extended

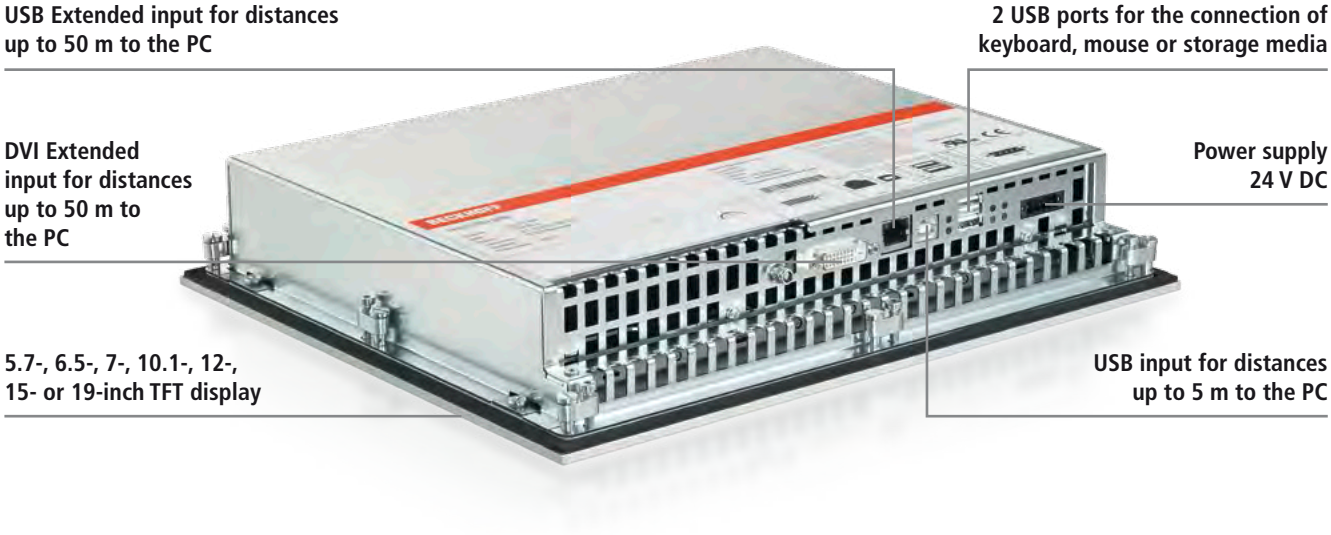
With the DVI/USB Extended technology, Control Panel and Industrial PC can be operated at distances of up to 50 m. The DVI graphics signal from the PC is directly transmitted via a DVI-E cable. The Control Panel is equipped with a signal processor, which restores the DVI signal after 50 m.

For the connection of CP69xx and CP79xx Control Panels, the CU8800 USB Extender box is connected to a USB port of the PC. The CU8800 converts the USB signal coming from the PC to USB Extended (USB-E) and transmits it to the Control Panel via up to 50 m of Cat.5 cable, where it is reconverted to USB 1.1 with data rates of 12 Mbit/s.

A USB hub in the Control Panel enables the connection of external USB devices such as a keyboard or USB stick in addition to touch screen, membrane keyboard and push-button extension. It is not possible, however, to connect an additional USB hub to the Control Panel.

The CU8800 USB Extender box does not require auxiliary power supply. It has a USB input and an RJ45 USB Extended output. The box is available in a set with all required cables in various lengths to bridge distances of up to 50 m between PC and Control Panel.

For smaller distances of up to 5 m, CP69xx Control Panels and PC can be directly connected via a USB cable, whereas the CP79xx Control Panels have to be connected by means of the CU8800 USB Extender no matter what distance.



CP69xx | “Economy” built-in Control Panel with DVI/USB Extended interface

Ordering information	without touch screen	with single-touch screen	with touch pad
Display only			
5.7-inch display 640 x 480	CP6907-0000-0000	CP6907-0001-0000	
6.5-inch display 640 x 480	CP6909-0000-0000	CP6909-0001-0000	
12-inch display 800 x 600	CP6901-0000-0000	CP6901-0001-0000	
15-inch display 1024 x 768	CP6902-0000-0000	CP6902-0001-0000	
19-inch display 1280 x 1024	CP6903-0000-0000	CP6903-0001-0000	
Display only, USB A socket in the front			
12-inch display 800 x 600	CP6901-0020-0000	CP6901-0021-0000	
15-inch display 1024 x 768	CP6902-0020-0000	CP6902-0021-0000	
19-inch display 1280 x 1024	CP6903-0020-0000	CP6903-0021-0000	
With function keys			
6.5-inch display 640 x 480	CP6919-0000-0000	CP6919-0001-0000	
12-inch display 800 x 600	CP6911-0000-0000	CP6911-0001-0000	
15-inch display 1024 x 768	CP6912-0000-0000	CP6912-0001-0000	
19-inch display 1280 x 1024	CP6913-0000-0000	CP6913-0001-0000	
Numeric keyboard			
6.5-inch display 640 x 480	CP6929-0000-0000	CP6929-0001-0000	
12-inch display 800 x 600	CP6921-0000-0000	CP6921-0001-0000	CP6921-0002-0000
15-inch display 1024 x 768	CP6922-0000-0000	CP6922-0001-0000	CP6922-0002-0000
19-inch display 1280 x 1024	CP6923-0000-0000	CP6923-0001-0000	CP6923-0002-0000
Alphanumeric keyboard			
12-inch display 800 x 600	CP6931-0000-0000	CP6931-0001-0000	CP6931-0002-0000
15-inch display 1024 x 768	CP6932-0000-0000	CP6932-0001-0000	CP6932-0002-0000
19-inch display 1280 x 1024	CP6933-0000-0000	CP6933-0001-0000	CP6933-0002-0000
Alphanumeric keyboard with PLC keys on the sides			
15-inch display 1024 x 768	CP6942-0000-0000	CP6942-0001-0000	

We reserve the right to make technical changes.

Without keys

Function keys

Numeric keyboard

Alphanumeric keyboard

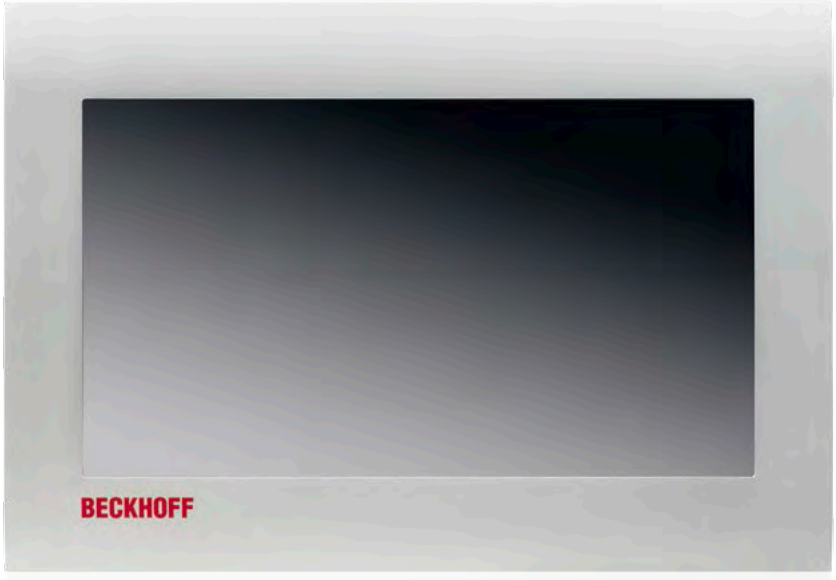
Alphanumeric keyboard with PLC keys on the sides

CP69xx	"Economy" built-in Control Panel
Features	TFT display in five sizes
	aluminium front with sheet-steel rear cover, front side IP 65, rear side IP 20
	front laminate in five variants – only display – function keys and 10 PLC special keys with LED – numeric keyboard and 10 PLC special keys with LED – alphanumeric PC keyboard in US layout and 10 PLC special keys with LED – alphanumeric PC keyboard in US layout and 16 PLC special keys with LED on the sides
	integrated DVI/USB extension technology – DVI-E and USB-E enable remote panel operation at a distance of up to 50 m from the PC. – DVI-E input is compatible to the standard DVI output of a PC.
	USB input for the direct connection to a standard USB output of a PC with distances of up to 5 m
	all connectors at the lower rear side
	24 V power supply
	operating temperature 0…55 °C
	pull-out clamping levers for fast installation without loose parts
Options	touch screen pen with wall holder
	push-button extension with electromechanical switches and keys
	connecting kits for up to 50 m distance to the PC
	wall mounting frame for building installation
Stainless steel options	stainless steel front (1.4301) with bevelled edges at top and bottom and touch screen for CP690x
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP69xx

CP6906, CP6900 | "Economy" built-in Control Panels with DVI/USB Extended interface

▶ **www.beckhoff.com/CP6906**
▶ **www.beckhoff.com/CP6900**

The CP6906 and CP6900 "Economy" Control Panel series expands the IPC entry-level class by two built-in Control Panels with DVI/USB Extended interface. The panels are designed for installation in the front of a control cabinet and have a 7-inch respectively a 10.1-inch touch screen display. Ideally combined with the compact Embedded PCs in the CX series or C6xxx series Industrial PCs, this results in an inexpensive PC/panel combination. Both Control Panel types are supplied with a 24 V power supply unit. The integrated DVI/USB Extended technology enables remote panel operation at a distance of up to 50 m from the PC.



CP6900

We reserve the right to make technical changes.

CP6906, CP6900 | “Economy” built-in Control Panels with DVI/USB Extended interface

Ordering information		with single-touch screen
7-inch display	800 x 480	CP6906-0001-0000
10.1-inch display	1024 x 600	CP6900-0001-0000

CP6906, CP6900	CP69xx-0001-0000
Features	TFT display in two sizes
	aluminium front with sheet-steel rear cover, front side IP 54, rear side IP 20
	touch screen without keys
	integrated DVI/USB extension technology – DVI-E and USB-E enable remote panel operation at a distance of up to 50 m from the PC. – DVI-E input is compatible to the standard DVI output of a PC.
	USB input for the direct connection to a standard USB output of a PC with distances of up to 5 m
	all connectors at the lower rear side
	24 V power supply
	operating temperature 0…55 °C
	pull-out clamping levers for fast installation without loose parts
Options	touch screen pen with wall holder
	connecting kits for up to 50 m distance to the PC
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP6906

CP79xx | "Economy" Control Panel with DVI/USB Extended interface

Ordering information	without touch screen	with single-touch screen	with touch pad
Display only			
6.5-inch display 640 x 480	CP7909-0000-0000	CP7909-0001-0000	
12-inch display 800 x 600	CP7901-0000-0000	CP7901-0001-0000	
15-inch display 1024 x 768	CP7902-0000-0000	CP7902-0001-0000	
19-inch display 1280 x 1024	CP7903-0000-0000	CP7903-0001-0000	
Display only, USB A socket in the front			
12-inch display 800 x 600	CP7901-0020-0000	CP7901-0021-0000	
15-inch display 1024 x 768	CP7902-0020-0000	CP7902-0021-0000	
19-inch display 1280 x 1024	CP7903-0020-0000	CP7903-0021-0000	
With function keys			
6.5-inch display 640 x 480	CP7919-0000-0000	CP7919-0001-0000	
12-inch display 800 x 600	CP7911-0000-0000	CP7911-0001-0000	
15-inch display 1024 x 768	CP7912-0000-0000	CP7912-0001-0000	
19-inch display 1280 x 1024	CP7913-0000-0000	CP7913-0001-0000	
Numeric keyboard			
6.5-inch display 640 x 480	CP7929-0000-0000	CP7929-0001-0000	
12-inch display 800 x 600	CP7921-0000-0000	CP7921-0001-0000	CP7921-0002-0000
15-inch display 1024 x 768	CP7922-0000-0000	CP7922-0001-0000	CP7922-0002-0000
19-inch display 1280 x 1024	CP7923-0000-0000	CP7923-0001-0000	CP7923-0002-0000
Alphanumeric keyboard			
12-inch display 800 x 600	CP7931-0000-0000	CP7931-0001-0000	CP7931-0002-0000
15-inch display 1024 x 768	CP7932-0000-0000	CP7932-0001-0000	CP7932-0002-0000
19-inch display 1280 x 1024	CP7933-0000-0000	CP7933-0001-0000	CP7933-0002-0000
Alphanumeric keyboard with PLC keys on the sides			
15-inch display 1024 x 768	CP7942-0000-0000	CP7942-0001-0000	
Stainless steel housing		**with single-touch screen**	**with single-touch screen, push-buttons and USB socket**
12-inch display 800 x 600		CP7901-1400-0000	CP7901-1401-0000
15-inch display 1024 x 768		CP7902-1400-0000	CP7902-1401-0000
19-inch display 1280 x 1024		CP7903-1400-0000	CP7903-1401-0000

We reserve the right to make technical changes.

Stainless steel finish

Without keys

Function keys

Numeric keyboard

Alphanumeric keyboard

Alphanumeric keyboard with PLC keys on the sides

CP79xx	"Economy" Control Panel
Features	TFT display in four sizes
	aluminium housing, protection class IP 65
	front laminate in five variants – only display – function keys and 10 PLC special keys with LED – numeric keyboard and 10 PLC special keys with LED – alphanumeric PC keyboard in US layout and 10 PLC special keys with LED – alphanumeric PC keyboard in US layout and 16 PLC special keys with LED on the sides
	special keys identified by slide-in labels
	integrated DVI/USB extension technology – DVI-E and USB-E enable remote panel operation at a distance of up to 50 m from the PC. – DVI-E input is compatible to the standard DVI output of a PC.
	connection via 3 round connectors (IP 65) for DVI, USB-E and 24 V power supply unit in the backplane
	operating temperature 0…55 °C
	for mounting 4 M6 x 18 mm threaded holes in the backplane
Options	2-port IP 65 USB interface in the backplane
	touch screen pen with holder for aluminium Control Panels
	additional keyboard IP 65 or toolboard for keyboard and tools
	push-button extension with electromechanical switches and keys
	connection set up to 50 m length
	adapter plate for mounting arm installation
Stainless steel options	stainless steel housing with flush-mounted touch screen for CP7901, CP7902 and CP7903
Further information	for further options, technical drawings, documentations, etc. see www.beckhoff.com/CP79xx

Accessories for CP6xxx and CP7xxx single-touch Control Panels and Panel PCs

We reserve the right to make technical changes.

Keyboard shelf

Touch screen pen

Additional keyboard

RFID reader

Electromechanical buttons on the Control Panel or Panel PC

Control Panels and Panel PCs with push-button extension enable the application-specific arrangement of electromechanical buttons, switches, signal lamps, additional membrane keys and a hand wheel directly on the operating unit. It enables precise adaptation of the Control Panel to the machine control requirements. In many cases, a machine operator control panel is no longer required, since all functions are integrated in the Control Panel. The Control Panel housing is increased in size on one side. Depending on the required functions and the electromechanical components, the flat rear panel is enlarged or extended with a trough-shaped rear panel for the button area.

For the CP77xx and CP79xx units the Rolec Tara Plus mounting arm system, article numbers 149.025.012, 149.025.013, 149.025.014, 149.035.012, 149.035.013 or 149.035.015, can be mounted centrally at the rear of the Control Panel. The mounting arm can optionally be connected from above or below. The Rittal mounting arm system is available as an additional option. The CP6508.020 or CP6501.170 Rittal adapters can be mounted at the back of the Control Panel. The cables are routed through the mounting arm, through a cable gland in the mounting arm adapter and from there concealed through a channel at the rear of the Control Panel to the push-button extension. A circular plug-in connector instead of a screwed cable gland is available on request. The housings of the CP7xxx range have protection class IP 65 on all sides. The wiring space can be opened without removing the Control Panel from the mounting arm.

The buttons, switches and indicator lamps are connected to the control system via USB. A second contact on the buttons and switches can at the same time be wired directly via a terminal row. Besides the push-button extensions shown on the following pages, numerous other variants are conceivable, which can be individually designed in accordance with requirements.

Open wiring space

CP6233-0001-0010 with C9900-E595

Push-button extensions for CP6xxx

C9900-Exxx	Push-button extension for "Economy" built-in Panel PCs, built-in Panel PCs, "Economy" built-in Control Panels
Features	push-button extension on the right side
	push-button keys with signal lamp, type Siemens Signum square, 30 x 30 mm
	1 emergency stop key Siemens Signum
	Labels for push-button caps allow individual marking.
	All push-buttons are transmitted via USB with one normally-open contact.
	Additionally, all push-buttons are directly wireable with a second normally-open contact via a terminal row.
	All signal lamps are transmitted via USB only.
	Selector switches and keylock switches as well as other elements from the Signum series are integrateable on request.
Options	A circular plug-in connector is available on request (instead of a screwed cable gland).
Further information	www.beckhoff.com/C9900-Exxx

Ordering information	Push-button extension for "Economy" built-in Panel PC CP62xx
C9900-E505	push-button extension for CP6221 with 12" display and numeric keyboard, 12 push-button keys with signal lamp
C9900-E515	push-button extension for CP6231 with 12" display and alphanumeric keyboard, 16 push-button keys with signal lamp
C9900-E545	push-button extension for CP6202 with 15" display and without keyboard, 16 push-button keys with signal lamp
C9900-E555	push-button extension for CP6212 with 15" display and function keys, 16 push-button keys with signal lamp
C9900-E565	push-button extension for CP6222 with 15" display and numeric keyboard, 14 push-button keys with signal lamp
C9900-E575	push-button extension for CP6232 with 15" display and alphanumeric keyboard, 18 push-button keys with signal lamp
C9900-E525	push-button extension for CP6203 with 19" display and without keyboard, 20 push-button keys with signal lamp
C9900-E535	push-button extension for CP6213 with 19" display and function keys, 20 push-button keys with signal lamp
C9900-E594	push-button extension for CP6223 with 19" display and numeric keyboard, 20 push-button keys with signal lamp
C9900-E595	push-button extension for CP6233 with 19" display and alphanumeric keyboard, 20 push-button keys with signal lamp

We reserve the right to make technical changes.

CP6232-0002-0035 with C9900-E575

Ordering information	Push-button extension for built-in Panel PC CP65xx
C9900-E705	push-button extension for CP6521 with 12" display and numeric keyboard, 12 push-button keys with signal lamp
C9900-E715	push-button extension for CP6531 with 12" display and alphanumeric keyboard, 16 push-button keys with signal lamp
C9900-E745	push-button extension for CP6502 with 15" display and without keyboard, 16 push-button keys with signal lamp
C9900-E755	push-button extension for CP6512 with 15" display and function keys, 16 push-button keys with signal lamp
C9900-E765	push-button extension for CP6522 with 15" display and numeric keyboard, 14 push-button keys with signal lamp
C9900-E775	push-button extension for CP6532 with 15" display and alphanumeric keyboard, 18 push-button keys with signal lamp
C9900-E725	push-button extension for CP6503 with 19" display and without keyboard, 20 push-button keys with signal lamp
C9900-E735	push-button extension for CP6513 with 19" display and function keys, 20 push-button keys with signal lamp
C9900-E796	push-button extension for CP6523 with 19" display and numeric keyboard, 20 push-button keys with signal lamp
C9900-E797	push-button extension for CP6533 with 19" display and alphanumeric keyboard, 20 push-button keys with signal lamp

Ordering information	Push-button extension for "Economy" built-in Panel PC CP66xx
C9900-E406	push-button extension for CP6621 with 12" display and numeric keyboard, 12 push-button keys with signal lamp
C9900-E416	push-button extension for CP6631 with 12" display and alphanumeric keyboard, 16 push-button keys with signal lamp
C9900-E446	push-button extension for CP6602 with 15" display and without keyboard, 16 push-button keys with signal lamp
C9900-E456	push-button extension for CP6612 with 15" display and function keys, 16 push-button keys with signal lamp
C9900-E466	push-button extension for CP6622 with 15" display and numeric keyboard, 14 push-button keys with signal lamp
C9900-E476	push-button extension for CP6632 with 15" display and alphanumeric keyboard, 18 push-button keys with signal lamp
C9900-E426	push-button extension for CP6603 with 19" display and without keyboard, 20 push-button keys with signal lamp
C9900-E436	push-button extension for CP6613 with 19" display and function keys, 20 push-button keys with signal lamp
C9900-E496	push-button extension for CP6623 with 19" display and numeric keyboard, 20 push-button keys with signal lamp
C9900-E497	push-button extension for CP6633 with 19" display and alphanumeric keyboard, 20 push-button keys with signal lamp

Push-button extension

CP6922-0001-0000 with C9900-E965

Ordering information	Push-button extension for "Economy" built-in Panel PC CP67xx-00xx-0040/-0050
C9900-E505	push-button extension for CP6721-00xx-0040/-0050 with 12" display and numeric keyboard, 12 push-button keys with signal lamp
C9900-E515	push-button extension for CP6731-00xx-0040/-0050 with 12" display and alphanumeric keyboard, 16 push-button keys with signal lamp
C9900-E545	push-button extension for CP6702-00xx-0040/-0050 with 15" display and without keyboard, 16 push-button keys with signal lamp
C9900-E555	push-button extension for CP6712-00xx-0040/-0050 with 15" display and function keys, 16 push-button keys with signal lamp
C9900-E565	push-button extension for CP6722-00xx-0040/-0050 with 15" display and numeric keyboard, 14 push-button keys with signal lamp
C9900-E575	push-button extension for CP6732-00xx-0040/-0050 with 15" display and alphanumeric keyboard, 18 push-button keys with signal lamp
C9900-E525	push-button extension for CP6703-00xx-0040/-0050 with 19" display and without keyboard, 20 push-button keys with signal lamp
C9900-E535	push-button extension for CP6713-00xx-0040/-0050 with 19" display and function keys, 20 push-button keys with signal lamp
C9900-E594	push-button extension for CP6723-00xx-0040/-0050 with 19" display and numeric keyboard, 20 push-button keys with signal lamp
C9900-E595	push-button extension for CP6733-00xx-0040/-0050 with 19" display and alphanumeric keyboard, 20 push-button keys with signal lamp

Ordering information	Push-button extension for "Economy" built-in Control Panel CP69xx
C9900-E905	push-button extension for CP6921 with 12" display and numeric keyboard, 12 push-button keys with signal lamp
C9900-E915	push-button extension for CP6931 with 12" display and alphanumeric keyboard, 16 push-button keys with signal lamp
C9900-E945	push-button extension for CP6902 with 15" display and without keyboard, 16 push-button keys with signal lamp
C9900-E955	push-button extension for CP6912 with 15" display and function keys, 16 push-button keys with signal lamp
C9900-E965	push-button extension for CP6922 with 15" display and numeric keyboard, 14 push-button keys with signal lamp
C9900-E975	push-button extension for CP6932 with 15" display and alphanumeric keyboard, 18 push-button keys with signal lamp
C9900-E925	push-button extension for CP6903 with 19" display and without keyboard, 20 push-button keys with signal lamp
C9900-E935	push-button extension for CP6913 with 19" display and function keys, 20 push-button keys with signal lamp
C9900-E996	push-button extension for CP6923 with 19" display and numeric keyboard, 20 push-button keys with signal lamp
C9900-E997	push-button extension for CP6933 with 19" display and alphanumeric keyboard, 20 push-button keys with signal lamp

We reserve the right to make technical changes.

CP7202-0001-0010
with C9900-E547 and
C9900-M161

Open wiring space

Push-button extensions for CP72xx

C9900-E5xx	Push-button extension for "Economy" Panel PC
Features	push-button extension on the right side
	push-button keys with signal lamp, type Siemens Signum square, 30 x 30 mm
	1 emergency stop key Siemens Signum
	Labels for push-button caps allow individual marking.
	All push-buttons are transmitted via USB with one normally-open contact.
	Additionally, all push-buttons are directly wireable with a second normally-open contact via a terminal row.
	All signal lamps are transmitted via USB only.
	circular plug-in connector between push-button extension and connection section
	Selector switches for keylock switches as well as other elements from the Signum series are integrateable on request.
Further information	www.beckhoff.com/C9900-Exxx

Ordering information	Push-button extension for "Economy" Panel PC CP72xx
C9900-E507	push-button extension for CP7221 with 12" display and numeric keyboard, 12 push-button keys with signal lamp
C9900-E517	push-button extension for CP7231 with 12" display and alphanumeric keyboard, 16 push-button keys with signal lamp
C9900-E547	push-button extension for CP7202 with 15" display and without keyboard, 16 push-button keys with signal lamp
C9900-E557	push-button extension for CP7212 with 15" display and function keys, 16 push-button keys with signal lamp
C9900-E567	push-button extension for CP7222 with 15" display and numeric keyboard, 14 push-button keys with signal lamp
C9900-E577	push-button extension for CP7232 with 15" display and alphanumeric keyboard, 18 push-button keys with signal lamp
C9900-E527	push-button extension for CP7203 with 19" display and without keyboard, 20 push-button keys with signal lamp
C9900-E537	push-button extension for CP7213 with 19" display and function keys, 20 push-button keys with signal lamp
C9900-E597	push-button extension for CP7223 with 19" display and numeric keyboard, 20 push-button keys with signal lamp
C9900-E599	push-button extension for CP7233 with 19" display and alphanumeric keyboard, 20 push-button keys with signal lamp

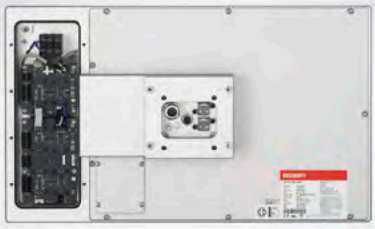
CP7932-0001-0000 with C9900-E771

Push-button extensions for CP7xxx without mounting arm connection

C9900-E7xx, -E8xx	Push-button extension for Panel PC and Control Panel
Features	push-button extension on the right side
	push-button keys with signal lamp, type Siemens Signum square, 30 x 30 mm
	1 emergency stop key Siemens Signum
	Labels for push-button caps allow individual marking.
	All push-buttons are transmitted via USB with one normally-open contact.
	Additionally, all push-buttons are directly wireable with a second normally-open contact via a terminal row.
	All signal lamps are transmitted via USB only.
	without mounting arm connection
	without cable bushing
	Selector switches and keylock switches as well as other elements from the Signum series are integrateable on request.
Options	screwed cable gland for feeding a signal line into a push-button extension, mounting arm adapter plates
Further information	www.beckhoff.com/C9900-Exxx
Ordering information	**Push-button extension for Panel PC CP77xx**
C9900-E801	push-button extension for CP7721 with 12" display and numeric keyboard, 12 push-button keys with signal lamp
C9900-E811	push-button extension for CP7731 with 12" display and alphanumeric keyboard, 16 push-button keys with signal lamp
C9900-E841	push-button extension for CP7702 with 15" display and without keyboard, 16 push-button keys with signal lamp
C9900-E851	push-button extension for CP7712 with 15" display and function keys, 16 push-button keys with signal lamp
C9900-E861	push-button extension for CP7722 with 15" display and numeric keyboard, 14 push-button keys with signal lamp
C9900-E871	push-button extension for CP7732 with 15" display and alphanumeric keyboard, 18 push-button keys with signal lamp
C9900-E823	push-button extension for CP7703 with 19" display and without keyboard, 20 push-button keys with signal lamp
C9900-E831	push-button extension for CP7713 with 19" display and function keys, 20 push-button keys with signal lamp
C9900-E892	push-button extension for CP7723 with 19" display and numeric keyboard, 20 push-button keys with signal lamp
C9900-E893	push-button extension for CP7733 with 19" display and alphanumeric keyboard, 20 push-button keys with signal lamp
Ordering information	**Push-button extension for Control Panel CP79xx**
C9900-E701	push-button extension for CP7921 with 12" display and numeric keyboard, 12 push-button keys with signal lamp
C9900-E711	push-button extension for CP7931 with 12" display and alphanumeric keyboard, 16 push-button keys with signal lamp
C9900-E741	push-button extension for CP7902 with 15" display and without keyboard, 16 push-button keys with signal lamp
C9900-E751	push-button extension for CP7912 with 15" display and function keys, 16 push-button keys with signal lamp
C9900-E761	push-button extension for CP7922 with 15" display and numeric keyboard, 14 push-button keys with signal lamp
C9900-E771	push-button extension for CP7932 with 15" display and alphanumeric keyboard, 18 push-button keys with signal lamp
C9900-E723	push-button extension for CP7903 with 19" display and without keyboard, 20 push-button keys with signal lamp
C9900-E731	push-button extension for CP7913 with 19" display and function keys, 20 push-button keys with signal lamp
C9900-E792	push-button extension for CP7923 with 19" display and numeric keyboard, 20 push-button keys with signal lamp
C9900-E793	push-button extension for CP7933 with 19" display and alphanumeric keyboard, 20 push-button keys with signal lamp

We reserve the right to make technical changes.

CP7721-0001-0030 with C9900-E808



Open wiring space

Push-button extensions for CP7xxx with mounting arm adapter plate

C9900-E7xx, -E8xx	Push-button extension for Panel PC and Control Panel
Features	push-button extension on the right side
	push-button keys with signal lamp, type Siemens Signum square, 30 x 30 mm
	1 emergency stop key Siemens Signum
	Labels for push-button caps allow individual marking.
	All push-buttons are transmitted via USB with one normally-open contact.
	Additionally, all push-buttons are directly wireable with a second normally-open contact via a terminal row.
	All signal lamps are transmitted via USB only.
	mounting arm adapter plate at Control Panel backplane for top or bottom installation of mounting arm system Rolec
	Selector switches for keylock switches as well as other elements from the Signum series are integrateable on request.
	Circular plug-in connector instead of screwed cable gland is integrateable on request.
Options	mounting arm adapter plate for mounting arm systems Rittal instead of Rolec
Further information	www.beckhoff.com/C9900-Exxx
Ordering information	**Push-button extension for Panel PC CP77xx**
C9900-E808	push-button extension for CP7721 with 12" display and numeric keyboard, 12 push-button keys with signal lamp
C9900-E818	push-button extension for CP7731 with 12" display and alphanumeric keyboard, 16 push-button keys with signal lamp
C9900-E848	push-button extension for CP7702 with 15" display and without keyboard, 16 push-button keys with signal lamp
C9900-E858	push-button extension for CP7712 with 15" display and function keys, 16 push-button keys with signal lamp
C9900-E868	push-button extension for CP7722 with 15" display and numeric keyboard, 14 push-button keys with signal lamp
C9900-E878	push-button extension for CP7732 with 15" display and alphanumeric keyboard, 18 push-button keys with signal lamp
C9900-E828	push-button extension for CP7703 with 19" display and without keyboard, 20 push-button keys with signal lamp
C9900-E838	push-button extension for CP7713 with 19" display and function keys, 20 push-button keys with signal lamp
C9900-E898	push-button extension for CP7723 with 19" display and numeric keyboard, 20 push-button keys with signal lamp
C9900-E899	push-button extension for CP7733 with 19" display and alphanumeric keyboard, 20 push-button keys with signal lamp
Ordering information	**Push-button extension for Control Panel CP79xx**
C9900-E708	push-button extension for CP7921 with 12" display and numeric keyboard, 12 push-button keys with signal lamp
C9900-E718	push-button extension for CP7931 with 12" display and alphanumeric keyboard, 16 push-button keys with signal lamp
C9900-E748	push-button extension for CP7902 with 15" display and without keyboard, 16 push-button keys with signal lamp
C9900-E758	push-button extension for CP7912 with 15" display and function keys, 16 push-button keys with signal lamp
C9900-E768	push-button extension for CP7922 with 15" display and numeric keyboard, 14 push-button keys with signal lamp
C9900-E778	push-button extension for CP7932 with 15" display and alphanumeric keyboard, 18 push-button keys with signal lamp
C9900-E728	push-button extension for CP7903 with 19" display and without keyboard, 20 push-button keys with signal lamp
C9900-E738	push-button extension for CP7913 with 19" display and function keys, 20 push-button keys with signal lamp
C9900-E798	push-button extension for CP7923 with 19" display and numeric keyboard, 20 push-button keys with signal lamp
C9900-E799	push-button extension for CP7933 with 19" display and alphanumeric keyboard, 20 push-button keys with signal lamp

CP6942-0001-0000 with C9900-E781

PLC push-button extensions for tool machines

C9900-E78x	PLC push-button extension for tool machines at "Economy" built-in Panel PC, built-in Panel PC, built-in Control Panel, Panel PC and Control Panel
Features	push-button extension below
	16 push-button keys with signal lamp, type Siemens Signum square, 30 x 30 mm
	1 emergency stop key Siemens Signum
	inscription of the keys via slide-in labels
	All push-buttons are transmitted via USB with one normally-open contact.
	Additionally, all push-buttons are directly wireable with a second normally-open contact via a terminal row.
	All signal lamps are transmitted via USB only.
	1 graycode switch with 23 positions, controlled via USB
	2-port USB A interface in the front with screw cap IP 65
Additional features CP7942	mounting arm adapter plate at the Control Panel backplane for mounting arm installation from top or bottom for mounting arm system Rolec
Options	Circular plug-in connector instead of screwed cable gland is integrateable on request.
Additional options CP7942	mounting arm adapter plate for mounting arm system Rittal instead of Rolec
	mounting arm adapter plate for mounting arm system Rose instead of Rolec, with 2-port USB interface on the side with screw cap IP 65
Further information	www.beckhoff.com/C9900-Exxx

Ordering information	PLC push-button extension for CP6242, CP6542, CP6742-00xx-0040, CP6942, CP7242 and CP7942
C9900-E781	push-button extension for CP6242 with 15" display and alphanumeric keyboard
C9900-E780	push-button extension for CP6542 with 15" display and alphanumeric keyboard
C9900-E781	push-button extension for CP6742-00xx-0040 with 15" display and alphanumeric keyboard
C9900-E781	push-button extension for CP6942 with 15" display and alphanumeric keyboard
C9900-E784	push-button extension for CP7242 with 15" display and alphanumeric keyboard
C9900-E783	push-button extension for CP7942 with 15" display and alphanumeric keyboard

We reserve the right to make technical changes.

CP7942-0001-0000 with C9900-E789 and C9900-E181

CNC push-button extensions for tool machines

C9900-E7xx	CNC push-button extension for tool machines at "Economy" built-in Panel PC, built-in Panel PC, built-in Control Panel, Panel PC and Control Panel
Features	push-button extension below
	2 push-button keys with signal lamp, type Siemens Signum round, directly wireable
	1 emergency stop key Siemens Signum
	1 key switch, type Siemens Signum round, directly wireable
	45 membrane keys with an LED in each key, controlled via USB
	inscription of the keys via slide-in labels
	1 graycode switch with 17 positions, controlled via USB
	1 graycode switch with 23 positions, controlled via USB
	circular plug-in connector
Additional features CP7942	mounting arm adapter plate at the Control Panel backplane for mounting arm installation from top or bottom for mounting arm system Rolec
Options CP7242	connection IP 65 for control unit Euchner at the bottom of the CNC push-button extension
Options CP7942	connection IP 65 for control unit Euchner at the bottom of the CNC push-button extension
	mounting arm adapter plate for mounting arm system Rittal instead of Rolec
	mounting arm adapter plate for mounting arm system Rose instead of Rolec, with 2-port USB interface on the side with screw cap IP 65
Further information	www.beckhoff.com/C9900-Exxx

Ordering information	CNC push-button extension for CP6242, CP6542, CP6742-00xx-0040, CP6942, CP7242 and CP7942
C9900-E787	push-button extension for CP6242 with 15" display and alphanumeric keyboard
C9900-E786	push-button extension for CP6542 with 15" display and alphanumeric keyboard
C9900-E787	push-button extension for CP6742-00xx-0040 with 15" display and alphanumeric keyboard
C9900-E787	push-button extension for CP6942 with 15" display and alphanumeric keyboard
C9900-E791	push-button extension for CP7242 with 15" display and alphanumeric keyboard
C9900-E789	push-button extension for CP7942 with 15" display and alphanumeric keyboard

K7xxx, KT7xxx | **Additional keyboard for CP7xxx Control Panels and Panel PCs**

The indestructible PC keyboard

The K7xxx and KT7xxx PC keyboards add a keyboard to the Control Panel which allows the comfortable entry of large amounts of data with a keyboard designed for industrial use. The Control Panel keyboards K7xxx and KT7xxx are even more robust than a membrane keyboard and yet feel almost like a standard keyboard. They offer the optimum in operating comfort in tough industrial environments.

An aluminium keyboard housing in Control Panel design combines the keyboard and the Control Panel to form a homogeneous unit. The width of the housing is adapted to the Control Panel for which the keyboard is intended.

A touch pad can be integrated into the keyboard housing. Here, large, easily accessible keys meeting protection class IP 67 serve as mouse keys. The keyboards K7xxx and KT7xxx are mounted in a holder on the Control Panel which is available in a version located at a fixed angle of 100° and a version which can be adjusted between 90° and 180°. The Control Panel is modified to have additional open sections in the side contour which allow the cabling to be stored in an invisible way.

Ordering information	
K7100-0000	additional keyboard to be mounted to a Control Panel CP79xx or to a Panel PC CP72xx and CP77xx
KT7100-0000	additional keyboard with touch pad to be mounted to a Control Panel CP79xx or to a Panel PC CP72xx and CP77xx
C9900-M300	mounting adapter with fixed 100° angle for mounting a keyboard K7xxx or KT7xxx to a Control Panel
C9900-M310	mounting adapter with adjustable 90° to 180° angle for mounting a keyboard K7xxx or KT7xxx to a Control Panel

C9900-M400 | **Keyboard shelf for CP7xxx Control Panels and Panel PCs**

The keyboard shelf at a Beckhoff Control Panel permits a standard PC keyboard to be placed in front of the Control Panel, allowing convenient operation during commissioning or software updates. During normal production, the machine operator can rest tools and other items here while using the Control Panel.

The shelf is constructed from anodised aluminium. Its design matches that of the Control Panel. A ribbed rubber mat is glued to the surface of the shelf. The keyboard shelf is made as wide as the Control Panel. In the case of small Control Panels, the shelf is wider than the Control Panel housing, so that a keyboard can be rested on it. The Control Panel is given additional holes on the lower side, so the shelf should be ordered at the same time as the Control Panel.

Ordering information	
C9900-M400	toolboard for keyboard or tools, mounted under a Control Panel CP7xxx or Panel PCs CP7xxx
C9900-M401	drill holes at the bottom of a Control Panel or Panel PC CP7xxx for assembly of a keyboard shelf (supply without shelf)

We reserve the right to make technical changes.

C9900-T90x | Touch screen pen for CP6xxx, CP7xxx and C3xxx Control Panels and Panel PCs

The touch screen is the ideal operating medium for the Industrial PC. By using the Beckhoff touch screen pen, it is possible to make the touch screen technology available for tough operating environments and to allow higher operating precision than using the finger or another pointing medium.

The stable, round point of the pen allows easy, flowing operation of the touch screen and gives a better view of the display at the same time. It is also possible for operators who wear gloves to work in a precise and comfortable way with the Beckhoff touch screen pen. Grit or dirt on the finger is no longer a problem. The plastic tip is gentle on the surface of the touch screen. Direct operation without a pen still remains possible.

The user of the Beckhoff touch screen pen receives a precise input medium with an ergonomically formed, non-slip aluminium shaft, in a design which conforms to that of the Control Panel, and with the right balance of weight, form and friction. This pen is also ideal for the built-in Panel PCs with touch screen.

The touch screen pen is kept in a holder fastened to the Control Panel or to the Panel PC. A connecting cord between the pen and the holder makes the pen accessible at any time.

Ordering information	
C9900-T900	touch screen pen with holder for Control Panel and Panel PCs CP7xxx
C9900-T902	touch screen pen with wall holder for built-in Control Panel and Panel PCs CP6xxx and C3xxx

C9900-E21x | RFID reader in the CP7xxx Control Panel front

The CP720x and CP770x Panel PCs and the CP790x Control Panels with 15- or 19-inch display without membrane keyboard are available with RFID reader in the front panel. The card reader enables user identification at the device. The RFID module reads Legic transponders at a distance of up to 30 mm. The data are transferred to the PC via USB. The RFID reader is integrated in the Control Panel or the Panel PC behind the front laminate. The print on the front laminate indicates the position of the RFID reader below the display on the right-hand side. IP 65 protection class is maintained and enables operation in harsh industrial environments. The RFID option has no influence on the dimensions of the Control Panel.

C9900-E21x	RFID reader
	Legic transponder type
	transponder frequency 13.56 MHz
	integrated in the Control Panel behind the front laminate
	up to 30 mm reading distance
	internally connected via USB interface
	IP 65

Ordering information	
C9900-E213	RFID reader for Legic transponder inside the front of a Panel PC CP7202 or CP7702 or of a Control Panel CP7902, integrated behind the front laminate, protection class IP 65, connected internally by USB
C9900-E214	RFID reader for Legic transponder inside the front of a Panel PC CP7203 or CP7703 or of a Control Panel CP7903, integrated behind the front laminate, protection class IP 65, connected internally by USB

Highlights

- Scalable performance range
- Compact design
- Direct I/O interface
- Modular extension options
- DIN rail mounting

Embedded PC

Modular DIN rail IPCs and Industrial Motherboards

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241 CANopen CX1500-M510
241 DeviceNet CX1500-M520
241 SERCOS CX1500-M750

242 **Fieldbus slaves**
242 Lightbus CX1500-B200
242 PROFIBUS CX1500-B310
242 CANopen CX1500-B510
242 DeviceNet CX1500-B520

243 **UPS**
243 UPS modules CX1100-09x0

244 **Embedded PC series CX20x0 (x86)**
246 Basic CPU modules CX20x0
252 Power supply units and UPS modules CX2100-0xxx
253 System interfaces CX25x0-00xx

248 **Embedded PC series CX20x2 (x86)**
250 Basic CPU modules CX20x2
252 Power supply units and UPS modules CX2100-0xxx
253 System interfaces CX25x0-00xx

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Product overview Embedded PC

Embedded PC

Basic CPU	CX80xx		CX81xx		CX9020	
		200		208		210
Processor	ARM9, 400 MHz		ARM Cortex™-A9, 800 MHz		ARM Cortex™-A8, 1 GHz	
Flash memory	slot for microSD card, 512 MB included (expandable)		slot for microSD card, 512 MB included (expandable)		2 x slot for microSD card, 512 MB included (expandable)	
Main memory	64 MB DDR2 RAM (not expandable)		512 MB DDR3 RAM (not expandable)		1 GB DDR3 RAM (not expandable)	
Interfaces	1 x RJ45 10/100 Mbit/s, 1 x USB device (behind the front flap), fieldbus interface		1 x RJ45 10/100 Mbit/s, 1 x USB device (behind the front flap), fieldbus interface		2 x RJ45 10/100 Mbit/s (internal switch), 1 x DVI-D, 4 x USB 2.0, 1 x optional interface	
I/O connection	E-bus or K-bus, automatic recognition		E-bus or K-bus, automatic recognition		E-bus or K-bus, automatic recognition	
System interfaces	**integrated or expandable via EtherCAT Terminals**		**integrated or expandable via EtherCAT Terminals**		**integrated**	
DVI/USB	–		–		in the basic CPU	210
RS232	CX8080	202	CX8180	208	CX9020-N030	210
RS422/RS485	CX8080	202	CX8180	208	CX9020-N031	210
Audio	–		–		CX9020-N020	210
Ethernet	in the basic CPU	200	in the basic CPU	208	in the basic CPU	210
4-port USB hub	–		–		in the basic CPU	210
Memory medium	in the basic CPU	200	in the basic CPU	208	2nd microSD slot in the basic CPU	210
Fieldbus interfaces	**integrated or expandable via EtherCAT Terminals**		**integrated or expandable via EtherCAT Terminals**		**integrated or expandable via EtherCAT Terminals**	
EtherCAT	CX8010 slave	200	CX8110 slave	208	CX9020-B110 slave	210
Lightbus	EL6720 master	2 220	EL6720 master	2 220	EL6720 master	2 220
PROFIBUS	CX8030 master	200	EL6731 master	2 217	CX9020-M310 master	210
	CX8031 slave	201	EL6731-0010 slave	2 217	CX9020-B310 slave	210
CANopen	CX8050 master	201	EL6751 master	2 218	CX9020-M510 master	210
	CX8051 slave	201	EL6751-0010 slave	2 218	CX9020-B510 slave	210
DeviceNet	EL6752 master	2 219	EL6752 master	2 219	EL6752 master	2 219
	EL6752-0010 slave	2 219	EL6752-0010 slave	2 219	EL6752-0010 slave	2 219
PROFINET RT	CX8093 device	203	EL6631 controller	2 215	CX9020-M930 controller	210
			EL6631-0010 device	2 215	CX9020-B930 device	210
EtherNet/IP	CX8095 slave	203	EL6652 master	2 216	CX9020-B950 slave	210
			EL6652-0010 slave	2 216		
SERCOS	–		–		–	
UPS options	1-second UPS		1-second UPS		1-second UPS (optional)	

We reserve the right to make technical changes.

CX1010 214	CX5010 220	CX5020 220
compatible with Intel® Pentium® MMX, clock frequency 500 MHz	Intel® Atom™ Z510, 1.1 GHz clock frequency	Intel® Atom™ Z530, 1.6 GHz clock frequency
slot for Compact Flash card, 128 MB included (expandable)	slot for Compact Flash card, 128 MB included (expandable)	slot for Compact Flash card, 128 MB included (expandable)
256 MB DDR RAM (not expandable)	512 MB RAM (not expandable)	512 MB RAM (expandable ex factory to 1 GB)
1 x RJ45 10/100 Mbit/s	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-D, 4 x USB 2.0, 1 x optional interface	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-D, 4 x USB 2.0, 1 x optional interface
via power supply module (E-bus, K-bus, K-bus/IP-Link)	E-bus or K-bus, automatic recognition	E-bus or K-bus, automatic recognition
modularly expandable	**integrated**	**integrated**
CX1010-N010 216	in the basic CPU 220	in the basic CPU 220
CX1010-N030 (COM 1/2) 216 CX1010-N040 (COM 3/4) 216	CX5010-N030 220	CX5020-N030 220
CX1010-N031 (COM 1/2) 216 CX1010-N041 (COM 3/4) 216	CX5010-N031 220	CX5020-N031 220
CX1010-N020 216	CX5010-N020 220	CX5020-N020 220
CX1010-N060 216	in the basic CPU 220	in the basic CPU 220
–	in the basic CPU 220	in the basic CPU 220
in the basic CPU 216	in the basic CPU 220	in the basic CPU 220
modularly expandable	**integrated or expandable via EtherCAT Terminals**	**integrated or expandable via EtherCAT Terminals**
–	CX5010-B110 slave 220	CX5020-B110 slave 220
CX1500-M200 master 241 CX1500-B200 slave 242	EL6720 master 2 220	EL6720 master 2 220
CX1500-M310 master 241	CX5010-M310 master 220	CX5020-M310 master 220
CX1500-B310 slave 242	CX5010-B310 slave 220	CX5020-B310 slave 220
CX1500-M510 master 241	CX5010-M510 master 220	CX5020-M510 master 220
CX1500-B510 slave 242	CX5010-B510 slave 220	CX5020-B510 slave 220
CX1500-M520 master 241	EL6752 master 2 219	EL6752 master 2 219
CX1500-B520 slave 242	EL6752-0010 slave 2 219	EL6752-0010 slave 2 219
–	CX5010-M930 controller 220	CX5020-M930 controller 220
	CX5010-B930 device 220	CX5020-B930 device 220
–	CX5010-B950 slave 220	CX5020-B950 slave 220
CX1500-M750 SERCOS II master 241	–	–
CX1100-0910, -0900 243	**1-second UPS**	**1-second UPS**

Embedded PC

Basic CPU	CX5120 224	CX5130 226	CX5140 228
Processor	Intel® Atom™ E3815, 1.46 GHz	Intel® Atom™ E3827, 1.75 GHz	Intel® Atom™ E3845, 1.91 GHz
Flash memory	slot for CFast card and for microSD card, cards not included	slot for CFast card and for microSD card, cards not included	slot for CFast card and for microSD card, cards not included
Main memory	2 GB DDR3 RAM (not expandable)	4 GB DDR3 RAM (not expandable)	4 GB DDR3 RAM (not expandable)
Interfaces	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 2.0, 1 x optional interface	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 2.0, 1 x optional interface	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 2.0, 1 x optional interface
I/O connection	E-bus or K-bus, automatic recognition	E-bus or K-bus, automatic recognition	E-bus or K-bus, automatic recognition
System interfaces	integrated	integrated	integrated
DVI/USB	in the basic CPU 224	in the basic CPU 226	in the basic CPU 228
RS232	CX5120-N030 224	CX5130-N030 226	CX5140-N030 228
RS422/RS485	CX5120-N031 224	CX5130-N031 226	CX5140-N031 228
Audio	CX5120-N020 224	CX5130-N020 226	CX5140-N020 228
Ethernet	in the basic CPU 224	in the basic CPU 226	in the basic CPU 228
4-port USB hub	in the basic CPU 224	in the basic CPU 226	in the basic CPU 228
Memory medium	in the basic CPU 224	in the basic CPU 226	in the basic CPU 228
Fieldbus interfaces	integrated or expandable via EtherCAT Terminals	integrated or expandable via EtherCAT Terminals	integrated or expandable via EtherCAT Terminals
EtherCAT	CX5120-B110 slave 224	CX5130-B110 slave 226	CX5140-B110 slave 228
Lightbus	EL6720 master 2 220	EL6720 master 2 220	EL6720 master 2 220
PROFIBUS	CX5120-M310 master 224	CX5130-M310 master 226	CX5140-M310 master 228
	CX5120-B310 slave 224	CX5130-B310 slave 226	CX5140-B310 slave 228
CANopen	CX5120-M510 master 224	CX5130-M510 master 226	CX5140-M510 master 228
	CX5120-B510 slave 224	CX5130-B510 slave 226	CX5140-B510 slave 228
DeviceNet	EL6752 master 2 219	EL6752 master 2 219	EL6752 master 2 219
	EL6752-0010 slave 2 219	EL6752-0010 slave 2 219	EL6752-0010 slave 2 219
PROFINET RT	CX5120-M930 controller 224	CX5130-M930 controller 226	CX5140-M930 controller 228
	CX5120-B930 device 224	CX5130-B930 device 226	CX5140-B930 device 228
PROFINET IRT	CX5120-B931 device 224	CX5130-B931 device 226	CX5140-B931 device 228
EtherNet/IP	CX5120-B950 slave 224	CX5130-B950 slave 226	CX5140-B950 slave 228
SERCOS	–	–	–
UPS options	1-second UPS	1-second UPS	1-second UPS

We reserve the right to make technical changes.

CX1020	232	CX1030	234
Intel® Celeron® M ULV, 1 GHz clock frequency		Intel® Pentium® M, 1.8 GHz clock frequency	
slot for Compact Flash card, 128 MB included (expandable)		slot for Compact Flash card, 128 MB included (expandable)	
256 MB DDR RAM (expandable ex factory to 1 GB)		256 MB DDR RAM (expandable ex factory to 1 GB)	
2 x RJ45 10/100 Mbit/s (internal switch)		2 x RJ45 10/100 Mbit/s (internal switch)	
via power supply module (E-bus, K-bus, K-bus/IP-Link)		via power supply module (E-bus, K-bus, K-bus/IP-Link)	
modularly expandable		**modularly expandable**	
CX1020-N010	236	CX1030-N010	237
CX1020-N030 (COM 1/2)	236	CX1030-N030 (COM 1/2)	237
CX1020-N040 (COM 3/4)	236	CX1030-N040 (COM 3/4)	237
CX1020-N031 (COM 1/2)	236	CX1030-N031 (COM 1/2)	237
CX1020-N041 (COM 3/4)	236	CX1030-N041 (COM 3/4)	237
CX1020-N020	236	CX1030-N020	237
CX1020-N060	236	CX1030-N060	237
–		–	
–		–	
modularly expandable		**modularly expandable**	
–		–	
CX1500-M200 master	241	CX1500-M200 master	241
CX1500-B200 slave	242	CX1500-B200 slave	242
CX1500-M310 master	241	CX1500-M310 master	241
CX1500-B310 slave	242	CX1500-B310 slave	242
CX1500-M510 master	241	CX1500-M510 master	241
CX1500-B510 slave	242	CX1500-B510 slave	242
CX1500-M520 master	241	CX1500-M520 master	241
CX1500-B520 slave	242	CX1500-B520 slave	242
–		–	
–		–	
–		–	
CX1500-M750 SERCOS II master	241	CX1500-M750 SERCOS II master	241
CX1100-0920	243	**CX1100-0930**	243

Embedded PC

Basic CPU	CX2020 246	CX2030 246	CX2040 246
Processor	Intel® Celeron® 827E 1.4 GHz	Intel® Core™ i7 2610UE 1.5 GHz	Intel® Core™ i7 2715QE 2.1 GHz
Flash memory	slot for CFast card, optionally 4 or 8 GB included (expandable)	slot for CFast card, optionally 4 or 8 GB included (expandable)	slot for CFast card, optionally 4 or 8 GB included (expandable)
Main memory	2 GB DDR3 RAM (expandable ex factory to 4 GB)	2 GB DDR3 RAM (expandable ex factory to 4 GB)	4 GB DDR3 RAM (not expandable)
Interfaces	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 2.0, 1 x optional interface	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 2.0, 1 x optional interface	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 2.0, 1 x optional interface
I/O connection	via power supply module (E-bus or K-bus, automatic recognition)	via power supply module (E-bus or K-bus, automatic recognition)	via power supply module (E-bus or K-bus, automatic recognition)
System interfaces	modularly expandable	modularly expandable	modularly expandable
DVI/USB	in the basic CPU, 2nd DVI port as option CX2020-N010 246	in the basic CPU, 2nd DVI port as option CX2030-N010 246	in the basic CPU, 2nd DVI port as option CX2040-N010 246
RS232	CX2020-N030 or CX2500-0030 246	CX2030-N030 or CX2500-0030 246	CX2040-N030 or CX2500-0030 246
RS422/RS485	CX2020-N031 or CX2500-0031 246	CX2030-N031 or CX2500-0031 246	CX2040-N031 or CX2500-0031 246
Audio	CX2500-0020 253	CX2500-0020 253	CX2500-0020 253
Ethernet	in the basic CPU or CX2500-0060 246	in the basic CPU or CX2500-0060 246	in the basic CPU or CX2500-0060 246
Power over Ethernet	CX2500-0061 253	CX2500-0061 253	CX2500-0061 253
4-port USB hub	in the basic CPU or CX2500-0070 246	in the basic CPU or CX2500-0070 246	in the basic CPU or CX2500-0070 246
Memory medium	in the basic CPU or CX2550-0010/ CX2550-0020 246	in the basic CPU or CX2550-0010/ CX2550-0020 246	in the basic CPU or CX2550-0010/ CX2550-0020 246
USB extension	CX2550-0179 (USB 1.1) or CX2550-0279 (USB 2.0) 255	CX2550-0179 (USB 1.1) or CX2550-0279 (USB 2.0) 255	CX2550-0179 (USB 1.1) or CX2550-0279 (USB 2.0) 255
Fieldbus interfaces	integrated or expandable via EtherCAT Terminals	integrated or expandable via EtherCAT Terminals	integrated or expandable via EtherCAT Terminals
EtherCAT	CX2020-B110 slave 246	CX2030-B110 slave 246	CX2040-B110 slave 246
Lightbus	EL6720 master 2 220	EL6720 master 2 220	EL6720 master 2 220
PROFIBUS	CX2020-M310 or CX2500-M310 master 246	CX2030-M310 or CX2500-M310 master 246	CX2040-M310 or CX2500-M310 master 246
	CX2020-B310 or CX2500-B310 slave 246	CX2030-B310 or CX2500-B310 slave 246	CX2040-B310 or CX2500-B310 slave 246
CANopen	CX2020-M510 or CX2500-M510 master 246	CX2030-M510 or CX2500-M510 master 246	CX2040-M510 or CX2500-M510 master 246
	CX2020-B510 or CX2500-B510 slave 246	CX2030-B510 or CX2500-B510 slave 246	CX2040-B510 or CX2500-B510 slave 246
DeviceNet	EL6752 master 2 219	EL6752 master 2 219	EL6752 master 2 219
	EL6752-0010 slave 2 219	EL6752-0010 slave 2 219	EL6752-0010 slave 2 219
PROFINET RT	CX2020-M930 controller 246	CX2030-M930 controller 246	CX2040-M930 controller 246
	CX2020-B930 device 246	CX2030-B930 device 246	CX2040-B930 device 246
PROFINET IRT	CX2020-B931 device 246	CX2030-B931 device 246	CX2040-B931 device 246
EtherNet/IP	CX2020-B950 slave 246	CX2030-B950 slave 246	CX2040-B950 slave 246
UPS options	CX2100-0904, CX2100-0914 252	CX2100-0904, CX2100-0914 252	CX2100-0904, CX2100-0914 252

We reserve the right to make technical changes.

CX2042	250	CX2062	250	CX2072	250
Intel® Xeon® D-1527 2.2 GHz, 4 cores		Intel® Xeon® D-1548 2.0 GHz, 8 cores		Intel® Xeon® D-1567 2.1 GHz, 12 cores	
slot for CFast card, card not included		slot for CFast card, card not included		slot for CFast card, card not included	
8 GB DDR4 RAM (expandable ex factory to 32 GB)		8 GB DDR4 RAM (expandable ex factory to 32 GB)		8 GB DDR4 RAM (expandable ex factory to 32 GB)	
2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 3.0, 1 x optional interface		2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 3.0, 1 x optional interface		2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 3.0, 1 x optional interface	
via power supply module (E-bus or K-bus, automatic recognition)		via power supply module (E-bus or K-bus, automatic recognition)		via power supply module (E-bus or K-bus, automatic recognition)	
modularly expandable		**modularly expandable**		**modularly expandable**	
in the basic CPU, 2nd DVI port as option CX2042-N010	250	in the basic CPU, 2nd DVI port as option CX2062-N010	250	in the basic CPU, 2nd DVI port as option CX2072-N010	250
CX2042-N030 or CX2500-0030	250	CX2062-N030 or CX2500-0030	250	CX2072-N030 or CX2500-0030	250
CX2042-N031 or CX2500-0031	250	CX2062-N031 or CX2500-0031	250	CX2072-N031 or CX2500-0031	250
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in the basic CPU or CX2500-0060	250	in the basic CPU or CX2500-0060	250	in the basic CPU or CX2500-0060	250
CX2500-0061	253	CX2500-0061	253	CX2500-0061	253
in the basic CPU or CX2500-0070	250	in the basic CPU or CX2500-0070	250	in the basic CPU or CX2500-0070	250
in the basic CPU or CX2550-0010/ CX2550-0020	250	in the basic CPU or CX2550-0010/ CX2550-0020	250	in the basic CPU or CX2550-0010/ CX2550-0020	250
CX2550-0179 (USB 1.1) or CX2550-0279 (USB 2.0)	255	CX2550-0179 (USB 1.1) or CX2550-0279 (USB 2.0)	255	CX2550-0179 (USB 1.1) or CX2550-0279 (USB 2.0)	255
integrated or expandable via EtherCAT Terminals		**integrated or expandable via EtherCAT Terminals**		**integrated or expandable via EtherCAT Terminals**	
CX2042-B110 slave	250	CX2062-B110 slave	250	CX2072-B110 slave	250
EL6720 master	2 220	EL6720 master	2 220	EL6720 master	2 220
CX2042-M310 or CX2500-M310 master	250	CX2062-M310 or CX2500-M310 master	250	CX2072-M310 or CX2500-M310 master	250
CX2042-B310 or CX2500-B310 slave	250	CX2062-B310 or CX2500-B310 slave	250	CX2072-B310 or CX2500-B310 slave	250
CX2042-M510 or CX2500-M510 master	250	CX2062-M510 or CX2500-M510 master	250	CX2072-M510 or CX2500-M510 master	250
CX2042-B510 or CX2500-B510 slave	250	CX2062-B510 or CX2500-B510 slave	250	CX2072-B510 or CX2500-B510 slave	250
EL6752 master	2 219	EL6752 master	2 219	EL6752 master	2 219
EL6752-0010 slave	2 219	EL6752-0010 slave	2 219	EL6752-0010 slave	2 219
CX2042-M930 controller	250	CX2062-M930 controller	250	CX2072-M930 controller	250
CX2042-B930 device	250	CX2062-B930 device	250	CX2072-B930 device	250
CX2042-B931 device	250	CX2062-B931 device	250	CX2072-B931 device	250
CX2042-B950 slave	250	CX2062-B950 slave	250	CX2072-B950 slave	250
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Embedded PCs

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CX8100 | **Embedded PC with fieldbus interface**
– CPU: ARM Cortex™-A9 800 MHz
– Windows Embedded Compact 7

See page 204

CX9020 | **Ethernet controller**
– CPU: ARM Cortex™-A8 1 GHz
– Windows Embedded Compact 7

See page 209

CX5000 | **Embedded PC series with Intel® Atom™ processor**
– CPU: Intel® Atom™ 1.1 GHz or 1.6 GHz
– Windows Embedded CE 6, Windows Embedded Standard 2009

See page 218

CX5100 | **Embedded PC series with Intel® Atom™ processor**
– CPU: Intel® Atom™ 1.46 GHz/1 core, Intel® Atom™ 1.75 GHz/2 cores, Intel® Atom™ 1.91 GHz/4 cores
– Windows Embedded Compact 7, Windows Embedded Standard 7 P, Windows 10 IoT Enterprise LSTB

See page 222

We reserve the right to make technical changes.

CX8000 | **Embedded PC with fieldbus interface**
– CPU: ARM9 400 MHz
– Windows Embedded CE 6

See page 196

CX1010 | **Basic CX**
– CPU: Intel® Pentium® MMX-compatible 500 MHz
– Windows Embedded CE 6, Windows Embedded Standard 2009

See page 212

CX1020, CX1030 | **High-performance CX**
– CPU: Intel® Celeron® M ULV 1 GHz, Intel® Pentium® M 1.8 GHz
– Windows Embedded CE 6, Windows Embedded Standard 2009

See page 230

CX2020, CX2030, CX2040 | **Multi-core CX**
– CPU: Intel® Celeron® 1.4 GHz/1 core, Intel® Core™ i7 1.5 GHz/2 cores, Intel® Core™ i7 2.1 GHz/4 cores
– Windows Embedded Compact 7, Windows Embedded Standard 7 P, Windows 10 IoT Enterprise LTSB

See page 244

CX2042, CX2062, CX2072 | **Many-core CX**
– CPU: Intel® Xeon® D-1527 2.2 GHz/4 cores, Intel® Xeon® D-1548 2.0 GHz/8 cores, Intel® Xeon® D-1567 2.1 GHz/12 cores
– Windows 10 IoT Enterprise LTSB

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Beckhoff Embedded PC

Modular DIN rail Industrial PCs
With the Embedded PCs of the CX series, Beckhoff has combined PC technology and modular I/O level on a DIN rail unit in the control cabinet. The CX device series combines the worlds of Industrial PC and hardware PLC and is suitable for all performance control tasks. The modular system of the CX series can be configured to match the task in hand: by adding or omitting units and interfaces, only those components that the system actually requires are installed on the DIN rail in the control cabinet or terminal box. Installation space and costs are reduced.

The CX family covers the whole range of Beckhoff control technology in terms of both price and performance. This product range is designed for tasks requiring the characteristics and computing capacity of Industrial PCs, but whose budget does not stretch to full-blown Industrial PCs.

Scalable performance classes
The CX family includes several basic CPU modules with different processors for optimum adaptation to the respective control task. The following list gives an overview, sorted by CPU type and, within the group, in descending order of computing performance:
Devices with x86 CPU:
CX2072: many-core CX with Intel® Xeon® D-1567 2.1 GHz, 12 cores
CX2062: many-core CX with Intel® Xeon® D-1548 2.0 GHz, 8 cores
CX2042: many-core CX with Intel® Xeon® D-1527 2.2 GHz, 4 cores
CX2040: multi-core CX with Intel® Core™ i7 CPU, 2.1 GHz, 4 cores
CX2030: multi-core CX with Intel® Core™ i7 CPU, 1.5 GHz, 2 cores
CX2020: high-performance CX with Intel® Celeron® CPU, 1.4 GHz
CX5140: multi-core CX with Intel® Atom™ CPU, 1.91 GHz, 4 cores
CX5130: multi-core CX with Intel® Atom™ CPU, 1.75 GHz, 2 cores
CX5120: compact CX with Intel® Atom™ CPU, 1.46 GHz
CX5020: compact CX with Intel® Atom™ CPU, 1.6 GHz
CX5010: compact CX with Intel® Atom™ CPU, 1.1 GHz
CX1030: high-performance CX with Intel® Pentium® M CPU, 1.8 GHz
CX1020: high-performance CX with Intel® Celeron® M ULV CPU, 1 GHz
CX1010: basic CX with Intel® Pentium® MMX-compatible CPU, 500 MHz

Devices with ARM CPU:
CX9020: Ethernet controller with ARM Cortex™-A8 CPU, 1 GHz
CX8100: basic CX with ARM Cortex™-A9 CPU, 800 MHz, and integrated fieldbus interface
CX8000: basic CX with ARM9 CPU, 400 MHz, and integrated fieldbus interface

Apart from various CPUs, the individual CX types also have different system interfaces and power supply units. Via the associated I/O interfaces the Embedded PCs support Beckhoff Bus Terminals and also EtherCAT Terminals as I/O system.

A suitable CX controller is selected on the basis of the expected complexity and scope of the automation program. Decisive here is not just the clock frequency of the CPU, but a combination of many criteria. The main criteria apart from the clock frequency are the CPU architecture, the cache sizes, the type and size of the RAM, graphic controller etc. Changing from one CX CPU to another with a higher performance is, however, still possible even at a very late stage in the course of the project and can usually take place without any program modification.

The components
The individual system components of the CX series come as modules in standard widths of 19 mm or 22 mm, that can be connected in series. The basic unit for the CX20x2, CX2000 and CX10x0 series consists of a CPU module and a separate power supply module. The CX8000, CX8100, CX9020, CX5000 and CX5100 Embedded PCs integrate CPU and power supply in a single unit. Depending on the CX type, the controllers can be expanded through further system interfaces. The range of optional modules is complemented by fieldbus connections for PROFIBUS, CANopen, DeviceNet, SERCOS and Lightbus, both as master or slave versions.

In contrast to the other CX device families, the CX8000, CX8100, CX9020, CX5100 and CX5000 series have a fixed, non-expandable number of system interfaces. The devices from the CX8000 and CX8100 series are mainly used as programmable fieldbus slaves, while both the CX9020 and CX5000/CX5100 offer an optional fieldbus master or slave interface.

The optional interface, a common feature of all second-generation CX devices (CX9020, CX5000, CX5100, CX2000 and CX20x2), is an interface that can be configured ex factory with various signal types. These devices are also characterised by a further important feature: the automatic K-bus/E-bus detection enables the use of both types of I/O terminals without additional expenditure.

EtherCAT integration offers a wide range of expansion capability. Further master/slave fieldbus connections or communication interfaces and all other signal types accessible via EtherCAT can be directly connected as EtherCAT Terminals.

The software
In combination with the TwinCAT 2 or TwinCAT 3 automation software, the CX Embedded PC becomes a powerful IEC 61131-3 PLC. Additionally, Motion Control tasks can also be executed. Depending on the required cycle time, it may be used to control several servo axes. With the CX1010, CX5000, CX5100, CX1020, CX1030 and CX2000 even special functions such as flying saw, electronic gearbox or cam plate can be realised. The CX thus becomes a controller that covers PLC, Motion Control and visualisation tasks with a single hardware. Under Windows Embedded CE, thanks to the real-time capability of the operating system, user tasks written in high-level languages can be processed in real-time in parallel with TwinCAT.

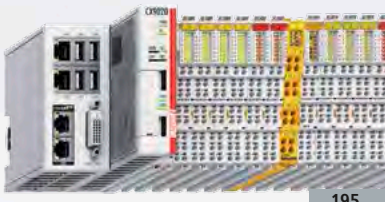
Wide range of applications
Due to the design and the features of an industrial PC control, the Embedded PCs can be used in a wide range of applications. Existing applications include mechanical engineering, process technology, building services and many more.

We reserve the right to make technical changes.

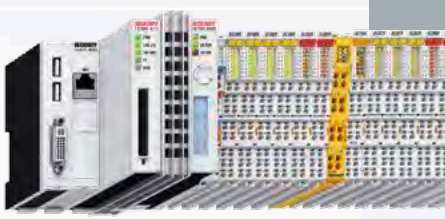
CX8000

CX8100

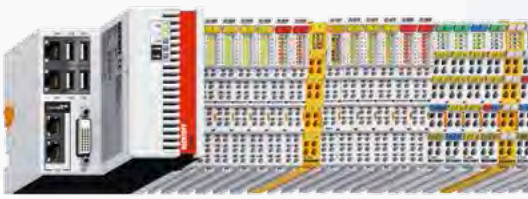
CX9020



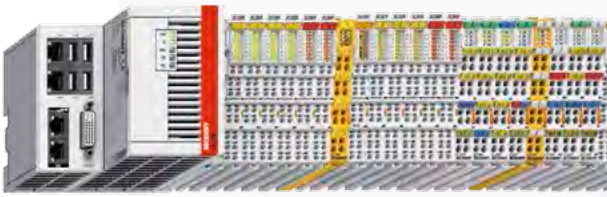
CX1010



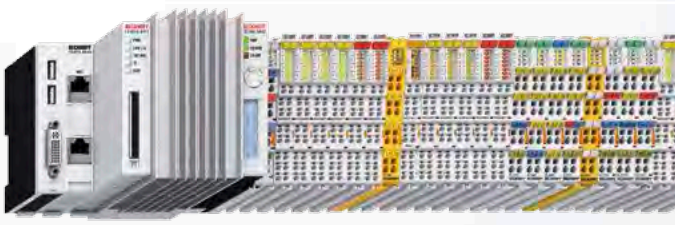
CX5010, CX5020



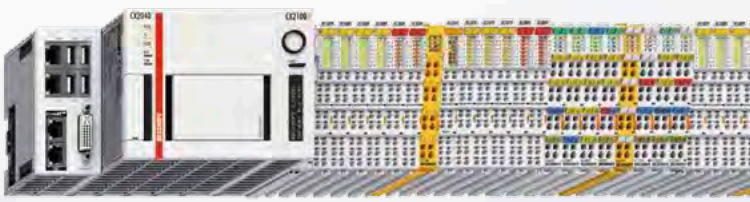
CX5100



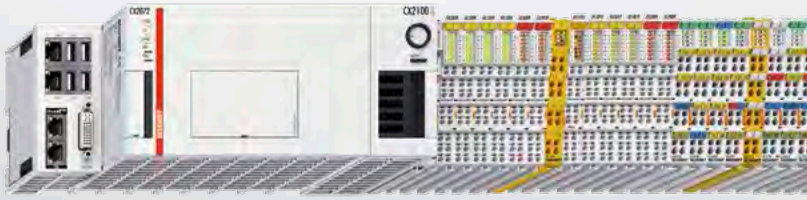
CX1020, CX1030



CX2020, CX2030, CX2040



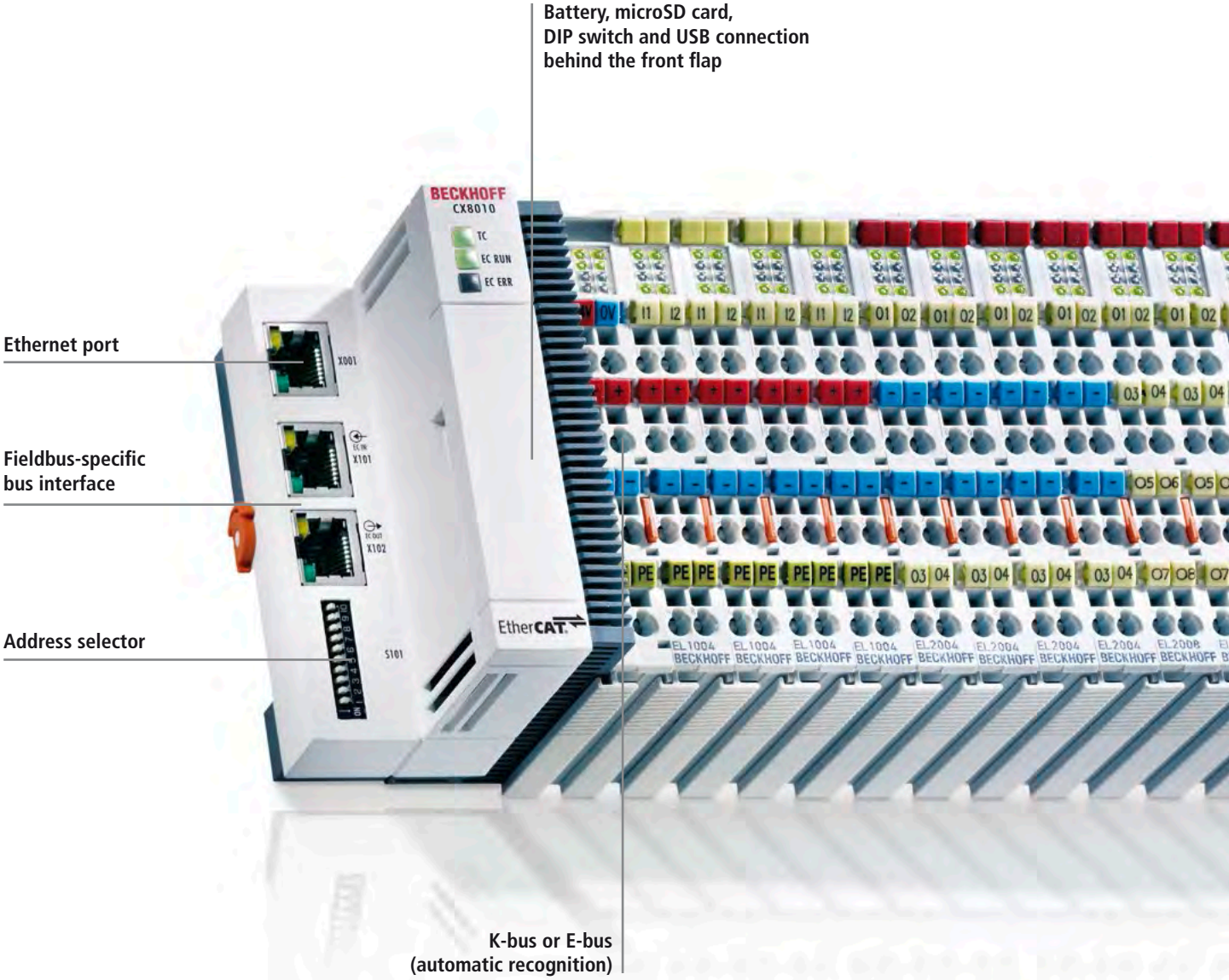
CX2042, CX2062, CX2072



We reserve the right to make technical changes.

CX8000 | Embedded PCs with fieldbus interface

▶ **www.beckhoff.com/CX8000**



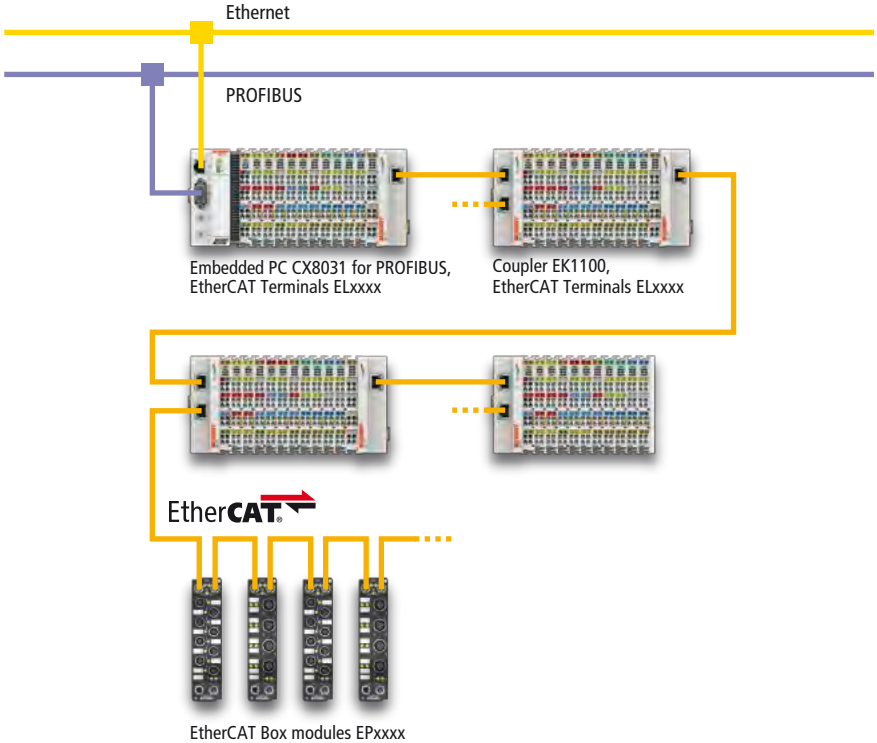
For further information on the individual fieldbuses see page 2 18

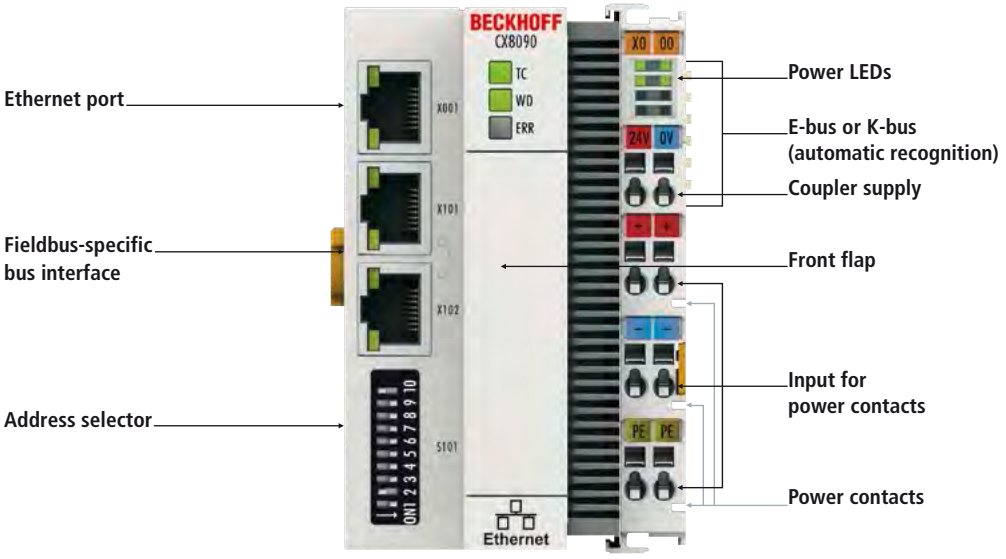
We reserve the right to make technical changes.

CX8000 is a device family of programmable controllers with 32-bit ARM CPU, which can be used for processing of PLC programs or as intelligent slave devices for higher-level fieldbus systems. Unlike with the non-programmable Bus Couplers of the EK series (EtherCAT Coupler), which only act as gateway between the associated fieldbus system and the connected EtherCAT terminals, the CX8000 is programmable and able to run its own control program. The CX8000 devices can therefore be used as local controllers. Bus Terminals (K-bus) or EtherCAT Terminals (E-bus) can alternatively be connected; the CX8000 automatically recognises the type of I/O system connected during the start-up phase. The use of EtherCAT gives rise to further options, such as the realisation of different topologies, the integration of further bus systems such as CANopen, PROFIBUS and PROFINET and – with the EtherCAT Box modules – connection to the IP 67 world.

Like all CX products, the CX8000 devices are programmed and commissioned via the Ethernet interface, which can also be used for connection of the control system with a regular network. Some of the Embedded PCs have further Ethernet interfaces with switch functions, so that a linear "daisy chain" topology can be constructed inexpensively without additional hardware. The other connections on the lower plug level are fieldbus-specific. Thanks to their low power consumption, the devices are fanless. Microsoft Windows Embedded CE 6 is used as the operating system. TwinCAT 2 software is used for system configuration and the programming of the PLC functionality. The CX8000 target device features a pre-installed TwinCAT 2 PLC runtime environment. All software required for operating the device, including the operating system, the TwinCAT files and user files and data, is stored on the microSD flash card. This simplifies exchange in the case of service. Commercial card readers can be used to access the card data. The size of the microSD flash card (e.g. 256 MB) can be chosen depending on the application and the quantity of data to be stored. The CX8000 device family features an integrated, capacitive 1-second UPS, which in the event of a failure of the supply voltage provides sufficient energy for saving persistent data. Important data are thus retained without battery back-up in the event of a loss of power.

With a high-performance but nevertheless energy-saving 32-bit ARM processor, EtherCAT as I/O bus and TwinCAT 2 PLC with extensive PLC libraries, the Embedded Controllers from the CX8000 series represent very compact, high-performance and versatile controllers with slave fieldbus connection.





CX80xx | Basic CPU module

The devices from this series represent a further development of the well-known and proven 16-bit controllers from the Bus Terminal Controller series – through to the more powerful 32-bit ARM processors.

The CX8000 device series was developed for two different usage scenarios:

– as a local, independent PLC that can be integrated into data networks thanks to its existing Ethernet interface;
– as a local PLC that features a slave interface to a fieldbus system in addition to the Ethernet connection.

Taking the CX8010 as an example, there are two EtherCAT slave connections (IN and OUT) on the left-hand side; on the right-hand side it acts again as an independent EtherCAT master or K-bus master for the locally connected terminals.

As with the BC Bus Terminal Controller series, it is also ensured in the case of the CX8000 that the control and the local program continue to be executed in the case of interruption or loss of the higher-level fieldbus system.

The compact, fanless housing makes highly space-saving structures possible for the control of machines or for use in building automation.

Under the cover at the upper housing level there is an exchangeable coin cell for date and time, a set of DIP switches for setting function modes, a slot for microSD flash memory cards and a USB B connection. Thanks to their low power consumption, the devices are fanless.

The very compact, small design facilitates installation in confined control cabinets, but it can nevertheless serve a large number of I/O points over EtherCAT or K-bus.

Although there is no monitor connection, the Windows Embedded CE 6 operating system and its "virtual" display can be accessed via the network. This is not absolutely necessary for the programming of the automation function: any PC or laptop equipped with TwinCAT 2 can be used for PLC programming or online faultfinding via a network connection with the CX8000. All system software is located on the industrially-compatible microSD card. Hardware and software can thus be exchanged simply and quickly in the case of service. In addition, the microSD card can be used in any commercial card reader. The installation and execution of proprietary Windows Embedded CE 6 applications (e.g. parts tracking, data acquisition, Web operating interfaces) is also possible. Access to the microSD card is also possible via the USB connection: if the CX8000 is connected to another PC, then the microSD card becomes visible on this PC as a mass storage device.

The order identifier is derived as follows:

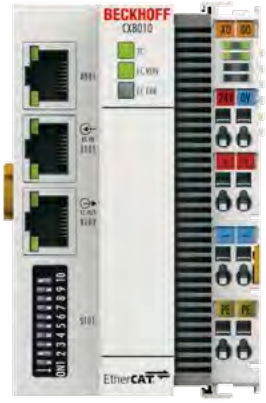
CX80xx

- 10 = EtherCAT slave
- 30 = PROFIBUS master
- 31 = PROFIBUS slave
- 50 = CANopen master
- 51 = CANopen slave
- 80 = RS232/RS485
- 90 = Ethernet
- 91 = BACnet/IP and OPC UA
- 93 = PROFINET RT device
- 95 = EtherNet/IP slave

We reserve the right to make technical changes.

Technical data	CX80xx
Processor	ARM9, 400 MHz
Flash memory	slot for microSD card, 512 MB included (expandable)
Main memory	64 MB DDR2 RAM (not expandable)
Programming	TwinCAT 2 PLC
Programming languages	IEC 61131-3
Web visualisation	yes
Online change	yes
Up/down load code	yes/yes
Interfaces	1 x RJ45 10/100 Mbit/s, 1 x USB device (behind the front flap), fieldbus interface
I/O connection	E-bus or K-bus, automatic recognition
Clock	internal battery-backed clock for time and date (battery behind the front flap, exchangeable)
UPS	1-second UPS (for 1 MB of persistent data)
Operating system	Microsoft Windows Embedded CE 6
Web-based management	yes
Current supply E-bus/K-bus	2 A
Max. power loss	3 W
Dimensions (W x H x D)	64 mm x 100 mm x 73 mm
Weight	approx. 170 g
Operating/storage temperature	0…+55 °C/-25…+85 °C
Relative humidity	95 %, no condensation
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4
Protection class	IP 20
Further information	www.beckhoff.com/CX8000

CX80xx | **Embedded PCs with fieldbus interface**

	EtherCAT	PROFIBUS
	Embedded PC for EtherCAT	Embedded PC for PROFIBUS
Technical data	**CX8010**	**CX8030**
Protocol	EtherCAT (slave)	PROFIBUS-DP (master)
Max. number of bytes fieldbus	512 byte input and 512 byte output	only limited by memory
Data transfer rates	100 Mbit/s	up to 12 Mbaud (automatic detection)
Bus interface	EtherCAT IN and OUT (2 x RJ45)	1 x D-sub 9-pin socket with shielding
	 The DIP switch enables the fixed addressing of a hot plug group. Automatic addressing in the EtherCAT network is also possible.	 The CX8030 is a PROFIBUS master device. Optionally it can be operated as a PROFIBUS slave device.
I/O connection	E-bus or K-bus, automatic recognition	E-bus or K-bus, automatic recognition
Type/number of peripheral signals	K-bus 2 kByte IN/OUT, E-bus only limited by memory	K-bus 2 kByte IN/OUT, E-bus only limited by memory
Approvals	CE, UL, Ex, IECEx	CE, UL, Ex, IECEx
Further information	www.beckhoff.com/CX8010	www.beckhoff.com/CX8030

We reserve the right to make technical changes.

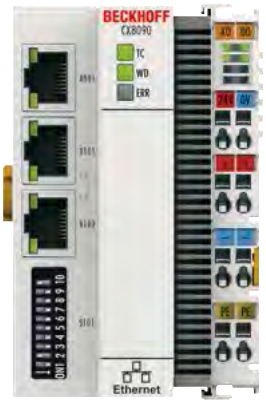
CANopen

	Embedded PC for PROFIBUS	Embedded PC for CANopen	Embedded PC for CANopen
	CX8031	**CX8050**	**CX8051**
	PROFIBUS-DP (slave)	CANopen (master)	CANopen (slave)
	240 byte input and 240 byte output + 3 virtual slaves	only limited by memory	16 Tx/Rx PDOs + 3 virtual slaves
	up to 12 Mbaud (automatic detection)	up to 1 Mbaud (automatic detection)	up to 1 Mbaud (automatic detection)
	1 x D-sub 9-pin socket with shielding	D-sub connector, 9-pin according to CANopen specification, galvanically decoupled	D-sub connector, 9-pin according to CANopen specification, galvanically decoupled
	The PROFIBUS address is set via two rotary selection switches. The CX8031 offers automatic baud rate detection. The CX8031 offers three virtual slaves, so that the amount of data can be tripled.	The CX8050 controller is equipped with a CANopen master interface. Apart from offering the CANopen master functionality, it can optionally be used to support CAN layer 2 communication.	The CANopen address is set via two rotary selection switches. The CX8051 offers automatic baud rate detection.
	E-bus or K-bus, automatic recognition	E-bus or K-bus, automatic recognition	E-bus or K-bus, automatic recognition
	K-bus 2 kByte IN/OUT, E-bus only limited by memory	K-bus 2 kByte IN/OUT, E-bus only limited by memory	K-bus 2 kByte IN/OUT, E-bus only limited by memory
	CE, UL, Ex, IECEx	CE, UL, Ex, IECEx	CE, UL, Ex, IECEx
	www.beckhoff.com/CX8031	www.beckhoff.com/CX8050	www.beckhoff.com/CX8051

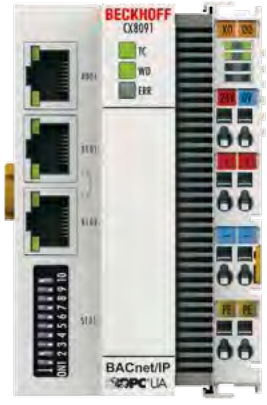
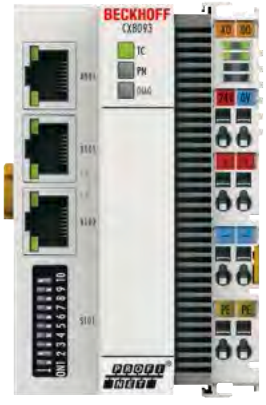
EtherCAT Terminals see page 2 110, EtherCAT Box modules see page 2 272, Bus Terminals see page 2 442

We reserve the right to make technical changes.

CX80xx | Embedded PCs with fieldbus interface

	RS232 RS485	Ethernet
	Embedded PC for RS232/RS485	Embedded PC for different Ethernet protocols
Technical data	**CX8080**	**CX8090**
Protocol	serial communication	real-time Ethernet, ADS TCP, Modbus TCP, TCP/IP, UDP/IP, EAP (EtherCAT Automation Protocol)
Max. number of bytes fieldbus	512 byte input and 512 byte output	protocol dependency
Data transfer rates	300 baud…115 kbaud	100 Mbit/s
Bus interface	D-sub socket, 9-pin, 1 x RS232, 1 x RS485	2 x RJ45 (switched)
	 The CX8080 has two serial interfaces: one with RS232 and one with RS485 physics. Both serial interfaces are on the D-sub socket. The interface is not bound to a particular protocol and can be expanded with the appropriate TwinCAT supplements for the different serial communication protocols.	 It supports protocols such as realtime Ethernet, ADS UDP/TCP, Modbus TCP client/server or open TCP/IP-UDP/IP communication.
I/O connection	E-bus or K-bus, automatic recognition	E-bus or K-bus, automatic recognition
Type/number of peripheral signals	K-bus 2 kByte IN/OUT, E-bus only limited by memory	K-bus 2 kByte IN/OUT, E-bus only limited by memory
Approvals	CE, UL, Ex, IECEx	CE, UL, Ex, IECEx
Further information	www.beckhoff.com/CX8080	www.beckhoff.com/CX8090

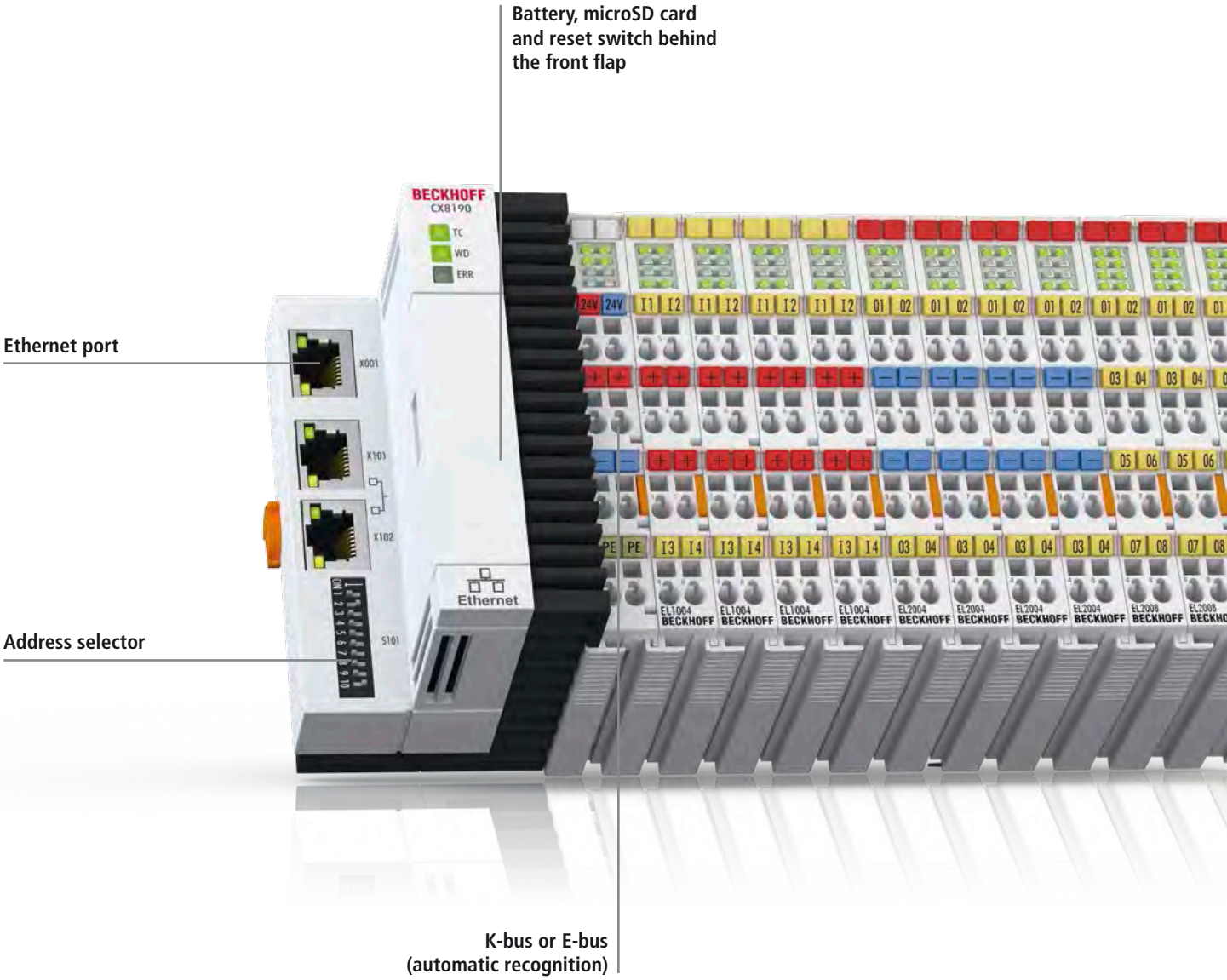
We reserve the right to make technical changes.

	BACnet/IP OPC UA	PROFINET	EtherNet/IP
	Embedded PC for BACnet/IP and OPC UA	Embedded PC for PROFINET RT	Embedded PC for EtherNet/IP
	CX8091	**CX8093**	**CX8095**
	BACnet/IP or OPC UA	PROFINET RT device	EtherNet/IP (slave)
	protocol dependency	1024 byte input and 1024 byte output + 1 virtual slave	1024 byte input and 1024 byte output + 1 virtual slave
	100 Mbit/s	100 Mbit/s	100 Mbit/s
	2 x RJ45 (switched)	2 x RJ45 (switched)	2 x RJ45 (switched)
			
	It supports the BACnet/IP and OPC UA protocols.	The PROFINET interface is designed as a 2-port switch for realisation of daisy-chain cabling.	The EtherNet/IP interface is designed as a 2-port switch for realisation of daisy-chain cabling.
	E-bus or K-bus, automatic recognition	E-bus or K-bus, automatic recognition	E-bus or K-bus, automatic recognition
	K-bus 2 kByte IN/OUT, E-bus only limited by memory	K-bus 2 kByte IN/OUT, E-bus only limited by memory	K-bus 2 kByte IN/OUT, E-bus only limited by memory
	CE, UL, Ex, IECEx	CE, UL, Ex, IECEx	CE, UL, Ex, IECEx
	www.beckhoff.com/CX8091	www.beckhoff.com/CX8093	www.beckhoff.com/CX8095

EtherCAT Terminals see page 2 110, EtherCAT Box modules see page 2 272, Bus Terminals see page 2 442

CX8100 | Embedded PCs with fieldbus interface

▶ **www.beckhoff.com/CX8100**



For further information on the individual fieldbuses see page 2 18

We reserve the right to make technical changes.

CX8110

CX8180

CX8190

Beckhoff supports a multitude of bus systems and offers an unequalled level of openness in the market segment of compact controllers. The CX8100 series of Embedded PCs is an advancement of the CX8000 series featuring a faster CPU, programmability with TwinCAT 3, and significantly expanded main memory.

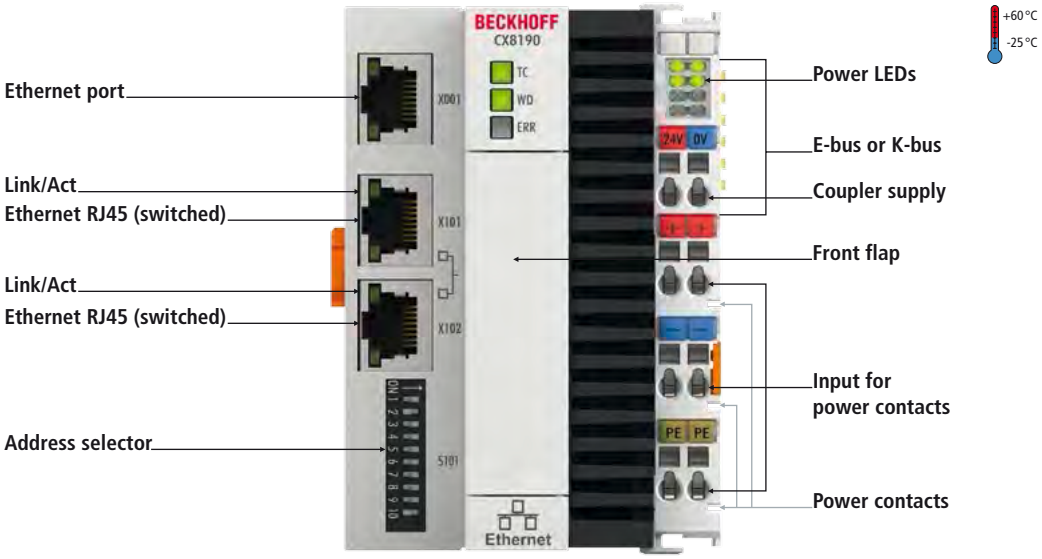
- performance class 20 in TwinCAT 3
- ARM Cortex™ A9 CPU, 800 MHz, 512 MB RAM
- microSD cards up to 8 GB
- 1-second UPS

Users benefit from powerful object-oriented programming capabilities and a wide range of software components (Functions) from the TwinCAT 3 portfolio. They are cost-optimised for use on the CX8100 device platform. Proven features of the CX8000 series such as e.g. a 1-second UPS for saving persistent data and automatic K-bus/E-bus recognition are also provided.

+60 °C
-25 °C

Designed for an extended temperature range of -25 to +60 °C, the CX8100 covers a wide variety of possible applications.

The CX8100 series is being advanced continuously and now has its own real-time driver. The resulting reduction in jitter delivers a noticeable performance increase in distributed-clock applications. As new fieldbus interfaces, the CX8110 EtherCAT slave and the CX8180 for serial protocols were introduced. The fieldbus and communication system support will be extended e.g. PROFINET, EtherNet/IP, CANopen, PROFIBUS.



CX81xx | Embedded PC for Ethernet

CX8100 is a family of programmable controller devices with a 32-bit ARM-based CPU, which can be used for executing PLC programs or as slave devices for higher-level fieldbus systems. The CX8100 device series represents a development based on the familiar and proven CX8000 series. Just like the CX8000 series, the CX8100 also ensures that the control system and the local program can still be processed in the event of an interrupted connection to the higher-level fieldbus system. The CX8100 devices can therefore be used as decentralised controllers. Bus Terminals (K-bus) or EtherCAT Terminals (E-bus) can be connected; the CX8100 automatically recognises the type of I/O system connected during the start-up phase. The application of EtherCAT opens up further options, such as the realisation of different topologies, integration of further bus systems such as CANopen, PROFIBUS and PROFINET, and the connection to the IP 67 world with the EtherCAT Box modules.

Like all CX products, the CX8100 devices are programmed and commissioned via the Ethernet interface, which can, of course, also be used for the regular network connection of the control system. Some Embedded PCs have additional Ethernet interfaces with switch functionality, so that a linear "daisy chain" topology can be established cost-effectively without additional hardware. The other connections provided on the lower connection level are fieldbus-specific. A replaceable coin cell for date and time, a reset switch, as well as a slot for microSD flash memory cards can be found under the front flap at the upper housing level. Owing to their low electrical power consumption, the devices are fanless.

Microsoft Windows Embedded Compact 7 is used as the operating system. In the absence of a monitor port, the operating system can only be accessed via network connection and a "virtual" display. TwinCAT 3 software is used for system configuration and the programming of the PLC functionality. The CX8100 target device features a pre-installed TwinCAT 3 I/O runtime environment. TwinCAT 3 Functions from PLC to different functions can be ordered via a licence or reloaded. Commercial card readers can be used to access the SD card data. The size of the microSD Flash card (e.g. 512 MB to 8 GB) can be chosen depending on the application and the quantity of data to be stored.

The CX8100 device family features an integrated, capacitive 1-second UPS, which in the event of a failure of the supply voltage provides sufficient energy for saving remanent data. Important data are thus preserved in a non-volatile manner without battery backup.

With a high-performance but nevertheless energy-saving 32-bit ARM processor, EtherCAT as I/O bus and TwinCAT 3 PLC with extensive PLC libraries, the Embedded Controllers from the CX8100 series represent versatile high-performance controllers with slave or master fieldbus connection.

The order identifier is derived as follows:

CX81xx

- 10 = EtherCAT slave
- 80 = RS232/RS485
- 90 = Ethernet

We reserve the right to make technical changes.

Technical data	CX81xx
Processor	ARM Cortex™-A9, 800 MHz (TC3: 20)
Flash memory	slot for microSD card, 512 MB included (expandable)
Main memory	512 MB DDR3 RAM (not expandable)
Programming	TwinCAT 3
Interfaces	1 x RJ45 10/100 Mbit/s, 1 x USB device (behind the front flap), fieldbus interface
I/O connection	E-bus or K-bus, automatic recognition
Clock	internal battery-backed clock for time and date (battery behind the front flap, exchangeable)
UPS	1-second UPS
Operating system	Microsoft Windows Embedded Compact 7
Current supply E-bus/K-bus	2 A
Max. power loss	4 W (including the system interfaces)
Dimensions (W x H x D)	71 mm x 100 mm x 73 mm
Operating/storage temperature	-25…+60 °C/-40…+85 °C
Relative humidity	95 %, no condensation
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4
Protection class	IP 20
TC3 performance class	Economy (20); for further information on TwinCAT 3 see page 470
Further information	www.beckhoff.com/CX8100

CX81xx | Embedded PCs with fieldbus interface

	EtherCAT	RS232 / RS485	Ethernet
	Embedded PC for EtherCAT	Embedded PC for RS232/RS485	Embedded PC for different Ethernet protocols
Technical data	**CX8110**	**CX8180**	**CX8190**
Protocol	EtherCAT (slave)	serial communication	real-time Ethernet, ADS UDP, ADS TCP, EAP (EtherCAT Automation Protocol)
Max. number of bytes fieldbus	512 byte input and 512 byte output	protocol dependency	protocol dependency
Data transfer rates	100 Mbit/s	300 baud…115 kbaud	100 Mbit/s
Bus interface	EtherCAT IN and OUT (2 x RJ45)	D-sub socket, 9-pin, 1 x RS232, 1 x RS485	2 x RJ45 (switched)
	+60 °C -25 °C	+60 °C -25 °C	+60 °C -25 °C
I/O connection	E-bus or K-bus, automatic recognition	E-bus or K-bus, automatic recognition	E-bus or K-bus, automatic recognition
Type/number of peripheral signals	K-bus 2 kByte IN/OUT, E-bus only limited by memory	K-bus 2 kByte IN/OUT, E-bus only limited by memory	K-bus 2 kByte IN/OUT, E-bus only limited by memory
Approvals	CE, UL	CE, UL	CE, UL
Further information	www.beckhoff.com/CX8110	www.beckhoff.com/CX8180	www.beckhoff.com/CX8190

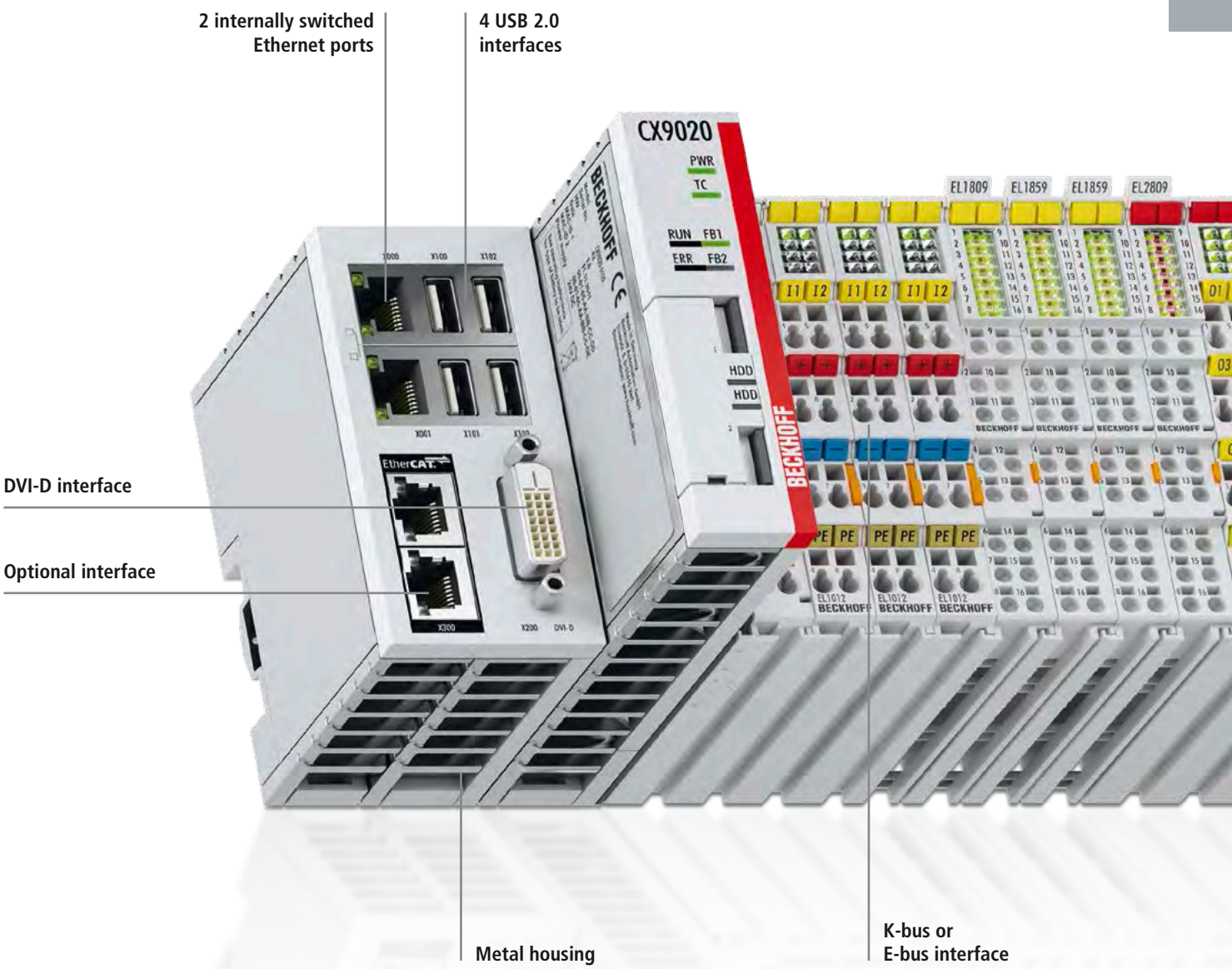
For availability status see Beckhoff website at: www.beckhoff.com

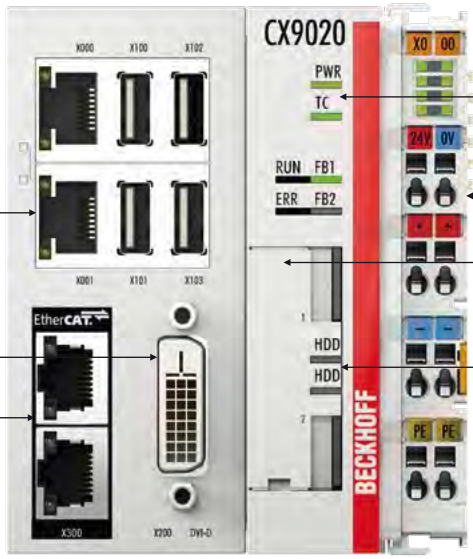
EtherCAT Terminals see page 2 110, EtherCAT Box modules see page 2 272, Bus Terminals see page 2 442

We reserve the right to make technical changes.

CX9020 | Embedded PCs

▶ www.beckhoff.com/CX9020





CX9020 | Basic CPU module

The CX9020 is a compact, DIN rail-mountable Ethernet control system with 1 GHz ARM Cortex™-A8 CPU. The connection for the Beckhoff I/O systems is directly integrated into the CPU module. The unit offers automatic bus system identification (K-bus or E-bus) and independently switches in the corresponding mode. The CX9020 comprises the CPU with two microSD card slots, the internal RAM and 128 kB NOVRAM as non-volatile memory. The basic configuration also includes two switched Ethernet RJ45 interfaces, four USB 2.0 interfaces and a DVI-D interface. The RJ45 interfaces are connected to an internal switch and offer a simple option for creating a line topology without the need for additional Ethernet switches. The operating system is Microsoft Windows Embedded Compact 7. TwinCAT automation software transforms a CX9020 system into a powerful PLC and Motion Control system that can be operated with or without visualisation. Optionally, the unit can be ordered with a fieldbus, serial or audio interface.

The extended operating temperature range between -25 and +60 °C enables application in climatically demanding situations.

The order identifier is derived as follows:

CX9020-01ST

- 0 = no TwinCAT
- 1 = with TwinCAT 2 PLC runtime
- 2 = with TwinCAT 2 PLC/NC PTP runtime
- 5 = TwinCAT 3 runtime (XAR)

- 0 = no operating system
- 1 = operating system Windows Embedded Compact 7

Since not all combinations make sense, the table "Ordering information" contains a breakdown of the permissible combinations.

Optional interfaces:

CX9020-N020 = audio interface
CX9020-N030 = RS232, D-sub plug
CX9020-N031 = RS422/RS485, D-sub socket
CX9020-B110 = EtherCAT slave, EtherCAT IN and OUT (2 x RJ45)
CX9020-M310 = PROFIBUS master, D-sub socket, 9-pin
CX9020-B310 = PROFIBUS slave, D-sub socket, 9-pin
CX9020-M510 = CANopen master, D-sub plug, 9-pin
CX9020-B510 = CANopen slave, D-sub plug, 9-pin
CX9020-M930 = PROFINET RT, controller
CX9020-B930 = PROFINET RT, device, Ethernet (2 x RJ45 switch)
CX9020-B950 = EtherNet/IP slave, Ethernet (2 x RJ45 switch)

We reserve the right to make technical changes.

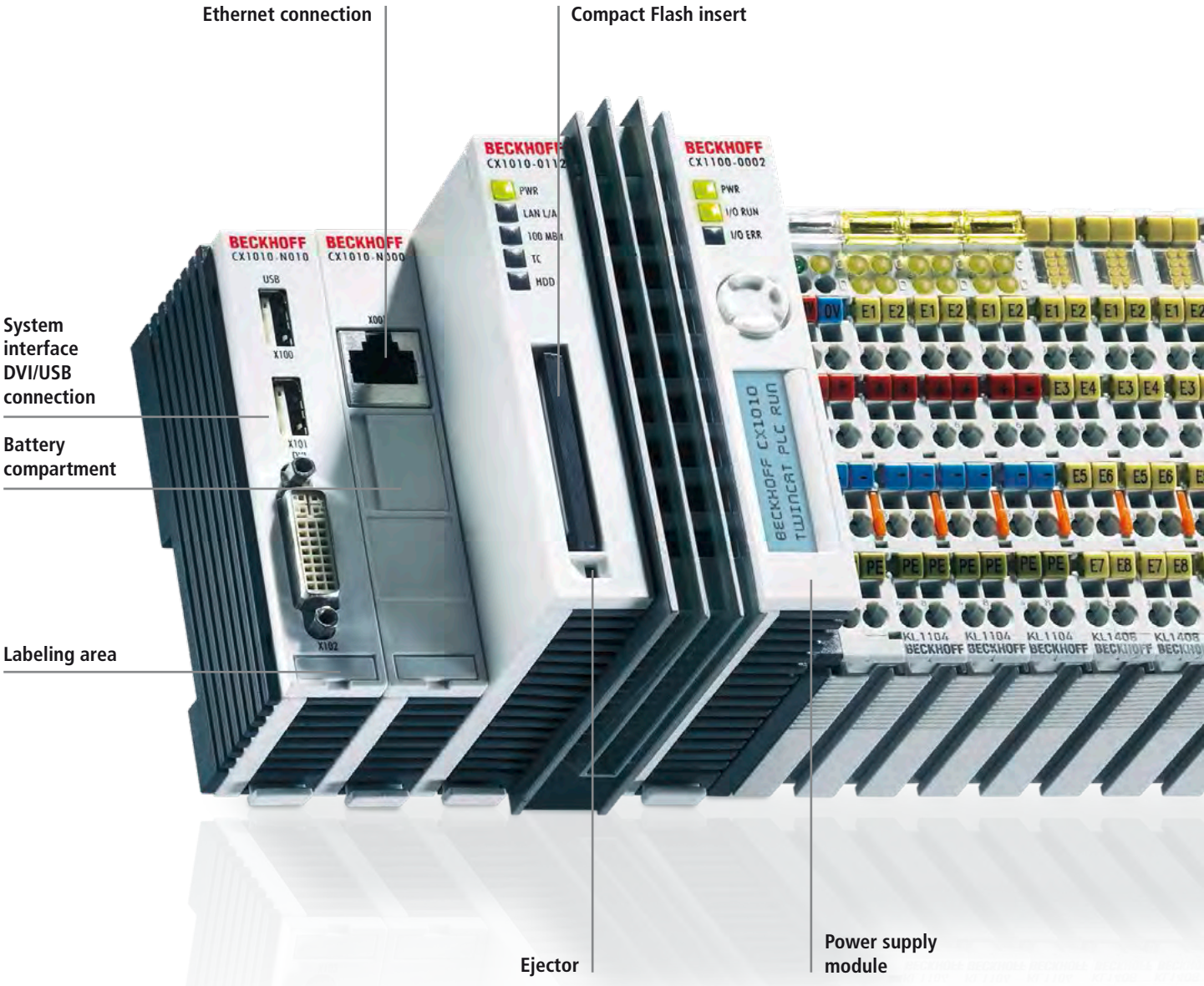
Technical data	CX9020
Processor	ARM Cortex™-A8, 1 GHz
Flash memory	2 x slot for microSD card, 512 MB included (expandable)
Main memory	1 GB DDR3 RAM (not expandable)
Persistent memory	128 KB NOVRAM integrated
Interfaces	2 x RJ45 10/100 Mbit/s (internal switch), 1 x DVI-D, 4 x USB 2.0, 1 x optional interface
Diagnostics LED	1 x power, 1 x TC status, 2 x flash access, 2 x bus status
Clock	internal battery-backed clock for time and date (battery exchangeable)
Operating system	Microsoft Windows Embedded Compact 7, English
Control software	TwinCAT 2 runtime TwinCAT 3 runtime (XAR)
I/O connection	E-bus or K-bus, automatic recognition
Power supply	24 V DC (-15 %/+20 %)
Current supply E-bus/K-bus	2 A
Max. power loss	5 W (including the system interfaces)
Dimensions (W x H x D)	84 mm x 99 mm x 91 mm
Weight	approx. 590 g
Operating/storage temperature	-25…+60 °C/-40…+85 °C
Relative humidity	95 %, no condensation
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4
Protection class	IP 20
Approvals	CE, UL, Ex, GL, IECEx
TC3 performance class	Economy plus (30); for further information on TwinCAT 3 see page 470
Further information	www.beckhoff.com/CX9020

Ordering information	no operating system	Windows Embedded Compact 7	no TwinCAT	TwinCAT 2 PLC runtime	TwinCAT 2 NC PTP runtime	TwinCAT 3 runtime (XAR)
CX9020-0100	x	–	x	–	–	–
CX9020-0110	–	x	x	–	–	–
CX9020-0111	–	x	–	x	–	–
CX9020-0112	–	x	–	–	x	–
CX9020-0115	–	x	–	–	–	x

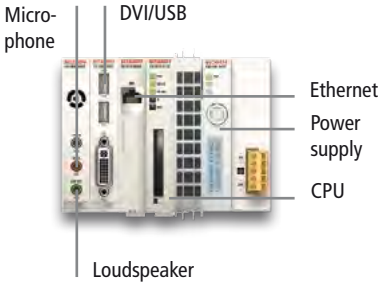
Options	
CX9020-U900	internal, capacitive 1-second UPS to ensure secure backup of persistent application data on the microSD card
CX2900-0107	Device modification for CX5120, CX5130, CX5140 and CX9020 Embedded PCs according to the requirements for ATEX and IECEx certification. The modification is mandatory for the usage of CX5120, CX5130, CX5140 and CX9020 in hazardous areas, Zone 2/22. It includes the modification and repositioning of the device label as well as a mounting bracket installed ex works for mechanical locking of the connectors. Product labeling: ATEX: II 3 G Ex nA IIC T4 Gc and II 3 D Ex tc IIIC T135 °C Dc; IECEx: Ex nA IIC T4 Gc and Ex tc IIIC T135 °C Dc Read the device documentation for use in hazardous areas carefully.

CX1010 | Embedded PCs

▶ www.beckhoff.com/CX1010



We reserve the right to make technical changes.



Application example multimedia system with audio connection

– multimedia system (e.g. building automation)
– audio interface
– Windows Embedded Standard 2009 (no TwinCAT)

Components

– CPU CX1010-0120 (DVI/USB, audio interface)
– power supply CX1100-0001

The basic CX1010 module is the basic device of the CX family. With a 500 MHz Intel® Pentium® MMX-compatible processor it offers average CPU performance. Depending on the application the CX1010 can also be operated in "headless" mode, i.e. without display and keyboard. If local visualisation is required, this can be implemented via a DVI (digital video interface), to which all Beckhoff Control Panels and all commercially available monitors with DVI input or VGA input can be connected. The touch screen signal is read via one of the two available USB interfaces.

The components

The individual system components are modules with a width of 19 mm (single) or 38 mm (double) that can be arranged in series. The basic unit consists of a (CX1010) CPU module and a power supply module (CX1100-000x).

The CPU module is available in several variants, e.g.

– System interfaces: as an option, a DVI and two USB interfaces can be added to the existing Ethernet interface. Further system interfaces for serial communication (2 x RS232 or 2 x RS422/485) or audio signals can be ordered separately.
– Operating system: There is a choice of no operating system, Microsoft Windows Embedded CE 6 or Microsoft Windows Embedded Standard 2009.
– TwinCAT 2 software (pre-installed): without a TwinCAT 2 system, with TwinCAT 2 CE PLC or with TwinCAT 2 CE NC PTP, or with the associated full version of the individual TwinCAT 2 levels for PLC and NC PTP

Power supply unit with integrated I/O interface

For the 24 V DC power supply unit there is a choice of four different versions:

– CX1100-0001: without I/O interface
– CX1100-0002: with terminal bus interface for Beckhoff Bus Terminals
– CX1100-0003: with terminal bus interface for Beckhoff Bus Terminals and IP-Link interface for Beckhoff Fieldbus Box modules
– CX1100-0004: with terminal bus interface for Beckhoff EtherCAT Terminals

All power supply variants have an illuminated, low-glare LC-display with FSTN technology and two rows with 16 characters each for displaying status messages. The application programs can also use the display for displaying application-specific texts. 8 kB of non-volatile memory for remanent data are also included.

The range of optional modules is complemented by fieldbus connections for PROFIBUS, CANopen, DeviceNet, SERCOS and Lightbus, both as master or slave versions.

PLC, Motion Control and visualisation

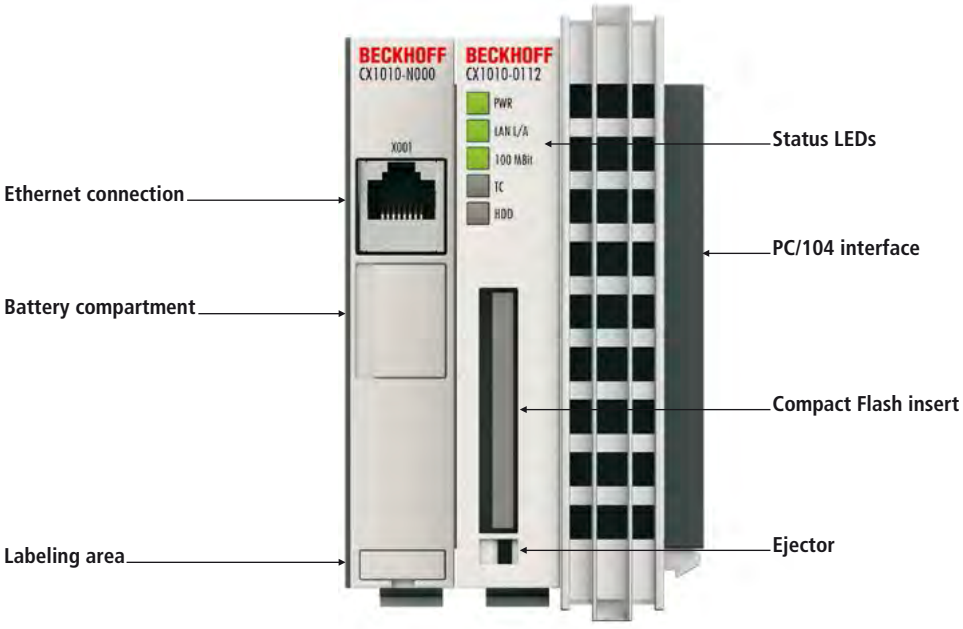
In combination with TwinCAT 2 automation software, the CX1010 Embedded PC becomes a powerful IEC 61131-3 PLC with up to four user tasks. Additionally, Motion Control tasks can also be executed. Depending on the required cycle time, several servo axes can be controlled. Even special functions such as flying saw, electronic gearbox and cam plate can be realised. Under Windows Embedded CE 6, thanks to the real-time capability of the operating system, user tasks written in high-level languages can be processed in real-time in parallel with TwinCAT 2.

Remote programming via Ethernet

The CX1010 units are programmed via a laptop or a desktop PC that is connected with the CX1010 via Ethernet (network or crossover cable). The programs are developed on the laptop with a standard TwinCAT 2 software license and then loaded into the target device.

Operating systems

Both Windows Embedded Standard 2009 and Windows Embedded CE 6 are available as operating system. The latter has the advantages of faster boot up and lower license costs. The Beckhoff OPC server for connection to SCADA packages is available for both operating systems variants. The same applies to the CX1010: easy visualisation and at the same time real-time control on one system.



CX1010 | Basic CPU module

The CX1010 CPU module is the basic module of the CX system. It comprises the CPU and the internal flash memory in two implementation levels and offers the option to operate an additional memory medium in Compact Flash format II. An Ethernet interface is part of the basic configuration. All other CX family components can be connected via the PC/104 interface that is available on both sides. The CPU module can be equipped with different hardware and software options: the operating system can be Windows Embedded CE 6 or Windows Embedded Standard 2009.

The basic configuration of the CX1010 includes a 128 MB Compact Flash card. The TwinCAT 2 automation software transforms a CX1010 system into a powerful PLC and Motion Control system that can be operated with or without visualisation. Further system interfaces or fieldbus connections can be added to the basic CPU module. The passive cooling module is included in the scope of supply. The CPU module requires a CX1100 type power supply module.

The order identifier is derived as follows:

CX1010-0CST

- **0 = no TwinCAT**
- **1 = with TwinCAT 2 PLC runtime**
- **2 = with TwinCAT 2 PLC/NC PTP runtime**

- **0 = no operating system**
- **1 = operating system Windows Embedded CE 6**
- **2 = operating system Windows Embedded Standard 2009**

- **0 = CPU with Ethernet**
- **1 = CPU with Ethernet + 2 x USB + DVI**

Since not all combinations make sense, the table "Ordering information" contains a breakdown of the permissible combinations.

Embedded PC interfaces for CX1010
see page 238

We reserve the right to make technical changes.

Technical data	CX1010-0xxx
Processor	compatible with Intel® Pentium® MMX, clock frequency 500 MHz
Flash memory	slot for Compact Flash card, 128 MB included (expandable)
Main memory	256 MB DDR RAM (not expandable)
Interfaces	1 x RJ45 10/100 Mbit/s
Diagnostics LED	1 x power, 1 x LAN speed, 1 x LAN activity, TC status, 1 x flash access
Expansion slot	1 x Compact Flash type II insert with ejector
Clock	internal battery-backed clock for time and date (battery exchangeable)
Operating system	Microsoft Windows Embedded CE 6 or Microsoft Windows Embedded Standard 2009
Control software	TwinCAT 2 PLC runtime or TwinCAT 2 NC PTP runtime
System bus	16 bit ISA (PC/104)
I/O connection	via power supply module (E-bus, K-bus, K-bus/IP-Link)
Power supply	via system bus (through CX1100-xxxx power supply modules)
Max. power loss	8 W (including the system interfaces CX1010-N0xx)
Dimensions (W x H x D)	58 mm x 120 mm x 91 mm
Weight	approx. 355 g
Operating/storage temperature	0…+50 °C/-25…+85 °C
Relative humidity	95 %, no condensation
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4
Protection class	IP 20
Approvals	CE, UL
Further information	www.beckhoff.com/CX1010

Ordering information	DVI/USB	no operating system	Windows Embedded CE 6	Windows Embedded Standard 2009	no TwinCAT	TwinCAT 2 PLC runtime	TwinCAT 2 NC PTP runtime
CX1010-0000	–	x	–	–	x	–	–
CX1010-0010	–	–	x	–	x	–	–
CX1010-0011	–	–	x	–	–	x	–
CX1010-0012	–	–	x	–	–	x	x
CX1010-0020	–	–	–	x*	x	–	–
CX1010-0021	–	–	–	x*	–	x	–
CX1010-0022	–	–	–	x*	–	x	x
CX1010-0100	x	x	–	–	x	–	–
CX1010-0110	x	–	x	–	x	–	–
CX1010-0111	x	–	x	–	–	x	–
CX1010-0112	x	–	x	–	–	x	x
CX1010-0120	x	–	–	x*	x	–	–
CX1010-0121	x	–	–	x*	–	x	–
CX1010-0122	x	–	–	x*	–	x	x

*CX1010 systems with Microsoft Embedded Standard 2009 require Compact Flash with a capacity of at least 2 GB (must be ordered separately).

DVI/USB interface

Audio interface

RS232 interface

RS422/RS485 interface

Ethernet interface

CX1010-N0xx | **System interfaces**

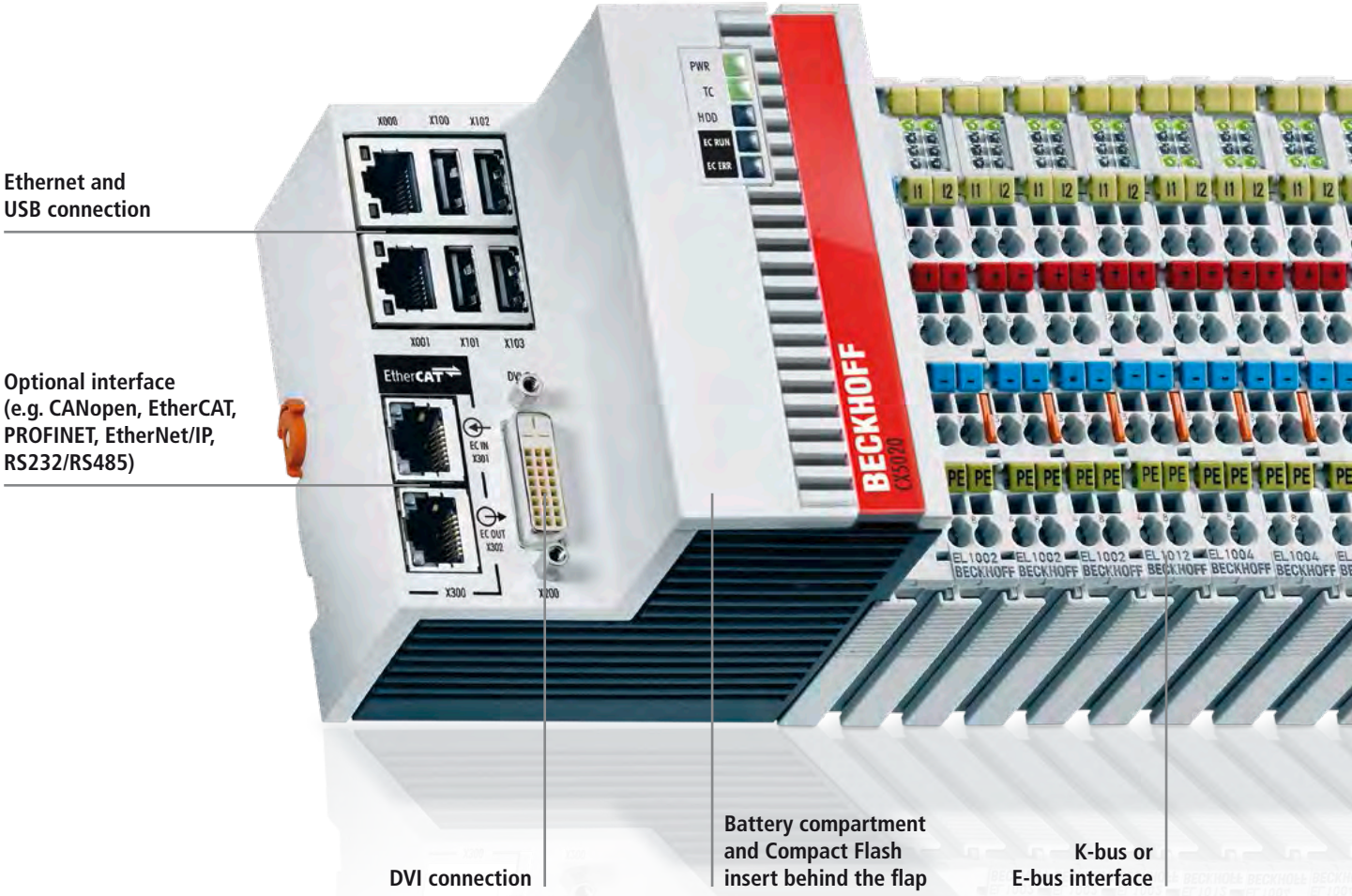
A number of optional interface modules are available for the basic CX1010 CPU module that can be installed ex factory. The CX1010-N010 option connects Beckhoff Control Panels or standard monitors with DVI or VGA input via the DVI or USB interfaces. Devices such as printer, scanner, mouse, keyboard, mass storage, etc. can be connected via the USB 2.0 interfaces. Multimedia capability is realised via the CX1010-N020 audio interface. The modules CX1010-N030 and CX1010-N040 offer a total of four serial RS232 interfaces with a maximum transfer speed of 115 kbaud. These four interfaces can be implemented in pairs as RS422/RS485, in which case they are identified as CX1010-N031 and CX1010-N041 respectively. The system interfaces cannot be retrofitted or expanded in the field. They are supplied ex factory in the specified configuration and cannot be separated from the CPU module. The internal PC/104 bus runs through the system interfaces, so that further CX components can be connected. The power supply of the system interface modules is ensured via the internal PC/104 bus.

We reserve the right to make technical changes.

Technical data	CX1010-N010	CX1010-N020	CX1010-N030	CX1010-N040	CX1010-N031	CX1010-N041	CX1010-N060
Interfaces	1 x DVI + 2 x USB 2.0 (max. 500 mA per port)	Line IN, Line Mic IN, Line OUT	1 x COM1 + 1 x COM2, RS232	1 x COM3 + 1 x COM4, RS232	1 x COM1 + 1 x COM2, RS422/RS485	1 x COM3 + 1 x COM4, RS422/RS485	1 x Ethernet, 10/100 Mbit/s
Type of connection	DVI-I 29-pin socket + 2 USB ports type A	3.5 mm socket for jack plug	2 x D-sub plug, 9-pin	2 x D-sub plug, 9-pin	2 x D-sub socket, 9-pin	2 x D-sub socket, 9-pin	1 x RJ45
Properties	DVI-I interface also carries out VGA signals (DVI-A)	built-in PC beeper, Line OUT output, max. 200 mW, suitable for earphones	max. baud rate 115 kbaud, not combinable with N031/ N041	max. baud rate 115 kbaud, not combinable with N031/ N041	max. baud rate 115 kbaud, not combinable with N030/ N040	max. baud rate 115 kbaud, not combinable with N030/ N040	max. 20 m cable length Cat. 5, not combinable with CX1100-0004
Power supply	via system bus (through CX1100-xxxx power supply modules)						
Dimensions (W x H x D)	19 mm x 100 mm x 51 mm						
Weight	approx. 80 g						
Operating/storage temperature	0…+55 °C/-25…+85 °C						
Relative humidity	95 %, no condensation						
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27						
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4						
Protection class	IP 20						
Approvals	CE, UL						
Further information	www. beckhoff.com/ CX1010-N010	www. beckhoff.com/ CX1010-N020	www. beckhoff.com/ CX1010-N030	www. beckhoff.com/ CX1010-N040	www. beckhoff.com/ CX1010-N031	www. beckhoff.com/ CX1010-N041	www. beckhoff.com/ CX1010-N060

CX5000 | Embedded PC series with Intel® Atom™ processor

▶ **www.beckhoff.com/CX5000**



We reserve the right to make technical changes.

CX5020 with optional PROFINET interfaces

CX5020 with D-sub plug, 9-pin

CX5020 with audio interface

The CX5000 series devices are DIN rail-mountable, fanless Embedded PCs with direct connection for Beckhoff Bus Terminals or EtherCAT Terminals.

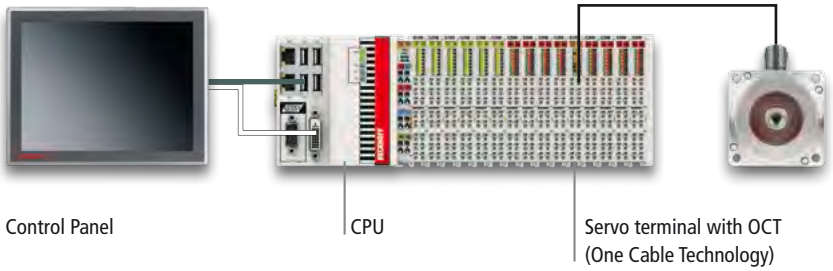
The housing concept of this series is optimised for sturdiness and compactness; the individual housing parts are made of metal (magnesium). Apart from the electrical advantages of better screening and ESD protection, the user also benefits from the weight-saving magnesium construction.

The I/O level can be implemented both with Bus Terminals and with EtherCAT Terminals. The connection of EtherCAT gives rise to many different extension options. Further master/slave fieldbus connections (PROFIBUS, CANopen, DeviceNet) or communication interfaces (RS232, RS422/RS485) and all other signal types accessible via EtherCAT can be directly connected as EtherCAT Terminals.

Two independent Gigabit Ethernet ports and four USB 2.0 interfaces are available. A Beckhoff Control Panel or a commercially available DVI monitor can be connected to the DVI-D interface. Unlike the other CX device families, the CX5000 series has no option for expansion using attachable expansion modules to the left. There is, however, a factory-fitted option slot in the basic housing. For example, a serial port (RS232/RS422/RS485) or a fieldbus connection with master or slave function can be added here as an optional interface as required. Particularly worth mentioning is the function as an EtherCAT slave, as a result of which the CX5000 becomes a programmable local controller within an EtherCAT network.

The operating system can be Windows Embedded CE 6 or Windows Embedded Standard 2009. An exchangeable, industrially-compatible CF card, which can be accessed behind a panel, is used as boot and storage medium. The CF card serves as a substitute for a hard disk; i.e. the operating system as well as TwinCAT and user projects are stored on it. This way, in the case of service, hardware can be exchanged quickly or a software update can be performed on site by simply exchanging the CF card. The builtin capacitive 1-second UPS ensures secure backup of persistent application data on the CF card. The date and time are buffered via a replaceable battery.

TwinCAT automation software transforms a CX5000 system into a powerful PLC and Motion Control system that can be operated with or without visualisation.

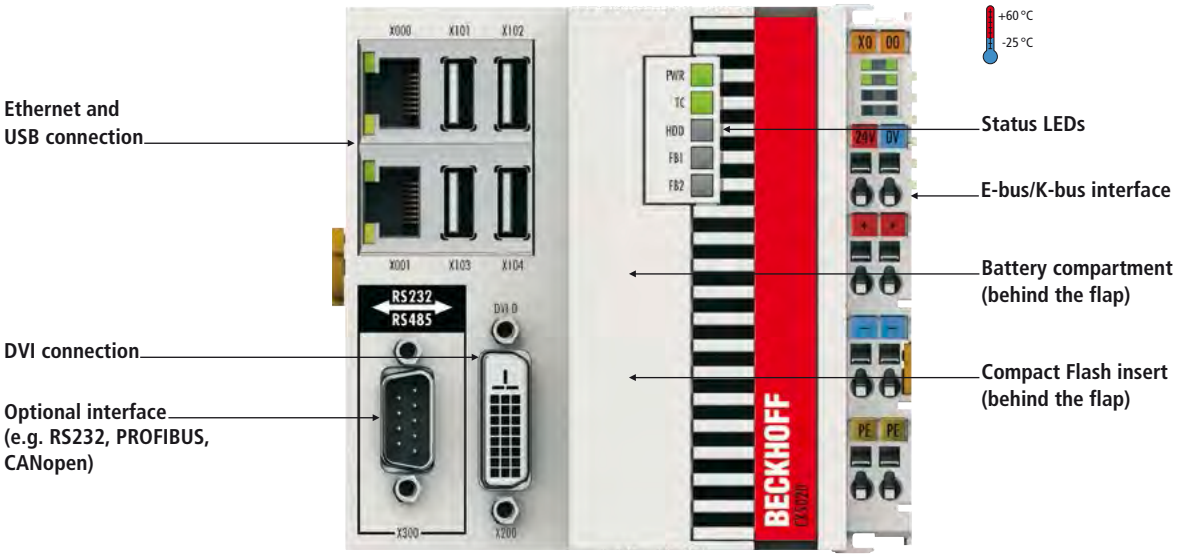


Application example: PLC and Motion Control system with DVI/USB interface

- PLC and Motion Control software
- Control Panel connection via DVI/USB
- Windows Embedded CE 6 and TwinCAT NC

Components

- CPU CX5020-0112
- display CP39xx
- drive: EL7211-0010 servo terminal and AM8131-wF1z motor



CX5000 | Embedded PC series with Intel® Atom™ processor

The CX5010 and CX5020 are Embedded PCs from the CX5000 series based on Intel® Atom™ processors and differ only by the CPU version. The CX5010 has a 1.1 GHz Intel® Atom™ Z510 processor, while the CX5020 has a 1.6 GHz Intel® Atom™ Z530 processor. Apart from the clock speed, the two processors also differ by the fact that the Z530 features hyperthreading technology, i.e. it has two virtual CPU cores for more effective execution of software.

Depending on the installed TwinCAT runtime environment, the CX5010/CX5020 can be used for the implementation of PLC or PLC/Motion Control projects (with or without visualisation).

+60 °C
-25 °C

The extended operating temperature range between -25 and +60 °C enables application in climatically demanding situations.

The order identifier is derived as follows:

CX50x0-U1ST

- 0 = no TwinCAT
- 1 = with TwinCAT 2 PLC runtime
- 2 = with TwinCAT 2 NC PTP runtime
- 5 = TwinCAT 3 runtime (XAR)

- 0 = no operating system
- 1 = operating system Windows Embedded CE 6
- 2 = operating system Windows Embedded Standard 2009

- 0 = E-bus interface for EtherCAT Terminals
- 1 = K-bus interface for Bus Terminals

- 1 = Intel® Atom™ processor 1.1 GHz
- 2 = Intel® Atom™ processor 1.6 GHz

Since not all combinations make sense, the table "Ordering information" contains a breakdown of the permissible combinations.

Optional interfaces:

CX50x0-N020	=	audio interface
CX50x0-N030	=	RS232, D-sub plug
CX50x0-N031	=	RS422/RS485, D-sub socket
CX50x0-M310	=	PROFIBUS master, D-sub socket, 9-pin
CX50x0-B310	=	PROFIBUS slave, D-sub socket, 9-pin
CX50x0-M510	=	CANopen master, D-sub plug, 9-pin
CX50x0-B510	=	CANopen slave, D-sub plug, 9-pin
CX50x0-M930	=	PROFINET RT, controller
CX50x0-B930	=	PROFINET RT, device, Ethernet (2 x RJ45 switch)
CX50x0-B950	=	EtherNet/IP slave, Ethernet (2 x RJ45 switch)
CX50x0-B110	=	EtherCAT slave, EtherCAT IN and OUT (2 x RJ45)

We reserve the right to make technical changes.

Technical data	CX5010	CX5020
Processor	Intel® Atom™ Z510, 1.1 GHz clock frequency	Intel® Atom™ Z530, 1.6 GHz clock frequency
Flash memory	slot for Compact Flash card, 128 MB included (expandable)	
Main memory	512 MB RAM (not expandable)	512 MB RAM (expandable ex factory to 1 GB)
Persistent memory	integrated 1-second UPS (1 MB on Compact Flash card)	
Interfaces	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-D, 4 x USB 2.0, 1 x optional interface	
Diagnostics LED	1 x power, 1 x TC status, 1 x flash access, 2 x bus status	
Clock	internal battery-backed clock for time and date (battery exchangeable)	
Operating system	Microsoft Windows Embedded CE 6 or Microsoft Windows Embedded Standard 2009	
Control software	TwinCAT 2 runtime TwinCAT 3 runtime (XAR)	
I/O connection	E-bus or K-bus, automatic recognition	
Power supply	24 V DC (-15 %/+20 %)	
Current supply E-bus/K-bus	2 A	
Max. power loss	12 W (including the system interfaces)	12.5 W (including the system interfaces)
Dimensions (W x H x D)	100 mm x 106 mm x 92 mm	
Weight	approx. 575 g	
Operating/storage temperature	-25…+60 °C/-40…+85 °C	
Relative humidity	95 %, no condensation	
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27	
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4	
Protection class	IP 20	
Approvals	CE, UL, Ex	
TC3 performance class	Performance (40); for further information on TwinCAT 3 see page 470	
Further information	www.beckhoff.com/CX5010	www.beckhoff.com/CX5020

Ordering information	E-bus	K-bus	no operating system	Windows Embedded CE 6	Windows Embedded Standard 2009	no TwinCAT	TwinCAT 2 PLC runtime	TwinCAT 2 NC PTP runtime	TwinCAT 3 runtime (XAR)
CX50x0-0100	x	–	x	–	–	x	–	–	–
CX50x0-0110	x	–	–	x	–	x	–	–	–
CX50x0-0111	x	–	–	x	–	–	x	–	–
CX50x0-0112	x	–	–	x	–	–	x	x	–
CX50x0-0115	x	–	–	x	–	–	–	–	x
CX50x0-0120	x	–	–	–	x*	x	–	–	–
CX50x0-0121	x	–	–	–	x*	–	x	–	–
CX50x0-0122	x	–	–	–	x*	–	x	x	–
CX50x0-0125	x	–	–	–	x*	–	–	–	x
CX50x0-1100	–	x	x	–	–	x	–	–	–
CX50x0-1110	–	x	–	x	–	x	–	–	–
CX50x0-1111	–	x	–	x	–	–	x	–	–
CX50x0-1112	–	x	–	x	–	–	x	x	–
CX50x0-1115	–	x	–	x	–	–	–	–	x
CX50x0-1120	–	x	–	–	x*	x	–	–	–
CX50x0-1121	–	x	–	–	x*	–	x	–	–
CX50x0-1122	–	x	–	–	x*	–	x	x	–
CX50x0-1125	–	x	–	–	x*	–	–	–	x

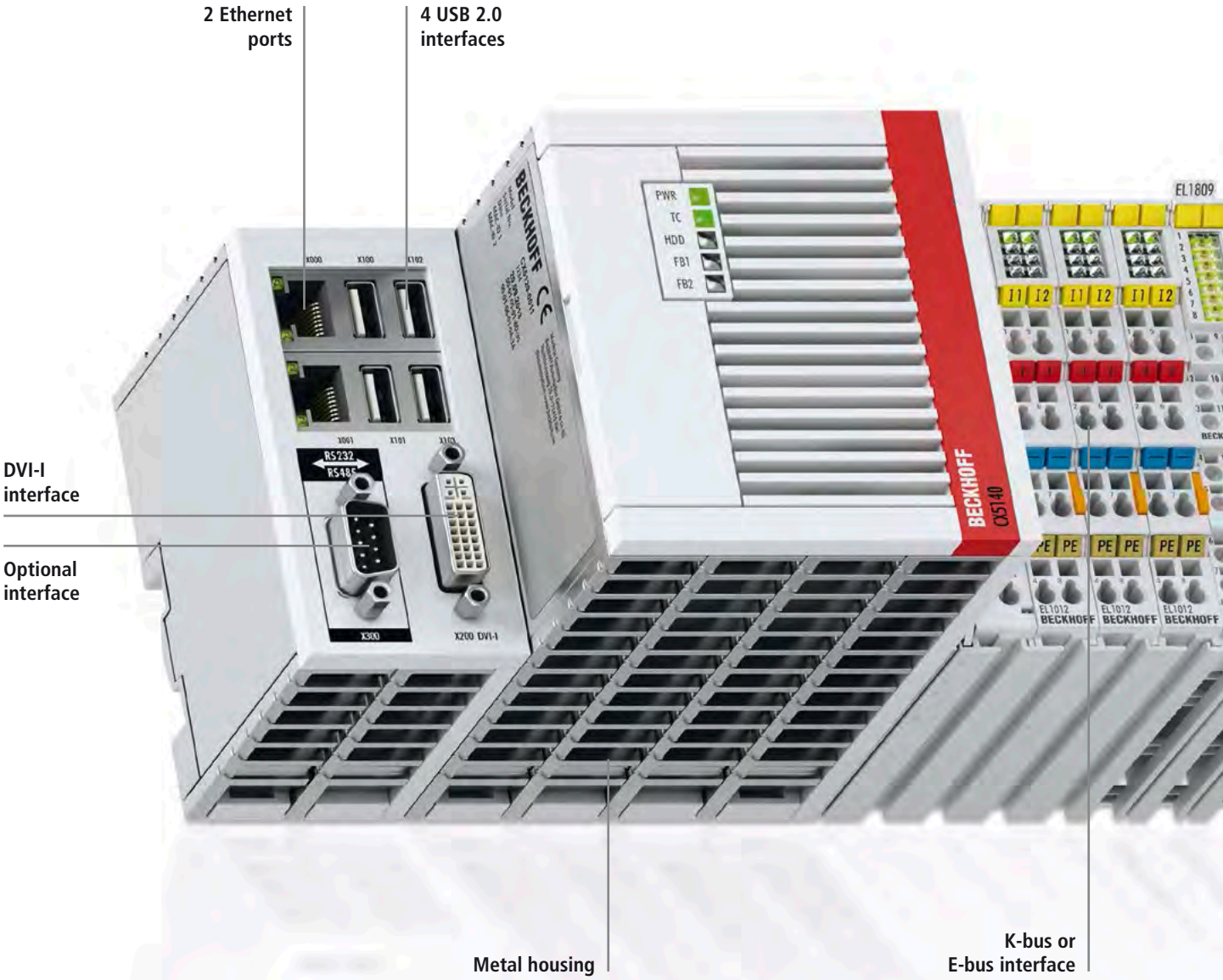
Options	
CX1900-0204	1 GB DDR2 RAM for CX5020, instead of 512 MB DDR2 RAM; pre-assembled ex factory
CX1800-0401	Microsoft Windows Embedded Standard 7 P 32 bit instead of Microsoft Windows Embedded Standard 2009
CX1900-0105	Device modification for CX5010 and CX5020 Embedded PCs according to the requirements for ATEX certification. The modification is mandatory for the usage of the devices in hazardous areas, Zone 2. It includes the modification and repositioning of the device label as well as a mounting bracket installed ex works for mechanical locking of the connectors. Product labeling: ATEX: II 3 G Ex nA IIC T4 Gc Read the device documentation for use in hazardous areas carefully.

*CX50x0 systems with Microsoft Embedded Standard 2009 require Compact Flash with a capacity of at least 2 GB (must be ordered separately).

We reserve the right to make technical changes.

CX5100 | Embedded PCs

▶ www.beckhoff.com/CX5100



We reserve the right to make technical changes.

CX5120

CX5130

CX5140

The DIN-rail-mountable, fanless Embedded PCs from the CX5100 series are equipped with Intel® Atom™ multi-core processors. The series encompasses three devices that differ from each other by processor type, RAM size and housing size. The new CX5100 PCs supplement the existing devices of the CX5000 series which are equipped with processors of the first Intel® Atom™ generation. In direct comparison the new processors are considerably more efficient: the out-of-order architecture and the modern 22-nm technology enable higher clock rates combined with reduced power losses.

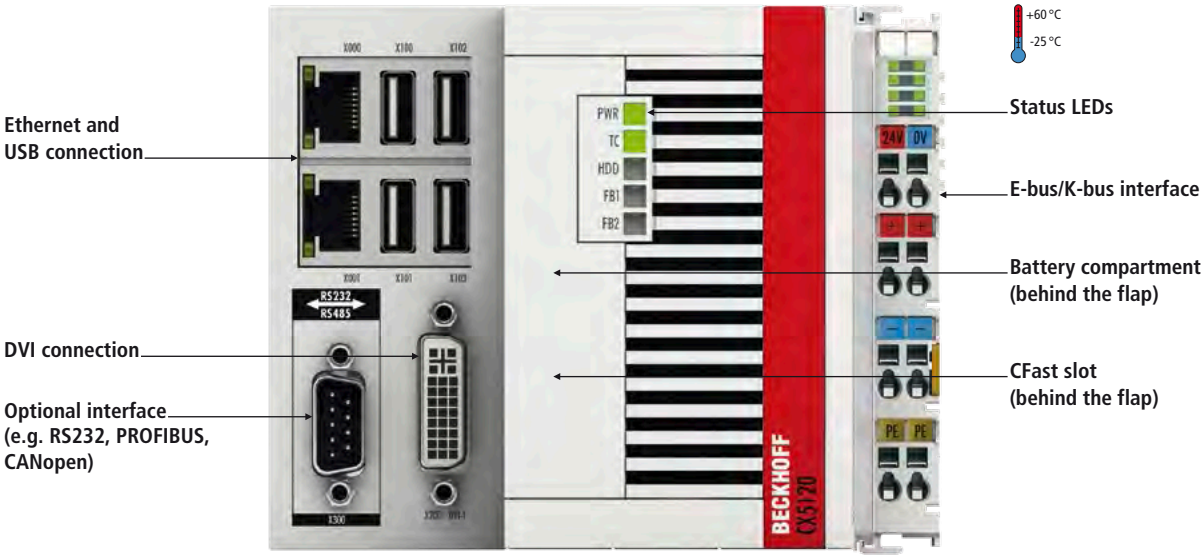
– CX5120: Intel® Atom™ CPU, 1.46 GHz, 1 core
– CX5130: Intel® Atom™ CPU, 1.75 GHz, 2 cores
– CX5140: Intel® Atom™ CPU, 1.91 GHz, 4 cores

The CX5100 has a fixed number of system interfaces, which in the basic version is identical to previous CX5000 devices. Two independent Gigabit Ethernet ports and four USB 2.0 interfaces are available. To the DVI-I interface either a Beckhoff Control Panel or a commercially available DVI or VGA monitor can be connected. Like the CX5000 the CX5100 series has a compact design; a modular device with extension modules like in the CX2000 series is not available. The option interface of the CX5100 can be factory-fitted with various interfaces depending on needs: e.g. with a serial port (RS232/RS422/RS485) or a fieldbus connection for master or slave function. If the EtherCAT Slave option is selected, the CX5100 becomes a programmable, decentralised controller within an EtherCAT network.

At I/O level either Bus Terminals or EtherCAT Terminals can be used. Like all Embedded PCs of the second generation, the CX5100 automatically recognises the I/O type that is plugged-in. With EtherCAT many different extension options are available: further master/slave fieldbus connections (PROFIBUS, CANopen, DeviceNet, etc.) and communication interfaces (RS232, RS422/RS485) as well as all other signal types supported by EtherCAT can be directly connected as EtherCAT Terminals.

The operating system is Windows Embedded Standard 7 P, optionally in a 32-bit or 64-bit version. The boot and storage medium is an interchangeable, industrially compatible CFast card with a slot that is accessible behind a cover. The CFast card serves as a substitute for a hard disk; i.e. the operating system as well as TwinCAT and user projects are stored on it. Fast hardware exchange is thus possible if service is required; a software update can be performed simply by replacing the card on site. The built-in capacitive 1-second UPS ensures secure backup of persistent application data on the CFast card. Date and time are buffered via a replaceable battery.

The new CX5100 Embedded PCs are positioned in terms of both price and performance below the CX2000 series with multi-core-i CPU. If the machine and plant programmer uses the CX5100 in combination with the TwinCAT 3 automation suite, he now benefits from the availability of genuine multi-core processors and the optimised allocation of different program sections to individual cores, even with Intel® Atom™-based devices.



CX5120 | Embedded PC with Intel® Atom™ processor

The CX5120 has an Intel® Atom™ single-core processor with a clock rate of 1.46 GHz. The hardware interfaces in this new series are oriented and implemented identically to those of the existing CX5000 series. Two independent, Gigabit-capable Ethernet interfaces as well as four USB 2.0 and a DVI-I interface are available. A multitude of further connection options or gateway functions are created by an option interface, which can be pre-fitted in the factory, as well as the I/O level, which can selectively consist either of E-Bus or K-Bus terminals.

The CX5120 is characterised by low power consumption and fanless design.

Depending on the installed TwinCAT runtime environment, the CX5120 can be used for implementing PLC or PLC/Motion Control projects with or without visualisation. The execution of Motion Control applications with interpolating axis movements is also possible.

The extended operating temperature range from -25 to +60 °C enables the use in climatically demanding environments.

Like the CX5000, the CX5100 series has a compact design; a modular device with extension modules like in the CX2000 series is not available.

The order identifier is derived as follows:

CX5120-01ST

- 0 = no TwinCAT
- 1 = with TwinCAT 2 PLC runtime
- 2 = with TwinCAT 2 NC PTP runtime
- 3 = with TwinCAT 2 NC I runtime
- 5 = TwinCAT 3 runtime (XAR)

- 0 = no operating system
- 1 = operating system Windows Embedded Compact 7
- 2 = operating system Windows Embedded Standard 7 P 32 bit
- 3 = operating system Windows Embedded Standard 7 P 64 bit
- 4 = Windows 10 IoT Enterprise LTSB 32 bit
- 5 = Windows 10 IoT Enterprise LTSB 64 bit

Since not all combinations make sense, the table "Ordering information" contains a breakdown of the permissible combinations.

Optional interfaces:

CX5120-N020	=	audio interface
CX5120-N030	=	RS232, D-sub plug
CX5120-N031	=	RS422/RS485, D-sub socket
CX5120-M310	=	PROFIBUS master, D-sub socket, 9-pin
CX5120-B310	=	PROFIBUS slave, D-sub socket, 9-pin
CX5120-M510	=	CANopen master, D-sub plug, 9-pin
CX5120-B510	=	CANopen slave, D-sub plug, 9-pin
CX5120-M930	=	PROFINET RT, controller
CX5120-B930	=	PROFINET RT, device, Ethernet (2 x RJ45 switch)
CX5120-B931	=	PROFINET IRT, device, Ethernet (2 x RJ45 switch)
CX5120-B950	=	EtherNet/IP slave, Ethernet (2 x RJ45 switch)
CX5120-B110	=	EtherCAT slave, EtherCAT IN and OUT (2 x RJ45)

We reserve the right to make technical changes.

Technical data	CX5120
Processor	Intel® Atom™ E3815, 1.46 GHz
Number of cores	1
Flash memory	slot for CFast card and for microSD card, cards not included
Main memory	2 GB DDR3 RAM (not expandable)
Persistent memory	integrated 1-second UPS (1 MB on CFast card)
Interfaces	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 2.0, 1 x optional interface
Diagnostics LED	1 x power, 1 x TC status, 1 x flash access, 2 x bus status
Clock	internal battery-backed clock for time and date (battery exchangeable)
Operating system	Microsoft Windows Embedded Compact 7, Microsoft Windows Embedded Standard 7 P or Microsoft Windows 10 IoT Enterprise LTSB
Control software	TwinCAT 2 runtime | TwinCAT 3 runtime (XAR)
I/O connection	E-bus or K-bus, automatic recognition
Power supply	24 V DC (-15 %/+20 %)
Current supply E-bus/K-bus	2 A
Max. power loss	9 W (including the system interfaces)
Dimensions (W x H x D)	124 mm x 100 mm x 92 mm
Weight	approx. 860 g
Operating/storage temperature	-25…+60 °C/-40…+85 °C
Relative humidity	95 %, no condensation
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4
Protection class	IP 20
Approvals	CE, UL, Ex, IECEx
TC3 performance class	Performance (40); for further information on TwinCAT 3 see page 470
Further information	www.beckhoff.com/CX5120

Ordering information	no operating system	Windows Embedded Compact 7	Standard 7 P 32 bit	Standard 7 P 64 bit	Windows 10 IoT Enterprise LTSB 32 bit	Windows 10 IoT Enterprise LTSB 64 bit	no TwinCAT	TwinCAT 2 runtime PLC	TwinCAT 2 runtime NC PTP	TwinCAT 2 runtime NC I	TwinCAT 3 runtime (XAR)
CX5120-0100	x	–	–	–	–	–	x	–	–	–	–
CX5120-0110	–	x	–	–	–	–	x	–	–	–	–
CX5120-0111	–	x	–	–	–	–	–	x	–	–	–
CX5120-0112	–	x	–	–	–	–	–	–	x	–	–
CX5120-0113	–	x	–	–	–	–	–	–	–	x	–
CX5120-0115	–	x	–	–	–	–	–	–	–	–	x
CX5120-0120	–	–	x	–	–	–	x	–	–	–	–
CX5120-0121	–	–	x	–	–	–	–	x	–	–	–
CX5120-0122	–	–	x	–	–	–	–	–	x	–	–
CX5120-0123	–	–	x	–	–	–	–	–	–	x	–
CX5120-0125	–	–	x	–	–	–	–	–	–	–	x
CX5120-0130	–	–	–	x	–	–	x	–	–	–	–
CX5120-0135	–	–	–	x	–	–	–	–	–	–	x
CX5120-0140	–	–	–	–	x	–	x	–	–	–	–
CX5120-0141	–	–	–	–	x	–	–	x	–	–	–
CX5120-0142	–	–	–	–	x	–	–	–	x	–	–
CX5120-0143	–	–	–	–	x	–	–	–	–	x	–
CX5120-0150	–	–	–	–	–	x	x	–	–	–	–
CX5120-0155	–	–	–	–	–	x	–	–	–	–	x

Option	
CX2900-0107	Device modification for CX5120, CX5130, CX5140 and CX9020 Embedded PCs according to the requirements for ATEX and IECEx certification. The modification is mandatory for the usage of CX5120, CX5130, CX5140 and CX9020 in hazardous areas, Zone 2/22. It includes the modification and repositioning of the device label as well as a mounting bracket installed ex works for mechanical locking of the connectors. Product labeling: ATEX: II 3 G Ex nA IIC T4 Gc and II 3 D Ex tc IIIC T135 °C Dc; IECEx: Ex nA IIC T4 Gc and Ex tc IIIC T135 °C Dc Read the device documentation for use in hazardous areas carefully.

CX5130 | Embedded PC with Intel® Atom™ processor

The CX5130 has an Intel® Atom™ multi-core processor with a clock rate of 1.75 GHz. This makes genuine multi-core technology possible in the Embedded PC segment. The hardware interfaces in this new series are oriented and implemented identically to those of the existing CX5000 series. Two independent, Gigabit-capable Ethernet interfaces as well as four USB 2.0 and a DVI-I interface are available. A multitude of further connection options and gateway functions is created by an option interface, which can be pre-equipped ex factory, as well as the I/O level, which can optionally consist of either E-bus or K-bus terminals.

The CX5130 is characterised by low power consumption and fanless design.

Depending on the installed TwinCAT runtime environment, the CX5130 can be used for implementing PLC or PLC/Motion Control projects with or without visualisation. The execution of Motion Control applications with interpolating axis movements is also possible.

The extended operating temperature range from -25 to +60 °C enables the use in climatically demanding environments.

Like the CX5000, the CX5100 series has a compact design; a modular device with extension modules like in the CX2000 series is not available.

The order identifier is derived as follows:

CX5130-01ST

- 0 = no TwinCAT
- 1 = with TwinCAT 2 PLC runtime
- 2 = with TwinCAT 2 NC PTP runtime
- 3 = with TwinCAT 2 NC I runtime
- 5 = TwinCAT 3 runtime (XAR)

- 0 = no operating system
- 1 = operating system Windows Embedded Compact 7
- 2 = operating system Windows Embedded Standard 7 P 32 bit
- 3 = operating system Windows Embedded Standard 7 P 64 bit
- 4 = Windows 10 IoT Enterprise LTSB 32 bit
- 5 = Windows 10 IoT Enterprise LTSB 64 bit

Since not all combinations make sense, the table "Ordering information" contains a breakdown of the permissible combinations.

Optional interfaces:

CX5130-N020	=	audio interface
CX5130-N030	=	RS232, D-sub plug
CX5130-N031	=	RS422/RS485, D-sub socket
CX5130-M310	=	PROFIBUS master, D-sub socket, 9-pin
CX5130-B310	=	PROFIBUS slave, D-sub socket, 9-pin
CX5130-M510	=	CANopen master, D-sub plug, 9-pin
CX5130-B510	=	CANopen slave, D-sub plug, 9-pin
CX5130-M930	=	PROFINET RT, controller
CX5130-B930	=	PROFINET RT, device, Ethernet (2 x RJ45 switch)
CX5130-B931	=	PROFINET IRT, device, Ethernet (2 x RJ45 switch)
CX5130-B950	=	EtherNet/IP slave, Ethernet (2 x RJ45 switch)
CX5130-B110	=	EtherCAT slave, EtherCAT IN and OUT (2 x RJ45)

We reserve the right to make technical changes.

Technical data	CX5130
Processor	Intel® Atom™ E3827, 1.75 GHz
Number of cores	2
Flash memory	slot for CFast card and for microSD card, cards not included
Main memory	4 GB DDR3 RAM (not expandable)
Persistent memory	integrated 1-second UPS (1 MB on CFast card)
Interfaces	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 2.0, 1 x optional interface
Diagnostics LED	1 x power, 1 x TC status, 1 x flash access, 2 x bus status
Clock	internal battery-backed clock for time and date (battery exchangeable)
Operating system	Microsoft Windows Embedded Compact 7, Microsoft Windows Embedded Standard 7 P or Microsoft Windows 10 IoT Enterprise LTSB
Control software	TwinCAT 2 runtime | TwinCAT 3 runtime (XAR)
I/O connection	E-bus or K-bus, automatic recognition
Power supply	24 V DC (-15 %/+20 %)
Current supply E-bus/K-bus	2 A
Max. power loss	11 W (including the system interfaces)
Dimensions (W x H x D)	142 mm x 100 mm x 92 mm
Weight	approx. 960 g
Operating/storage temperature	-25…+60 °C/-40…+85 °C
Relative humidity	95 %, no condensation
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4
Protection class	IP 20
Approvals	CE, UL, Ex, IECEx
TC3 performance class	Performance (40); for further information on TwinCAT 3 see page 470
Further information	www.beckhoff.com/CX5130

Ordering information	no operating system	Windows Embedded Compact 7	Windows Embedded Standard 7 P 32 bit	Windows Embedded Standard 7 P 64 bit	Windows 10 IoT Enterprise LTSB 32 bit	Windows 10 IoT Enterprise LTSB 64 bit	no TwinCAT	TwinCAT 2 runtime PLC	TwinCAT 2 runtime NC PTP	TwinCAT 2 runtime NC I	TwinCAT 3 runtime (XAR)
CX5130-0100	x	–	–	–	–	–	x	–	–	–	–
CX5130-0110	–	x	–	–	–	–	x	–	–	–	–
CX5130-0111	–	x	–	–	–	–	–	x	–	–	–
CX5130-0112	–	x	–	–	–	–	–	–	x	–	–
CX5130-0113	–	x	–	–	–	–	–	–	–	x	–
CX5130-0115	–	x	–	–	–	–	–	–	–	–	x
CX5130-0120	–	–	x	–	–	–	x	–	–	–	–
CX5130-0121	–	–	x	–	–	–	–	x	–	–	–
CX5130-0122	–	–	x	–	–	–	–	–	x	–	–
CX5130-0123	–	–	x	–	–	–	–	–	–	x	–
CX5130-0125	–	–	x	–	–	–	–	–	–	–	x
CX5130-0130	–	–	–	x	–	–	x	–	–	–	–
CX5130-0135	–	–	–	x	–	–	–	–	–	–	x
CX5130-0140	–	–	–	–	x	–	x	–	–	–	–
CX5130-0141	–	–	–	–	x	–	–	x	–	–	–
CX5130-0142	–	–	–	–	x	–	–	–	x	–	–
CX5130-0143	–	–	–	–	x	–	–	–	–	x	–
CX5130-0150	–	–	–	–	–	x	x	–	–	–	–
CX5130-0155	–	–	–	–	–	x	–	–	–	–	x

Option	
CX2900-0107	Device modification for CX5120, CX5130, CX5140 and CX9020 Embedded PCs according to the requirements for ATEX and IECEx certification. The modification is mandatory for the usage of CX5120, CX5130, CX5140 and CX9020 in hazardous areas, Zone 2/22. It includes the modification and repositioning of the device label as well as a mounting bracket installed ex works for mechanical locking of the connectors. Product labeling: ATEX: II 3 G Ex nA IIC T4 Gc and II 3 D Ex tc IIIC T135 °C Dc; IECEx: Ex nA IIC T4 Gc and Ex tc IIIC T135 °C Dc Read the device documentation for use in hazardous areas carefully.

CX5140 | Embedded PC with Intel® Atom™ processor

The CX5140 has an Intel® Atom™ quad-core processor with a clock rate of 1.91 GHz. This makes genuine multi-core technology possible in the Embedded PC segment. The hardware interfaces in this new series are oriented and implemented identically to those of the existing CX5000 series. Two independent, Gigabit-capable Ethernet interfaces as well as four USB 2.0 and a DVI-I interface are available. A multitude of further connection options and gateway functions is created by an option interface, which can be pre-equipped ex factory, as well as the I/O level, which can optionally consist of either E-bus or K-bus terminals.

The CX5140 is characterised by low power consumption and fanless design.

Depending on the installed TwinCAT runtime environment, the CX5140 can be used for implementing PLC or PLC/Motion Control projects with or without visualisation. The execution of Motion Control applications with interpolating axis movements is also possible.

The extended operating temperature range from -25 to +60 °C enables the use in climatically demanding environments.

Like the CX5000, the CX5100 series has a compact design; a modular device with extension modules like in the CX2000 series is not available.

The order identifier is derived as follows:

CX5140-01ST

- 0 = no TwinCAT
- 1 = with TwinCAT 2 PLC runtime
- 2 = with TwinCAT 2 NC PTP runtime
- 3 = with TwinCAT 2 NC I runtime
- 5 = TwinCAT 3 runtime (XAR)

- 0 = no operating system
- 1 = operating system Windows Embedded Compact 7
- 2 = operating system Windows Embedded Standard 7 P 32 bit
- 3 = operating system Windows Embedded Standard 7 P 64 bit
- 4 = Windows 10 IoT Enterprise LTSB 32 bit
- 5 = Windows 10 IoT Enterprise LTSB 64 bit

Since not all combinations make sense, the table "Ordering information" contains a breakdown of the permissible combinations.

Optional interfaces:

CX5140-N020	=	audio interface
CX5140-N030	=	RS232, D-sub plug
CX5140-N031	=	RS422/RS485, D-sub socket
CX5140-M310	=	PROFIBUS master, D-sub socket, 9-pin
CX5140-B310	=	PROFIBUS slave, D-sub socket, 9-pin
CX5140-M510	=	CANopen master, D-sub plug, 9-pin
CX5140-B510	=	CANopen slave, D-sub plug, 9-pin
CX5140-M930	=	PROFINET RT, controller
CX5140-B930	=	PROFINET RT, device, Ethernet (2 x RJ45 switch)
CX5140-B931	=	PROFINET IRT, device, Ethernet (2 x RJ45 switch)
CX5140-B950	=	EtherNet/IP slave, Ethernet (2 x RJ45 switch)
CX5140-B110	=	EtherCAT slave, EtherCAT IN and OUT (2 x RJ45)

We reserve the right to make technical changes.

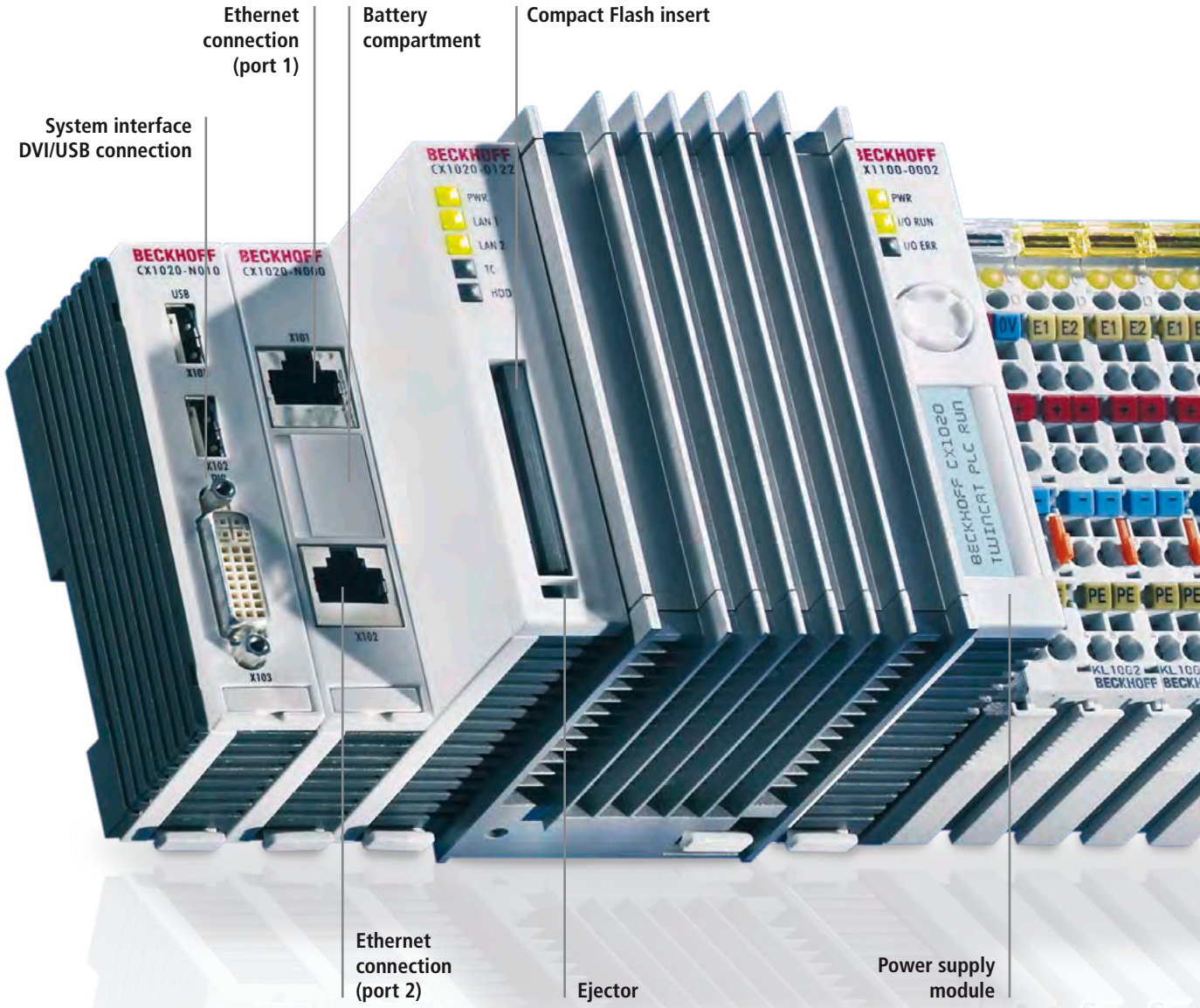
Technical data	CX5140
Processor	Intel® Atom™ E3845, 1.91 GHz
Number of cores	4
Flash memory	slot for CFast card and for microSD card, cards not included
Main memory	4 GB DDR3 RAM (not expandable)
Persistent memory	integrated 1-second UPS (1 MB on CFast card)
Interfaces	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 2.0, 1 x optional interface
Diagnostics LED	1 x power, 1 x TC status, 1 x flash access, 2 x bus status
Clock	internal battery-backed clock for time and date (battery exchangeable)
Operating system	Microsoft Windows Embedded Compact 7, Microsoft Windows Embedded Standard 7 P or Microsoft Windows 10 IoT Enterprise LTSB
Control software	TwinCAT 2 runtime | TwinCAT 3 runtime (XAR)
I/O connection	E-bus or K-bus, automatic recognition
Power supply	24 V DC (-15 %/+20 %)
Current supply E-bus/K-bus	2 A
Max. power loss	12 W (including the system interfaces)
Dimensions (W x H x D)	142 mm x 100 mm x 92 mm
Weight	approx. 960 g
Operating/storage temperature	-25…+60 °C/-40…+85 °C
Relative humidity	95 %, no condensation
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4
Protection class	IP 20
Approvals	CE, UL, Ex, IECEx
TC3 performance class	Performance plus (50); for further information on TwinCAT 3 see page 470
Further information	www.beckhoff.com/CX5140

Ordering information	no operating system	Windows Embedded Compact 7	Windows Embedded Standard 7 P 32 bit	Windows Embedded Standard 7 P 64 bit	Windows 10 IoT Enterprise LTSB 32 bit	Windows 10 IoT Enterprise LTSB 64 bit	no TwinCAT	TwinCAT 2 runtime PLC	TwinCAT 2 runtime NC PTP	TwinCAT 2 runtime NC I	TwinCAT 3 runtime (XAR)
CX5140-0100	x	–	–	–	–	–	x	–	–	–	–
CX5140-0110	–	x	–	–	–	–	x	–	–	–	–
CX5140-0111	–	x	–	–	–	–	–	x	–	–	–
CX5140-0112	–	x	–	–	–	–	–	–	x	–	–
CX5140-0113	–	x	–	–	–	–	–	–	–	x	–
CX5140-0115	–	x	–	–	–	–	–	–	–	–	x
CX5140-0120	–	–	x	–	–	–	x	–	–	–	–
CX5140-0121	–	–	x	–	–	–	–	x	–	–	–
CX5140-0122	–	–	x	–	–	–	–	–	x	–	–
CX5140-0123	–	–	x	–	–	–	–	–	–	x	–
CX5140-0125	–	–	x	–	–	–	–	–	–	–	x
CX5140-0130	–	–	–	x	–	–	x	–	–	–	–
CX5140-0135	–	–	–	x	–	–	–	–	–	–	x
CX5140-0140	–	–	–	–	x	–	x	–	–	–	–
CX5140-0141	–	–	–	–	x	–	–	x	–	–	–
CX5140-0142	–	–	–	–	x	–	–	–	x	–	–
CX5140-0143	–	–	–	–	x	–	–	–	–	x	–
CX5140-0150	–	–	–	–	–	x	x	–	–	–	–
CX5140-0155	–	–	–	–	–	x	–	–	–	–	x

Option	
CX2900-0107	Device modification for CX5120, CX5130, CX5140 and CX9020 Embedded PCs according to the requirements for ATEX and IECEx certification. The modification is mandatory for the usage of CX5120, CX5130, CX5140 and CX9020 in hazardous areas, Zone 2/22. It includes the modification and repositioning of the device label as well as a mounting bracket installed ex works for mechanical locking of the connectors. Product labeling: ATEX: II 3 G Ex nA IIC T4 Gc and II 3 D Ex tc IIIC T135 °C Dc; IECEx: Ex nA IIC T4 Gc and Ex tc IIIC T135 °C Dc Read the device documentation for use in hazardous areas carefully.

CX1020, CX1030 | Embedded PCs

▶ www.beckhoff.com/CX1020



We reserve the right to make technical changes.

CX1020

CX1030

The Embedded PCs CX1020 and CX1030 extend the CX product family by versions with higher CPU performance and enable the direct connection of Bus Terminals and EtherCAT Terminals. The CX1020 is equipped with a 1 GHz Intel® Celeron® M CPU. It is an energy-saving device that operates with ultra-low core voltage and features low thermal power dissipation of only 7 W TDP (thermal design power). As a result, no fan is required despite the compact design of the CX1020 Embedded PC. Since Compact Flash is used as boot and memory medium, no rotating media are required in the controller. This is an important aspect for increasing the MTBF (mean time between failures) of the overall system.

The CX1030 is equipped with a 1.8 GHz Intel® Pentium® M. Apart from the cartridge (which is required due to the higher performance) and the CPU, the CX1030 and CX1020 feature identical hardware and software. The high-quality fan is supported by dual ball bearings and mounted in a tray so that it can be replaced in the field without tools or wiring, if required. The fan speed is monitored and can be queried via software. The combination of CX1030, EtherCAT and TwinCAT enables very fast control processes in the sub-millisecond range (eXtreme Fast Control Technology).

The basic CPU modules are equipped with two RJ45 sockets and an integrated 3-port switch as standard.

The components

The modules of the CX series system are connected with each other via the standardised PC/104 bus (16 bit). The individual system components are modules with a width of 19 mm (single) or 38 mm (double) that can be arranged in series. The basic unit consists of a CPU module CX1020/CX1030 and a power supply module (CX1100-00xx).

The range of optional modules is complemented by fieldbus connections for PROFIBUS, CANopen, DeviceNet, SERCOS and Lightbus, both as master or slave versions.

Power supply unit with integrated I/O interface

The following types of 24 V DC power supply units are available:

– CX1100-0001: without I/O interface, CX1020 only
– CX1100-00x2: with terminal bus interface for Beckhoff Bus Terminals
– CX1100-00x3: with terminal bus interface for Beckhoff Bus Terminals and IP-Link interface for Beckhoff Fieldbus Box modules
– CX1100-00x4: with terminal bus interface for Beckhoff EtherCAT Terminals

All power supply variants have an illuminated, low-glare LC display with FSTN technology and two rows with 16 characters each for displaying status messages. The application programs can also use the display for displaying application-specific texts. 8 kB of non-volatile memory for remanent data are also included.

EtherCAT as a fast I/O system

The Embedded PCs CX1020 and CX1030 were developed for optimum interaction with EtherCAT.

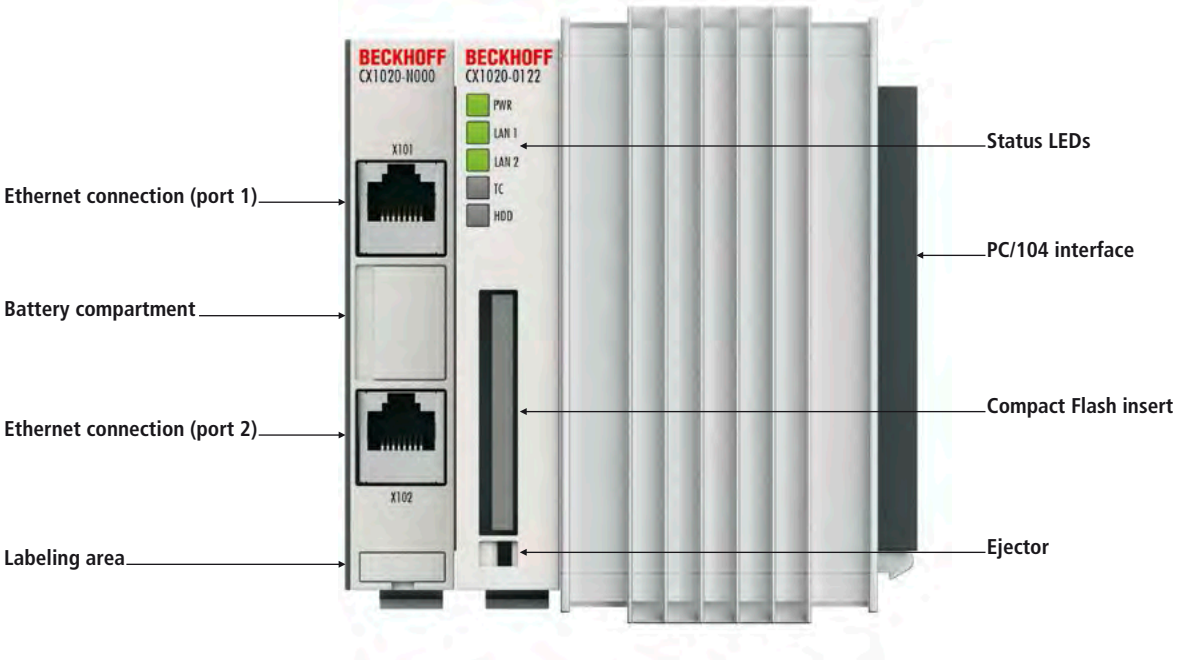
EtherCAT offers several options for connecting traditional fieldbus systems with the CX1020/CX1030: either as a CX1500 module directly at the CPU or as an EtherCAT device in terminal form. The PROFIBUS master is available either as a CX1500-M310 or as an EL6731 EtherCAT Terminal.

PLC, Motion Control, interpolation and visualisation

As a DIN rail IPC and in conjunction with the TwinCAT software from Beckhoff, the CX1020/CX1030 offers the same functionality as large Industrial PCs. In terms of PLC, up to four virtual IEC 61131 CPUs can be programmed with up to four tasks each, with a minimum cycle time of 50 µs. All IEC 61131-3 languages can be used.

Moreover, all TwinCAT functionalities are available for Motion Control applications: in theory, up to 256 axes can be controlled. In addition to simple point-to-point movements, more complex multi-axis functions such as electronic gearbox, cam plate and flying saw can be implemented. Thanks to the more powerful CPU, the CX1020 and CX1030 can also be used for interpolating 3D path movements and DIN 66025 programs.

In addition to real-time execution of control tasks, the TwinCAT real-time kernel ensures that enough time remains for the user interface (HMI) to communicate with the real-time components via software interfaces such as ADS or OPC.



CX1020 | Basic CPU module

The basic CX1020 CPU module has a 1 GHz Intel® CPU. The controller does not require a fan or other rotating components. In addition to the CPU and the chipset, the CX1020 module also contains the main memory, which is available in different sizes. The controller boots from the Compact Flash.

The basic configuration of the CX1020 includes a 128 MB Compact Flash card and two Ethernet RJ45 interfaces. These interfaces are connected to an internal switch and offer a simple option for creating a line topology without the need for additional Ethernet switches. All other CX family components can be connected via the PC/104 interface that is available on both sides. The passive cooling module is included in the scope of supply. The operating system can be Windows Embedded CE 6 or Windows Embedded Standard 2009. The TwinCAT 2 automation software transforms a CX1020 system into a powerful PLC and Motion Control system that can be operated with or without visualisation. In contrast to the CX1010, the CX1020 can also be used for interpolating axis movements with TwinCAT 2 NC I.

Further system interfaces or fieldbus connections can be added to the basic CPU module. The CPU module requires a CX1100 type power supply module. All CX1500 fieldbus modules and all CX1100 power supplies from the CX series can be used in combination with the CX1020.

The Embedded PC CX1020 is also available as the ordering option CX1900-0320 with zero second level cache. Instead of the 1 GHz processor with 512 kB second level cache (L2), a less expensive variant of the processor without a second level cache (L2 = 0 kB) is used. Since the CX1900-0320 has the same 855GME chipset as the CX1020, none of the basic characteristics of the CX1020 are changed, apart from the slightly lower CPU power.

The order identifier is derived as follows:

CX1020-0CST

- 0 = no TwinCAT
- 1 = with TwinCAT 2 PLC runtime
- 2 = with TwinCAT 2 PLC/NC PTP runtime
- 3 = with TwinCAT 2 PLC/NC I runtime

- 0 = no operating system
- 1 = operating system Windows Embedded CE 6
- 2 = operating system Windows Embedded Standard 2009

- 0 = CPU with 2 Ethernet ports
- 1 = CPU with 2 Ethernet ports + 2 x USB + DVI

Since not all combinations make sense, the table "Ordering information" contains a breakdown of the permissible combinations.

Embedded PC interfaces for CX10x0
see page 238

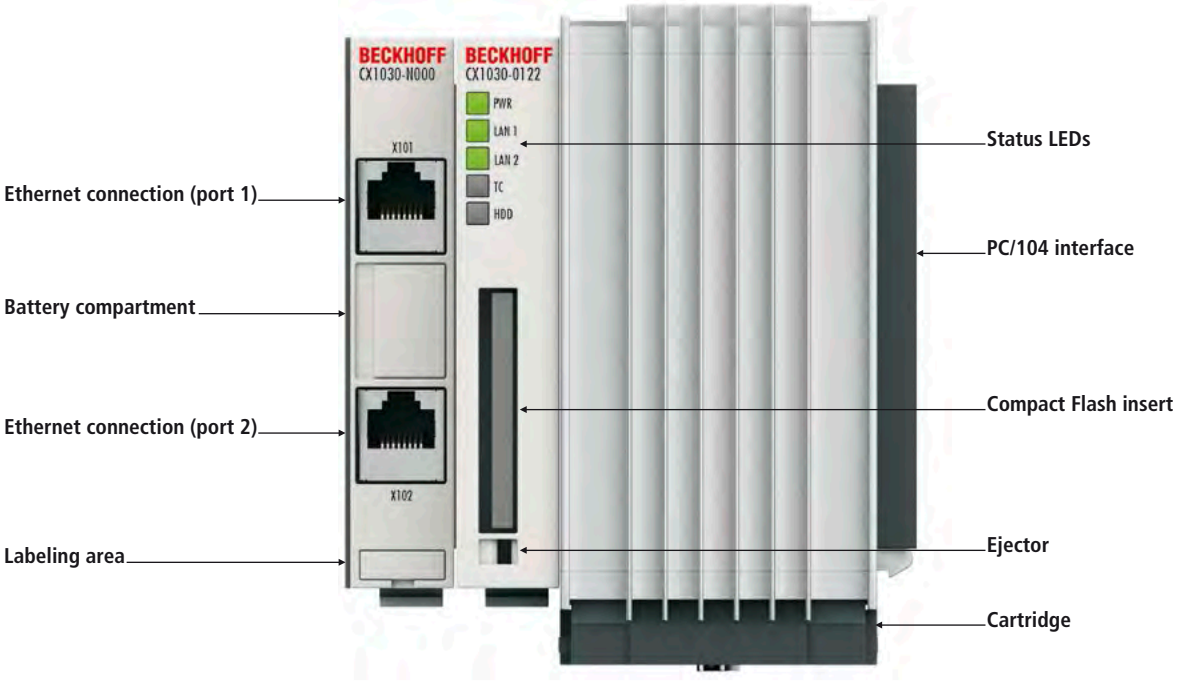
We reserve the right to make technical changes.

Technical data	CX1020-0xxx
Processor	Intel® Celeron® M ULV, 1 GHz clock frequency
Flash memory	slot for Compact Flash card, 128 MB included (expandable)
Main memory	256 MB DDR RAM (expandable ex factory to 1 GB)
Interfaces	2 x RJ45 10/100 Mbit/s (internal switch)
Diagnostics LED	1 x power, 2 x LAN link/activity, TC status, 1 x flash access
Expansion slot	1 x Compact Flash type I+II insert with eject mechanism
Clock	internal battery-backed clock for time and date (battery exchangeable)
Operating system	Microsoft Windows Embedded CE 6 or Microsoft Windows Embedded Standard 2009
Control software	TwinCAT 2 PLC runtime, NC PTP runtime, NC I runtime
System bus	16 bit ISA (PC/104)
I/O connection	via power supply module (E-bus, K-bus, K-bus/IP-Link)
Power supply	via system bus (through CX1100-xxxx power supply modules)
Max. power loss	11 W (including CX1020-N0xx system interfaces)
Dimensions (W x H x D)	96 mm x 112 mm x 99 mm
Weight	approx. 550 g
Operating/storage temperature	0…+50 °C/-25…+85 °C
Relative humidity	95 %, no condensation
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4
Protection class	IP 20
Approvals	CE, UL
Further information	www.beckhoff.com/CX1020

Ordering information	DVI/USB	no operating system	Windows Embedded CE 6	Windows Embedded Standard 2009	no TwinCAT	TwinCAT 2 PLC runtime	TwinCAT 2 NC PTP runtime	TwinCAT 2 NC I runtime
CX1020-0000	–	x	–	–	x	–	–	–
CX1020-0010	–	–	x	–	x	–	–	–
CX1020-0011	–	–	x	–	–	x	–	–
CX1020-0012	–	–	x	–	–	x	x	–
CX1020-0013	–	–	x	–	–	x	x	x
CX1020-0100	x	x	–	–	x	–	–	–
CX1020-0110	x	–	x	–	x	–	–	–
CX1020-0111	x	–	x	–	–	x	–	–
CX1020-0112	x	–	x	–	–	x	x	–
CX1020-0113	x	–	x	–	–	x	x	x
CX1020-0020	–	–	–	x*	x	–	–	–
CX1020-0021	–	–	–	x*	–	x	–	–
CX1020-0022	–	–	–	x*	–	x	x	–
CX1020-0023	–	–	–	x*	–	x	x	x
CX1020-0120	x	–	–	x*	x	–	–	–
CX1020-0121	x	–	–	x*	–	x	–	–
CX1020-0122	x	–	–	x*	–	x	x	–
CX1020-0123	x	–	–	x*	–	x	x	x

Options	
CX1900-0320	option for basic CPU module: Intel® Celeron® M processor 1 GHz, zero second level cache
CX1900-0120	"Active cooling": factory conversion of the CX1020 CPU module for active cooling in order to enable flexible installation positions (see documentation). Active cooling takes place via a fan cartridge. This option requires the use of a power supply unit type CX1100-001x.

*CX1020 systems with Microsoft Embedded Standard require Compact Flash with a capacity of at least 2 GB (must be ordered separately).



CX1030 | Basic CPU module

The CX1030 basic CPU module offers Intel® Pentium® M power on the DIN rail. The CX1030 has a 1.8 GHz Intel® Pentium® M CPU. The CPU is cooled via the cooling module and an easily exchangeable fan cartridge located on the underside of the housing. The fan speed can be read via software and can therefore be monitored.

In addition to the CPU and the chipset, the CX1030 module also contains the RAM, which is available in different sizes. The controller boots from the Compact Flash. The basic configuration of the CX1030 includes a 128 MB Compact Flash card and two Ethernet RJ45 interfaces. These are connected to an internal switch and offer a simple option for creating a line topology without the need for additional Ethernet Switches. All other CX family components can be connected via the PC/104 interface that is available on both sides. The passive cooling module is included in the scope of supply.

The operating system can be Windows Embedded CE 6 or Windows Embedded Standard 2009. The TwinCAT 2 automation software transforms a CX1030 system into a powerful PLC and Motion Control system that can be used with or without visualisation. In contrast to the CX1010, the CX1030 can also be used for interpolating axis movements with TwinCAT 2 NC I.

Further system interfaces or fieldbus connections can be added to the basic CPU module. The CPU module requires a CX1100-001x type power supply module. All CX1500 fieldbus modules and all CX1100-001x power supply units from the CX series can be used in combination with the CX1030.

The order identifier is derived as follows:

CX1030-0CST

- **0 = no TwinCAT**
- **1 = with TwinCAT 2 PLC runtime**
- **2 = with TwinCAT 2 PLC/NC PTP runtime**
- **3 = with TwinCAT 2 PLC/NC I runtime**

- **0 = no operating system**
- **1 = operating system Windows Embedded CE 6**
- **2 = operating system Windows Embedded Standard 2009**

- **0 = CPU with 2 Ethernet ports**
- **1 = CPU with 2 Ethernet ports + 2 x USB + DVI**

Since not all combinations make sense, the table "Ordering information" contains a breakdown of the permissible combinations.

Embedded PC interfaces for CX10x0
see page 238

We reserve the right to make technical changes.

Technical data	CX1030-0xxx
Processor	Intel® Pentium® M, 1.8 GHz clock frequency
Flash memory	slot for Compact Flash card, 128 MB included (expandable)
Main memory	256 MB DDR RAM (expandable ex factory to 1 GB)
Interfaces	2 x RJ45 10/100 Mbit/s (internal switch)
Cooling	cooling module + fan cartridge featuring speed control with double ball bearing fans, easily replaceable
Diagnostics LED	1 x power, 2 x LAN link/activity, TC status, 1 x flash access
Expansion slot	1 x Compact Flash type I+II insert with eject mechanism
Clock	internal battery-backed clock for time and date (battery exchangeable)
Operating system	Microsoft Windows Embedded CE 6 or Microsoft Windows Embedded Standard 2009
Control software	TwinCAT 2 PLC runtime, NC PTP runtime, NC I runtime
System bus	16 bit ISA (PC/104)
I/O connection	via power supply module (E-bus, K-bus, K-bus/IP-Link)
Power supply	via system bus (through CX1100-0012 [K-bus], CX1100-0013 [K-bus, IP-Link], CX1100-014 [E-bus] power supply module)
Max. power loss	32 W (including CX1030-N0xx system interfaces)
Dimensions (W x H x D)	96 mm x 112 mm x 99 mm
Weight	approx. 580 g
Operating/storage temperature	0…+50 °C/-25…+85 °C
Relative humidity	95 %, no condensation
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4
Protection class	IP 20
Approvals	CE, UL
Further information	www.beckhoff.com/CX1030

Ordering information	DVI/USB	no operating system	Windows Embedded CE 6	Windows Embedded Standard 2009	no TwinCAT	TwinCAT 2 PLC runtime	TwinCAT 2 NC PTP runtime	TwinCAT 2 NC I runtime
CX1030-0000	–	x	–	–	x	–	–	–
CX1030-0010	–	–	x	–	x	–	–	–
CX1030-0011	–	–	x	–	–	x	–	–
CX1030-0012	–	–	x	–	–	x	x	–
CX1030-0013	–	–	x	–	–	x	x	x
CX1030-0100	x	x	–	–	x	–	–	–
CX1030-0110	x	–	x	–	x	–	–	–
CX1030-0111	x	–	x	–	–	x	–	–
CX1030-0112	x	–	x	–	–	x	x	–
CX1030-0113	x	–	x	–	–	x	x	x
CX1030-0020	–	–	–	x*	x	–	–	–
CX1030-0021	–	–	–	x*	–	x	–	–
CX1030-0022	–	–	–	x*	–	x	x	–
CX1030-0023	–	–	–	x*	–	x	x	x
CX1030-0120	x	–	–	x*	x	–	–	–
CX1030-0121	x	–	–	x*	–	x	–	–
CX1030-0122	x	–	–	x*	–	x	x	–
CX1030-0123	x	–	–	x*	–	x	x	x

*CX1030 systems with Microsoft Embedded Standard 2009 require Compact Flash with a capacity of at least 2 GB (must be ordered separately).

DVI/USB interface

Audio interface

RS232 interface

RS422/RS485 interface

Ethernet interface

CX1020-N0xx | System interfaces

A number of optional interface modules are available for the basic CX1020 CPU module that can be installed ex factory. The CX1020-N010 option connects Beckhoff Control Panels or standard monitors with DVI or VGA input via the DVI or USB interfaces. Devices such as a printer, scanner, mouse, keyboard, mass storage, etc. can be connected via the USB 2.0 interfaces. Multimedia capability is realised via the CX1020-N020 audio interface. The modules CX1020-N030 and CX1020-N040 offer a total of four serial RS232 interfaces with a maximum transfer speed of 115 kbaud. These four interfaces can be implemented in pairs as RS422/RS485, in which case they are identified as CX1020-N031 and CX1020-N041 respectively. The system interfaces cannot be retrofitted or expanded in the field. They are supplied ex factory in the specified configuration and cannot be separated from the CPU module. The internal PC/104 bus runs through the system interfaces, so that further CX components can be connected. The power supply of the system interface modules is ensured via the internal PC/104 bus.

Technical data	CX1020-N010	CX1020-N020	CX1020-N030	CX1020-N040	CX1020-N031	CX1020-N041	CX1020-N060
Interfaces	1 x DVI + 2 x USB 2.0 (max. 500 mA per port)	Line IN, Line Mic IN, Line OUT	1 x COM1 + 1 x COM2, RS232	1 x COM3 + 1 x COM4, RS232	1 x COM1 + 1 x COM2, RS422/RS485	1 x COM3 + 1 x COM4, RS422/RS485	1 x Ethernet, 10/100 Mbit/s
Type of connection	DVI-I 29-pin socket + 2 USB ports type A	3.5 mm socket for jack plug	2 x D-sub plug, 9-pin	2 x D-sub plug, 9-pin	2 x D-sub socket, 9-pin	2 x D-sub socket, 9-pin	1 x RJ45
Properties	DVI-I interface also carries out VGA signals (DVI-A)	built-in PC beeper, Line OUT output, max. 200 mW, suitable for earphones	max. baud rate 115 kbaud, not combinable with N031/ N041	max. baud rate 115 kbaud, not combinable with N031/ N041	max. baud rate 115 kbaud, not combinable with N030/ N040	max. baud rate 115 kbaud, not combinable with N030/ N040	max. 20 m cable length Cat. 5, not combinable with CX1100-0004
Power supply	via system bus (through CX1100-xxxx power supply modules)						
Dimensions (W x H x D)	19 mm x 100 mm x 51 mm						
Weight	approx. 80 g						
Operating/storage temperature	0…+55 °C/-25…+85 °C						
Relative humidity	95 %, no condensation						
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27						
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4						
Protection class	IP 20						
Approvals	CE, UL						
Further information	www.beckhoff.com/CX1020-N010	www.beckhoff.com/CX1020-N020	www.beckhoff.com/CX1020-N030	www.beckhoff.com/CX1020-N040	www.beckhoff.com/CX1020-N031	www.beckhoff.com/CX1020-N041	www.beckhoff.com/CX1020-N060

We reserve the right to make technical changes.

DVI/USB interface

Audio interface

RS232 interface

RS422/RS485 interface

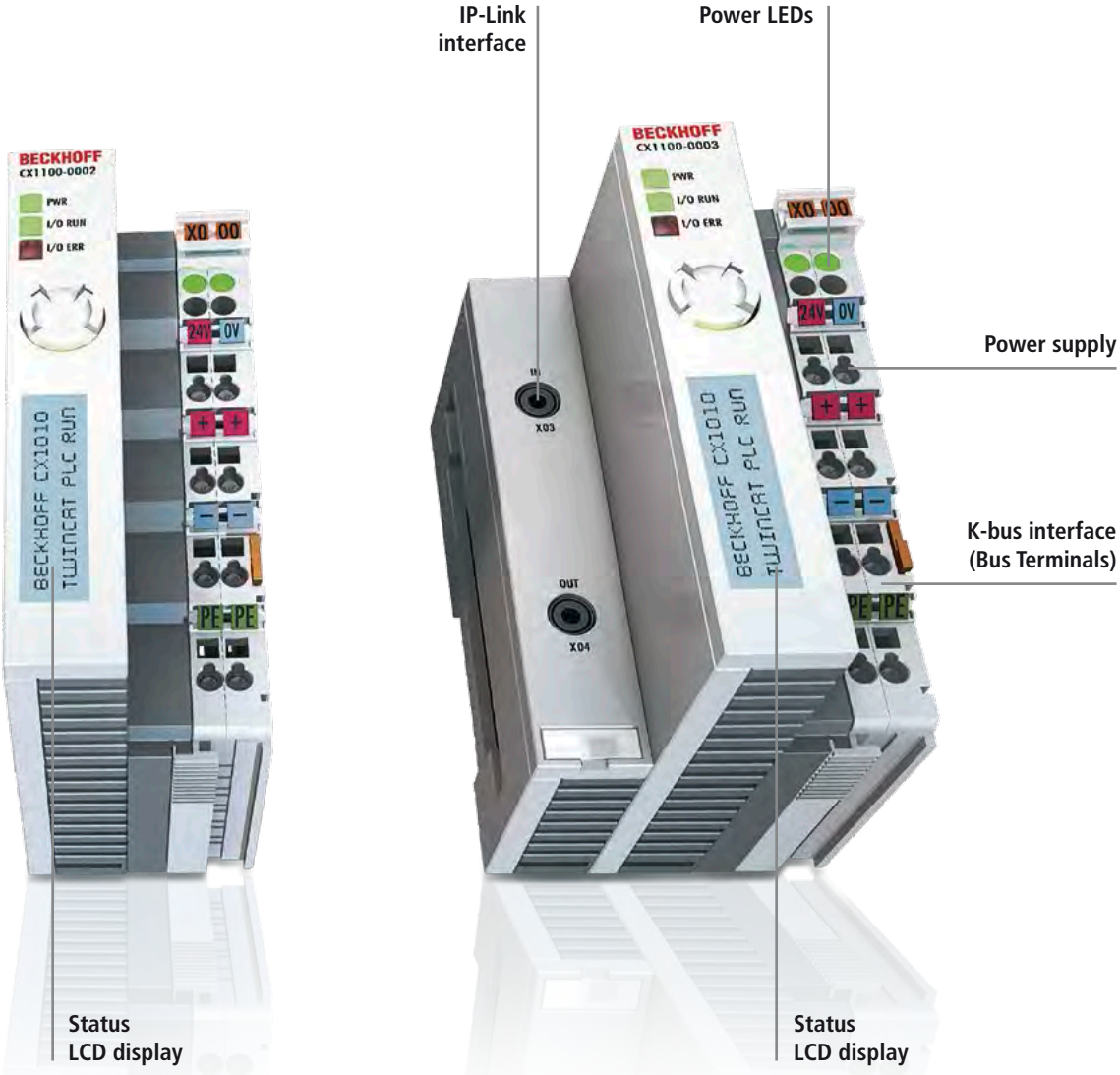
Ethernet interface

CX1030-N0xx | System interfaces

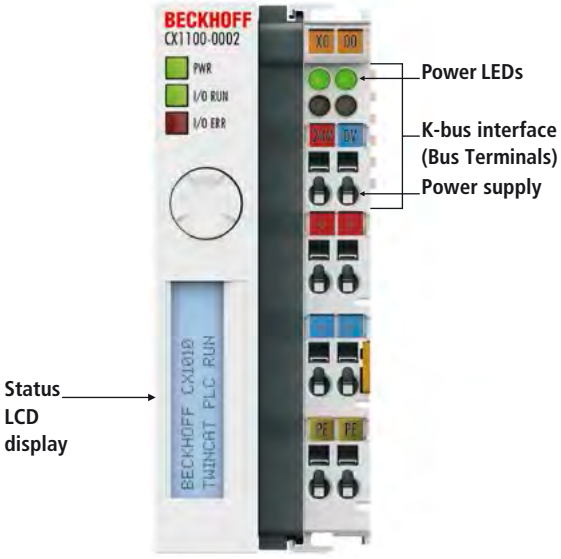
A number of optional interface modules are available for the basic CX1030 CPU module that can be installed ex factory. The CX1030-N010 option connects Beckhoff Control Panels or standard monitors with DVI or VGA input via the DVI or USB interfaces. Devices such as a printer, scanner, mouse, keyboard, mass storage, etc. can be connected via the USB 2.0 interfaces. Multimedia capability is realised via the CX1030-N020 audio interface. The modules CX1030-N030 and CX1030-N040 offer a total of four serial RS232 interfaces with a maximum transfer speed of 115 kbaud. These four interfaces can be implemented in pairs as RS422/RS485, in which case they are identified as CX1030-N031 and CX1030-N041 respectively. The system interfaces cannot be retrofitted or expanded in the field. They are supplied ex factory in the specified configuration and cannot be separated from the CPU module. The internal PC/104 bus runs through the system interfaces, so that further CX components can be connected. The power supply of the system interface modules is ensured via the internal PC/104 bus.

Technical data	CX1030-N010	CX1030-N020	CX1030-N030	CX1030-N040	CX1030-N031	CX1030-N041	CX1030-N060
Interfaces	1 x DVI + 2 x USB 2.0 (max. 500 mA per port)	Line IN, Line Mic IN, Line OUT	1 x COM1 + 1 x COM2, RS232	1 x COM3 + 1 x COM4, RS232	1 x COM1 + 1 x COM2, RS422/RS485	1 x COM3 + 1 x COM4, RS422/RS485	1 x Ethernet, 10/100 Mbit/s
Type of connection	DVI-I 29-pin socket + 2 USB ports type A	3.5 mm socket for jack plug	2 x D-sub plug, 9-pin	2 x D-sub plug, 9-pin	2 x D-sub plug, 9-pin	2 x D-sub plug, 9-pin	1 x RJ45
Properties	DVI-I interface also carries out VGA signals (DVI-A)	built-in PC beeper, Line OUT output, max. 200 mW, suitable for earphones	max. baud rate 115 kbaud, not combinable with N031/ N041	max. baud rate 115 kbaud, not combinable with N031/ N041	max. baud rate 115 kbaud, not combinable with N030/ N040	max. baud rate 115 kbaud, not combinable with N030/ N040	max. 20 m cable length Cat. 5, not combinable with CX1100-0004
Power supply	via system bus (through CX1100-xxxx power supply modules)						
Dimensions (W x H x D)	19 mm x 100 mm x 51 mm						
Weight	approx. 80 g						
Operating/storage temperature	0…+55 °C/-25…+85 °C						
Relative humidity	95 %, no condensation						
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27						
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4						
Protection class	IP 20						
Approvals	CE, UL						
Further information	www.beckhoff.com/CX1030-N010	www.beckhoff.com/CX1030-N020	www.beckhoff.com/CX1030-N030	www.beckhoff.com/CX1030-N040	www.beckhoff.com/CX1030-N031	www.beckhoff.com/CX1030-N041	www.beckhoff.com/CX1030-N060

CX1100-, CX1500-xxxx | Embedded PC interfaces for CX10xx



We reserve the right to make technical changes.



Power supply
with K-bus interface

Power supply
with E-bus interface

Power supply

Power supply
with K-bus/IP-Link interface

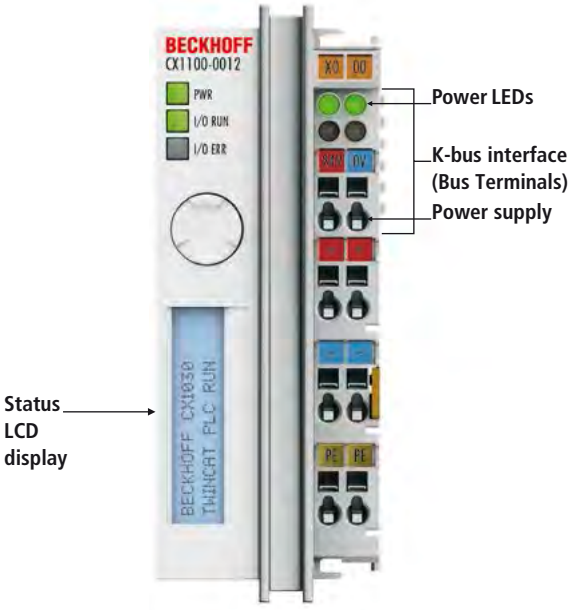
CX1100-000x | Power supply units and I/O interfaces for CX1010/CX1020

Four power supplies are optionally available for CX1010/CX1020 systems; all other system components are powered via the internal PC/104 bus. Each CX1100-000x power supply module contains an integrated NOVRAM for the non-volatile storage of process data and an LC display (two lines of 16 characters). The CX1100-0002 version is suitable for the direct connection of Beckhoff Bus Terminals (KLxxxx); the Extension Box modules (IExxxx) from the Fieldbus Box range can be connected to the CX1100-0003 in addition to the Bus Terminals. The CX1100-0004 power supply unit is available for the connection of EtherCAT Terminals (ELxxxx). All power supply units for the CX1100-000x system can be exchanged in the field.

Technical data	CX1100-0002	CX1100-0004	CX1100-0001	CX1100-0003
Power supply	24 V DC (-15 %/+20 %)			
E-bus connection	–	yes (adapter terminal)	–	–
K-bus connection	yes (adapter terminal)	–	–	yes (adapter terminal)
IP-Link connection	–	–	–	yes
Current supply E-bus	–	2 A	–	–
Current supply K-bus	up to max. 1.75 A	–	–	1.75 A
Type of connection	spring-loaded technique (adapter terminal)	spring-loaded technique (adapter terminal)	1 x open style connector, 5-pin	spring-loaded technique (adapter terminal)
NOVRAM	8 kbytes			
Display	FSTN display 2 lines x 16 characters of text, illuminated			
I/O-DPRAM	4 kbytes	–	–	4 kbytes
Diagnostics LED	1 x PWR, 1 x I/O Run, 1 x I/O Err	1 x PWR, 1 x L/A, 1 x Run	1 x PWR	1 x PWR, 1 x I/O Run, 1 x I/O Err
Max. power consumption	3.5 W	3.5 W	2.5 W	4 W
Dimensions (W x H x D)	40 mm x 100 mm x 91 mm	40 mm x 100 mm x 91 mm	45 mm x 100 mm x 91 mm	58 mm x 100 mm x 91 mm
Weight	approx. 250 g	approx. 250 g	approx. 180 g	approx. 350 g
Operating/storage temperature	0…+55 °C/-25…+85 °C			
Relative humidity	95 %, no condensation			
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27			
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4			
Protection class	IP 20			
Approvals	CE, UL			
Further information	www.beckhoff.com/CX1100-0002	www.beckhoff.com/CX1100-0004	www.beckhoff.com/CX1100-0001	www.beckhoff.com/CX1100-0003

EtherCAT Terminals see page 2 110, Bus Terminals see page 2 442, Fieldbus Box modules see page 2 576

We reserve the right to make technical changes.



Power supply
with K-bus interface

Power supply
with E-bus interface

Power supply
with K-bus/IP-Link interface

CX1100-001x | Power supply units and I/O interfaces for CX1030

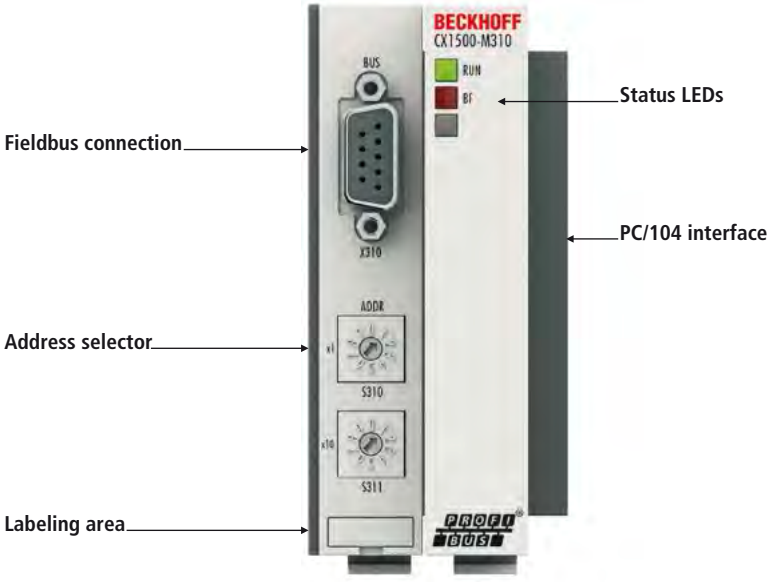
Three power supplies are optionally available for CX1030 systems; all other system components are powered via the internal PC/104 bus. Each CX1100-001x power supply module contains an integrated NOVRAM for the non-volatile storage of process data and an LC display (two lines of 16 characters). The CX1100-0012 version is suitable for the direct connection of Beckhoff Bus Terminals (KLxxxx); the Extension Box modules (IExxxx) from the Fieldbus Box range can be connected to the CX1100-0013 in addition to the Bus Terminals. The CX1100-0014 power supply unit is available for EtherCAT Terminals (ELxxxx). The power supply units of the CX system can be changed in the field.

The CX1100-001x power supply units are electronically identical to the CX1100-000x series, but have an internal heat sink and additional ventilation slits. The CX1100-001x series is suitable for non-standard assembly directions, even when using a CX1020 or a CX1010 (see documentation).

Technical data	CX1100-0012	CX1100-0014	CX1100-0013
Power supply	24 V DC (-15 %/+20 %)		
E-bus connection	–	yes (adapter terminal)	–
K-bus connection	yes (adapter terminal)	–	yes (adapter terminal)
IP-Link connection	–	–	yes
Current supply E-bus	–	2 A	–
Current supply K-bus	up to max. 1.75 A	–	2 A
Type of connection	spring-loaded technique (adapter terminal)		
NOVRAM	8 kbytes		
Display	FSTN display 2 lines x 16 characters of text, illuminated		
I/O-DPRAM	4 kbytes	–	4 kbytes
Diagnostics LED	1 x PWR, 1 x I/O Run, 1 x I/O Err	1 x PWR, 1 x L/A, 1 x Run	1 x PWR, 1 x I/O Run, 1 x I/O Err
Dimensions (W x H x D)	42 mm x 109 mm x 92 mm	42 mm x 109 mm x 92 mm	58 mm x 109 mm x 92 mm
Weight	approx. 240 g	approx. 235 g	approx. 325 g
Operating/storage temperature	0…+55 °C/-25…+85 °C		
Relative humidity	95 %, no condensation		
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27		
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4		
Protection class	IP 20		
Approvals	CE, UL		
Further information	www.beckhoff.com/CX1100-0012	www.beckhoff.com/CX1100-0014	www.beckhoff.com/CX1100-0013

EtherCAT Terminals see page 2 110, Bus Terminals see page 2 442, Fieldbus Box modules see page 2 576

We reserve the right to make technical changes.



Lightbus master

CANopen master

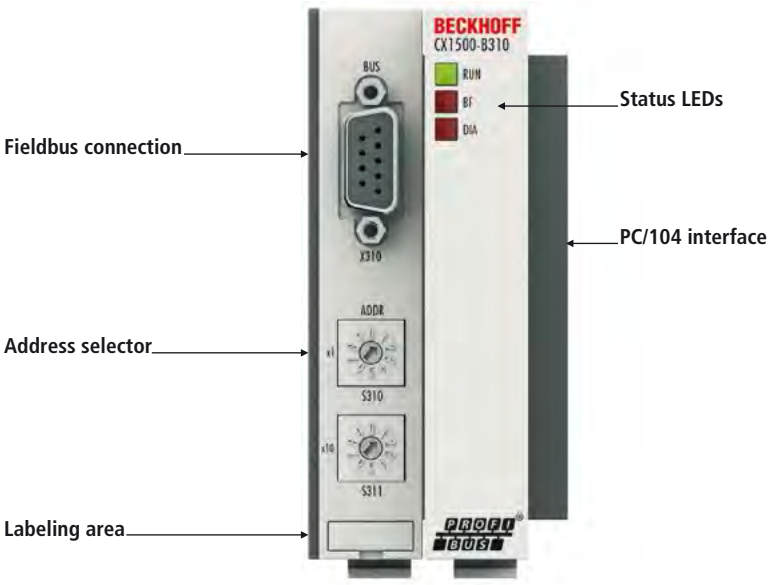
DeviceNet master

SERCOS II master

CX1500-Mxxx | Master fieldbus connections for CX10x0

The fieldbus master modules enable the segment-like construction of control structures in extensive plants and machines. The parallel operation of several identical or different masters is possible, e.g. two PROFIBUS masters or a PROFIBUS master and a SERCOS II master simultaneously in a system. In the case of mixed operation of master and slave connections, CX systems act as intelligent gateways between different fieldbuses: data are received, processed and fed into other fieldbuses. Compared with the PC Fieldbus Cards, the performance data of the fieldbus master modules are almost identical; CX variants are single-channel, however. Master or slave connections network several CX systems with one another strictly deterministically via the fieldbus level. CX fieldbus modules can be retrofitted/exchanged by adding them to existing CX systems. The fieldbus connections are powered via the PC/104 bus. The scanning and recognising of the modules, the parameterisation, the configuration of the connected I/O components and the online diagnosis of the process/fieldbus status take place in the TwinCAT System Manager.

Technical data	CX1500-M200	CX1500-M310	CX1500-M510	CX1500-M520	CX1500-M750
Fieldbus	Lightbus	PROFIBUS DP, DP-V1, DP-V2 (MC)	CANopen	DeviceNet	SERCOS II
Data transfer rates	2.5 Mbaud, 32 bit of process data in 25 µs	9.6 kbaud… 12 Mbaud	10, 20, 50, 100, 125, 250, 500, 800, 1000 kbaud	125, 250, 500 kbaud	2, 4, 8, 16 Mbaud
Bus interface	2 x fibre optic	1 x D-sub socket, 9-pin	open style connector, 5-pin	open style connector, 5-pin	FSMA standard, IEC 872-2
Bus device	max. 254 nodes with a max. of 65,280 I/O points	max. 125 slaves with up to 244 bytes data per slave	max. 127 slaves	max. 63 slaves	max. 254 slaves
Interface to the CPU	ISA plug and play, 2 kbyte DPRAM				
Max. power loss	2 W	1.8 W	1.8 W	1.8 W	1.3 W
Dimensions (W x H x D)	38 mm x 100 mm x 91 mm				
Weight	approx. 190 g				
Operating/storage temperature	0…+55 °C/-25…+85 °C				
Relative humidity	95 %, no condensation				
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27				
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4				
Driver	only compatible with TwinCAT 2	for TwinCAT 2/ TwinCAT 3	for TwinCAT 2/ TwinCAT 3	for TwinCAT 2/ TwinCAT 3	for TwinCAT 2/ TwinCAT 3
Protection class	IP 20				
Approvals	CE, UL				
Further information	www.beckhoff.com/ CX1500-M200	www.beckhoff.com/ CX1500-M310	www.beckhoff.com/ CX1500-M510	www.beckhoff.com/ CX1500-M520	www.beckhoff.com/ CX1500-M750



PROFIBUS slave

Lightbus slave

CANopen slave

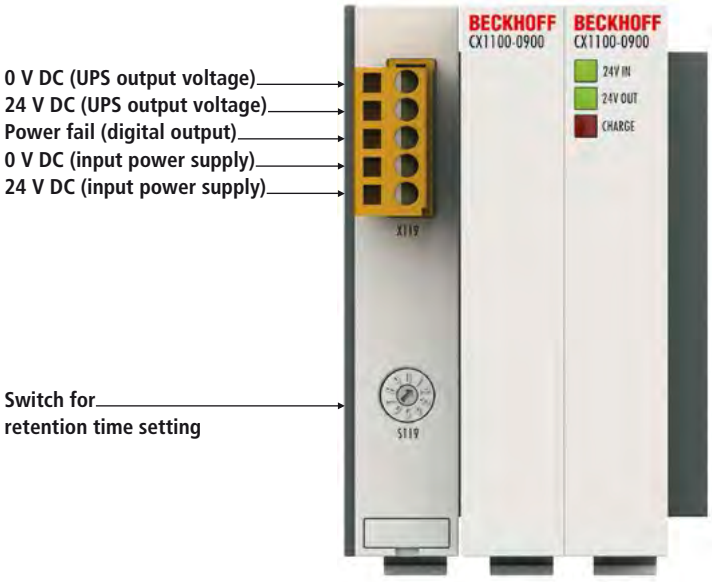
DeviceNet slave

CX1500-Bxxx | Slave fieldbus connections for CX10x0

Fieldbus slave modules enable the use of a CX system as a subordinate local controller for the construction of complex or modular systems. External process data are received from the master and processed, or data from its own process peripherals are returned to the master controller directly or processed. The interface between the respective bus system and the CX CPU module is the DPRAM, which is addressed by the CPU module via the internal ISA bus. The parallel operation of several identical or different slave connections is possible, e.g. two PROFIBUS slaves or a PROFIBUS slave and a SERCOS slave simultaneously in a system. In the case of mixed operation of master and slave connections, CX systems act as intelligent gateways between different fieldbuses: data are received, processed and fed into other fieldbuses. The CX fieldbus modules are single-channel. Master or slave connections network several CX systems with one another strictly deterministically via the fieldbus level. CX fieldbus modules can be retrofitted/exchanged by adding them to existing CX systems. The fieldbus connections are powered via the PC/104 bus. The integration of the fieldbus connections in TwinCAT automation software is simple, as usual. The scanning and recognising of the modules, the parameterisation, the configuration of the connected I/O components and the online diagnosis of the process/fieldbus status take place in the TwinCAT System Manager.

Technical data	CX1500-B200	CX1500-B310	CX1500-B510	CX1500-B520
Fieldbus	Lightbus	PROFIBUS DP, DP-V1, DP-V2 (MC)	CANopen	DeviceNet
Data transfer rates	2.5 Mbaud, 32 bit of process data in 25 µs	9.6 kbaud…12 Mbaud	10, 20, 50, 100, 125, 250, 500, 800, 1000 kbaud	125, 250, 500 kbaud
Bus interface	2 x fibre optic	1 x D-sub socket, 9-pin	open style connector, 5-pin	open style connector, 5-pin
Bus device	max. 255 slaves	max. 125 slaves	max. 127 slaves	max. 63 slaves
Max. number of bytes	max. 512 byte input/ 512 byte output	max. 244 byte input/ 244 byte output	max. 1536 byte input/ 1536 byte output	max. 255 byte input/ 255 byte output
Max. power loss	1.8 W			
Dimensions (W x H x D)	38 mm x 100 mm x 91 mm			
Weight	approx. 190 g			
Operating/storage temperature	0…+55 °C/-25…+85 °C			
Relative humidity	95 %, no condensation			
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27			
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4			
Driver	only compatible with TwinCAT 2	for TwinCAT 2/ TwinCAT 3	for TwinCAT 2/ TwinCAT 3	for TwinCAT 2/ TwinCAT 3
Protection class	IP 20			
Approvals	CE, UL			
Further information	www.beckhoff.com/ CX1500-B200	www.beckhoff.com/ CX1500-B310	www.beckhoff.com/ CX1500-B510	www.beckhoff.com/ CX1500-B520

We reserve the right to make technical changes.



UPS CX1100-0900

UPS CX1100-0910

UPS CX1100-0920, CX1100-0930

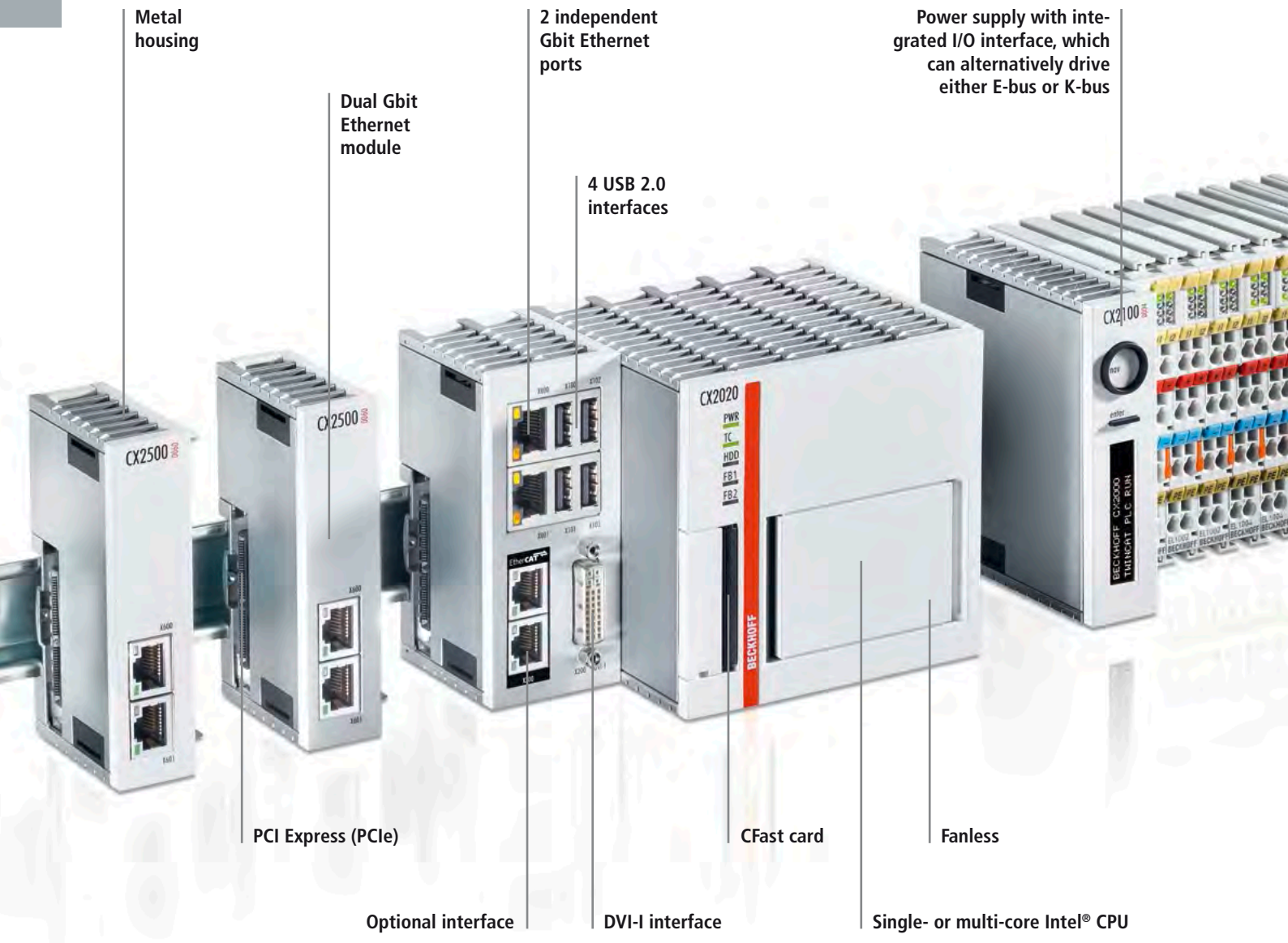
CX1100-09x0 | UPS modules for CX10x0

The CX1100-09x0 UPS module (uninterruptible power supply) for CX CPUs and the connected CX components ensures that important data are stored safely by the user software if the external voltage fails. As opposed to other battery operated methods, the use of the latest capacitor technologies enables absolute freedom from maintenance and fast charging. By storing the data, for example on a Compact Flash card, in NOVRAM or via the network in a database, the machine or the process can be placed in a defined condition during the retention time of the UPS and the operating system can be shut down. The retention time can be set via a rotary switch or via software. UPS settings are made and its status messages are output via a DPRAM interface. The functionality of the UPS is therefore independent of the operating system to be used. No driver software is required. The TwinCAT System Manager recognises the UPS module automatically, and the signals are available to the PLC programmer. The module is installed by simply adding it to a CX system in addition to wiring a 24 V DC supply line, and it can also be retrofitted on site. The 24 V DC output voltage of the UPS is protected against short circuit and overload. When dimensioning the UPS, the power consumption of the CX device being powered must be considered. For the supply, a regulated 24 V DC power supply unit with an output current of at least 4 A is required. The CX1100-0920 UPS is recommended for UPS use with a CX1020 and the CX1100-0930 UPS for use with a CX1030.

Technical data	CX1100-0900	CX1100-0910	CX1100-0920	CX1100-0930
Power supply	24 V DC (-15 %/+20 %)			
Storage technology	capacitive			
Capacity	20 As	20 As	40 As	40 As
Retention time	adjustable, load-dependent			
Max. output current	550 mA (24 V DC)	1.1 A (24 V DC)	1.1 A (24 V DC)	2.0 A (24 V DC)
Charging current	max. 4 A			
Diagnostics LED	24 V DC input, 24 V DC output, Charge			
Interface to the CPU	16 bit ISA (PC/104 standard)			
Max. power loss	2 W			
Dimensions (W x H x D)	57 mm x 100 mm x 91 mm	76 mm x 100 mm x 91 mm	95 mm x 100 mm x 91 mm	95 mm x 100 mm x 91 mm
Weight	approx. 346 g	approx. 465 g	approx. 617 g	approx. 650 g
Operating/storage temperature	0…+55 °C/-25…+85 °C			
Relative humidity	95 %, no condensation			
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27			
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4			
Protection class	IP 20			
Approvals	CE, UL			
Further information	www.beckhoff.com/CX1100-0900	www.beckhoff.com/CX1100-0910	www.beckhoff.com/CX1100-0920	www.beckhoff.com/CX1100-0930

CX2000 | Embedded PCs

▶ www.beckhoff.com/CX2000



We reserve the right to make technical changes.

CX2020

CX2030

CX2040

The CX2020, CX2030 and CX2040 Embedded PCs extend the CX product family with versions with very high CPU power (optionally with multi-core) and enable direct connection of Bus Terminals or EtherCAT Terminals. The CX2000 in conjunction with EtherCAT and TwinCAT enables very fast control processes in the microsecond range (eXtreme Fast Control Technology).

The basic CPU modules have a CFast card, two independent Gbit Ethernet interfaces, four USB 2.0 interfaces and a DVI-I interface as standard. In addition there are fieldbus or serial connection options. Please note that these have to be specified with the order, i.e. retrospective installation is not possible. Other components from the CX2000 family can be connected via the multi-pin terminals on either side. The multi-pin terminal on the left-hand side enables the connection of up to four further optional modules.

The components

The individual system component are 22 mm wide or a multiple thereof. The basic unit consists of the CX20x0 CPU module and a power supply module (CX2100-0xxx).

Power supply unit with integrated I/O interface and optional UPS

The 24 V DC power supply unit is available in four different versions:

- CX2100-0004: E-bus/K-bus power supply unit with automatic switchover
- CX2100-0014: E-bus/K-bus power supply unit with automatic switchover and passive ventilation
- CX2100-0904: E-bus/K-bus power supply unit with automatic switchover and integrated capacitive UPS
- CX2100-0914: E-bus/K-bus power supply unit with automatic switchover and integrated electronic charging unit for external battery packs in order to maintain UPS functionality

All power supply units feature an illuminated anti-glare LC display with two rows of 16 characters each for displaying status messages.

The application programs can also use the display for displaying application-specific texts.

EtherCAT as a fast I/O system

The Embedded PCs were developed with a view towards optimised interaction with EtherCAT. EtherCAT offers a wide range of application options. The separate Gbit Ethernet interfaces enable EtherCAT to be used with cable redundancy by using one of the Ethernet interfaces as redundancy port. In addition, devices with EtherCAT slave interface can be operated such that several intelligent controllers can be synchronised via an EtherCAT network.

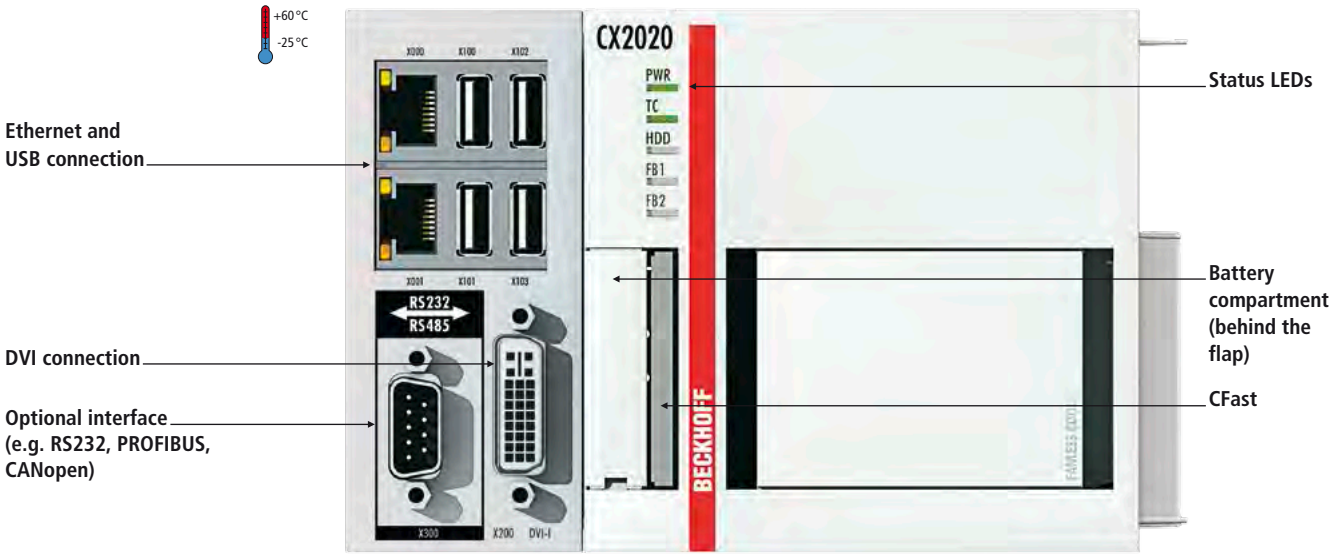
PLC, Motion Control, interpolation and visualisation

As IPC on a DIN rail the CX2000 in conjunction with TwinCAT offers the functionality of large Industrial PCs. Multi-core CPUs in conjunction with TwinCAT 3 enable PLC projects to be distributed to several cores, resulting in significant performance gains.

Moreover, all TwinCAT functionalities are available for Motion Control applications: in theory, up to 256 axes can be controlled. In addition to simple point-to-point movements, more complex multi-axis functions such as electronic gearbox, cam plates and flying saw can be implemented. Due to the high-performance CPUs in the CX2000, interpolating 3D path movements can also be implemented and DIN 66025 programs executed.

In addition to handling real-time control tasks the TwinCAT real-time kernel leaves enough time for the user interface (HMI). The high performance of the graphics kernel integrated in the CPU enables demanding visualisations with advanced user interfaces to be realised.

The extended operating temperature range between -25…+60 °C enables application in climatically demanding situations.



CX2020, CX2030, CX2040 | **Basic CPU module**

The CX2020 has a 1.4 GHz Intel® Celeron® CPU, the CX2030 has a 1.5 GHz Intel® Core™ i7 dual-core CPU and the CX2040 has a 2.1 GHz Intel® Core™ i7 quad-core CPU. In the CX2020 and CX2030 the controller is fanless and has no rotating components. Due to its high power, the CX2040 has a fan with ball bearings and speed monitoring. In addition to the CPU and chipset the basic modules also contain the main memory. For the CX2020 and CX2030 the size is 2 GB. 4 GB is possible as option. The CX2040 has 4 GB of RAM as standard. The controller boots from the CFast card. The CPU has a 128 kB NOVRAM persistent data memory for situations where no UPS is used. Up to four modules can be connected to the basic CPU module. The connection order is irrelevant. Internally the modules are connected via PCI Express and can be connected subsequently to the CPU in the field. The power supply for the CPU module comes from a CX2100 power supply module, which is connected on the right-hand side of the CPU. Two further CFast memory card modules (CX2550-0010) can be connected between the power supply unit and the CPU, so that a total of up to three CFast cards can be used. RAID can be used in situations where more than one CFast card is used.

The order identifier is derived as follows:

CX20x0-01ST

- 0 = no TwinCAT
- 1 = with TwinCAT 2 PLC runtime
- 2 = with TwinCAT 2 NC PTP runtime
- 3 = with TwinCAT 2 NC I runtime
- 5 = TwinCAT 3 runtime (XAR)

- 0 = no operating system
- 1 = operating system Microsoft Windows Embedded Compact 7
- 2 = operating system Microsoft Windows Embedded Standard 7 P 32 bit
- 3 = operating system Microsoft Windows Embedded Standard 7 P 64 bit
- 4 = Windows 10 IoT Enterprise LTSB 32 bit
- 5 = Windows 10 IoT Enterprise LTSB 64 bit

- 2 = Intel® Celeron® processor 1.4 GHz, 1 core
- 3 = Intel® Core™ processor 1.5 GHz, 2 cores
- 4 = Intel® Core™ processor 2.1 GHz, 4 cores

Optional interfaces:

CX20x0-N010 = second DVI connection, DVI-D port
CX20x0-N030 = RS232, D-sub plug
CX20x0-N031 = RS422/RS485, D-sub socket
CX20x0-B110 = EtherCAT slave, EtherCAT IN and OUT (2 x RJ45)
CX20x0-M310 = PROFIBUS master, D-sub socket, 9-pin
CX20x0-B310 = PROFIBUS slave, D-sub socket, 9-pin
CX20x0-M510 = CANopen master, D-sub plug, 9-pin
CX20x0-B510 = CANopen slave, D-sub plug, 9-pin
CX20x0-M930 = PROFINET RT, controller
CX20x0-B930 = PROFINET RT, device, Ethernet (2 x RJ45 switch)
CX20x0-B931 = PROFINET IRT, device, Ethernet (2 x RJ45 switch)
CX20x0-B950 = EtherNet/IP slave, Ethernet (2 x RJ45 switch)

Since not all combinations make sense, the table "Ordering information" contains a breakdown of the permissible combinations.

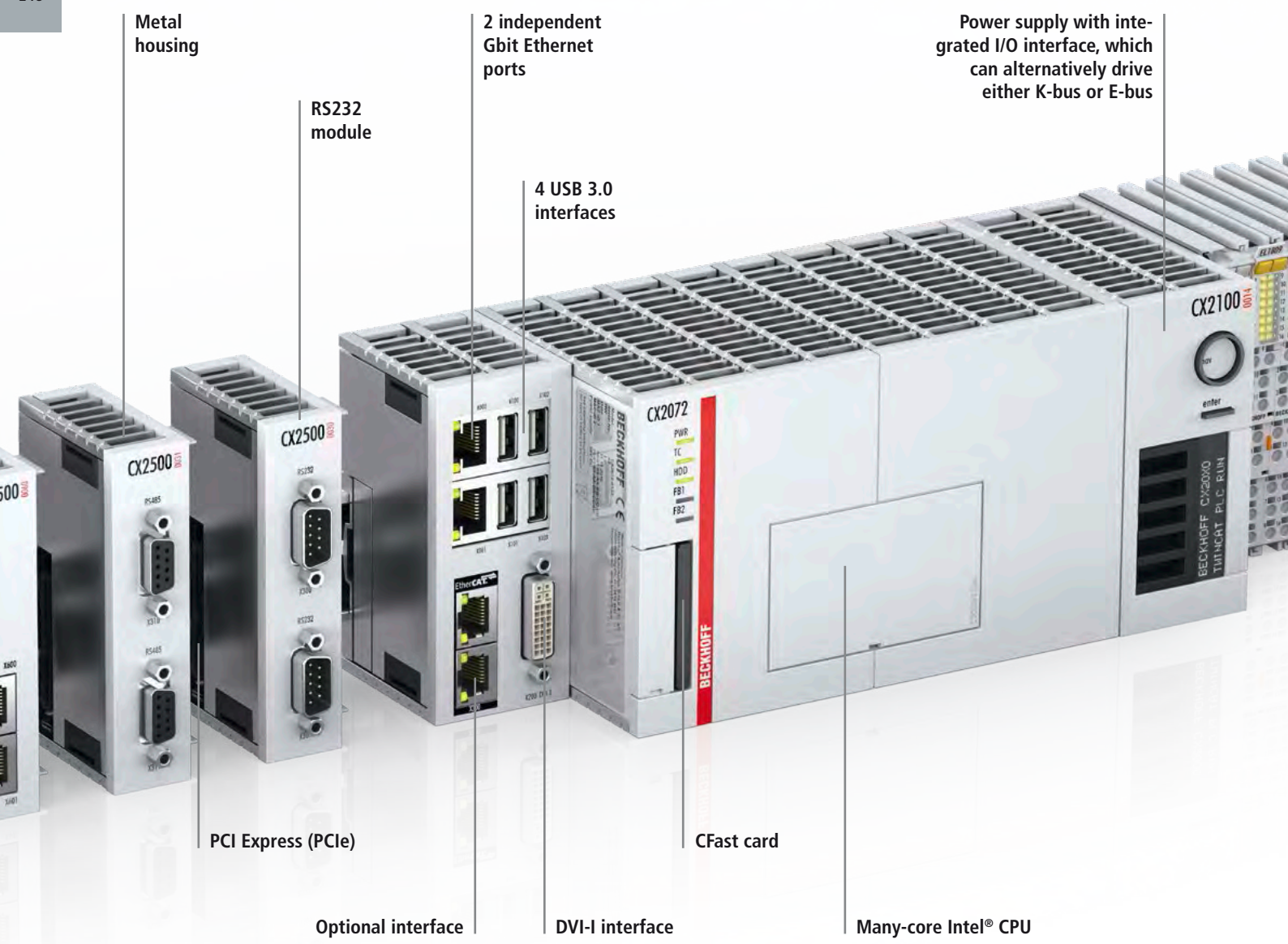
We reserve the right to make technical changes.

Technical data	CX2020	CX2030	CX2040
Processor	Intel® Celeron® 827E 1.4 GHz	Intel® Core™ i7 2610UE 1.5 GHz	Intel® Core™ i7 2715QE 2.1 GHz
Flash memory	slot for CFast card, optionally 4 or 8 GB included (expandable)		
Main memory	2 GB DDR3 RAM (expandable ex factory to 4 GB)	2 GB DDR3 RAM (expandable ex factory to 4 GB)	4 GB DDR3 RAM (not expandable)
Persistent memory	128 KB NOVRAM integrated		
Interfaces	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 2.0, 1 x optional interface		
Cooling	passive cooling, optionally with active cooling ex factory	passive cooling, optionally with active cooling ex factory	integrated fan with ball bearings and speed monitoring
Diagnostics LED	1 x power, 1 x TC status, 1 x flash access, 2 x bus status		
Clock	internal battery-backed clock for time and date (battery exchangeable)		
Operating system	Microsoft Windows Embedded Compact 7, Microsoft Windows Embedded Standard 7 P or Microsoft Windows 10 IoT Enterprise LTSB		
Control software	TwinCAT 2 runtime TwinCAT 3 runtime (XAR)		
I/O connection	via power supply module (E-bus or K-bus, automatic recognition)		
Power supply	24 V DC (-15 %/+20 %)		
Max. power loss	15 W (including the system interfaces)	20 W (including the system interfaces)	42 W (including the system interfaces)
Dimensions (W x H x D)	144 mm x 100 mm x 91 mm		
Weight	approx. 1160 g	approx. 1165 g	approx. 1230 g
Operating/storage temperature	-25…+60 °C/-40…+85 °C		
Relative humidity	95 %, no condensation		
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27		
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4		
Protection class	IP 20		
Approvals	CE, UL		
TC3 performance class	Performance plus (50); for further information on TwinCAT 3 see page 470	Mid performance (60); for further information on TwinCAT 3 see page 470	High performance (70); for further information on TwinCAT 3 see page 470
Further information	www.beckhoff.com/CX2020	www.beckhoff.com/CX2030	www.beckhoff.com/CX2040

Ordering information	no operating system	Windows Embedded			Windows 10 IoT Enterprise LTSB		no TwinCAT	TwinCAT 2 runtime			TwinCAT 3 runtime (XAR)
		Compact 7	Standard 7 P 32 bit	Standard 7 P 64 bit	32 bit	64 bit		PLC	NC PTP	NC I	
CX20x0-0100	x	–	–	–	–	–	x	–	–	–	–
CX20x0-0110	–	x	–	–	–	–	x	–	–	–	–
CX20x0-0111	–	x	–	–	–	–	–	x	–	–	–
CX20x0-0112	–	x	–	–	–	–	–	–	x	–	–
CX20x0-0113	–	x	–	–	–	–	–	–	–	x	–
CX20x0-0115	–	x	–	–	–	–	–	–	–	–	x
CX20x0-0120	–	–	x	–	–	–	x	–	–	–	–
CX20x0-0121	–	–	x	–	–	–	–	x	–	–	–
CX20x0-0122	–	–	x	–	–	–	–	–	x	–	–
CX20x0-0123	–	–	x	–	–	–	–	–	–	x	–
CX20x0-0125	–	–	x	–	–	–	–	–	–	–	x
CX20x0-0130	–	–	–	x	–	–	x	–	–	–	–
CX20x0-0135	–	–	–	x	–	–	–	–	–	–	x
CX20x0-0140	–	–	–	–	x	–	x	–	–	–	–
CX20x0-0141	–	–	–	–	x	–	–	x	–	–	–
CX20x0-0142	–	–	–	–	x	–	–	–	x	–	–
CX20x0-0143	–	–	–	–	x	–	–	–	–	x	–
CX20x0-0150	–	–	–	–	–	x	x	–	–	–	–
CX20x0-0155	–	–	–	–	–	x	–	–	–	–	x

CX20x2 | Embedded PCs

▶ www.beckhoff.com/CX20x2



We reserve the right to make technical changes.

CX2042, CX2062, CX2072

The CX2042, CX2062 and CX2072 Embedded PCs extend the CX product family with versions with very high CPU power (optionally with many-core) and enable direct connection of Bus Terminals or EtherCAT Terminals. The CX20x2 in conjunction with EtherCAT and TwinCAT enables very fast control processes in the microsecond range (eXtreme Fast Control Technology).

The basic CPU modules have a CFast card, two independent Gbit Ethernet interfaces, four USB 3.0 interfaces and a DVI-I interface as standard. In addition there are fieldbus or serial connection options. Please note that these have to be specified with the order, i.e. retrospective installation is not possible. Other components from the CX2000 family can be connected via the multi-pin terminals on either side. The multi-pin terminal on the left-hand side enables the connection of up to four further optional modules.

The components

The individual system component are 22 mm wide or a multiple thereof. The basic unit consists of the CX20x2 CPU module and a power supply module (CX2100-0xxx).

Power supply unit with integrated I/O interface and optional UPS

The 24 V DC power supply unit is available in two different versions:

– CX2100-0014: E-bus/K-bus power supply unit with automatic switchover and passive ventilation
– CX2100-0914: E-bus/K-bus power supply unit with automatic switchover and integrated electronic charging unit for external battery packs in order to maintain UPS functionality

Both power supply units feature an illuminated anti-glare LC display with two rows of 16 characters each for displaying status messages.

The application programs can also use the display for displaying application-specific texts.

EtherCAT as a fast I/O system

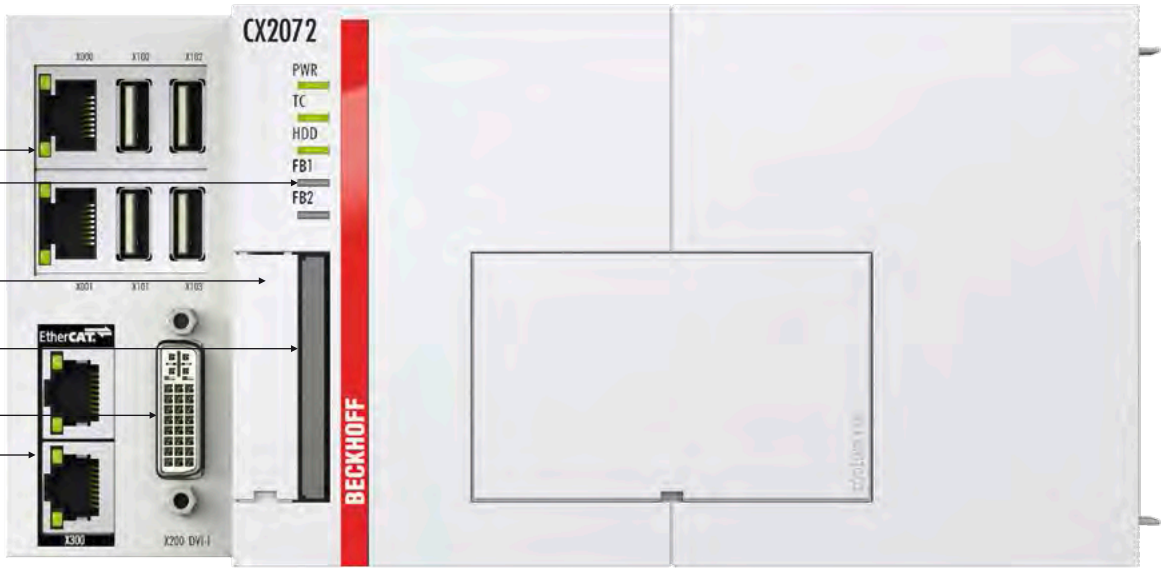
The CX2042, CX2062 and CX2072 Embedded PCs were developed with a view towards optimised interaction with EtherCAT. EtherCAT offers a wide range of application options. The separate Gbit Ethernet interfaces enable EtherCAT to be used with cable redundancy by using one of the Ethernet interfaces as redundancy port. In addition, devices with EtherCAT slave interface can be operated such that several intelligent controllers can be synchronised via an EtherCAT network.

PLC, Motion Control, interpolation and visualisation

As IPC on a DIN rail the CX20x2 in conjunction with TwinCAT offers the functionality of large Industrial PCs. Many-core CPUs in conjunction with TwinCAT 3 enable PLC projects to be distributed to several cores, resulting in significant performance gains.

Moreover, all TwinCAT functionalities are available for Motion Control applications: in theory, up to 256 axes can be controlled. In addition to simple point-to-point movements, more complex multi-axis functions such as electronic gearbox, cam plates and flying saw can be implemented. Due to the high-performance CPUs in the CX20x2, interpolating 3D path movements can also be implemented and DIN 66025 programs executed.

In addition to handling real-time control tasks the TwinCAT real-time kernel leaves enough time for the user interface (HMI). The high performance of the graphics kernel integrated in the CPU enables demanding visualisations with advanced user interfaces to be realised.



CX2042, CX2062, CX2072 | Many-core basic CPU module

Providing many-core performance on the DIN rail, the Embedded PCs CX20x2 make very powerful industrial control systems possible.

The CX2042 has an Intel® Xeon® CPU with a clock rate of 2.2 GHz (four cores), the CX2062 an Intel® Xeon® CPU with a clock rate of 2.0 GHz (eight cores) and the CX2072 an Intel® Xeon® CPU with a clock rate of 2.1 GHz (12 cores). A fan with ball bearings and speed monitoring is integrated into all basic CPU modules. In addition to the CPU, the basic modules also contain the main memory with a size of 8 GB RAM, optionally available with up to 32 GB. The controller boots from a CFast card where both the operating system as well as user programs and data are stored. The CPU has an internal 128 kB NOVRAM, which acts as a persistent data memory if no UPS is used. Microsoft Windows 10 IoT Enterprise LTSB 64 bit is used as operating system. The use of TwinCAT 3 allows automation tasks to be distributed across the various cores of the Intel® Xeon® CPU. All system modules from the CX2000 series for left- or right-sided functional extensions can also be connected to the new Embedded PCs.

Internally the modules are connected via PCI Express and can be plugged to the CPU in the field. The power supply for the CPU module comes from a CX2100-0014 power supply module. Up to two mass storage modules (either CX2550-0010 CFast modules or CX2550-0020 2½-inch SSD modules) can be plugged in between the power supply unit and the CPU, allowing the use of up to three mass storage devices in total.

The order identifier is derived as follows:

CX20x2-01ST

- 0 = no TwinCAT
- 5 = TwinCAT 3 runtime (XAR)

- 0 = no operating system
- 5 = Windows 10 IoT Enterprise LTSB 64 bit

- 4 = Intel® Xeon® processor 2.2 GHz, 4 cores
- 6 = Intel® Xeon® processor 2.0 GHz, 8 cores
- 7 = Intel® Xeon® processor 2.1 GHz, 12 cores

Since not all combinations make sense, the table "Ordering information" contains a breakdown of the permissible combinations.

Optional interfaces:

CX20x2-N010 = second DVI connection, DVI-D port
CX20x2-N011 = DisplayPort interface
CX20x2-N030 = RS232, D-sub plug
CX20x2-N031 = RS422/RS485, D-sub socket
CX20x2-M310 = PROFIBUS master, D-sub socket, 9-pin
CX20x2-B310 = PROFIBUS slave, D-sub socket, 9-pin
CX20x2-M510 = CANopen master, D-sub plug, 9-pin
CX20x2-B510 = CANopen slave, D-sub plug, 9-pin
CX20x2-M930 = PROFINET RT, controller
CX20x2-B930 = PROFINET RT, device, Ethernet (2 x RJ45 switch)
CX20x2-B931 = PROFINET IRT, device, Ethernet (2 x RJ45 switch)
CX20x2-B950 = EtherNet/IP slave, Ethernet (2 x RJ45 switch)
CX20x2-B110 = EtherCAT slave, EtherCAT IN and OUT (2 x RJ45)

We reserve the right to make technical changes.

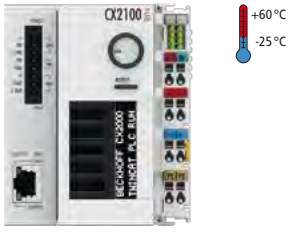
Technical data	CX2042	CX2062	CX2072
Processor	Intel® Xeon® D-1527 2.2 GHz, 4 cores (TC3: 70)	Intel® Xeon® D-1548 2.0 GHz, 8 cores (TC3: 80)	Intel® Xeon® D-1567 2.1 GHz, 12 cores (TC3: 81)
Graphics	AMD E8860, 2 GB GDDR5		
Flash memory	slot for CFast card, card not included		
Main memory	8 GB DDR4 RAM (expandable ex factory to 32 GB)		
Persistent memory	128 KB NOVRAM integrated		
Interfaces	2 x RJ45 10/100/1000 Mbit/s, 1 x DVI-I, 4 x USB 3.0, 1 x optional interface		
Cooling	integrated fan with ball bearings and speed monitoring		
Diagnostics LED	1 x power, 1 x TC status, 1 x flash access, 2 x bus status		
Clock	internal battery-backed clock for time and date (battery exchangeable)		
Operating system	Microsoft Windows 10 IoT Enterprise, Long Term Servicing Branch (LTSB), 64 bit		
Control software	TwinCAT 3 runtime (XAR)		
I/O connection	via power supply module (E-bus or K-bus, automatic recognition)		
Power supply	24 V DC (-15 %/+20 %)		
Max. power loss	100 W	110 W	130 W
Dimensions (W x H x D)	204 mm x 99 mm x 91 mm		
Weight	approx. 1300 g		
Operating/storage temperature	-25…+50 °C/-40…+85 °C		
Relative humidity	95 %, no condensation		
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27		
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4		
Protection class	IP 20		
Approvals	CE		
TC3 performance class	High performance (70); for further information on TwinCAT 3 see page 470	Very high performance (80); for further information on TwinCAT 3 see page 470	Many Core 5–8 cores (81); for further information on TwinCAT 3 see page 470
Further information	www.beckhoff.com/CX2042	www.beckhoff.com/CX2062	www.beckhoff.com/CX2072

Ordering information	no operating system	Windows 10 IoT Enterprise LTSB 64 bit	no TwinCAT	TwinCAT 3 runtime (XAR)
CX2042-0100	x	–	x	–
CX2042-0150	–	x	x	–
CX2042-0155	–	x	–	x
CX2062-0100	x	–	x	–
CX2062-0150	–	x	x	–
CX2062-0155	–	x	–	x
CX2072-0100	x	–	x	–
CX2072-0150	–	x	x	–
CX2072-0155	–	x	–	x

Power supply unit with E-bus/K-bus interface

Power supply unit with E-bus/K-bus interface and passive ventilation

Power supply unit with integrated capacitive UPS and E-bus/K-bus interface



Power supply unit with integrated Smart Battery charger and E-bus/K-bus interface

CX2100-0xxx | Power supply units and UPS modules for CX2000

Each of the four CX2100 power supply modules has an LC display with 2 x 16 characters. It is controlled via TwinCAT. All power supply modules feature automatic E-bus/K-bus detection and therefore support both I/O systems. The standard power supply CX2100-0004 provides a maximum output of 45 W. The more powerful CX2100-0014 power supply unit offers a maximum output of 130 W. It has to be used for CX2040 or CX20x2 systems with quad-core CPUs or higher. Thanks to its wider housing front the CX2100-0014 also allows passive ventilation through the front and is thus also suitable for horizontal mounting positions. Optionally it can be equipped with active ventilation (fan option) to provide the normally fanless CX2020/CX2030 with a better heat dissipation for operation in different ambient conditions. The CX2100-0904 module also features integrated capacitive UPS. In the event of a power failure this enables the system to save data on the storage medium and then shut down in an orderly manner. The CX2100-0914 module can be used to charge external battery packs in order to provide backup power for the system and external components such as Control Panels. All power supply units from the CX2000 series are in principle passively cooled and fanless.

Technical data	CX2100-0004	CX2100-0014	CX2100-0904	CX2100-0914
Power supply	24 V DC (-15 %/+20 %)			
Max. output	45 W	130 W	45 W	100 W
I/O connection	E-bus or K-bus, automatic recognition			
Current supply E-bus/K-bus	2 A			
UPS	–	–	capacitively integrated	external
Capacity	–	–	75 As	dependent on battery
Type of connection	spring-loaded technique (adapter terminal)			
Display	FSTN display 2 lines x 16 characters of text, illuminated			
Diagnostics LED	1 x PWR, 1 x I/O Run, 1 x I/O Err			
Max. power consumption	3.5 W			
Dimensions (W x H x D)	40 mm x 100 mm x 91 mm	60 mm x 100 mm x 91 mm	118 mm x 100 mm x 91 mm	84 mm x 100 mm x 91 mm
Weight	approx. 375 g	approx. 550 g	approx. 1025 g	approx. 695 g
Operating/storage temperature	-25…+60 °C/-40…+85 °C	-25…+60 °C/-40…+85 °C	-25…+50 °C/-25…+60 °C	-25…+60 °C/-40…+85 °C
Relative humidity	95 %, no condensation			
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27			
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4			
Protection class	IP 20			
Approvals	CE, UL			
Further information	www.beckhoff.com/CX2100-0004	www.beckhoff.com/CX2100-0014	www.beckhoff.com/CX2100-0904	www.beckhoff.com/CX2100-0914
Option				
CX2900-0192	battery pack for CX2100-0914			

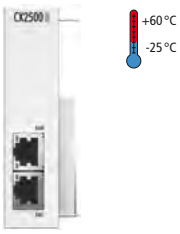
EtherCAT Terminals see page 2 110, Bus Terminals see page 2 442

We reserve the right to make technical changes.

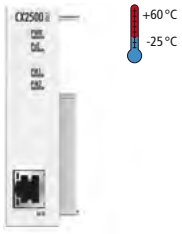
Audio interface

RS232 interface

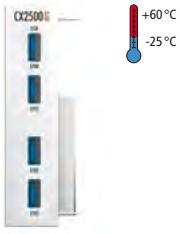
RS422/RS485 interface



Dual Gbit Ethernet interface



Power over Ethernet interface



USB interface

CX2500-00xx | System modules for CX2000

The system modules for the CX2000 family are connected to the CPU on the left-hand side via a multi-pin connector. Internally they are connected via PCI Express. Up to four modules can be connected in any order.

The CX2500-0020 audio module (only for CX2020, CX2030 and CX2040) has a jack plug (5 x 3.5 mm) and a cinch plug for digital signals (SPDIF). Up to 7.1 multi-channel audio can be used. Serial interfaces can be added with the modules CX2500-0030 (RS232) and CX2500-0031 (RS422/RS485). The CX2500-0060 module provides two further independent Gbit Ethernet interfaces.

The CX2500-0061 Power over Ethernet module supports devices with PoE class 0, 1, 2, 3 and 4 in accordance with the PoE standard IEEE 802.3af-2003. The maximum PoE power output is 15.4 W. The PoE supply voltage is generated internally, no external power supply is necessary. In the case of an overload of the CX2500-0061, the PoE supply shuts down for two seconds, then restarts. The diagnostic LEDs PWR, PoE, PM1 and PM2 provide information about the type of PoE supply (mode A or B) as well as about the PoE class reported by the powered device.

The CX2500-0070 module can be used to add up to four further USB 3.0 interfaces.

Technical data	CX2500-0020	CX2500-0030	CX2500-0031	CX2500-0060	CX2500-0061	CX2500-0070
Interfaces	Line IN, Line OUT, Mic IN, 7.1, SPDIF	RS232	RS422/RS485	2 x Ethernet, 10/100/ 1000 Mbit/s	1 x Ethernet, 10/100/ 1000 Mbit/s with Power over Ethernet (PoE)	4 x USB 3.0 (max. 2 A total current)
Type of connection	3.5 mm socket for jack plug, RCA socket	2 x D-sub plug, 9-pin	2 x D-sub plug, 9-pin	2 x RJ45	1 x RJ45	4 x USB 3.0, type A
Power supply	via system bus (through CX2100-0xxx power supply modules)					
Dimensions (W x H x D)	24 mm x 99 mm x 54.5 mm					
Weight	approx. 180 g	approx. 205 g	approx. 203 g	approx. 195 g	approx. 208 g	approx. 195 g
Operating/storage temperature	-25…+60 °C/-40…+85 °C					
Relative humidity	95 %, no condensation					
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27					
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4					
Protection class	IP 20					
Approvals	CE, UL	CE, UL	CE, UL	CE, UL	CE	CE, UL
Further information	www.beckhoff.com/CX2500-0020	www.beckhoff.com/CX2500-0030	www.beckhoff.com/CX2500-0031	www.beckhoff.com/CX2500-0060	www.beckhoff.com/CX2500-0061	www.beckhoff.com/CX2500-0070

CFast slot

2½-inch HDD/SSD

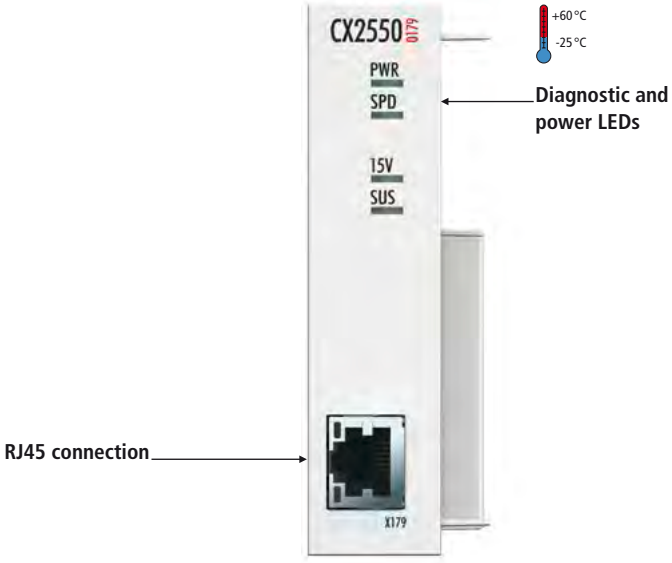
CX2550-00x0 | Extension modules for CX2000

The extension modules for the CX2000 family are connected to the CPU on the right-hand side via a multi-pin connector. Up to two CX2550-0010 CFast or CX2550-0020 HDD/SSD modules can be connected, so that a total of up to three storage media are available. The storage media can be mounted at the front without tools (CX2550-0010) or by means of a plug-in frame (CX2550-0020), enabling fast and uncomplicated exchange of the storage medium.

The CX2550-0020 module can accept 2½-inch storage media with a thickness of up to 9.5 mm. The internal SATA 6G port offers sufficient bandwidth even for the latest SSD storage media. The storage medium is protected by the attachable cap, which latches to the housing of the module.

Technical data	CX2550-0010	CX2550-0020
Interfaces	SATA	
Type of connection	CFast slot	2½-inch slot
Diagnostics LED	1 x RDY, 1 x HDD	–
Power supply	via system bus (through CX2100-0xxx power supply modules)	
Dimensions (W x H x D)	24 mm x 99 mm x 91 mm	24 mm x 99 mm x 125 mm
Weight	approx. 280 g (without medium)	approx. 290 g (without medium)
Operating/storage temperature	-25…+60 °C/-40…+85 °C	
Relative humidity	95 %, no condensation	
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27	
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4	
Protection class	IP 20	
Approvals	CE, UL	
Further information	www.beckhoff.com/CX2550-0010	www.beckhoff.com/CX2550-0020

We reserve the right to make technical changes.



USB Extended 1.1 interface

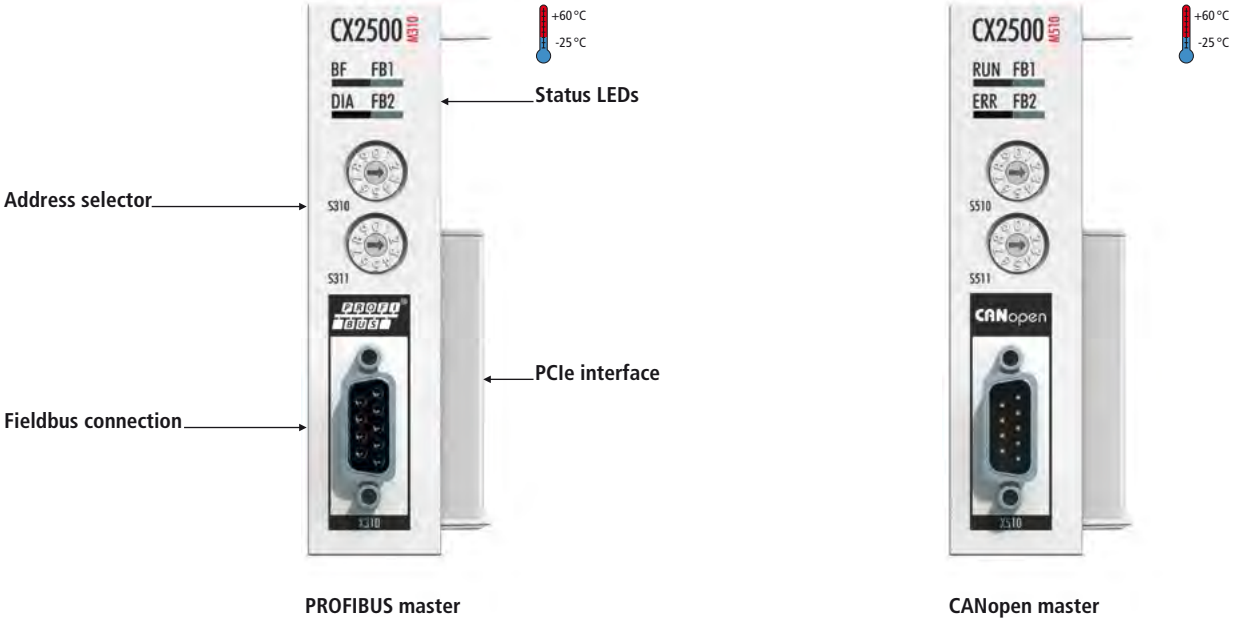
USB Extended 2.0 interface

CX2550-0x79 | System modules USB extension for CX2000

The CX2550-0x79 system modules are attachments for the CX2000 Embedded PC series. They transmit USB signals via a Cat. 5E cable over distances of up to max. 50 m. The CX2550-0179 system module transmits USB signals according to the USB 1.1 standard (full speed, max. 12 Mbit/s) while the CX2550-0279 system module transmits USB signals according to the USB 2.0 standard (high speed, max. 480 Mbit/s). Both modules can be attached at the right-hand side of a CX20x0-CPU and are placed between the power supply unit and the CPU. The internal connection is made via a USB port of the CX20x0-CPU; this way, no PCI Express resources are required or used. No additional drivers are required for operation since signal transformation and forwarding of the USB signals take place at the electrical level and are completely transparent for the operating system. Each module has four diagnostic LEDs, which indicate the status of the transmission standard in addition to the power. For better visibility the LEDs of the RJ45 sockets are redundantly implemented on the lower diagnostic LEDs.

The CX2550-0179 and CX2550-0279 modules supplement the CX2000 series by the function of the CU8800 and CU8801 USB extension for Industrial PCs and enable the direct connection of Beckhoff Control Panels with USB Extended interface. The CX2550-0179 system module is suitable for the connection of the Beckhoff CP69xx and CP79xx Control Panel series with USB Extended 1.1 connection. The CX2550-0279 system module is suitable for the connection of the Beckhoff CP29xx and CP39xx Control Panel series with USB Extended 2.0 connection.

Technical data	CX2550-0179	CX2550-0279
Interfaces	1 x USB Extended 1.1	1 x USB Extended 2.0
Type of connection	RJ45 socket	
Properties	transmission of USB 1.1 up to max. 50 m via Cat. 5E cable	transmission of USB 2.0 up to max. 50 m via Cat. 5E cable
Diagnostics LED	1 x power, 1 x speed, 1 x +15 V, 1 x suspend	1 x power, 1 x host, 1 x activity, 1 x link
Power supply	via system bus (through CX2100-0xxx power supply modules)	
Dimensions (W x H x D)	24 mm x 99 mm x 54.5 mm	
Weight	approx. 190 g	
Operating/storage temperature	-25…+60 °C/-40…+85 °C	
Relative humidity	95 %, no condensation	
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27	
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4	
Protection class	IP 20	
Approvals	CE, UL	
Further information	www.beckhoff.com/CX2550-0179	www.beckhoff.com/CX2550-0279



PROFIBUS master

CANopen master

CX2500-Mxxx | Master fieldbus modules for CX2000

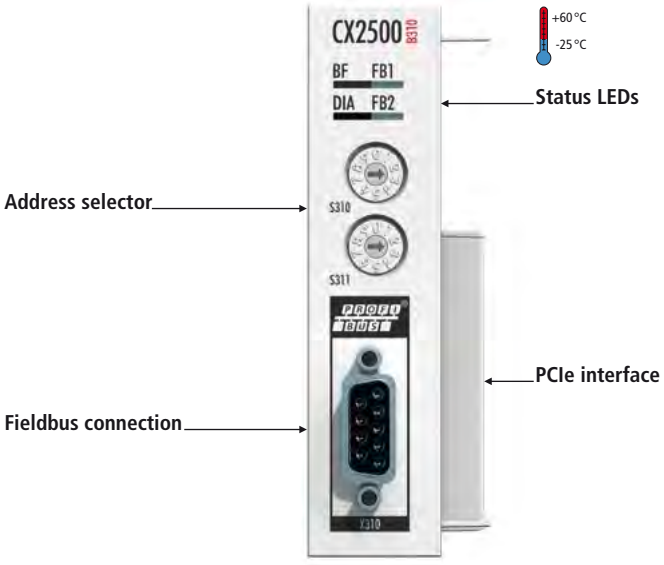
The CX2500-Mxxx fieldbus master modules are left-sided attachments for the CX2000 Embedded PC series. The use of CX2000 systems with fieldbus master modules enables the segment-like construction of control structures in extensive plants and machines using further fieldbus components (Bus Couplers, Bus Terminal Controllers, Drive Technology, etc.).

The CX2500-M310 fieldbus master module assumes the function of a PROFIBUS master, while the CX2500-M510 is a CANopen master. Each of these modules occupies a PCI Express lane, so that a total of four modules can be connected in any desired combination to the left side of a CX2000 group. Compared with the Beckhoff PCIe Fieldbus Cards, the technical data of the fieldbus master modules are almost identical, but with single channels.

The parallel operation of several identical or different masters is possible, e.g. two PROFIBUS masters or a PROFIBUS master and a CANopen master. In the case of mixed operation of master and slave connections, CX systems act as intelligent gateways between different fieldbuses: data are received, processed and fed into other fieldbuses. Master or slave connections network several CX systems with one another strictly deterministically via the fieldbus level. CX fieldbus modules can be retrofitted/exchanged by adding them to existing CX systems. The scanning and recognising of the modules, the parameterisation, the configuration of the connected I/O components and the online diagnosis of the process/fieldbus status take place in the TwinCAT System Manager.

Technical data	CX2500-M310	CX2500-M510
Fieldbus	PROFIBUS DP, DP-V1; DP-V2 (MC) in preparation	CANopen
Data transfer rates	9.6 kbaud…12 Mbaud	10, 20, 50, 100, 125, 250, 500, 800, 1000 kbaud
Bus interface	1 x D-sub socket, 9-pin	
Bus device	max. 125 slaves with up to 244 bytes input, output, parameter, configuration or diagnostic data per slave	max. 127 slaves
Interface to the CPU	PCI Express	
Max. power loss	2.8 W	
Dimensions (W x H x D)	24 mm x 99 mm x 54.5 mm	
Weight	approx. 180 g	
Operating/storage temperature	-25…+60 °C/-40…+85 °C	
Relative humidity	95 %, no condensation	
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27	
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4	
Protection class	IP 20	
Approvals	CE, UL	
Further information	www.beckhoff.com/CX2500-M310	www.beckhoff.com/CX2500-M510

We reserve the right to make technical changes.



PROFIBUS slave

CANopen slave

CX2500-Bxxx | Slave fieldbus modules for CX2000

The CX2500-Bxxx fieldbus slave modules are left-sided attachments for the CX2000 Embedded PC series. The use of CX2000 systems with fieldbus slave modules enables the use of a CX system as a subordinate local controller for the construction of complex or modular systems. External process data are received from the master and processed, or data from its own process peripherals are returned to the master controller directly or processed.

The CX2500-B310 fieldbus slave module assumes the function of a PROFIBUS slave, while the CX2500-B510 is a CANopen slave. Each of these modules occupies a PCI Express lane, so that a total of four of these modules can be connected in any desired combination to the left side of a CX2000 group. The fieldbus slave modules are single-channel modules. The CX2500-B310 fieldbus slave module for PROFIBUS can present itself to the master as a multiple (max. quadruple) "virtual" slave station, resulting in a four-fold increase in the quantity of exchanged process data.

The parallel operation of several identical or different slaves is possible, e.g. two PROFIBUS slaves or a PROFIBUS slave and a CANopen slave. In the case of mixed operation of master and slave connections, CX systems act as intelligent gateways between different fieldbuses: data are received, processed and fed into other fieldbuses.

Master or slave connections network several CX systems with one another strictly deterministically via the fieldbus level. CX fieldbus modules can be retrofitted/exchanged by adding them to existing CX systems. The scanning and recognising of the modules, the parameterisation, the configuration of the connected I/O components and the online diagnosis of the process/fieldbus status take place in the TwinCAT System Manager.

Technical data	CX2500-B310	CX2500-B510
Fieldbus	PROFIBUS DP, DP-V1	CANopen
Data transfer rates	9.6 kbaud…12 Mbaud	10, 20, 50, 100, 125, 250, 500, 800, 1000 kbaud
Bus interface	1 x D-sub socket, 9-pin	
Bus device	max. 125 slaves	max. 127 slaves
Interface to the CPU	PCI Express	
Max. number of bytes	max. 244 byte input/244 byte output	max. 1536 byte input/1536 byte output
Max. power loss	2.8 W	
Dimensions (W x H x D)	24 mm x 99 mm x 54.5 mm	
Weight	approx. 180 g	
Operating/storage temperature	-25…+60 °C/-40…+85 °C	
Relative humidity	95 %, no condensation	
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27	
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4	
Protection class	IP 20	
Approvals	CE, UL	
Further information	www.beckhoff.com/CX2500-B310	www.beckhoff.com/CX2500-B510

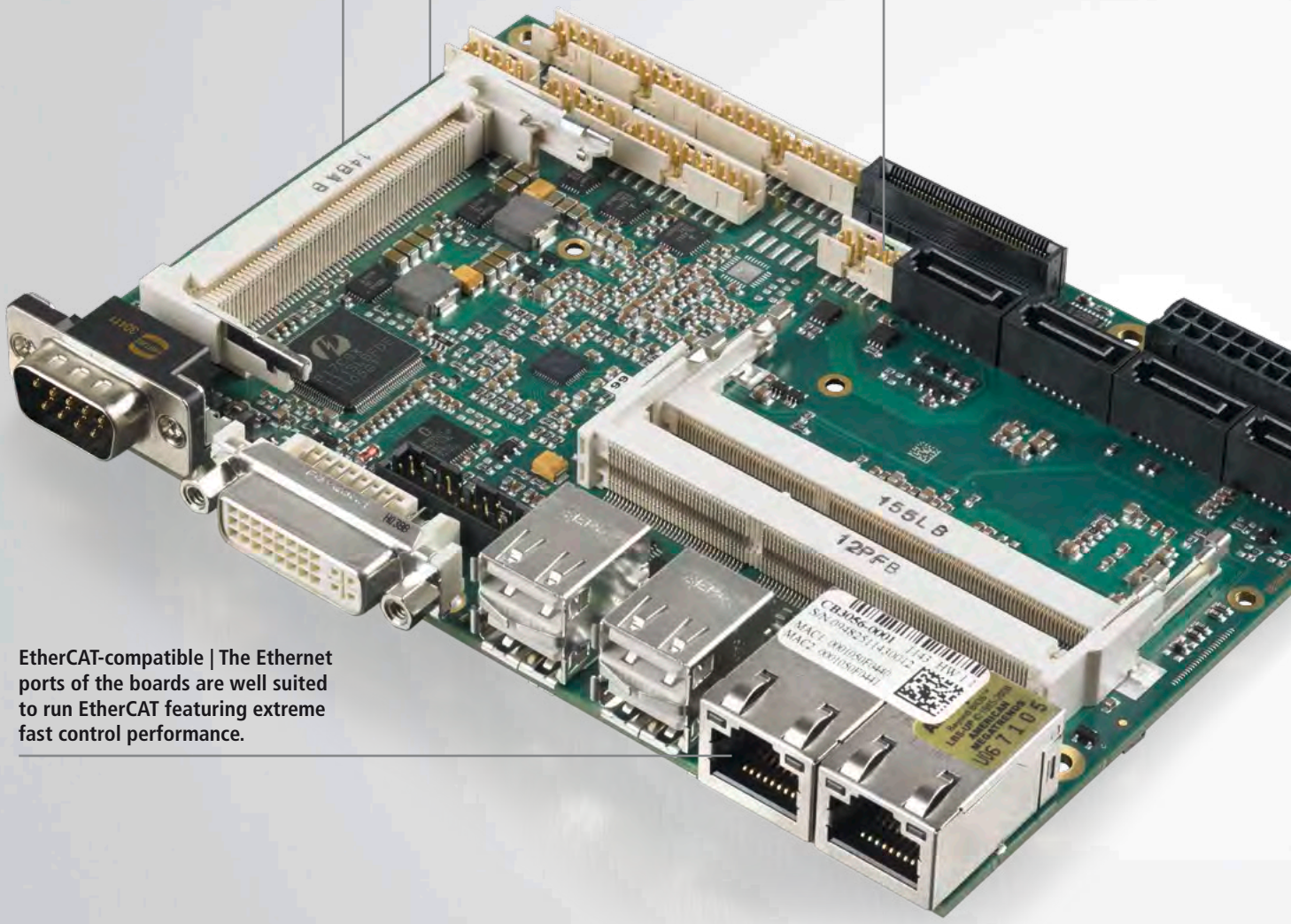
Industrial Motherboards

▶ www.beckhoff.com/Motherboards

Simple cooling adaptation | The layout of the boards is optimised for simple and efficient cooling.

Operating system support | Beckhoff supports all Microsoft operating systems like Windows NT, 2000, XP, XP Embedded, Windows 7, 10 and CE.

Auxiliary on-board interfaces | On-board touch screen controller, I²C, SMB, and GPIO reduce the overall bill of material for a device.



EtherCAT-compatible | The Ethernet ports of the boards are well suited to run EtherCAT featuring extreme fast control performance.

We reserve the right to make technical changes.

Motherboard series ATX

Motherboard series 3½-inch

Compact motherboard

Motherboards with Intel® x86 and ARM architecture

Beckhoff has expanded the "Industrial Motherboards" line of business into an independent product segment, with in-house board development, design and production. In addition, the own motherboard and BIOS development initiatives enable Beckhoff to respond more quickly to new technologies in the PC market and to customer-specific requirements.

Flexible PC BIOS software

BIOS source code access for Phoenix and AMI BIOS makes it possible to adapt to special board functions or introduce specific customer requirements. BIOS functionality very much depends on the field of usage for a motherboard: commercial applications typically require a balance between power dissipation and program load, the industrial usage often requires full CPU availability at any time. For example, settings for speed stepping and thermal monitoring need to be adapted in the BIOS to reflect the different usage modes.

Standard form factors

Typical form factors such as 3½-inch and ATX are supported. The 3½-inch form factor is characterised by its compact dimensions and simple cooling adaptation. No specially adapted cables are required for fast commissioning. In general, Beckhoff provides all form factors with one chipset. This allows the construction of a family with architecture-identical devices.

Long-term availability

Boards are made available for a minimum of five years, based on the general market availability of the components. All components are selected according to the longevity of supply. CPUs and chipsets, for example, are selected only if they are part of the embedded product line of the manufacturer.

Manufacturing quality

Since Beckhoff is using many of the motherboard products in their own PCs, quality is the number one goal. The focus is robustness and reliability; only high quality electronic components are used. All boards must pass a visual, electrical and functional inspection. The manufacturing date and serial number are clearly marked on the boards.

Customer-specific adaptation and integration services

Board and BIOS can be adapted to meet the needs of a customized device. Furthermore, Beckhoff is experienced in designing and producing complete embedded units, including the housing, display, various other electrical and mechanical interfaces, operating systems and application software.

Beckhoff Motherboards – Hightech from Westphalia, Germany

The complete engineering and design cycle as well as manufacturing of the boards takes place in Westphalia, Germany, at two locations: in Münster and at the Beckhoff headquarters in Verl. This local geographical context ensures short turnaround cycles between engineering, production and quality control. It also ensures that reaction time on customer feedback is the shortest possible.

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Product overview Industrial Motherboards

	ATX		3½-inch
	CB1061	CB1064	CB3060
General data			
CPU	Intel® Core™ i3/i5/i7, 4th generation	Intel® Pentium®/Celeron®/ Core™ i3/i5/i7, 6th/7th generation	Intel® Core™ i3/i5/i7, 4th generation
Socket	LGA1150	LGA1151	FCBGA 1364
Chipset	Intel® Q87	Intel® Q170	Intel® QM87
Further information	www.beckhoff.com/CB1061	www.beckhoff.com/CB1064	www.beckhoff.com/CB3060
Memory			
Type	SODIMM204–1.35 V/DDR3L	SODIMM260–1.2 V/DDR4	SODIMM204–1.35 V/DDR3L
Slots	4	4	2
Max. memory	32 GB	64 GB	16 GB
Max. speed	1600 MHz	2133 MHz	1600 MHz
Graphic			
HDMI resolution	2560 x 1600 @ 60 Hz; 4096 x 2304 @ 24 Hz	2560 x 1600 @ 60 Hz; 4096 x 2160 @ 24 Hz	2560 x 1600 @ 60 Hz; 4096 x 2304 @ 24 Hz
DP resolution	3840 x 2160	4096 x 2304 @ 60 Hz	3840 x 2160
DVI resolution	1920 x 1200	1920 x 1200 @ 60 Hz	1920 x 1200
LAN			
LAN1 controller	Intel® Q87/i218 Phy	Intel® Q170/i219 Phy	Intel® Q87/i218 Phy
LAN1	10/100/1000 MB/s	10/100/1000 MB/s	10/100/1000 MB/s
LAN2 controller	Intel® i210	Intel® i210	Intel® i210
LAN2	10/100/1000 MB/s	10/100/1000 MB/s	10/100/1000 MB/s
LAN3 controller	–	–	–
LAN3	–	–	–
LAN4 controller	–	–	–
LAN4	–	–	–
Internal interfaces			
PCI32	3 x	2 x (3.0)	–
Mini PCI slot	–	–	1 x
PCIe (manufacturer dependency)	–	–	4 x PCIe x1(2.0) or 1 x PCIe x4(2.0), adapter cards required
PCIe x16	1 x (3.0)	1 x (3.0)	–
PCIe x4	1 x (2.0)	2 x (3.0)	–
PCIe x1	2 x (2.0)	2 x (3.0)	–
SATA (total)	6 x	6 x	4 x
SATA (6 GB/s)	6 x	6 x	2 x
SATA (3 GB/s)	–	–	2 x
SATA RAID	0/1/5/10	0/1/5/10	0/1/5/10
USB 3.0	2 x	–	–
USB 2.0	8 x	8 x	6 x
Serial interface	3 x RS232	3 x RS232	3 x RS232
External interfaces			
PS/2 keyboard/mouse	yes/yes	yes/yes	–
USB 3.0	2 x	4 x	2 x
USB 2.0	2 x	–	2 x
LAN	2 x	2 x	2 x
DVI-I	1 x	–	1 x
DVI-D	1 x	2 x	–
DisplayPort	1 x	1 x	–
Serial interface	1 x RS232	1 x RS232	1 x RS232
Audio	Line in/out & Mic	Line in/out & Mic	–

We reserve the right to make technical changes.

Compact motherboard			
CB3063	**CB3064**	**CB6263**	**CB6464**
Intel® Atom™ E38xx, System on a Chip (SoC)	Intel® Pentium®/Celeron®/ Core™ i3/i5/i7, 6th/7th generation	Intel® Atom™ E38xx, System on a Chip (SoC)	Intel® Pentium®/Celeron®/ Core™ i3/i5/i7, 6th/7th generation
–	LGA1151	–	LGA1151
Intel® Atom™ E38xx	Intel® Q170	Intel® Atom™ E38xx	Intel® Q170, Intel® H110
www.beckhoff.com/CB3063	www.beckhoff.com/CB3064	www.beckhoff.com/CB6263	www.beckhoff.com/CB6464
SODIMM204–1.35 V/DDR3L	SODIMM260–1.2 V/DDR4	on-board 1.35 V/DDR3L	SODIMM260–1.2 V/DDR4
1	2	–	2
8 GB	32 GB	4 GB	32 GB
1333 MHz	2133 MHz	1333 MHz	2133 MHz
1920 x 1080 @ 60 Hz	3840 x 2160 @ 60 Hz; 4096 x 2160 @ 24 Hz	1920 x 1080 @ 60 Hz	3840 x 2160 @ 60 Hz; 4096 x 2160 @ 24 Hz
2560 x 1600 @ 60 Hz	3840 x 2160 @ 60 Hz	2560 x 1600 @ 60 Hz	3840 x 2160 @ 60 Hz
1920 x 1200 @ 60 Hz	1920 x 1200 @ 60 Hz	1920 x 1200 @ 60 Hz	1920 x 1200 @ 60 Hz
Intel® i210	Intel® Q170/i210 Phy	Intel® i210	Intel® i219 Phy
10/100/1000 MB/s	10/100/1000 MB/s	10/100/1000 MB/s	10/100/1000 MB/s
Intel® i210	Intel® i219	Intel® i210	Intel® Q170/H110/i210 Phy
10/100/1000 MB/s	10/100/1000 MB/s	10/100/1000 MB/s	10/100/1000 MB/s
–	–	–	Intel® Q170/H110/i210 Phy
–	–	–	10/100/1000 MB/s
–	–	–	Intel® Q170/H110/i210 Phy
–	–	–	10/100/1000 MB/s
–	–	–	–
–	–	–	–
1 x PCIe x1(2.0), adapter cards required	4 x PCIe x1(2.0) or 1 x PCIe x4(2.0), adapter cards required	2 x PCIe x1(2.0), adapter cards required	2 x PCIe x1 at M.2 (depending on chipset configuration)
–	–	–	–
–	–	–	1 x via BaseCon*
–	–	–	max. 8 x (3.0) via BaseCon*
2 x	4 x	2 x (1 x M.2, 1 x BaseCon)	6 x*
–	4 x	–	2 x at M.2, 4 x via BaseCon*
2 x	–	2 x	–
–	0/1/5/10	–	0/1/5/10
1 x	–	–	2 x internally at M.2, 4 x via BaseCon*
4 x	6 x	3 x (1 x M.2, 2 x BaseCon)	2 x internally at M.2, 4 x via BaseCon*
1 x RS232	1 x RS232	–	–
–	–	–	–
–	4 x	1 x	4 x
4 x	–	–	–
2 x	2 x	2 x	4 x
1 x	–	–	–
–	1 x	–	–
–	–	1 x	2 x
–	1 x RS232	–	–
–	–	–	–

*(depending on chipset configuration), adapter cards necessary

Highlights

- Comprehensive, modular I/O system for all signal types and fieldbus systems
- Universal product range optimised for EtherCAT
- High investment security: Mature I/O technology based on more than 20 years of success in the field

Fieldbus Components

I/Os for all common fieldbus systems

▸ **www.beckhoff.com/FieldbusComponents**

266 Modular I/O system

268 Overviews

268 Fieldbus systems
270 Signal types
272 EtherCAT
274 EtherCAT Terminals
282 EtherCAT Box
290 EtherCAT Plug-in Modules
292 Bus Terminals
302 Fieldbus Box
305 Infrastructure Components

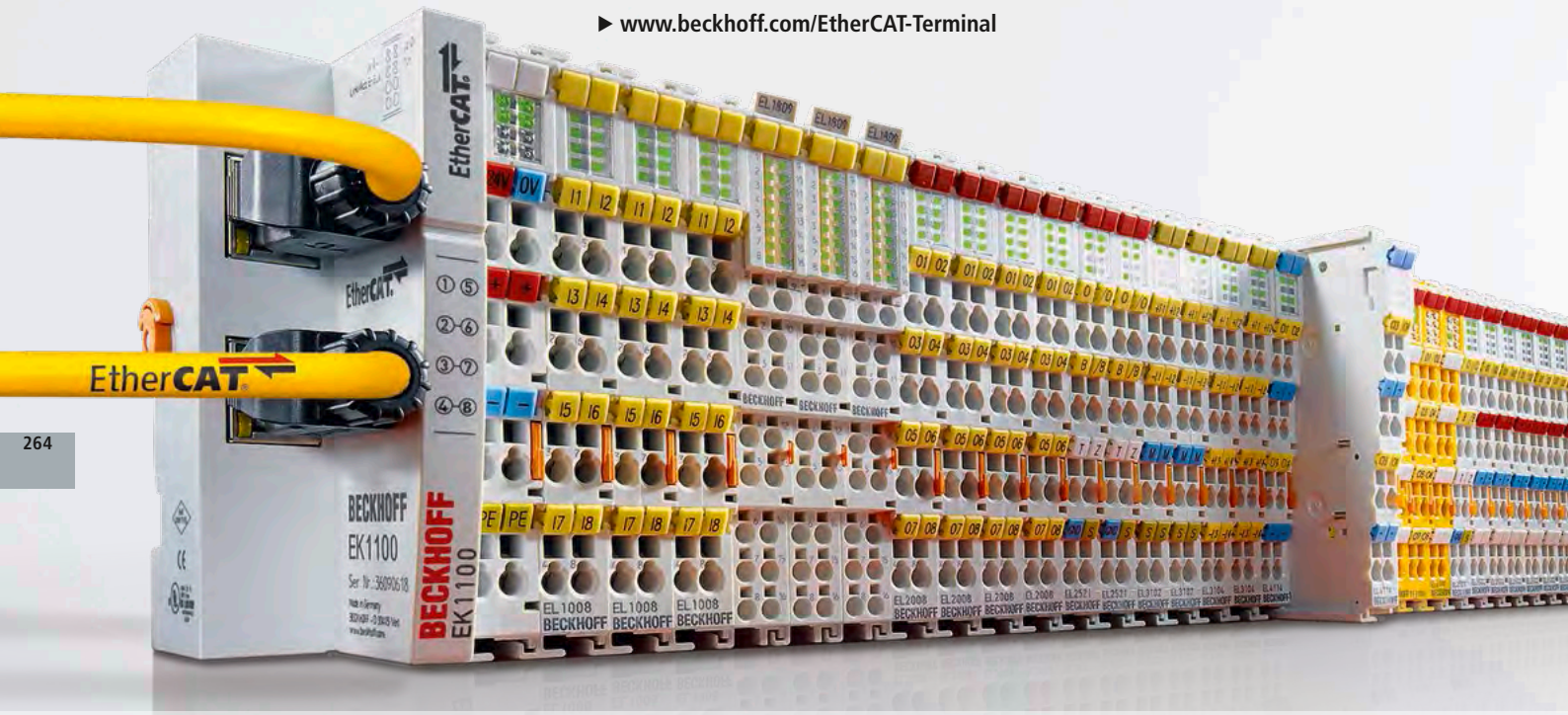
2 36 Products

2 36 EtherCAT
2 70 EtherCAT Terminals
2 252 EtherCAT Box
2 364 EtherCAT Plug-in Modules
2 396 Bus Terminals
2 546 Fieldbus Box
2 610 Infrastructure Components

EtherCAT Terminals 274

- IP 20 EtherCAT I/O system
- Real-time Ethernet performance retained into each terminal
- Integration of highly precise measurement technology, condition monitoring, drive technology and process technology
- Electronic overcurrent protection
- Gateways for subordinate fieldbus systems
- TwinSAFE PLC and safety I/Os

▶ **www.beckhoff.com/EtherCAT-Terminal**



EtherCAT Box 282

- IP 67 EtherCAT I/O system
- High performance for harsh environments
- Compact and robust
- Can be mounted directly on machines, outside of control cabinets and terminal boxes
- Integrated sensor/actuator supply directly via EtherCAT P

▶ **www.beckhoff.com/EtherCAT-Box**
▶ **www.beckhoff.com/EtherCAT-P-Box**

EtherCAT Plug-in Modules 290

- Very compact EtherCAT I/O system in IP 20 for plug-in into a circuit board (signal distribution board)
- Optimised for high-volume production
- Application-specific connector interface
- Use of cable harnesses avoids wiring errors.

▶ **www.beckhoff.com/EtherCAT-Plug-in-Modules**

Bus Terminals 292

- Open, fieldbus-neutral IP 20 I/O system
- More than 400 different Bus Terminals
- Support for more than 20 fieldbus systems
- Gateways for subordinate bus systems
- System-integrated safety I/O terminals available

▶ **www.beckhoff.com/BusTerminal**

We reserve the right to make technical changes.

The I/O Company

Beckhoff supplies a complete range of fieldbus components for all common I/O and bus systems. With Bus Terminals offering IP 20 protection and Fieldbus Box modules in IP 67, a comprehensive range of devices is available for a wide variety of signal types and fieldbus systems. In addition to components for conventional bus systems, Beckhoff offers an integrated product range optimised for EtherCAT. Invented by Beckhoff, this real-time Ethernet solution for industrial automation has global acceptance and is characterised by outstanding performance and simple handling. The result is high-precision machine and plant control and significantly increased production efficiency.

▶ **www.beckhoff.com/IO**

▶ **www.beckhoff.com/EtherCAT**

Fieldbus Box 302

- Open, fieldbus-neutral IP 67 I/O system
- 12 fieldbus systems, 24 signal types
- Compact and robust
- Can be mounted directly on machines, outside of control cabinets and terminal boxes while reducing machine footprint
- IO-Link box modules for inexpensive point-to-point connections

▶ **www.beckhoff.com/FieldbusBox**

Infrastructure Components 305

- PC cards for all common fieldbus systems
- Industrial Ethernet switches
- EtherCAT junctions and media converters in IP 20 and IP 67 ratings

▶ **www.beckhoff.com/Infrastructure-components**

- **Comprehensive, modular I/O system for all signal types and fieldbus systems**
- **Universal product range optimised for EtherCAT**
- **High investment security: Mature I/O technology based on more than 20 years of success in the field**
- **Beckhoff is the I/O pioneer, developing the Bus Terminal concept and EtherCAT.**

We reserve the right to make technical changes.

Modular I/O system for all signal types and fieldbus systems

Beckhoff supplies a complete range of fieldbus components for all common I/O and bus systems. With Bus Terminals offering IP 20 protection and Fieldbus Box modules in IP 67, a comprehensive range of devices is available for a wide variety of signal types and fieldbus systems. In addition to components for conventional bus systems, Beckhoff offers an integrated product range optimised for EtherCAT. Invented by Beckhoff, this real-time Ethernet solution for industrial automation has global acceptance and is characterised by outstanding performance and simple handling. The result is high-precision machine and plant control and significantly increased production efficiency.

EtherCAT
EtherCAT (Ethernet Control Automation Technology) is the Ethernet solution for industrial automation, characterised by outstanding performance and particularly simple handling.

Ethernet
The advantages of Ethernet, such as high data transmission rates, easy methods of integration into existing networks, and a wide range of services and interfaces are also found in the Beckhoff Ethernet products.

Lightbus
This well proven fibre optics bus system from Beckhoff is characterised by particularly good immunity to EMI, easy installation and a very fast, cyclic and deterministic data flow.

PROFIBUS
PROFIBUS is widely used as a fast bus for decentralised peripheral components (PROFIBUS DP). In addition to PROFIBUS DP and FMS, Beckhoff also supports the standard for drive communication, PROFIBUS MC.

PROFINET
PROFINET is the open Industrial Ethernet standard of the PNO (PROFIBUS users organisation). Internationally established IT standards such as TCP/IP are used for communication.

EtherNet/IP
Ethernet/IP is the Industrial Ethernet standard of the ODVA (Open DeviceNet Vendor Association). Ethernet/IP is based on Ethernet TCP/IP and UDP/IP.

CANopen
The effective utilisation of the bus bandwidth allows CANopen to achieve a short system reaction time at comparatively low data rates. The typical advantages of CAN, such as high data security and multi-master capability are retained.

DeviceNet
DeviceNet is a sensor/actuator bus system that originated in the USA, but which meanwhile is increasingly being used in Europe and Asia. DeviceNet is CAN-based (Controller Area Network).

SERCOS
SERCOS was originally developed as a fast fibre optic bus system for drives. Thanks to the Beckhoff SERCOS Bus Coupler, the advantages such as high data rate and short cycle times can now be provided for the I/O peripherals too.

Modbus RTU
Modbus RTU is an open, serial communications protocol based on the master/slave architecture. Since it is extremely easy to implement on all kinds of serial interfaces, it has gained wide acceptance.

Modbus TCP
Due to its open standards Modbus TCP is common for the use of Ethernet in the fields of automation. Modbus TCP has a so called "Well known port (Port 502)", which makes it routable via the Internet.

RS232/RS485
The classic serial interfaces, RS232 and RS485, continue in wide use. The Beckhoff RS485/RS232 I/O modules use a simple, published serial communication protocol that is easy to implement.

IO-Link
IO-Link serves to connect sensors and actuators to the control level by means of an inexpensive point-to-point connection. As an open interface, IO-Link can be integrated in all common fieldbus systems.

EnOcean
EnOcean enables the battery-free transmission of switching signals and measured values and is mainly used in building automation.

BACnet/IP
BACnet (Building Automation Control Network) is a standardised, manufacturer-independent communication protocol for building automation, based on Ethernet. Areas of application include HVAC, lighting control, safety and fire alarm technology.

We reserve the right to make technical changes.

AS-Interface
AS-Interface connects sensors and actuators with the higher control level via a simple and low-priced wiring method. AS-Interface is internationally standardised through EN 50295 and IEC 62026-2.

DALI
In building automation DALI is a standard for digital control of electronic ballasts for lighting.

EIB/KNX
The local two-wire bus system EIB/KNX for the connection of sensors and actuators has its main area of use in building automation, since it is well suited for implementation in various functionalities.

LON
LON (Local Operating Network) is a multi-network-capable communication system for distributed applications. It is predominately used for automation applications in commercial buildings.

DMX
As bus system for professional lighting equipment DMX (Digital Multiplexing) controls dynamic lighting in stage- and event-business as well as lighting of exclusive displays of light and color in high-profile buildings.

MP-Bus
As simple sensor/actuator bus for HVAC systems the MP-Bus (Multi Point Bus) serves to control flaps and volumetric flow rate controllers alongside valves and window ventilation systems.

SMI
Standard Motor Interface (SMI) is a standard interface for the control of electronic drives for sun blinds and roller shutters e.g. via bus topologies used in building automation.

M-Bus
The M-Bus (Metering Bus) is used as a standardised system for reading energy and consumption meters or other end devices in buildings and properties with a large number of end users (see EN 13757).

IEEE 1588 PTP
The Precision Time Protocol (PTP) secures the synchronicity of the time settings of several devices in a network and is defined in IEEE 1588 as the protocol standard for the synchronisation of distributed clocks in networks.

ControlNet
ControlNet is an open, standardised fieldbus system. The protocol allows both cyclic and acyclic data to be exchanged over the bus without affecting each other.

CC-Link
CC-Link (Control & Communication Link) is an open bus system for communication between the control and fieldbus level. It is predominately used in Asia.

Product overview fieldbus systems

Fieldbus	EtherCAT Terminal	EtherCAT Box	EtherCAT Plug-in Modules	Bus Terminal		Fieldbus Box	
	Couplers/Gateways	Modules		Bus Couplers/ Master term.	PLC (IEC 61131-3)	Compact Box	Coupler Box
EtherCAT	EK1xxx, EKM1xxx	EPxxxx	EJxxxx	BK1120			IL230x-B110
	EL6695 bridge	ERxxxx		BK1150			
		EQxxxx		BK1250			
EtherCAT P	EK13xx	EPPxxxx					
		EP1312					
LIGHTBUS	EL6720 master			BK20x0		IPxxxx-B200	IL230x-B200
PROFIBUS	EK3100			BK3xx0	BC31x0	IPxxxx-B31x	IL230x-B31x
	EL6731 master/slave			LC3100	BX3100		
INTERBUS	EL6740 slave			BK40x0		IPxxxx-B400	IL230x-B400
CANopen	EL6751 master/slave			BK51xx	BC5150	IPxxxx-B51x	IL230x-B51x
				LC5100	BX5100		
DeviceNet	EL6752 master/slave			BK52x0	BC5250	IPxxxx-B52x	IL230x-B52x
				LC5200	BX5200		
ControlNet				BK7000			
CC-Link				BK7150			
Modbus				BK73x0	BC7300	IPxxxx-B730	IL230x-B730
sercos the automation bus				BK7520			
RS485	EL6021, EL6022	EP600x	EJ6002	BK8000	BC8050	IPxxxx-B800	IL230x-B800
		EPP600x		KL6021	BX8000		
				KL6041			
RS232	EL6001, EL6002	EP600x	EJ6002	BK8100	BC8150	IPxxxx-B810	IL230x-B810
		EPP600x		KL6001	BX8000		
				KL6031			
Ethernet TCP/IP	EK9000			BK9xx0	BC9xxx		IL230x-B90x
	EL6601, EL6614 switch port				BX9000		
PROFINET	EK9300	EP9300		BK9xx3			IL230x-B903
	EL6631 RT controller/device						
	EL6632 IRT controller						
EtherNet/IP	EK9500			BK9xx5			IL230x-B905
	EL6652 master/slave						
AS-Interface	EL6201			KL62x1			
IO-Link	EL6224 master	EP622x, EPP6228 master	EJ6224 master	KL6224 master			
EIB/KNX				KL6301			
LON				KL6401			
MP-Bus				KL6771			
M-Bus				KL6781			
DALI/DSI				KL6811			
DALI 2				KL6821			
IEEE 1588	EL6688						
DMX	EL6851						
EnOcean				KL658x			
SMI				KL68x1			
BACnet	EL6861						

We reserve the right to make technical changes.

		Fieldbus Modules	Infrastructure Components	Embedded PC 184	Drive Technology 306	Accessories
PLC Box (IEC 61131-3)	IO-Link box	For thermo-couples/mV	Interfaces	Master/Slave	Servo Drives	Connectors/ Cables
		FM33xx-B110	FC90xx, FC11xx	CXxxxx 186	AX8000 336	ZS1090-00xx
			CUxxxx		AX5000 344	ZK1090-9191
			EP9xxx			ZK1090-xxxx
						ZB7xxx
						ZK/ZS7xxx
			FC200x	CX1500-M/B200 241		Z1xxx
IL230x-C31x		FM33xx-B310	FC31xx	CXxxxx 186		ZB3xxx
				CX2500-M/B310 256		ZK/ZS1031
						ZB4200
			FC51xx	CXxxxx 186		ZB51xx
				CX2500-M/B510 256		ZK/ZS1052
			FC52xx	CX1500-M/B520 241		ZB52xx
						ZK/ZS1052
				CXxxxx 186		ZK/ZS1031
			FC75xx	CXxxxx 186		
				CXxxxx 186		ZK/ZS1031
IL230x-C810				CXxxxx 186		ZK/ZS1031
IL230x-C900			FC90xx	CXxxxx 186		ZS1090-00xx
			CU2xxx, CU2508 Ethernet Switch			ZB90x0 ZK1090-xxxx
			CU2508	CXxxxx 186		ZS1090-00xx
						ZB90x0
			FC93xx IRT device			ZK1090-xxxx
			CU2508	CXxxxx 186		ZS1090-00xx
	EPIxxxx, ERIxxxx devices					

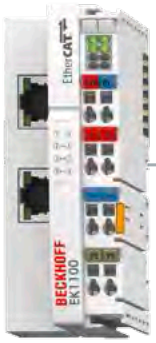
Product overview signal types

Signal	EtherCAT Terminal		EtherCAT Box		
			Industrial housing	Zinc die-cast housing	Stainless steel housing
Digital input					
5/12/48/60 V DC	EL1xxx				
24 V DC	EL1xxx		EP1xxx	ER1xxx	EQ1xxx
120 V AC/DC	EL1712				
230 V AC	EL17x2				
Safety	EL19xx		EP19xx		
NAMUR					
Thermistor	EL1382				
Counter	EL15x2		EP1518	ER1518	
Digital output					
5 V DC/12 V DC	EL2x24				
24 V DC	EL2xxx		EP2xxx	ER2xxx	EQ2xxx
30 V AC/DC	EL27xx		EP2624	ER2624	
125 V AC/DC					
230 V AC	EL2xxx				
400 V AC					
Safety	EL29xx				
PWM	EL25xx				
Digital combi					
24 V DC	EL1859		EP23xx	ER23xx	EQ23xx
	EL1259				
Safety					
Analog input					
Multi-function	EL3751				
±10 V, ±20 mA, NAMUR NE43	EL3174				
0…2 V, ±2 V					
0…10 V	EL3x6x		EP31xx	ER31x4	EQ3174
±10 V	EL3x0x		EP31xx	ER31x4	EQ3174
0…20 mA	EL3xxx		EP31xx	ER31x4	EQ3174
4…20 mA	EL3xxx		EP31xx	ER31x4	EQ3174
Resistance thermometer	EL32xx		EP32xx	ER3204	EQ3204
Thermocouple/mV	EL331x		EP3314	ER3314	EQ3314
Measurement bridge	EL335x		EP3356		
Potentiometer	EL3255				
Power meas./Condition Monitor.	EL3xxx	ELM3xxx			
Pressure measurement	EM37xx		EP3744		
Analog output					
0…10 V	EL4x0x		EP4x74	ER4x74	
±10 V	EL4x3x		EP4x74	ER4x74	
24 V DC			EP4378-1022		
0…20 mA	EL4x1x		EP4x74	ER4x74	
4…20 mA	EL4x2x		EP4x74	ER4x74	
Special functions					
SSI sensor interface	EL500x		EP5001		
EnDat 2.2 interface	EL5032				
Incremental encoder interface	EL51xx		EP51x1	ER51x1	
RS232, RS485, TTY, IO-Link	EL60xx		EP6xxx	ER600x	
Motion Control	EL7xxx		EP7xxx	ER7x4x	
Overcurrent protection	EL922x				
Multi-functional			EP8309	ER8309	

We reserve the right to make technical changes.

EtherCAT P Box	EtherCAT Plug-in Modules	Bus Terminal		Fieldbus Box	
Industrial housing		Bus Terminal	Terminal Modules	Compact Box, Coupler/ PLC Box, Extension Box	IO-Link box (industrial/ zinc die-cast housing)
	EJ1128	KL1124			
EPP1xxx	EJ1xxx	KL1xxx	KM1xxx	IP10xx-Bxxx, IE10xx	EPI1xxx, ERI1xxx
		KL1712			
		KL17x2			
	EJ19xx	KL1904			
		KL1352			
		KL1382			
EPP1518		KL15xx		IP1502-Bxxx, IE1502	
		KL2124			
EPP2xxx	EJ2xxx	KL2xxx	KM20xx	IP20xx-Bxxx, IE2xxx	EPI2xxx, ERI2xxx
EPP2624		KL27xx			
		KL2612			
		KL2xxx	KM2xxx		
		KL2631			
	EJ29xx	KL2904			
		KL25xx		IP2512-Bxxx, IE2512	
EPP23xx	EJ1859	KL1859		IP/IL23xx-Bxxx, IE23xx IL230x-Cxxx	EPI23xx, ERI23xx
	EJ1957				
	EJ3104	KL31x2			
EPP31x4		KL3x6x		IP3102-Bxxx, IE3102	EPI3174, ERI3174
EPP31x4	EJ3x0x	KL3xxx		IP3102-Bxxx, IE3102	EPI3174, ERI3174
EPP31x4		KL3xxx		IP3112-Bxxx, IE3112	EPI3174, ERI3174
EPP31x4	EJ30x8	KL3xxx		IP3112-Bxxx, IE3112	EPI3174, ERI3174
EPP3204		KL32xx		IP3202-Bxxx, IE3202	
EPP3314	EJ3318	KL331x		IP3312-Bxxx, IE3312	
		KL335x			
		KL3xxx			
EPP3744		KM37xx			
EPP4x74	EJ4002	KL4x0x	KM4602	IP4132-Bxxx, IE4132	EPI4374, ERI4374
EPP4x74	EJ413x	KL4xxx		IP4132-Bxxx, IE4132	EPI4374, ERI4374
EPP4x74	EJ4018	KL4x1x		IP4112-Bxxx, IE4112	EPI4374, ERI4374
EPP4x74		KL402x		IP4112-Bxxx, IE4112	EPI4374, ERI4374
	EJ5002	KL50x1		IP5009-Bxxx, IE5009	
EPP51x1	EJ5101	KL51xx		IP5109-Bxxx, IE5109	
EPP6xxx	EJ6xxx	KL60x1		IP60x2-Bxxx, IE60x2	
EPP7xxx	EJ7xxx	KL25x1			

System overview EtherCAT I/O



EK EtherCAT Coupler series

EtherCAT Coupler with integrated digital I/Os

Bus Coupler (e.g. PROFIBUS) for EtherCAT Terminals

Embedded PC series CX, further Embedded PCs see page 184

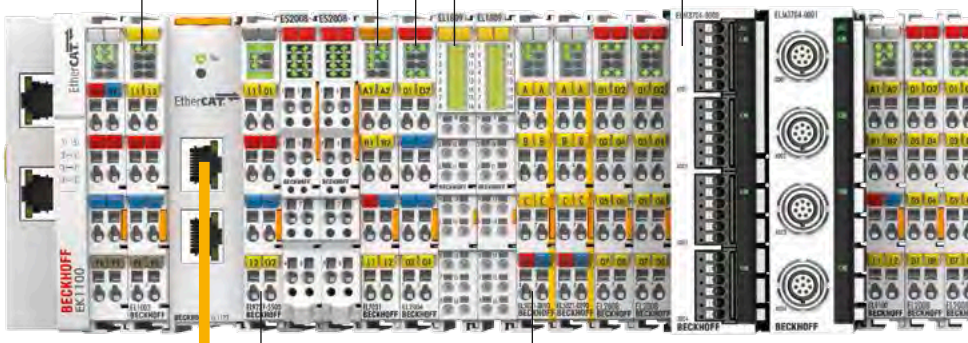
Free mix of signals: more than 200 different EtherCAT Terminals enable connection of all common sensors and actuators.

Motion terminals for stepper, servo or DC motors or hydraulic valves

EtherCAT Terminals in 1-, 2-, 4-, 8- and 16-channel modularity

HD EtherCAT Terminals (high-density) with 16 connection points offer high packing density on 12 mm.

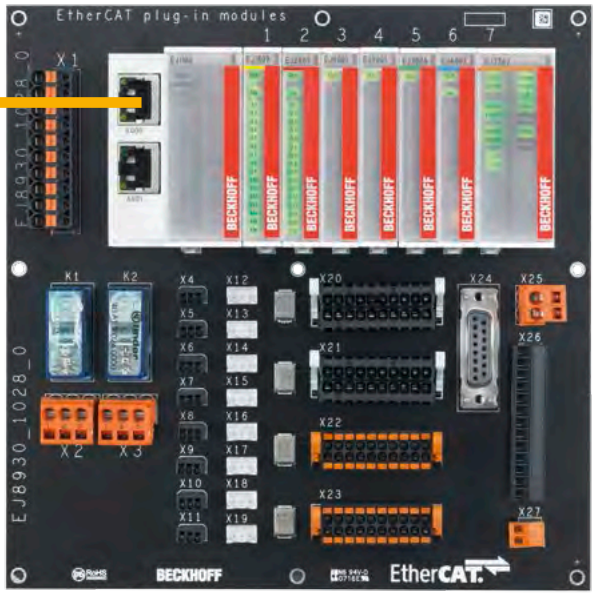
High-end measurement technology with attractive pricing through series production, seamlessly integrated into the automation system.



100 m Industrial Ethernet cable (100BASE-TX)

Integrated electronic overcurrent protection for safeguarding of potential groups incl. monitoring function

With the aid of the TwinSAFE SC technology it is possible to make use of standard signals for safety tasks in any network or fieldbus.



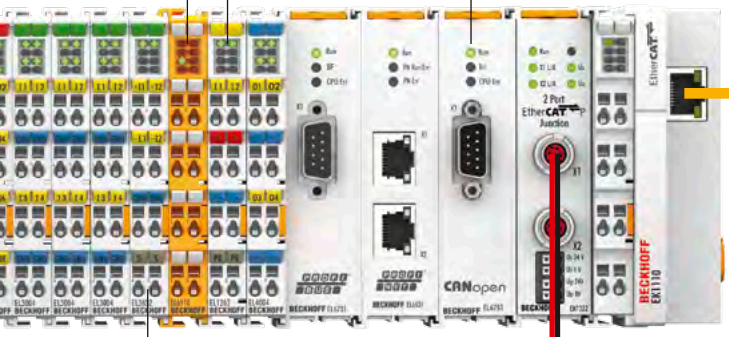
EtherCAT plug-in modules: very compact EtherCAT I/O system in IP 20 for plug-in into a circuit board (signal distribution board)

We reserve the right to make technical changes.

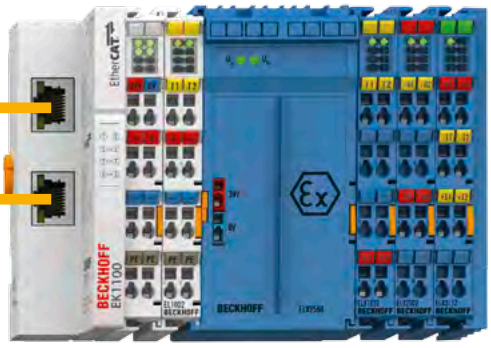
TwinSAFE: safety I/Os and compact Safety PLC for up to 212 safety-relevant bus devices

Ultra-fast I/O terminals for I/O response times < 100 µs for fast I/O, oversampling and timestamp

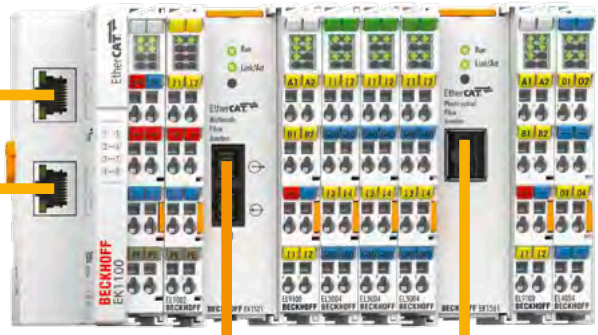
Optional fieldbus integration via decentralised field-bus master/slave terminals



High-speed measurement, high-precision measurement, Condition Monitoring, energy monitoring

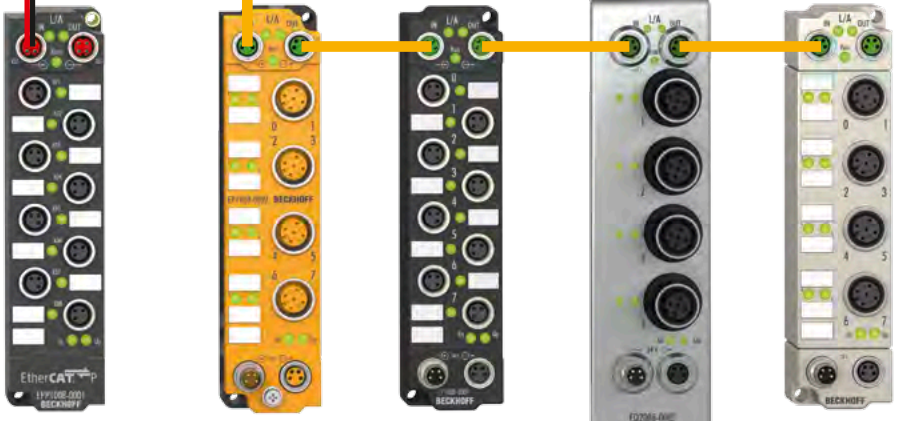


ELX terminals: direct connection of intrinsically safe sensors and actuators



2000/20,000 m fibre optic (100BASE-FX)

50 m Plastic Optical Fibre (100BASE-FX POF)



IP 67 EtherCAT P Box

IP 67 EtherCAT Box

IP 69K EtherCAT Box (stainless steel)

IP 67 EtherCAT Box (die-cast zinc)

Product overview EtherCAT Terminals

EtherCAT Couplers

EtherCAT Couplers E-bus	**EK1100**	**EK1000** Ethernet/TSN	**EK1300** EtherCAT P	**EK1101** ID switch	**EKM1101** ID switch and diagnostics
	EK1101-0080 ID switch, Fast Hot Connect	**EK1100-0008** M8 connection	**EK1501** ID switch, multimode fibre optic	**EK1501-0010** ID switch, singlemode fibre optic	**EK1501-0100** ID switch, multimode fibre optic to RJ45
	EK1541 ID switch, POF				
EtherCAT Couplers E-bus with integrated digital I/Os	**EK1814** 4 inputs + 4 outputs	**EK1818** 8 inputs + 4 outputs	**EK1828** 4 inputs + 8 outputs	**EK1828-0010** 8 outputs	
	EK1914 4 inputs + 4 outputs, 2 safe inputs + 2 safe outputs	**EK1960** 20 safe inputs + 24 safe outputs			
EtherCAT Couplers K-bus	**BK1120**	**BK1150** "Compact"	**BK1250** between E-bus and K-bus terminals		
Bus Couplers (for ELxxxx)	**EK3100** PROFIBUS	**EK9000** Modbus TCP/UDP	**EK9160** IoT	**EK9300** PROFINET RT	**EK9500** EtherNet/IP
Extension system and junctions	**EK1110** extension end terminal	**EK1110-0008** extension end terminal, M8	**EK1122** 2-port junction	**EK1122-0008** 2-port junction, M8	**EK1122-0080** 2-port junction, Fast Hot Connect
	EK1310 EtherCAT P extension with feed-in	**EK1322** EtherCAT P junction with feed-in	**EK1521** multimode fibre optic junction	**EK1521-0010** singlemode fibre optic junction	**EK1561** POF junction

We reserve the right to make technical changes.

EtherCAT Terminal | Digital input 24 V DC: EL1xxx/ES1xxx

Signal	2-channel	4-channel		8-channel	16-channel
Filter 3.0 ms	**EL1002** type 3	**EL1004** type 3	**EL1004-0020** > 2500 V	**EL1008** type 3, 1-wire	**EL1809** type 3
		EL1104 with sensor supply, type 3	**EL1804** 8 x 24 V, 4 x 0 V, type 3, 3-wire	**EL1808** 8 x 24 V DC, type 3, 2-wire	**EL1862** flat-ribbon cable, type 3
		EL1084 ground switching	**EL1024** type 2	**EL1852** type 3, 8 inputs, 8 outputs, I_{max} = 0.5 A, flat ribbon cable	**EL1862-0010** flat-ribbon cable, ground switching
				EL1859 type 3, 8 inputs, 8 outputs, I_{max} = 0.5 A	**EL1889** ground switching
				EL1088 ground switching	
Filter 10 µs	**EL1012** type 3	**EL1014** type 3	**EL1034** potential-free inputs, type 1	**EL1018** type 3	**EL1819** type 3
		EL1114 with sensor supply, type 3	**EL1814** 8 x 24 V, 4 x 0 V, type 3, 3-wire		**EL1872** flat-ribbon cable, type 3
			EL1094 ground switching	**EL1098** ground switching	**EL1872-0010** flat-ribbon cable, ground switching
XFC: T_{ON}/T_{OFF} 1 µs	**EL1202** fast input, type 3			**EL1258** multi-timestamping	
	EL1252 timestamp, type 3			**EL1259** 8 multi-timestamping inputs and outputs	
	EL1262 type 3, oversampling				
Counter	**EL1502** type 1, 100 kHz, 32 bit				
	EL1512 type 1, 1 kHz, 32 bit				
Safe input		**EL1904** TwinSAFE, 4 safe inputs	**EL2911** TwinSAFE Logic, 4 safe inputs, 1 safe output	**EL1918** TwinSAFE Logic, 8 safe inputs	

EtherCAT Terminal | Digital input: EL1xxx/ES1xxx/ELX1xxx

Signal	2-channel		4-channel
5 V DC			**EL1124** filter 0.05 µs, type 1
12 V DC			**EL1144**
48 V DC			**EL1134** filter 10 µs, type 1
120 V AC/DC	**EL1712** power contacts		
120 V DC	**EL1712-0020** power contacts		
120…230 V AC	**EL1702** power contacts	**EL1722** no power contacts	
220 V DC	**EL1702-0020** power contacts		
Thermistor	**EL1382**		
NAMUR	**EL1052**		**EL1054**
Ex i, NAMUR	**ELX1052**		

The standard EtherCAT Terminals (ELxxxx) can be optionally ordered as ESxxxx with pluggable wiring level. EN 61131-2 specification ▶ **www.beckhoff.com/EN61131-2**

EtherCAT Terminal | Digital output 24 V DC: EL2xxx/ES2xxx/ELX2xxx

Signal	1-channel	2-channel		4-channel	8-channel	16-channel
I_{max} = 0.5 A		EL2002		EL2004	EL2008	EM2042 D-sub connection
				EL2014 with diagnostics	EL2878-0005 flat-ribbon cable, with diagnostics	EL2872 flat-ribbon cable
					EL2808 8 x 0 V	EL2809
					EL1852 type 3, 8 inputs, 8 outputs, I_{max} = 0.5 A, flat ribbon cable	EL2819 with diagnostics
				EL2084 ground switching	EL2088 ground switching	EL2889 ground switching
					EL1859 8 inputs, 8 outputs, filter 3.0 ms, type 3	EL2872-0010 flat-ribbon cable, ground switching
I_{max} = 2.0 A		EL2022		EL2024	EL2828	
		EL2032 with diagnostics		EL2034 with diagnostics		
I_{max} = ∑ 8.0 A		EL2042 2 x 4.0 A, 1 x 8.0 A				
XFC: T_{ON}/T_{OFF} 1 µs		EL2202 push-pull outputs	EL2212 overexcitation, multi-timestamping		EL1259 8 multi-timestamping inputs and outputs	
		EL2252 timestamp	EL2262 oversampling		EL2258 multi-timestamping	
Ex i		ELX2002				
Safe output	EL2911 TwinSAFE Logic, 4 safe inputs, 1 safe output			EL2904 TwinSAFE, 4 safe outputs		

EtherCAT Terminal | Digital output: EL2xxx/ES2xxx

Signal	2-channel			4-channel	8-channel
5 V DC				EL2124 I_{max} = ±20 mA	
12 V DC				EL2024-0010 I_{max} = 2.0 A	
30 V AC/DC (I_{max} = 2.0 A)				EL2784	EL2788
				EL2794 potential-free	EL2798 potential-free
Relay (up to 230 V AC)	EL2602 I_{max} = 5.0 A, make contact, power contacts	EL2622 I_{max} = 5.0 A, make contact, no power contacts	EL2612 I_{max} = 2.0 A, change-over, no power contacts	EL2624 I_{max} = 2.0 A, make contact, no power contacts	
	EL2602-0010 I_{max} = 5.0 A, make contact, power contacts, contact- protecting switching	EL2622-0010 I_{max} = 5.0 A, make contact, no power contacts, contact- protecting switching	EL2652 I_{max} = 1.0 A, change-over, no power contacts		

The standard EtherCAT Terminals (ELxxxx) can be optionally ordered as ESxxxx with pluggable wiring level.

We reserve the right to make technical changes.

EtherCAT Terminal | Digital output: EL2xxx/ES2xxx

Signal	1-channel	2-channel		
Triac (12…230 V AC)		**EL2712** I_{max} = 0.5 A, power contacts	**EL2722** I_{max} = 1.0 A, mutually locked outputs	**EL2732** I_{max} = 0.5 A, no power contacts
PWM		**EL2502** 24 V DC, I_{max} = 0.5 A		
Frequency output	**EL2521** 1-channel AB, 0…500 kHz, RS422	**EL2522** 2-channel AB, 1-channel ABC, 0…4 MHz		
	EL2521-0024 1-channel AB, 0…500 kHz, 24 V DC			
Current control	**EL2595** LED constant current terminal	**EL2535** 24 V DC, I_{max} = ±50 mA, ±1 A or ±2 A	**EL2545** 50 V DC, I_{max} = ±3.5 A	

EtherCAT Terminal | Analog input: EL3xxx/ES3xxx/ELM3xxx/ELX3xxx

Signal	1-channel		2-channel		4-channel		5-/6-/8-channel
±10 V	**EL3001** single-ended, 12 bit		**EL3002** single-ended, 12 bit		**EL3004** single-ended, 12 bit		**EL3008** single-ended, 12 bit
	EL3101 differential input, 16 bit		**EL3102** differential input, 16 bit	**EL3602** differential input, 24 bit	**EL3104** differential input, 16 bit		
			EL3702 differential input, 16 bit, oversampling				
0…10 V	**EL3061** 12 bit	**EL3161** 16 bit	**EL3062** 12 bit	**EL3162** 16 bit	**EL3064** 12 bit	**EL3164** 16 bit	**EL3068** 12 bit
0…30 V			**EL3062-0030** 12 bit				
±30 V… ±20 mV			**ELM3002** 24 bit, 20 ksps, push-in		**ELM3004** 24 bit, 10 ksps, push-in		
±200 mV			**EL3602-0002** differential input, 24 bit				
±75 mV			**EL3602-0010** differential input, 24 bit				
±10 V/0… 20 mA					**EL3174** 16 bit, NAMUR NE43	**EL3174-0002** 16 bit, electrically isolated, NAMUR NE43	
					EL3174-0032 16 bit, electrically isolated, NAMUR NE43, ±3 V	**EL3174-0090** 16 bit, NAMUR NE43, TwinSAFE SC	
			ELM3142 24 bit, 1 ksps, push-in		**ELM3144** 24 bit, 1 ksps, push-in		**ELM3146** 24 bit, 1 ksps, push-in
							ELM3148 24 bit, 1 ksps, push-in

EtherCAT Terminal | Analog input: EL3xxx/ES3xxx/ELM3xxx/ELX3xxx

Signal	1-channel		2-channel		4-channel		5-/6-/8-channel
0…20 mA	**EL3041** single-ended, 12 bit	**EL3141** single-ended, 16 bit	**EL3042** single-ended, 12 bit	**EL3142** single-ended, 16 bit	**EL3044** single-ended, 12 bit	**EL3144** single-ended, 16 bit	**EL3048** single-ended, 12 bit
	EL3011 differential input, 12 bit	**EL3111** differential input, 16 bit	**EL3742** differential input, 16 bit, oversampling	**EL3012** differential input, 12 bit	**EL3014** differential input, 12 bit	**EL3114** differential input, 16 bit	
			EL3112 differential input, 16 bit	**EL3612** differential input, 24 bit			
4…20 mA	**EL3051** single-ended, 12 bit	**EL3151** single-ended, 16 bit	**EL3052** single-ended, 12 bit	**EL3152** single-ended, 16 bit	**EL3054** single-ended, 12 bit	**EL3154** single-ended, 16 bit	**EL3058** single-ended, 12 bit
	EL3021 differential input, 12 bit	**EL3121** differential input, 16 bit	**EL3022** differential input, 12 bit	**EL3122** differential input, 16 bit	**EL3024** differential input, 12 bit	**EL3124** differential input, 16 bit	
		EL3621-0020 differential input, 24 bit	**EL3182** single-ended, 16 bit, HART			**EL3124-0090** 16 bit, TwinSAFE SC	
Ex i, 0/4…20 mA	**ELX3181** 4…20 mA, single-ended, 16 bit, HART		**ELX3152** single-ended, 16 bit	**ELX3152-0090** single-ended, 16 bit, TwinSAFE SC			
±20 mA			**EL3112-0011** differential input, 16 bit	**ELM3102** 24 bit, 20 ksps, NAMUR NE43	**ELM3104** 24 bit, 10 ksps, NAMUR NE43		
±10 mA			**EL3142-0010** single-ended, 16 bit				
Multi-function	**EL3751** 24 bit, 10 ksps		**ELM3702** 24 bit, 10 ksps, push-in		**ELM3704** 24 bit, 10 ksps, push-in	**ELM3704-0001** 24 bit, 10 ksps, LEMO	
Thermo-couple/mV	**EL3311** 16 bit		**EL3312** 16 bit		**EL3314** 16 bit	**EL3314-0090** 16 bit, TwinSAFE SC	**EL3318** 16 bit
					EL3314-0002 24 bit, electrically isolated		
Ex i, thermo-couple/mV			**ELX3312** 16 bit	**ELX3312-0090** 16 bit, TwinSAFE SC	**ELX3314** 16 bit	**ELX3314-0090** 16 bit, TwinSAFE SC	
Resistance thermometer (RTD)	**EL3201** 16 bit		**EL3202** 16 bit		**EL3204** 2-wire, 16 bit	**EL3204-0200** 16 bit, universal input for RTD	**EL3208** 16 bit
					EL3214 3-wire, 16 bit	**EL3214-0090** 16 bit, TwinSAFE SC	
Ex i, resistance thermometer (RTD)			**ELX3202** 16 bit	**ELX3202-0090** 16 bit, TwinSAFE SC	**ELX3204** 2-wire, 16 bit	**ELX3204-0090** 2-wire, 16 bit, TwinSAFE SC	
Measurement bridge (SG)	**EL3351**	**EL3356** self-calibration	**ELM3502** 24 bit, 20 ksps		**ELM3504** 24 bit, 10 ksps		
	EL3356-0010 24 bit, 10 ksps	**EL3356-0090** TwinSAFE SC					
Ex i, measurement bridge (SG)	**ELX3351** 16 bit	**ELX3351-0090** 16 bit, TwinSAFE SC					

The standard EtherCAT Terminals (ELxxxx) can be optionally ordered as ESxxxx with pluggable wiring level.

We reserve the right to make technical changes.

EtherCAT Terminal | Analog input: EL3xxx/ES3xxx/ELM3xxx/ELX3xxx

Signal	1-channel	2-channel		4-channel	5-channel
Measurement technology	**EL3681** digital multimeter terminal, 18 bit	**EL3692** resistance measurement, 10 mΩ…10 MΩ			**EL3255** potentiometer measurement, 5-channel
Condition Monitoring/ IEPE		**EL3632** 16 bit, 50 ksps	**ELM3602** 24 bit, 50 ksps	**ELM3604** 24 bit, 20 ksps	
Pressure measuring	**EM3701** differential pressure, ±100 hPa	**EM3702** relative pressure, 7500 hPa	**EM3712** relative pressure, ±1000 hPa		

EtherCAT Terminal | Analog input 3-phase power measurement terminal: EL3xxx

Signal	≤ 500 V					> 500 V	
Power measurement	**EL3403** 500 V AC, 1 A	**EL3423** 480 V AC/DC, 1 A, Economy	**EL3433** 500 V AC, 10 A	**EL3443** 480 V AC/DC, 1 A, extended functionality	**EL3443-0010** 480 V AC/DC, 5 A, extended functionality	**EL3413** 690 V AC, 5 A	**EL3453** 690 V AC, 5 A, extended functionality
	EL3483 480 V AC/DC, mains monitor						
Power monitoring	**EL3773** 500 V AC/DC, 10 ksps					**EL3783** 690 V AC, 20 ksps	

EtherCAT Terminal | Analog output: EL4xxx/ES4xxx/ELX4xxx

Signal	1-channel	2-channel		4-channel		8-channel
0…10 V	**EL4001** 12 bit	**EL4002** 12 bit	**EL4102** 16 bit	**EL4004** 12 bit	**EL4104** 16 bit	**EL4008** 12 bit
±10 V	**EL4031** 12 bit	**EL4032** 12 bit	**EL4132** 16 bit	**EL4034** 12 bit	**EL4134** 16 bit	**EL4038** 12 bit
		EL4732 16 bit, oversampling				
0…20 mA	**EL4011** 12 bit	**EL4012** 12 bit	**EL4112** 16 bit	**EL4014** 12 bit	**EL4114** 16 bit	**EL4018** 12 bit
		EL4712 16 bit, oversampling				
4…20 mA	**EL4021** 12 bit	**EL4022** 12 bit		**EL4024** 12 bit		**EL4028** 12 bit
		EL4122 16 bit		**EL4124** 16 bit		
Ex i, 0/4…20 mA	**ELX4181** 16 bit, HART					
±10 mA		**EL4112-0010** 16 bit				

EtherCAT Terminal | Position measurement: EL5xxx/ES5xxx/ELX5xxx

Signal	1-channel				2-channel	
Absolute encoder	**EL5001** SSI encoder interface	**EL5001-0011** SSI monitor terminal	**EL5001-0090** SSI encoder interface, TwinSAFE SC		**EL5002** SSI encoder interface	**EL5032** EnDat 2.2 interface
					EL5032-0090 EnDat 2.2 interface, TwinSAFE SC	**EL5042** BiSS-C interface, unidirectional
Incremental encoder	**EL5151** incremental encoder interface 24 V DC	**EL5151-0021** incremental encoder interface 24 V DC, parameterisable 24 V DC output	**EL5151-0090** incremental encoder interface 24 V DC, TwinSAFE SC		**EL5152** incremental encoder interface 24 V DC	
	EL5101 incremental encoder interface, RS422, 4 million increments/s	**EL5101-0010** incremental encoder interface, RS422, 20 million increments/s	**EL5101-0011** incremental encoder interface, RS422, oversampling	**EL5101-0090** incremental encoder interface, RS422, TwinSAFE SC		
	EL5021 SinCos encoder interface, 1 V_{PP}	**EL5021-0090** SinCos encoder interface, 1 V_{PP}, TwinSAFE SC				
Ex i, incremental encoder	**ELX5151** incremental encoder interface NAMUR	**ELX5151-0090** incremental encoder interface NAMUR, TwinSAFE SC				

EtherCAT Terminal | Communication: EL6xxx/ES6xxx

Signal	1-channel			2-channel		4-channel
System	**EL6090** display terminal	**EL6070** license key terminal	**EL6080** memory terminal 128 kbyte			
Serial	**EL6001** RS232, 115.2 kbaud	**EL6021** RS422/RS485, 115.2 kbaud		**EL6002** RS232, 115.2 kbaud, D-sub	**EL6022** RS422/RS485, 115.2 kbaud, D-sub	
EtherCAT/ Ethernet	**EL6601** switch port	**EL6688** IEEE 1588 master/slave		**EL6692** EtherCAT bridge	**EL6695** EtherCAT bridge, high performance	**EL6614** switch port
Master	**EL6201** AS-Interface	**EL6631** PROFINET RT	**EL6632** PROFINET IRT			**EL6224** IO-Link
	EL6652 EtherNet/IP	**EL6720** Lightbus	**EL6731** PROFIBUS			**EL6224-0090** IO-Link, TwinSAFE SC
	EL6751 CANopen	**EL6752** DeviceNet	**EL6851** DMX			
	EL6861 BACnet, MS/TP, RS485					
Slave	**EL6631-0010** PROFINET RT	**EL6652-0010** EtherNet/IP	**EL6731-0010** PROFIBUS			
	EL6740-0010 Interbus	**EL6751-0010** CANopen	**EL6752-0010** DeviceNet			
	EL6851-0010 DMX					
Safety	**EL6910** TwinSAFE Logic	**EL6900** TwinSAFE Logic	**EL6930** TwinSAFE Logic and PROFIsafe gateway			

The standard EtherCAT Terminals (ELxxxx) can be optionally ordered as ESxxxx with pluggable wiring level.

We reserve the right to make technical changes.

EtherCAT Terminal | Motion: EL7xxx/ES7xxx/EM7xxx

	< 3 A	3…5 A	> 5 A
Servomotor	**EL7201-9014** I_{rms} = 2.8 A, 50 V DC, OCT, STO	**EL7211-9014** I_{rms} = 4.5 A, 50 V DC, OCT, STO	**EL7221-9014** I_{rms} = 7…8 A with ZB8610, 50 V DC, OCT, STO
	EL7201-0010 I_{rms} = 2.8 A, 50 V DC, OCT	**EL7211-0010** I_{rms} = 4.5 A, 50 V DC, OCT	**ZB8610** fan cartridge for EtherCAT and Bus Terminals
	EL7201 I_{rms} = 2.8 A, 50 V DC, resolver	**EL7211** I_{rms} = 4.5 A, 50 V DC, resolver	
Stepper motor	**EL7031** I_{max} = 1.5 A, 24 V DC	**EL7041** I_{max} = 5.0 A, 50 V DC, incremental encoder	
	EL7031-0030 I_{max} = 2.8 A, 24 V DC, 2 AI	**EL7041-0052** I_{max} = 5.0 A, 50 V DC	
	EL7037 I_{max} = 1.5 A, 24 V DC, incremental encoder, vector control	**EL7047** I_{max} = 5.0 A, 50 V DC, incremental encoder, vector control	
		EL7047-9014 I_{max} = 5.0 A, 50 V DC, incremental encoder, vector control, STO	
DC motor output stage	**EL7332** I_{max} = 1.0 A, 24 V DC	**EL7342** I_{max} = 3.5 A, 50 V DC, incremental encoder	
		EL7411-9014 I_{rms} = 4.5 A, 50 V DC, STO	
4-axis interface	**EM7004** 4 incremental encoders, 32 digital I/Os 24 V DC, 4 analog outputs ±10 V		

EtherCAT Terminal | System terminals: EL9xxx/ES9xxx/ELM9xxx/ELX9xxx

Signal	System				
Components for system bus	**EL9011** bus end cover	**EL9012** bus end cover for power and E-bus contacts	**ELM9012** bus end cover for ELMxxxx, black	**ELX9012** bus end cover for ELXxxxx, blue	**EL9195** shield terminal
	EL9070 shield terminal	**EL9080** isolation terminal			
Potential distribution	**EL9180** 2 clamping units per power contact	**EL9181** 2 x 8 terminal points	**EL9182** 8 x 2 terminal points	**EL9183** 1 x 16 terminal points	**EL9184** 8 x 24 V DC, 8 x 0 V DC
	EL9185 4 clamping units at 2 power contacts	**EL9186** 8 x 24 V DC	**EL9187** 8 x 0 V DC	**EL9188** 16 x 24 V DC	**EL9189** 16 x 0 V DC
Potential supply, 24 V DC	**EL9100**	**EL9110** diagnostics	**EL9200** with fuse	**EL9210** diagnostics, with fuse	**EL9520** AS-Interface potential supply with filter
Potential supply, 120…230 V AC	**EL9150** with LED	**EL9160** diagnostics	**EL9190**	**EL9250** with fuse, with LED	**EL9260** diagnostics, with fuse
	EL9290 with fuse				
Overcurrent protection, 24 V DC	**EL9221** 1-channel	**EL9222** 2-channel	**EL9227** 2-channel, extended functionalities		
Power supply	**EL9410** input 24 V DC, output 5 V DC/2 A	**ELM9410** input 24 V DC, output 5 V DC/2 A	**ELX9410** input 24 V DC, output 5 V DC/1 A	**EL9505** input 24 V DC, output 5 V DC/0.5 A	**EL9508** input 24 V DC, output 8 V DC/0.5 A
	EL9510 input 24 V DC, output 10 V DC/0.5 A	**EL9512** input 24 V DC, output 12 V DC/0.5 A	**EL9515** input 24 V DC, output 15 V DC/0.5 A	**EL9560** input 24 V DC, output 24 V DC/0.1 A with electrical isolation	**ELX9560** power supply, 24 V DC, electrically isolated
Filtering and smoothing	**EL9540** surge filter terminal for field supply	**EL9550** surge filter terminal for system/field supply	**EL9576** brake chopper terminal, up to 72 V DC, 155 µF	**ZB8110** external braking resistor	

Product overview
EtherCAT Box

EPxxxx

ERxxxx

EQxxxx

EtherCAT Box | Digital I/O

Input		8 x M8	16 x M8	4 x M12	8 x M12	Other
24 V DC	8-channel filter 3.0 ms	EP1008-0001 ER1008-0001		EP1008-0002 ER1008-0002 EQ1008-0002	EP1008-0022 ER1008-0022	
	8-channel filter 10 µs	EP1018-0001 ER1018-0001		EP1018-0002 ER1018-0002		
	8-channel filter 10 µs, ground switching	EP1098-0001 ER1098-0001				
	8-channel 2-channel timestamp	EP1258-0001 ER1258-0001		EP1258-0002 ER1258-0002		
	8-channel multi-function input			EP1518-0002 ER1518-0002		
	16-channel filter 3.0 ms		EP1809-0021 ER1809-0021		EP1809-0022 ER1809-0022 EQ1809-0022	
	16-channel filter 10 µs		EP1819-0021 ER1819-0021		EP1819-0022 ER1819-0022	
	16-channel filter 10 µs, D-sub, 25-pin					EP1816-0008 EP1816-1008 EP1816-3008 acceleration sensor
Safety	8-channel TwinSAFE, 8 safe inputs			EP1908-0002		

Output		8 x M8	16 x M8	4 x M12	8 x M12	Other
24 V DC	8-channel I_{max} = 0.5 A	EP2008-0001 ER2008-0001		EP2008-0002 ER2008-0002 EQ2008-0002	EP2008-0022 ER2008-0022	
	8-channel I_{max} = 2 A, ∑ 4 A	EP2028-0001 ER2028-0001		EP2028-0002 ER2028-0002		
	8-channel I_{max} = 2.8 A, ∑ 16 A				EP2028-0032 ER2028-1032	
	8-channel I_{max} = 2 A, ∑ 4 A, with diagnostics	EP2038-0001 ER2038-0001		EP2038-0002 ER2038-0002		
	16-channel I_{max} = 0.5 A, ∑ 4 A		EP2809-0021 ER2809-0021		EP2809-0022 ER2809-0022 EQ2809-0022	
	16-channel I_{max} = 0.5 A, ∑ 4 A					EP2816-0008 D-sub, 25-pin EP2816-0010 2 x D-sub, 9-pin EP2816-0004 M16, 19-pin EP2816-0003 IP 20 plug
	24-channel I_{max} = 0.5 A					EP2817-0008 D-sub, 25-pin
25 V AC/ 30 V DC	4-channel relay output			EP2624-0002 ER2624-0002		

EPxxxx: industrial housing in IP 67, ERxxxx: zinc die-cast housing in IP 67, EQxxxx: stainless steel housing in IP 69K

We reserve the right to make technical changes.

EtherCAT Box | Digital I/O

Combi		8 x M8	16 x M8	4 x M12	8 x M12	Other
24 V DC	**8-channel** 4 inputs + 4 outputs, filter 3.0 ms, I_{max} = 0.5 A	**EP2308-0001** ER2308-0001		**EP2308-0002** ER2308-0002		
	8-channel 4 inputs + 4 outputs, filter 10 µs, I_{max} = 0.5 A	**EP2318-0001** ER2318-0001		**EP2318-0002** ER2318-0002		
	8-channel 4 inputs + 4 outputs, filter 3.0 ms, I_{max} = 2 A	**EP2328-0001** ER2328-0001		**EP2328-0002** ER2328-0002		
	8-channel 8 inputs/outputs, filter 10 µs, I_{max} = 0.5 A	**EP2338-0001** ER2338-0001		**EP2338-0002** ER2338-0002		
	8-channel 8 inputs/outputs, filter 3.0 ms, I_{max} = 0.5 A	**EP2338-1001** ER2338-1001		**EP2338-1002** ER2338-1002		
	16-channel 16 inputs/outputs, filter 3.0 ms, I_{max} = 0.5 A, ∑ 4 A		**EP2339-0021** ER2339-0021		**EP2339-0022** ER2339-0022 **EQ2339-0022**	
	16-channel 16 inputs/outputs, filter 10 µs, I_{max} = 0.5 A, ∑ 4 A		**EP2349-0021** ER2349-0021		**EP2349-0022** ER2349-0022	
	16-channel 8 inputs + 8 outputs, filter 10 µs, I_{max} = 0.5 A					**EP2316-0008** D-sub, 25-pin **EP2316-0003** IP 20 plug
Safety	**12-channel** TwinSAFE Logic, 8 safe inputs, 4 safe outputs				**EP1957-0022**	

EtherCAT Box | Analog I/O

Input		M8	M12	Other
±10 V, ±20 mA	**2-channel** parameterisable, with galvanic isolation, single-ended, 16 bit		**EP3162-0002**	
±10 V, 0/4…20 mA	**4-channel** parameterisable, differential inputs, 16 bit		**EP3174-0002** ER3174-0002 **EQ3174-0002** **EP3174-0092** TwinSAFE SC	
	2-channel 2 analog inputs, parameterisable, single-ended, 16 bit, 2 digital control outputs (sink/source type), 24 V DC, short-circuit proof		**EP3182-1002**	
	4-channel parameterisable, single-ended, 16 bit		**EP3184-0002** ER3184-0002 **EP3184-1002** 2 channels per socket ER3184-1002 2 channels per socket	
Resistance thermometer (RTD)	**4-channel** PT100, PT200, PT500, PT1000, Ni100, Ni120, Ni1000, 16 bit		**EP3204-0002** ER3204-0002 **EQ3204-0002**	
Thermo-couple/mV	**4-channel** type J, K, L, B, E, N, R, S, T, U, 16 bit		**EP3314-0002** ER3314-0002 **EQ3314-0002**	
Measuring bridge (SG)	**1-channel** 24 bit, self-calibration		**EP3356-0022**	
Condition Monitoring/ IEPE	**2-channel**	**EP3632-0001**		
Accelero-meters	**2-channel** 2 x 3 axes			**EP3752-0000**
Pressure measuring	**4-channel** differential/absolute pressure measurement, 6 digital inputs, 2 digital outputs	**EP3744-0041** 4 pressure inputs -1…1 bar (differential pressure to fifth connection) **EP3744-1041** 4 pressure inputs 0…7 bar (differential pressure to fifth connection)		

Output		M8	M12	Other
±10 V, 0/4…20 mA	**4-channel** parameterisable, 16 bit		**EP4174-0002** ER4174-0002	

Combi		M8	M12	Other
±10 V, 0/4…20 mA	**8-channel** 4 inputs + 4 outputs, U/I parameterisable per channel, 8 digital I/Os, 24 V DC/3.0 ms		**EP4378-1022**	
	4-channel 2 inputs + 2 outputs, parameterisable, 16 bit		**EP4374-0002** ER4374-0002	

EPxxxx: industrial housing in IP 67, ERxxxx: zinc die-cast housing in IP 67, EQxxxx: stainless steel housing in IP 69K

We reserve the right to make technical changes.

EtherCAT Box | Special functions

Function		M8	M12	Other
Position measurement	**SSI encoder interface** 1 MHz, 32 bit		**EP5001-0002**	
	Incremental encoder interface RS422 32/16 bit, 5 V DC sensor supply		**EP5101-0002** ER5101-0002	**EP5101-0011** D-sub, 4 million increments/s **EP5101-2011** D-sub, 20 million increments/s
	Incremental encoder interface RS422 32/16 bit, 24 V DC sensor supply		**EP5101-1002** ER5101-1002	
	Incremental encoder interface 24 V DC 32/16 bit		**EP5151-0002** ER5151-0002	
Communi-cation	**Serial interface** 1-channel, RS232, RS422/RS485, 5 V DC/1 A		**EP6001-0002** ER6001-0002	
	Serial interface 2-channel, RS232, RS422/RS485		**EP6002-0002** ER6002-0002	
	IO-Link master 4 ports		**EP6224-2022** Class A **EP6224-3022** Class B	
	IO-Link master 8 ports		**EP6228-0022** Class A **EP6228-3032** Class B	
Motion	**Servomotor module** I_{rms} = 4.5 A, 50 V DC, OCT, STO			**EP7211-9034**
	Stepper motor module I_{max} = 1.5 A, 50 V DC, incremental encoder		**EP7041-1002** ER7041-1002	
	Stepper motor module I_{max} = 5 A, 50 V DC, incremental encoder		**EP7041-0002** ER7041-0002 **EP7041-2002** ER7041-2002 **EP7041-3002** ER7041-3002 **EP7041-3102**	
	DC motor output stage I_{max} = 3.5 A, 50 V DC		**EP7342-0002** ER7342-0002	
Special functions	**Multi-functional I/O box** 8 digital inputs/outputs, 2 x tacho input, 2 x 0/4…20 mA input, 1 x 0/4…20 mA output, 1 x 1.2 A PWMi output		**EP8309-1022** ER8309-1022	
System	**EtherCAT Box** 3 decimal ID switches	**EP1111-0000**		
	EtherCAT junction 2-channel	**EP1122-0001**		
	EtherCAT P junction 2 ports	**EP1312-0001**		
	EtherCAT junction 8 ports	**EP9128-0021**		
	Power distribution 4/4-channel			**EP9214-0023** 7/8" plug, 7/8" socket
	Power distribution with current measurement/data logging 4/4-channel			**EP9224-0023** 7/8" plug, 7/8" socket
	1-channel power distribution box ENP to EtherCAT P			**EP9221-0057** ENP B17 plug, ENP B17 socket
	4-channel power distribution box ENP to EtherCAT P			**EP9224-0037** ENP B17 plug, ENP B17 socket
	PROFINET RT EtherCAT Box EtherCAT Box interface with PROFINET RT		**EP9300-0022**	
	EtherCAT media converter fibre optic 1-channel			**EP9521-0020**

Product overview EtherCAT P Box

EtherCAT P Box | Digital I/O							
Input		**4 x M8**	**8 x M8**	**16 x M8**	**4 x M12**	**8 x M12**	**Other**
24 V DC	**4-channel** filter 3.0 ms	**EPP1004-0061**					
	8-channel filter 3.0 ms		**EPP1008-0001**		**EPP1008-0002**	**EPP1008-0022**	
	8-channel filter 10 µs		**EPP1018-0001**		**EPP1018-0002**		
	8-channel 2-channel timestamp		**EPP1258-0001**		**EPP1258-0002**		
	8-channel multi-function input				**EPP1518-0002**		
	16-channel filter 3.0 ms			**EPP1809-0021**		**EPP1809-0022**	
	16-channel filter 10 µs			**EPP1819-0021**		**EPP1819-0022**	
	16-channel filter 10 µs, D-sub, 25-pin						**EPP1816-0008** **EPP1816-3008** acceleration sensor
Output		**4 x M8**	**8 x M8**	**16 x M8**	**4 x M12**	**8 x M12**	**Other**
24 V DC	**8-channel** I_{max} = 0.5 A, ∑ 3 A		**EPP2008-0001**		**EPP2008-0002**	**EPP2008-0022**	
	8-channel I_{max} = 2 A, ∑ 3 A		**EPP2028-0001**		**EPP2028-0002**		
	8-channel I_{max} = 2 A, ∑ 3 A, with diagnostics		**EPP2038-0001**		**EPP2038-0002**		
	16-channel I_{max} = 0.5 A, ∑ 3 A			**EPP2809-0021**		**EPP2809-0022**	
	16-channel I_{max} = 0.5 A, ∑ 3 A						**EPP2816-0008** D-sub, 25-pin **EPP2816-0010** 2 x D-sub, 9-pin **EPP2816-0004** M16, 19-pin
	24-channel I_{max} = 0.5 A						**EPP2817-0008** D-sub, 25-pin
25 V AC/ 30 V DC	**4-channel** relay output				**EPP2624-0002**		

We reserve the right to make technical changes.

EtherCAT P Box | Digital I/O

Combi		4 x M8	8 x M8	16 x M8	4 x M12	8 x M12	Other
24 V DC	**4-channel** 4 inputs/outputs, filter 10 µs, I_{max} = 0.5 A, ∑ 3 A	**EPP2334-0061**					
	8-channel 4 inputs + 4 outputs, filter 3.0 ms, I_{max} = 0.5 A		**EPP2308-0001**		**EPP2308-0002**		
	8-channel 4 inputs + 4 outputs, filter 10 µs, I_{max} = 0.5 A		**EPP2318-0001**		**EPP2318-0002**		
	8-channel 4 inputs + 4 outputs, filter 3.0 ms, I_{max} = 2 A, ∑ 3 A		**EPP2328-0001**		**EPP2328-0002**		
	8-channel 8 inputs/outputs, filter 10 µs, I_{max} = 0.5 A, ∑ 3 A		**EPP2338-0001**		**EPP2338-0002**		
	8-channel 8 inputs/outputs, filter 3.0 ms, I_{max} = 0.5 A, ∑ 3 A		**EPP2338-1001**		**EPP2338-1002**		
	16-channel 16 inputs/outputs, filter 3.0 ms, I_{max} = 0.5 A, ∑ 3 A			**EPP2339-0021**		**EPP2339-0022**	
	16-channel 16 inputs/outputs, filter 10 µs, I_{max} = 0.5 A, ∑ 3 A			**EPP2349-0021**		**EPP2349-0022**	
	16-channel 8 inputs + 8 outputs, filter 10 µs, I_{max} = 0.5 A, ∑ 3 A						**EPP2316-0008** D-sub, 25-pin **EPP2316-0003** IP 20 plug

EtherCAT P Box | Analog I/O

Input		M8	M12
±10 V, 0/4…20 mA	**4-channel** parameterisable, differential input, 16 bit		EPP3174-0002
	4-channel parameterisable, single-ended, 16 bit		EPP3184-0002
Resistance thermometer (RTD)	**4-channel** PT100, PT200, PT500, PT1000, Ni100, Ni120, Ni1000, 16 bit		EPP3204-0002
Thermo-couple/mV	**4-channel** type J, K, L, B, E, N, R, S, T, U, 16 bit		EPP3314-0002
Condition Monitoring/ IEPE	**2-channel**	EPP3632-0001	
Pressure measuring	**4-channel** differential/absolute pressure measurement, 6 digital inputs, 2 digital outputs	**EPP3744-0041** 4 pressure inputs -1…1 bar (differential pressure to fifth connection) **EPP3744-1041** 4 pressure inputs 0…7 bar (differential pressure to fifth connection)	
Output		**M8**	**M12**
±10 V, 0/4…20 mA	**4-channel** parameterisable, 16 bit		EPP4174-0002
	4-channel 2 inputs + 2 outputs, parameterisable, 16 bit		EPP4374-0002

We reserve the right to make technical changes.

EtherCAT P Box | Special functions

Function		M8	M12	Other
Position measurement	**Incremental encoder interface RS422** 32/16 bit, 5 V DC sensor supply		EPP5101-0002	EPP5101-0011 D-sub, 4 million increments/s
	Incremental encoder interface RS422 32/16 bit, 24 V DC sensor supply		EPP5101-1002	
	Incremental encoder interface 24 V DC 32/16 bit		EPP5151-0002	
Communi-cation	**Serial interface** 1-channel, RS232, RS422/RS485, 5 V DC/1 A		EPP6001-0002	
	Serial interface 2-channel, RS232, RS422/RS485		EPP6002-0002	
	IO-Link master Class A, 8 ports		EPP6228-0022	
Motion	**Stepper motor module** I_{max} = 1.5 A, 50 V DC, incremental encoder		EPP7041-1002	
	Stepper motor module I_{max} = 5.0 A, 50 V DC, incremental encoder		EPP7041-3002	
	DC motor output stage I_{max} = 3.5 A, 50 V DC		EPP7342-0002	
System	**EtherCAT P Box** 3 decimal ID switches	EPP1111-0000		
	EtherCAT P junction 3 ports, with feed-in	EPP1322-0001		
	EtherCAT P junction 3 ports, with refresh	EPP1332-0001		
	EtherCAT P junction 3 ports	EPP1342-0001		
	EtherCAT P Box EtherCAT P/EtherCAT connector with power transmission	EPP9001-0060		
	EtherCAT P Box 4 x diagnostics (U_S, U_P, I_S, I_F)	EPP9022-0060		

Product overview EtherCAT Plug-in Modules

EtherCAT Couplers

EtherCAT Couplers E-bus	**EJ1100**	**EJ1101-0022** external: connectors, power supply module and optional ID switches

EtherCAT Plug-in Modules | Digital input 24 V DC: EJ1xxx

Signal	4-channel	8-channel	16-channel
Filter 10 µs			**EJ1819** type 3
Filter 3.0 ms		**EJ1008** type 3	**EJ1809** type 3
		EJ1859 type 3, 8 inputs, 8 outputs	**EJ1889** ground switching
Safe input	**EJ1914** TwinSAFE Logic, 4 safe inputs	**EJ1918** TwinSAFE Logic, 8 safe inputs	
		EJ1957 TwinSAFE Logic, 8 safe inputs, 4 safe outputs	

EtherCAT Plug-in Modules | Digital input: EJ1xxx

Signal	8-channel
5 V DC/ 3.3 V DC	**EJ1128**

EtherCAT Plug-in Modules | Digital output 24 V DC: EJ2xxx

Signal	1-channel	2-channel	4-channel	8-channel	16-channel
I_{max} = 0.5 A				**EJ2008**	**EJ2809**
				EJ1859 type 3, 8 inputs, 8 outputs	**EJ2889** ground switching
Safe output			**EJ2914** TwinSAFE Logic, 4 safe outputs	**EJ2918** TwinSAFE Logic, 8 safe outputs	
			EJ1957 TwinSAFE Logic, 8 safe inputs, 4 safe outputs		
PWM	**EJ2521-0224** 24 V DC, 1 A	**EJ2502** 24 V DC, 0.5 A			

EtherCAT Plug-in Modules | Digital output: EJ2xxx

Signal	8-channel
5 V DC/ 3.3 V DC	**EJ2128**

EtherCAT Plug-in Modules | Analog input: EJ3xxx

Signal	2-channel	4-channel	8-channel
±10 V		**EJ3004** single-ended, 12 bit	
		EJ3104 differential input, 16 bit	**EJ3108** 6 x differential inputs, 2 x single-ended, 16 bit
0…20 mA			**EJ3048** single-ended, 12 bit
4…20 mA			**EJ3058** single-ended, 12 bit
Thermocouple			**EJ3318** type J, K, L…U, 16 bit
Resistance thermometer (RTD)	**EJ3202** 16 bit	**EJ3214** 16 bit	

EN 61131-2 specification ▶ **www.beckhoff.com/EN61131-2**

We reserve the right to make technical changes.

EtherCAT Plug-in Modules | Analog output: EJ4xxx

Signal	2-channel	4-channel	8-channel
0…10 V	**EJ4002** 12 bit		
±10 V	**EJ4132** 16 bit	**EJ4134** 16 bit	
0…20 mA			**EJ4018** 12 bit

EtherCAT Plug-in Modules | Position measurement: EJ5xxx

Signal	1-channel	2-channel
Absolute encoder		**EJ5002** SSI encoder interface
Incremental encoder	**EJ5101** incremental encoder interface RS422	

EtherCAT Plug-in Modules | Communication: EJ6xxx

Signal	1-channel	2-channel	4-channel	
Master		**EJ6002** serial interface RS232, RS485 or RS422	**EJ6224** IO-Link	**EJ6224-0090** IO-Link, TwinSAFE SC
Safety	**EJ6910** TwinSAFE Logic			

EtherCAT Plug-in Modules | Motion: EJ7xxx

	< 3 A	3…5 A
Servomotor		**EJ7211-0010** I_{rms} = 4.5 A, 50 V DC, OCT
		EJ7211-9414 I_{rms} = 4.5 A, 50 V DC, OCT, STO, TwinSAFE SC
Stepper motor	**EJ7031** I_{max} = 1.5 A, 24 V DC	**EJ7041-0052** I_{max} = 5.0 A, 50 V DC
		EJ7047 I_{max} = 5.0 A, 50 V DC, incremental encoder, vector control
DC motor output stage		**EJ7342** I_{max} = 3.5 A, 50 V DC, incremental encoder

EtherCAT Plug-in Modules | System: EJ9xxx

Signal	Power supply and accessories	
Power supply	**EJ9400** input 24 V DC, E-bus power supply, 2.5 A	**EJ9404** input 24 V DC, E-bus power supply, 12 A
	EJ9505 input 24 V DC, output 5 V DC, 0.5 A	
Filtering and smoothing	**EJ9576** brake chopper module, up to 72 V DC, 155 µF	
	System	
System	**EJ9001** placeholder module	

System overview fieldbus I/O

Bus Coupler series BK, the link between Bus Terminals and fieldbus

Bus Terminal Controller series BC with integrated IEC 61131-3 PLC

Bus Terminal Controller series BX with integrated IEC 61131-3 PLC and extended interfaces

Embedded PC series CX, further Embedded PCs see page 184

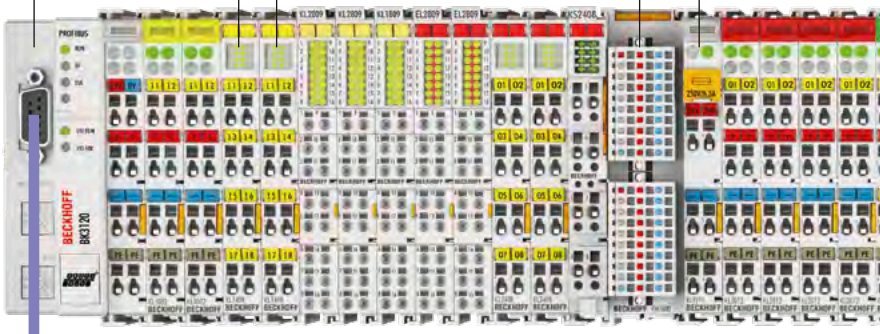
The head station of the Bus Terminals: from Bus Coupler with fieldbus interface to Embedded PC

Free mix of signals: about 400 different Bus Terminals for connection to all common sensors and actuators

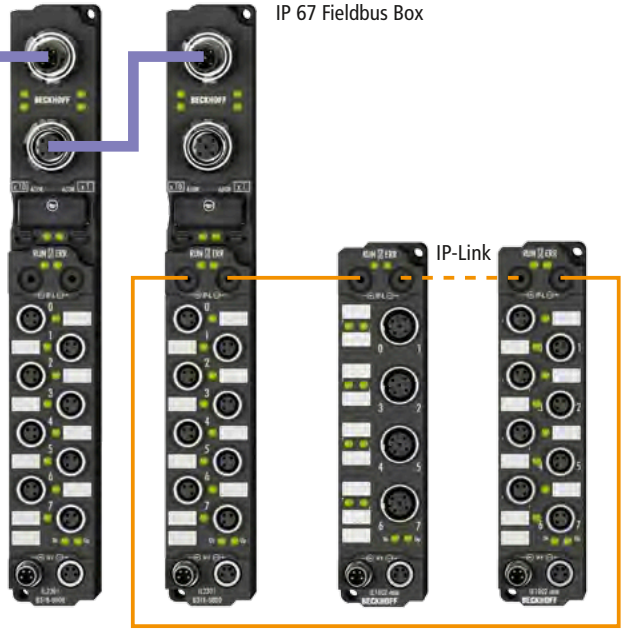
Potential feed terminals enable configuration of different potential groups.

Bus Terminals in 1-, 2-, 4-, 8- and 16-channel modularity

The terminal modules with plug-in wiring combine 16, 32 or 64 digital I/Os within a very small space and with high packing density.



IP 67 Fieldbus Box



IP-Link

Compact Box

Coupler Box/ PLC Box

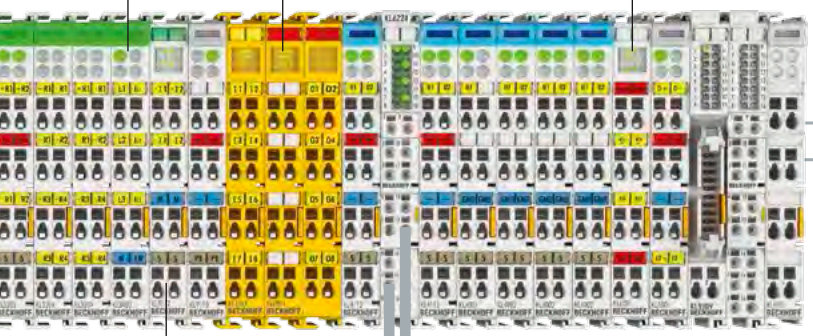
Extension Box modules

We reserve the right to make technical changes.

3-phase power measurement capability enables all relevant electrical data of the supply network to be measured.

Communication terminals enable the integration of subsystems such as AS-Interface, RS232 and RS485.

Integrated safety: the TwinSAFE Bus Terminals enable the connection of all common safety sensors and actuators.

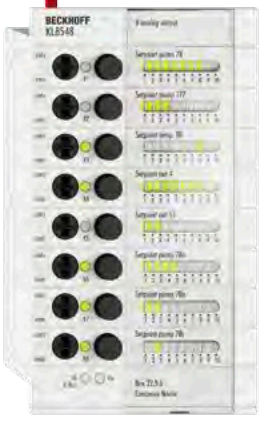


Bus Terminals with a maximum measurement error of ±0.01 %

Bus end terminal

The terminal bus extension enables the connection of up to 255 Bus Terminals (instead of 64) to a single station.

IO-Link box modules



Manual operating modules enable switching, controlling and monitoring of digital and analog signals as well as setting and reading of data and values in the event of a controller failure. Process data connection via K-bus interface with K-bus extension (up to 31 modules). Signal connection via KL9309.

System overview Bus Couplers

	Bus Coupler					PLC		
	Low Cost LCxx00	Economy BKxx10	Standard BKxx00	Economy plus BKxx20	Compact BKxx5x	Controller BCxx00	BCxx50	BCxx20
Fieldbus function	fieldbus slave	fieldbus slave	fieldbus slave	fieldbus slave	fieldbus slave	fieldbus slave	fieldbus slave	fieldbus slave
Integrated IEC 61131-3 PLC for	–	–	–	–	–	TwinCAT 2	TwinCAT 2	TwinCAT 2
Performance qualities	–	–	–	–	–	–	–	–
Program memory	–	–	–	–	–	32/96 kbyte	48 kbyte	128 kbyte
Main memory	–	–	–	–	–	–	–	–
Current supply K-bus	500 mA	500 mA	1750 mA	1750 mA	1000 mA	1750 mA	1000 mA	1750 mA
Fieldbus connection technology	direct to the spring-loaded terminals	plug depending on fieldbus	plug depending on fieldbus	plug depending on fieldbus	plug depending on fieldbus	plug depending on fieldbus	plug depending on fieldbus	plug depending on fieldbus
Supported Bus Terminals	all digital I/Os except KL15xx, KL25xx, KL2692, KL27x1	all digital I/Os except KL15xx, KL25xx, KL2692, KL27x1	all	all	all	all	all	all
Max. number of Bus Terminals	64	64	64	255 with terminal bus extension	255 with terminal bus extension	64	255 with terminal bus extension	255 with terminal bus extension
Electrical isolation	PROFIBUS: yes, CANopen and DeviceNet: no	between fieldbus/ power contacts/ supply voltage	between fieldbus/ power contacts/ supply voltage	between fieldbus/ power contacts/ supply voltage	between fieldbus/ power contacts/ supply voltage	between fieldbus/ power contacts/ supply voltage	between fieldbus/ power contacts/ supply voltage	between fieldbus/ power contacts/ supply voltage

We reserve the right to make technical changes.

	Embedded PC				
BC9191-xxxx	BXxx00	CX80xx	CX81xx	CX9020	CX51xx
Room Controller	fieldbus slave	integrated fieldbus master/slave	integrated fieldbus master/slave	optional fieldbus master/slave	optional fieldbus master/slave
TwinCAT 2	TwinCAT 2	TwinCAT 2	TwinCAT 3	TwinCAT 2, TwinCAT 3	TwinCAT 2, TwinCAT 3
Building Automation, integrated I/Os	–	–	–	Motion Control, visualisation	Motion Control, visualisation
48/128 kbyte	256 kbyte	–	–	–	–
–	–	64 Mbyte DDR2 RAM	512 Mbyte DDR3 RAM	1 Gbyte DDR3 RAM	2 or 4 Gbyte DDR3 RAM
200 mA	1450 mA	2000 mA	2000 mA	2000 mA	2000 mA
2 x RJ45 (switched)	plug depending on fieldbus	plug depending on fieldbus	plug depending on fieldbus	optional, plug depending on fieldbus	optional, plug depending on fieldbus
all	all	all	all	all	all
255 with terminal bus extension	255 with terminal bus extension	255 with terminal bus extension	255 with terminal bus extension	255 with terminal bus extension	255 with terminal bus extension
between mains supply and internal 24 V power supply	between fieldbus/ power contacts/ supply voltage	between supply voltage and fieldbus	between supply voltage and fieldbus	between supply voltage and fieldbus	between supply voltage and fieldbus

Further Embedded PCs see page 184

We reserve the right to make technical changes.

Product overview Bus Couplers

	Bus Coupler					PLC		
Fieldbus slave	Low Cost only digital I/Os	Economy only digital I/Os	Standard	Economy plus	Compact	Controller for TwinCAT 2 (IEC 61131-3) Program memory 32/96 kbyte	Program memory 48 kbyte	Program memory 128 kbyte
EtherCAT				BK1120	BK1150			
					BK1250			
LIGHTBUS		BK2010	BK2000	BK2020				
PROFIBUS		BK3010 1.5 Mbaud						
	LC3100 12 Mbaud	BK3110 12 Mbaud	BK3100 12 Mbaud	BK3120 12 Mbaud	BK3150 12 Mbaud	BC3100 12 Mbaud	BC3150 12 Mbaud	
				BK3520 12 Mbaud, fibre optic				
INTERBUS			BK4000	BK4020				
CANopen	LC5100	BK5110		BK5120	BK5150		BC5150	
					BK5151			
DeviceNet	LC5200	BK5210	BK5200	BK5220	BK5250		BC5250	
ControlNet			BK7000					
CC-Link					BK7150			
Modbus			BK7300		BK7350	BC7300	BC8050	
							BC8150	
sercos the automation bus				BK7520				
RS485			BK8000				BC8050	
RS232			BK8100				BC8150	
Ethernet TCP/IP			BK9000		BK9050	BC9000	BC9050	BC9020
			BK9100 2-channel switch			BC9100 2-channel switch	BC9191 Room Controller	BC9191-0100 Room Controller
								BC9120 2-channel switch
PROFINET			BK9103 2-channel switch		BK9053			
EtherNet/IP			BK9105 2-channel switch		BK9055			

We reserve the right to make technical changes.

Embedded PC

Program memory 256 kbyte	CX80xx	CX81xx	CX9020	CX1010	CX50xx	CX51xx	CX1020, CX1030	CX20xx
	CX8010 200	**CX8110** 208	optional[2]		optional[2]	optional[2]		optional[2]
				optional[1]			optional[1]	
	CX8030 200 master		optional[2]	optional[1]	optional[2]	optional[2]	optional[1]	optional[2]
BX3100 12 Mbaud	**CX8031** 201 slave		optional[2]	optional[1]	optional[2]	optional[2]	optional[1]	optional[2]
BX5100	**CX8050** 201 master		optional[2]	optional[1]	optional[2]	optional[2]	optional[1]	optional[2]
	CX8051 201 slave		optional[2]	optional[1]	optional[2]	optional[2]	optional[1]	optional[2]
BX5200								
		optional[3]	optional[3]	optional[3]	optional[3]	optional[3]	optional[3]	optional[3]
BX8000	**CX8080** 202	**CX8180** 208	optional[2]	optional[2]	optional[2]	optional[2]	optional[2]	optional[2]
BX8000	**CX8080** 202	**CX8180** 208	optional[2]	optional[2]	optional[2]	optional[2]	optional[2]	optional[2]
BX9000	**CX8090** 202	**CX8190** 208	**CX9020** 210	**CX1010** 214	**CX5010** 220	**CX5120** 224	**CX1020** 232	**CX2020** 246
					CX5020 220	**CX5130** 226	**CX1030** 234	**CX2030** 246
						CX5140 228		**CX2040** 246
								CX2042 250
								CX2062 250
								CX2072 250
	CX8093 203		optional[2]	optional[3]	optional[2, 3]	optional[2, 3]	optional[3]	optional[2, 3]
	CX8095 203		optional[2]	optional[3]	optional[2, 3]	optional[2, 3]	optional[3]	optional[2, 3]

[1] via modular fieldbus interface, [2] via hardware, [3] via software library

Product overview Bus Terminals

Bus Terminal | Digital input: KL1xxx/KS1xxx							KM1xxx
Signal	**2-channel**		**4-channel**		**8-channel**	**16-channel**	**4-/16-/32-/64-ch.**
5 V DC			**KL1124**				
24 V DC (filter 3.0 ms)	**KL1002** type 3		**KL1104** type 3	**KL1304** type 2	**KL1408** type 3	**KL1809** type 3	
	KL1302 type 2	**KL1402** type 3	**KL1154** positive/ground switching	**KL1184** ground switching	**KL1488** ground switching	**KL1862** flat-ribbon cable, type 3	**KM1002** 16-channel, type 1
	KL1052 positive/ground switching	**KL1352** NAMUR	**KL1404** 4 x 2-wire connection, type 3	**KL1804** 8 x 24 V, 4 x 0 V, type 3	**KL1808** 8 x 24 V DC, type 3	**KL1889** ground switching	**KM1004** 32-channel, type 1
	KL1212 short-circuit protected sensor supply, type 1	**KL1362** break-in alarm			**KL1859** 8 inputs, 8 outputs, type 3, I_{max} = 0.5 A	**KL1862-0010** flat-ribbon cable, type 3, ground switching	**KM1008** 64-channel, type 1
24 V DC (filter 0.2 ms)	**KL1012** type 3	**KL1312** type 2	**KL1114** type 3	**KL1314** type 2	**KL1418** type 3	**KL1819** type 3	
		KL1412 type 3	**KL1164** positive/ground switching	**KL1194** ground switching	**KL1498** ground switching	**KL1872** flat-ribbon cable, type 3	**KM1012** 16-channel, type 1
			KL1414 4 x 2-wire connection, type 3	**KL1434** 4 x 2-wire connection, type 2			**KM1014** 32-channel, type 1
			KL1814 8 x 24 V, 4 x 0 V, type 3				**KM1018** 64-channel, type 1
24 V DC	**KL1232** pulse expansion	**KL1382** thermistor	**KL1904** TwinSAFE, 4 safe inputs				**KM1644** manual operation, 4-channel
≥ 48 V DC	**KL1032** filter 3.0 ms	**KL1712-0060**					
120 V AC/DC	**KL1712**						
230 V AC	**KL1702**	**KL1722** no power contacts	**KL1704**				
Counter (24 V DC)	**KL1501** type 1, 100 kHz, 32 bit	**KL1512** type 1, 1 kHz, 16 bit					

Bus Terminal | Digital output: KL2xxx/KS2xxx					KM2xxx
Signal	**2-channel**	**4-channel**	**8-channel**	**16-channel**	**16-/32-/64-channel**
5 V DC		**KL2124**			
24 V DC (I_{max} = 0.5 A)	**KL2012**	**KL2114**	**KL2408**	**KL2809**	
				KL2819 with diagnostics	**KM2002** 16-channel
	KL2032 reverse voltage protection	**KL2184** ground switching	**KL2488** ground switching	**KL2889** ground switching	**KM2004** 32-channel
		KL2134 reverse voltage protection	**KL2808** 8 x 0 V	**KL2872** flat-ribbon cable	**KM2008** 64-channel
	KL2212 diagnostics, protected sensor supply	**KL2404** 4 x 2-wire	**KL1859** 8 inputs, 8 outputs, filter 3.0 ms, type 3	**KL2872-0010** flat-ribbon cable, ground switching	**KM2042** 16-channel, D-sub connection

The standard Bus Terminals (KLxxxx) can be optionally ordered as KSxxxx with pluggable wiring level.
EN 61131-2 specification ▶ **www.beckhoff.com/EN61131-2**

We reserve the right to make technical changes.

Bus Terminal | Digital output: KL2xxx/KS2xxx						KM2xxx
Signal	**1-channel**	**2-channel**		**4-channel**	**8-channel**	**2-/4-channel**
24 V DC (I_{max} = 2.0 A)		**KL2022**		**KL2424** 4 x 2-wire	**KL2828** 8 x 2-wire	
30 V AC/DC (I_{max} = 2.0 A), solid state relay				**KL2784**		
				KL2794 potential-free	**KL2798** potential-free	
24 V DC		**KL2442** 2 x 4 A/1 x 8 A		**KL2904** TwinSAFE, 4 safe outputs		
Relay > 100 V AC	**KL2631** 400 V AC, make contact	**KL2612** 125 V AC, change-over				
230 V AC	**KL2641** relay, make contact, manual operation, I_{max} = 16 A	**KL2602** relay, make contact, I_{max} = 5 A	**KL2622** relay, make contact, no power contacts, I_{max} = 5 A	**KL2634** relay, make contact, 250 V AC/30 V DC		**KM2604** relay, I_{max} = 16 A, 4-channel
	KL2751 universal dimmer, 300 W	**KL2602-0010** relay, make contact, I_{max} = 5 A, contact-protecting switching	**KL2622-0010** relay, make contact, no power contacts, I_{max} = 5 A, contact-protecting switching			**KM2614** relay, I_{max} = 16 A, 4-channel, manual operation
	KL2761 universal dimmer, 600 W	**KL2652** relay, change-over, I_{max} = 5 A	**KL2702** solid state relay, I_{max} = 0.3 A			**KM2774** triac outputs, I_{max} = 1.5 A
	KL2701 solid state relay, I_{max} = 3 A	**KL2712** triac	**KL2722** triac, mutually locked outputs			**KM2642** relay, I_{max} = 6 A, manual/automatic operation, relay state readable
		KL2732 triac, mutually locked outputs, no power contacts	**KL2692** cycle monitoring (watchdog)			**KM2652** relay, I_{max} = 6 A, manual/automatic operation, switch and relay state readable
PWM		**KL2502** 24 V DC, I_{max} = 0.1 A	**KL2512** 24 V DC, I_{max} = 1.5 A, ground switching			
		KL2535 I_{max} = ±1 A, 24 V DC, current-controlled	**KL2545** I_{max} = ±3.5 A, 50 V DC, current-controlled			
Frequency output	**KL2521**					

Bus Terminal | Motion: KL2xxx/KS2xxx		
	< 3 A	**3…5 A**
Stepper motor	**KL2531** I_{max} = 1.5 A, 24 V DC	**KL2541** I_{max} = 5.0 A, 50 V DC, incremental encoder
DC motor output stage	**KL2532** I_{max} = 1.0 A, 24 V DC	**KL2552** I_{max} = 5.0 A, 50 V DC, incremental encoder
	KL2284 reverse switching, I_{max} = 2.0 A, 0…24 V DC	
AC motor speed controller	**KL2791** 230 V AC, 200 VA, 1-phase AC motor	

Bus Terminal | Analog input: KL3xxx/KS3xxx, KM3xxx

Signal	1-channel		2-channel		4-channel	8-channel
0…2 V, 0…500 mV			**KL3172** 0…2 V, 16 bit, 0.05 %	**KL3172-0500** 0…500 mV, 16 bit, 0.05 %		
±2 V				**KL3182** 16 bit, 0.05 %		
0…10 V	**KL3061** single-ended, 12 bit		**KL3062** single-ended, 12 bit	**KL3162** 16 bit, 0.05 %	**KL3064** single-ended, 12 bit	
					KL3464 single-ended, 12 bit	**KL3468** single-ended, 12 bit
±10 V	**KL3001** differential input, 12 bit		**KL3002** differential input, 12 bit	**KL3102** differential input, 16 bit	**KL3404** single-ended, 12 bit	**KL3408** single-ended, 12 bit
				KL3132 16 bit, 0.05 %		
0…20 mA	**KL3011** differential input, 12 bit	**KL3041** with sensor supply, 12 bit	**KL3012** differential input, 12 bit	**KL3112** differential input, 16 bit	**KL3044** single-ended, 12 bit	**KL3448** single-ended, 12 bit
			KL3042 with sensor supply, 12 bit	**KL3142** 16 bit, 0.05 %	**KL3444** single-ended, 12 bit	
4…20 mA	**KL3021** differential input, 12 bit	**KL3051** with sensor supply, 12 bit	**KL3022** differential input, 12 bit	**KL3122** differential input, 16 bit	**KL3054** single-ended, 12 bit	**KL3458** single-ended, 12 bit
			KL3052 with sensor supply, 12 bit	**KL3152** 16 bit, 0.05 %	**KL3454** single-ended, 12 bit	
Resistance thermometer (RTD)	**KL3201** PT100…1000, Ni100, 16 bit		**KL3202** PT100…1000, Ni100, 16 bit	**KL3222** PT100, 4-wire connection, high-precision	**KL3204** PT100…1000, Ni100…1000, 2-wire connection	**KL3208-0010** PT1000, Ni1000, NTC 1.8… 100 k, potentiom. 1, 5, 10 kΩ
					KL3214 PT100…1000, Ni100…1000, KTY, 3-wire connection	**KL3228** PT1000, Ni1000
Thermo-couple/mV	**KL3311** type J, K, L…U, 16 bit		**KL3312** type J, K, L…U, 16 bit		**KL3314** type J, K, L…U, 16 bit	
Measurement bridge (SG)	**KL3351** strain gauge, 16 bit	**KL3356** strain gauge, 16 bit, self-calibration				
Oscilloscope	**KL3361** ±16 mV		**KL3362** ±10 V			
Measurement technology	**KL3681** digital multimeter, 18 bit		**KL3403** power measurement, 3-phase, 1 A	**KL3403-0010** power measurement, 3-phase, 5 A		
Pressure measuring	**KM3701** differential pressure, -100…+100 hPa	**KM3701-0340** differential pressure, up to 340 hPa	**KM3702** relative pressure, 7500 hPa	**KM3712** relative pressure, -1000…+1000 hPa		

Bus Terminal | Analog output: KL4xxx/KS4xxx

Signal	1-channel	2-channel	4-channel	8-channel	KM4xxx 2-channel
0…10 V	**KL4001** 12 bit, potential-free output	**KL4002** 12 bit	**KL4004** 12 bit, no power contacts		**KM4602** 12-bit manual/automatic operation
			KL4404 12 bit	**KL4408** 12 bit	
±10 V	**KL4031** 12 bit, potential-free output	**KL4032** 12 bit	**KL4034** 12 bit, no power contacts		
		KL4132 16 bit	**KL4434** 12 bit	**KL4438** 12 bit	
			KL4494 12 bit, 2 x input, 2 x output		
0…20 mA	**KL4011** 12 bit	**KL4012** 12 bit	**KL4414** 12 bit	**KL4418** 12 bit	
		KL4112 16 bit			
4…20 mA	**KL4021** 12 bit	**KL4022** 12 bit	**KL4424** 12 bit	**KL4428** 12 bit	

The standard Bus Terminals (KLxxxx) can be optionally ordered as KSxxxx with pluggable wiring level.

We reserve the right to make technical changes.

Bus Terminal | Special functions: KL5xxx/KS5xxx, KL6xxx/KS6xxx, KL8xxx

Signal			
Position measurement	**KL5001** SSI encoder interface	**KL5051** SSI encoder interface, bidirectional	**KL5121** incremental encoder interface with programmable outputs
	KL5101 incremental encoder interface RS422	**KL5151** incremental encoder interface 24 V DC, 1-channel, 32 bit	**KL5152** incremental encoder interface 24 V DC, 2-channel, 32 bit
	KL5111 incremental encoder interface 24 V DC		
Communication	**KL6001** serial interface RS232, 19.2 kbaud	**KL6031** serial interface RS232, 115.2 kbaud	**KL6011** serial interface TTY, 20 mA current loop
	KL6051 data exchange terminal, 32 bit	**KL6021** serial interface RS422/RS485, 19.2 kbaud	**KL6041** serial interface RS422/RS485, 115.2 kbaud
	KL6023 wireless adapter for EnOcean radio technology	**KL6021-0023** RS485 interface for EnOcean signals	**KL6201** AS-Interface master terminal
	KL6211 AS-Interface master terminal with power contacts	**KL6224** IO-Link master	**KL6301** EIB/KNX Bus Terminal
	KL6401 LON Bus Terminal	**KL6581** EnOcean master	**KL6583** EnOcean transmitter/receiver
	KL6771 MP-Bus master terminal	**KL6781** M-Bus master terminal	**KL6811** DALI/DSI master and power supply terminal
	KL6821 DALI 2 multi-master and power supply terminal	**KL6831** SMI terminal, LoVo	**KL6841** SMI terminal, 230 V AC

Signal	
Safety	**KL6904** TwinSAFE Logic Bus Terminal, 4 safe outputs
Manual operation	**KL8519** 16-channel digital input signal module
	KL8524 4 x 2-channel digital output, 24 V DC, 0.5 A
	KL8528 8-channel digital output, 24 V DC, 0.5 A
	KL8548 8-channel analog output, 0…10 V
Power terminals	**KL8001** switching capacity 5.5 kW, nominal current 0.9…9.9 A, connection mechanism for Siemens contactors (Sirius 3R series)

Bus Terminal | System terminals: KL9xxx/KS9xxx

Signal	System	
System	**KL9010** bus end terminal	**KL9070** shield terminal
	KL9020 terminal bus extension end terminal	**KL9050** terminal bus extension coupler terminal
	KL9060 adapter terminal for power terminal KL8xxx	**KL9309** adapter terminal for KL85xx manual operating modules
	KL9080 isolation terminal	**KL9195** shield terminal
Potential distribution terminals	**KL9180** 2 terminal points per power contact	**KL9181** 2 x 8 terminal points
	KL9182 8 x 2 terminal points	**KL9183** 1 x 16 terminal points
	KL9184 8 x 24 V DC, 8 x 0 V DC	**KL9185** only 2 power contacts
	KL9186 8 x 24 V DC	**KL9187** 8 x 0 V DC
	KL9188 16 x 24 V DC	**KL9189** 16 x 0 V DC
	KL9380 mains filter, approx. 1 µF	
Filter	**KL9540** surge filter terminal for field supply	
	KL9540-0010 surge filter field supply for analog terminals	**KL9550** surge filter terminal for system/field supply
Diode array	**KL9300** 4 diodes, potential-free	
	KL9301 7 diodes, common cathode	**KL9302** 7 diodes, common anode

Signal	Potential supply	Power supply and accessories
24 V DC	**KL9100**	**KL9400** K-bus power supply, 2 A
	KL9110 diagnostics	**KL9505** output 5 V DC, 0.5 A
	KL9200 with fuse	**KL9508** output 8 V DC, 0.5 A
	KL9210 diagnostics, with fuse	**KL9510** output 10 V DC, 0.5 A
		KL9512 output 12 V DC, 0.5 A
		KL9515 output 15 V DC, 0.5 A
	KL9520 AS-Interface potential supply	**KL9528** AS-Interface power supply terminal
		KL9560 output 24 V DC, 0.1 A
50 V DC		**KL9570** buffer capacitor terminal, 500 µF
120… 230 V AC	**KL9150**	
	KL9160 diagnostics	
	KL9250 with fuse	
	KL9260 diagnostics, with fuse	
Up to 400 V AC	**KL9190**	
	KL9290 with fuse	

Product overview Fieldbus Box

Fieldbus Box	Compact Box		Coupler Box		PLC Box	
Fieldbus	Fieldbus Box without IP-Link interface		Fieldbus Box with IP-Link interface		Controller for TwinCAT 2 (IEC 61131-3) with IP-Link interface	
EtherCAT			IL230x-B110			
LIGHTBUS	IPxxxx-B200		IL230x-B200			
PROFIBUS	IPxxxx-B310	IPxxxx-B318 with integrated tee-connector	IL230x-B310	IL230x-B318 with integrated tee-connector	IL230x-C310	IL230x-C318 with integrated tee-connector
INTERBUS	IPxxxx-B400		IL230x-B400			
CANopen	IPxxxx-B510	IPxxxx-B518 with integrated tee-connector	IL230x-B510	IL230x-B518 with integrated tee-connector		
DeviceNet	IPxxxx-B520	IPxxxx-B528 with integrated tee-connector	IL230x-B520	IL230x-B528 with integrated tee-connector		
Modbus	IPxxxx-B730		IL230x-B730			
RS485	IPxxxx-B800		IL230x-B800			
RS232	IPxxxx-B810		IL230x-B810		IL230x-C810	
Ethernet TCP/IP			IL230x-B900	IL230x-B901	IL230x-C900	
PROFINET			IL230x-B903			
EtherNet/IP			IL230x-B905			

Fieldbus Box | Compact Box and Extension Box: Digital I/O

Input		8 mm	M8	M12
24 V DC	8-channel filter 3.0 ms	IP1000-Bxxx, IE1000	IP1001-Bxxx, IE1001	IP1002-Bxxx, IE1002
	8-channel filter 0.2 ms	IP1010-Bxxx, IE1010	IP1011-Bxxx, IE1011	IP1012-Bxxx, IE1012
Counter	2-channel up/down counter 24 V DC, 100 kHz			IP1502-Bxxx, IE1502
Output		**8 mm**	**M8**	**M12**
24 V DC	8-channel I_{max} = 0.5 A	IP2000-Bxxx, IE2000	IP2001-Bxxx, IE2001	IP2002-Bxxx, IE2002
	8-channel I_{max} = 2 A, ∑ 4 A	IP2020-Bxxx, IE2020	IP2021-Bxxx, IE2021	IP2022-Bxxx, IE2022
	8-channel I_{max} = 2 A, ∑ 12 A	IP2040-Bxxx, IE2040	IP2041-Bxxx, IE2041	IP2042-Bxxx, IE2042
	16-channel I_{max} = 0.5 A, ∑ 4 A, D-sub			IE2808 IE2808-0001
PWM	2-channel PWM, 24 V DC, I_{max} = 2.5 A			IP2512-Bxxx, IE2512

We reserve the right to make technical changes.

Fieldbus Box | Compact Box, Coupler Box, PLC Box and Extension Box: Digital I/O

Combi		8 mm	M8	M12	Other
24 V DC	**8-channel** 4 inputs + 4 outputs, filter 3.0 ms, I_{max} = 0.5 A	IL2300-Bxxx IL2300-Cxxx IP2300-Bxxx IE2300	IL2301-Bxxx IL2301-Cxxx IP2301-Bxxx IE2301	IL2302-Bxxx IL2302-Cxxx IP2302-Bxxx IE2302	
	8-channel 4 inputs + 4 outputs, filter 0.2 ms, I_{max} = 0.5 A	IP2310-Bxxx IE2310	IP2311-Bxxx IE2311	IP2312-Bxxx IE2312	
	8-channel 4 inputs + 4 outputs, filter 3.0 ms, I_{max} = 2 A, ∑ 4 A	IP2320-Bxxx IE2320	IP2321-Bxxx IE2321	IP2322-Bxxx IE2322	
	8-channel 4 inputs + 4 outputs, filter 0.2 ms, I_{max} = 2 A, ∑ 4 A	IP2330-Bxxx IE2330	IP2331-Bxxx IE2331	IP2332-Bxxx IE2332	
	16-channel combi inputs/outputs, filter 3.0 ms, I_{max} = 0.5 A	IP2400-Bxxx IE2400	IP2401-Bxxx IE2401		IE2403 IP 20 plug

Fieldbus Box | Compact Box and Extension Box: Analog I/O

Input		M12
±10 V	**4-channel** differential inputs, 16 bit	IP3102-Bxxx, IE3102
0/4…20 mA	**4-channel** differential inputs, 16 bit	IP3112-Bxxx, IE3112
Resistance thermometer	**4-channel** PT100, PT200, PT500, PT1000, Ni100, 16 bit	IP3202-Bxxx, IE3202
Thermocouple/mV	**4-channel** type J, K, L, B, E, N, R, S, T, U, 16 bit	IP3312-Bxxx, IE3312

Output		M12
±10 V	**4-channel** 16 bit	IP4132-Bxxx, IE4132
0/4…20 mA	**4-channel** 16 bit	IP4112-Bxxx, IE4112

Fieldbus Box | Compact Box and Extension Box: Special functions

Function		M12	M23
Position measurement	**1-channel** SSI encoder interface		IP5009-Bxxx, IE5009
	1-channel incremental encoder interface, 1 MHz		IP5109-Bxxx, IE5109
	1-channel SinCos encoder interface		IP5209-Bxxx (1 V_{PP}) IP5209-Bxxx-1000 (11 μA_{PP})
Communication	**1-channel** serial interface, RS232	IP6002-Bxxx, IE6002	
	1-channel serial interface, 0…20 mA (TTY)	IP6012-Bxxx, IE6012	
	1-channel serial interface, RS422/RS485	IP6022-Bxxx, IE6022	

EPIxxxx

ERIxxxx

Fieldbus Box | IO-Link box: Digital I/O

Input		8 x M8	16 x M8	4 x M12	8 x M12
24 V DC	8-channel filter 3.0 ms	EPI1008-0001 ERI1008-0001		EPI1008-0002 ERI1008-0002	
	16-channel filter 3.0 ms		EPI1809-0021 ERI1809-0021		EPI1809-0022 ERI1809-0022
Output		**8 x M8**	**16 x M8**	**4 x M12**	**8 x M12**
24 V DC	8-channel I_{max} = 0.5 A	EPI2008-0001 ERI2008-0001		EPI2008-0002 ERI2008-0002	
	16-channel I_{max} = 0.5 A, ∑ 4 A		EPI2809-0021 ERI2809-0021		EPI2809-0022 ERI2809-0022
Combi		**8 x M8**	**16 x M8**	**4 x M12**	**8 x M12**
24 V DC	8-channel 8 inputs/outputs, filter 3.0 ms, I_{max} = 0.5 A	EPI2338-0001 ERI2338-0001		EPI2338-0002 ERI2338-0002	
	16-channel 16 inputs/outputs, filter 3.0 ms, I_{max} = 0.5 A, ∑ 4 A		EPI2339-0021 ERI2339-0021		EPI2339-0022 ERI2339-0022

Fieldbus Box | IO-Link box: Analog I/O

Input		M12
±10 V, 0/4…20 mA	4-channel parameterisable, differential input, 16 bit	EPI3174-0002 ERI3174-0002
Output		**M12**
±10 V, 0/4…20 mA	4-channel 2 inputs + 2 outputs, parameterisable, 16 bit	EPI4374-0002 ERI4374-0002

EPIxxxx: industrial housing in IP 67, ERIxxxx: zinc die-cast housing in IP 67

We reserve the right to make technical changes.

Product overview Infrastructure Components

Ethernet components

	1 Gbit/s	10/100 Mbit/s
Switches	**CU2208** 8 x RJ45, IP 20	**CU2008** 8 x RJ45, IP 20
		CU2608 8 x M12 (D-coded), IP 67
		CU2016 16 x RJ45, IP 20
		CU2005 5 x RJ45, IP 20
Port multiplier	**CU2508** 1 x RJ45 (+ 8 x RJ45: 100 Mbit/s)	
PCI	**FC9024-0000** 4 x RJ45	**FC9004-0000** 4 x RJ45
	FC9022-0000 2 x RJ45	**FC9002-0000** 2 x RJ45
	FC9011-0000 1 x RJ45	**FC9001-0010** 1 x RJ45
Mini PCI	**FC9151-0000** 1 x RJ45	**FC9051-0000** 1 x RJ45

EtherCAT components

	IP 20	IP 67
Junctions	**CU1123** 3 x RJ45, IP 20	
	CU1124 4 x RJ45, IP 20	
	CU1128 8 x RJ45, IP 20	**EP9128-0021** 8 x M8, IP 67
Media converters	**CU1521-0000** multimode, IP 20	**EP9521-0020** multimode, IP 67
	CU1521-0010 singlemode, IP 20	
	CU1561 POF, IP 20	
Slave (PCI)	**FC1100** 1-channel, IP 20	
	FC1121 1-channel, PCIe, IP 20	

PC Fieldbus Cards

	PCI			Mini PCI	
LIGHTBUS	**FC2001-0000** 1-channel	**FC2002-0000** 2-channel			
PROFIBUS	**FC3101-0000** 1-channel	**FC3101-0002** 1-channel, 32 kbyte NOVRAM	**FC3121** 1-channel, PCIe	**FC3151-0000** 1-channel	**FC3151-0002** 1-channel, 128 kbyte NOVRAM
	FC3102-0000 2-channel	**FC3102-0002** 2-channel, 32 kbyte NOVRAM	**FC3122** 2-channel, PCIe		
CANopen	**FC5101-0000** 1-channel	**FC5101-0002** 1-channel, 32 kbyte NOVRAM	**FC5121** 1-channel, PCIe	**FC5151-0000** 1-channel	**FC5151-0002** 1-channel, 128 kbyte NOVRAM
	FC5102-0000 2-channel	**FC5102-0002** 2-channel, 32 kbyte NOVRAM	**FC5122** 2-channel, PCIe		
DeviceNet	**FC5201-0000** 1-channel	**FC5201-0002** 1-channel, 32 kbyte NOVRAM		**FC5251-0000** 1-channel	**FC5251-0002** 1-channel, 128 kbyte NOVRAM
	FC5202-0000 2-channel	**FC5202-0002** 2-channel, 32 kbyte NOVRAM			
sercos the automation bus	**FC7501-0000** 1-channel	**FC7502-0000** 2-channel		**FC7551-0000** 1-channel	**FC7551-0002** 1-channel, 128 kbyte NOVRAM
PROFINET	**FC9321-0010** 1-channel, IRT device, PCIe	**FC9361-0010** 1-channel, IRT device, PCIe, compact			

We reserve the right to make technical changes.

Highlights

- Complete drive system with TwinCAT Motion Control
- For highly dynamic, single and multiple axis positioning tasks
- Modularity and scalable power in compact Drive Technology
- XTS – Linear motor on an endless path

Drive Technology

The drive system for highly dynamic positioning tasks

▸ **www.beckhoff.com/DriveTechnology**

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Product overview Servo Drives

AX8000

AX8000 | Multi-axis servo system: power supply modules

	AX8620-0000 338	AX8640-0000 338
Rated output current	1 ~ 7 A DC 3 ~ 20 A DC	40 A DC
Supply voltage	1 x 100…240 V AC 3 x 200…480 V AC	3 x 200…480 V AC

Any number of axis modules can be added provided that the rated output current of the power supply modules is sufficient.

AX8000 | Multi-axis servo system: axis modules

	AX8108 339	AX8118 339	AX8206 339
Rated current	1 x 8 A	1 x 18 A	2 x 6 A
Number of axes	1	1	2
Motor feedback	OCT	OCT	OCT
TwinSAFE/safe drive technology	AX8108-0000 without TwinSAFE	AX8118-0000 without TwinSAFE	AX8206-0000 without TwinSAFE
	AX8108-0100 STO/SS1	AX8118-0100 STO/SS1	AX8206-0100 STO/SS1
	AX8108-0200 Safe Motion	AX8118-0200 Safe Motion	AX8206-0200 Safe Motion

AX8000 | Multi-axis servo system: option modules

	1-channel	2-channel
Coupling module for AMP8000	AX8831-0000-0000 360	AX8832-0000-0000 360
		For AX86xx-0000
Capacitor module		AX8810-0000-0000 340

We reserve the right to make technical changes.

AX5000

AX5000 | Digital Compact Servo Drives

	AX5101…AX5112 346	AX5201…AX5206 347	AX5118…AX5140 346	AX5160…AX5193 346
Number of axes	1	2	1	1
Rated current	1.5…12 A	2 x 1.5…6 A	18…40 A	60…170 A
Supply voltage	3 x 100…480 V AC (wide voltage range), 1 x 100…240 V AC	3 x 100…480 V AC (wide voltage range), 1 x 100…240 V AC	3 x 100…480 V AC (wide voltage range)	3 x 400…480 V AC
Motor feedback	OCT, multi-feedback	OCT, multi-feedback	OCT, multi-feedback	multi-feedback

AX5000 | Digital Compact Servo Drives: options

	1-channel		2-channel	
Coupling module for AMP8000	**AX5031-0000-0200** 360		**AX5032-0000-0200** 360	
Encoder option cards	**AX5701** 348 1 V_{PP}, BiSS B, Hiperface, EnDat	**AX5721** 348 EnDat 2.2, BiSS C	**AX5702** 348 1 V_{PP}, BiSS B, Hiperface, EnDat	**AX5722** 348 EnDat 2.2, BiSS C
	STO/SS1		**Safe Motion**	
TwinSAFE/safe drive technology	**AX5801-0200** 348 for AX5101…AX5140 and AX5201…AX5206		**AX5805-0000** 348 for AX5101…AX5140 and AX5201…AX5206	**AX5806-0000** 348 for AX5160…AX5193
	Power supply		**Power distribution**	
AX-Bridge	**AX5901** 349 for AX5101…AX5125 and AX5201…AX5206	**AX5902** 349 for AX5140	**AX5911** 349 for AX5101…AX5112 and AX5201…AX5206	**AX5912** 349 for AX5118 and AX5125
	Brake energy recovery			
Brake module	**AX5021** 353 connection of external brake resistors			

Product overview Distributed Servo Drive system

AMP804x | Distributed Servo Drive, flange code F4

Data for 560 V DC	AMP8041-wDyz 358	AMP8041-wEyz 358	AMP8042-wEyz 358	AMP8043-wEyz 358
Standstill torque	2.01 Nm	2.01 Nm	3.48 Nm	4.80 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	2500 min^{-1}	2500 min^{-1}
Rated power	0.61 kW	1.23 kW	0.87 kW	1.18 kW
Standstill current	1.65 A	3.00 A	2.15 A	2.90 A
Connection technology	ECP B23 plug	ECP B23 plug	ECP B23 plug	ECP B23 plug
One Cable Technology (OCT)	yes	yes	yes	yes

AMP805x | Distributed Servo Drive, flange code F5

Data for 560 V DC	AMP8051-wEyz 358	AMP8051-wGyz 358	AMP8052-wFyz 358	AMP8053-wGyz 358
Standstill torque	4.08 Nm	4.08 Nm	6.97 Nm	9.70 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	2000 min^{-1}	2000 min^{-1}
Rated power	1.02 kW	1.02 kW	1.34 kW	1.78 kW
Standstill current	2.70 A	4.75 A	3.30 A	4.70 A
Connection technology	ECP B23 plug	ECP B23 plug	ECP B23 plug	ECP B23 plug
One Cable Technology (OCT)	yes	yes	yes	yes

AX503x, AX883x | Coupling modules for AMP8000

	AX5031-0000-0200 360	AX5032-0000-0200 360	AX8831-0000-0000 360	AX8832-0000-0000 360
Function	coupling module with feed	coupling module with feed	coupling module	coupling module
Number of channels	1	2	1	2
Rated output current DC-Link	20 A DC	∑ 20 A DC	20 A DC	2 x 20 A DC
Rated output current 24 V	16 A DC	∑ 20 A DC	16 A DC	∑ 20 A DC
DC-Link voltage	565…680 V DC	565…680 V DC	565…680 V DC	565…680 V DC

AMP8805 | Distribution module for AMP8000

	AMP8805-0000-0000 361
Function	distribution module
Number of channels	1 x Power IN, 5 x Power OUT, 1 x EtherCAT P OUT
Rated input current 24 V	16 A DC
DC-Link voltage	565…680 V DC
DC-Link capacitance	1120 µF
Protection class	IP 65

We reserve the right to make technical changes.

Product overview Synchronous Servomotors

AM8000, AM8500

AM8000, AM8500 with fan

Synchronous Servomotors, OCT

	Flange code F1 (40 mm)	F2 (58 mm)	F3 (72 mm)	F4 (87 mm)	F5 (104 mm)	F6 (142 mm)	F7 (197 mm)	
Standard 400 V AC		**AM802x** M_0 = 0.50…1.20 Nm	**AM803x** M_0 = 1.37…3.22 Nm	**AM804x** M_0 = 2.37…5.65 Nm	**AM805x** M_0 = 4.80…11.4 Nm, up to 15.4 Nm with fan	**AM806x** M_0 = 12.8…35.0 Nm, up to 49.0 Nm with fan	**AM807x** M_0 = 29.0…92.0 Nm, up to 129 Nm with fan	366
Standard 230 V AC	**AM801x** M_0 = 0.20…0.52 Nm							366
Standard 48 V DC	**AM811x** M_0 = 0.20…0.52 Nm	**AM812x** M_0 = 0.50…0.80 Nm	**AM813x** M_0 = 1.35…2.37 Nm	**AM8141** M_0 = 2.40 Nm				414
Increased inertia 400 V AC			**AM853x** M_0 = 1.37…3.22 Nm	**AM854x** M_0 = 2.37…5.65 Nm	**AM855x** M_0 = 4.80…11.4 Nm, up to 15.4 Nm with fan	**AM856x** M_0 = 12.8…29.0 Nm, up to 41.4 Nm with fan		378
Stainless steel 400 V AC			**AM883x*** M_0 = 0.85…1.85 Nm	**AM884x*** M_0 = 1.60…3.50 Nm	**AM885x*** M_0 = 3.10…6.40 Nm	**AM886x*** M_0 = 7.75…16.7 Nm		392

*Please note the different flange size.

Synchronous Servomotors, 2-cable standard

	Flange code F1 (40 mm)	F2 (58 mm)	F3 (72 mm)	F4 (87 mm)	F5 (104 mm)	F6 (142 mm)	F7 (197 mm)	F8 (260 mm)	
Standard 400 V AC		**AM802x** M_0 = 0.50…1.20 Nm	**AM803x** M_0 = 1.37…3.22 Nm	**AM804x** M_0 = 2.37…5.65 Nm	**AM805x** M_0 = 4.80…11.4 Nm, up to 15.4 Nm with fan	**AM806x** M_0 = 12.8…35.0 Nm, up to 49.0 Nm with fan	**AM807x** M_0 = 29.0…92.0 Nm, up to 129 Nm with fan		366
		AM302x M_0 = 0.87…1.41 Nm	**AM303x*** M_0 = 1.15…2.79 Nm	**AM304x*** M_0 = 1.95…6.00 Nm	**AM305x*** M_0 = 4.70…14.9 Nm	**AM306x*** M_0 = 11.9…25.0 Nm	**AM307x*** M_0 = 29.7…53.0 Nm	**AM308x** M_0 = 75.0…180 Nm	396
Standard 230 V AC	**AM301x** M_0 = 0.18…0.41 Nm	**AM302x** M_0 = 0.48…0.87 Nm	**AM3031** M_0 = 1.20 Nm						396
	AM801x M_0 = 0.20…0.52 Nm								368
Standard 48 V DC	**AM811x** M_0 = 0.20…0.52 Nm	**AM812x** M_0 = 0.50…0.80 Nm	**AM813x** M_0 = 1.35…2.37 Nm	**AM8141** M_0 = 2.40 Nm					414
Increased inertia 400 V AC			**AM853x** M_0 = 1.37…3.22 Nm	**AM854x** M_0 = 2.37…5.65 Nm	**AM855x** M_0 = 4.80…11.4 Nm, up to 15.4 Nm with fan	**AM856x** M_0 = 12.8…29.0 Nm, up to 41.4 Nm with fan			378
				AM354x* M_0 = 1.90…4.20 Nm	**AM355x*** M_0 = 4.10…8.60 Nm	**AM356x*** M_0 = 11.6…14.9 Nm			
Stainless steel 400 V AC			**AM883x*** M_0 = 0.85…1.85 Nm	**AM884x*** M_0 = 1.60…3.50 Nm	**AM885x*** M_0 = 3.10…6.40 Nm	**AM886x*** M_0 = 7.75…16.7 Nm			392

*Please note the different flange size.

We reserve the right to make technical changes.

Product overview Linear Servomotors, stepper motors

Linear Servomotors

	AL2000 403	AL2400 404	AL2800 405
Especially suitable for	maximum power density	confined spaces	highest demands on force
Magnetic path width	80 mm	50 mm	130 mm
Cooling	air	air	air, partly water
Max. speed	7 m/s	12 m/s	6 m/s
Max. force	225…1800 N	120…720 N	1800…6750 N
Protection class	IP 64	IP 64	IP 64

Linear actuators

	AA1121 412
Rated force	150 N
Peak force	800 N
Max. movement	10 mm
Max. acceleration	7 m/s²
Protection class	IP 54

Stepper motors

	AS1000 424	AS2000 420
Sizes	N1 (NEMA17), N2 (NEMA23), N3 (NEMA34)	N2 (NEMA23), N3 (NEMA34)
Resolution	1.8°/200 full steps	1.8°/200 full steps
Encoder	incremental, 1024 lines	incremental, 1024 lines
Standstill torque < 3 A	0.38…0.60 Nm	0.80 Nm
Standstill torque > 3 A	1.20…5.00 Nm	1.50…8.00 Nm
Protection class	IP 43, AS1060: IP 20	IP 54

We reserve the right to make technical changes.

Product overview planetary gear units

AG3210 AG2300 AG3300 AG2400 AG3400 AG2800 AG2250 AG1000

Planetary gear units for AM8000/AM8500

	AG3210 389	AG2300 386	AG3300 388	AG2400 390	AG3400 391
Variant	standard (MF)	standard (MF), high-speed (MC)	standard (MF)	standard (MF)	standard (MF)
Output type	shaft	shaft	shaft	flange	flange
Gear ratios	1-stage i = 3…10, 2-stage i = 9…100	1-stage i = 3…10, 2-stage i = 16…100	1-stage i = 3…10, 2-stage i = 9…100	1-stage i = 4…10, 2-stage i = 16…100	1-stage i = 3…10, 2-stage i = 9…100
Protection class	IP 64	IP 65	IP 65	IP 65	IP 64

Planetary gear units for other motor series

	AG2800 395	AG2250 418	AG1000 427
Variant	stainless steel	straight and angled versions	standard
Motor series	AM8800	AM8100, AS2000	AS1000
Output type	shaft	shaft	shaft
Gear ratios	1-stage i = 3…10, 2-stage i = 9…100	1-stage i = 3…10, 2-stage i = 9…64	1-stage i = 3.7 or 6.75
Protection class	IP 69K	IP 54	IP 43, AS1060: IP 20

Product overview compact Drive Technology

EtherCAT Terminals

EtherCAT Plug-in Modules

Bus Terminals

EtherCAT Box modules

EtherCAT P Box modules

	Product group	BLDC motor	DC motor			Stepper motor
		4.5…8 A	< 3 A	3…5 A	> 5 A	< 3 A
I/O	EtherCAT Terminals IP 20	EL7411-9014 2 232 I_{rms} = 4.5 A, 50 V DC, STO	EL7332 2 231 I_{max} = 1.0 A, 24 V DC	EL7332 + ZB8610 2 231 I_{max} = 3.0 A, 24 V DC		EL7037 2 227 I_{max} = 1.5 A, 24 V DC, incremental encoder, vector control
		EL7411-9014 + ZB8610 2 232 I_{rms} = 7…8 A, 50 V DC, STO		EL7342 2 231 I_{max} = 3.5 A, 50 V DC, incremental encoder	EL7342 + ZB8610 2 231 I_{max} = 6.5 A, 50 V DC, incremental encoder	EL7031 2 226 I_{max} = 1.5 A, 24 V DC
	EtherCAT Plug-in Modules IP 20			EJ7342 I_{max} = 3.5 A, 2 393 50 V DC, incremental encoder		EJ7031 2 391 I_{max} = 1.5 A, 24 V DC
	Bus Terminals IP 20		KL2532 2 483 I_{max} = 1.0 A, 24 V DC	KL2552 I_{max} = 5.0 A, 2 483 50 V DC, incremental encoder		KL2531 2 481 I_{max} = 1.5 A, 24 V DC
	EtherCAT Box modules IP 67			EP/ER7342-0002 2 314 I_{max} = 3.5 A, 50 V DC		EP/ER7041-1002 2 312 I_{max} = 1.5 A, 50 V DC, incremental encoder
	EtherCAT P Box modules IP 67			EPP7342-0002 2 352 I_{max} = 3.5 A, 50 V DC		EPP7041-1002 2 351 I_{max} = 1.5 A, 50 V DC, incremental encoder
Motion	Flange code F1 (40 mm), N1 (NEMA17)					AS1010 424 1.0 A, 48 V DC, 0.38 Nm
						AS1020 424 1.0 A, 48 V DC, 0.50 Nm
	Flange code F2 (58 mm), N2 (NEMA23)					AS1030 424 1.5 A, 48 V DC, 0.60 Nm
						AS2021-0Dy0 420 2.0 A, 48 V DC, 0.80 Nm
	Flange code F3 (72 mm), N3 (NEMA34)					
	Flange code F4 (87 mm)					

We reserve the right to make technical changes.

Flange code F1 | Flange code N1 | Flange code F2 | Flange code N2 | Flange code F3 | Flange code N3 | Flange code F4

Servomotor

3…5 A	> 5 A	< 3 A	3…5 A	> 5 A
EL7037 + ZB8610 2 227 I_{max} = 3.0 A, 24 V DC, incremental encoder, vector control		**EL7201-9014** 2 229 I_{rms} = 2.8 A, 50 V DC, OCT, STO	**EL7201-9014 + ZB8610** 2 229 I_{rms} = 4.5 A, 50 V DC, OCT, STO	**EL7221-9014** 2 228 I_{rms} = 7…8 A with ZB8610, 50 V DC, OCT, STO
EL7047-9014 2 227 I_{max} = 5.0 A, 50 V DC, incremental encoder, vector control, STO	**EL7047-9014 + ZB8610** 2 227 I_{max} = 6.5 A, 50 V DC, incremental encoder, vector control, STO	**EL7201-0010** 2 229 I_{rms} = 2.8 A, 50 V DC, OCT	**EL7201-0010 + ZB8610** 2 229 I_{rms} = 4.5 A, 50 V DC, OCT	
EL7047 2 227 I_{max} = 5.0 A, 50 V DC, incremental encoder, vector control	**EL7047 + ZB8610** 2 227 I_{max} = 6.5 A, 50 V DC, incremental encoder, vector control	**EL7201** 2 229 I_{rms} = 2.8 A, 50 V DC, resolver	**EL7201 + ZB8610** 2 229 I_{rms} = 4.5 A, 50 V DC, resolver	
EL7041 2 227 I_{max} = 5.0 A, 50 V DC, incremental encoder			**EL7211-9014** 2 229 I_{rms} = 4.5 A, 50 V DC, OCT, STO	
			EL7211-0010 2 229 I_{rms} = 4.5 A, 50 V DC, OCT	
			EL7211 2 229 I_{rms} = 4.5 A, 50 V DC, resolver	
EJ7047 I_{max} = 5.0 A, 50 V DC, 2 391 incremental encoder, vector control			**EJ7211-9414** 2 392 I_{rms} = 4.5 A, 50 V DC, OCT, STO, TwinSAFE SC	
EJ7041-0052 2 391 I_{max} = 5.0 A, 50 V DC			**EJ7211-0010** 2 392 I_{rms} = 4.5 A, 50 V DC, OCT	
KL2541 2 481 I_{max} = 5.0 A, 50 V DC, incremental encoder				
EP/ER7041-3002 2 313 I_{max} = 5.0 A, 50 V DC, incremental encoder			**EP7211-9034** 2 311 I_{rms} = 4.5 A, 50 V DC, OCT, STO	
EPP7041-3002 2 351 I_{max} = 5.0 A, 50 V DC, incremental encoder				
		AM8111-wFyz 414 2.8 A, 48 V DC, 0.20 Nm, 4000 min^{-1}	**AM8112-wFyz** 414 4.7 A, 48 V DC, 0.38 Nm, 4500 min^{-1}	
			AM8113-wFyz 414 4.8 A, 48 V DC, 0.52 Nm, 3000 min^{-1}	
AS1050 424 5.0 A, 48 V DC, 1.20 Nm	**AS2022-0Hy0** 420 5.6 A, 48 V DC, 1.50 Nm		**AM8121-wFyz** 414 4.0 A, 48 V DC, 0.50 Nm, 3000 min^{-1}	
	AS2023-0Hy0 420 5.6 A, 48 V DC, 1.80 Nm		**AM8122-wFyz** 414 4.0 A, 48 V DC, 0.80 Nm, 2000 min^{-1}	**AM8122-wJyz** 414 8.0 A, 48 V DC, 0.80 Nm, 4500 min^{-1}
AS1060 424 5.0 A, 48 V DC, 5.00 Nm	**AS2041-1Hy0** 420 5.6 A, 48 V DC, 3.30 Nm		**AM8131-wFyz** 414 5.0 A, 48 V DC, 1.35 Nm, 1000 min^{-1}	**AM8131-wJyz** 414 8.0 A, 48 V DC, 1.35 Nm, 1800 min^{-1}
	AS2042-1Hy0 420 5.6 A, 48 V DC, 6.40 Nm			**AM8132-wJyz** 414 8.0 A, 48 V DC, 2.37 Nm, 1000 min^{-1}
	AS2043-1Jy0 420 6.5 A, 48 V DC, 8.00 Nm			
				AM8141-wJyz 414 8.0 A, 48 V DC, 2.40 Nm, 1000 min^{-1}

Product overview XTS

Standard
motor module

Black Line
motor module

Hygienic
motor module

Motor modules

	Standard 432	Black Line 441	Hygienic 444
Straight	**AT2000-0250**	**AT2000-0250-0002**	**ATH2000-0250**
	AT2001-0250 with feed	**AT2001-0250-0002** with feed	**ATH2001-0250** with feed
	AT2001-0250-0003 with feed, UL-listed	**AT2001-0250-0004** with feed, UL-listed	
Curved, 180° (clothoid)	**AT2050-0500**	**AT2050-0500-0002**	**ATH2050-0500**
Positive curve, 45°	**AT2040-0250**	**AT2040-0250-0002**	
	AT2041-0250 with feed	**AT2041-0250-0002** with feed	
	AT2041-0250-0003 with feed, UL-listed	**AT2041-0250-0004** with feed, UL-listed	
Positive curve, 22.5°	**AT2020-0250**	**AT2020-0250-0002**	
	AT2021-0250 with feed	**AT2021-0250-0002** with feed	
Negative curve, -22.5°	**AT2025-0250**	**AT2025-0250-0002**	
	AT2026-0250 with feed	**AT2026-0250-0002** with feed	

Movers

	Standard 434	Hygienic 445
6 rollers	**AT9011-0050-0550** mover standard, length 50 mm	**ATH9011-0075-0550** mover standard, length 75 mm
	AT9011-0050-1550 mover 1, length 50 mm	
	AT9011-0070-0550 mover standard, length 70 mm	
	AT9011-0070-1550 mover 1, length 70 mm	
12 rollers	**AT9012-0050-0550** mover standard, length 50 mm	
	AT9012-0050-1550 mover 1, length 50 mm	

We reserve the right to make technical changes.

Standard mover

Hygienic mover

Standard guide rail

Hygienic guide rail

Standard starter kit

Guide rails

	Standard 435	Hygienic 446
Straight	**AT9000-xxxx** without lock	**ATH9000-xxxx** without lock
	AT9100-xxxx with lock	**ATH9100-xxxx** with lock
		ATH9200-xxxx connector, without lock
Positive curve, 180°	**AT9020-2250** length 2250 mm, for 22.5° motor module [1]	
	AT9040-1250 length 1250 mm, for 45° motor module [1]	
	AT9050-0500 length 500 mm, for 180° motor module [2]	**ATH9050-0500-0075** length 500 mm, for 180° motor module
Positive curve, 90°	**AT9040-0750** length 750 mm, for 45° motor module [1]	
Positive curve, 45°	**AT9040-0500** length 500 mm, for 45° motor module [1]	
Positive curve, 22.5°	**AT9020-0500** length 500 mm, for 22.5° motor module [1]	
Negative curve, -22.5°	**AT9025-0500** length 500 mm, for -22.5° motor module [1]	
Positive curve, 360°	**AT9142-2000** length 2000 mm, for 45° motor module [1]	

[1] Suitable for mover type AT9011-0050-0550. For mover AT9011-0070-0550, add -0070 to the order specification.

[2] Suitable for mover types AT9011-0050-0550 and AT9012-0050-0550. For mover AT9011-0070-0550, add -0070 to the order specification.

Starter kits

	Standard 438
Small	**AT2000-0500**
Medium	**AT2000-1000**
Large	**AT2000-1500**

The Motion Company

AX8000 multi-axis EtherCAT drive

Servo Drives 334
- Available as multi-axis system or stand-alone version (1-/2-channel)
- High-speed EtherCAT communication
- Wide range of nominal current types, up to 170 A
- Flexible motor type selection
- Optimised for multi-axis applications

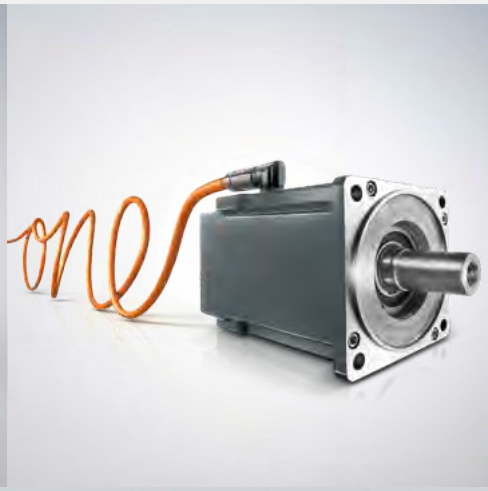
▶ **www.beckhoff.com/Servo-Drives**

Distributed Servo Drive system 354
- Servo drives directly integrated into the motor
- STO/SS1 safety function as standard; optionally Safe Motion
- Advanced power electronics ensure minimal derating
- No changes in machine design required

▶ **www.beckhoff.com/AMP8000**

Synchronous Servomotors 364
- For demanding positioning tasks
- Highly dynamic behaviour
- Brushless three-phase motors
- Permanent magnet in the rotor

▶ **www.beckhoff.com/Servomotors**



We reserve the right to make technical changes.

In combination with the motion control solutions offered by the company's TwinCAT automation software, Beckhoff Drive Technology provides an advanced, all-inclusive drive system. PC-based control technology from Beckhoff is ideally suited for single- and multi-axis positioning tasks with high dynamic requirements.

The AX5000 and AX8000 Servo Drive series with high-performance EtherCAT communication offer the best-possible performance and dynamics. Servomotors with One Cable Technology (OCT), combining power and feedback systems into one standard motor cable, reduce material and commissioning costs.

▶ **www.beckhoff.com/DriveTechnology**

Compact Drive Technology 410

- Solutions for up to 8 A in the space-saving I/O system
- Simple connection of stepper, servo, DC or AC motors
- IP 20 or IP 67 connection options
- Matching motors and gearboxes

▶ **www.beckhoff.com/compact-drive-technology**

eXtended Transport System XTS 428

- Linear motor on an endless path
- Replaces traditional mechanics with advanced mechatronic solutions
- Software-based functional changes
- Individual product transport with continuous material flow

▶ **www.beckhoff.com/XTS**

- **Scalable product range of servo drive technology**
- **Integrated safety technology in compliance with safety performance level PL e, integrated into compact Drive Technology up to safety performance level PL d**
- **As the pioneer of One Cable Technology and the eXtended Transport System, Beckhoff specialises in manufacturing efficient, space-saving motion solutions.**

We reserve the right to make technical changes.

AM8000, AM8500, AM8800, AM8100 | One Cable Technology (OCT)

The One Cable Technology (OCT) of the AM8xxx motor series reduces the motor cabling to the mandatory motor cable, which can then also be used directly for the feedback signals. As in sensorless control, the user no longer has to use an additional feedback cable. All the information required for control purposes is transferred reliably and interference-proof via a digital interface.

The symbiosis of power and feedback cable enables reliable implementation of high-precision positioning and lower velocity fluctuations. The encoder data, rotor position, multi-turn information and thermal conditions in motor are transferred via a purely digital interface. Costly analog evaluation function blocks in the drive amplifier can be avoided, while retaining extensive diagnostic options.

Since a cable and plug are omitted at both the motor and controller end, the component and commissioning costs are significantly reduced. The wiring is simplified significantly, possible error sources are eliminated. This also has positive effects on the peripheral devices, since drag-chains, cable bushings and areas reserved for cables in machines and control cabinets can now be made smaller. OCT can be used for line lengths of up to 100 m.

This results in greater degrees of freedom on the motor side: the omission of a plug connector allows the new technology to be used even in the smallest motor sizes. The AX5000 and AX8000 EtherCAT Servo Drives support OCT.

Features

- digital single-cable transmission via the existing motor cable
- digital transmission of sensor data
- no interference-susceptible analog signals
- support for the electronic identification plate
- Encoder cables, including expensive plugs, are dispensed with.
- reduction
  - in the costs for cable, plug and assembly
  - in warehouse costs by dispensing with a cable variant
  - in space requirements in cable carrier chains
  - in space requirements on the motor (important with small sizes)
  - in the sources of error and wear
- Remote diagnostics are possible up to the motor.
- Cable lengths of up to 100 m are possible.
- operating hours counter and error memory integrated in the motor

▶ **www.beckhoff.com/OCT**

The AX8000 and AX5000 EtherCAT Servo Drives support One Cable Technology.

We reserve the right to make technical changes.

AM8000, AM8500 | Fan hoods with improved connection technology

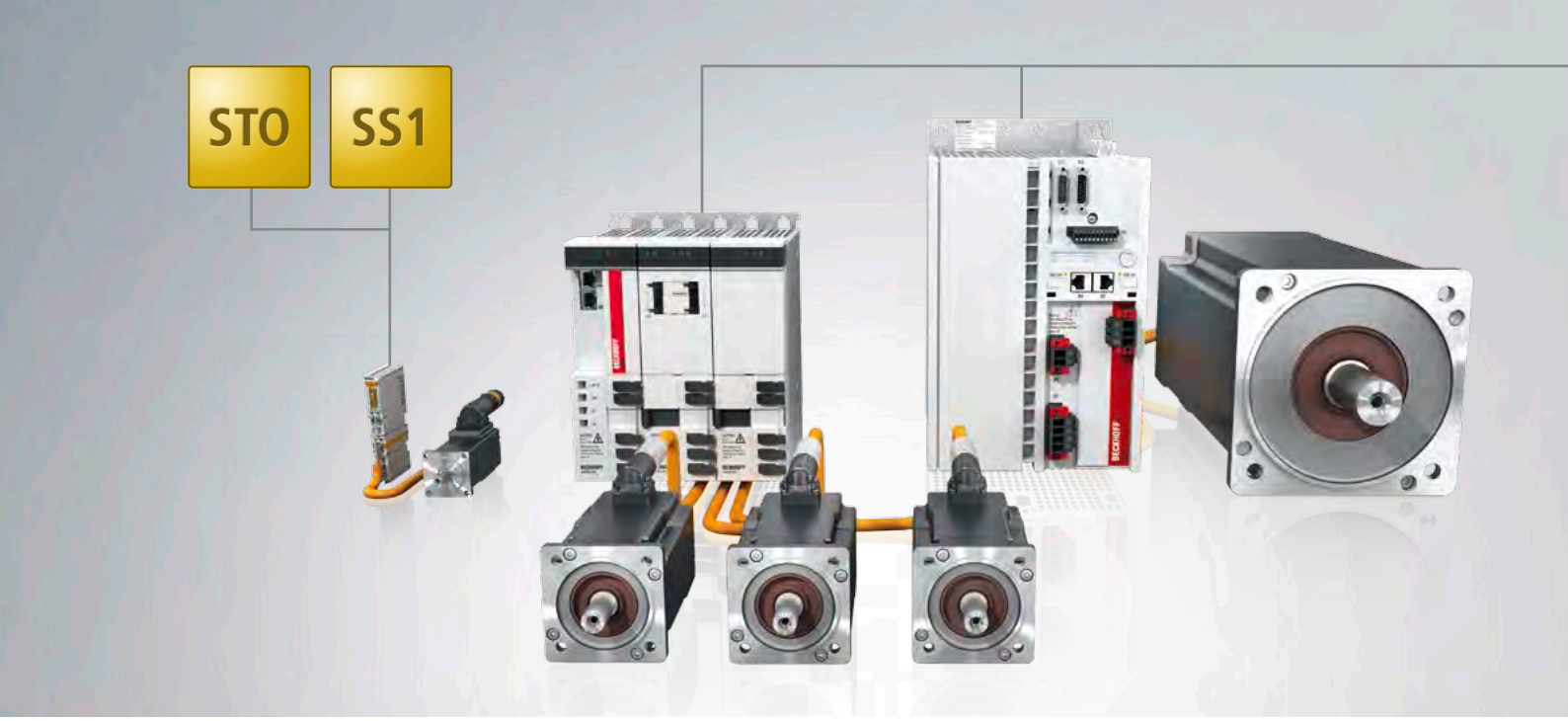
In the forced-cooling versions, the AM8000 and AM8500 servomotor series offer a high torque even at high speeds. The external axial ventilation by means of a 24 V DC fan, which is controlled independently of the motor, increases the power density of the servomotors: the standstill torque is about 35 % higher; the nominal torque at nominal speed is even 150 % higher compared with the standard variant.

The new design of the fan hoods, with an enhanced smooth surface, simplifies mounting and reduces the required mounting space by 5 %. Also new is the easy connection using the integrated robust M12 connector, which is a perfect match for the angled M12 plug connector of the preassembled, ready-to-install ZK4054-6400-0xxx control cable.

Ordering information	Available for following motors
AM805x-wxyA/B	servomotor 4.9…11.4 Nm (standstill torque)
AM806x-wxyA/B	servomotor 12.8…29 Nm (standstill torque)
AM807x-wxyA/B	servomotor 41.2…129 Nm (standstill torque)
AM855x-wxyA/B	servomotor with increased moment of inertia 4.9…11.4 Nm (standstill torque)
AM856x-wxyA/B	servomotor with increased moment of inertia 12.8…29 Nm (standstill torque)

Ordering information	Connection cable and matching digital output terminals
ZK4054-6400-0xxx	M12 control cable, PUR, 3 x 0.75 mm², drag-chain suitable, for connetion of the fan for the AM8000 and AM8500 motor series
KL2022	2-channel digital output terminal 24 V DC, 2.0 A, 4-wire system
EL2022	2-channel digital output terminal 24 V DC, 2.0 A, 4-wire system

ZK4054-6400-0xxx



TwinSAFE | Safe drive technology

TwinSAFE is a universal safety concept that integrates secure functionalities into the standard control platform: including the PLC, I/Os and drive technology. All safety functions such as emergency stop, safety door monitoring, two-hand operation, safety mat evaluation and muting, safe position, safely limited velocity, etc. can be programmed and configured with the integrated TwinCAT engineering platform.

Dynamic movements of electrical drive technology used in a machine can create considerable hazards to people and the environment. From a normative point of view, drive technology is therefore also considered in a safety-oriented way by coordinating and monitoring certain movements and processes.

TwinSAFE offers three levels for implementing safe drive technology:

– STO/SS1 according to IEC 61800-5-2
– Safe Motion according to IEC 61800-5-2
– programmable, safe drive technology through integrated logic

The safe drive components are able to switch the motor torque-free or to monitor velocity, position and direction of rotation (in compliance with EN ISO 13849-1:2008 (Cat. 4, PL e)). No further devices such as contactors or circuit breakers are necessary in the supply lines for this. This enables a very lean installation and helps to reduce costs and control cabinet space.

Even safe position monitoring or position range monitoring is simple to implement with the aid of the safe drive technology. It requires no additional wiring, since the EtherCAT communication in the servo drives is used to communicate directly with the TwinSAFE Logic components, based on the safe drive technology.

Like the programming or configuration of the safety application, the entire parameterisation of the safe drive technology is performed from the TwinCAT software. All system-specific settings are stored together with the application in the TwinSAFE Logic components. For that reason the safe drive components can be exchanged at any time without requiring software changes. The respective component receives all the parameters necessary for operation at the next power-on or boot-up.

Programmable, safe drive technology through integrated logic

The AX8000 multi-axis servo drive system encompasses new functions of safe drive technology with TwinSAFE: the AX8108, AX8118 and AX8206 axis modules include a programmable TwinSAFE Logic corresponding to an EL6910 and enable the direct implementation of a safety application in the servo drive. The user enjoys greater degrees of freedom in the implementation of safety applications in drive technology systems, and the flexibility in programming facilitates individual design of safe drive technology to suit the specific system. The safety functions STO and SS1 can be implemented with the TwinSAFE axis modules with the ordering option -0100 (STO/SS1). These functions can be initiated both via hard wiring and via FSoE. For TwinSAFE axis modules with the ordering option -0200 (Safe Motion), various internal and external drive signals are available for implementing an application-specific safety function. As usual, these can be interconnected with the typical EL6910 pre-certified function blocks to form complex, safe drive functions such as SLS, SLP, etc. Depending on the application, the safety-oriented information can be pre-processed directly in the drive so that the central TwinSAFE logic need only process the information that is aggregated there.

TwinSAFE safe drive technology see
▶ **www.beckhoff.com/TwinSAFE**
or page 542

We reserve the right to make technical changes.

Ordering information	TwinSAFE components for STO/SS1 according to IEC 61800-5-2
EL7047-9014	stepper motor terminal with incremental encoder, STO and vector control, 50 V DC, 5 A
EL7221-9014	EtherCAT servo terminal for OCT, with STO input, 50 V DC, I_{rms} = 7…8 A with ZB8610
EL7211-9014	EtherCAT servo terminal for OCT, with STO input, 50 V DC, I_{rms} = 4.5 A
EL7201-9014	EtherCAT servo terminal for OCT, with STO input, 50 V DC, I_{rms} = 2.8 A
EP7211-9034	EtherCAT Box, industrial housing, servo box module with OCT and STO, 50 V DC, I_{rms} = 4.5 A
EJ7211-9414	EtherCAT plug-in module, servomotor module for OCT, with STO input, 50 V DC, I_{rms} = 4.5 A, TwinSAFE SC
EL7411-9014	BLDC motor terminal with incremental encoder and STO, 50 V DC, I_{rms} = 4.5 A
AX5801-0200	TwinSAFE drive option card for AX5000 up to 40 A, HW 2.0: STO, SS1 (1)
AX8108-0100	single-axis module 8 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated
AX8118-0100	single-axis module 18 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated
AX8206-0100	double-axis module 2 x 6 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated

(1) only compatible with drives of the HW version 2.0 (AX5xxx-0000-020x)

Ordering information	TwinSAFE components for Safe Motion according to IEC 61800-5-2
AX5805-0000	TwinSAFE drive option card for AX5000 up to 40 A, HW 2.0: STO, SS1, SS2, SOS, SLS, SDI (1)
AX5806-0000	TwinSAFE drive option card for AX5000 from 60 A, HW 2.0: STO, SS1, SS2, SOS, SLS, SDI (2)
AX8108-0200	single-axis module 8 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated
AX8118-0200	single-axis module 18 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated
AX8206-0200	double-axis module 2 x 6 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated

(1) AX5000 up to 40 A: AX5x01-0000-020x, AX5x03-0000-020x, AX5x06-0000-020x, AX5112-0000-020x, AX5118-0000-020x, AX5125-0000-020x, AX5140-0000-020x

(2) AX5000 from 60 A up to 170 A: AX5160-0000-020x, AX5172-0000-020x, AX519x-0000-020x

Ordering information	TwinSAFE axis modules with integrated Logic
AX8108-0100	single-axis module 8 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated
AX8108-0200	single-axis module 8 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated
AX8118-0100	single-axis module 18 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated
AX8118-0200	single-axis module 18 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated
AX8206-0100	double-axis module 2 x 6 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated
AX8206-0200	double-axis module 2 x 6 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated

XTS | eXtended Transport System

The linear transport system XTS (eXtended Transport System) unites the benefits of rotary and linear systems. XTS enables individual product transport with a continuous flow of material. Due to the low construction volume the energy efficiency can be improved and the size of a machine can be significantly reduced.

Only motor module, mover, software and Industrial PC

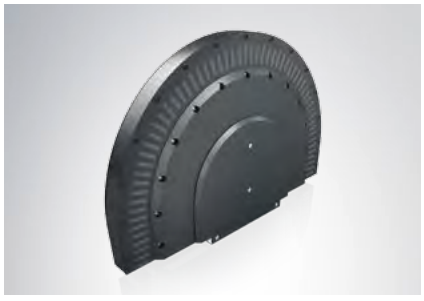
PC-based control from Beckhoff follows a principle that is equally simple and efficient: the maximum application of information technology for the simplification of mechanical processes. With XTS, Beckhoff has transferred this principle directly to the field of drive systems – and in this way has opened up new efficiency potentials in mechanical engineering, because XTS makes do with four simple components.

- Firstly: an arbitrary number of motor parts, which serve as path modules.
- Secondly: an arbitrary number of movers, which act individually or in groups.
- Thirdly: control software.
- And fourthly: an Industrial PC.

Flexible use, arbitrary functional options

There are virtually no limits to the possibilities of use of XTS: the movers can accelerate, brake, position and synchronise; they can take up absolute and positions relative to each other; they can group themselves and accumulate; they can create clamping forces in motion; they can travel through curves as fast as along straights; they can recover energy through regenerative braking and utilise both travel directions for transport purposes. And all of that with precise position control, without backlash, without material fatigue, virtually without wear – and without cost-intensive maintenance.

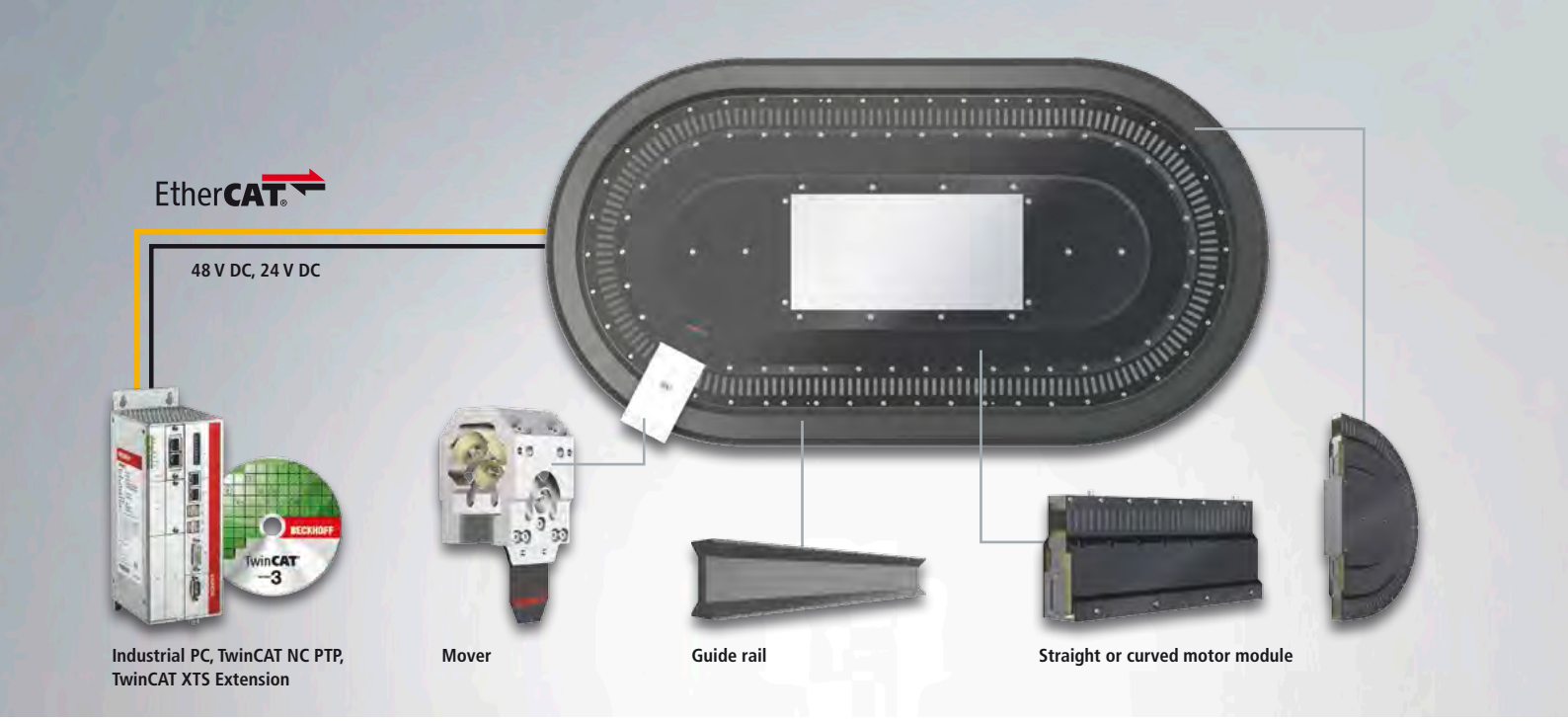
XTS Standard



XTS Black Line

XTS Hygienic

We reserve the right to make technical changes.

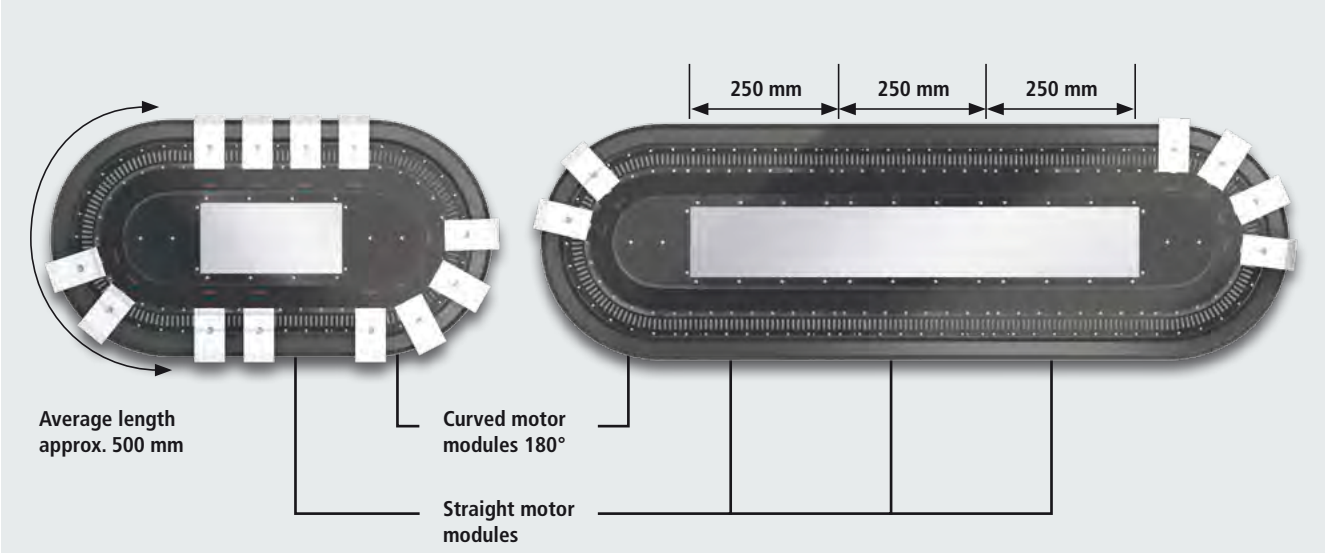


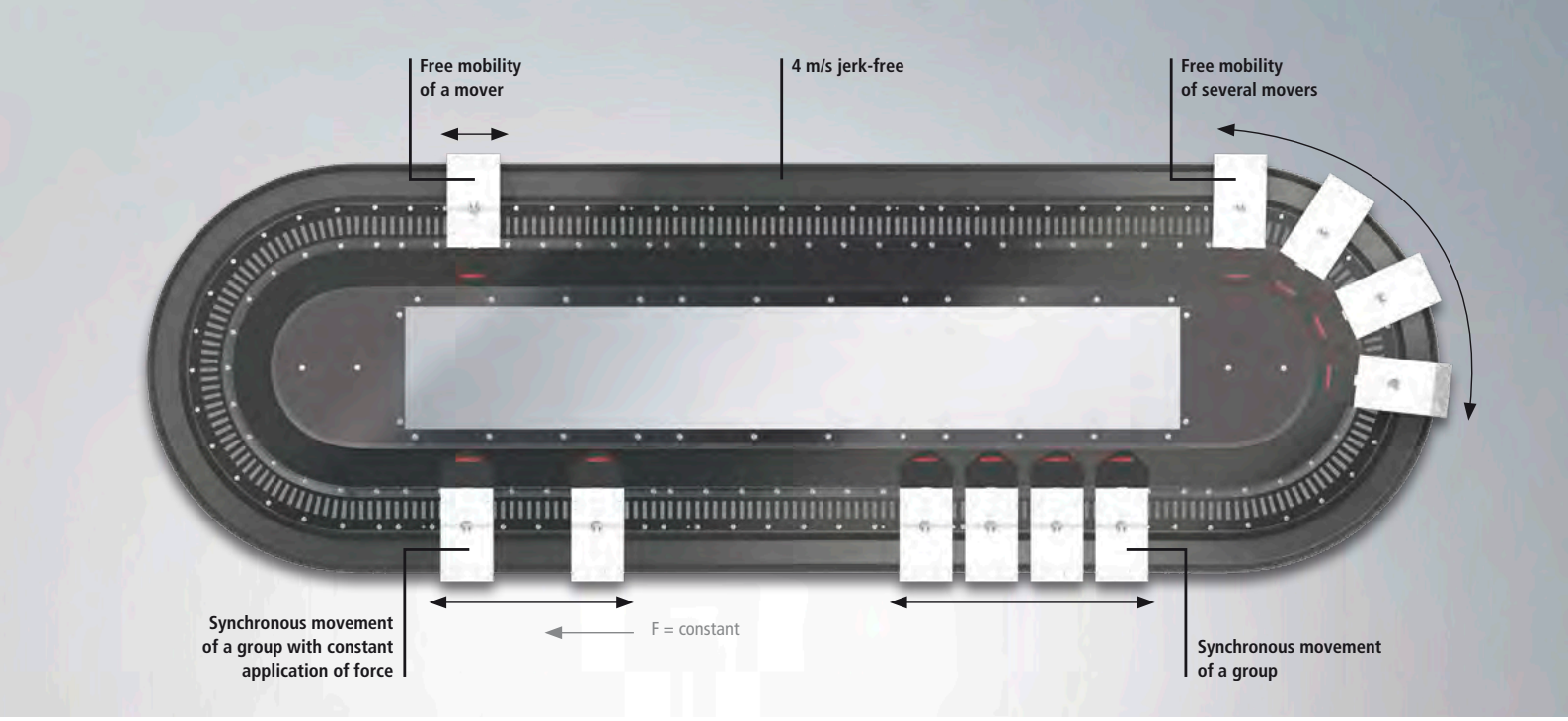
XTS | Modular and flexible

XTS is a mechatronic system containing all functions necessary for operation. A modular, fully integrated linear motor with power electronics and displacement measurement in one device. A mover as the moved part. A mechanical guide rail. The most diverse applications can be realised with these few coordinated components. The desired geometries, lengths and radii are formed by the number and choice of the components.

The XTS components for a continuous system

- curve sections
- 2 or more straight sections
- 1 or more movers
- Beckhoff Industrial PC
- TwinCAT NC PTP
- TwinCAT XTS extension
- power supply units





XTS | **Basic functions**

The XTS system enables a new class of functions that can be used at the same time in several places.
Completely new, particularly flexible: transport and positioning tasks are economically solvable with little effort.

The linear motor with NC and more degrees of freedom

Free mobility of an individual wireless mover
The individual mover can be moved like a linear motor along the entire path, since it makes do without cables. It can arbitrarily start, stop, brake, accelerate and drive to positions. Like a linear motor with NC, an individual mover can be synchronised to external motion profiles, thereby achieving maximum flexibility.

Production speed of up to 4 m/s over the entire path
An individual mover can be addressed sensitively – without jerking and with maximum positioning accuracy. The jerk-free acceleration profiles even allow the transport of open liquids.

Less wear, less maintenance
The use of XTS leads to less mechanical wear, since only the mover needs mechanical bearings. Gears, belts, guide rollers and clamps are no longer necessary. Due to the high positioning accuracy, the compensation of inaccuracies as required in common transport solutions is unnecessary: there is no stretching of chains due to load and wear, re-tensioning of toothed belts or mechanical backlash during load changes. Apart from the payload, only the small mass of the mover is moved.

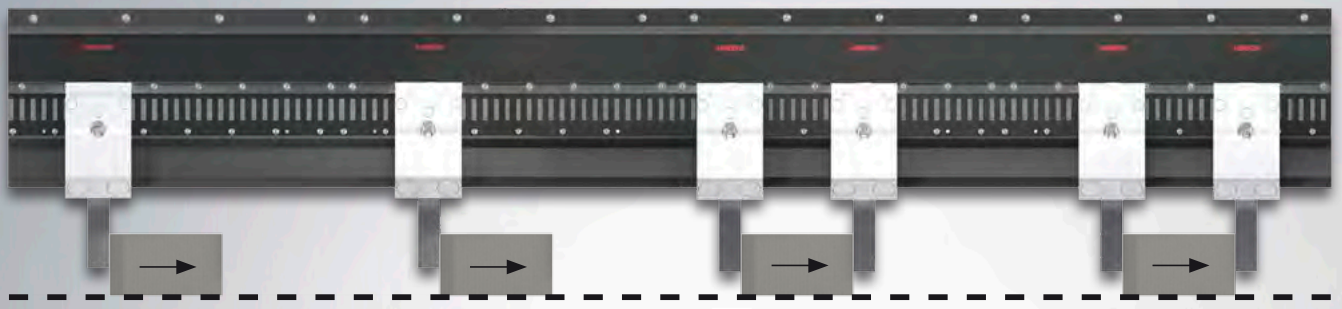
Synchronous movement in the group

Movements with constant force
A mover follows another with a defined force. It can apply a "clamping force" while at the same time following a movement, for example in order to hold a product. For other applications the force can be limited so as not to place an unnecessary load on a product under any conditions.

Synchronous movement of a group
At any place on the path during movement, groups can be formed that stop together or drive past processing stations with a specified speed profile. The size of the group (number and spacing) can be changed dynamically.

Free mobility of several movers
The movers can all be moved independently of one another. They can take up absolute positions along the entire travel distance. In addition, they can be moved relatively to each other and always avoid a collision with their neighbour.

We reserve the right to make technical changes.



Push product, adapt product spacing, reduce or increase product speed

Clamp and move product

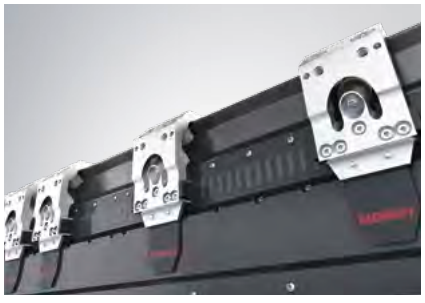
Use of the basic functions

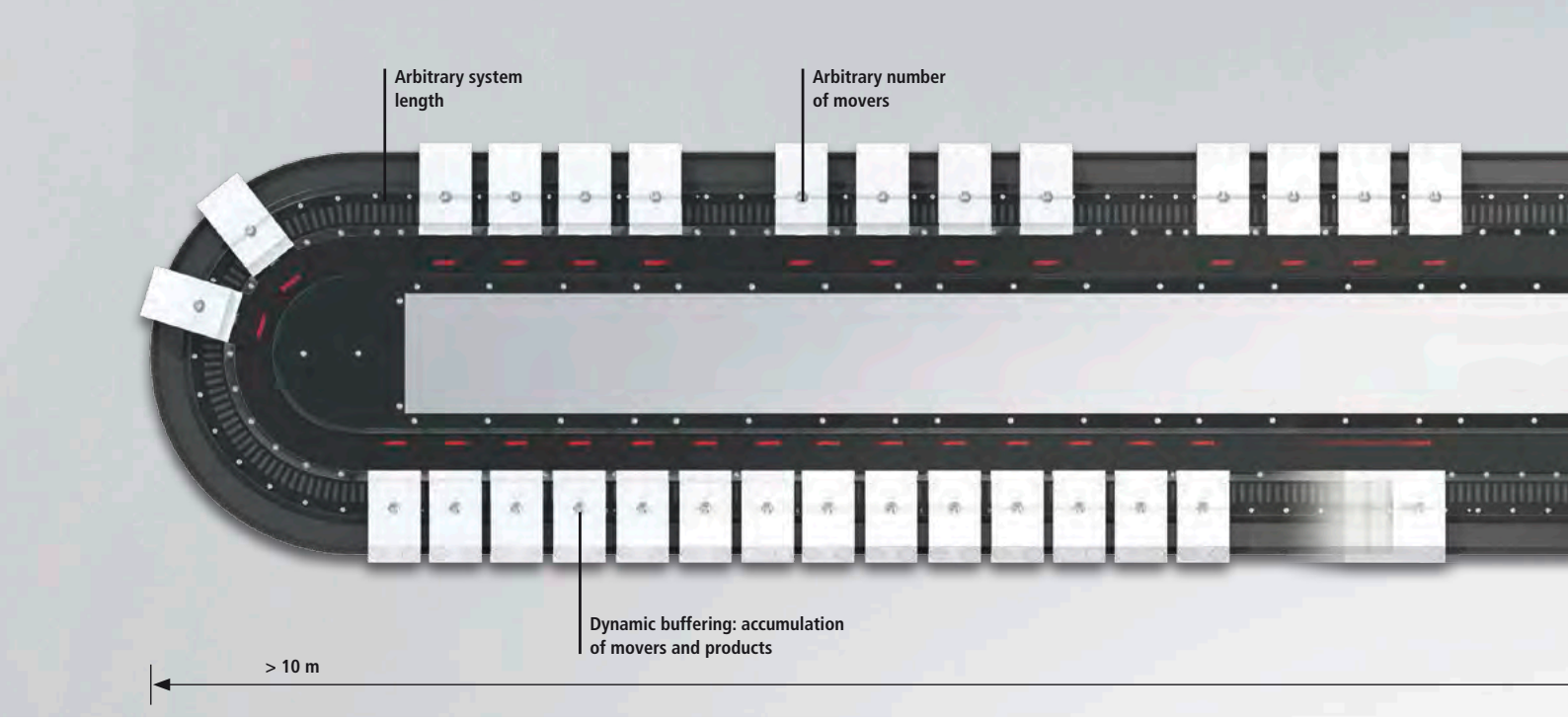
Interruption-free production flow

From the combination of the basic functions, product flows can be kept constantly in motion with XTS. Since the movers in the XTS operate independently of each other, it is possible to stop and process individual objects without having to interrupt the entire process. Viewed from the outside the production flow is maintained.

Push product, adapt product spacing, reduce or increase product speed
The movers of the XTS system can always run with the flow of product. No return trip or return stroke is necessary. The transported material can be accumulated and grouped during the movement via the dynamic buffering.

Clamp and move product
Through the combination of the synchronous movement of a group and the application of a constant force, a product can be clamped and moved in a clamped condition. Movement is controlled at all times and at all places on the transport path.





XTS | **Complex functions**

Due to the mechatronic concept, XTS combines functions and characteristics that are required for the dynamic transport of goods of all kinds. Apart from the basic functions of the movers, the complex functions of XTS enable the gentle control of an endless product flow.

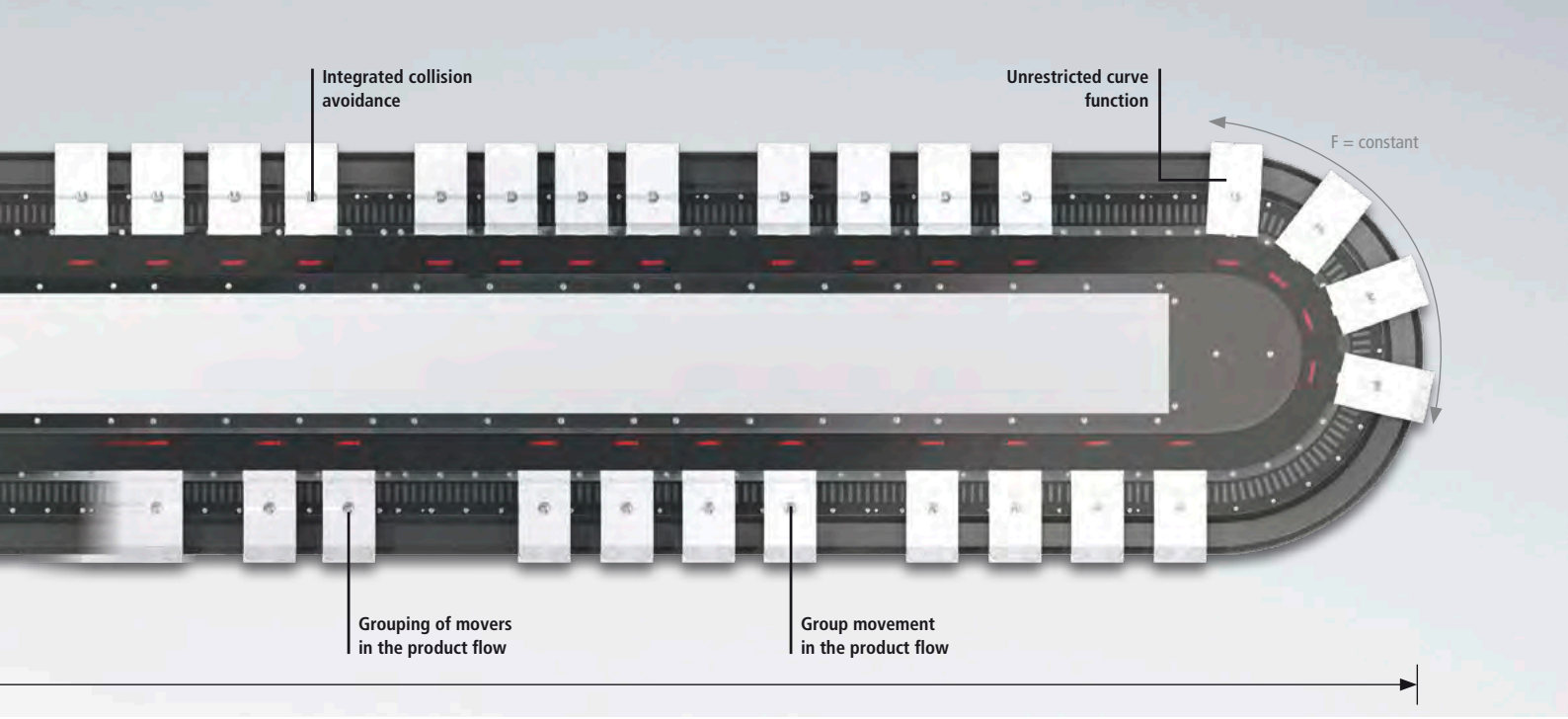
Arbitrary number of movers
There are no system limits for the number of movers; consequently the number can be optimally adapted to the application. In practice the number is limited only by the available computing power of the PC.

Unrestricted curve function
The entire travel path becomes the utilisable path, since the outward and return path and also the curve segments are available for the transport and processing of materials. This maximum utilisation of the machine volume results in very compact application solutions, which enable completely new machine concepts.

Arbitrary system length
There are no restrictions on the total length of the path, so that 10 m and much more are technically possible. The system consists of individual modules, which when combined with one another create both small, compact solutions and metre-long transport paths. Straight sections are made up of 250 mm modules which can be made endless by the use of curved segments. A motor cable has to be attached at least every three metres. The electrical connection between the modules is automatically made when assembling. The guide rail system offers lengths of up to 2.5 m.

Lower mass, increased safety
Small masses lead to a lower hazard potential, because unlike XTS, a conveyor chain is kept in motion by a central drive unit. The total acting force corresponds to the sum of all necessary individual forces over the entire length. In the case of an error, a mechanical malfunction or a manual intervention in the process, this force acts on one place. With XTS this risk can be significantly minimised and safety can be increased, since in most cases only the parameterised force of a mover acts. Hence, even in the case of a collision with an obstacle, only the mass of a mover with its payload acts.

We reserve the right to make technical changes.

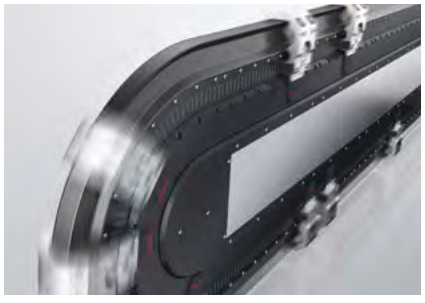


Control of a continuous product flow

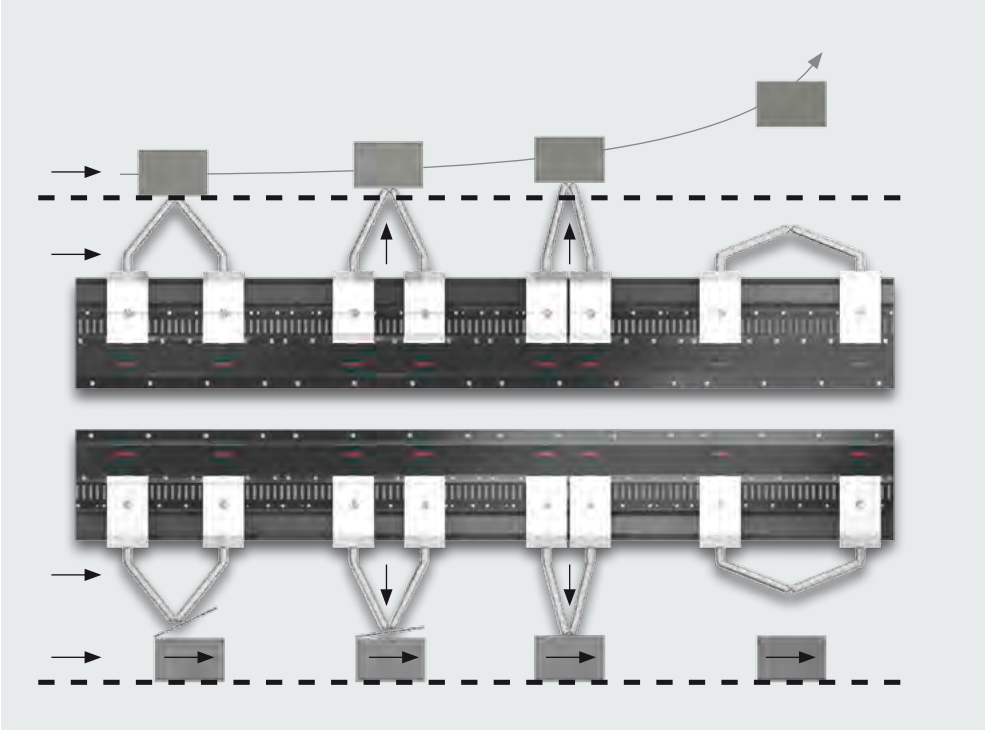
High-power dynamics, but no unrestrained force
The fast signal processing and the large bandwidth of EtherCAT enable the best dynamic characteristics. Together with large peak forces, high acceleration is available to the application. Position lag monitoring avoids damage to the product in case of mechanical malfunctions. In addition, force limitation and jerk reduction allow the optimal handling of the product at all times at different points in the production. For example, the parameters can be adapted according to the filling level while moving.

Absolutely precise configuration
The arbitrary number of movers, the modular path guidance, the individual controllability of each individual mover and the simple integrability into existing machines and plants ensure a precisely matching solution with which the production efficiency of a machine can be further optimised.

Fast, flexible format adaptation
A change of format when changing products or, for example, when the filling quantity changes can be carried out without stopping production: the modifications can be realised by changing the software parameters and empirical values can also be retrieved at any time in the form of a stored parameter set. The parameters can be exchanged between applications of the same type.

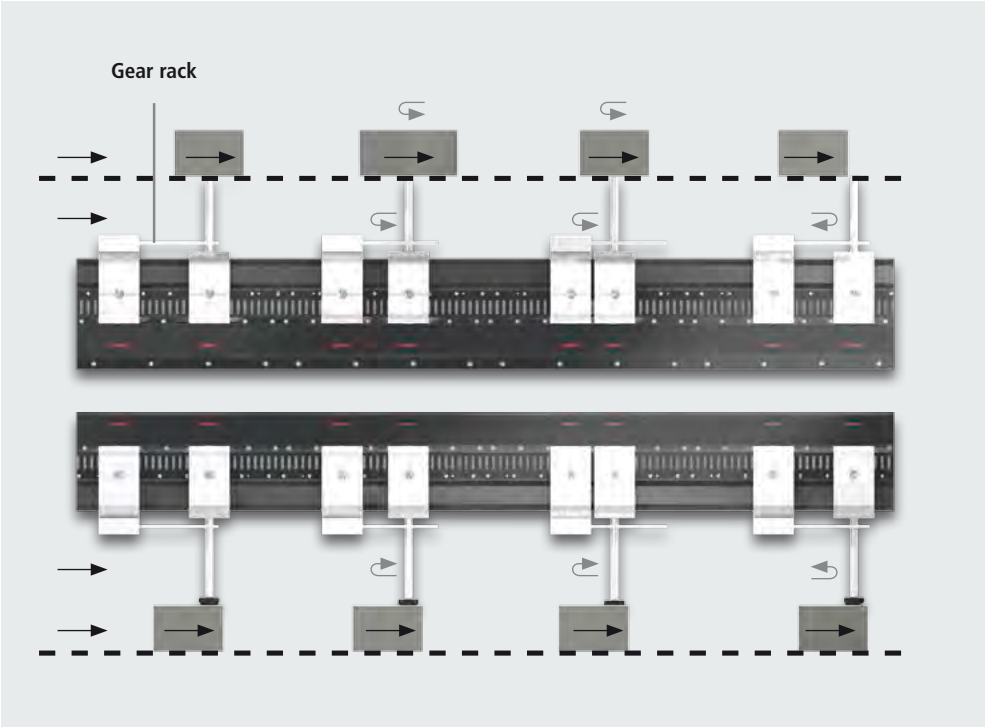


XTS | **Application examples**



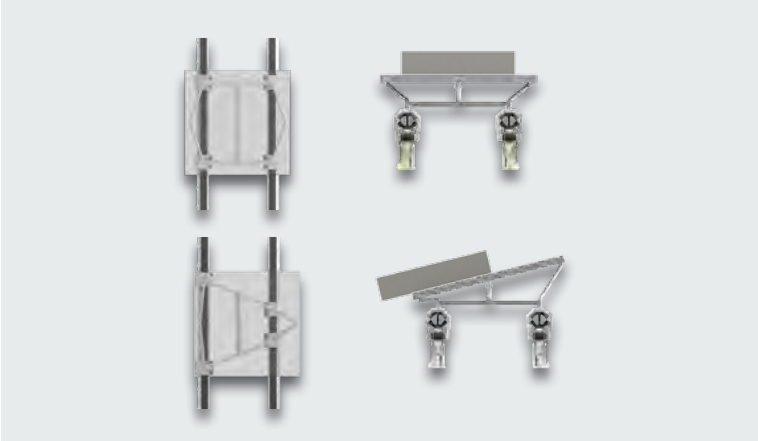
Movement kinematics in one system

Kinematics in linear motion for handling a product: lifting, sealing, etc.
A mechanical action generated by the relative movement between two movers creates an additional movement that can manipulate a product. Transported materials can be pushed upwards or to the side. A product can be closed or processed in some other way while moving.



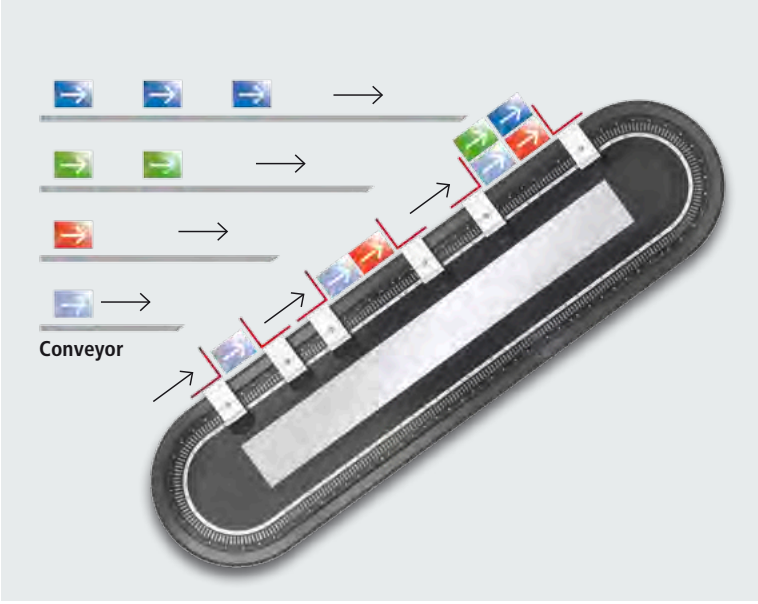
Kinematics in linear motion for handling a product: rotate, screw cap on, etc.
A rotary movement can be generated between two movers by a suitable mechanical action. This can, for example, screw a cap on or rotate the product.

We reserve the right to make technical changes.



Movement kinematics in two systems

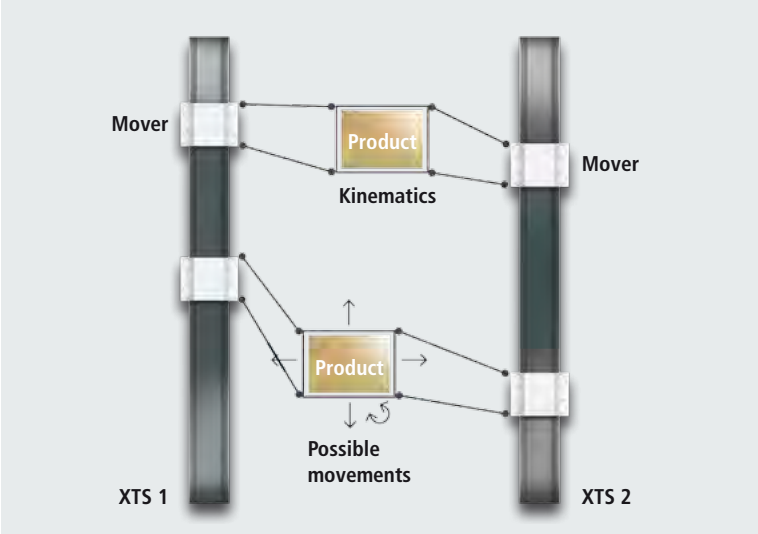
Transport and discharge product
A package or a case is transported on a surface. The package is to be deposited at a station. The surface is tilted to the side and the package slides off. Four movers on two paths move the tilting surface with the transported material. A change in the spacing of the movers with respect to each other generates a mechanical action that tilts the surface. The transported material can be prevented from sliding off when driving through curves by an inclined position and can be specifically deposited at another place while driving or after stopping.



Grouping system

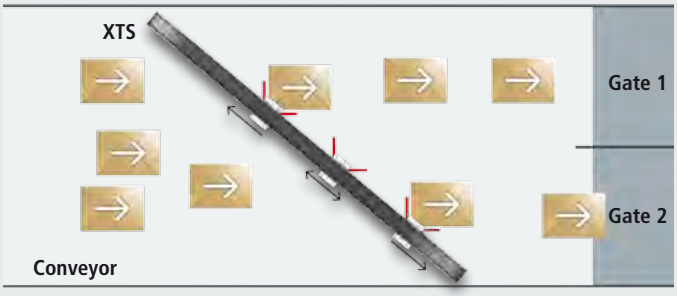
Used as a grouping system, the XTS can easily combine products arriving on multiple conveyor belts into predefined and easily changed groups and move them to the next station.

The plant can adapt to the product width, stack height and number of stacks without any manual intervention. The distance between the movers and also the motion profile are changed by parameters in the software. This can even be done during operation without a standstill.



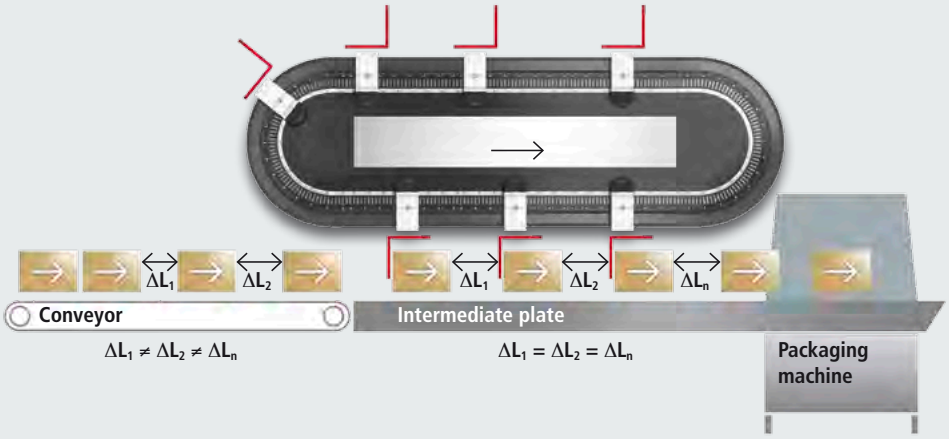
Travelling manipulator

With circulating kinematics the transported product can be influenced in X and Y directions. With two XTS systems arranged in parallel, the manipulator is synchronised to the product and shifts it on the belt at full speed. The product can even be slightly rotated by using appropriate kinematics.



Distribution system

Functioning as a distribution system, the XTS splits an incoming product stream into multiple streams (two in this case) inexpensively and with great flexibility.



Feeder with distance adjustment

The XTS makes it easy to implement a feeder with distance adjustment that synchronises products arriving at different intervals with the downstream process.

XY axis

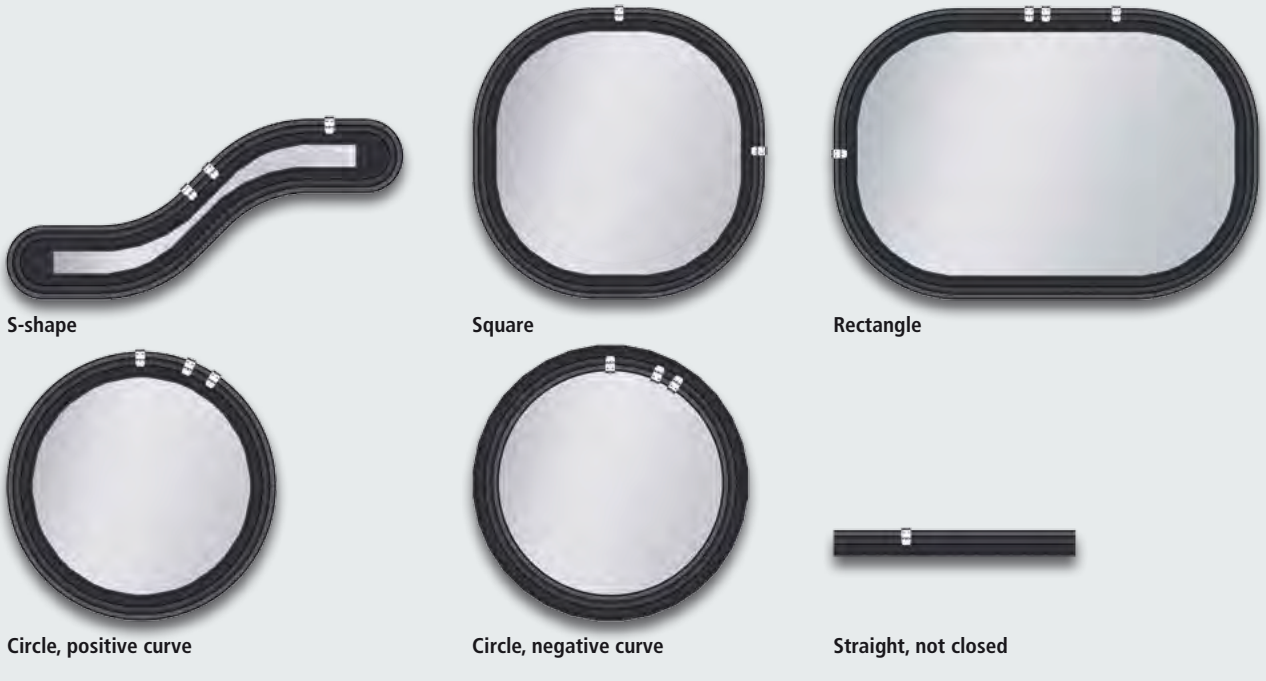
Two movers, defined as a virtual XY axis, and can be controlled with G-code. For example, the XTS can move the product along in a targeted manner under a fixed adhesive nozzle, in order to apply adhesive evenly along the outer contour.

We reserve the right to make technical changes.

Parallel filling of liquids

The particularly time-consuming liquid filling process shown here is implemented as a 15-fold parallel configuration. All inherently fast operations, such as bottle inspection, sealing, labeling and grouping are implemented just once. This considerably reduces the costs and space requirements of the entire system. With a filling time of three seconds, the plant achieves an output of five units per second. Dwell times, accelerations and product distances are realised as software functions. As a result, no mechanical adjustments are necessary, and product changeovers can be carried out during ongoing operation.

XTS | **Trajectories**



Servo Drives

▶ www.beckhoff.com/Servo-Drives

AX5101–AX5112, AX52xx | **Digital Compact Servo Drives: 1-/2-channel up to 8.3 kW**

- 1- or 2-channel Servo Drives
- high-speed EtherCAT communication
- rated current up to 12 A or 2 x 6 A
- optimised for multi-axis applications
- variable motor output current for 2-channel Servo Drives
- TwinSAFE drive option card

See page 344

AX8000 | **Multi-axis EtherCAT drive: Compact control power with 1 µs current control update time**

- optimised, compact dimensions for control cabinet installation
- OCT integrated
- new, integrated AX-Bridge: toolless mounting
- powerful FPGA technology combined with multi-core ARM processors
- multi-channel current control technology
- TwinSAFE axis modules

See page 336

We reserve the right to make technical changes.

EL72x1-9014 | **Compact servo drive in EtherCAT Terminals**

- seamless integration within EtherCAT I/O system
- various performance classes between 2.8 and 8 A
- direct motor connection with OCT
- enables implementation of the STO (Safe Torque Off) safety function
- vector control for highly dynamic positioning tasks
- designed for use with AM8100

See page 2 228

EP7211-9034 | **Servomotor box with OCT and STO, 4.5 A**

- seamless integration within EtherCAT I/O system
- direct motor connection with OCT
- enables implementation of the STO (Safe Torque Off) safety function
- vector control for highly dynamic positioning tasks
- designed for use with AM8100

See page 2 311

EJ7211-xxxx | **Servomotor modules with OCT, 4.5 A**

- seamless integration within EtherCAT I/O system
- direct motor connection with OCT
- EJ7211-9414 enables implementation of the STO (Safe Torque Off) safety function
- vector control for highly dynamic positioning tasks
- designed for use with AM8100

See page 2 392

AX5118–AX5140 | **Digital Compact Servo Drives: 1-channel up to 28 kW**

- high-speed EtherCAT communication
- rated current: 18/25/40 A
- flexible motor type selection
- TwinSAFE drive option card

See page 344

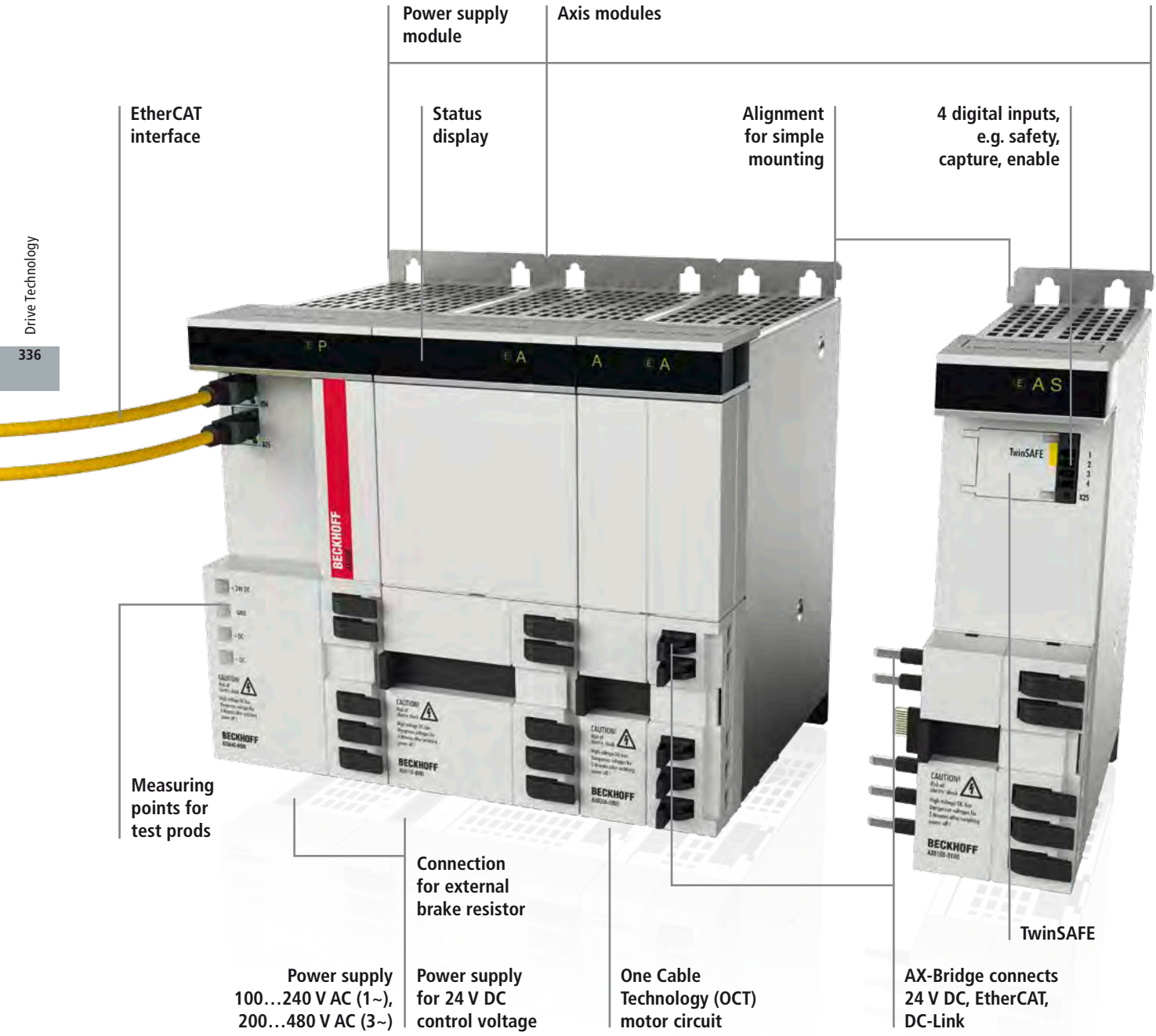
AX5160–AX5193 | **Digital Compact Servo Drives: 1-channel up to 118 kW**

- high-speed EtherCAT communication
- rated current: 60/72/90/110/143/170 A
- high performance with small dimensions
- flexible motor type selection
- TwinSAFE drive option card

See page 344

AX8000 | Multi-axis servo system

▶ www.beckhoff.com/AX8000



We reserve the right to make technical changes.

AX8620 | Power supply module, 20 A

AX8640 | Power supply module, 40 A

AX8108 | Axis module, 8 A

AX8118 | Axis module, 18 A

AX8206 | Double-axis module, 2 x 6 A

The AX8000 multi-axis servo system greatly simplifies the implementation of multi-channel drive solutions. The required number of 1-channel or 2-channel axis modules are attached to the central supply module. The modules are connected without screws or tools using the built-in AX-Bridge quick connection system, which is based on spring-loaded terminals. The 1-axis and 2-axis modules can optionally be equipped with STO or TwinSAFE (drive-integrated safety functions).

eXtreme Fast Control in the drive

The EtherCAT-based AX8000 multi-axis servo system combines powerful FPGA technology with multi-core ARM processors. The new multi-channel current control technology enables extremely short sampling and response times. The entirely hardware-implemented current controller combines the advantages of analog and digital control technology: reaction to a current deviation from the setpoint value is possible within 1 µs; the velocity controller cycle time is around 16 µs at a switching frequency of 32 kHz. The processing of EtherCAT process data (actual and setpoint values) is carried out without a processor almost without delay in the hardware, so that the minimum EtherCAT cycle time is only 62.5 µs.

One Cable Technology (OCT)

The AX8000 multi-axis servo system supports OCT, the One Cable Technology for power and feedback. In connection with the servomotors from the AM8000 (standard), AM8500 (increased inertia) and AM8800 (stainless steel) series, the wiring is reduced to the standard motor cable, via which the feedback signals are also transmitted. As in sensorless control, the user no longer has to use an additional feedback cable. All information required for control purposes is transmitted reliably and interference-proof via a digital interface.

Drive-integrated safety functions

The AX8000 with TwinSAFE supports the typical drive-integrated safety functions and fulfills the requirements of DIN EN ISO 13849-1:2008 (PL c/Cat. 3 up to PL e/Cat. 4).

- stop functions (STO, SOS, SS1, SS2)
- speed functions (SLS, SSM, SSR, SMS) with up to 8 speeds
- position functions (SLP, SCA, SLI) with reference cams
- acceleration functions (SAR, SMA)
- rotating direction functions (SDIp, SDIn)
- brake function (SBC)
- safely limited torque (SLT)

Technical data	AX8000
Bus system	EtherCAT
Drive profile	CiA402 according to IEC 61800-7-201 (CoE)
Rated supply voltage	100…480 V AC, 50/60 Hz
DC-Link voltage	140…875 V DC
Current control	1 µs update time, 16 µs cycle time
Design form	modular system with 60 or 90 mm wide elements
Protection class	IP 20
Operating temperature	0…+55 °C (see documentation)
Approvals	CE, cULus

AX8620, AX8640 | **Power supply modules**

A power supply module generates the DC-Link voltage (DC) for the supply of the axis modules and the option modules from the mains voltage. It already contains a mains filter, for which the drive is tested and certified in accordance with EN 61800-3 for Category C3 use.

Any regenerative energy produced, e.g. through strong braking of the motors, can be converted into heat either via the internal brake resistor or via the combination of built-in brake chopper and external brake resistor. Alternatively, the energy can be buffered in the AX8810 capacitor module.

AX8000 supply modules can be used on 1- and 3-phase low-voltage mains supplies.

– 1-phase mains supplies 100…240 V AC, 50/60 Hz
– 3-phase mains supplies 200…480 V AC, 50/60 Hz

A separate 24 V DC power supply is required in each case.

Technical data	AX8620-0000-0000	AX8640-0000-0000
Rated supply voltage	1 x 100…240 V AC 3 x 200…480 V AC	
Rated input current at 40 °C	1~: 10.0 A AC 3~: 17.5 A AC	3~: 35 A AC
Rated output current	1~: 5 A DC without mains choke/7 A DC with mains choke 3~: 20 A DC	3~: 40.0 A DC
Rated output	1~: 2.0 kW 3~: 10.7 kW	3~: 21.4 kW
DC-Link voltage	max. 875 V DC	
DC-Link capacitance	405 µF	625 µF
Max. braking power (internal/external)	21.8 kW/21.8 kW	43.6 kW/40.1 kW
Further information	www.beckhoff.com/AX8620	www.beckhoff.com/AX8640

We reserve the right to make technical changes.

AX81xx, AX8206 | **Axis modules**

An axis module contains the DC-Link and the inverter for supplying the motor. Depending on the required number of axes, the axis modules are attached to the supply module to form the multi-axis servo system. Axis modules with different ratings can be combined in order to enable an optimised design of the individual axes.

Supporting a wide supply voltage range from 100 to 480 V AC, the axis modules can be operated without limitation with any of the supply modules. This flexibility simplifies the implementation of machine configurations for any type of mains supply. The electrical connection is established without tools via the already integrated AX-Bridge: it automatically connects DC-Link, 24 V DC control voltage and communication via EtherCAT between the linked modules. The DC-Link connection enables the exchange of energy during acceleration and braking procedures, where the regenerative brake energy is primarily stored in the common DC-Link. If the energy exceeds the DC-Link capacitance, utilize the brake resistor of the AX881x capacitor modul to suppress the DC-Link voltage. The AX8000 multi-axis servo drive system encompasses new functions of safe drive technology with TwinSAFE: the AX8108, AX8118 and AX8206 axis modules include a programmable TwinSAFE Logic corresponding to an EL6910 and enable the direct implementation of a safety application in the servo drive. The user enjoys greater degrees of freedom in the implementation of safety applications in drive technology systems, and the flexibility in programming facilitates individual design of safe drive technology to suit the specific system. The safety functions STO and SS1 can be implemented with the TwinSAFE axis modules with the ordering option -0100 (STO/SS1). These functions can be initiated both via hard wiring and via FSoE. For TwinSAFE axis modules with the ordering option -0200 (Safe Motion), various internal and external drive signals are available for implementing an application-specific safety function.

Technical data	AX8108	AX8118	AX8206
Rated current	1 x 8 A	1 x 18 A	2 x 6 A
DC-Link voltage	max. 875 V DC		
DC-Link capacitance	135 µF	405 µF	135 µF
Number of channels	1	1	2
Min. rated channel current at full current resolution	1 A	5 A	1 A
Peak output current*	20 A	40 A	14 A | 20 A
Further information	www.beckhoff.com/AX81xx	www.beckhoff.com/AX81xx	www.beckhoff.com/AX82xx

*rating for 560 V DC

Ordering information	Axis module 1 x 8 A	Axis module 1 x 18 A	Axis module 2 x 6 A
Without TwinSAFE	AX8108-0000-0000	AX8118-0000-0000	AX8206-0000-0000
STO/SS1	AX8108-0100-0000	AX8118-0100-0000	AX8206-0100-0000
Safe Motion	AX8108-0200-0000	AX8118-0200-0000	AX8206-0200-0000

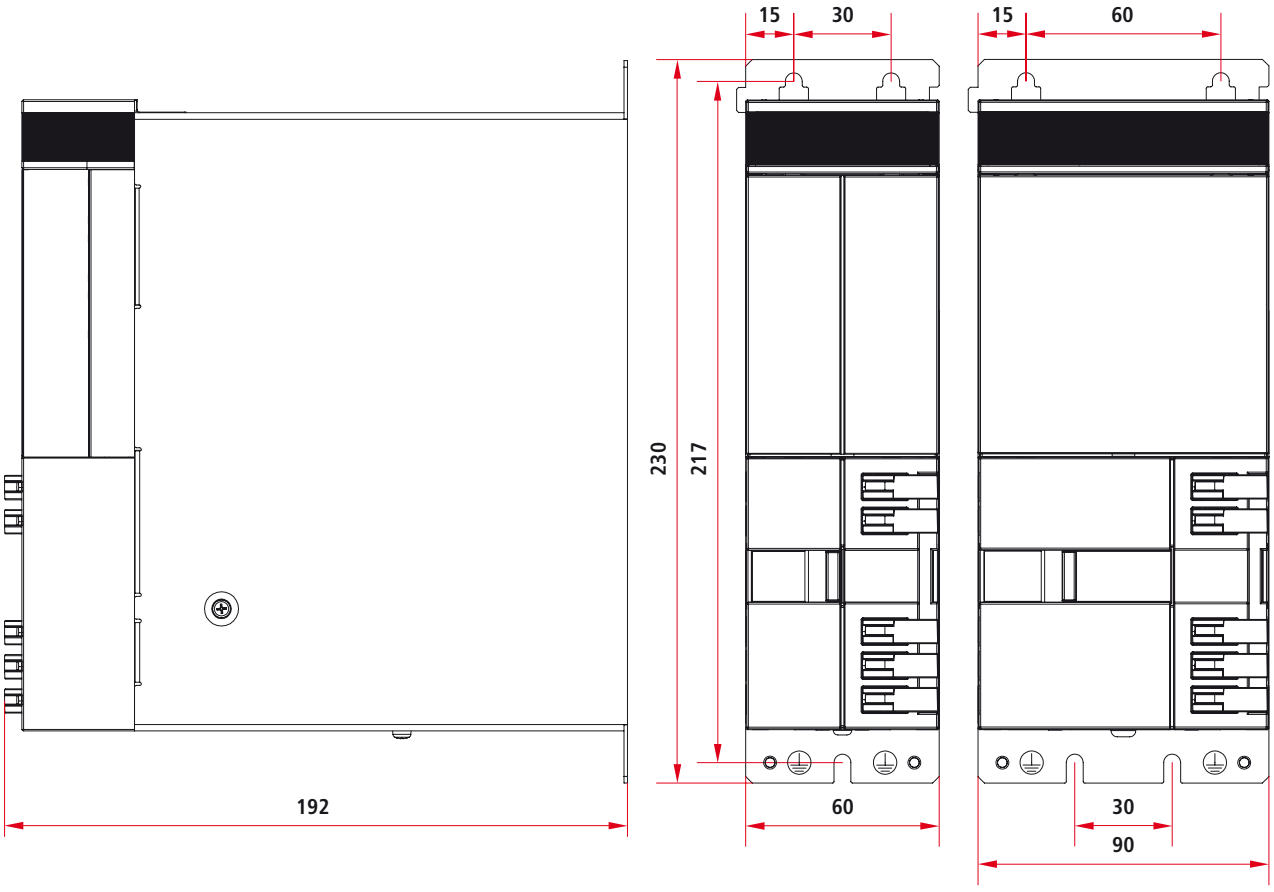
We reserve the right to make technical changes.

AX8810 | **Capacitor module**

An AX8810 capacitor module extends the DC-Link capacitance and is suitable for the support of the DC-Link. It enables energy savings: voltage peaks generated by braking motors are taken up and stored. This makes the activation of the brake resistor mostly unnecessary and helps to reduce power losses. Overall, the use of the capacitor module makes a reduction in the total connected load possible and also a smaller dimensioning of the fuse.

Technical data	AX8810-0000-0000
Function	capacitor module
For power supply modules	AX86xx-0000
DC-Link voltage	max. 875 V DC
DC-Link capacitance	1755 µF
Further information	www.beckhoff.com/AX881x

We reserve the right to make technical changes.



Dimensions	Height without connectors	Depth without connectors	Width
AX8620	230 mm	192 mm	60 mm
AX8640	230 mm	192 mm	90 mm
AX8108	230 mm	192 mm	60 mm
AX8118	230 mm	192 mm	90 mm
AX8206	230 mm	192 mm	60 mm
AX8810	230 mm	192 mm	60 mm

We reserve the right to make technical changes.

Motor supply cables for AX8000 Servo Drives at AM8xxx

For maximum cable lengths and further specifications see current documentation under ▶ **www.beckhoff.com/documentation**.
Torsion-resistant variants for robotic applications are available in the following wire gauges: 1 mm², 1.5 mm², 2.5 mm².

Motor cables 1 mm² for motors with itec® plug at AX8108 and AX8206

Ordering information	Motor cable with 1 mm² wire gauge, highly flexible for drag-chain use
ZK4800-8022-xxxx	Highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 81 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 1 mm² + (2 x 0.75 mm²) + (2 x AWG22)). The cable is UL and CSA listed.
ZK4800-8022-0050	example for 5 m length
ZK4501-8022-xxxx	extension cable

Motor cables 1.5 mm² for motors with M23 speedtec® at AX8108 and AX8206

Ordering information	Motor cable with 1.5 mm² wire gauge, fixed installation
ZK4800-8003-xxxx	Cables for fixed installation, min. bending radius = 61 mm (5 x OD), (4 x 1.5 mm² + (2 x 0.75 mm²) + (2 x AWG22)). The cable is UL and CSA listed.
ZK4800-8003-0050	example for 5 m length
ZK4501-8003-xxxx	extension cable

Ordering information	Motor cable with 1.5 mm² wire gauge, highly flexible for drag-chain use
ZK4800-8023-xxxx	Highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 89 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 1.5 mm² + (2 x 0.75 mm²) + (2 x AWG22)). The cable is UL and CSA listed.
ZK4800-8023-0050	example for 5 m length
ZK4501-8023-xxxx	extension cable

Motor cables 2.5 mm² for motors with M23 speedtec® plug at AX8118

Ordering information	Motor cable with 2.5 mm² wire gauge, fixed installation
ZK4800-8004-xxxx	Cables for fixed installation, min. bending radius = 69 mm (5 x OD), (4 x 2.5 mm² + (2 x 1 mm²) + (2 x AWG22)). The cable is UL and CSA listed.
ZK4800-8004-0050	example for 5 m length
ZK4501-8004-xxxx	extension cable

Ordering information	Motor cable with 2.5 mm² wire gauge, highly flexible for drag-chain use
ZK4800-8024-xxxx	Highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 97 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 2.5 mm² + (2 x 1 mm²) + (2 x AWG22)). The cable is UL and CSA listed.
ZK4800-8024-0050	example for 5 m length
ZK4501-8024-xxxx	extension cable

We reserve the right to make technical changes.

Motor cables 4 mm² for motors with M40 speedtec® plug at AX8118

Ordering information	Motor cable with 4 mm² wire gauge, highly flexible for drag-chain use
ZK4800-8025-xxxx	Highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 111 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 4 mm² + (2 x 1 mm²) + (2 x AWG22)). The cable is UL and CSA listed.
ZK4800-8025-0050	example for 5 m length
ZK4501-8025-xxxx	extension cable

Accessories for AX8000 Servo Drives at AM8xxx

Power supply | Mains chokes for AX8000

Ordering information	AX2090-ND80-00xx | Mains chokes
AX2090-ND80-0010	mains choke for AX8620-xxxx supply module, 1-phase, U_K 4 %
AX2090-ND80-0020	mains choke for AX8620-xxxx supply module, 3-phase, U_K 4 %
AX2090-ND80-0040	mains choke for AX8640-xxxx supply module, 3-phase, U_K 4 %

Brake energy management

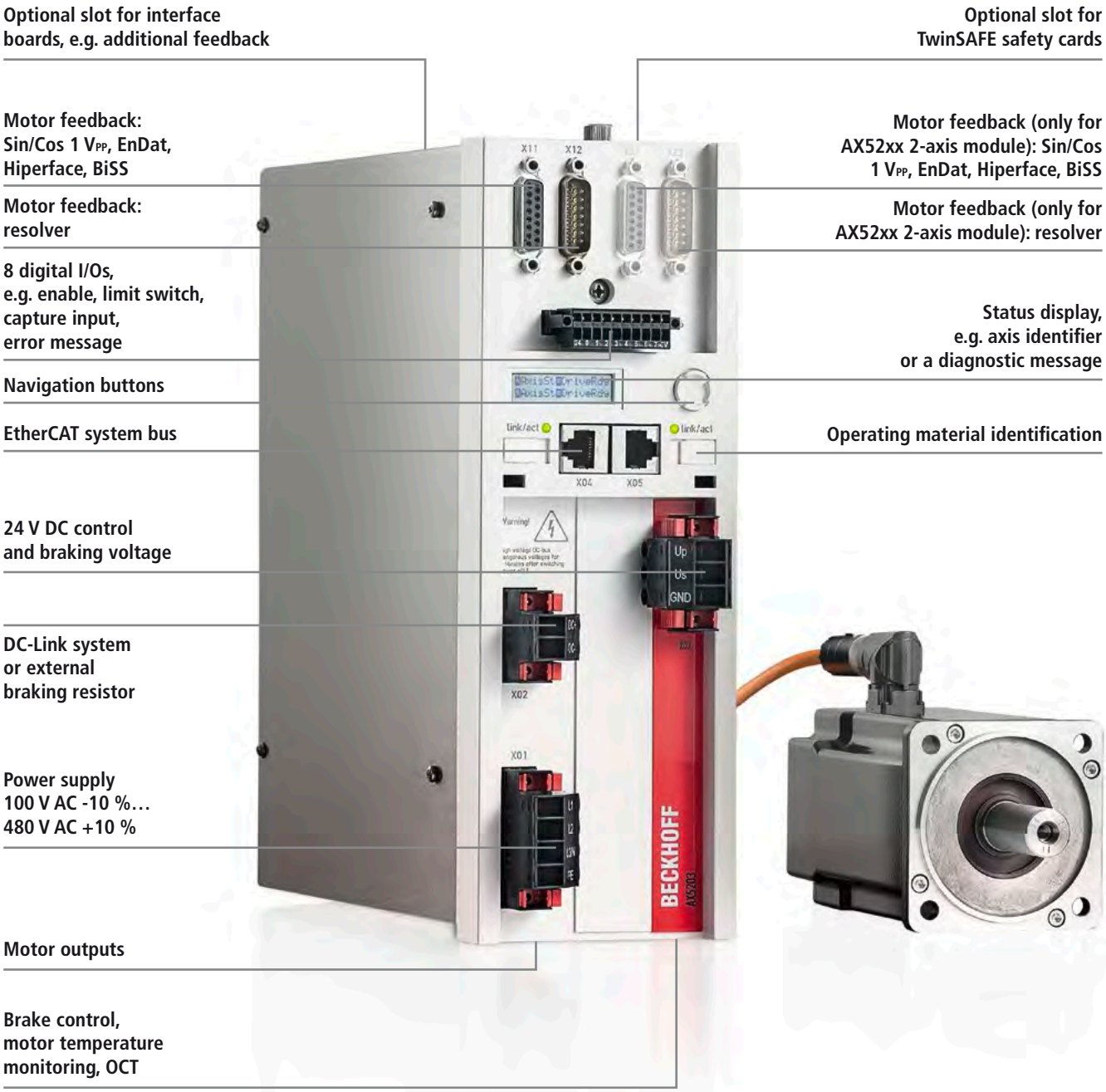
Ordering information	AX2090-BW80-xxxx | Braking resistors
AX2090-BW80-1000	external braking resistor for AX8640-0000-0000 supply module, 1.0 kW, 18 Ω [(1)]
AX2090-BW80-1600	external braking resistor for AX8620-0000-0000 supply module, 1.6 kW, 33 Ω [(1)]
AX2090-BW80-3200	external braking resistor for AX8640-0000-0000 supply module, 3.2 kW, 18 Ω [(2)]

Recommended interface cables: [(1)] ZK4000-2101-2xxx (1.5 mm²), [(2)] ZK4000-2102-2xxx (2.5 mm²)

We reserve the right to make technical changes.

AX5000 | Digital Compact Servo Drives

▶ www.beckhoff.com/AX5000



We reserve the right to make technical changes.

AX5101–AX5112 | 1-channel, up to 12 A

AX52xx | 2-channel, up to 2 x 6 A

AX5118–AX5140 | 1-channel, 18/25/40 A

AX5160, AX5172 | 1-channel, 60/72 A

AX5190, AX5191 | 1-channel, 90/110 A

AX5192, AX5193 | 1-channel, 143/170 A

The EtherCAT drives

The AX5000 Servo Drive product line from Beckhoff sets new standards in drive performance. The AX5000 series is available in single- or multi-channel form and is optimised for exceptional functionality and cost-effectiveness. Featuring integrated, high-speed control technology with a current control cycle of down to 62.5 µs, the AX5000 drives support fast and highly dynamic positioning tasks. The drives utilise EtherCAT as a high-performance communication system, providing an ideal interface with PC-based control technology while supporting coupling with other fieldbus systems. The 2-channel Servo Drives with variable motor output current optimise the packaging density and the cost per drive channel. The compact design and simple and safe installation through the "AX-Bridge" quick connection system significantly simplify control cabinet assembly.

Technical highlights

- **fast control algorithms**
  - current control: min. 62.5 µs
  - speed control: min. 62.5 µs
  - position control: min. 62.5 µs
- **variably adjustable current and speed filters**
- **high-speed EtherCAT system communication**
- **1- or 2-channel Servo Drive**
  - optimised for multi-axis applications
  - variable motor output current in 2-channel drives
- **active DC-Link and brake energy management via AX-Bridge**
- **variable motor interface with**
  - multi-feedback interface
  - flexible motor type selection
  - scalable, wide range motor current measurement
  - OCT (One Cable Technology)
  - electronic identification plate
- **high-speed capture inputs**
  - eight programmable digital I/Os, two with timestamp
- **mains connection**
  - wide voltage range 100…480 V AC
  - integrated mains filter
- **integration of safety functions (optional)**
  - STO, SS1
  - TwinSAFE: intelligent safety functions for Motion Control with AX58xx
- **compact design for simple control cabinet installation (300 mm depth)**
- **AX-Bridge – the quick connection system for power supply, DC-Link and control voltage**
- **variable cooling concept (fanless, forced cooling)**

Technical data	AX5000
Bus system	EtherCAT
Drive profile	SERCOS™ profile for servo drives according to IEC 61800 7 204 (SoE)
Rated supply voltage	100…480 V AC, 50/60 Hz
DC-Link voltage	max. 875 V DC
Current control	62.5 µs
Design form	compact Servo Drive in 1- and 2-channel models, multi-axis systems with AX-Bridge
Protection class	IP 20
Operating temperature	AX5x01…AX5140: 0…50 °C, AX5160…AX5193: 0…40 °C
Approvals	CE, cULus

We reserve the right to make technical changes.

AX51xx | 1-channel Servo Drives up to 40 A

Technical data	AX5101-0000-020x	AX5103-0000-020x	AX5106-0000-020x	AX5112-0000-020x
Function	servo drive for one drive axis			
Rated supply voltage	3 x 100…480 V AC ±10 % 1 x 100…240 V AC ±10 %	3 x 100…480 V AC ±10 % 1 x 100…240 V AC ±10 %	3 x 100…480 V AC ±10 % 1 x 100…240 V AC ±10 %	3 x 100…480 V AC ±10 %
Rated current	1~: 1.5 A 3~: 1.5 A	1~: 3 A 3~: 3 A	1~: 4.5 A 3~: 6 A	3~: 12 A
DC-Link voltage	max. 875 V DC			
Peak output current	4.5 A	7.5 A	13 A	26 A
Further information	www.beckhoff.com/AX51xx			

Technical data	AX5118-0000-020x	AX5125-0000-020x	AX5140-0000-020x
Function	servo drive for one drive axis		
Rated supply voltage	3 x 100…480 V AC ±10 %		
Rated current	3~: 18 A	3~: 25 A	3~: 40 A
DC-Link voltage	max. 875 V DC		
Minimum rated channel current at full current resolution	12 A	12 A	18 A
Peak output current	36 A	50 A	80 A
Further information	www.beckhoff.com/AX51xx		

AX51xx | 1-channel Servo Drives 60…170 A

Technical data	AX5160-0000-020x	AX5172-0000-020x	AX5190-0000-020x
Function	servo drive for one drive axis		
Rated supply voltage	3 x 400…480 V AC ±10 %		
Rated current	3~: 60 A	3~: 72 A	3~: 90 A
DC-Link voltage	max. 875 V DC		
Max. braking power (internal/external)	–/52 kW	–/52 kW	–/67 kW
Peak output current	120 A	144 A	180 A
Further information	www.beckhoff.com/AX5160		

Technical data	AX5191-0000-020x	AX5192-0000-020x	AX5193-0000-020x
Function	servo drive for one drive axis		
Rated supply voltage	3 x 400…480 V AC ±10 %		
Rated current	3~: 110 A	3~: 143 A	3~: 170 A
DC-Link voltage	max. 875 V DC		
Max. braking power (internal/external)	–/67 kW	–/103 kW	–/103 kW
Peak output current	180 A	215 A	221 A
Further information	www.beckhoff.com/AX5160		

We reserve the right to make technical changes.

AX52xx | 2-channel Servo Drives

Technical data	AX5201-0000-020x	AX5203-0000-020x	AX5206-0000-020x
Function	servo drive for two drive axes with flexible distribution of the total device current		
Rated supply voltage	3 x 100…480 V AC ±10 % 1 x 100…240 V AC ±10 %		
Rated current	1~: 2 x 1.5 A 3~: 2 x 1.5 A	1~: 2 x 3 A 3~: 2 x 3 A	1~: 2 x 4.5 A 3~: 2 x 6 A
DC-Link voltage	max. 875 V DC		
Peak output current	2 x 5 A	2 x 10 A	2 x 13 A
Further information	www.beckhoff.com/AX52xx		

Dimensions	Height without connectors	Width	Depth without connectors
AX5101	274 mm	92 mm	232 mm
AX5103	274 mm	92 mm	232 mm
AX5106	274 mm	92 mm	232 mm
AX5112	274 mm	92 mm	232 mm
AX5118	274 mm	185 mm	232 mm
AX5125	274 mm	185 mm	232 mm
AX5140	274 mm	185 mm	232 mm
AX5201	274 mm	92 mm	232 mm
AX5203	274 mm	92 mm	232 mm
AX5206	274 mm	92 mm	232 mm
AX5160	345 mm	190 mm	259 mm
AX5172	345 mm	190 mm	259 mm
AX5190	540 mm	280 mm	253 mm
AX5191	540 mm	280 mm	253 mm
AX5192	540 mm	280 mm	332 mm
AX5193	540 mm	280 mm	332 mm

Typical combinations AX5000	Mains choke	Mains filter	Braking resistor (x = 3 or 6)
AX5160	AX2090-ND50-0060	integrated (C3 up to 25 m)	AX2090-BW52-x000
AX5172	AX2090-ND50-0072	integrated (C3 up to 25 m)	AX2090-BW52-x000
AX5190	AX2090-ND50-0090	AX2090-NF50-0100	AX2090-BW53-x000
AX5191	AX2090-ND50-0110	AX2090-NF50-0150	AX2090-BW53-x000
AX5192	AX2090-ND50-0143	AX2090-NF50-0150	AX2090-BW54-x000
AX5193	AX2090-ND50-0170	AX2090-NF50-0180	AX2090-BW54-x000

Braking resistor: x = power in kW

We reserve the right to make technical changes.

Options for AX5000 Servo Drives

AX57xx | Encoder option cards

The AX5000 Servo Drive series supports a large number of feedback interfaces via the multi-feedback interface:
- resolver (2-, 4-, 6- or 8-pole)
- SinCos encoder 1 V_{PP}
- single- and multi-turn encoder EnDat
- single- and multi-turn encoder EnDat 2.2
- single- and multi-turn encoder Hiperface 1 V_{PP}
- single- and multi-turn encoder BiSS 1 V_{PP}
- single- and multi-turn encoder 1 V_{PP}

From hardware revision 2 onwards, OCT (One Cable Technology) is also supported by the AX5000 and with it the "second encoder" function where the encoder inside the motor is used for commutation and a second high-resolution encoder is used for position control.

Encoder option cards
For the integration of further feedback systems the controllers can be equipped with encoder option cards from hardware revision 2 onwards. The option cards are inserted in the second option slot on top of the AX5000, offering the possibility to connect one or two further encoders, depending on the version.

Encoder option cards for AX51xx
- AX5701: one additional encoder input 1 V_{PP}, BiSS B, Hiperface, EnDat
- AX5721: one additional encoder input EnDat 2.2 or BiSS C

Encoder option cards for AX52xx
- AX5702: two additional encoder inputs 1 V_{PP}, BiSS B, Hiperface, EnDat
- AX5722: two additional encoder inputs EnDat 2.2 or BiSS C

Ordering information		Pict.
AX5701-0000	encoder option card for one additional encoder input 1 V_{PP}, BiSS B, Hiperface, EnDat	
AX5702-0000	encoder option card for two additional encoder inputs 1 V_{PP}, BiSS B, Hiperface, EnDat	A
AX5721-0000	encoder option card for one additional encoder input EnDat 2.2, BiSS C	
AX5722-0000	encoder option card for two additional encoder inputs EnDat 2.2, BiSS C	

AX58xx | TwinSAFE drive options cards

Significant hazards to persons arise from the dynamic movements of the electrical drive equipment of machines. With the AX58xx TwinSAFE drive option cards numerous safety functions can be easily implemented by the user. No further circuits are necessary for this, such as circuit breakers or contactors in the supply lines or special external encoder systems. Optional cards that are certified according to DIN EN ISO 13849-1:2008 (Cat. 4, PL e) and IEC 61508:2010 (SIL 3) are available for different safety categories:

AX5801 | Personal protection against inadvertent restart of the drive axis (STO/SS1):
- Safe Torque Off (STO) according to IEC 61800-5-2
- control through safe 24 V DC outputs
- mains voltage and motor line remain connected

AX5805, AX5806 | Safe Motion according to IEC 61800-5-2. Control is performed via EtherCAT; no further wiring is required:
- stop functions (STO, SOS, SS1, SS2)
- speed functions (SLS, SSM, SSR, SMS) with up to 8 speeds
- position functions (SLP, SCA, SLI) with reference cams
- acceleration functions (SAR, SMA)
- rotating direction functions (SDIp, SDIn)

For further information on TwinSAFE and the TwinSAFE products see page 542

Ordering information		Pict.
AX5801-0200	TwinSAFE drive option card for AX5000 up to 40 A, HW 2.0: STO, SS1 (1)	B
AX5805-0000	TwinSAFE drive option card for AX5000 up to 40 A, HW 2.0: STO, SS1, SS2, SOS, SLS, SDI (1)	C
AX5806-0000	TwinSAFE drive option card for AX5000 from 60 A, HW 2.0: STO, SS1, SS2, SOS, SLS, SDI (2)	

(1) AX5000 up to 40 A: AX5x01-0000-020x, AX5x03-0000-020x, AX5x06-0000-020x, AX5112-0000-020x, AX5118-0000-020x, AX5125-0000-020x, AX5140-0000-020x

(2) AX5000 from 60 A up to 170 A: AX5160-0000-020x, AX5172-0000-020x, AX519x-0000-020x

We reserve the right to make technical changes.

AX59xx | **AX-Bridge quick connection system**

For Servo Drives up to a rated current of 40 A, the AX59xx AX bridge enables the simple and fast connection of several AX5000 units to form a multi-axis system by means of plug-in supply and connection modules.

The AX590x supply module is simply snapped onto the Servo Drive. The AX591x connection module with integrated busbars is suitable for multi-axis systems and combines mains input, intermediate circuit, 24 V DC control voltage and brake voltage. In combination, the AX590x and AX591x modules enable fast installation and commissioning.

– integration of power supply, DC-Link, 24 V DC control and braking voltage
– connection module with power rail system, current carrying capacity up to 85 A
– straightforward installation and disassembly without additional wiring
– visible and safe contacting

Active DC-Link and brake energy management

With the AX-Bridge the DC-Links are automatically through-connected: This enables an economic energy balancing between axes.

– short-circuit-proof
– intelligent utilisation of all available system braking resistors
– elimination power loss

Ordering information		Pict.
AX5901-0000	AX-Bridge power supply module for connection of supply voltage and 24 V DC for control and brake energy (pluggable), for AX5x01…AX5125, 85 A	D
AX5902-0000	AX-Bridge power supply module for connection of supply voltage and 24 V DC for control and brake energy (pluggable), for AX5140, 85 A	D
AX5911-0000	AX-Bridge power distribution module, quick connection system for power supply, DC-Link and control voltage (pluggable), for AX5x01…AX5112, 85 A	E
AX5912-0000	AX-Bridge power distribution module, quick connection system for power supply, DC-Link and control voltage (pluggable), for AX5118 and AX5125, 85 A	F

A

B

C

D

E

F

We reserve the right to make technical changes.

Motor cables for AX5000 Servo Drives at AM8xxx

For maximum cable lengths and further specifications see current documentation under ▶ **www.beckhoff.com/documentation**.
Torsion-resistant variants for robotic applications are available in the following wire gauges: 1 mm², 1.5 mm², 2.5 mm².

Motor cables 1 mm² for motors with itec® plug at AX5000 (1.5…6 A)

Ordering information	Motor cable with 1 mm² wire gauge, highly flexible for drag-chain use
ZK4500-8022-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 81 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 1 mm² + (2 x 0.75 mm²) + (2 x AWG22))
ZK4500-8022-0050	example for 5 m length
ZK4501-8022-xxxx	extension cable

Motor cables 1.5 mm² for motors with M23 speedtec® plug at AX5000 (1.5…12 A)

Ordering information	Motor cable with 1.5 mm² wire gauge, fixed installation
ZK4500-8003-xxxx	cables for fixed installation, min. bending radius = 61 mm (5 x OD), (4 x 1.5 mm² + (2 x 0.75 mm²) + (2 x AWG22))
ZK4500-8003-0050	example for 5 m length
ZK4501-8003-xxxx	extension cable

Ordering information	Motor cable with 1.5 mm² wire gauge, highly flexible for drag-chain use
ZK4500-8023-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 89 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 1.5 mm² + (2 x 0.75 mm²) + (2 x AWG22))
ZK4500-8023-0050	example for 5 m length
ZK4501-8023-xxxx	extension cable

Motor cables 2.5 mm² for motors with M23 speedtec® plug at AX5000 (18…25 A)

Ordering information	Motor cable with 2.5 mm² wire gauge, fixed installation
ZK4500-8004-xxxx	cables for fixed installation, min. bending radius = 69 mm (5 x OD), (4 x 2.5 mm² + (2 x 1 mm²) + (2 x AWG22))
ZK4500-8004-0050	example for 5 m length
ZK4501-8004-xxxx	extension cable

Ordering information	Motor cable with 2.5 mm² wire gauge, highly flexible for drag-chain use
ZK4500-8024-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 97 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 2.5 mm² + (2 x 1 mm²) + (2 x AWG22))
ZK4500-8024-0050	example for 5 m length
ZK4501-8024-xxxx	extension cable

Motor cables 4 mm² for motors with M40 speedtec® plug at AX5000 (12…25 A)

Ordering information	Motor cable with 4 mm² wire gauge, highly flexible for drag-chain use
ZK4500-8025-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 111 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 4 mm² + (2 x 1 mm²) + (2 x AWG22))
ZK4500-8025-0050	example for 5 m length
ZK4501-8025-xxxx	extension cable

We reserve the right to make technical changes.

Motor cables 10 mm² for motors with M40 speedtec® plug at AX5000 (40 A)

Ordering information	Motor cable with 10 mm² wire gauge, highly flexible for drag-chain use
ZK4500-8027-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 225 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 10 mm² + (2 x 1.5 mm²) + (2 x AWG22))
ZK4500-8027-0050	example for 5 m length
ZK4501-8027-xxxx	extension cable

Motor cables 10 mm² for motors with M40 speedtec® plug at AX5000 (60 A) (1)

Ordering information	Motor cable with 10 mm² wire gauge, highly flexible for drag-chain use
ZK4504-8027-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 255 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 10 mm² + (2 x 1.5 mm²) + (2 x AWG22))
ZK4504-8027-0050	example for 5 m length
ZK4501-8027-xxxx	extension cable

(1) According to DIN EN 60204-1 only permitted for a continuous current of 52 A! With AX5000 Servo Drives (60 A) only permitted for utilising the peak current capacity! AX5000 (60 A) does not support OCT. Order feedback cable separately: ZK4530-8010-xxxx for resolver, ZK4510-8020-xxxx for encoder.

Motor cables 10 mm² for motors with connector box at AX5000 (60 A) (1)

Ordering information	Motor cable with 10 mm² wire gauge, highly flexible for drag-chain use
ZK4506-8027-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 255 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 10 mm² + (2 x 1.5 mm²) + (2 x AWG22))
ZK4506-8027-0050	example for 5 m length

(1) According to DIN EN 60204-1 only permitted for a continuous current of 52 A! With AX5000 Servo Drives (60 A) only permitted for utilising the peak current capacity! AX5000 (60 A) does not support OCT. Order feedback cable separately: ZK4530-8010-xxxx for resolver, ZK4510-8020-xxxx for encoder.

Motor cables 16 mm² for motors with M40 speedtec® plug at AX5000 (72 A) (1)

Ordering information	Motor cable with 16 mm² wire gauge, flexible for drag-chain use
ZK4504-8018-xxxx	flexible, drag-chain suitable cable with 5 million bending cycles, max. 180 m/min, max. 5 m/s², min. bending radius = 250 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 10 mm² + (2 x 1.5 mm²) + (2 x 1.5 mm²))
ZK4504-8018-0050	example for 5 m length

(1) According to DIN EN 60204-1 only permitted for a continuous current of 70 A! With AX5000 Servo Drives (72 A) only permitted for utilising the peak current capacity! AX5000 (72 A) does not support OCT. Order feedback cable separately: ZK4530-8010-xxxx for resolver, ZK4510-8020-xxxx for encoder.

Motor cables 16 mm² for motors with connector box at AX5000 (72 A) (1)

Ordering information	Motor cable with 16 mm² wire gauge, flexible for drag-chain use
ZK4506-8018-xxxx	flexible, drag-chain suitable cable with 5 million bending cycles, max. 180 m/min, max. 5 m/s², min. bending radius = 250 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 10 mm² + (2 x 1.5 mm²) + (2 x 1.5 mm²))
ZK4506-8018-0050	example for 5 m length

(1) According to DIN EN 60204-1 only permitted for a continuous current of 70 A! With AX5000 Servo Drives (72 A) only permitted for utilising the peak current capacity! AX5000 (72 A) does not support OCT. Order feedback cable separately: ZK4530-8010-xxxx for resolver, ZK4510-8020-xxxx for encoder.

Feedback cables for AX5000 Servo Drives at AM8xxx

Resolver cables for motors with itec® plug at AX5000

Ordering information	Resolver cable with 0.25 mm² wire gauge, flexible, for drag-chain use
ZK4530-8110-xxxx	flexible, drag-chain suitable cable with 5 million bending cycles, max. 120 m/min, max. 4 m/s², min. bending radius = 75 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, 4 x 2 x 0.25 mm²
ZK4530-8110-0050	example for 5 m length
ZK4531-8110-xxxx	extension cable

Resolver cables for motors with M23 speedtec® plug at AX5000

Ordering information	Resolver cable with 0.25 mm² wire gauge, flexible, for drag-chain use
ZK4530-8010-xxxx	flexible, drag-chain suitable cable with 5 million bending cycles, max. 120 m/min, max. 4 m/s², min. bending radius = 75 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, 4 x 2 x 0.25 mm²
ZK4530-8010-0050	example for 5 m length
ZK4531-8010-xxxx	extension cable

Encoder cables for motors with M23 speedtec® plug at AX5000

Ordering information	Encoder cable with 0.5 mm² wire gauge, highly flexible, suitable as trailing cable
ZK4510-8020-xxxx	Highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 53 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (7 x 2 x 0.14 mm² + 2 x 0.5 mm²). The cable is UL and CSA listed.
ZK4510-8020-0050	example for 5 m length
ZK4511-8020-xxxx	extension cable

Accessories for AX5000 Servo Drives at AM8xxx

EtherCAT patch cables

Ordering information	ZK1090-9191-0xxx | EtherCAT patch cables
ZK1090-9191-0001	EtherCAT bridge AX5x01 to AX5112, length 0.17 m
ZK1090-9191-0002	EtherCAT bridge AX5118 to AX5140, length 0.26 m
ZK1090-9191-0xxx	EtherCAT patch cable, 0xxx = length in decimetres (-0020 = 2 m)

Not assembled motor cables for higher performance, for AX5000 (from 25 A)

Ordering information	Motor cable, flexible, drag-chain suitable with 5 million bending cycles, for Servo Drives AX5000 from 25 A
ZK4509-0016-0zzz	6 mm², for AX5125, (4 x 6 mm² + (2 x 1 mm² + 2 x 1.5 mm²)) (1)
ZK4509-0017-0zzz	10 mm², for AX5140, (4 x 10 mm² + (2 x 1 mm² + 2 x 1.5 mm²)) (1)
ZK4509-0018-0zzz	16 mm², for AX5160, (4 x 16 mm² + 2 x (2 x 1.5 mm²)) (1)
ZK4509-0019-0zzz	25 mm², for AX5172, (4 x 25 mm² + 2 x (2 x 1.5 mm²)) (1)
ZK4509-0019-1zzz	35 mm², for AX5190, (4 x 35 mm² + 2 x (2 x 1.5 mm²)) (1)
ZK4509-0019-2zzz	50 mm², for AX5191, (4 x 50 mm² + 2 x (2 x 2.5 mm²)) (1)

zzz = ordering indication of the length of material in decimetres, e.g. ZK4509-0016-0100 = 10 metres, (1) not suitable for OCT

EMC accessories | Shroud for AX5000 (from 60 A)

Ordering information	Shroud for connecting cable screens
AX2090-SB50-0001	shroud for AX5160/AX5172
AX2090-SB50-0002	shroud for AX5190/AX5191
AX2090-SB50-0003	shroud for AX5192/AX5193

We reserve the right to make technical changes.

Power supply | Mains filters for AX5000 (from 1.5 A)

Ordering information	AX2090-NF50-0xxx | Mains filters
AX2090-NF50-0014	mains filter C2 up to AX5112 Servo Drives, 46.4 x 231 x 70 mm (W x H x D), 0.9 kg
AX2090-NF50-0032	mains filter C2 up to AX5125 Servo Drives, 58 x 265 x 90 mm (W x H x D), 1.75 kg
AX2090-NF50-0063	mains filter C3 for AX5160* Servo Drives up to 63 A, 62 x 305 x 180 mm (W x H x D), 5 kg
AX2090-NF50-0100	mains filter C3 for AX5172*/AX5190 Servo Drives up to 100 A, 75 x 336 x 200 mm (W x H x D), 6 kg
AX2090-NF50-0150	mains filter C3 for AX5191/AX5192 Servo Drives up to 150 A, 90 x 380 x 220 mm (W x H x D), 6.8 kg
AX2090-NF50-0180	mains filter C3 for AX5193 Servo Drives up to 180 A, 200 x 410 x 120 mm (W x H x D), 7 kg

* AX5160, AX5172: mains filter already integrated. Additional mains filter for C3 only necessary if the cable lengths exceed 25 m.

Power supply | Mains chokes for AX5000 (from 60 A)

Ordering information	AX2090-ND50-0xxx | Mains chokes
AX2090-ND50-0060	mains choke for AX5160 Servo Drive, 60 A, 0.25 mH, U_k 2 %, 190 x 200 x 120 mm (W x H x D), 7 kg
AX2090-ND50-0072	mains choke for AX5172 Servo Drive, 72 A, 0.20 mH, U_k 2 %, 190 x 240 x 110 mm (W x H x D), 10 kg
AX2090-ND50-0090	mains choke for AX5190 Servo Drive, 90 A, 0.16 mH, U_k 2 %, 230 x 300 x 160 mm (W x H x D), 13 kg
AX2090-ND50-0110	mains choke for AX5191 Servo Drive, 110 A, 0.13 mH, U_k 2 %, 230 x 300 x 180 mm (W x H x D), 15 kg
AX2090-ND50-0143	mains choke for AX5192 Servo Drive, 143 A, 0.10 mH, U_k 2 %, 240 x 330 x 200 mm (W x H x D), 25 kg
AX2090-ND50-0170	mains choke for AX5193 Servo Drive, 170 A, 0.09 mH, U_k 2 %, 240 x 330 x 200 mm (W x H x D), 25 kg

Power supply | Transient voltage suppressor for AX5000 (1.5…25 A)

Ordering information	Transient voltage suppressor for AX5000 Servo Drives
AX2090-TS50-3000	transient voltage suppressor for AX5000, required if CSA certification necessary

Braking energy management

Ordering information	Components for brake energy management for AX5000
AX5021-0000-0000	brake module unit with internal braking resistor (250 W) and option for connecting an external braking resistor (up to 6 kW) as well as an additional DC-Link expansion capacity for storing brake energy efficiently
AX2090-BW50-0300	external braking resistor for AX5x01 to AX5112 (stand-alone), 0.3 kW/47 Ω, 92 x 120 x 349 mm (W x H x D), 2 kg (1)
AX2090-BW50-0600	external braking resistor for AX5x01 to AX5112 (stand-alone), 0.6 kW/47 Ω, 92 x 120 x 549 mm (W x H x D), 3 kg (1)
AX2090-BW50-1600	external braking resistor for AX5x01 to AX5112 (stand-alone), 1.6 kW/47 Ω, 185 x 120 x 649 mm (W x H x D), 5.8 kg (1)
AX2090-BW51-1000	external braking resistor for AX5118 to AX5140 (stand-alone) and in combination with braking unit AX5021, 1 kW/23 Ω, 92 x 120 x 749 mm (W x H x D), 4 kg (2)
AX2090-BW51-3000	external braking resistor for AX5118 to AX5140 (stand-alone) and in combination with braking unit AX5021, 3 kW/23.4 Ω, 355 x 255 x 490 mm (W x H x D), 8 kg (2)
AX2090-BW51-6000	external braking resistor for AX5118 to AX5140 (stand-alone) and in combination with braking unit AX5021, 6 kW/23.2 Ω, 455 x 255 x 490 mm (W x H x D), 12 kg (2)
AX2090-BW52-3000	external braking resistor for AX5160 and AX5172 (stand-alone), 3 kW/13.2 Ω, 355 x 260 x 490 mm (W x H x D), 9.5 kg (3)
AX2090-BW52-6000	external braking resistor for AX5160 and AX5172 (stand-alone), 6 kW/13 Ω, 455 x 260 x 490 mm (W x H x D), 13 kg (3)
AX2090-BW53-3000	external braking resistor for AX5190 and AX5191 (stand-alone), 3 kW/10.2 Ω, 355 x 255 x 490 mm (W x H x D), 9.5 kg (4)
AX2090-BW53-6000	external braking resistor for AX5190 and AX5191 (stand-alone), 6 kW/10 Ω, 455 x 260 x 490 mm (W x H x D), 13 kg (4)
AX2090-BW54-3000	external braking resistor for AX5192 and AX5193 (stand-alone), 3 kW/6.6 Ω, 355 x 255 x 490 mm (W x H x D), 9.5 kg (4)
AX2090-BW54-6000	external braking resistor for AX5192 and AX5193 (stand-alone), 6 kW/6.5 Ω, 455 x 260 x 490 mm (W x H x D), 13 kg (4)

Recommended interface cables: (1) ZK4000-2101-2xxx (1.5 mm²), (2) ZK4000-2102-2xxx (2.5 mm²), (3) ZK4509-8025-xxxx (4 mm²), (4) ZK4000-2104-2xxx (6 mm²)

AX5000 motor chokes

Ordering information	AX2090-MD50-00xx | Motor chokes
AX2090-MD50-0012	motor choke for AX5000 (1.5…12 A) up to 12 A rated current, necessary for motor cable ≥ 25 m with a max. cable length of 100 m, with integrated supply cable (150 mm)
AX2090-MD50-0025	motor choke for AX5000 (18…25 A), up to 25 A rated current, necessary for motor cable ≥ 25 m with a max. cable length of 50 m, with integrated supply cable (150 mm)

Distributed Servo Drive system

▶ www.beckhoff.com/AMP8000

AX503x, AX883x | **Coupling modules for AMP8000**

- 1- or 2-channel coupling modules
- AX503x with feed
- only component in the control cabinet
- IP 20 protection class

See page 360

We reserve the right to make technical changes.

AMP8805 | **Distribution module for AMP8000**
- five outputs
- EtherCAT P output
- high protection class IP 65: direct machine layout integration
- overall cable length reduction

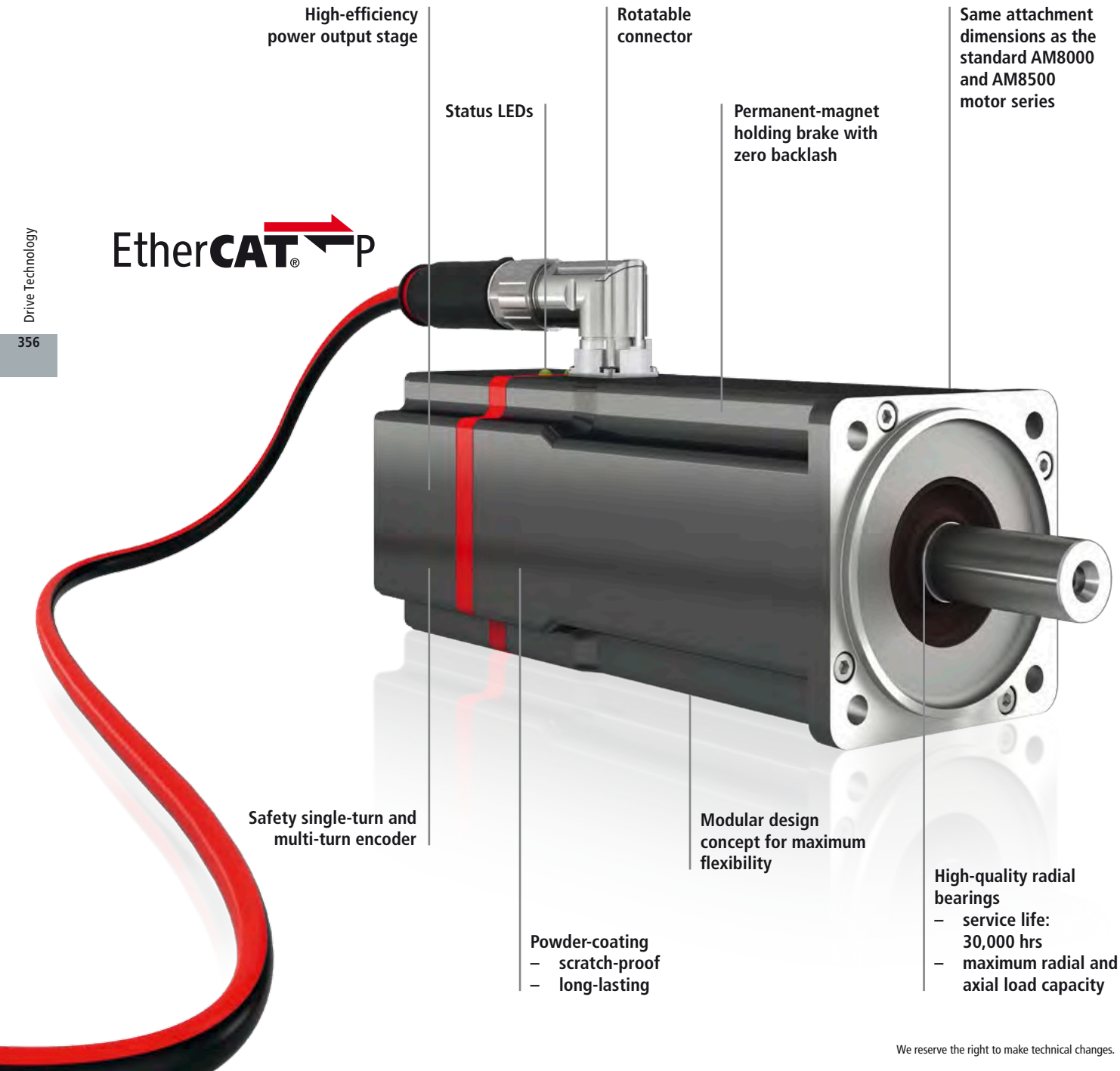
See page 361

AMP80xx | **Distributed Servo Drive**
- permanent magnet-excited three-phase synchronous motor with integrated servo drive
- safe single-turn and multi-turn encoder
- 2.01 to 9.70 Nm standstill torque
- integrated TwinSAFE Logic

See page 356

AMP8000 | Distributed Servo Drive system

▶ www.beckhoff.com/AMP8000



We reserve the right to make technical changes.

AX5031

AX8831

AMP8805

AMP8000

Distributed Servo Drives for modular machines

The AMP8000 distributed Servo Drive system opens up new possibilities for modular machine concepts, because it integrates the drive directly into the motor in a very compact design. By relocating the power electronics to the machine, the control cabinet needs to house only a single coupling module that supplies multiple distributed Servo Drives with a single cable via a distribution module. This produces significant savings in terms of material, space, cost, and installation effort.

More compact motors, fewer cables

The one cable solution EtherCAT P can be used for consistently cabling entire distributed Servo Drive systems. EtherCAT P combines communication and power supply in one cable. Instead of having to use multiple connection cables between a control cabinet and a machine, a single cable to the AMP8805 distribution module is all it takes, because each of the AMP8805 distribution Servo Drives is in turn connected to the distribution module with just a short cable. Since the entire system can be cascaded, even complex machines or lines can be implemented in simple topologies. The one cable solution EtherCAT P simplifies the logistics in installation considerably and minimises wiring errors. The cable routes to the motor can be laid out much more clearly, and space requirements in the control cabinet are reduced to a minimum.

Safe drive technology with TwinSAFE

TwinSAFE is a universal safety concept that seamlessly integrates safety functionalities – from the PLC to I/Os through to the drive technology – into the standard control platform. All safety functions such as emergency stop, safety door monitoring, two-hand operation, safety mat monitoring, and muting, safe position, safely limited speed, a.o., can be programmed and/or configured with the universal TwinCAT engineering platform. The distributed AMP8000 Servo Drives support drive-integrated STO/SS1 safety functions with TwinSAFE as per IEC 61800-2 by default. The system will soon be available with TwinSAFE Safe Motion as well, so that more complex and more limiting safety functions can be implemented.

Highlights

- reduced space requirements in control cabinets through direct integration of the servo drive in the motor
- modularity and flexibility through coupling and distribution modules
- Existing machine designs can remain unchanged: flange and shaft are mechanically compatible with the AM8000.
- no reduction in motor performance because of highly efficient and thermally insulated power electronics
- cost-effectiveness through one cable solution: only one cable type needed in the entire drive system
- reduced cabling effort and minimised cable lengths through AMP8805 distribution module
- Efficient through DC-Link group: regenerative energy can be used by other drives.
- STO/SS1 safety functions as standard; extensive Safe Motion functions as an option

AMP80xx | **Distributed Servo Drive**

The AMP8000 can be installed in place of a standard AM8000 or AM8500 servomotor. There is no need to modify existing machine design, since only the overall length has been changed, i.e. the other dimensions remain unchanged. Through the use of the latest output stage technologies, there is minimal derating, i.e. the performance data is almost on a par with the comparable standard motor type.

The AMP8000 is available with flange sizes F4 (2.01…4.80 Nm) and F5 (4.08…9.70 Nm). It can be equipped with either multi-turn or single-turn encoders. TwinSAFE (STO/SS1) is integrated as standard; Safe Motion will be available as an option.

Technical data	AMP80xx
Motor type	permanent magnet-excited three-phase synchronous motor with integrated servo drive
Magnet material	neodymium-iron-boron
Insulation class	thermal class F (155 °C)
Design form	flange-mounted according to IM B5, IM V1, IM V3
Protection class	IP 54, IP 65 (shaft seal)
Cooling	convection, permissible ambient temperature 40 °C
Coating/surface	dark grey powder coating, similar to RAL7016
Temperature sensor	integrated in stator winding
Connection method	round plug connector, swivelling, angled
Approvals	CE, UL in preparation
Feedback system	absolute encoder single-turn and multi-turn (OCT)

Options	AMP80xx
Feather key groove	according to DIN 6885 P1
Holding brake backlash-free	permanent magnet single-surface brake, suitable only as holding brake
Shaft seal	radial shaft seal made of FPM
Feedback system option	safe absolute encoder single- and multi-turn
TwinSAFE safe drive technology	integrated TwinSAFE Logic, STO, SS1, SS2, SOS, SLS, SDIp, SDIn, SSM, SSR, SMS, SLP, SCA, SLI, SAR, SMA (in preparation)

We reserve the right to make technical changes.

Ordering options

You will find the possible ordering options for the distributed Servo Drives listed in this table. Please note: The options cannot be retrofitted. All electrical variables are RMS values.

Order reference	AMP80uv-wxyz
u	flange code F
v	motor length
w = 0	smooth shaft
w = 1	shaft with groove and feather key according to DIN 6885
w = 2	smooth shaft with IP 65 sealing ring
w = 3	shaft with IP 65 sealing ring and shaft with groove and feather key
x	winding code A…Z
y = 1	safe absolute encoder single-turn, absolute position within one revolution, 24 bit resolution
y = 2	safe absolute encoder multi-turn, absolute position within 4096 revolutions, 24 bit resolution
z = 0	without holding brake
z = 1	with holding brake
Information	AMP804x = F4, ECP B23 plug AMP805x = F5, ECP B23 plug

AMP804x | **Flange code F4, motor length 1 – 3**

Data for 560 V DC	AMP8041-wDyz	AMP8041-wEyz	AMP8042-wEyz	AMP8043-wEyz
Standstill torque	2.01 Nm	2.01 Nm	3.48 Nm	4.80 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	2500 min^{-1}	2500 min^{-1}
Rated power	0.61 kW	1.23 kW	0.87 kW	1.18 kW
Standstill current	1.65 A	3.00 A	2.15 A	2.90 A
Connection technology	ECP B23 plug			
One Cable Technology (OCT)	yes			

AMP805x | **Flange code F5, motor length 1 – 3**

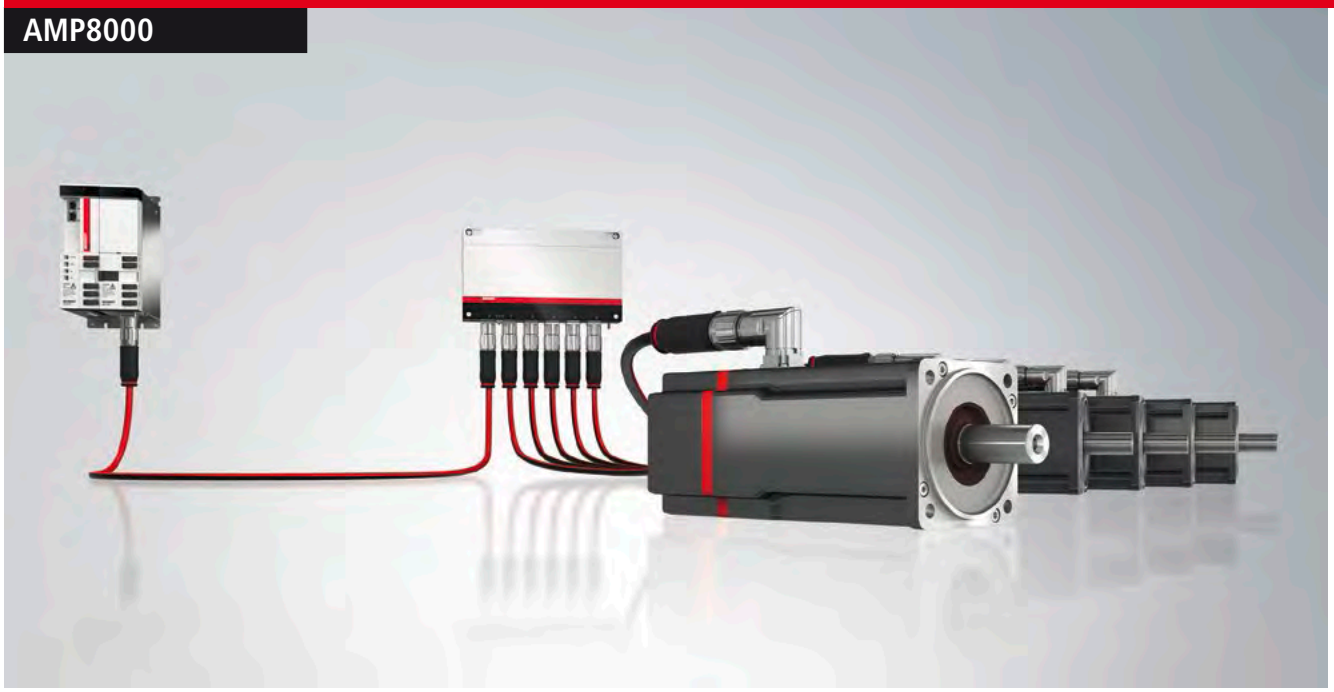
Data for 560 V DC	AMP8051-wEyz	AMP8051-wGyz	AMP8052-wFyz	AMP8053-wGyz
Standstill torque	4.08 Nm	4.08 Nm	6.97 Nm	9.70 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	2000 min^{-1}	2000 min^{-1}
Rated power	1.02 kW	1.02 kW	1.34 kW	1.78 kW
Standstill current	2.70 A	4.75 A	3.30 A	4.70 A
Connection technology	ECP B23 plug			
One Cable Technology (OCT)	yes			

▶ **www.beckhoff.com/AMP8000**

Accessories

Ordering information	Motor cable with 2.5 mm² wire gauge, flexible for drag-chain use
ZK7A26-3031-0xxx	flexible, drag-chain suitable EtherCAT P cable, mechanical coding 3, (3 G 2.5 mm² + 2 x 1.5 mm² + (1 x 4 x AWG22)), ECP B23, plug, straight, female+female, 5+4 pin, EtherCAT-P-coded – ECP B23, plug, straight, male+male, 5+4 pin, EtherCAT-P-coded, xxxx = ordering indication of the length of the motor cable in decimetres

For availability status see Beckhoff website at: www.beckhoff.com/AMP8000



AX503x, AX883x | Coupling modules for AMP8000

For connecting AMP8000 distributed Servo Drives to the PC-based control technology, and more specifically to the EtherCAT-based Servo Drive systems AX5000 and AX8000 there are two coupling modules available in single-channel and dual-channel versions each.

The coupling modules provide a connection for the DC-Link intermediate circuit, 24 V DC power supply and EtherCAT communication. Distributed Servo Drives can be coupled to the AX8000 multi-axis servo system via an AX883x coupling module and to the AX5000 EtherCAT Drives via an AX503x coupling module. By means of the 1- or 2-channel coupling modules and the AMP8805 distribution module, the implementation of simple as well as complex distributed drive solutions is easy and straightforward.

Technical data	i AX5031-0000-0200	i AX5032-0000-0200	i AX8831-0000-0000	i AX8832-0000-0000
Function	coupling module with feed	coupling module with feed	coupling module	coupling module
Number of channels	1	2	1	2
Rated output current DC-Link	20 A DC	∑ 20 A DC	20 A DC	2 x 20 A DC
Rated output current 24 V	16 A DC	∑ 20 A DC	16 A DC	∑ 20 A DC
DC-Link voltage	565…680 V DC			
EtherCAT connection	directly via RJ45 socket	directly via RJ45 socket	integrated via AX-Bridge	integrated via AX-Bridge
Protection class	IP 20			
Further information	www.beckhoff.com/AX5031	www.beckhoff.com/AX5032	www.beckhoff.com/AX8831	www.beckhoff.com/AX8832

i For availability status see Beckhoff website at: www.beckhoff.com

We reserve the right to make technical changes.

AMP8805 | Distribution module for AMP8000

Via the AMP8805 distribution module, the AMP8000 system can be cascaded using just one short cable in such a way that even complex machines and lines can be implemented in simple topologies. Up to five outputs are available to connect further distributed Servo Drives or distribution modules. Because of their high protection rating, the AMP8805 distribution modules can be directly integrated into the machine layout. This reduces the overall cable lengths and wiring effort considerably, because only a single cable needs to be routed from the control cabinet to the machine. To store energy efficiently, the coupling modules are equipped with capacitors. Additional EtherCAT P Box modules can be installed easily and quickly via the integrated EtherCAT P output in order to integrate further I/Os or data acquisition applications.

Technical data	i AMP8805-0000-0000
Function	distribution module
Number of channels	1 x Power IN, 5 x Power OUT, 1 x EtherCAT P OUT
Rated input current 24 V	16 A DC
DC-Link voltage	565…680 V DC
DC-Link capacitance	1120 µF
Protection class	IP 65
Further information	www.beckhoff.com/AMP8805

i For availability status see Beckhoff website at: www.beckhoff.com/AMP8805

Servo and Linear Motors

▶ www.beckhoff.com/Servomotors

Servomotors
- AM8000 for applications with highest demands on dynamics and performance, One Cable Technology (OCT) for power and feedback
- AM8500 with increased internal inertia ratio, One Cable Technology (OCT) for power and feedback

For dynamic applications in the lower power range Beckhoff offers the compact Drive Technology series.

See page 364,
compact Drive Technology see page 410

Servomotors with forced cooling
- higher performance AM8000 and AM8500 motor series due to additional forced cooling
- independent 24 V DC fan
- standstill torques increased by about 30 %
- rated torque at rated speed increased by up to 150 %

See page 364

We reserve the right to make technical changes.

Stainless steel servomotors

– AM8800 for use in the food, chemical and pharmaceutical industries, One Cable Technology (OCT) for power and feedback
– AG2800: stainless steel gear unit turns the AM8800 into a perfectly matched and certified Hygienic Design servo axis by dead-space-free design, smooth surfaces, a round motor adapter and high resistance to corrosion

See page 392

Planetary gear units

– AG2300: high-end planetary gear units with output shaft
– AG2400: high-end planetary gear units with output flange
– AG3210, AG3300: Economy planetary gear units with output shaft
– AG3400: Economy planetary gear units with output flange

See page 386

Linear Servomotors

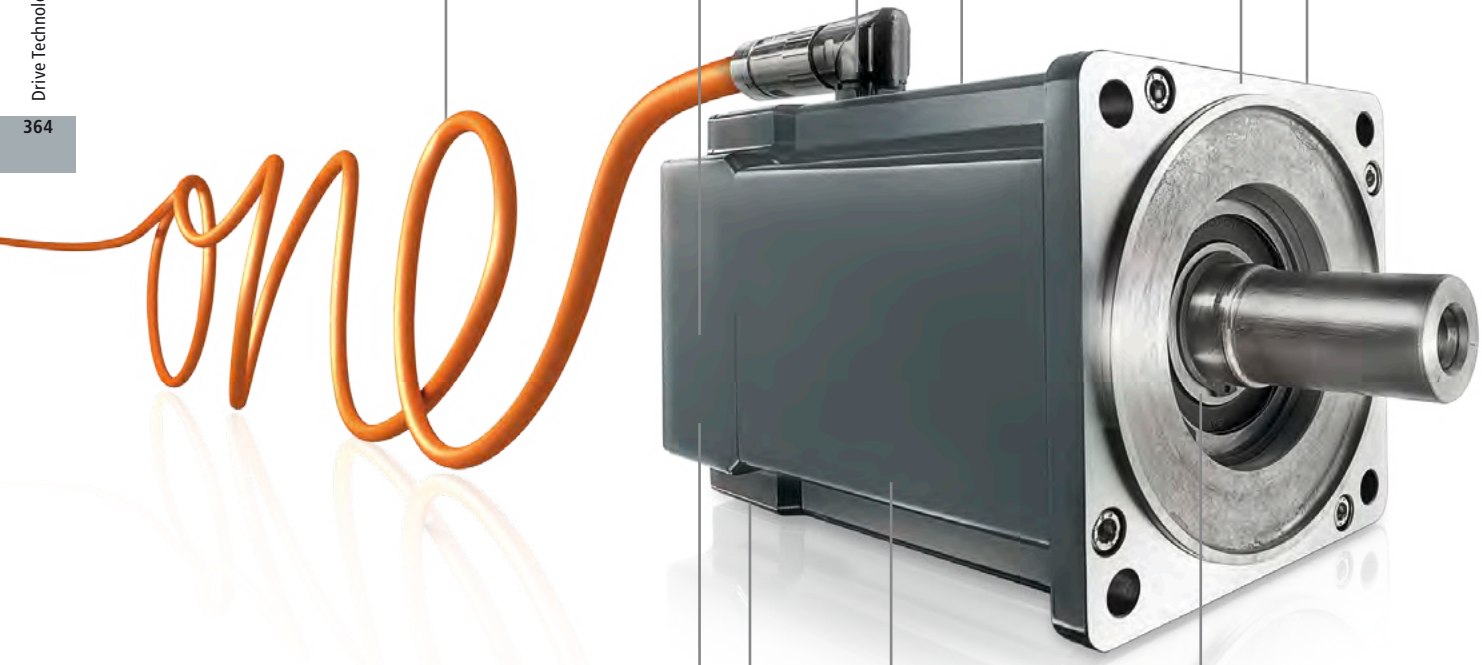
– AL2xxx: iron core motor for high forces with different magnetic path widths (50/80/130 mm)

See page 400

We reserve the right to make technical changes.

AMxxxx | Synchronous Servomotors

▶ www.beckhoff.com/Servomotors



One Cable Technology (OCT) for power and feedback with absolute encoder

Backlash-free permanent magnet holding brake

Rotatable speedtec® plug

– Modular design
– Greatest possible variability

– Salient-pole winding technology
– Fully-encapsulated stator

Temperature sensor PT1000

Powder-coated
– scratchproof
– durable
– high quality

Single- and multi-turn encoder, resolver

– Low cogging
– High performance
– High power density
– High overload capacity

High-quality radial bearing
– service life 30,000 hrs
– maximum axial and radial loadability

We reserve the right to make technical changes.

AM80xx high performance type with forced cooling

AM85xx

AM88xx

AM8000 – Dynamic power packages made in Germany

The AM8000 servomotors are durable and powerful synchronous servomotors in seven sizes, each with up to four overall lengths and provide seamless coverage for all areas of application from 0.2 up to 12 Nm. The high-performance servomotor series is characterised by an exceptional power density. Small end turns and the fully potted stator enable an optimised thermal transition from winding to motor housing.

As a result of low rotor moment of inertia coupled with an overload capability of up to 5 times, the AM8000 series is highly dynamic. The motors can be optionally equipped with OCT (One Cable Technology) or resolver (2-cable standard). With OCT, no encoder cable is required, since the feedback signals are digitally transmitted over the existing standard motor cable. Thus, the wiring costs can be reduced by up to 50 %.

Typical for all seven sizes of this motor series is the modular design. Therefore, mechanical adjustments to suit customer requirements can be made quickly and easily. With a guaranteed service life of 30,000 h for wearing parts such as ball bearings, this motor series offers high durability and robustness. Matching accessories such as gears and pre-assembled motor and encoder cables are available.

AM8500 – Synchronous servomotors with increased rotor moment of inertia

The AM8500 series extends the servomotor range by a complete series with increased rotor moment of inertia. This series covers a wide performance range with four sizes and three lengths with standstill torques ranging from 1.37 to 41 Nm. Due to the high rotor moment of inertia, the control of AM8500 servomotors is simplified in applications where a high external inertia has to be moved, because these motor types tend to vibrate less and are much easier to adjust via the servo controller.

AM8000/AM8500 – Forced Cooling

High torques even at high speeds: This is the benefit of the AM8000 and AM8500 motor series with additional forced cooling for increased performance. Equipped with a fan for axial ventilation, the standstill torques of these servomotors can be increased by about 35 %, and the rated torques at the rated speed by even up to 150 %. The external 24 V DC fan can be actuated independently of the motor.

AM8800 – Attractive hygienic design, EHEDG certified

The AM8800 stainless steel motor range is based on the AM8000 range and especially designed for use in the food, chemical and pharmaceutical industries. The motor design complies with the EHEDG requirements and the materials used with the FDA guidelines. The motors are made from AISI-316L stainless steel, making them resistant to aggressive cleaning materials. All AM8800 motors comply with protection class IP 69K and are provided with a hygienic-design cable gland. Four sizes, each with three different lengths, are available. The AM8800 range supports the One Cable Technology (OCT) as standard. The available options include a resolver, a sealing-air connection, or an AG2280 stainless steel gear unit for the implementation of a perfectly matched and standards-compliant servo axis in hygienic design.

AM3000 – High-dynamic, brushless servomotors

The low-inertia servomotors of the AM3000 series are equipped with rotors containing high-grade neodymium. The high-quality permanent magnet material highly contributes to the exceptionally dynamic behaviour of the motor series. Consequently, the AM3000 synchronous servomotors are mainly used in motion applications with highly dynamic requirements.

The AM3000 series incorporate resolvers as standard feedback unit; however, they can also be fitted with single-turn or multi-turn absolute encoders. The connection plugs can be rotated continuously. The IP 65/64 protection class of the motors can be increased to IP 65/65 by adding a sealing ring. Available accessories for these series include matching gears an pre-assembled motor and encoder cables.

We reserve the right to make technical changes.

AM8000 | **Synchronous Servomotors**

The AM8000 series represents robust, durable and high-performance synchronous servomotors "Made in Germany". The seven flange codes, with up to four overall lengths, cover a wide torque range from 0.2 up to 129 Nm.

The AM8000 motors feature a low rotor moment of inertia and a very high overload capacity. Based on these technical characteristics, the most highly dynamic applications can be realised.

The windings of the AM8000 motors are implemented using salient pole-wound technology, resulting in a high copper space factor. Due to the high slot space factor, high continuous torques can be achieved. The fully potted stator provides for an ideal thermal transition from winding to housing. Another advantage is mechanical protection of the winding wires against vibrations.

Amply sized, sealed grooved ball bearings in conjunction with a sophisticated mechanical design ensure a bearing service life of 30,000 hours. All motors feature an integrated PT1000 temperature sensor for exact temperature evaluation.

In the forced-cooling version, the power density of the AM8000 motor series can be further increased by means of external axial ventilation. This option is available for the AM806x to AM807x sizes.

The modular design of the AM8000 motors enables rapid implementation of mechanical adjustments. Customer-specific variants are available. The motors offer an electronic identification plate for simple commissioning.

The housing is fully powder-coated so that cutting edges are covered. The acrylic powder coating also offers high resistance against scratching and corrosion. In the basic version, AM8000 motors feature IP 54 protected housings. For harsh environmental conditions, the shaft feedthrough can optionally be equipped with an FPM sealing ring (fluoropolymer rubber), so that the whole motor is IP 65 protected.

Planetary gear units
see page 386

Pre-assembled cables
see page 350

Technical data	AM80xx
Motor type	permanent magnet-excited three-phase synchronous motor
Magnet material	neodymium-iron-boron
Insulation class	thermal class F (155 °C)
Design form	flange-mounted according to IM B5, IM V1, IM V3
Protection class	IP 54, IP 65 (shaft seal)
Cooling	convection, permissible ambient temperature 40 °C, optionally: external axial ventilation
Coating/surface	dark grey powder coating, similar to RAL7016
Temperature sensor	integrated in stator winding
Connection method	round plug connector, swivelling, angled; terminal box according to winding type
Life span	L_{10h} = 30,000 hrs for ball bearings
Approvals	CE, UL
Feedback system	absolute encoder single-turn and multi-turn, OCT, resolver, multi-turn 2-cable standard

We reserve the right to make technical changes.

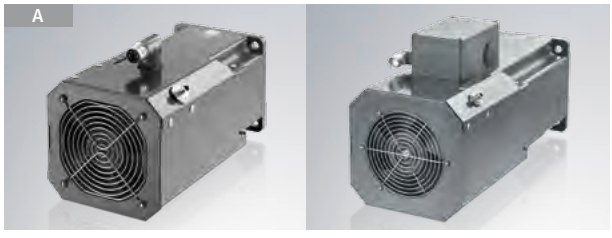
Ordering options

You will find the possible ordering options for the listed motors in this table. The options cannot be retrofitted. All specified electrical values are RMS values. The specifications for the connection technology (size of the connector) apply to motors with OCT. For motors with standard 2-cable configuration, "connection technology" refers to the size of the power connector. The size of the feedback connector for a standard 2-cable configuration is different, as follows: flange sizes F1…F3 = ytec® plug, F4…F7 = M23 speedtec® plug.

Order reference	AM80uv-wxyz	Pict.
u	flange code F	
v	motor length	
w = 0	smooth shaft	
w = 1	shaft with groove and feather key according to DIN 6885	
w = 2	smooth shaft with IP 65 sealing ring (not for AM801x)	
w = 3	shaft with IP 65 sealing ring and shaft with groove and feather key	
x	winding code A…Z	
y = 0	2-cable standard: feedback resolver (not for AM801x)	
y = 1	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, single-turn, absolute position within one revolution, 18 bit resolution	
y = 2	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, multi-turn, absolute position within 4096 revolutions, 18 bit resolution	
y = 4	2-cable standard: feedback multi-turn, absoulte encoder SKM36, 128 SinCos periods (only for AM806x, AM807x and AM856x)	
y = A	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, single-turn, absolute position within one revolution, resolution 23 bit (only for AM803x to AM807x and AM853x to AM856x)	
y = B	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, multi-turn, absolute position within 4096 revolutions, resolution 23 bit (only for AM803x to AM807x and AM853x to AM856x)	
y = N	without feedback (sensorless)	
z = 0	without holding brake	
z = 1	with permanent magnet-excited holding brake	
z = A	forced cooling, without holding brake, for AM805x, AM806x, AM807x [1]	A
z = B	forced cooling, with permanent magnet-excited holding brake, for AM805x, AM806x, AM807x [1]	A

[1] The EL2022 2 130 or KL2022 2 461 digital output terminal with matching ZK4054-6400-xxxx 321 supply cable is recommended for controlling the external 24 V DC ventilation.

A



AM801x | Flange code F1, motor length 1 – 3

Data for 230 V AC	AM8011-wByz	AM8012-wCyz	AM8013-wDyz
Standstill torque	0.20 Nm	0.38 Nm	0.52 Nm
Rated torque	0.18 Nm	0.33 Nm	0.45 Nm
Rated speed	8000 min^{-1}		
Rated power	0.15 kW	0.28 kW	0.38 kW
Standstill current	0.76 A	1.30 A	1.65 A
Rotor moment of inertia	0.034 $kgcm^2$	0.053 $kgcm^2$	0.072 $kgcm^2$
Rotor moment of inertia (with brake)	0.057 $kgcm^2$	0.075 $kgcm^2$	0.094 $kgcm^2$
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8021 | Flange code F2, motor length 1

Data for 400 V AC	AM8021-wByz	AM8021-wDyz
Standstill torque	0.50 Nm	
Rated torque	0.50 Nm	
Rated speed	8000 min^{-1}	9000 min^{-1}
Rated power	0.42 kW	0.47 kW
Standstill current	0.85 A	1.60 A
Rotor moment of inertia	0.139 $kgcm^2$	
Rotor moment of inertia (with brake)	0.208 $kgcm^2$	
Connection technology	itec® plug	
One Cable Technology (OCT)	yes	

AM8022 | Flange code F2, motor length 2

Data for 400 V AC	AM8022-wDyz	AM8022-wEyz
Standstill torque	0.80 Nm	
Rated torque	0.70 Nm	0.65 Nm
Rated speed	8000 min^{-1}	9000 min^{-1}
Rated power	0.59 kW	0.61 kW
Standstill current	1.50 A	2.44 A
Rotor moment of inertia	0.258 $kgcm^2$	
Rotor moment of inertia (with brake)	0.328 $kgcm^2$	
Connection technology	itec® plug	
One Cable Technology (OCT)	yes	

AM8023 | Flange code F2, motor length 3

Data for 400 V AC	AM8023-wEyz	AM8023-wFyz
Standstill torque	1.20 Nm	
Rated torque	1.00 Nm	0.90 Nm
Rated speed	8000 min^{-1}	9000 min^{-1}
Rated power	0.84 kW	0.85 kW
Standstill current	2.20 A	3.40 A
Rotor moment of inertia	0.378 $kgcm^2$	
Rotor moment of inertia (with brake)	0.448 $kgcm^2$	
Connection technology	itec® plug	
One Cable Technology (OCT)	yes	

We reserve the right to make technical changes.

AM8031 | Flange code F3, motor length 1

Data for 400 V AC	AM8031-wCyz	AM8031-wDyz	AM8031-wFyz
Standstill torque	1.37 Nm	1.38 Nm	1.40 Nm
Rated torque	1.34 Nm	1.33 Nm	1.30 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	9000 min^{-1}
Rated power	0.42 kW	0.84 kW	1.23 kW
Standstill current	1.00 A	1.95 A	3.20 A
Rotor moment of inertia	0.467 $kgcm^2$		
Rotor moment of inertia (with brake)	0.546 $kgcm^2$		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8032 | Flange code F3, motor length 2

Data for 400 V AC	AM8032-wDyz	AM8032-wEyz	AM8032-wHyz
Standstill torque	2.38 Nm	2.37 Nm	2.37 Nm
Rated torque	2.30 Nm	2.20 Nm	1.85 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	9000 min^{-1}
Rated power	0.72 kW	1.38 kW	1.74 kW
Standstill current	1.70 A	2.95 A	5.10 A
Rotor moment of inertia	0.847 $kgcm^2$		
Rotor moment of inertia (with brake)	0.926 $kgcm^2$		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8033 | Flange code F3, motor length 3

Data for 400 V AC	AM8033-wEyz	AM8033-wFyz	AM8033-wJyz
Standstill torque	3.20 Nm	3.22 Nm	3.22 Nm
Rated torque	2.98 Nm	2.70 Nm	2.30 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	9000 min^{-1}
Rated power	0.94 kW	1.70 kW	2.17 kW
Standstill current	2.10 A	4.10 A	6.80 A
Rotor moment of inertia	1.23 $kgcm^2$		
Rotor moment of inertia (with brake)	1.46 $kgcm^2$		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8041 | Flange code F4, motor length 1

Data for 400 V AC	AM8041-wDyz	AM8041-wEyz	AM8041-wHyz
Standstill torque	2.37 Nm	2.45 Nm	2.40 Nm
Rated torque	2.30 Nm	2.31 Nm	2.10 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	8000 min^{-1}
Rated power	0.72 kW	1.45 kW	1.76 kW
Standstill current	1.65 A	3.00 A	5.25 A
Rotor moment of inertia	1.09 $kgcm^2$		
Rotor moment of inertia (with brake)	1.73 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

We reserve the right to make technical changes.

AM8042 | Flange code F4, motor length 2

Data for 400 V AC	AM8042-wEyz	AM8042-wFyz	AM8042-wJyz
Standstill torque	4.10 Nm		
Rated torque	3.90 Nm	3.70 Nm	3.10 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	8000 min^{-1}
Rated power	1.02 kW	1.94 kW	2.60 kW
Standstill current	2.15 A	4.10 A	6.90 A
Rotor moment of inertia	1.98 $kgcm^2$		
Rotor moment of inertia (with brake)	2.63 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8043 | Flange code F4, motor length 3

Data for 400 V AC	AM8043-wEyz	AM8043-wHyz	AM8043-wKyz
Standstill torque	5.65 Nm	5.65 Nm	5.60 Nm
Rated torque	5.30 Nm	4.90 Nm	4.10 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	8000 min^{-1}
Rated power	1.39 kW	2.57 kW	3.43 kW
Standstill current	2.90 A	5.40 A	9.30 A
Rotor moment of inertia	2.87 $kgcm^2$		
Rotor moment of inertia (with brake)	3.52 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8051 | Flange code F5, motor length 1

Data for 400 V AC	AM8051-wEyz	AM8051-wGyz	AM8051-wKyz
Standstill torque	4.80 Nm	4.90 Nm	4.90 Nm
Rated torque	4.60 Nm	4.40 Nm	3.90 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	8000 min^{-1}
Rated power	1.20 kW	2.30 kW	3.27 kW
Standstill current	2.70 A	4.75 A	8.50 A
Rotor moment of inertia	2.25 $kgcm^2$		
Rotor moment of inertia (with brake)	2.91 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8051 | Flange code F5, motor length 1, high-performance type with forced cooling

Data for 400 V AC	AM8051-wFyz	AM8051-wJyz	AM8051-wLyz
Standstill torque	6.20 Nm	6.30 Nm	6.30 Nm
Rated torque	5.8 Nm	5.5 Nm	3.6 Nm
Rated speed	2500 min^{-1}	4750 min^{-1}	8000 min^{-1}
Rated power	1.52 kW	2.74 kW	3.02 kW
Standstill current	3.50 A	5.80 A	11.1 A
Rotor moment of inertia	2.24 $kgcm^2$		
Rotor moment of inertia (with brake)	2.90 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

We reserve the right to make technical changes.

AM8052 | Flange code F5, motor length 2

Data for 400 V AC	AM8052-wFyz	AM8052-wJyz	AM8052-wLyz
Standstill torque	8.20 Nm		
Rated torque	7.50 Nm	6.90 Nm	5.40 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	7300 min^{-1}
Rated power	1.57 kW	2.89 kW	4.13 kW
Standstill current	3.30 A	6.30 A	11.3 A
Rotor moment of inertia	4.09 $kgcm^2$		
Rotor moment of inertia (with brake)	4.75 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8052 | Flange code F5, motor length 2, high-performance type with forced cooling

Data for 400 V AC	AM8052-wGyz	AM8052-wKyz	AM8052-wNyz
Standstill torque	10.7 Nm	10.7 Nm	9.6 Nm
Rated torque	9.7 Nm	9.1 Nm	5.4 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	6000 min^{-1}
Rated power	2.03 kW	3.77 kW	4.08 kW
Standstill current	4.30 A	8.50 A	13.6 A
Rotor moment of inertia	4.08 $kgcm^2$		
Rotor moment of inertia (with brake)	4.74 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8053 | Flange code F5, motor length 3

Data for 400 V AC	AM8053-wGyz	AM8053-wKyz	AM8053-wNyz
Standstill torque	11.4 Nm		
Rated torque	10.0 Nm	8.35 Nm	4.50 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	7000 min^{-1}
Rated power	2.09 kW	3.50 kW	3.30 kW
Standstill current	4.70 A	8.80 A	15.6 A
Rotor moment of inertia	5.93 $kgcm^2$		
Rotor moment of inertia (with brake)	7.04 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8053 | Flange code F5, motor length 3, high-performance type with forced cooling

Data for 400 V AC	AM8053-wJyz	AM8053-wLyz	AM8053-wPyz
Standstill torque	15.4 Nm	15.4 Nm	13.3 Nm
Rated torque	14.9 Nm	12.9 Nm	7.1 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	5000 min^{-1}
Rated power	3.12 kW	5.41 kW	3.72 kW
Standstill current	6.40 A	11.9 A	18.6 A
Rotor moment of inertia	5.92 $kgcm^2$		
Rotor moment of inertia (with brake)	7.04 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

We reserve the right to make technical changes.

AM8061 | Flange code F6, motor length 1

Data for 400 V AC	AM8061-wGyz	AM8061-wJyz	AM8061-wMyz
Standstill torque	12.8 Nm		
Rated torque	12.1 Nm	11.0 Nm	9.00 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	1.90 kW	3.46 kW	4.71 kW
Standstill current	4.00 A	7.80 A	13.1 A
Rotor moment of inertia	11.1 $kgcm^2$		
Rotor moment of inertia (with brake)	13.4 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8061 | Flange code F6, motor length 1, high-performance type with forced cooling

Data for 400 V AC	AM8061-wHyz	AM8061-wLyz	AM8061-wNyz
Standstill torque	17.1 Nm	17.1 Nm	15.5 Nm
Rated torque	16.1 Nm	14.7 Nm	10.7 Nm
Rated speed	1400 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	2.36 kW	4.60 kW	5.60 kW
Standstill current	5.20 A	10.1 A	15.8 A
Rotor moment of inertia	11.1 $kgcm^2$		
Rotor moment of inertia (with brake)	13.4 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8062 | Flange code F6, motor length 2

Data for 400 V AC	AM8062-wJyz	AM8062-wLyz	AM8062-wPyz
Standstill torque	21.1 Nm		
Rated torque	18.50 Nm	15.2 Nm	6.50 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	2.91 kW	4.78 kW	3.40 kW
Standstill current	6.20 A	12.4 A	20.3 A
Rotor moment of inertia	20.0 $kgcm^2$		
Rotor moment of inertia (with brake)	22.3 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8062 | Flange code F6, motor length 2, high-performance type with forced cooling

Data for 400 V AC	AM8062-wKyz	AM8062-wNyz	AM8062-wRyz
Standstill torque	29.9 Nm	29.9 Nm	28.1 Nm
Rated torque	26.4 Nm	22.2 Nm	13.4 Nm
Rated speed	1400 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	3.87 kW	7.00 kW	7.00 kW
Standstill current	8.70 A	17.4 A	28.7 A
Rotor moment of inertia	20.0 $kgcm^2$		
Rotor moment of inertia (with brake)	22.3 $kgcm^2$		
Connection technology	M23 speedtec® plug	M23 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		

We reserve the right to make technical changes.

AM8063 | **Flange code F6, motor length 3**

Data for 400 V AC	AM8063-wKyz	AM8063-wNyz	AM8063-wRyz
Standstill torque	29.0 Nm		
Rated torque	22.3 Nm	13.2 Nm	6.10 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	4000 min^{-1}
Rated power	3.50 kW	4.15 kW	2.56 kW
Standstill current	8.70 A	17.2 A	29.5 A
Rotor moment of inertia	29.0 $kgcm^2$		
Rotor moment of inertia (with brake)	34.9 $kgcm^2$		
Connection technology	M23 speedtec® plug	M23 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		

AM8063 | **Flange code F6, motor length 3, high-performance type with forced cooling**

Data for 400 V AC	AM8063-wLyz	AM8063-wQyz	AM8063-wTyz
Standstill torque	41.4 Nm	41.4 Nm	40.1 Nm
Rated torque	33.9 Nm	25.5 Nm	15.1 Nm
Rated speed	1400 min^{-1}	3000 min^{-1}	4000 min^{-1}
Rated power	4.97 kW	8.00 kW	6.30 kW
Standstill current	11.6 A	24.0 A	39.8 A
Rotor moment of inertia	29.0 $kgcm^2$		
Rotor moment of inertia (with brake)	34.9 $kgcm^2$		
Connection technology	M23 speedtec® plug	M40 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		

AM8064 | **Flange code F6, motor length 4**

Data for 400 V AC	AM8064-wLy0	AM8064-wQy0	AM8064-wTy0
Standstill torque	35.0 Nm		
Rated torque	24.0 Nm	19.0 Nm	6.50 Nm
Rated speed	1500 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	2.51 kW	3.98 kW	2.00 kW
Standstill current	10.4 A	21.0 A	35.0 A
Rotor moment of inertia	38.6 $kgcm^2$		
Connection technology	M23 speedtec® plug	M23 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		

AM8064 | **Flange code F6, motor length 4, high-performance type with forced cooling**

Data for 400 V AC	AM8064-wNyA	AM8064-wRyA	AM8064-wTyA
Standstill torque	49.0 Nm		
Rated torque	33.0 Nm	26.0 Nm	10.0 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	3.45 kW	5.44 kW	3.10 kW
Standstill current	14.6 A	29.4 A	49.0 A
Rotor moment of inertia	38.6 $kgcm^2$		
Connection technology	M23 speedtec® plug	M40 speedtec® plug	terminal box
One Cable Technology (OCT)	yes	yes	–

AM8071 | Flange code F7, motor length 1

Data for 400 V AC	AM8071-wKyz	AM8071-wNyz	AM8071-wRyz
Standstill torque	31.8 Nm	31.8 Nm	29.0 Nm
Rated torque	26.5 Nm	19.5 Nm	8.00 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	4000 min^{-1}
Rated power	4.16 kW	6.13 kW	3.35 kW
Standstill current	9.60 A	17.8 A	28.2 A
Rotor moment of inertia	49.6 $kgcm^2$		
Rotor moment of inertia (with brake)	68.3 $kgcm^2$		
Connection technology	M40 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8071 | Flange code F7, motor length 1, high-performance type with forced cooling

Data for 400 V AC	AM8071-wMyz	AM8071-wPyz	AM8071-wTyz
Standstill torque	42.8 Nm	42.8 Nm	41.2 Nm
Rated torque	36.2 Nm	29.2 Nm	18.1 Nm
Rated speed	1500 min^{-1}	2900 min^{-1}	4000 min^{-1}
Rated power	5.70 kW	8.90 kW	7.60 kW
Standstill current	12.6 A	23.8 A	41.1 A
Rotor moment of inertia	49.6 $kgcm^2$		
Rotor moment of inertia (with brake)	68.3 $kgcm^2$		
Connection technology	M40 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8072 | Flange code F7, motor length 2

Data for 400 V AC	AM8072-wLyz	AM8072-wPyz	AM8072-wTyz
Standstill torque	54.6 Nm	54.6 Nm	50.0 Nm
Rated torque	48.9 Nm	38.2 Nm	13.0 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	5.12 kW	8.00 kW	4.08 kW
Standstill current	11.1 A	20.6 A	39.0 A
Rotor moment of inertia	92.2 $kgcm^2$		
Rotor moment of inertia (with brake)	110.9 $kgcm^2$		
Connection technology	M40 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8072 | Flange code F7, motor length 2, high-performance type with forced cooling

Data for 400 V AC	AM8072-wNyz	AM8072-wRyz	AM8072-wUyz
Standstill torque	80.7 Nm	80.7 Nm	74.0 Nm
Rated torque	72.6 Nm	60.1 Nm	33.8 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	7.6 kW	12.6 kW	10.6 kW
Standstill current	16.1 A	29.2 A	53.0 A
Rotor moment of inertia	92.2 $kgcm^2$		
Rotor moment of inertia (with brake)	111 $kgcm^2$		
Connection technology	M40 speedtec® plug		
One Cable Technology (OCT)	yes		

We reserve the right to make technical changes.

AM8073 | **Flange code F7, motor length 3**

Data for 400 V AC	AM8073-wNyz	AM8073-wQyz	AM8073-wTyz
Standstill torque	72.6 Nm	72.6 Nm	70.0 Nm
Rated torque	58.5 Nm	38.8 Nm	10.8 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	6.13 kW	8.13 kW	3.39 kW
Standstill current	14.7 A	27.9 A	45.6 A
Rotor moment of inertia	135 $kgcm^2$		
Rotor moment of inertia (with brake)	154 $kgcm^2$		
Connection technology	M40 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8073 | **Flange code F7, motor length 3, high-performance type with forced cooling**

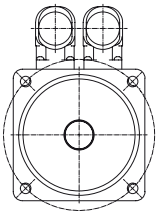
Data for 400 V AC	AM8073-wPyz	AM8073-wRyz	AM8073-wUyz
Standstill torque	104 Nm	104 Nm	95.0 Nm
Rated torque	83.7 Nm	63.3 Nm	17.8 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	8.8 kW	13.3 kW	5.60 kW
Standstill current	19.8 A	37.4 A	66.5 A
Rotor moment of inertia	135 $kgcm^2$		
Rotor moment of inertia (with brake)	154 $kgcm^2$		
Connection technology	M40 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8074 | **Flange code F7, motor length 4**

Data for 400 V AC	AM8074-wNy0	AM8074-wRy0	AM8074-wTy0
Standstill torque	92 Nm		
Rated torque	67 Nm	34 Nm	19.1 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	2500 min^{-1}
Rated power	7.02 kW	7.12 kW	5.0 kW
Standstill current	17.4 A	34.9 A	49.8 A
Rotor moment of inertia	180 $kgcm^2$		
Connection technology	M40 speedtec® plug	M40 speedtec® plug	terminal box
One Cable Technology (OCT)	yes	yes	–

AM8074 | **Flange code F7, motor length 4, high-performance type with forced cooling**

Data for 400 V AC	AM8074-wRyA	AM8074-wTyA	AM8074-wUyA
Standstill torque	129 Nm		
Rated torque	93.3 Nm	51.7 Nm	24.5 Nm
Rated speed	1000 min^{-1}	2000 min^{-1}	3000 min^{-1}
Rated power	9.77 kW	10.83 kW	7.7 kW
Standstill current	25.8 A	49.4 A	69.2 A
Rotor moment of inertia	180 $kgcm^2$		
Connection technology	M40 speedtec® plug	terminal box	terminal box
One Cable Technology (OCT)	yes	–	–



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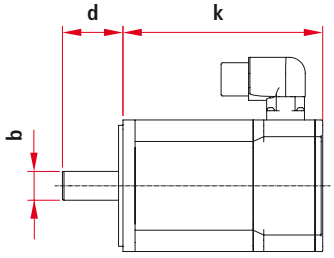
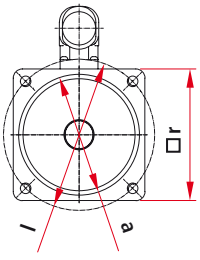
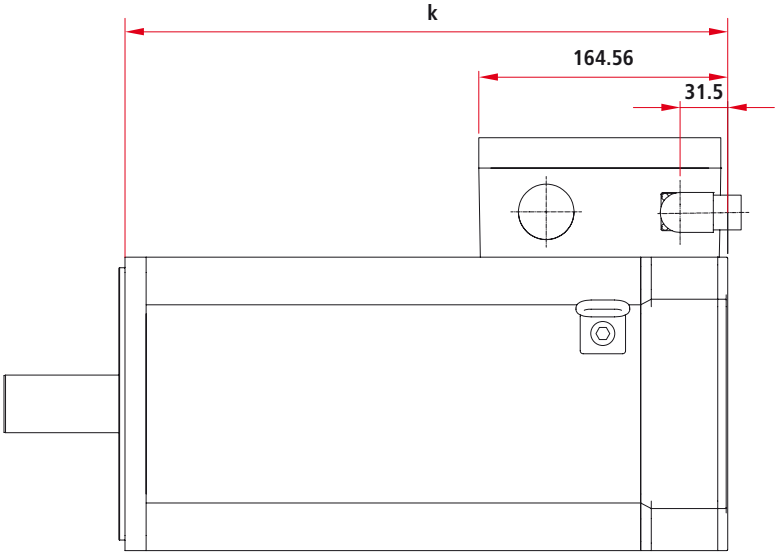
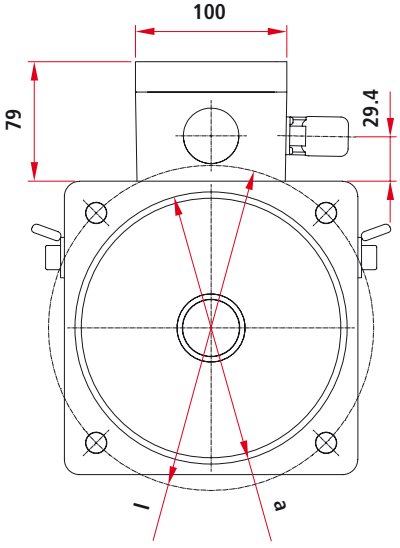




One Cable Technology





Motor connection with terminal box

We reserve the right to make technical changes.

Dimensions	a	b	d	l	r	k (without brake)	k (with brake)
AM8011	30 h7	8 h7	25 mm	46 mm	40 mm	97 mm	129 mm
AM8012	30 h7	8 h7	25 mm	46 mm	40 mm	117 mm	149 mm
AM8013	30 h7	8 h7	25 mm	46 mm	40 mm	137 mm	169 mm
AM8021	40 j6	9 k6	20 mm	63 mm	58 mm	111.5 mm	146 mm
AM8022	40 j6	9 k6	20 mm	63 mm	58 mm	133.5 mm	168 mm
AM8023	40 j6	9 k6	20 mm	63 mm	58 mm	155.5 mm	190 mm
AM8031	60 j6	14 k6	30 mm	75 mm	72 mm	129 mm	168 mm
AM8032	60 j6	14 k6	30 mm	75 mm	72 mm	154 mm	194 mm
AM8033	60 j6	14 k6	30 mm	75 mm	72 mm	180 mm	229 mm
AM8041	80 j6	19 k6	40 mm	100 mm	87 mm	132 mm	179.5 mm
AM8042	80 j6	19 k6	40 mm	100 mm	87 mm	162 mm	209.5 mm
AM8043	80 j6	19 k6	40 mm	100 mm	87 mm	192 mm	239.5 mm
AM8051	95 j6	24 k6	50 mm	115 mm	104 mm	136.5 mm	183.5 mm
AM8051*	95 j6	24 k6	50 mm	115 mm	104 mm	209 mm	256 mm
AM8052	95 j6	24 k6	50 mm	115 mm	104 mm	169.5 mm	216.5 mm
AM8052*	95 j6	24 k6	50 mm	115 mm	104 mm	242 mm	289 mm
AM8053	95 j6	24 k6	50 mm	115 mm	104 mm	202.5 mm	251.5 mm
AM8053*	95 j6	24 k6	50 mm	115 mm	104 mm	275 mm	324 mm
AM8061	130 j6	32 k6	58 mm	165 mm	142 mm	176 mm	228 mm
AM8061*	130 j6	32 k6	58 mm	165 mm	142 mm	259 mm	311 mm
AM8062	130 j6	32 k6	58 mm	165 mm	142 mm	216 mm	268 mm
AM8062*	130 j6	32 k6	58 mm	165 mm	142 mm	299 mm	351 mm
AM8063	130 j6	32 k6	58 mm	165 mm	142 mm	256 mm	315 mm
AM8063*	130 j6	32 k6	58 mm	165 mm	142 mm	339 mm	398 mm
AM8064	130 j6	32 k6	58 mm	165 mm	142 mm	296 mm	–
AM8071	180 j6	38 k6	80 mm	215 mm	194 mm	212 mm	284.5 mm
AM8071*	180 j6	38 k6	80 mm	215 mm	194 mm	322.5 mm	395 mm
AM8072	180 j6	38 k6	80 mm	215 mm	194 mm	269 mm	341.5 mm
AM8072*	180 j6	38 k6	80 mm	215 mm	194 mm	379.5 mm	452 mm
AM8073	180 j6	38 k6	80 mm	215 mm	194 mm	326 mm	398.5 mm
AM8073*	180 j6	38 k6	80 mm	215 mm	194 mm	436.5 mm	509 mm
AM8074	180 j6	38 k6	80 mm	215 mm	194 mm	398.5 mm	–
AM8074*	180 j6	38 k6	80 mm	215 mm	194 mm	517 mm	–

* high-performance type: oversize caused by fan, see dimension "k"

▶ **www.beckhoff.com/AM80xx**

We reserve the right to make technical changes.

AM8500 | Synchronous Servomotors with higher moment of inertia

The AM8500 series extends the servomotor range by a complete series with increased rotor moment of inertia. Due to the modified rotor geometry it is increased, depending on the length, by 100 to 300 % compared to the AM8000 servomotors. The AM8500 series covers a wide performance range with four sizes and three lengths with standstill torques from 1.37 to 41 Nm. A particular highlight, as with all servomotors from the AM8000 series, is the One Cable Technology (OCT) that combines power and feedback system in the standard motor cable.

Due to the high rotor inertia, control of the AM8500 is simplified in areas in which a high external inertia has to be moved, e.g. CNC applications in machine tools and woodworking machines. The servomotors tend to vibrate less and are much easier to adjust to the application on the servo controller. Where the ratio of external to inherent inertia has previously required a gearbox, this can now be dispensed with in some cases. Typical areas of application for the AM8500 servomotors are in woodworking machines, printing machines and machine tools as well as in film winders and feeding drive units.

In the forced cooling version the power density of the AM8500 motor series is thus increased further thanks to the external axial ventilation of the servomotors: the standstill torques can be increased by about 35 %; the rated torques at the rated speed even by up to 150 %. In this version the servomotor series offers high torques even at high speeds. Cooling takes place with a 24 V DC fan, which is actuated independently of the motor. In the forced cooling version all further options are available in accordance with the order data such as OCT or backlash-free permanent magnet holding brake. The forced cooling option is available for AM855x and AM856x.

Planetary gear units
see page 386

Pre-assembled cables
see page 350

Technical data	AM85xx
Motor type	permanent magnet-excited three-phase synchronous motor
Magnet material	neodymium-iron-boron
Insulation class	thermal class F (155 °C)
Design form	flange-mounted according to IM B5, IM V1, IM V3
Protection class	IP 54, IP 65 (shaft seal)
Cooling	convection, permissible ambient temperature 40 °C, optionally: external axial ventilation
Coating/surface	dark grey powder coating, similar to RAL7016
Temperature sensor	integrated in stator winding
Connection method	round plug connector, swivelling, angled
Life span	L_{10h} = 30,000 hrs for ball bearings
Approvals	CE, UL
Feedback system	absolute encoder single-turn and multi-turn, OCT, resolver, multi-turn 2-cable standard

We reserve the right to make technical changes.

Ordering options

You will find the possible ordering options for the listed motors in this table. The options cannot be retrofitted. All specified electrical values are RMS values. The specifications for the connection technology (size of the connector) apply to motors with OCT. For motors with standard 2-cable configuration, "connection technology" refers to the size of the power connector. The size of the feedback connector for a standard 2-cable configuration is different, as follows: flange size F3: ytec® plug, flange sizes F4…F6 = M23 speedtec® plug.

Order reference	AM85uv-wxyz	Pict.
u	flange code F	
v	motor length	
w = 0	smooth shaft	
w = 1	shaft with groove and feather key according to DIN 6885	
w = 2	smooth shaft with IP 65 sealing ring	
w = 3	shaft with IP 65 sealing ring and shaft with groove and feather key	
x	winding code A…Z	
y = 0	2-cable standard: feedback resolver	
y = 1	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, single-turn, absolute position within one revolution, 18 bit resolution	
y = 2	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, multi-turn, absolute position within 4096 revolutions, 18 bit resolution	
y = 4	2-cable standard: feedback multi-turn, absoulte encoder SKM36, 128 sincos periods (only for AM856x)	
y = A	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, single-turn, absolute position within one revolution, resolution 23 bit	
y = B	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, multi-turn, absolute position within 4096 revolutions, resolution 23 bit	
y = N	without feedback (sensorless)	
z = 0	without holding brake	
z = 1	with holding brake (not available for AM8533, AM8543, AM8553 and AM8563)	
z = A	forced cooling, without holding brake, for AM855x, AM856x [1]	A
z = B	forced cooling, with holding brake, for AM855x, AM856x (not available for AM8553 and AM8563) [1]	A

[1] The EL2022 2 130 or KL2022 2 461 digital output terminal with matching ZK4054-6400-xxxx 321 supply cable is recommended for controlling the external 24 V DC ventilation.

A

AM8531 | Flange code F3, motor length 1

Data for 400 V AC	AM8531-wCyz	AM8531-wDyz	AM8531-wFyz
Standstill torque	1.37 Nm	1.38 Nm	1.40 Nm
Rated torque	1.34 Nm	1.33 Nm	1.30 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	9000 min^{-1}
Rated power	0.42 kW	0.84 kW	1.23 kW
Standstill current	1.00 A	1.95 A	3.20 A
Rotor moment of inertia	1.67 $kgcm^2$		
Rotor moment of inertia (with brake)	1.76 $kgcm^2$		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8532 | Flange code F3, motor length 2

Data for 400 V AC	AM8532-wDyz	AM8532-wEyz	AM8532-wHyz
Standstill torque	2.38 Nm	2.37 Nm	2.37 Nm
Rated torque	2.30 Nm	2.20 Nm	1.85 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	9000 min^{-1}
Rated power	0.72 kW	1.38 kW	1.74 kW
Standstill current	1.70 A	2.95 A	5.10 A
Rotor moment of inertia	2.05 $kgcm^2$		
Rotor moment of inertia (with brake)	2.15 $kgcm^2$		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8533 | Flange code F3, motor length 3

Data for 400 V AC	AM8533-wEy0	AM8533-wFy0	AM8533-wJy0
Standstill torque	3.20 Nm	3.22 Nm	3.22 Nm
Rated torque	2.98 Nm	2.70 Nm	2.30 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	9000 min^{-1}
Rated power	0.94 kW	1.70 kW	2.17 kW
Standstill current	2.10 A	4.10 A	6.80 A
Rotor moment of inertia	2.44 $kgcm^2$		
Rotor moment of inertia (with brake)	–		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM8541 | Flange code F4, motor length 1

Data for 400 V AC	AM8541-wDyz	AM8541-wEyz	AM8541-wHyz
Standstill torque	2.37 Nm	2.45 Nm	2.40 Nm
Rated torque	2.30 Nm	2.31 Nm	2.10 Nm
Rated speed	3000 min^{-1}	6000 min^{-1}	8000 min^{-1}
Rated power	0.72 kW	1.45 kW	1.76 kW
Standstill current	1.65 A	3.00 A	5.25 A
Rotor moment of inertia	4.62 $kgcm^2$		
Rotor moment of inertia (with brake)	5.27 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

We reserve the right to make technical changes.

AM8542 | Flange code F4, motor length 2

Data for 400 V AC	AM8542-wEyz	AM8542-wFyz	AM8542-wJyz
Standstill torque	4.10 Nm		
Rated torque	3.90 Nm	3.70 Nm	3.10 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	8000 min^{-1}
Rated power	1.02 kW	1.94 kW	2.60 kW
Standstill current	2.15 A	4.10 A	6.90 A
Rotor moment of inertia	5.51 $kgcm^2$		
Rotor moment of inertia (with brake)	6.17 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8543 | Flange code F4, motor length 3

Data for 400 V AC	AM8543-wEy0	AM8543-wHy0	AM8543-wKy0
Standstill torque	5.65 Nm	5.65 Nm	5.60 Nm
Rated torque	5.30 Nm	4.90 Nm	4.10 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	8000 min^{-1}
Rated power	1.39 kW	2.57 kW	3.43 kW
Standstill current	2.90 A	5.40 A	9.30 A
Rotor moment of inertia	6.41 $kgcm^2$		
Rotor moment of inertia (with brake)	–		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8551 | Flange code F5, motor length 1

Data for 400 V AC	AM8551-wEyz	AM8551-wGyz	AM8551-wKyz
Standstill torque	4.80 Nm	4.90 Nm	4.90 Nm
Rated torque	4.60 Nm	4.40 Nm	3.90 Nm
Rated speed	2500 min^{-1}	5000 min^{-1}	8000 min^{-1}
Rated power	1.20 kW	2.30 kW	3.27 kW
Standstill current	2.70 A	4.75 A	8.50 A
Rotor moment of inertia	8.75 $kgcm^2$		
Rotor moment of inertia (with brake)	9.41 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8551 | Flange code F5, motor length 1, high-performance type with forced cooling

Data for 400 V AC	AM8551-wFyz	AM8551-wJyz	AM8551-wLyz
Standstill torque	6.20 Nm	6.30 Nm	6.30 Nm
Rated torque	5.8 Nm	5.5 Nm	3.6 Nm
Rated speed	2500 min^{-1}	4750 min^{-1}	8000 min^{-1}
Rated power	1.52 kW	2.74 kW	3.02 kW
Standstill current	3.50 A	5.80 A	11.1 A
Rotor moment of inertia	8.75 $kgcm^2$		
Rotor moment of inertia (with brake)	9.41 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

We reserve the right to make technical changes.

AM8552 | Flange code F5, motor length 2

Data for 400 V AC	AM8552-wFyz	AM8552-wJyz	AM8552-wLyz
Standstill torque	8.20 Nm		
Rated torque	7.50 Nm	6.90 Nm	5.40 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	7300 min^{-1}
Rated power	1.57 kW	2.89 kW	4.13 kW
Standstill current	3.30 A	6.30 A	11.3 A
Rotor moment of inertia	10.6 $kgcm^2$		
Rotor moment of inertia (with brake)	11.3 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8552 | Flange code F5, motor length 2, high-performance type with forced cooling

Data for 400 V AC	AM8552-wGyz	AM8552-wKyz	AM8552-wNyz
Standstill torque	10.7 Nm	10.7 Nm	9.6 Nm
Rated torque	9.7 Nm	9.1 Nm	5.4 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	6000 min^{-1}
Rated power	2.03 kW	3.77 kW	4.08 kW
Standstill current	4.30 A	8.50 A	13.6 A
Rotor moment of inertia	10.6 $kgcm^2$		
Rotor moment of inertia (with brake)	11.2 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8553 | Flange code F5, motor length 3

Data for 400 V AC	AM8553-wGy0	AM8553-wKy0	AM8553-wNy0
Standstill torque	11.4 Nm		
Rated torque	10.0 Nm	8.35 Nm	4.50 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	7000 min^{-1}
Rated power	2.09 kW	3.50 kW	3.30 kW
Standstill current	4.70 A	8.80 A	15.6 A
Rotor moment of inertia	12.4 $kgcm^2$		
Rotor moment of inertia (with brake)	–		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8553 | Flange code F5, motor length 3, high-performance type with forced cooling

Data for 400 V AC	AM8553-wJyA	AM8553-wLyA	AM8553-wPyA
Standstill torque	15.4 Nm	15.4 Nm	13.3 Nm
Rated torque	14.9 Nm	12.9 Nm	7.1 Nm
Rated speed	2000 min^{-1}	4000 min^{-1}	5000 min^{-1}
Rated power	3.12 kW	5.41 kW	3.72 kW
Standstill current	6.40 A	11.9 A	18.6 A
Rotor moment of inertia	12.5 $kgcm^2$		
Rotor moment of inertia (with brake)	–		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

We reserve the right to make technical changes.

AM8561 | Flange code F6, motor length 1

Data for 400 V AC	AM8561-wGyz	AM8561-wJyz	AM8561-wMyz
Standstill torque	12.8 Nm		
Rated torque	12.1 Nm	11.0 Nm	9.00 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	1.90 kW	3.46 kW	4.71 kW
Standstill current	4.00 A	7.80 A	13.1 A
Rotor moment of inertia	48.2 $kgcm^2$		
Rotor moment of inertia (with brake)	50.6 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8561 | Flange code F6, motor length 1, high-performance type with forced cooling

Data for 400 V AC	AM8561-wHyz	AM8561-wLyz	AM8561-wNyz
Standstill torque	17.1 Nm	17.1 Nm	15.5 Nm
Rated torque	16.1 Nm	14.7 Nm	10.7 Nm
Rated speed	1400 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	2.36 kW	4.60 kW	5.60 kW
Standstill current	5.20 A	10.1 A	15.8 A
Rotor moment of inertia	48.2 $kgcm^2$		
Rotor moment of inertia (with brake)	50.6 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8562 | Flange code F6, motor length 2

Data for 400 V AC	AM8562-wJyz	AM8562-wLyz	AM8562-wPyz
Standstill torque	21.1 Nm		
Rated torque	18.5 Nm	15.2 Nm	6.50 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	2.91 kW	4.78 kW	3.40 kW
Standstill current	6.20 A	12.4 A	20.3 A
Rotor moment of inertia	57.1 $kgcm^2$		
Rotor moment of inertia (with brake)	59.6 $kgcm^2$		
Connection technology	M23 speedtec® plug		
One Cable Technology (OCT)	yes		

AM8562 | Flange code F6, motor length 2, high-performance type with forced cooling

Data for 400 V AC	AM8562-wKyz	AM8562-wNyz	AM8562-wRyz
Standstill torque	29.9 Nm	29.9 Nm	28.1 Nm
Rated torque	26.4 Nm	22.2 Nm	13.4 Nm
Rated speed	1400 min^{-1}	3000 min^{-1}	5000 min^{-1}
Rated power	3.87 kW	7.00 kW	7.00 kW
Standstill current	8.70 A	17.4 A	28.7 A
Rotor moment of inertia	57.1 $kgcm^2$		
Rotor moment of inertia (with brake)	59.6 $kgcm^2$		
Connection technology	M23 speedtec® plug	M23 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		

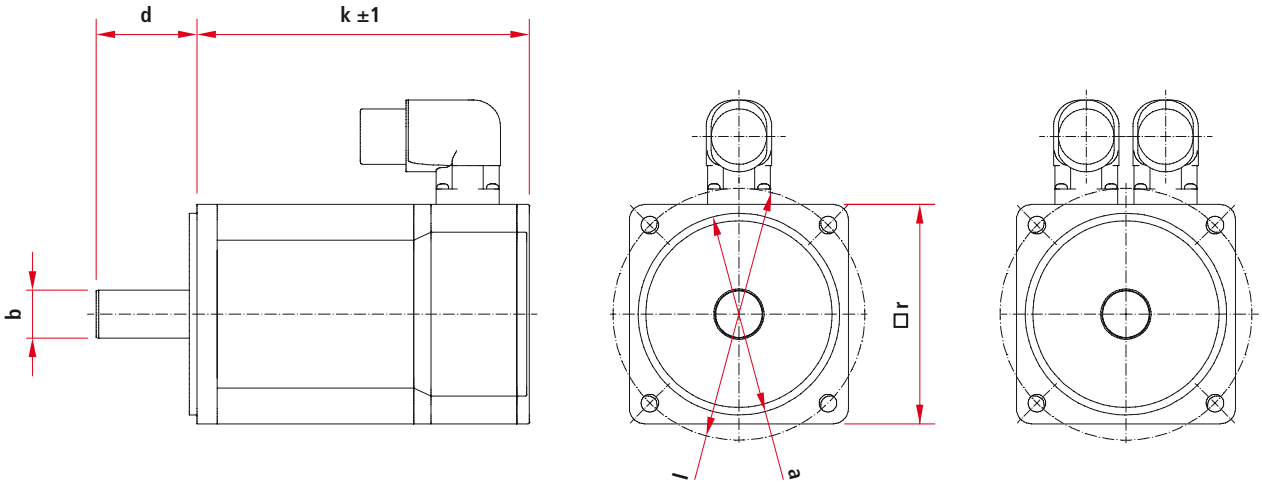
We reserve the right to make technical changes.

AM8563 | **Flange code F6, motor length 3**

Data for 400 V AC	AM8563-wKy0	AM8563-wNy0	AM8563-wRy0
Standstill torque	29.0 Nm		
Rated torque	22.3 Nm	13.2 Nm	6.10 Nm
Rated speed	1500 min^{-1}	3000 min^{-1}	4000 min^{-1}
Rated power	3.50 kW	4.15 kW	2.56 kW
Standstill current	8.70 A	17.2 A	29.5 A
Rotor moment of inertia	66.1 $kgcm^2$		
Rotor moment of inertia (with brake)	–		
Connection technology	M23 speedtec® plug	M23 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		

AM8563 | **Flange code F6, motor length 3, high-performance type with forced cooling**

Data for 400 V AC	AM8563-wLyA	AM8563-wQyA	AM8563-wTyA
Standstill torque	41.4 Nm	41.4 Nm	40.1 Nm
Rated torque	33.9 Nm	25.5 Nm	15.1 Nm
Rated speed	1400 min^{-1}	3000 min^{-1}	4000 min^{-1}
Rated power	4.97 kW	8.00 kW	6.30 kW
Standstill current	11.6 A	24.0 A	39.8 A
Rotor moment of inertia	66.1 $kgcm^2$		
Rotor moment of inertia (with brake)	–		
Connection technology	M23 speedtec® plug	M40 speedtec® plug	M40 speedtec® plug
One Cable Technology (OCT)	yes		



One Cable Technology

Resolver version

Dimensions	a	b	d	l	r	k (without brake)	k (with brake)
AM8531	60 j6	14 k6	30 mm	75 mm	72 mm	168 mm	194 mm
AM8532	60 j6	14 k6	30 mm	75 mm	72 mm	194 mm	229 mm
AM8533	60 j6	14 k6	30 mm	75 mm	72 mm	229 mm	–
AM8541	80 j6	19 k6	40 mm	100 mm	87 mm	179.5 mm	209.5 mm
AM8542	80 j6	19 k6	40 mm	100 mm	87 mm	209.5 mm	239.5 mm
AM8543	80 j6	19 k6	40 mm	100 mm	87 mm	239.5 mm	–
AM8551	95 j6	24 k6	50 mm	115 mm	104 mm	183.5 mm	216.5 mm
AM8551*	95 j6	24 k6	50 mm	115 mm	104 mm	256 mm	289 mm
AM8552	95 j6	24 k6	50 mm	115 mm	104 mm	216.5 mm	251.5 mm
AM8552*	95 j6	24 k6	50 mm	115 mm	104 mm	289 mm	324 mm
AM8553	95 j6	24 k6	50 mm	115 mm	104 mm	251.5 mm	–
AM8553*	95 j6	24 k6	50 mm	115 mm	104 mm	324 mm	–
AM8561	130 j6	32 k6	58 mm	165 mm	142 mm	228 mm	268 mm
AM8561*	130 j6	32 k6	58 mm	165 mm	142 mm	311 mm	351 mm
AM8562	130 j6	32 k6	58 mm	165 mm	142 mm	268 mm	315 mm
AM8562*	130 j6	32 k6	58 mm	165 mm	142 mm	351 mm	398 mm
AM8563	130 j6	32 k6	58 mm	165 mm	142 mm	315 mm	–
AM8563*	130 j6	32 k6	58 mm	165 mm	142 mm	398 mm	–

* high-performance type: oversize caused by fan, see dimension "k"

▶ **www.beckhoff.com/AM85xx**

We reserve the right to make technical changes.

AG2300 | High-end gear series for AM8000 and AM8500 servomotors

The low-backlash, high-performance planetary gear units of the AG2300 series offer high torque, low torsional backlash and a very low noise level in all 14 gear ratios. The high-end gear units for the AM8000 and AM8500 servomotors have a high power density and are able to absorb high radial and axial forces. The high quality and running smoothness of this helical gear unit series meet the highest control quality demands.

The MF standard variant allows high positioning accuracy and highly dynamic operating cycles (duty cycle < 60 %). The high-speed MC variant is suited for positioning with high nominal speeds in continuous operation (duty cycle > 60 %).

The gear units of the AG2300 series are perfectly matched to the AM8000 and AM8500 motor series. The inertia ratios, the required torques and the suitable motors can be conveniently calculated directly in TwinCAT with the TC Motion Designer. In addition, the tool checks in a single step whether the selected motor can be adapted to the gear unit. The planetary gear units are fitted to the respective motor in the factory and delivered as a complete motor/gear unit.

Features

- standard version MF for high positioning quality in highly dynamic operating cycles
- high-speed version MC for high speeds in continuous operation
- low-backlash planetary gear unit with output shaft
- absolutely maintenance-free, thanks to unique lubrication concept
- high axial and radial forces
- long service life (MF > 20,000 h, MC > 30,000 h)
- maximum efficiency
- maximum power density
- low running noise and smooth running thanks to helical gearing
- flexible installation position
- output shaft with feather key or smooth shaft
- available in 7 or 6 sizes
  - MF: SP060 to SP240
  - MC: SP075 to SP240
- 14 gear ratios, i = 3, 4, 5, 7, 8, 10 (1-stage), i = 16, 20, 25, 28, 32, 35, 40, 50, 64, 70, 100 (2-stage)
- acceleration torques between 36 and 5400 Nm
- low torsional backlash (1…8 arcmin)

We reserve the right to make technical changes.

Technical data	Gear ratio	Max. acceleration torque	Max. torsional backlash standard/reduced	Typ. flange code
AG2300-+SP060S-MF1-i	3/4/5/7/8/10	36…50 Nm	≤ 4/2 arcmin	F2, F3
AG2300-+SP060S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	38…50 Nm	≤ 6/4 arcmin	F2, F3
AG2300-+SP075S-MF1-i	3/4/5/7/8/10	102…132 Nm	≤ 4/2 arcmin	F3, F4, F5
AG2300-+SP075S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	105…132 Nm	≤ 6/4 arcmin	F3, F4
AG2300-+SP075S-MC1-i	3/4/5/7/8/10	68…90 Nm	≤ 6/4 arcmin	F3, F4, F5
AG2300-+SP075S-MC2-i	16/20/25/28/32/35/40/50/64/70/100	70…90 Nm	≤ 8/6 arcmin	F3, F4
AG2300-+SP100S-MF1-i	3/4/5/7/8/10	282…378 Nm	≤ 3/1 arcmin	F4, F5, F6
AG2300-+SP100S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	259…347 Nm	≤ 5/3 arcmin	F3, F4, F5
AG2300-+SP100S-MC1-i	3/4/5/7/8/10	180…240 Nm	≤ 4/2 arcmin	F4, F5, F6
AG2300-+SP100S-MC2-i	16/20/25/28/32/35/40/50/64/70/100	180…240 Nm	≤ 6/4 arcmin	F3, F4, F5
AG2300-+SP140S-MF1-i	3/4/5/7/8/10	468…792 Nm	≤ 3/1 arcmin	F5, F6, F7
AG2300-+SP140S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	583…726 Nm	≤ 5/3 arcmin	F4, F5, F6
AG2300-+SP140S-MC1-i	3/4/5/7/8/10	310…480 Nm	≤ 4/2 arcmin	F5, F6, F7
AG2300-+SP140S-MC2-i	16/20/25/28/32/35/40/50/64/70/100	380…480 Nm	≤ 6/4 arcmin	F4, F5, F6
AG2300-+SP180S-MF1-i	3/4/5/7/8/10	1164…1452 Nm	≤ 3/1 arcmin	F6, F7
AG2300-+SP180S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	1164…1452 Nm	≤ 5/3 arcmin	F5, F6
AG2300-+SP180S-MC1-i	3/4/5/7/8/10	700…880 Nm	≤ 4/2 arcmin	F6, F7
AG2300-+SP180S-MC2-i	16/20/25/28/32/35/40/50/64/70/100	700…880 Nm	≤ 6/4 arcmin	F5, F6, F7
AG2300-+SP210S-MF1-i	3/4/5/7/8/10	1920…3000 Nm	≤ 3/1 arcmin	F7
AG2300-+SP210S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	2043…3000 Nm	≤ 5/3 arcmin	F7
AG2300-+SP210S-MC1-i	3/4/5/7/8/10	1200…2000 Nm	≤ 4/2 arcmin	F7
AG2300-+SP210S-MC2-i	16/20/25/28/32/35/40/50/64/70/100	1040…2000 Nm	≤ 5/4 arcmin	F7
AG2300-+SP240S-MF1-i	3/4/5/7/8/10	3300…5400 Nm	≤ 3/1 arcmin	F7, AM308x
AG2300-+SP240S-MF2-i	16/20/25/28/32/35/40/50/64/70/100	3642…5400 Nm	≤ 5/3 arcmin	F7, AM308x
AG2300-+SP240S-MC1-i	3/4/5/7/8/10	1750…3600 Nm	≤ 4/2 arcmin	F7, AM308x
AG2300-+SP240S-MC2-i	16/20/25/28/32/35/40/50/64/70/100	1680…3600 Nm	≤ 5/4 arcmin	F7, AM308x

▶ **www.beckhoff.com/AG2300**

We reserve the right to make technical changes.

AG3300 | **Economy planetary gear units**

The planetary gear units with output shaft in the AG3300 economy series are a cost-efficient alternative to the high-end AG2300 gears. The gears, which are available in 1-stage and 2-stage versions, are compatible in their mating dimensions with those of the high-end AG2300 series and enable the user to implement applications with lower demands on dynamics, torque and accuracy in a very cost-effective manner. The AG3300 series is available in standard and high-torque versions for AM8000 and AM8500 servomotors. The transmission ratios are finely scalable and range from 3 to 100.

Features

- equipped with output shaft
- standard version for applications with high positioning accuracy in dynamic cyclical operation; high-torque version for high-torque applications
- 4 sizes with up to 21 gear ratios
- acceleration torques from 51 to 800 Nm
- high efficiency and high power density
- high radial and axial forces with low torsional backlash
- lubricated for life
- IP 65 protection rating; any installation position
- integrated into TC Motion Designer for optimal specification

Technical data	Gear ratio	Max. acceleration torque	Max. torsional backlash standard/reduced	Typ. flange code
AG3300-+NPS015S-MF1-i	3/4/5/7/8/10	51…64 Nm	≤ 8 arcmin	F2, F3, F4
AG3300-+NPS015S-MF2-i	12/15/16/20/25/28/30/32/35/40/50/64/70/100	51…64 Nm	≤ 10 arcmin	F1, F2, F3
AG3300-+NPS025S-MF1-i	3/4/5/7/8/10	128…160 Nm	≤ 8 arcmin	F3, F4, F5
AG3300-+NPS025S-MF2-i	9/12/15/16/20/25/28/30/32/35/40/50/64/70/100	128…160 Nm	≤ 10 arcmin	F2, F3, F4
AG3300-+NPS035S-MF1-i	3/4/5/7/8/10	320…408 Nm	≤ 8 arcmin	F4, F5, F6
AG3300-+NPS035S-MF2-i	9/12/15/16/20/25/28/30/32/35/40/50/64/70/100	320…408 Nm	≤ 10 arcmin	F3, F4, F5
AG3300-+NPS045S-MF1-i	5/8/10	640…800 Nm	≤ 8 arcmin	F6, F7
AG3300-+NPS045S-MF2-i	25/50/64/100	640…800 Nm	≤ 10 arcmin	F5, F6, F7

▶ **www.beckhoff.com/AG3300**

We reserve the right to make technical changes.

AG3210 | Economy planetary gear units

The planetary gear units of the AG3210 economy series with output shaft are a cost-efficient alternative to the high-end AG2210 gears. The gears, which are available in 1-stage and 2-stage versions, are compatible in their mating dimensions with those of the high-end AG2210 series, offering added value with regard to the transmittable torque as well as radial and axial force, and significantly reduced torsional backlash. The AG3210 series is available in standard and high-torque versions for AM8000 and AM8500 servomotors. The gear ratios are finely scalable and range from 3 to 100.

Features

- equipped with output shaft
- standard version for applications with high positioning accuracy in dynamic cyclical operation; high-torque version for high-torque applications
- 5 sizes with up to 21 gear ratios
- acceleration torques from 18 to 800 Nm
- high efficiency and high power density
- high radial and axial forces with low torsional backlash
- lubricated for life
- IP 64 protection rating; any installation position
- integrated into TC Motion Designer for optimal specification

Technical data	Gear ratio	Max. acceleration torque	Max. torsional backlash standard/reduced	Typ. flange code
AG3210-+NP005S-MF1-i	4/5/7/8/10	18…22 Nm	≤ 10 arcmin	F1, F2, F3
AG3210-+NP005S-MF2-i	16/20/25/28/35/40/50/64/70/100	18…22 Nm	≤ 13 arcmin	F1, F2, F3
AG3210-+NP015S-MF1-i	3/4/5/7/8/10	51…64 Nm	≤ 8 arcmin	F2, F3, F4
AG3210-+NP015S-MF2-i	12/15/16/20/25/28/30/32/35/40/50/64/70/100	51…64 Nm	≤ 10 arcmin	F1, F2, F3
AG3210-+NP025S-MF1-i	3/4/5/7/8/10	128…160 Nm	≤ 8 arcmin	F3, F4, F5
AG3210-+NP025S-MF2-i	9/12/15/16/20/25/28/30/32/35/40/50/64/70/100	128…160 Nm	≤ 10 arcmin	F2, F3, F4
AG3210-+NP035S-MF1-i	3/4/5/7/8/10	320…408 Nm	≤ 8 arcmin	F4, F5, F6
AG3210-+NP035S-MF2-i	9/12/15/16/20/25/28/30/32/35/40/50/64/70/100	320…408 Nm	≤ 10 arcmin	F3, F4, F5
AG3210-+NP045S-MF1-i	5/8/10	640…800 Nm	≤ 8 arcmin	F6, F7
AG3210-+NP045S-MF2-i	25/50/64/100	640…700 Nm	≤ 10 arcmin	F5, F6, F7

▶ **www.beckhoff.com/AG3210**

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AG2400 | High-end planetary gear units with output flange

The planetary gear units with output flange in the high-end AG2400 series absorb maximum radial and axial forces and transmit highest torques. High-quality gear tooth systems result in very low torsional backlash, making this gear series the ideal solution for dynamic and highly accurate positioning applications. The low-noise gears of the AG2400 series are optimised for the AM8xxx high-performance servomotors and meet the highest requirements regarding precision, dynamics and power density.

Features

- equipped with output flange
- standard version for applications with high positioning accuracy in dynamic cyclical operation; high-torque version for high-torque applications
- 7 sizes with up to 20 gear ratios
- acceleration torques from 38 to 7200 Nm
- maximum efficiency
- maximum radial and axial forces with very low torsional backlash
- lubricated for life
- IP 65 protection rating; any installation position
- integrated into TC Motion Designer for optimal specification

Technical data	Gear ratio	Max. acceleration torque	Max. torsional backlash standard/reduced	Typ. flange code
AG2400-+TP004S-MF1-i	4/5/7/8/10	42…66 Nm	≤ 4/2 arcmin	F2, F3, F4
AG2400-+TP004S-MF2-i	16/20/21/25/28/31/32/35/40/50/61/64/70/91/100	38…66 Nm	≤ 4/2 arcmin	F1, F2, F3
AG2400-+TP010S-MF1-i	4/5/7/8/10	126…172 Nm	≤ 4/2 arcmin	F3, F4, F5
AG2400-+TP010S-MF2-i	16/20/21/25/28/31/32/35/40/50/61/64/70/91/100	96…158 Nm	≤ 3/1 arcmin	F2, F3, F4
AG2400-+TP025S-MF1-i	4/5/7/8/10	318…380 Nm	≤ 3/1 arcmin	F4, F5, F6
AG2400-+TP025S-MF2-i	16/20/21/25/28/31/32/35/40/50/61/64/70/91/100	275…380 Nm	≤ 3/1 arcmin	F3, F4, F5
AG2400-+TP050S-MF1-i	4/5/7/8/10	648…840 Nm	≤ 3/1 arcmin	F5, F6, F7
AG2400-+TP050S-MF2-i	16/20/21/25/28/31/32/35/40/50/61/64/70/91/100	550…825 Nm	≤ 3/1 arcmin	F4, F5, F6
AG2400-+TP110S-MF1-i	4/5/7/8/10	1680…1920 Nm	≤ 3/1 arcmin	F6, F7
AG2400-+TP110S-MF2-i	16/20/21/25/28/31/32/35/40/50/61/64/70/91/100	1430…1760 Nm	≤ 3/1 arcmin	F5, F6, F7
AG2400-+TP300S-MF1-i	5/7/8/10	2280…4200 Nm	≤ 3/1 arcmin	F6, F7
AG2400-+TP300S-MF2-i	20/21/25/31/32/35/50/61/64/70/91/100	2800…3949 Nm	≤ 3/2 arcmin	F6, F7
AG2400-+TP500S-MF1-i	5/7/8/10	4000…7200 Nm	≤ 3/1 arcmin	F6, F7
AG2400-+TP500S-MF2-i	20/21/25/31/32/35/50/61/64/70/91/100	4800…6808 Nm	≤ 3/2 arcmin	F6, F7

▶ **www.beckhoff.com/AG2400**

We reserve the right to make technical changes.

AG3400 | Economy planetary gear units with output flange

The planetary gear units with output flange in the AG3400 economy series are a cost-efficient alternative to the high-end AG2400 gears.
The gears, which are available in 1-stage and 2-stage versions, are compatible in their mating dimensions with those of the high-end AG2400 series and enable the user to implement applications with lower demands on dynamics, torque and accuracy in a very cost-effective manner. The AG3400 series is available in standard and high-torque versions for AM8000 and AM8500 servomotors. The gear ratios are finely scalable and range from 3 to 100.

Features

- equipped with output flange
- standard version for applications with high positioning accuracy in dynamic cyclical operation; high-torque version for high-torque applications
- 5 sizes with up to 21 gear ratios
- acceleration torques from 18 to 700 Nm
- high efficiency and high power density
- high radial and axial forces with low torsional backlash
- lubricated for life
- IP 64 protection rating; any installation position
- integrated into TC Motion Designer for optimal specification

Technical data	Gear ratio	Max. acceleration torque	Max. torsional backlash standard/reduced	Typ. flange code
AG3400-+NPT005S-MF1-i	4/5/7/8/10	18…22 Nm	≤ 10 arcmin	F1, F2, F3
AG3400-+NPT005S-MF2-i	16/20/25/28/35/40/50/64/70/100	18…22 Nm	≤ 13 arcmin	F1, F2, F3
AG3400-+NPT015S-MF1-i	3/4/5/7/8/10	51…60 Nm	≤ 8 arcmin	F2, F3, F4
AG3400-+NPT015S-MF2-i	12/15/16/20/25/28/30/32/35/40/50/64/70/100	51…60 Nm	≤ 10 arcmin	F1, F2, F3
AG3400-+NPT025S-MF1-i	3/4/5/7/8/10	128…160 Nm	≤ 8 arcmin	F3, F4, F5
AG3400-+NPT025S-MF2-i	9/12/15/16/20/25/28/30/32/35/40/50/64/70/100	128…160 Nm	≤ 10 arcmin	F2, F3, F4
AG3400-+NPT035S-MF1-i	3/4/5/7/8/10	320…365 Nm	≤ 8 arcmin	F4, F5, F6
AG3400-+NPT035S-MF2-i	9/12/15/16/20/25/28/30/32/35/40/50/64/70/100	320…365 Nm	≤ 10 arcmin	F3, F4, F5
AG3400-+NPT045S-MF1-i	5/8/10	640…700 Nm	≤ 8 arcmin	F6, F7
AG3400-+NPT045S-MF2-i	25/50/64/100	640…700 Nm	≤ 10 arcmin	F5, F6, F7

▶ **www.beckhoff.com/AG3400**

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AM8800 | Stainless steel servomotors

Based on the AM8000 technology, the AM8800 series has a stainless steel housing that is designed according to the EHEDG guidelines in Hygienic Design. The AM8800 is ideally suited for use in the food, pharmaceutical and chemical industries.

The windings of the AM8800 motors are implemented using salient pole-wound technology. This gives rise to a high copper space factor. Due to the high slot space factor, high continuous torques can be attained. The fully potted stator provides for a thermally ideal transition of the winding to the housing. A further positive consequence of this is the mechanical protection of the winding wires against vibrations.

Since the housing and motor shaft are manufactured from scratch-proof stainless steel AISI 316L, no corrosion creep or damage to the paint finish is possible. The motors are manufactured as standard with IP 69K protection, allowing the use of steam pressure cleaners. An optional sealing air connection to prevent the formation of condensation is also available. The cable gland also has a hygienic design. The lubricants used are certified food-safe (FDA).

One Cable Technology (OCT)
With the servomotors of the AM8000 series the feedback signals are sent directly along the conductor to the power supply so that the power and feedback systems are combined in a single motor supply cable. With the use of OCT, the information is sent reliably and without interference through a digital interface. Since a cable and plug are omitted at both the motor and controller end, the component and commissioning costs are significantly reduced.

For further information on OCT see page 320

Stainless steel gear units AG2800 see page 395

Pre-assembled cables see page 350

Technical data	AM88xx
Motor type	permanent magnet-excited three-phase synchronous motor
Magnet material	neodymium-iron-boron
Insulation class	thermal class F (155 °C)
Design form	flange-mounted according to IM B5, IM V1, IM V3, optionally IM B14, IM V18, IM V19
Protection class	IP 69K, PTFE double-lip shaft seal with FDA approval
Cooling	convection, permissible ambient temperature 40 °C
Materials	AISI 316L
Temperature sensor	integrated in stator winding
Connection method	direct cable outlet via cable gland with connected M23 speedtec® coupling plug or direct connection for AX5000 or AX8000
Life span	L_{10h} = 30,000 hrs for ball bearings
Approvals	CE, UL, EHEDG
Feedback system	absolute encoder single-turn and multi-turn (OCT), resolver

We reserve the right to make technical changes.

Ordering options

You will find the possible ordering options for the motors listed in this table. Please note: The options cannot be retrofitted.
All electrical variables are RMS values.

Order reference	AM88uv-wxyz-caaa
u	flange code
v	motor length
w = 0	smooth shaft with sealing ring IP 69K
w = 1	shaft with groove and feather key according to DIN 6885 and sealing ring IP 69K
x	winding code A…Z
y = 0	2-cable standard: feedback resolver
y = 1	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, single-turn, absolute position within one revolution, 18 bit resolution
y = 2	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, multi-turn, absolute position within 4096 revolutions, 18 bit resolution
z = 0	without holding brake
z = 2	without holding brake, with sealing air connection
z = 1	with holding brake
z = 3	with holding brake, with sealing air connection
c = 0	motor connection via M23 speedtec® plug, cable length definable via aaa [1]
c = 2	direct connection for AX5000 up to 25 A (X13+X14), cable length definable via aaa
c = 3	direct connection for AX8000 (X13), cable length definable via aaa
aaa	length of the motor cable in decimetres

[1] For motor connection via an M23 speedtec® plug, a ZK4x00-80x3-xxxx motor supply cable must also be ordered in the required length.

Motor connections see page 350

AM883x | **Flange code 3**

Data for 400 V AC	AM8831-wByz	AM8832-wCyz	AM8833-wDyz
Standstill torque	0.85 Nm	1.40 Nm	1.85 Nm
Rated torque	0.70 Nm	1.00 Nm	1.35 Nm
Rated speed	3000 min^{-1}		
Rated power	0.22 kW	0.31 kW	0.42 kW
Standstill current	0.65 A	1.00 A	1.25 A
Rotor moment of inertia	0.469 $kgcm^2$	0.850 $kgcm^2$	1.231 $kgcm^2$
Rotor moment of inertia (with brake)	0.548 $kgcm^2$	0.929 $kgcm^2$	1.471 $kgcm^2$
One Cable Technology (OCT)	yes		

AM884x | **Flange code 4**

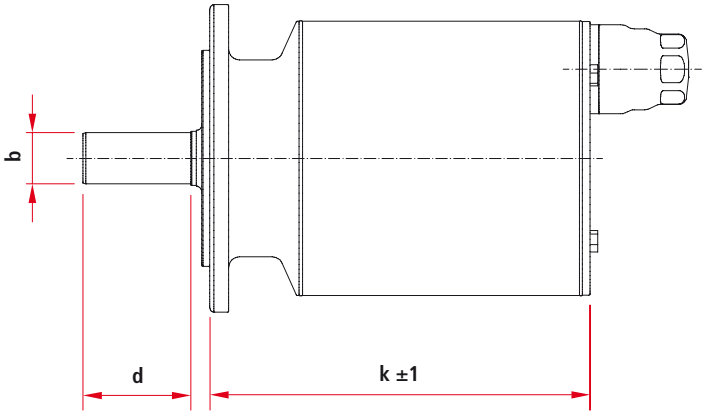
Data for 400 V AC	AM8841-wCyz	AM8842-wDyz	AM8843-wEyz
Standstill torque	1.60 Nm	2.60 Nm	3.50 Nm
Rated torque	1.30 Nm	1.90 Nm	2.75 Nm
Rated speed	3000 min^{-1}	2500 min^{-1}	2500 min^{-1}
Rated power	0.41 kW	0.50 kW	0.72 kW
Standstill current	1.10 A	1.60 A	1.90 A
Rotor moment of inertia	1.115 $kgcm^2$	2.006 $kgcm^2$	2.898 $kgcm^2$
Rotor moment of inertia (with brake)	1.765 $kgcm^2$	2.656 $kgcm^2$	3.548 $kgcm^2$
One Cable Technology (OCT)	yes		

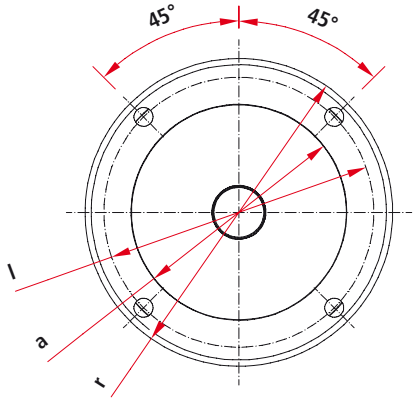
AM885x | **Flange code 5**

Data for 400 V AC	AM8851-wDyz	AM8852-wEyz	AM8853-wFyz
Standstill torque	3.10 Nm	4.80 Nm	6.40 Nm
Rated torque	2.70 Nm	3.70 Nm	4.30 Nm
Rated speed	2500 min^{-1}	2000 min^{-1}	2000 min^{-1}
Rated power	0.71 kW	0.77 kW	0.90 kW
Standstill current	1.80 A	2.10 A	2.80 A
Rotor moment of inertia	2.315 $kgcm^2$	4.142 $kgcm^2$	5.970 $kgcm^2$
Rotor moment of inertia (with brake)	2.975 $kgcm^2$	4.802 $kgcm^2$	7.090 $kgcm^2$
One Cable Technology (OCT)	yes		

AM886x | **Flange code 6**

Data for 400 V AC	AM8861-wEyz	AM8862-wFyz	AM8863-wGyz
Standstill torque	7.75 Nm	13.1 Nm	16.7 Nm
Rated torque	6.20 Nm	6.00 Nm	8.00 Nm
Rated speed	1500 min^{-1}		
Rated power	0.97 kW	0.94 kW	1.26 kW
Standstill current	2.53 A	4.10 A	4.90 A
Rotor moment of inertia	11.69 $kgcm^2$	20.93 $kgcm^2$	30.16 $kgcm^2$
Rotor moment of inertia (with brake)	13.94 $kgcm^2$	23.17 $kgcm^2$	32.40 $kgcm^2$
One Cable Technology (OCT)	yes		





Dimensions	a	b	d	l	r	k (without brake)	k (with brake)
AM8831	60 j6	14 k6	30 mm	75 mm	89 mm	134 mm	172 mm
AM8832	60 j6	14 k6	30 mm	75 mm	89 mm	159.5 mm	197.5 mm
AM8833	60 j6	14 k6	30 mm	75 mm	89 mm	185 mm	223 mm
AM8841	80 j6	19 k6	40 mm	100 mm	114 mm	141 mm	188 mm
AM8842	80 j6	19 k6	40 mm	100 mm	114 mm	171 mm	218 mm
AM8843	80 j6	19 k6	40 mm	100 mm	114 mm	201 mm	248 mm
AM8851	95 j6	24 k6	50 mm	115 mm	134 mm	146 mm	192 mm
AM8852	95 j6	24 k6	50 mm	115 mm	134 mm	179 mm	225 mm
AM8853	95 j6	24 k6	50 mm	115 mm	134 mm	212 mm	258 mm
AM8861	130 j6	32 k6	58 mm	165 mm	189 mm	171.5 mm	221.5 mm
AM8862	130 j6	32 k6	58 mm	165 mm	189 mm	211.5 mm	261.5 mm
AM8863	130 j6	32 k6	58 mm	165 mm	189 mm	251.5 mm	301.5 mm

▶ **www.beckhoff.com/AM88xx**

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AG2800 | Planetary gear units for AM8800 stainless steel servomotors

The AM8800 stainless steel servomotors are fully compatible with the high requirements in the food, beverage and pharmaceutical industries with respect to optimum cleaning, resistance to aggressive cleaning agents, heavy mechanical loads and adverse environmental conditions. With their absolutely edge-free design these motors reduce the costs for machine manufacturers and users to a minimum.

A Hygienic Design drive axis does not always end at the stainless steel shaft of the motor; the use of a gearbox is often absolutely necessary. The same requirements apply here as to the stainless steel servomotors. All gearbox materials that come into contact with the environment exhibit high resistance to a large number of aggressive CIP (Cleaning in Place) cleaning media. The dead-space-free design, the smooth surface, the round motor adapter and the high resistance to corrosion of the gearboxes make the AM8800 a perfectly matched and certified Hygienic Design servo axis. The planetary gear units are fitted to the respective motor in the factory and delivered as a complete motor/gear unit.

Features

- corrosion-resistant implementation
- resistant to aggressive cleaning agents
- stainless steel screw plug
- food-compatible NSF-H1 lubrication
- high protection class IP 69K (at 30 bar, refering to DIN 40050-9)
- laser-etched name plate
- dead-space-free design and smooth, electro-polished surfaces

Technical data	Gear ratio	Max. acceleration torque	Max. torsional backlash standard/reduced
AG2800-+HDV015Z-MF1-i	4/5/7/10	29…32 Nm	≤ 10/– arcmin
AG2800-+HDV015Z-MF2-i	16/20/25/35/50/70/100	29…32 Nm	≤ 15/– arcmin
AG2800-+HDV025Z-MF1-i	4/5/7/10	72…80 Nm	≤ 10/– arcmin
AG2800-+HDV025Z-MF2-i	16/20/25/35/50/70/100	72…80 Nm	≤ 15/– arcmin
AG2800-+HDV035Z-MF1-i	4/5/7/10	180…200 Nm	≤ 10/– arcmin
AG2800-+HDV035Z-MF2-i	16/20/25/35/50/70/100	180…200 Nm	≤ 15/– arcmin

▶ **www.beckhoff.com/AG2800**

We reserve the right to make technical changes.

AM3000 | Synchronous Servomotors

Pole-wound motor series
For the AM3000 servomotors, the stator is not wound outside the housing but inside through a needle winder.

With pole winding, the copper wire is in close contact with the iron core. The wire insulation can be much thinner, since no pressing of the winding head is required. These measures lead to a significant increase in the proportion of "active" copper, which determines the torque value, so that the performance of the AM3000 series is approx. 25…35 % higher. An additional benefit is that the motors are significantly shorter than conventional models.

Sealed winding
The AM3000 servomotors are characterised by an extremely low moment of inertia, robust design and high overload capacity. The winding is sealed in order to eliminate air between the individual wires, since the thermal resistance of air is higher than that of epoxy resin. This further increases mechanical resilience, e.g. in case of vibrations.

The AM3000 Synchronous Servomotors are available with eight different flange codes. For each size, once the flange code has been defined, there is scope for variation in the length. The motors are offered with torques between 0.18 and 180 Nm and with a wide range of nominal speeds, so that for each application and gear ratio the motor with the optimum dimensions can be selected.

Features
- rotable plug connectors
- terminal box for AM308x
- tight tolerances: resulting in a highly symmetric structure inside the motor reducing cogging to an absolute minimum
- feedback option: resolver, single-turn and multi-turn absolute encoders
- The motors are available with smooth shaft or with groove and feather key.
- protection class IP 65, shaft feedthrough IP 54, optional IP 65/IP 65
- UL/CSA

Option
- planetary gear units in different variants

Pre-assembled cables and more accessories
▶ **www.beckhoff.com/AM30xx**

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AM30uv-wxyz-000a	Stand-still torque	Stand-still current	Rated speed at rated supply voltage 230 V AC	400 V AC	480 V AC	Rotor moment of inertia (without brake)	(with brake)	Weight (without brake)	Weight (with brake)
AM3011-wByz-000a	0.18 Nm	1.16 A	8000 min^{-1}	–	–	0.017 kg cm²	0.020 kg cm²	0.35 kg	0.55 kg
AM3012-wCyz-000a	0.31 Nm	1.51 A	8000 min^{-1}	–	–	0.031 kg cm²	0.034 kg cm²	0.49 kg	0.69 kg
AM3013-wCyz-000a	0.41 Nm	1.48 A	8000 min^{-1}	–	–	0.045 kg cm²	0.048 kg cm²	0.63 kg	0.83 kg
AM3013-wDyz-000a	0.40 Nm	2.40 A	–	–	–	0.045 kg cm²	0.048 kg cm²	0.63 kg	0.83 kg
AM3021-wCyz-000a	0.48 Nm	1.58 A	8000 min^{-1}	–	–	0.107 kg cm²	0.118 kg cm²	0.82 kg	1.09 kg
AM3022-wCyz-000a	0.84 Nm	1.39 A	3500 min^{-1}	8000 min^{-1}	8000 min^{-1}	0.161 kg cm²	0.172 kg cm²	1.10 kg	1.37 kg
AM3022-wEyz-000a	0.87 Nm	2.73 A	8000 min^{-1}	–	–	0.161 kg cm²	0.172 kg cm²	1.10 kg	1.37 kg
AM3023-wCyz-000a	1.13 Nm	1.41 A	2500 min^{-1}	5500 min^{-1}	7000 min^{-1}	0.216 kg cm²	0.227 kg cm²	1.38 kg	1.65 kg
AM3023-wDyz-000a	1.16 Nm	2.19 A	5000 min^{-1}	8000 min^{-1}	8000 min^{-1}	0.216 kg cm²	0.227 kg cm²	1.38 kg	1.65 kg
AM3024-wCyz-000a	1.38 Nm	1.42 A	2000 min^{-1}	4500 min^{-1}	5500 min^{-1}	0.270 kg cm²	0.281 kg cm²	1.66 kg	1.93 kg
AM3024-wDyz-000a	1.41 Nm	2.21 A	4000 min^{-1}	8000 min^{-1}	8000 min^{-1}	0.270 kg cm²	0.281 kg cm²	1.66 kg	1.93 kg
AM3031-wCyz-0000	1.15 Nm	1.37 A	2500 min^{-1}	5000 min^{-1}	6000 min^{-1}	0.330 kg cm²	0.341 kg cm²	1.55 kg	1.90 kg
AM3031-wEyz-0000	1.20 Nm	2.99 A	6000 min^{-1}	–	–	0.330 kg cm²	0.341 kg cm²	1.55 kg	1.90 kg
AM3032-wCyz-0000	2.00 Nm	1.44 A	1500 min^{-1}	3000 min^{-1}	3500 min^{-1}	0.590 kg cm²	0.601 kg cm²	2.23 kg	2.58 kg
AM3032-wDyz-0000	2.04 Nm	2.23 A	2500 min^{-1}	5500 min^{-1}	6000 min^{-1}	0.590 kg cm²	0.601 kg cm²	2.23 kg	2.58 kg
AM3032-wHyz-0000	2.10 Nm	5.50 A	7000 min^{-1}	–	–	0.590 kg cm²	0.601 kg cm²	2.23 kg	2.58 kg
AM3033-wCyz-0000	2.71 Nm	1.47 A	1000 min^{-1}	2000 min^{-1}	2500 min^{-1}	0.850 kg cm²	0.861 kg cm²	2.90 kg	3.25 kg
AM3033-wEyz-0000	2.79 Nm	2.58 A	2000 min^{-1}	4500 min^{-1}	5000 min^{-1}	0.850 kg cm²	0.861 kg cm²	2.90 kg	3.25 kg
AM3041-wCyz-0000	1.95 Nm	1.46 A	1200 min^{-1}	3000 min^{-1}	3500 min^{-1}	0.810 kg cm²	0.878 kg cm²	2.44 kg	3.07 kg
AM3041-wEyz-0000	2.02 Nm	2.85 A	3000 min^{-1}	6000 min^{-1}	6000 min^{-1}	0.810 kg cm²	0.878 kg cm²	2.44 kg	3.07 kg
AM3041-wHyz-0000	2.06 Nm	5.60 A	6000 min^{-1}	6000 min^{-1}	6000 min^{-1}	0.810 kg cm²	0.878 kg cm²	2.44 kg	3.07 kg
AM3042-wCyz-0000	3.35 Nm	1.40 A	–	1500 min^{-1}	2000 min^{-1}	1.450 kg cm²	1.518 kg cm²	3.39 kg	4.02 kg
AM3042-wEyz-0000	3.42 Nm	2.74 A	1800 min^{-1}	3500 min^{-1}	4000 min^{-1}	1.450 kg cm²	1.518 kg cm²	3.39 kg	4.02 kg
AM3042-wGyz-0000	3.53 Nm	4.80 A	3500 min^{-1}	6000 min^{-1}	6000 min^{-1}	1.450 kg cm²	1.518 kg cm²	3.39 kg	4.02 kg
AM3043-wEyz-0000	4.70 Nm	2.76 A	1500 min^{-1}	2500 min^{-1}	3000 min^{-1}	2.090 kg cm²	2.158 kg cm²	4.35 kg	4.98 kg
AM3043-wGyz-0000	4.80 Nm	4.87 A	2500 min^{-1}	5000 min^{-1}	6000 min^{-1}	2.090 kg cm²	2.158 kg cm²	4.35 kg	4.98 kg
AM3043-wHyz-0000	4.82 Nm	5.40 A	3000 min^{-1}	6000 min^{-1}	–	2.090 kg cm²	2.158 kg cm²	4.35 kg	4.98 kg
AM3044-wEyz-0000	5.76 Nm	2.90 A	1200 min^{-1}	2000 min^{-1}	2500 min^{-1}	2.730 kg cm²	2.798 kg cm²	5.30 kg	5.93 kg
AM3044-wGyz-0000	5.88 Nm	5.00 A	2000 min^{-1}	4000 min^{-1}	5000 min^{-1}	2.730 kg cm²	2.798 kg cm²	5.30 kg	5.93 kg
AM3044-wHyz-0000	5.89 Nm	5.60 A	2500 min^{-1}	5000 min^{-1}	6000 min^{-1}	2.730 kg cm²	2.798 kg cm²	5.30 kg	5.93 kg
AM3044-wJyz-0000	6.00 Nm	8.80 A	4000 min^{-1}	6000 min^{-1}	6000 min^{-1}	2.730 kg cm²	2.798 kg cm²	5.30 kg	5.93 kg
AM3051-wEyz-0000	4.70 Nm	2.75 A	1200 min^{-1}	2500 min^{-1}	3000 min^{-1}	3.420 kg cm²	3.593 kg cm²	4.20 kg	5.30 kg
AM3051-wGyz-0000	4.75 Nm	4.84 A	2500 min^{-1}	5000 min^{-1}	6000 min^{-1}	3.420 kg cm²	3.593 kg cm²	4.20 kg	5.30 kg
AM3051-wHyz-0000	4.79 Nm	6.00 A	3000 min^{-1}	6000 min^{-1}	6000 min^{-1}	3.420 kg cm²	3.593 kg cm²	4.20 kg	5.30 kg
AM3052-wGyz-0000	8.43 Nm	4.72 A	1500 min^{-1}	2500 min^{-1}	3000 min^{-1}	6.220 kg cm²	6.393 kg cm²	5.80 kg	6.90 kg
AM3052-wHyz-0000	8.48 Nm	5.90 A	1800 min^{-1}	3500 min^{-1}	4000 min^{-1}	6.220 kg cm²	6.393 kg cm²	5.80 kg	6.90 kg
AM3052-wKyz-0000	8.60 Nm	9.30 A	3000 min^{-1}	5500 min^{-1}	6000 min^{-1}	6.220 kg cm²	6.393 kg cm²	5.80 kg	6.90 kg
AM3053-wGyz-0000	11.37 Nm	4.77 A	1000 min^{-1}	2000 min^{-1}	2400 min^{-1}	9.120 kg cm²	9.293 kg cm²	7.40 kg	8.50 kg
AM3053-wHyz-0000	11.51 Nm	6.60 A	–	3000 min^{-1}	3500 min^{-1}	9.120 kg cm²	9.293 kg cm²	7.40 kg	8.50 kg
AM3053-wKyz-0000	11.60 Nm	9.40 A	2000 min^{-1}	4000 min^{-1}	4500 min^{-1}	9.120 kg cm²	9.293 kg cm²	7.40 kg	8.50 kg
AM3054-wGyz-0000	14.30 Nm	5.00 A	–	1500 min^{-1}	2000 min^{-1}	11.92 kg cm²	12.093 kg cm²	9.00 kg	10.1 kg
AM3054-wHyz-0000	14.90 Nm	5.50 A	1000 min^{-1}	1800 min^{-1}	2000 min^{-1}	11.92 kg cm²	12.093 kg cm²	9.00 kg	10.1 kg
AM3054-wKyz-0000	14.40 Nm	9.70 A	1800 min^{-1}	3500 min^{-1}	4000 min^{-1}	11.92 kg cm²	12.093 kg cm²	9.00 kg	10.1 kg
AM3054-wLyz-0000	14.10 Nm	12.50 A	2500 min^{-1}	4500 min^{-1}	–	11.92 kg cm²	12.093 kg cm²	9.00 kg	10.1 kg
AM3062-wGyz-0000	11.90 Nm	4.90 A	–	1800 min^{-1}	2000 min^{-1}	16.90 kg cm²	17.51 kg cm²	8.90 kg	10.9 kg
AM3062-wHyz-0000	11.90 Nm	5.40 A	1000 min^{-1}	2000 min^{-1}	2400 min^{-1}	16.90 kg cm²	17.51 kg cm²	8.90 kg	10.9 kg
AM3062-wKyz-0000	12.20 Nm	9.60 A	2000 min^{-1}	3500 min^{-1}	4500 min^{-1}	16.90 kg cm²	17.51 kg cm²	8.90 kg	10.9 kg
AM3062-wMyz-0000	12.20 Nm	13.40 A	3000 min^{-1}	6000 min^{-1}	6000 min^{-1}	16.90 kg cm²	17.51 kg cm²	8.90 kg	10.9 kg
AM3063-wKyz-0000	16.80 Nm	9.90 A	1500 min^{-1}	3000 min^{-1}	3500 min^{-1}	24.20 kg cm²	24.81 kg cm²	11.1 kg	13.1 kg
AM3063-wMyz-0000	17.00 Nm	13.80 A	2000 min^{-1}	4000 min^{-1}	4500 min^{-1}	24.20 kg cm²	24.81 kg cm²	11.1 kg	13.1 kg
AM3063-wNyz-0000	17.00 Nm	17.40 A	3000 min^{-1}	5000 min^{-1}	6000 min^{-1}	24.20 kg cm²	24.81 kg cm²	11.1 kg	13.1 kg

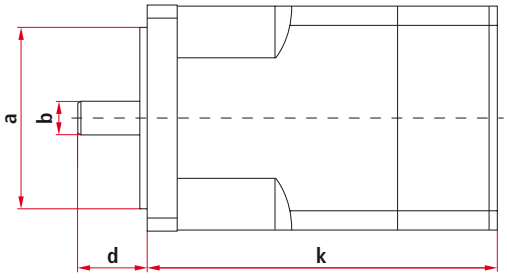
The table is continued on the next page.

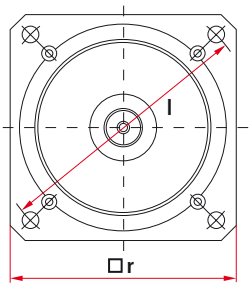
AM30uv-wxyz-000a	Stand-still torque	Stand-still current	Rated speed at rated supply voltage 230 V AC	400 V AC	480 V AC	Rotor moment of inertia (without brake)	(with brake)	Weight (without brake)	Weight (with brake)
AM3063-wHyz-0000	16.60 Nm	5.60 A	–	1500 min^{-1}	1800 min^{-1}	31.60 kg cm^2	32.21 kg cm^2	13.3 kg	15.3 kg
AM3064-wKyz-0000	20.80 Nm	9.20 A	1200 min^{-1}	2000 min^{-1}	2500 min^{-1}	31.60 kg cm^2	32.21 kg cm^2	13.3 kg	15.3 kg
AM3064-wLyz-0000	21.00 Nm	12.80 A	1500 min^{-1}	3000 min^{-1}	3500 min^{-1}	31.60 kg cm^2	32.21 kg cm^2	13.3 kg	15.3 kg
AM3064-wPyz-0000	20.40 Nm	18.60 A	2500 min^{-1}	4500 min^{-1}	5500 min^{-1}	31.60 kg cm^2	32.21 kg cm^2	13.3 kg	15.3 kg
AM3065-wKyz-0000	24.80 Nm	9.80 A	1000 min^{-1}	2000 min^{-1}	2200 min^{-1}	40.00 kg cm^2	40.61 kg cm^2	15.4 kg	17.4 kg
AM3065-wMyz-0000	25.00 Nm	13.60 A	1500 min^{-1}	2500 min^{-1}	3000 min^{-1}	40.00 kg cm^2	40.61 kg cm^2	15.4 kg	17.4 kg
AM3065-wNyz-0000	24.30 Nm	17.80 A	2000 min^{-1}	3500 min^{-1}	4000 min^{-1}	40.00 kg cm^2	40.61 kg cm^2	15.4 kg	17.4 kg
AM3065-wPyz-0000	24.50 Nm	19.80 A	2400 min^{-1}	4000 min^{-1}	5000 min^{-1}	40.00 kg cm^2	40.61 kg cm^2	15.4 kg	17.4 kg
AM3072-wKyz-0000	29.70 Nm	9.30 A	–	1500 min^{-1}	1800 min^{-1}	64.50 kg cm^2	66.14 kg cm^2	19.7 kg	21.8 kg
AM3072-wMyz-0000	30.00 Nm	13.00 A	–	2000 min^{-1}	2500 min^{-1}	64.50 kg cm^2	66.14 kg cm^2	19.7 kg	21.8 kg
AM3072-wPyz-0000	29.40 Nm	18.70 A	1800 min^{-1}	3000 min^{-1}	3500 min^{-1}	64.50 kg cm^2	66.14 kg cm^2	19.7 kg	21.8 kg
AM3072-wQyz-0000	29.70 Nm	20.90 A	–	3500 min^{-1}	4000 min^{-1}	64.50 kg cm^2	66.14 kg cm^2	19.7 kg	21.8 kg
AM3073-wMyz-0000	42.00 Nm	13.60 A	–	1500 min^{-1}	1800 min^{-1}	92.10 kg cm^2	93.74 kg cm^2	26.7 kg	28.8 kg
AM3073-wPyz-0000	41.60 Nm	19.50 A	1300 min^{-1}	2400 min^{-1}	2800 min^{-1}	92.10 kg cm^2	93.74 kg cm^2	26.7 kg	28.8 kg
AM3073-wQyz-0000	41.60 Nm	24.60 A	–	3000 min^{-1}	3500 min^{-1}	92.10 kg cm^2	93.74 kg cm^2	26.7 kg	28.8 kg
AM3074-wLyz-0000	53.00 Nm	12.90 A	–	1200 min^{-1}	1400 min^{-1}	119.7 kg cm^2	121.34 kg cm^2	33.6 kg	35.7 kg
AM3074-wPyz-0000	52.50 Nm	18.50 A	–	1800 min^{-1}	2000 min^{-1}	119.7 kg cm^2	121.34 kg cm^2	33.6 kg	35.7 kg
AM3074-wQyz-0000	51.90 Nm	26.20 A	–	2500 min^{-1}	3000 min^{-1}	119.7 kg cm^2	121.34 kg cm^2	33.0 kg	35.7 kg
AM3082-wTyz-0006	75.00 Nm	48.00 A	–	2500 min^{-1}	3000 min^{-1}	172.0 kg cm^2	177.00 kg cm^2	65.0 kg	73.0 kg
AM3083-wTyz-0006	130.0 Nm	62.00 A	–	2200 min^{-1}	2500 min^{-1}	334.0 kg cm^2	339.00 kg cm^2	85.0 kg	93.0 kg
AM3084-wTyz-0006	180.0 Nm	67.00 A	–	1800 min^{-1}	2000 min^{-1}	495.0 kg cm^2	500.00 kg cm^2	105 kg	113 kg

u: flange code
v: motor length

Option w = 0: smooth shaft (preferred type)
w = 1: shaft with groove and feather key according to DIN 6885
w = 2: shaft with IP 65 sealing ring and smooth shaft
w = 3: shaft with IP 65 sealing ring and shaft with groove and feather key
Option x = winding code A…T
Option y = 0: resolver, 2-pole
y = 1: single-turn absolute encoder, EnDat 2.1
absolute position within one revolution, electronic identification plate
AM302x…AM304x: 512 sine periods per revolution
AM305x…AM308x: 2048 sine periods per revolution
y = 2: multi-turn absolute encoder, EnDat 2.1
absolute position within 4096 revolutions, electronic identification plate
AM302x…AM304x: 512 sine periods per revolution
AM305x…AM308x: 2048 sine periods per revolution
y = 3: single-turn absolute encoder, BiSS
absolute position within one revolution, electronic identification plate
AM302x…AM308x: 2048 sine periods per revolution
y = 4: multi-turn absolute encoder, BiSS
absolute position within 4096 revolutions, electronic identification plate
AM302x…AM308x: 2048 sine periods per revolution
Option z = 0: without holding brake
z = 1: with holding brake
Option a = 0: rotatable angular connectors for motor and feedback cable (only for AM302x up to AM307x)
a = 1: supply cable 0.5 m with non-detachable plugs (only for AM301x/AM302x), only for resolver
a = 3: vertical connectors for motor and feedback cables (only for AM302x up to AM307x)
a = 5: yTec plug (only for AM301x)
a = 6: motor connection via terminal box (only for AM308x)
With the exception of the shaft seal, the options cannot be installed in the field.
Options such as shaft seal, holding brake, absolute encoder can lead to a reduction of the nominal rating.

We reserve the right to make technical changes.





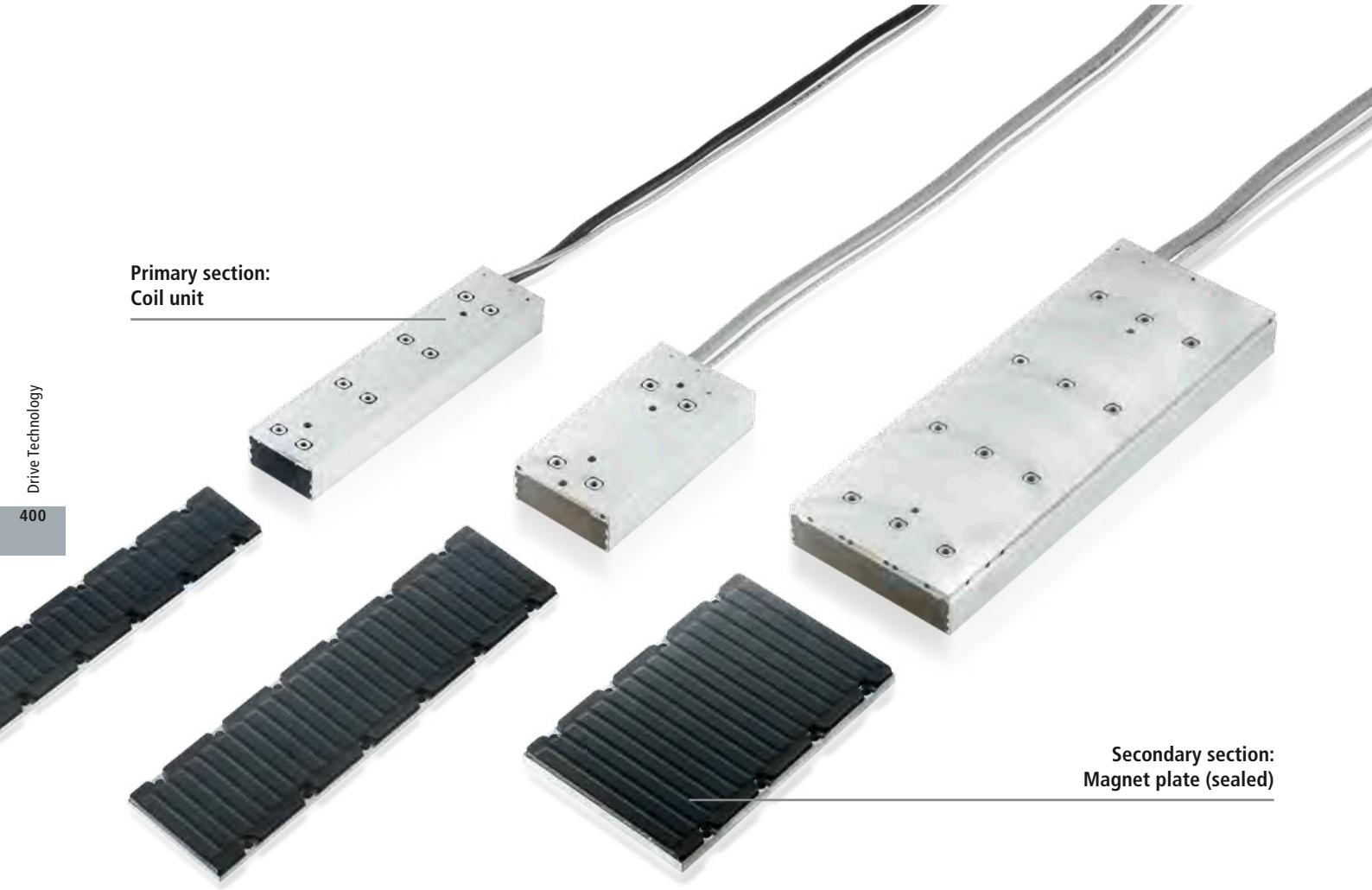
Dimensions	a	b	d	k (resolver) (without brake)	k (resolver) (with brake)	k (encoder) (without brake)	k (encoder) (with brake)	l	r
AM3011	30 mm	8 mm	25 mm	69.6 mm	106.6 mm	79.1 mm	116.1 mm	46 mm	40 mm
AM3012	30 mm	8 mm	25 mm	88.6 mm	125.6 mm	98.1 mm	135.1 mm	46 mm	40 mm
AM3013	30 mm	8 mm	25 mm	107.6 mm	144.6 mm	117.1 mm	154.1 mm	46 mm	40 mm
AM3021	40 mm	9 mm	20 mm	95.4 mm	129.5 mm	95.4 mm	129.5 mm	63 mm	58 mm
AM3022	40 mm	9 mm	20 mm	114.4 mm	148.5 mm	114.4 mm	148.5 mm	63 mm	58 mm
AM3023	40 mm	9 mm	20 mm	133.4 mm	167.5 mm	133.4 mm	167.5 mm	63 mm	58 mm
AM3024	40 mm	9 mm	20 mm	152.4 mm	186.5 mm	152.4 mm	186.5 mm	63 mm	58 mm
AM3031	60 mm	14 mm	30 mm	109.8 mm	141.3 mm	109.8 mm	141.3 mm	75 mm	70 mm
AM3032	60 mm	14 mm	30 mm	140.8 mm	172.3 mm	140.8 mm	172.3 mm	75 mm	70 mm
AM3033	60 mm	14 mm	30 mm	171.8 mm	203.3 mm	171.8 mm	203.3 mm	75 mm	70 mm
AM3041	80 mm	19 mm	40 mm	118.8 mm	152.3 mm	118.8 mm	152.3 mm	100 mm	84 mm
AM3042	80 mm	19 mm	40 mm	147.8 mm	181.3 mm	147.8 mm	181.3 mm	100 mm	84 mm
AM3043	80 mm	19 mm	40 mm	176.8 mm	210.3 mm	176.8 mm	210.3 mm	100 mm	84 mm
AM3044	80 mm	19 mm	40 mm	205.8 mm	239.3 mm	205.8 mm	239.3 mm	100 mm	84 mm
AM3051	110 mm	24 mm	50 mm	127.5 mm	172.5 mm	146.0 mm	189.0 mm	130 mm	108 mm
AM3052	110 mm	24 mm	50 mm	158.5 mm	203.5 mm	177.0 mm	220.0 mm	130 mm	108 mm
AM3053	110 mm	24 mm	50 mm	189.5 mm	234.5 mm	208.0 mm	251.0 mm	130 mm	108 mm
AM3054	110 mm	24 mm	50 mm	220.5 mm	265.5 mm	239.0 mm	282.0 mm	130 mm	108 mm
AM3062	130 mm	32 mm	58 mm	153.7 mm	200.7 mm	172.2 mm	219.7 mm	165 mm	138 mm
AM3063	130 mm	32 mm	58 mm	178.7 mm	225.7 mm	197.2 mm	244.7 mm	165 mm	138 mm
AM3064	130 mm	32 mm	58 mm	203.7 mm	250.7 mm	222.2 mm	269.7 mm	165 mm	138 mm
AM3065	130 mm	32 mm	58 mm	228.7 mm	275.7 mm	247.2 mm	294.7 mm	165 mm	138 mm
AM3072	180 mm	38 mm	80 mm	192.5 mm	234.5 mm	201.7 mm	253.7 mm	215 mm	188 mm
AM3073	180 mm	38 mm	80 mm	226.5 mm	268.5 mm	235.7 mm	287.3 mm	215 mm	188 mm
AM3074	180 mm	38 mm	80 mm	260.5 mm	302.5 mm	269.7 mm	321.3 mm	215 mm	188 mm
AM3082	250 mm	48 mm	110 mm	263.4 mm	329.4 mm	263.4 mm	329.4 mm	300 mm	260 mm
AM3083	250 mm	48 mm	110 mm	343.9 mm	410.0 mm	343.9 mm	410.0 mm	300 mm	260 mm
AM3084	250 mm	48 mm	110 mm	424.4 mm	490.4 mm	424.4 mm	490.4 mm	300 mm	260 mm

▶ **www.beckhoff.com/AM30xx**

We reserve the right to make technical changes.

ALxxxx | Linear Servomotors

▶ www.beckhoff.com/Linear-motors



We reserve the right to make technical changes.

AL20xx | Iron core motor,
magnetic path width 80 mm

AL24xx | Iron core motor,
magnetic path width 50 mm

AL28xx | Iron core motor,
magnetic path width 130 mm

Compact power packages: Linear Servomotors AL2xxx

The AL2xxx Linear Servomotors complement the servomotors series and can be used wherever rotary design reaches mechanical limits during installation, or where special drive characteristics, in terms of dynamics, synchronism or acceleration, are required.

Linear Servomotors are easy to set up and are not subject to mechanical wear. Moreover, there are virtually no limits on travel options. With their high acceleration characteristics, Linear Servomotors can achieve positioning velocities of up to 12 m/s – with a high force constant and a very good force/mass ratio.

The pole spacing is the same for all the motors of a motor series. This has the advantage that the procedure for adjusting the drive amplifiers and the adaptation to a linear encoder is always the same, which saves time during commissioning. In principle, it is possible to operate several primary sections on one magnetic track. This significantly reduces the installation and component costs and opens up application options that would not normally be considered for linear motors.

AL2200 magnetic encoder system (MES) for linear motors

The feedback system required by linear motors for commutation and detection of speed and position normally consists of a reading head and a graduated rule installed parallel to the travel path. The hardware requirements for the complete system increase with the length of the travel path. The AL2200 in contrast detects the magnetic field of a magnetic plate and supplies the servo drive with the incremental encoder signals for commutation and position control. The MES supplies one sine oscillation per logical motor revolution. A logical motor revolution is equivalent to the distance between two homopolar magnets, i.e. between two north poles, for example. The attainable accuracy of ±0.1 mm is sufficient for simple positioning tasks and depends to a large extent on the mechanical accuracy and position of the magnets along the travel path. Since no graduated rule has to be installed, the MES is a cost-efficient feedback solution for linear motors.

Ironless AL3800 Linear Servomotors
▶ **www.beckhoff.com/AL38xx**

AL2xxx | Linear Servomotors

The 3-phase Synchronous Linear Servomotors of the AL2xxx series consist of a primary section and a secondary section. The primary section contains a grooved, laminated core with inlaid copper windings. It is generally used as the moving part. The secondary section contains the steel plate with attached permanent magnets.

The motors of the individual series have the same width (including magnetic plate), i.e. all motors can be operated on the same magnetic plates, in any combination. The magnetic plates are fully sealed and therefore have an almost perfectly level and robust surface.

The primary sections have an IP 64 protection rating and are therefore suitable for application in harsh environments. They are equipped with a 0.5 m cable strand and optionally with pre-assembled connectors, so that they can be coupled with the servo drives either via the connector box or via plug connectors. This greatly reduces the difficulty of implementing the cabling, and makes a significant contribution to avoiding errors.

In conjunction with the AX5000 Servo Drives the linear motors of the AL2xxx series are very suitable for dynamic movements, which require high acceleration values over short distances.

Features
- accelerations up to 30 g
- no mechanical wear
- complete absence of backlash, giving stiff control response
- extremely precise positioning, high repeatability
- even, immediate force, little cogging
- very low thermal resistance, allowing high capacity utilisation
- protection from thermal overload through integrated temperature sensors
- Operation with the AX5000 simplified through default values.
- connection to the AX5000 through pre-assembled cables

AL20xx
- velocity: 2.5 m/s to 7 m/s
- peak forces: 225 N to 1800 N

AL24xx
- velocity: 4.5 m/s to 10 m/s
- peak forces: 120 N to 720 N

AL28xx
- velocity: 2.5 m/s or 6 m/s
- peak forces: 1800 N to 6750 N
- operation optionally with or without water cooling

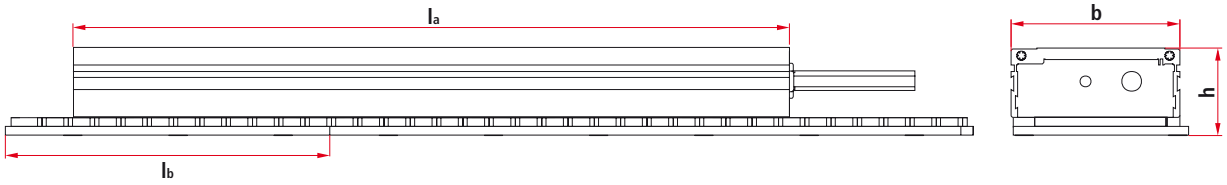
AL2200 scaleless feedback system (MES) for Linear Servomotors
An MES system is available as an optional accessory for monitoring the magnetic field of the permanent magnets on the magnetic plate. With the aid of an integrated electronic unit, it provides incremental encoder signals for the Servo Drives of the AX5000 series for commutation, velocity and position control. The MES provides a sine wave per 24 mm pole pitch and a precision of 1/10 mm.

AL225x connector box
The AL225x connector boxes facilitate wiring between linear motor and servo drive. On one side, the motor, feedback and thermal protection cables are connected. The standard motor and encoder cables are connected on the other side of the boxes.

Options, pre-assembled cables and accessories see page 406

We reserve the right to make technical changes.

AL2000 | **Linear Servomotors**



Dimensions	b	l_a	h
AL2003	77 mm	98 mm	40 mm
AL2006	77 mm	146 mm	40 mm
AL2009	77 mm	195 mm	40 mm
AL2012	77 mm	244 mm	40 mm
AL2015	77 mm	290 mm	40 mm
AL2018	77 mm	336 mm	40 mm
AL2024	77 mm	468 mm	40 mm

Technical data	AL2003	AL2006	AL2009	AL2012	AL2015	AL2018	AL2024
Winding type	S	N | S	N | S	N | S	N | S	N | S	N | S
Max. speed	7 m/s	3.5 m/s (N), 7 m/s (S)	2.5 m/s (N), 7 m/s (S)	3.5 m/s (N), 7 m/s (S)	3.5 m/s (N), 7 m/s (S)	3.5 m/s (N), 7 m/s (S)	3.5 m/s (N), 7 m/s (S)
Motor configuration	3-phase synchronous Linear Servomotors (400…480 V AC)						
Peak force (F_P)	225 N	450 N	675 N	900 N	1125 N	1350 N	1800 N
Peak current (I_{Pa})	6.5 A	6.5 A (N), 13.0 A (S)	6.5 A (N), 19.6 A (S)	13.1 A (N), 26.2 A (S)	13.5 A (N), 32.7 A (S)	19.6 A (N), 41 A (S)	26.2 A (N), 52 A (S)
Continuous force with air cooling (F_{ca})	75 N	200 N	300 N	400 N	500 N	600 N	800 N
Continuous current with air cooling (I_{ca})	2.28 A	2.15 A (N), 4.3 A (S)	2.14 A (N), 6.45 A (S)	4.3 A (N), 8.6 A (S)	4.46 A (N), 10.75 A (S)	6.45 A (N), 13.38 A (S)	8.6 A (N), 17.2 A (S)
Force constant (K_f)	46 N/A	93 N/A (N), 46 N/A (S)	140 N/A (N), 46 N/A (S)	93 N/A (N), 46 N/A (S)	112 N/A (N), 46 N/A (S)	93 N/A (N), 44.9 N/A (S)	93 N/A (N), 46 N/A (S)
Motor constant (K_m)	185 N²/W	380 N²/W	570 N²/W	760 N²/W	950 N²/W	1140 N²/W	1520 N²/W
Magnet pitch	24 mm						
Magnetic attraction force (F_a)	500 N	950 N	1325 N	1700 N	2075 N	2450 N	3400 N
Weight of the coil (M_P)	0.9 kg	1.5 kg	2.0 kg	2.6 kg	3.2 kg	3.8 kg	5.2 kg
Air gap	0.5 mm						
Temperature sensor	PTC 1 kΩ and KTY83-122						
Corresponding Servo Drive	AX5x03	AX5x03 (N), AX5x06 (S)	AX5x03 (N), AX5112 (S)	AX5x06 (N), AX5112 (S)	AX5x06 (N), AX5112 (S)	AX5112 (N), AX5118 (S)	AX5112 (N), AX5118 (S)

Ordering information	AL20xx-000x-000y coil unit
AL2003-0001-000y	Linear Servomotor, 400…480 V, F_p = 225 N, F_{ca} = 75 N
AL2006-000x-000y	Linear Servomotor, 400…480 V, F_p = 450 N, F_{ca} = 200 N
AL2009-000x-000y	Linear Servomotor, 400…480 V, F_p = 675 N, F_{ca} = 300 N
AL2012-000x-000y	Linear Servomotor, 400…480 V, F_p = 900 N, F_{ca} = 400 N
AL2015-000x-000y	Linear Servomotor, 400…480 V, F_p = 1125 N, F_{ca} = 500 N
AL2018-000x-000y	Linear Servomotor, 400…480 V, F_p = 1350 N, F_{ca} = 600 N
AL2024-000x-000y	Linear Servomotor, 400…480 V, F_p = 1800 N, F_{ca} = 800 N

Option x = 0: N type, x = 1: S type

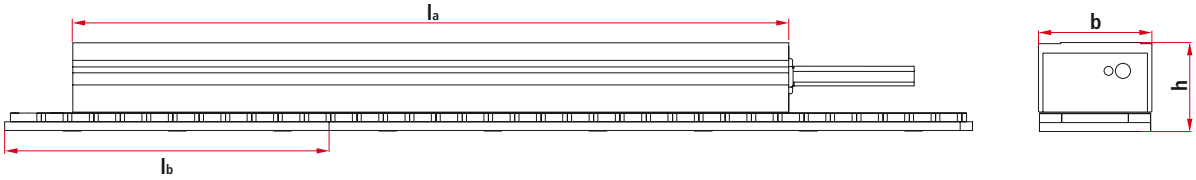
Option y = 0: without connector plug, y = 1: with connector plugs (motor and temperature)

Ordering information	AL21xx-0000 magnet plate
AL2110-0000	magnetic assembly (l_b = 192 mm, weight 3.8 kg/m), for AL20xx motors
AL2120-0000	magnetic assembly (l_b = 288 mm, weight 3.8 kg/m), for AL20xx motors

▶ **www.beckhoff.com/AL20xx**

We reserve the right to make technical changes.

AL2400 | **Linear Servomotors**



Dimensions	b	l_a	h
AL2403	51 mm	93 mm	40 mm
AL2406	51 mm	143 mm	40 mm
AL2412	51 mm	241 mm	40 mm
AL2418	51 mm	336 mm	40 mm

Technical data	AL2403	AL2406	AL2412	AL2418
Winding type	S	S	S	N | S
Max. speed	12 m/s	12 m/s	12 m/s	4.5 m/s (N), 10 m/s (S)
Motor configuration	3-phase synchronous Linear Servomotors (400…480 V AC)			
Peak force (F_P)	120 N	240 N	480 N	720 N
Peak current (I_{Pa})	4.1 A	8.2 A	16.4 A	12.3 A (N), 25.1 A (S)
Continuous force with air cooling (F_{ca})	60 N	120 N	240 N	360 N
Continuous current with air cooling (I_{ca})	1.54 A	3.08 A	6.15 A	4.50 A (N), 9.30 A (S)
Force constant (K_f)	39 N/A	39 N/A	39 N/A	79 N/A (N), 39 N/A (S)
Motor constant (K_m)	95 N²/W	190 N²/W	380 N²/W	570 N²/W
Magnet pitch	24 mm			
Magnetic attraction force (F_a)	300 N	500 N	900 N	1300 N
Weight of the coil (M_p)	0.6 kg	0.9 kg	1.6 kg	2.3 kg
Air gap	0.5 mm			
Temperature sensor	PTC 1 kΩ and KTY83-122			
Corresponding Servo Drive	AX5x03	AX5x03/AX5x06	AX5x06/AX5112	AX5x06/AX5112

Ordering information	AL240x-000x-000y coil unit
AL2403-0001-000y	Linear Servomotor, 400…480 V, F_p = 120 N, F_{ca} = 60 N
AL2406-0001-000y	Linear Servomotor, 400…480 V, F_p = 240 N, F_{ca} = 120 N
AL2412-0001-000y	Linear Servomotor, 400…480 V, F_p = 480 N, F_{ca} = 240 N
AL2418-0000-000y	Linear Servomotor, 400…480 V, F_p = 720 N, F_{ca} = 360 N, I_{Pa} = 12.3 A
AL2418-0001-000y	Linear Servomotor, 400…480 V, F_p = 720 N, F_{ca} = 360 N, I_{Pa} = 25.1 A

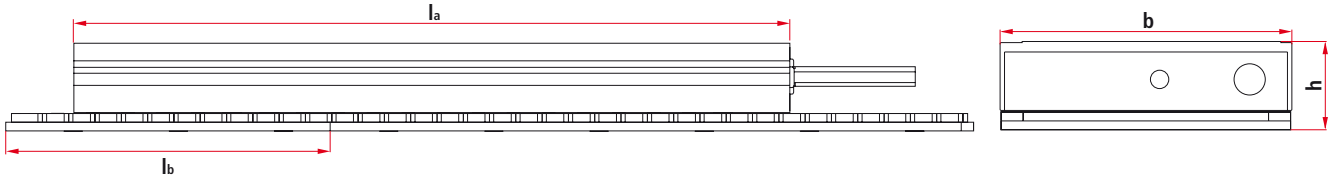
Option y = 0: without connector plug, y = 1: with connector plugs (motor and temperature)

Ordering information	AL25xx-0000 magnet plate
AL2510-0000	magnetic assembly (l_b = 96 mm, weight 2.1 kg/m), for AL24xx motors
AL2520-0000	magnetic assembly (l_b = 144 mm, weight 2.1 kg/m), for AL24xx motors
AL2530-0000	magnetic assembly (l_b = 384 mm, weight 2.1 kg/m), for AL24xx motors

▶ **www.beckhoff.com/AL24xx**

We reserve the right to make technical changes.

AL2800 | **Linear Servomotors**



Dimensions	b	l_a	h
AL2812	130 mm	244 mm	45 mm
AL2815	130 mm	290 mm	45 mm
AL2818	130 mm	344 mm	47 mm
AL2830	130 mm	562 mm	45 mm
AL2830-100x-0000	130 mm	580 mm	47 mm
AL2845	130 mm	852 mm	47 mm

Technical data	AL2812	AL2815	AL2818	AL2830	AL2845
Winding type	N | S	N | S	N | S	N | S	N | S
Max. speed	3 m/s (N), 6 m/s (S)	2.5 m/s (N), 6 m/s (S)	3 m/s (N), 6 m/s (S)	2.5 m/s (N), 6 m/s (S)	2.5 m/s (N), 6 m/s (S)
Motor configuration	3-phase synchronous Linear Servomotors (400…480 V AC)				
Peak force (F_P)	1800 N	2250 N	2700 N	4500 N	6750 N
Peak current (I_{Pa})	13 A (N), 26 A (S)	13.5 A (N), 33 A (S)	19.6 A (N), 41 A (S)	27 A (N), 66 A (S)	41 A (N), 98 A (S)
Continuous force with water cooling (F_{cw})	–	–	1200 N	2000 N	3000 N
Continuous force with air cooling (F_{ca})	760 N	950 N	1140 N	1900 N	2850 N
Continuous current with water cooling (I_{cw})	–	–	6.5 A (N), 13.4 A (S)	8.9 A (N), 21.5 A (S)	13.4 A (N), 32.3 A (S)
Continuous current with air cooling (I_{ca})	4.1 A (N), 8.2 A (S)	4.2 A (N), 10.2 A (S)	6.1 A (N), 12.7 A (S)	8.5 A (N), 20 A (S)	12.5 A (N), 31 A (S)
Force constant (K_f)	186 N/A (N), 93 N/A (S)	225 N/A (N), 93 N/A (S)	186 N/A (N), 90 N/A (S)	225 N/A (N), 93 N/A (S)	225 N/A (N), 93 N/A (S)
Motor constant (K_m)	1750 N²/W	2150 N²/W	2580 N²/W	4300 N²/W	6450 N²/W
Magnet pitch	24 mm				
Magnetic attraction force (F_a)	3400 N	4150 N	4900 N	8300 N	12450 N
Weight of the coil (M_P)	4.9 kg	5.9 kg	7.3 kg	11.6 kg, (12.3 kg*)	18.2 kg
Air gap	0.5 mm				
Temperature sensor	PTC 1 kΩ and KTY83-122				
Corresponding Servo Drive	AX5x06 (N), AX5112 (S)	AX5x06 (N), AX5118 (S)	AX5112 (N), AX5118 (S)	AX5112 (N), AX5125 (S)	AX5118 (N), AX5140 (S)

* increased weight with water-cooled primary section

Ordering information	AL28xx-000x-000y coil unit
AL2812-000x-000y	Linear Servomotor, 400…480 V, F_p = 1800 N, F_{ca} = 760 N
AL2815-000x-000y	Linear Servomotor, 400…480 V, F_p = 2250 N, F_{ca} = 950 N
AL2818-100x-000y	Linear Servomotor, 400…480 V, F_p = 2700 N, F_{cw} = 1200 N, water cooling
AL2830-000x-0000	Linear Servomotor, 400…480 V, F_p = 4500 N, F_{ca} = 1900 N
AL2830-100x-0000	Linear Servomotor, 400…480 V, F_p = 4500 N, F_{cw} = 2000 N, water cooling
AL2845-100x-0000	Linear Servomotor, 400…480 V, F_p = 6750 N, F_{cw} = 3000 N, water cooling

Option x = 0: N type, x = 1: S type, option y = 0: without connector plug, y = 1: with connector plugs (only possible with AL2812, AL2815 and AL2818!)

Ordering information	AL29xx-0000 magnet plate
AL2910-0000	magnetic assembly (l_b = 192 mm, weight 10.5 kg/m), for AL28xx motors
AL2920-0000	magnetic assembly (l_b = 288 mm, weight 10.5 kg/m), for AL28xx motors

▶ **www.beckhoff.com/AL28xx**

We reserve the right to make technical changes.

Accessories for ALxxxx Linear Motors

MES feedback system for Linear Servomotors

The MES supplies one sine oscillation per logical motor revolution. Since no graduated rule has to be installed, the MES is an inexpensive feedback solution for linear motors.

Ordering information	AL2200-000x | Feedback system	Pict.
AL2200-000x	magnetic encoder system (MES) for AL2000, AL2400 and AL2800 Linear Servomotors	A

Option x = 0: without connector plug, x = 1: with connector plug

Connector box for ALxxxx

The AL225x connector boxes facilitate wiring between linear motor and the Servo Drive. They are mounted on the linear slide and move with the motor. The motor cable, the thermal protection contact cable and the encoder cable are inserted into the box through cable glands and connected to the terminal strip. The temperature contact is linked to the motor and encoder cable, so that no thermal protection contact cable is required. The standard motor and encoder cables are connected on the other side of the boxes.

Ordering information	AL225x-0001 | Connector box	Pict.
AL2250-0001	connector box for linear motors, suitable for following types: AL20xx-000x-0000, AL24xx-000x-0000, AL2812-000x-0000, AL2815-000x-0000, AL2818-100x-0000, AL2830-0001-0000, AL2830-x000-0000	B
AL2255-0001	connector box for linear motors, suitable for following types: AL2830-1001-0000, AL2845-1000-0000	
AL2256-0001	connector box for linear motors, suitable for following types: AL2845-1001-0000	

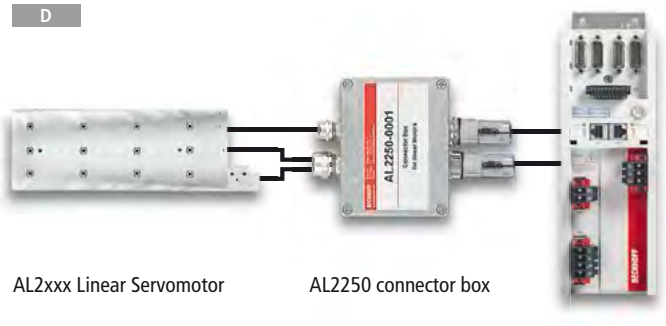
Installation options Linear Servomotors/connector box

Cable	AX5000	C	AX5000 + AL225x	D
Motor cable	ZK4500-0023/ZK4500-0024			
Thermal protection contact cable	ZK4540-0020		–	
Encoder cable for MES or absolute encoder	ZK4510-0020			
Encoder cable for encoder with zero pulse	ZK4520-0020			
Coil and feedback system	with connector plugs		without connector plugs	

C

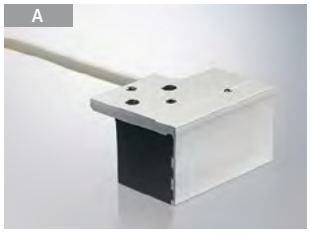
AL2xxx Linear Servomotor

D



AL2xxx Linear Servomotor AL2250 connector box

A



B

We reserve the right to make technical changes.

Supply cables for ALxxxx Linear Motors

Motor cable 1.5 mm² for ALxxxx at AX5000 (1.5…12 A)

Ordering information	Motor cable with 1.5 mm² wire gauge, highly flexible for drag-chain use	Pict.
ZK4500-0023-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 87 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, length < 25 m, (4 x 1.5 mm² + 2 x (2 x 0.75 mm²))	A
ZK4500-0023-0050	example for 5 m length	
ZK4502-0023-xxxx	length ≥ 25 m	
ZK4509-0023-zzzz	not assembled	
ZK4501-0023-xxxx	extension cable	B

zzzz = ordering indication of the length of material in decimetres, e.g. ZK4509-0023-0100 = 10 metres

Motor cable 2.5 mm² for ALxxxx at AX5000 (18…25 A)

Ordering information	Motor cable with 2.5 mm² wire gauge, highly flexible for drag-chain use	Pict.
ZK4500-0024-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 95 mm (7 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, length < 25 m, (4 x 2.5 mm² + 2 x (2 x 1 mm²))	A
ZK4500-0024-0050	example for 5 m length	
ZK4502-0024-xxxx	length ≥ 25 m	
ZK4509-0024-zzzz	not assembled	
ZK4501-0024-xxxx	extension cable	B

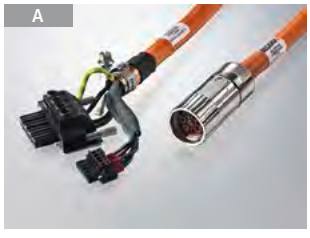
zzzz = ordering indication of the length of material in decimetres, e.g. ZK4509-0024-0100 = 10 metres

Motor cable 10 mm² for ALxxxx at AX5000 (40 A)

Ordering information	Motor cable with 10 mm² wire gauge, highly flexible for drag-chain use	Pict.
ZK4500-0017-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 180 m/min, max. 5 m/s², min. bending radius = 225 mm (10 x OD), max. drag-chain length horizontal 20 m, vertical 5 m, (4 x 10 mm² + (2 x 1 mm²) + (2 x 1.5 mm²)), from 25 m motor choke required	A
ZK4500-0017-0050	example for 5 m length	
ZK4509-0017-zzzz	not assembled	
ZK4501-0017-xxxx	extension cable	B

zzzz = ordering indication of the length of material in decimetres, e.g. ZK4509-0017-0100 = 10 metres

A



B

Encoder cable (MES) for ALxxxx and AL2250 at AX5000

Ordering information	Encoder cable with 0.14 mm² wire gauge, highly flexible for drag-chain use	Pict.
ZK4510-0020-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 53 mm (7 x OD), max. drag-chain length horizontal = 20 m, vertical = 5 m, (7 x 2 x 0.14 mm² + 2 x 0.5 mm²)	C
ZK4510-0020-0050	example for 5 m length	
ZK4519-0020-zzzz	not assembled	
ZK4511-0020-xxxx	extension cable, highly flexible, drag-chain suitable	D

zzzz = ordering indication of the length of material in decimetres, e.g. ZK4519-0020-0100 = 10 metres

Encoder cable (SinCos encoder with zero pulse) for ALxxxx and AL2250 at AX5000

Ordering information	Encoder cable with 0.14 mm² wire gauge, highly flexible for drag-chain use
ZK4520-0020-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 53 mm (7 x OD), max. drag-chain length horizontal = 20 m, vertical = 5 m, (7 x 2 x 0.14 mm² + 2 x 0.5 mm²)

Thermal protection cable for ALxxxx at AX5000

Ordering information	Thermal protection cable with 0.14 mm² wire gauge, highly flexible for drag-chain use	Pict.
ZK4540-0020-xxxx	highly flexible, drag-chain suitable cable with 5 million bending cycles, max. 240 m/min, max. 30 m/s², min. bending radius = 38 mm (7 x OD), max. drag-chain length horizontal = 20 m, vertical = 5 m, (2 x 2 x 0.14 mm²)	E

Note: Required if no connector box is used.

C

D

E

We reserve the right to make technical changes.

Connectors for AMxxxx and ALxxxx

Ordering information		Pict.
ZS4000-2030	EMC thermo-protective plug (female), D-sub, 9-pin, for AL2000, AL2400, AL2800 linear motors (counterpart to thermostat contact at AX5000 Servo Drive)	A
ZS4000-2040	EMC power coupling (male), M23, 8-pin, for motor cable extension ZK4501-00x3-xxxx and ZK4501-00x4-xxx (counterpart to motor cable ZK4500-00x3-xxxx and ZK4500-00x4-xxxx)	B
ZS4000-2100	metal flange for motor cable, itec®, M23 and feedback cable with itec®, to adjust the connector, including sealings	
ZS4000-2101	metal flange for feedback cable, M23, to adjust the connector, including sealings	C
ZS4000-2102	EMC power connector (female), itec®, 9-pin, for motor cable ZK4704-0411-xxxx for resolver feedback (counterpart to motor socket AM8100)	
ZS4000-2104	EMC power connector (female), M23, 9-pin, for motor cable ZK450x-80x3-xxxx and ZK450x-80x4-xxxx (counterpart to motor socket AM8000/AM8500)	
ZS4000-2105	EMC resolver connector (female), itec®, 12-pin, for resolver cable ZK453x-8110-xxxx (counterpart to motor socket AM801x, AM802x, AM803x, AM853x)	
ZS4000-2106	EMC resolver connector (female), M23, 12-pin, for resolver cable ZK453x-8010-xxxx (counterpart for motor socket AM8x4x up to AM8x7x)	
ZS4000-2107	EMC power connector (female), iTec, 9-pin, for motor cable ZK450x-8022-xxxx and ZK4704-0421-xxxx (counterpart for motor socket AM80xx/AM81xx/AM85xx with iTec)	
ZS4000-2108	EMC power coupling (male), M23, 9-pin, for AM8800 servomotor with cable tail (counterpart to motor cable ZK450x-80x3-xxxx and ZK450x-80x4-xxxx)	

A

B

C

Compact Drive Technology

▶ **www.beckhoff.com/compact-drive-technology**

Ultra-compact servo output stages
- seamless integration into the EtherCAT I/O system
- for highly dynamic positioning tasks
- EtherCAT Terminal (EL), EtherCAT Box (EP) and EtherCAT plug-in module (EJ)
- complete servo drive with STO input (Safe Torque Off)
- 2 feedback options: OCT, resolver
- adapted to AM8100

See page 314

AM8100 | **Compact Synchronous Servomotors with OCT**
- 0.2 to 2.4 Nm standstill torque
- integrated 18-bit absolute encoder (multi-turn or single-turn)
- dynamic servomotor from flange code 40 mm (F1)
- electronic type plate
- further ordering options for optimised axis matching
- suitable connecting cables for plug-and-play installation

See page 414

AA1121 | **Linear actuator up to 800 N peak force**
- integrated power electronics
- protective low voltage range
- absolute stroke measuring system (0.01 mm)

See page 412

We reserve the right to make technical changes.

Ultra-compact stepper motor output stages
- seamless integration into the I/O system
- EtherCAT Terminal (EL), Bus Terminal (KL), EtherCAT/EtherCAT P Box (EP/EPP) and EtherCAT plug-in module (EJ)
- 1 to 5 A output current
- vector control for highly dynamic positioning tasks (EL7037/EL7047/EJ7047)
- assembled connecting cables

See page 314

AG2250 | **Planetary gear units for servo and stepper motors**
- straight or angled design
- low torsional backlash
- suitable for AM8100, AS2000, AS1000

See page 418

AS2000 | **Stepper motors in industrial design up to 8 Nm**
- stepper motor with 1.8°/200 full steps
- flanges: NEMA23, NEMA34
- 0.8 to 8.0 Nm standstill torque
- industrial design and high protection class (IP 54)
- optionally with torsionally rigid integrated encoder (1024 inc/rev) for vector control

See page 420

AS1000 | **Stepper motors up to 5 Nm**
- stepper motor with 1.8°/200 full steps
- flanges: NEMA17, NEMA23, NEMA34
- 0.4 to 5.0 Nm standstill torque
- ready for connection, with cable outlet
- optionally with encoder

See page 424

We reserve the right to make technical changes.

AA1121 | Linear actuator with integrated power electronics

The linear actuator sets new standards for the electronic control of valves and linear adjusting units. With a lifting height of 10 mm and a peak force of 800 N, new standards are achieved with regard to the power density of linear actuators. The complete adjusting axis is defined with a size of only 49 x 49 x 92 mm (flange square x overall length).

The linear actuator is equipped with integrated power electronics that is controlled simply and extremely fast via EtherCAT. For easy commissioning the well-known Drive Manager can be used. A continuous force of 150 N can be generated with the actuator. Accelerations of 7 m/s² and linear speeds of 100 mm/s allow exceptionally short control cycles. Mounting via a B5 flange is possible without special tools in the tightest of spaces. The shaft is provided as standard with an M8x1 external thread, on which commercially available adaptors such as ball heads or tensioning hooks common in pneumatic/hydraulic applications can be mounted. For connection in the protective low voltage range < 48 V DC a robust M12 plug can be used. The fieldbus connections for EtherCAT IN/OUT are realised with M8 plugs.

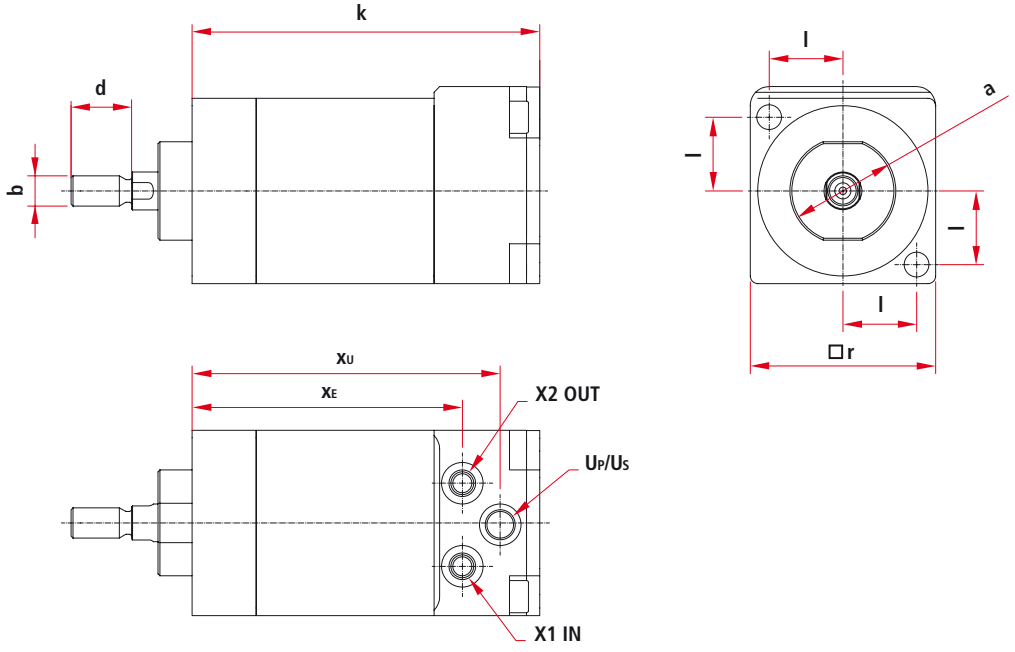
An absolute stroke measuring system is integrated, allowing an accuracy of 0.01 mm to be achieved so that previously necessary limit switches are not required. In comparison with conventional pneumatics, the linear actuator achieves a much higher positioning accuracy, resulting in higher process safety. This holds above all for distributed systems. Depending on the application, the use of an electronic actuator can save up to 75 % energy in comparison with pneumatic actuators, so that the linear actuator enables a rapid return on investment. Beckhoff supplies the necessary preassembled cables and the software to go with the actuators.

Technical data	AA1121
Motor type	axis actuator
Flange code	A2 (49 mm)
Rated supply voltage	24…48 V DC
Magnet material	neodymium-iron-boron
Design form	flange-mounted according to IM B5, IM V1, IM V3
Protection class	IP 54
Connection method	M12, screw type
Protocol	EtherCAT
Bus interface	2 x M8 socket, shielded, screw type
Feedback system	absolute encoder
Resolution	0.01 mm

We reserve the right to make technical changes.

AA1121 | **Flange code A2, motor length 1**

Data for 24…50 V DC	AA1121
Continuous stall force	200 N
Rated force	150 N
Peak force (F_P)	800 N
Standstill current	I_{rms} = 2.5 A
Peak current	I_{rms} = 10.0 A
Max. movement	10 mm
Max. acceleration	7 m/s²
Weight	840 g



Dimensions	a	b	d	x_E	x_U	l	r	k
AA1121	ø28	M8	16 mm	71.5 mm	81.5 mm	19.5 mm	49 mm	92 mm

▶ **www.beckhoff.com/AA1121**

Supply cables for linear actuator

Ordering information	Cable specification
ZK1090-3131-0xxx	M8, plug, straight, male, 4-pin, A-coded – M8, plug, straight, male, 4-pin, A-coded
ZK1090-3191-0xxx	M8, plug, straight, male, 4-pin, A-coded – RJ45, plug, straight, male, 8-pin
ZK2000-6100-0xxx	M12, plug, straight, male, 4-pin, A-coded – open end

For availability status see Beckhoff website at: www.beckhoff.com/AA1121

AM8100 | Servomotors for compact Drive Technology

The AM8100 servomotors from the AM8000 series are especially designed for operation with the Servo I/Os. The high dynamics of the servomotors open up a multitude of possible applications: for example in industrial robots for pick-and-place applications, or in general in mechanical engineering, where a compact design and high positioning accuracy are necessary. Like all motors of the AM8xxx family they are available in One Cable Technology (OCT) versions where power and feedback are combined in a single cable.

Homing is no longer necessary thanks to the absolute value encoder integrated in the motor: the position of the drive is saved in the EEPROM, which is ideal for adjustable axes. The encoder data are transmitted entirely digitally to the Servo I/Os via the motor cable. The encoder cable can be dispensed with. The full integration of the servo terminal in the Beckhoff control system facilitates the commissioning of the drive axis. All motors of the AM8xxx family use the electronic type plate, with which the engineering expenditure is additionally reduced by the simple reading of the motor parameters. The Beckhoff TwinCAT automation software enables the convenient parameterisation of the servomotors.

The AM81xx motors can optionally be equipped with a backlash-free permanent magnet holding brake, a sealing ring or a feather key groove. They are equipped with a sturdy rotary resolver encoder and for the purpose of long life have been developed with generously dimensioned bearings for general mechanical engineering. Matching gears and prefabricated connecting cables complete the ultra-compact drive axis.

Technical data	AM81xx
Motor type	permanent magnet-excited three-phase synchronous motor
Magnet material	neodymium-iron-boron
Insulation class	thermal class F (155 °C)
Design form	flange-mounted according to IM B5, IM V1, IM V3
Protection class	IP 54, IP 65 (shaft seal only for AM812x, AM813x, AM814x)
Cooling	convection, permissible ambient temperature 40 °C
Coating/surface	dark grey powder coating, similar to RAL7016
Temperature sensor	integrated in stator winding
Connection method	round plug connector, swivelling, angled
Life span	L_{10h} = 30,000 hrs for ball bearings
Approvals	CE, UL (AM811x: UL in preparation)
Feedback system	resolver, OCT

We reserve the right to make technical changes.

Ordering options

You will find the possible ordering options for the listed motors in this table. The options cannot be retrofitted. All specified electrical values are RMS values. The specifications for the connection technology (size of the connector) apply to motors with OCT. For motors with standard 2-cable configuration, the size of the power and feedback connector is determined by the ytec® technology.

Order reference	AM81uv-wxyz	Pict.
u	flange code	
v	motor length	
w = 0	smooth shaft	
w = 1	shaft with groove and feather key according to DIN 6885	
w = 2	smooth shaft with IP 65 sealing ring (only for AM812x, AM813x, AM814x)	
w = 3	shaft with IP 65 sealing ring and shaft with groove and feather key (only for AM812x, AM813x, AM814x)	
x	winding code	
y = 0	2-cable standard: feedback resolver	A
y = 1	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, single-turn, absolute position within one revolution, 18 bit resolution	
y = 2	One Cable Technology for power and feedback: feedback transmission via motor cable, no feedback cable necessary, electronic identification plate, multi-turn, absolute position within 4096 revolutions, 18 bit resolution	
z = 0	without holding brake	
z = 1	with holding brake	

A

Ultra-compact servo solutions with resolver feedback

AM811x | Flange code F1, motor length 1 – 3

Data for 50 V DC	AM8111-wFyz	AM8112-wFyz	AM8113-wFyz
Standstill torque	0.20 Nm	0.38 Nm	0.52 Nm
Rated torque	0.19 Nm	0.36 Nm	0.50 Nm
Rated speed	4000 min^{-1}	4500 min^{-1}	3000 min^{-1}
Rated power	0.08 kW	0.17 kW	0.16 kW
Standstill current	2.85 A	4.7 A	4.8 A
Rotor moment of inertia	0.029 $kgcm^2$	0.048 $kgcm^2$	0.067 $kgcm^2$
Rotor moment of inertia (with brake)	0.052 $kgcm^2$	0.071 $kgcm^2$	0.090 $kgcm^2$
EtherCAT Terminal	EL7201-0010	EL7211-0010	EL7211-0010
EtherCAT plug-in module	EJ7211-0010		
EtherCAT Box	EP7211-9034		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM812x | Flange code F2, motor length 1 – 2

Data for 50 V DC	AM8121-wFyz	AM8122-wFyz	AM8122-wJyz
Standstill torque	0.50 Nm	0.80 Nm	0.80 Nm
Rated torque	0.50 Nm	0.80 Nm	0.75 Nm
Rated speed	3000 min^{-1}	2000 min^{-1}	4500 min^{-1}
Rated power	0.16 kW	0.17 KW	0.35 KW
Standstill current	4.0 A	4.0 A	8.0 A
Rotor moment of inertia	0.134 $kgcm^2$	0.253 $kgcm^2$	0.253 $kgcm^2$
Rotor moment of inertia (with brake)	0.204 $kgcm^2$	0.324 $kgcm^2$	0.324 $kgcm^2$
EtherCAT Terminal	EL7211-0010	EL7211-0010	EL7221-9014
EtherCAT plug-in module	EJ7211-0010	EJ7211-0010	–
EtherCAT Box	EP7211-9034		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

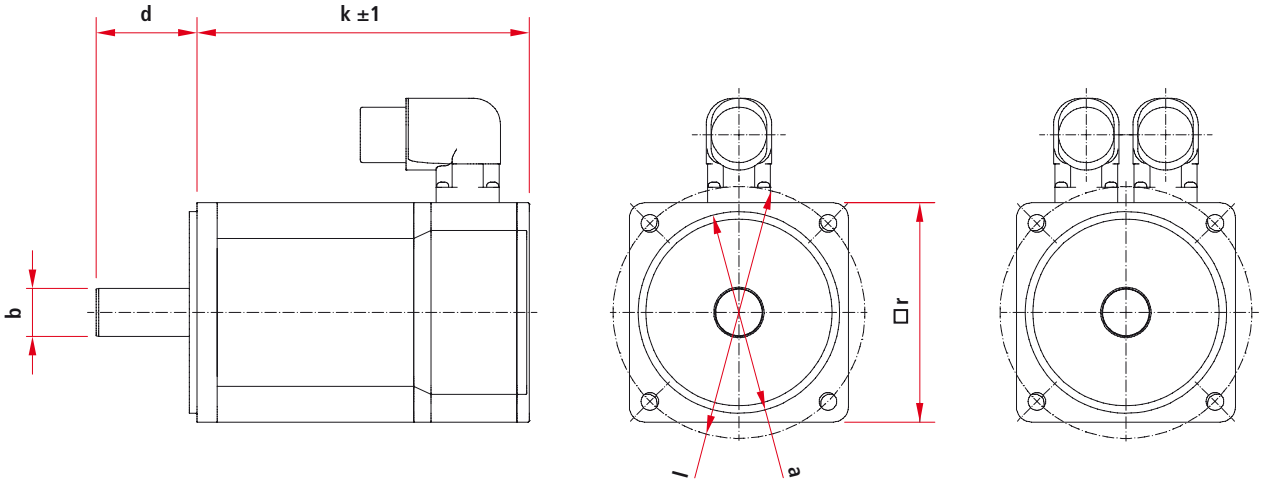
AM813x | Flange code F3, motor length 1 – 2

Data for 24…50 V DC	AM8131-wFyz	AM8131-wJyz	AM8132-wJyz
Standstill torque	1.35 Nm	1.35 Nm	2.37 Nm
Rated torque	1.35 Nm	1.34 Nm	2.35 Nm
Rated speed	1000 min^{-1}	1800 min^{-1}	1000 min^{-1}
Rated power	0.14 KW	0.25 kW	0.25 kW
Standstill current	5.0 A	8.0 A	8.0 A
Rotor moment of inertia	0.462 $kgcm^2$	0.462 $kgcm^2$	0.842 $kgcm^2$
Rotor moment of inertia (with brake)	0.541 $kgcm^2$	0.541 $kgcm^2$	0.921 $kgcm^2$
EtherCAT Terminal	EL7211-0010	EL7221-9014	EL7221-9014
EtherCAT plug-in module	EJ7211-0010	–	–
EtherCAT Box	EP7211-9034		
Connection technology	itec® plug		
One Cable Technology (OCT)	yes		

AM814x | Flange code F4, motor length 1

Data for 24…50 V DC	AM8141-wJyz
Standstill torque	2.40 Nm
Rated torque	2.40 Nm
Rated speed	1000 min^{-1}
Rated power	0.25 kW
Standstill current	8.0 A
Rotor moment of inertia	1.08 $kgcm^2$
Rotor moment of inertia (with brake)	1.73 $kgcm^2$
EtherCAT Terminal	EL7221-9014
EtherCAT plug-in module	–
EtherCAT Box	EP7211-9034
Connection technology	itec® plug
One Cable Technology (OCT)	yes

We reserve the right to make technical changes.



Dimensions	a	b	d	l	r	k (without brake)	k (with brake)
AM8111	30 h7	8 h7	25 mm	46 mm	40 mm	97 mm	129 mm
AM8112	30 h7	8 h7	25 mm	46 mm	40 mm	117 mm	149 mm
AM8113	30 h7	8 h7	25 mm	46 mm	40 mm	137 mm	169 mm
AM8121	40 j6	9 k6	20 mm	63 mm	58 mm	111.5 mm	146 mm
AM8122	40 j6	9 k6	20 mm	63 mm	58 mm	133.5 mm	168 mm
AM8131	60 j6	14 k6	30 mm	75 mm	72 mm	129 mm	168 mm
AM8132	60 j6	14 k6	30 mm	75 mm	72 mm	154 mm	194 mm
AM8141	80 j6	19 k6	40 mm	100 mm	87 mm	132 mm	179.5 mm

▶ **www.beckhoff.com/AM81xx**

Accessories for AM8100 servomotors

Supply cables for servomotor terminals with OCT (and STO)

Ordering information	Suitable for EL72xx-0010, EL72xx-9014	Pict.
ZK4704-0421-2xxx	motor cable for OCT feedback, drag-chain suitable, (4 x 0.75 mm² + (2 x 0.34 mm²) + (2 x AWG22)), shielded [1]	A
ZK4704-0421-2050	example for 5 m length	
ZK4701-0421-2xxx	extension cable	

[1] Available in metres up to 20 m (2xxx = length in decimetres, e.g. -2010 = 1 m)

Supply cables for servomotor terminals with resolver

Ordering information	Suitable for EL72xx-0000	Pict.
ZK4704-0411-2xxx	motor cable for resolver feedback, drag-chain suitable, (4 x 0.75 mm² + (2 x 0.5 mm²)), shielded [1]	
ZK4724-0410-2xxx	resolver cable, drag-chain suitable, (3 x 2 x 0.25 mm²), shielded [1]	B

[1] Available in lengths of 1 m, 3 m, 5 m, 10 m and 20 m (2xxx = length in decimetres, e.g. -2010 = 1 m)

Technical data for drag-chain use ▶ **www.beckhoff.com/compact-drive-technology**

A

B

AG2250 | Planetary gear units for compact Drive Technology

The AG2250 planetary gears are especially matched to the AM8100 motor series and have been expanded by a 2-stage version. For better design, planetary and angled planetary gears are available with the following transmission ratios: 12, 16, 20, 25, 32, 40 and 64.

The AG2250 series completes the range of small, affordable drive technology products. The gears are especially suited to applications where no particularly low torsional backlash is required. The inertia ratios, the required torques and the suitable motors can be conveniently calculated directly in TwinCAT with the TC Motion Designer. In addition, the tool checks in a single step whether the selected motor can be adapted to the gear unit. The planetary gear units are fitted to the respective motor in the factory and delivered as a complete motor/gear unit. The AG2250 series also contains angled planetary gears for space-saving installation of motors at a right-angle.

Features

- low torsional backlash
- high output torques
- high efficiency
- 1-stage planetary gear, transmission ratios 3, 4, 5, 7, 8, 10
- 2-stage planetary gear/ angled planetary gear, transmission ratios 12, 15, 16, 20, 25, 32, 40, 64
- 1-stage angled planetary gear, transmission ratios 3, 4, 5, 7, 8, 10
- 2-stage angled planetary gear, transmission ratios 12, 15, 16, 20, 25, 32, 40, 64
- flexible installation position
- lifetime lubrication
- suitable for motors of the AM8100 (48 V DC) and AS2000 (48 V DC) series

Technical data	AG2250
Type of gear	planetary gear/angled planetary gear
Life span	> 30,000 h/> 20,000 h
Lubrication	lubricated for life
Installation position	variable
Protection class	IP 54
Mechanically compatible with	flange code F, N (typical combination according to specifications)

We reserve the right to make technical changes.

Ordering options

You will find the possible ordering options for the gear units listed in this table. Please note: The options cannot be retrofitted.

Order reference	AG2250-+PLEaa-M0s-i-wXy-Motorsize
xPLEaa	series/size (PLE40, PLE60, PLE80, WPLE40, WPLE60, WPLE80)
s = 1	1-stage with i = 3/4/5/7/8/10
s = 2	2-stage with i = 12/16/20/25/32/40/64
i	gear ratio
w = 0	smooth shaft
w = 1	shaft with groove and feather key
X	identifying letter for clamping hub diameter; not available for selection, is selected automatically based on the respective motor
Motorsize	Specification of the size according to flange-compatible motors. The planetary gears are delivered as a unit with the assembled motor.
Motorsize = AM811x (F1)	flange code F1: AM801x, AM811x; compatible with AM301x, AM311x
Motorsize = AM812x (F2)	flange code F2: AM802x, AM812x; compatible with AM302x
Motorsize = AM312x	in combination with AM312x
Motorsize = AM813x (F3)	flange code F3: AM813x, AM803x, AM853x; compatible with AM303x
Motorsize = AM814x (F4)	flange code F4: AM814x, AM804x, AM854x; compatible with AM304x
Motorsize = AS202x (N2)	flange code N2 (NEMA23): AS202x
Motorsize = AS204x (N3)	flange code N3 (NEMA34): AS204x

AG2250 | **Size 40**

Technical data	AG2250-+PLE40-M01-i	AG2250-+PLE40-M02-i	AG2250-+WPLE40-M01-i	AG2250-+WPLE40-M02-i
Variant	planetary gear	planetary gear	angled planetary gear	angled planetary gear
Gear ratio	3/4/5/7/8/10	12/15/16/20/25/32/40/64	3/4/5/7/8/10	12/15/16/20/25/32/40/64
Nominal output torque	5…15 Nm	7.5…20 Nm	4.5…8.5 Nm	7.5…20 Nm
Max. acceleration torque	8…24 Nm	12…32 Nm	7…13.5 Nm	12…32 Nm
Max. torsion. backlash standard/reduced	≤ 15/– arcmin	≤ 19/– arcmin	≤ 21/– arcmin	≤ 25/– arcmin
Typ. flange code	F1	F1	F1	F1

AG2250 | **Size 60**

Technical data	AG2250-+PLE60-M01-i	AG2250-+PLE60-M02-i	AG2250-+WPLE60-M01-i	AG2250-+WPLE60-M02-i
Variant	planetary gear	planetary gear	angled planetary gear	angled planetary gear
Gear ratio	3/4/5/7/8/10	12/15/16/20/25/32/40/64	3/4/5/7/8/10	12/15/16/20/25/32/40/64
Nominal output torque	15…40 Nm	18…44 Nm	14…25 Nm	18…44 Nm
Max. acceleration torque	24…64 Nm	29…70 Nm	24…40 Nm	29…70 Nm
Max. torsion. backlash standard/reduced	≤ 10/– arcmin	≤ 12/– arcmin	≤ 16/– arcmin	≤ 18/– arcmin
Typ. flange code	F2, F3, AM312x, N2	F2, F3, AM312x	F2, F3, AM312x, N2	F2, F3, AM312x

AG2250 | **Size 80**

Technical data	AG2250-+PLE80-M01-i-wXy-AS204x	AG2250-+WPLE80-M01-i-wXy-AS204x
Variant	planetary gear	angled planetary gear
Gear ratio	3/4/5/7/8/10	3/4/5/7/8/10
Nominal output torque	38…115 Nm	38…67 Nm
Max. acceleration torque	61…184 Nm	61…107 Nm
Max. torsion. backlash standard/reduced	≤ 7/– arcmin	≤ 13/– arcmin
Typ. flange code	N3	N3

▶ **www.beckhoff.com/AG2250**

We reserve the right to make technical changes.

AS2000 | **Stepper motors**

The new AS2000 two-phase stepper motors with a stepper angle of 1.8 degrees shrink the gap to the AM8000 high-performance servomotor. With their flange codes N2 (NEMA23) and N3 (NEMA34), the stepper motors comply with international standards. Users can select from seven models ranging from 0.8 to 8 Nm.

The AS2023 with 2.3 Nm is a logical addition in the medium performance range, because the AS2000 series of stepper motors delivers significantly improved scalability.

The new design of the AS2000 series is more in line with industrial requirements. And with the higher IP 54 protection class, the motors can also be used under harsh environmental conditions. It also features easy cabling thanks to the standardised, integrated M12 high-power screwtype connector for power and the robust M12 connector for the encoder. With its torsion-proof, integrated encoder (1024 inc/rev), the motor is ideal for the Beckhoff-supported vector control of stepper motors. A non-encoder version is available as well. The vector control system minimises resonances and reduces the generation of heat and noise for servo-like operating characteristics.

All motors in the AS2000 series were designed to be used with EtherCAT stepper motor terminals EL7037 (1.5 A) and EL7047 (5 A). Commissioning them in TwinCAT is easy. To simplify the axis layout, the AS2000 stepper motors are integrated into the TC3 Motion Designer for easy dimensioning.

The motors are optionally available with a smooth shaft (flange code N2 only) or with a groove and feather key (flange code N3 only). Shielded motor and encoder cables are also available. They were designed for the stepper motor terminals and come preconfigured for the terminal points. With the low-backlash planetary gear of the AG2250 series in straight or angled versions, a wide range of applications can be accommodated. A new elastic coupling connector for easy machine mounting completes the portfolio.

Technical data	AS20xx
Motor type	stepper motor
Rated supply voltage	24…50 V DC
Resolution	1.8°/200 full steps
Insulation class	thermal class B (130 °C)
Design form	flange-mounted according to IM B5, IM V1, IM V3
Protection class	IP 54
Cooling	convection
Coating/surface	matt black coating RAL 9005
Connection method	M12 round plug connector
Life span	L_{10h} = 30,000 hrs for ball bearings
Approvals	CE

We reserve the right to make technical changes.

Ordering options

You will find the possible ordering options for the listed motors in this table. The options cannot be retrofitted.
All specified electrical values are RMS values.

Order reference	AS20uv-wxyz
u	flange code
v	motor length
w = 0	smooth shaft (only for AS202x)
w = 1	shaft with groove and feather key according to DIN 6885 (only for AS204x)
x	winding code
y = 0	no encoder
y = 1	encoder 24 V DC, 1024 increments
z = 0	without holding brake

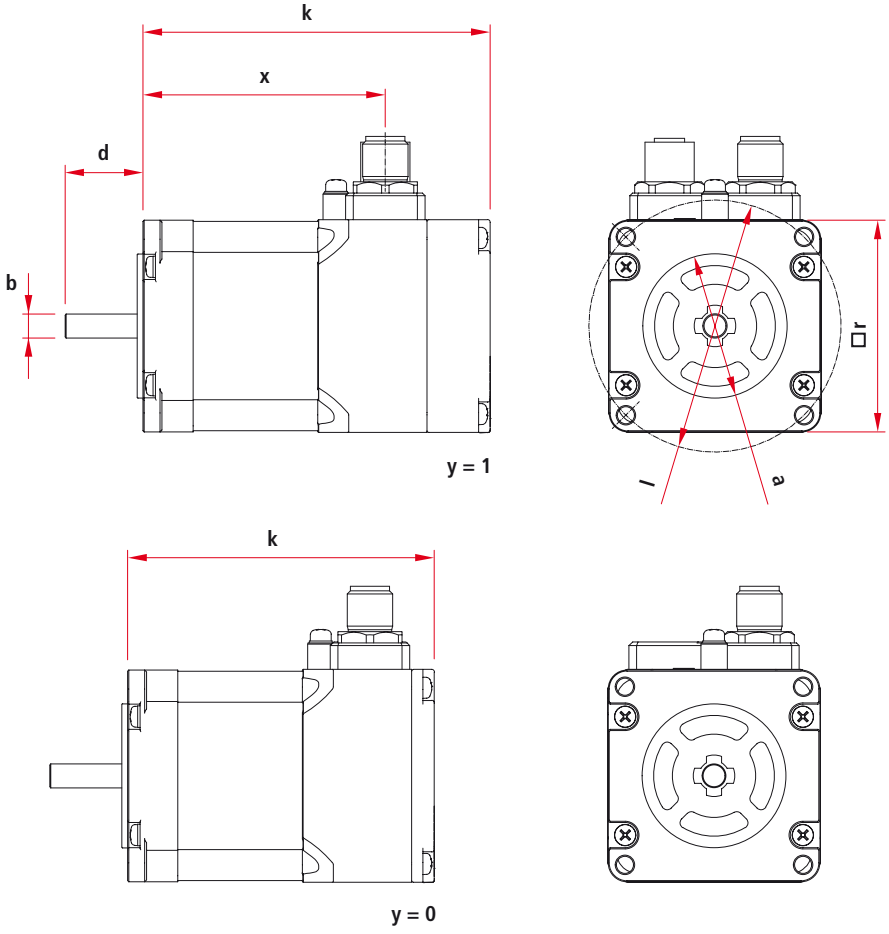
AS202x | Stepper motor 0.8…2.3 Nm (standstill torque), flange code N2

Data for 24…50 V DC	AS2021-0Dy0	AS2022-0Hy0	AS2023-0Hy0	AS2023-0Jy0
Flange code	N2 (NEMA23/56 mm)			
Rated supply voltage	24…50 V DC			
Rated current (per phase)	2.00 A	5.60 A	5.60 A	6.40 A
Standstill torque	0.8 Nm	1.53 Nm	1.8 Nm	2.30 Nm
EtherCAT Terminal	EL7037/EL7031	EL7047	EL7047	EL7047
EtherCAT Box	EP7041-1002	EP7041-3002	EP7041-3002	EP7041-3002
EtherCAT plug-in module	EJ7047			
Bus Terminal	KL2531	KL2541	KL2541	KL2541
Gear unit	AG2250: PLE60, WPLE60			

AS204x | Stepper motor 3.3…8.0 Nm (standstill torque), flange code N3

Data for 24…50 V DC	AS2041-1Hy0	AS2042-1Hy0	AS2043-1Jy0
Flange code	N3 (NEMA34/86 mm)		
Rated supply voltage	24…50 V DC		
Rated current (per phase)	5.60 A	5.60 A	6.50 A
Standstill torque	3.3 Nm	6.4 Nm	8.0 Nm
EtherCAT Terminal	EL7047		
EtherCAT Box	EP7041-3002		
EtherCAT plug-in module	EJ7047		
Bus Terminal	KL2541		
Gear unit	AG2250: PLE80, WPLE80		

i For availability status see Beckhoff website at: www.beckhoff.com/AS2023



Dimensions	a	b	d	k	k (with encoder)	x	l	r
AS2021	38.1 mm	6.35 mm	20.6 mm	80 mm	93 mm	64.1 mm	47.14 mm	56 mm (NEMA23)
AS2022	38.1 mm	6.35 mm	20.6 mm	102 mm	115 mm	86.2 mm	47.14 mm	56 mm (NEMA23)
AS2023	38.1 mm	6.35 mm	20.6 mm	121 mm	134 mm	105.1 mm	47.14 mm	56 mm (NEMA23)
AS2041	73 mm	14 mm	30 mm	89.5 mm	100 mm	71.8 mm	69.6 mm	86 mm (NEMA34)
AS2042	73 mm	14 mm	30 mm	120 mm	130.5 mm	102.3 mm	69.6 mm	86 mm (NEMA34)
AS2043	73 mm	14 mm	30 mm	150 mm	161 mm	132.7 mm	69.6 mm	86 mm (NEMA34)

▶ **www.beckhoff.com/AS2000**

We reserve the right to make technical changes.

Accessories for AS2000 stepper motors

Pre-assembled cables for IP 20

Ordering information	Motor and encoder cables for IP 20 I/Os	Pict.
ZK4000-7700-xxxx	AS2000 motor cable, drag-chain suitable, (4 x 0.75 mm²), shielded, for EL703x/EL704x/KL253x/KL254x	A
ZK4000-5100-2xxx	AS2000 encoder cable, drag-chain suitable, (5 x 0.25 mm²), shielded, for EL703x/EL704x/KL253x/KL254x	B

Max. cable length 10 m, available in lengths of 1 m, 3 m, 5 m and 10 m (xxx = length in decimetres, e.g. -2010 = 1 m)
Technical data for drag-chain use ▶ **www.beckhoff.com/compact-drive-technology**

Pre-assembled cables for IP 67

Ordering information	Motor and encoder cables for IP 67 I/Os	Pict.
ZK4000-6877-xxxx	AS2000 motor cable, drag-chain suitable, (4 x 0.75 mm²), shielded, for EP704x/EJ704x	C
ZK4000-5151-xxxx	AS2000 encoder cable, drag-chain suitable, (5 x 0.25 mm²), shielded, for EP704x/EJ704x	D

Max. cable length 10 m, available in lengths of 1 m, 3 m, 5 m and 10 m (xxx = length in decimetres, e.g. -2010 = 1 m)
Technical data for drag-chain use ▶ **www.beckhoff.com/compact-drive-technology**

Coupling for AS2000

Ordering information	AG2090-+JCbb-c/d
AX2090-+JC05-c/d	jaw-type coupling for flange code N2 (AS202x), available in (drive/output) 6.35/6.00 mm, 6.35/6.35 mm, 6.35/8.00 mm
AX2090-+JC10-c/d	jaw-type coupling for flange code N3 (AS204x), available in (drive/output) 14.0/14.0 mm, 14.0/16.0 mm

A

B

C

D

AS1000 | **Stepper motors**

The AS1000 stepper motors with flange codes from 42 to 86 mm (NEMA17, NEMA23, NEMA34) and torques from 0.4 to 5 Nm are ideally suited for use as auxiliary axes and positioning drives. They are characterised by robustness and high holding torques. Due to the integrated micro-stepping the motors can position very well even without a feedback system and require only a motion terminal for power electronics. Stepper motors can also be operated with TwinCAT NC PTP for synchronisation functions such as cam plates or flying saws.

Technical data	AS10xx
Motor type	stepper motor
Rated supply voltage	24…50 V DC
Resolution	1.8°/200 full steps
Insulation class	thermal class B (130 °C)
Design form	AS1010/AS1020: flange-mounted according IM B14, IM V1, IM V3, AS1030/AS1050/AS1060: flange-mounted according IM B5, IM V1, IM V3
Protection class	IP 43, AS1060: IP 20
Cooling	Free ventilation of the motors must be ensured.
Connection method	direct cable outlet via cable gland with connected M12 coupling
Life span	L_{10h} = 30,000 hrs for ball bearings
Approvals	CE

We reserve the right to make technical changes.

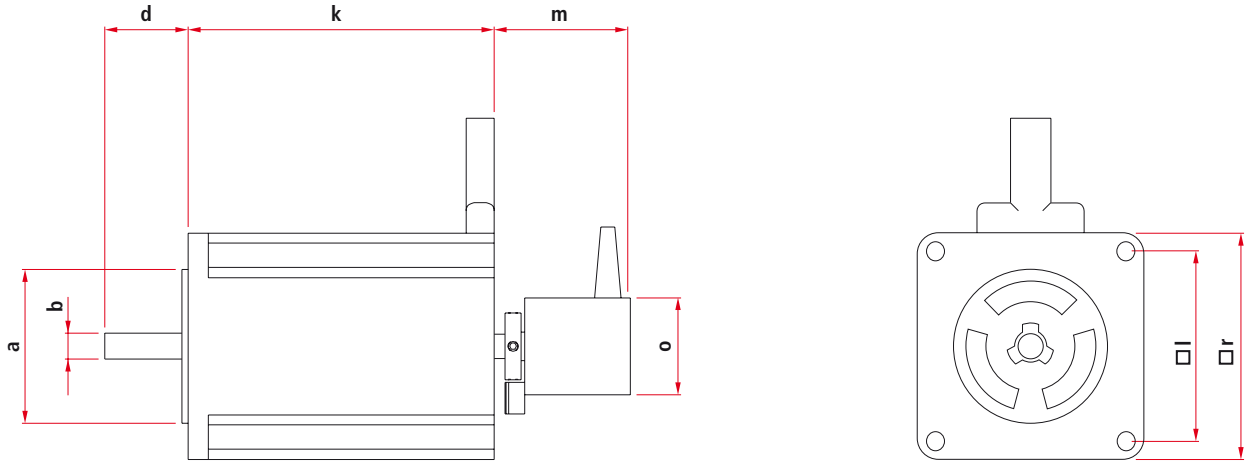
Order reference	AS10u0-wxyz
u	type
w = 0	AS1010, AS1020: smooth shaft with 1 flat, AS1030, AS1050: smooth shaft, AS1060: smooth shaft with 2 flats
w = 1	shaft with groove and feather key according to DIN 6885 (only available with AS1060)
x = 0	standard motor without second shaft
x = 1	second shaft (for AS1020/AS1050/AS1060 only), necessary for encoder
y = 0	no incremental encoder
y = 2	incremental encoder, 24 V DC, 1024 lines (only available for AS1020, AS1050, AS1060), requires x = 1

AS10xx | **Rated current 1.0…1.5 A**

Data for 24…50 V DC	AS1010-0000	AS1020-0xyz	AS1030-0000
Flange code	N1 (NEMA17/42 mm)	N1 (NEMA17/42 mm)	N2 (NEMA23/56 mm)
Rated current (per phase)	1.00 A	1.00 A	1.50 A
Standstill torque	0.38 Nm	0.50 Nm	0.60 Nm
Rotor moment of inertia	0.056 kgcm²	0.074 kgcm²	0.210 kgcm²
Bus Terminal	KL2531	KL2531/KL2541	KL2531
EtherCAT Terminal	EL7037/EL7031	EL7047/EL7037/EL7031/EL7041	EL7037/EL7031
EtherCAT Box	EP7041-1002	EP7041-1002	EP7041-1002
Gear unit	–	–	AG1000-+PM52.i

AS10xx | **Rated current 5 A**

Data for 24…50 V DC	AS1050-0xyz	AS1060-wxyz
Flange code	N2 (NEMA23/56 mm)	N3 (NEMA34/86 mm)
Rated current (per phase)	5.00 A	5.00 A
Standstill torque	1.20 Nm	5.00 Nm
Rotor moment of inertia	0.360 kgcm²	3.000 kgcm²
Bus Terminal	KL2541	KL2541
EtherCAT Terminal	EL7047/EL7041	EL7047/EL7041
EtherCAT Box	EP7041-3002	EP7041-3002
Gear unit	AG1000-+PM52.i	AG1000-+PM81.i



Dimensions	a	b	d	k	l	m	o	r
AS1010	22 mm	5 mm	24 mm	39 mm	31 mm	–	–	42 mm (NEMA17)
AS1020	22 mm	5 mm	24 mm	48 mm	31 mm	33 mm	24 mm	42 mm (NEMA17)
AS1030	38.1 mm	6.35 mm	20.6 mm	54 mm	47.14 mm	–	–	56 mm (NEMA23)
AS1050	38.1 mm	6.35 mm	20.6 mm	75.8 mm	47.14 mm	33 mm	24 mm	56 mm (NEMA23)
AS1060	73 mm	14 mm	30 mm	96.5 mm	69.6 mm	33 mm	24 mm	86 mm (NEMA34)

▶ **www.beckhoff.com/AS10xx**

Accessories for AS1000 stepper motors

Cables for AS1000 at Bus Terminal/EtherCAT Terminal up to 5 A

Ordering information	Cables for stepper terminals EL7031, EL7037, EL7041, EL7047 and KL2531, KL2541	Pict.
ZK4000-5100-2xxx	encoder cable for ASxxxx, IP 67, PUR, (5 x 0.25 mm²), shielded, flex, M12, plug, straight, male, 5-pin, A-coded – open end	A
ZK4000-6700-2xxx	motor cable for AS1000, assembled at both ends, (4 x 0.5 mm²), shielded, 4 million bending cycles, bending radius = 55 mm (10 x OD)	B

Available in lengths of 1 m, 3 m, 5 m and 10 m (2xxx = length in decimetres, e.g. -2010 = 1 m)
Technical data for drag-chain use ▶ **www.beckhoff.com/compact-drive-technology**

A

B

We reserve the right to make technical changes.

Cables for AS1000 at EtherCAT Box up to 5 A

Ordering infomation	Cables for stepper motor EtherCAT Box EP7041	Pict.
ZK4000-5151-xxxx	encoder cable for ASxxxx, IP 67, PUR, (5 x 0.25 mm²), shielded, flex, M12, plug, straight, male, 5-pin, A-coded – M12, plug, straight, male, 5-pin, A-coded	C
ZK4000-6768-xxxx	motor cable for AS1000, assembled at both ends, (4 x 0.5 mm²), shielded, 4 million bending cycles, bending radius = (10 x OD)	D

Available in lengths of 0.5 m, 1 m, 2 m and 10 m (xxxx = length in decimetres, e.g. -0005 = 0.5 m).
Technical data for drag-chain use ▶ **www.beckhoff.com/compact-drive-technology**

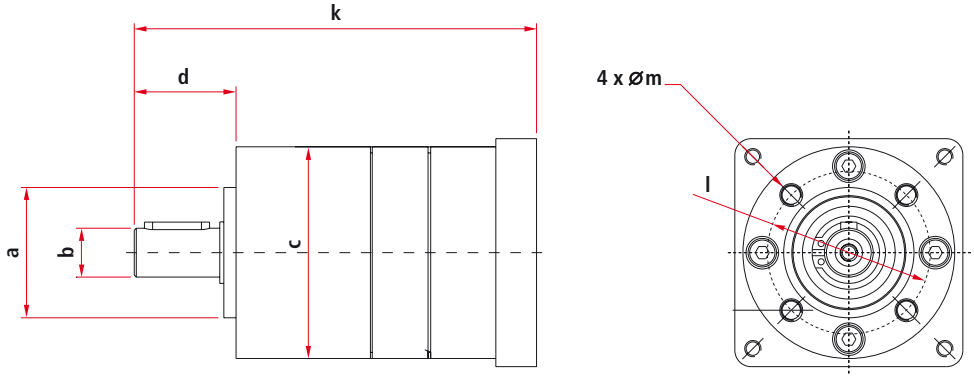
C

D

AG1000 | Planetary gear units for AS1000

Technical data	AG1000-+PM52.4	AG1000-+PM52.7	AG1000-+PM81.4	AG1000-+PM81.7
Nominal output torque	4 Nm	4 Nm	20 Nm	20 Nm
Max. acceleration torque	6 Nm	6 Nm	30 Nm	30 Nm
Gear ratio	3.7 or 63/17	6.75 or 27/4	3.7 or 63/17	6.75 or 27/4
Max. torsional backlash	≤ 0.7°	≤ 0.7°	≤ 0.5°	≤ 0.5°
Max. radial load	200 N	200 N	400 N	400 N
Efficiency	approx. 80 %			
Type of gear	planetary gear			
Weight	0.7 kg	0.7 kg	1.8 kg	1.8 kg
Available for stepper motors	AS1030, AS1050	AS1030, AS1050	AS1060	AS1060

The planetary gears are delivered as a unit with the assembled stepper motor.



Dimensions	a	b	c	d	k	l	m
AG1000-+PM52.i	32 mm	12 mm	52 mm	25 mm	99.8 mm	40 mm	M5 x 10
AG1000-+PM81.i	50 mm	19 mm	81 mm	49 mm	151.2 mm	65 mm	M6 x 12

XTS | eXtended Transport System

▶ **www.beckhoff.com/XTS**

XTS | **Standard**
- linear motor characteristics on an endless path
- replaces conventional mechanics with innovative mechatronics
- individual product transport with a continuous flow of material
- modular structure, simple adaptation to the application
- low space and power requirements

See page 430

We reserve the right to make technical changes.

XTS | **Hygienic**
- easy to clean
- chemically resistant
- stainless steel
- IP 69K protection

See page 442

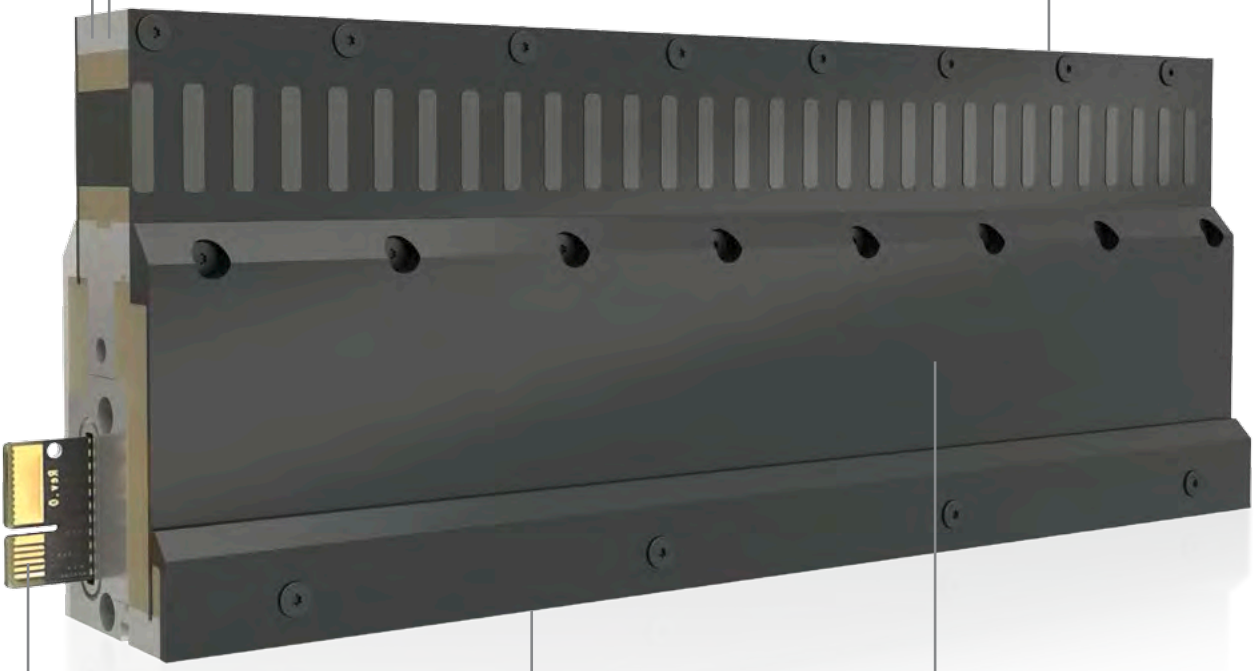
XTS | **Black Line**
- without any holes in the upper profile of the motor module
- suitable for guide rails that are not screwed onto the motor modules (e.g. GFX Hepco guide system)

See page 440

We reserve the right to make technical changes.

XTS Standard | The construction kit

▶ **www.beckhoff.com/XTS-construction-kit**



To create a track the single parts with protection class IP 65 are mounted at the machine frame.

Motor, coil package

Installation area guide rail

When mounting two modules, control voltage (24 V DC), power supply (48 V DC) and EtherCAT are automatically connected through.

Mounting area: This surface enables mounting at the machine base.

Displacement measurement integrated in motor module
- non-contact
- absolute positions of all movers
- multi-position measurement
- resistant to dirt

Straight motor module

We reserve the right to make technical changes.

Curved motor modules

Guide rail system

Mover

Motor module

The motor module contains the electromagnetic coils and all other active functions necessary for the operation of the system. Only a power supply and an EtherCAT connection are required. The motor module contains no moving parts and is not subject to any wear.

– fully integrated linear motor with power electronics and displacement measurement
– Coil arrangement and mechanical structure make up a ready-to-use unit.

Guide rail system

Movers and guide rails are optimally matched to each other. The geometry of the rail and the combination of hard anodised aluminium rail surface and running surface of the mover rollers allow good running characteristics and low wear. Lubrication of the system is not necessary.

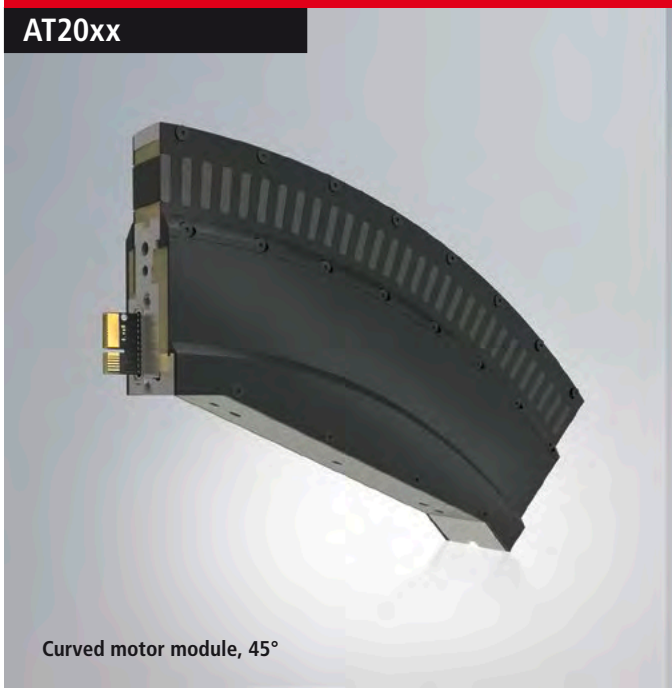
Mover

The mover contains magnetic plates which, together with the coils in the motor modules, can generate propulsive forces. It absorbs the attractive forces of the magnets on both sides and compensates them as far as possible. This allows the rollers of the mover to run at high speed in the guide rail with low wear. The rollers are equipped with a particularly wear-resistant synthetic running surface. The tensioning of the rollers prevents backlash and is at the same time designed for low wear. Consequently, the lifetime of the rollers depends on the payload. A mechanically robust encoder flag conveys the mover position to the motor module.

System properties	XTS Standard
Max. force	100 N at standstill
Continuous force	30 N (at ~30 °C temperature increase in the motor compared to mounting frame)
Speed	4 m/s @ 48 V DC supply
Acceleration	> 100 m/s² (without payload)
Positioning accuracy	< ±0.15 mm @ 1.5 m/s possible within a straight module
Absolute accuracy	< ±0.25 mm possible within a straight module
Repeatability	< ±10 µm (standstill unidirectional)
Mover length	50 mm in direction of movement
Mover weight	approx. 410 g (complete mover without attachments)
Max. system length	> 100 m (dependent on computing power, no system limit)
Operating/storage temperature	-10…+40 °C/-25…+85 °C (for further information see documentation)
Protection class	motor modules: IP 65 (for further information see documentation)
Approvals	CE, UL
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4

Electrical data	XTS Standard
Supply voltage	control voltage 24 V DC, power supply 48 V DC
Current consumption	power supply: 16 A nominal current
Power consumption 24 V DC	motor modules: 30 W/m (communication, electronics, position determination)
Length per feed	max. 3 m (voltage supply, EtherCAT)
Power consumption per mover	approx. 12 W @ 4 m/s without payload

We reserve the right to make technical changes.



Curved motor module, 45°

Curved motor module, +22.5°

AT20xx-0xxx | **XTS motor modules**

The motor module, the power electronics and the displacement measurement are built into the profile. The power electronics are optimised for the requirement and reduce assembly expenditure. There is an upper mechanical interface to the guide rail and a lower one to the support structure. Straight segments and curves can be combined arbitrarily. The geometry of the motor module without edges and openings allows easy cleaning.

Double-air-gap motor

- double-action linear motor, hence low resulting forces on the mechanical bearing and compact total solution
- displacement measurement integrated, no additional assembly, no calibration
- Tolerances are compensated automatically.
- Attractive forces neutralise each other.
- lower force effect (wear) on the guide
- Friction losses are greatly reduced.

Output stages and coil package integrated

- no cables between coil and output stage
  - no wiring expenditure
  - exclusion of errors
  - minimum mounting space
  - Output stage and coil are optimally matched to each other.
- supply voltage 48 V DC (low voltage, low safety expenditure)
- Independent supply of each individual coil with current is possible.
- arbitrary number of travelling fields/movers possible
- temperature monitoring of the output stage
- temperature model of the coils for optimum peak load use (I^2T model)
- low temperature rise due to good thermal coupling to the machine bed

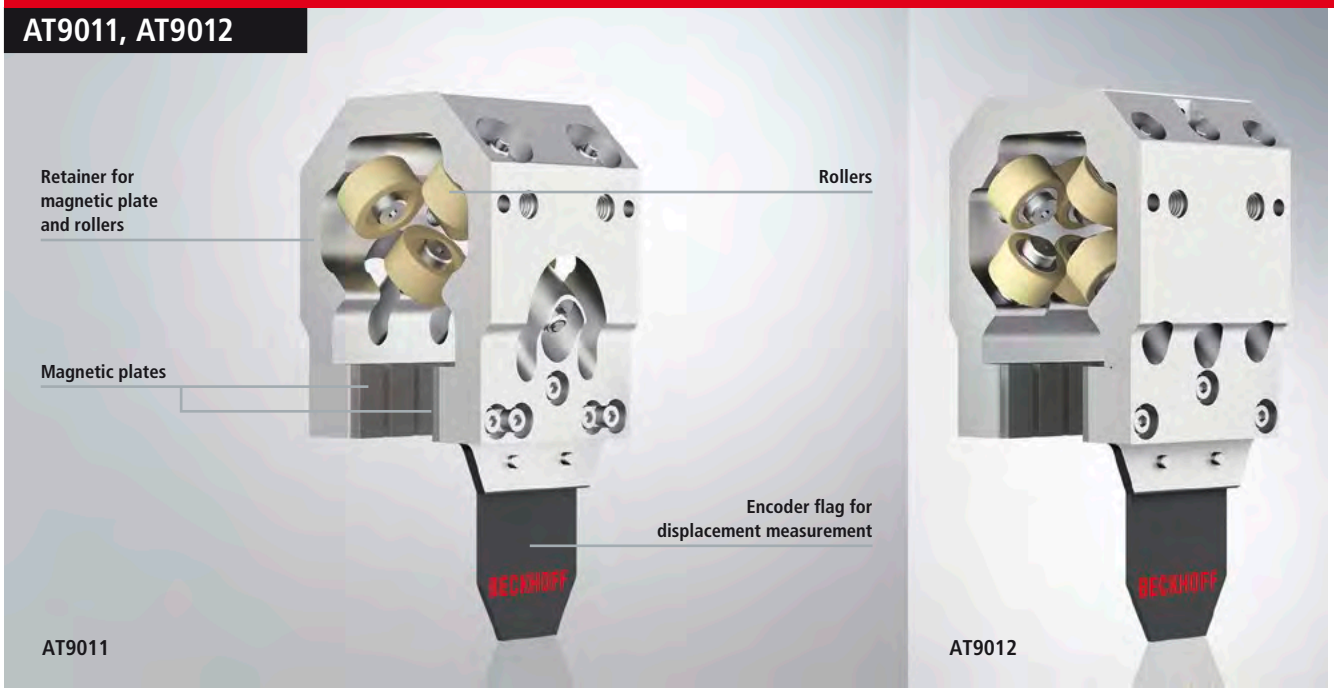
We reserve the right to make technical changes.

Straight motor module

Curved motor module, 180° (clothoid)

Ordering information	XTS motor modules
AT2000-0250	motor module, straight, 48 V DC/24 V DC, 250 mm x 39.1 mm x 96 mm (L x W x H), 2.0 kg
AT2001-0250	motor module with feed, straight, 48 V DC/24 V DC, cable length 5 m, 250 mm x 39.1 mm x 96 mm (L x W x H), 3.1 kg
AT2001-0250-0003	motor module with feed, straight, 48 V DC/24 V DC, cable length 5 m, 250 mm x 39.1 mm x 96 mm (L x W x H), 3.1 kg, UL-listed
AT2020-0250	motor module, 22.5° (positive curve, convex, radius constant), 48 V DC/24 V DC, 256.2 mm x 39.1 mm x 106.8 mm (L x W x H), 2.2 kg
AT2021-0250	motor module with feed, 22.5° (positive curve, convex, radius constant), 48 V DC/24 V DC, cable length 5 m, 256.2 mm x 39.1 mm x 106.8 mm (L x W x H), 3.3 kg
AT2025-0250	motor module, -22.5° (negative curve, concave, radius constant), 48 V DC/24 V DC, 278.1 mm x 39.1 mm x 107.8 mm (L x W x H), 2.2 kg
AT2026-0250	motor module with feed, -22.5° (negative curve, concave, radius constant), 48 V DC/24 V DC, 278.1 mm x 39.1 mm x 107.8 mm (L x W x H), 2.2 kg
AT2040-0250	motor module, 45° (positive curve, convex, radius constant), 48 V DC/24 V DC, 258.9 mm x 39.1 mm x 114.4 mm (L x W x H), 1.9 kg
AT2041-0250	motor module with feed, 45° (positive curve, convex, radius constant), 48 V DC/24 V DC, cable length 5 m, 258.9 mm x 39.1 mm x 114.4 mm (L x W x H), 3.0 kg
AT2041-0250-0003	motor module with feed, 45° (positive curve, convex, radius constant), 48 V DC/24 V DC, cable length 5 m, 258.9 mm x 39.1 mm x 114.4 mm (L x W x H), 3.0 kg, UL-listed
AT2050-0500	motor module, 180° (clothoid, radius not constant), 48 V DC/24 V DC, 306.7 mm x 39.1 mm x 194.5 mm (L x W x H), 4.1 kg

▶ **www.beckhoff.com/AT2000**



AT9011, AT9012 | XTS movers

The movers are made of a light and solid aluminium alloy. Thanks to their arrangement the rollers allow backlash-free travel on the straights and in the curves. The coating of the rollers causes very little running noise and is particularly low-wear without lubrication of the guide rail. The attractive forces of the magnetic plates are largely balanced by the opposed arrangement, so that the rollers and the rail do not have to absorb the comparatively high attractive forces of the magnets.

The centre of the encoder flag supplies a position signal to the motor module. A Mover 1 can be detected by means of a special magnetic plate set. The encoder flag is made from a sturdy, lightweight glass-fibre reinforced material.

The AT9011-0070-0550 mover provides an increased payload due to its overall length of 70 mm and larger rollers. The standard rail can be used for traveling in straight lines, adapted rails are necessary for traveling around corners. Therefore, a mixed operation of movers of different sizes is only possible when traveling in straight lines.

Features

- no sliding contacts or cables to the moved part, purely passive mover
- 2 magnetic plates generate the controlled propulsive force via the motor module.
- The attractive forces largely neutralise each other in relation to the guide mechanism.
- low friction losses
- An encoder flag generates the position signal.
- Short mover length allows small product spacings.
- Geometry allows driving through curves with full dynamics.
- no development of heat on and in the mover

Ordering information	XTS mover suitable for the guide rail system AT9000/AT9050
AT9011-0050-0550	mover, 6 rollers (plastic coated), length 50 mm, 410 g, mounted with magnetic plate set AT9001-0550 and set of rollers ZX9011-0050
AT9011-0050-1550	mover, 6 rollers (plastic coated), length 50 mm, 410 g, mounted with magnetic plate set AT9001-1550 and set of rollers ZX9011-0050
AT9011-0070-0550	mover, 6 rollers (plastic coated), length 70 mm, 595 g, mounted with magnetic plate set AT9001-0550 and set of rollers ZX9011-0070
AT9011-0070-1550	mover, 6 rollers (plastic coated), length 70 mm, 595 g, mounted with magnetic plate set AT9001-1550 and set of rollers ZX9011-0070
AT9012-0050-0550	mover, 12 rollers (plastic coated), length 50 mm, 460 g, mounted with magnetic plate set AT9001-0550 and set of rollers ZX9012-0050
AT9012-0050-1550	mover, 12 rollers (plastic coated), length 50 mm, 460 g, mounted with magnetic plate set AT9001-1550 and set of rollers ZX9012-0050

The magnetic plates can also be procured separately in order to be able to fit them to a self-developed mover.
Technical boundary conditions and support on enquiry.

▶ **www.beckhoff.com/AT9011**

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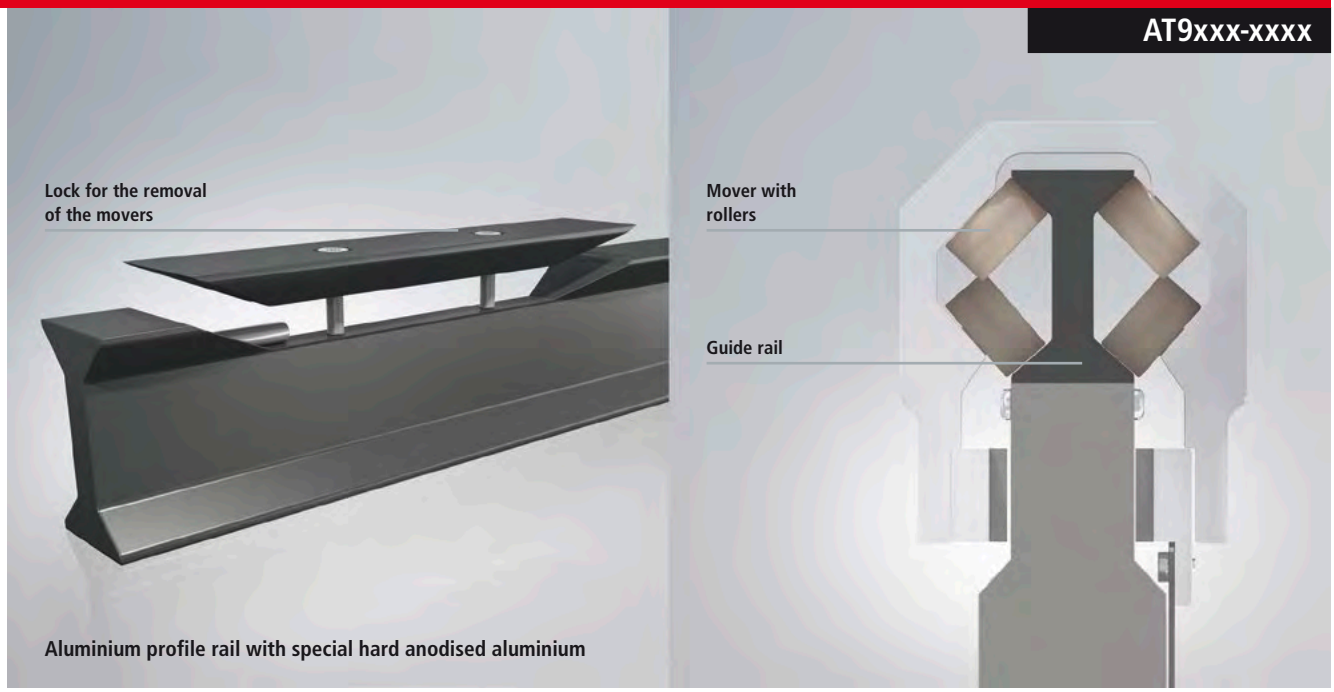


AT9xxx-xxxx | **XTS guide rails**

The guide rail with the matching movers makes the XTS system a ready-to-use solution. However, the motor modules can also be used together with the magnetic plate sets as a custom solution without the XTS guide rail.
The movers can be removed or inserted without tools through a lock by releasing two screws and removing part of the rail.

- optimised solution for immediate mounting on the motor module
- backlash-free due to low manufacturing tolerances and pre-tensioned rollers
- abrasion-resistant hard anodised aluminium
- free of abutting ends, lengths up to 2.5 m available
- high-precision mounting by means of fits
- easy maintenance through lock for the removal of the movers

Movers and guide rail are optimally matched to each other. The geometry of the aluminium rail and the hard anodised aluminium of the surface in combination with the running surface of the mover rollers allow good running characteristics and low wear.

Ordering information	XTS guide rails, suitable for straight motor modules
AT9000-0250	guide rail, 250 mm, straight, suitable for 1 x straight motor module AT200x-0250 with/without feed
AT9000-0500	guide rail, 500 mm, straight, suitable for 2 x straight motor module AT200x-0250 with/without feed
AT9000-0750	guide rail, 750 mm, straight, suitable for 3 x straight motor module AT200x-0250 with/without feed
AT9000-1000	guide rail, 1000 mm, straight, suitable for 4 x straight motor module AT200x-0250 with/without feed
AT9000-1250	guide rail, 1250 mm, straight, suitable for 5 x straight motor module AT200x-0250 with/without feed
AT9000-1500	guide rail, 1500 mm, straight, suitable for 6 x straight motor module AT200x-0250 with/without feed
AT9000-1750	guide rail, 1750 mm, straight, suitable for 7 x straight motor module AT200x-0250 with/without feed
AT9000-2000	guide rail, 2000 mm, straight, suitable for 8 x straight motor module AT200x-0250 with/without feed
AT9000-2250	guide rail, 2250 mm, straight, suitable for 9 x straight motor module AT200x-0250 with/without feed
AT9000-2500	guide rail, 2500 mm, straight, suitable for 10 x straight motor module AT200x-0250 with/without feed

Ordering information	XTS guide rails with gate, suitable for straigth motor modules
AT9100-0250	guide rail, 250 mm, straight with gate, suitable for 1 x straight motor module AT200x-0250 with/without feed
AT9100-0500	guide rail, 500 mm, straight with gate, suitable for 2 x straight motor module AT200x-0250 with/without feed
AT9100-0750	guide rail, 750 mm, straight with gate, suitable for 3 x straight motor module AT200x-0250 with/without feed
AT9100-1000	guide rail, 1000 mm, straight with gate, suitable for 4 x straight motor module AT200x-0250 with/without feed
AT9100-1250	guide rail, 1250 mm, straight with gate, suitable for 5 x straight motor module AT200x-0250 with/without feed
AT9100-1500	guide rail, 1500 mm, straight with gate, suitable for 6 x straight motor module AT200x-0250 with/without feed
AT9100-1750	guide rail, 1750 mm, straight with gate, suitable for 7 x straight motor module AT200x-0250 with/without feed
AT9100-2000	guide rail, 2000 mm, straight with gate, suitable for 8 x straight motor module AT200x-0250 with/without feed
AT9100-2250	guide rail, 2550 mm, straight with gate, suitable for 9 x straight motor module AT200x-0250 with/without feed
AT9100-2500	guide rail, 2500 mm, straight with gate, suitable for 10 x straight motor module AT200x-0250 with/without feed

Ordering information	XTS guide rails, suitable for 22.5° motor modules
AT9020-0500	guide rail, 500 mm, 22.5° curve (positive curve, convex, radius constant), for AT9011-0050-xxxx, suitable for 1 x straight motor module AT200x-0250 with/without feed and 1 x 22.5° motor module AT202x-0250 with/without feed
AT9020-2250	guide rail set, 2250 mm, 180° curve (positive curve, convex, radius constant, 2 parts), for AT9011-0050-xxxx, consisting of 1 x AT9020-2250-1050 guide rail, 1250 mm, 90° curve, suitable for 1 x straight motor module AT200x-0250 with/without feed and 4 x 22.5° motor module AT202x-0250 with/without feed 1 x AT9020-2250-2050 guide rail, 1000 mm, 90° curve, suitable for 4 x 22.5° motor module AT202x-0250 with/without feed
AT9020-2250-0070	guide rail set, 2250 mm, 180° curve (positive curve, convex, radius constant, 2 parts), for AT9011-0070-xxxx, consisting of 1 x AT9020-2250-1070 guide rail, 1250 mm, 90° curve, suitable for 1 x straight motor module AT200x-0250 with/without feed and 4 x 22.5° motor module AT202x-0250 with/without feed 1 x AT9020-2250-2070 guide rail, 1000 mm, 90° curve, suitable for 4 x 22.5° motor module AT202x-0250 with/without feed

We reserve the right to make technical changes.

Ordering information	XTS guide rails, suitable for -22.5° motor modules
AT9025-0500	guide rail, 500 mm, -22.5° curve (negative curve, concave, radius constant), for AT9011-0050-xxxx, suitable for 1 x straight motor module AT200x-0250 with/without feed and 1 x -22.5° motor module AT202x-0250 with/without feed

Ordering information	XTS guide rails, suitable for 45° motor modules
AT9040-0500	guide rail, 500 mm, 45° curve (positive curve, convex, radius constant), for AT9011-0050-xxxx, suitable for 1 x straight motor module AT200x-0250 with/without feed and 1 x 45° motor module AT204x-0250 with/without feed
AT9040-0750	guide rail, 750 mm, 90° curve (positive curve, convex, radius constant), for AT9011-0050-xxxx, suitable for 1 x straight motor module AT200x-0250 with/without feed and 2 x 45° motor module AT204x-0250 with/without feed
AT9040-0750-0070	guide rail, 750 mm, 90° curve (positive curve, convex, radius constant), for AT9011-0070-xxxx, suitable for 1 x straight motor module AT200x-0250 with/without feed and 2 x 45° motor module AT204x-0250 with/without feed
AT9040-1250	guide rail set, 1250 mm, 180° curve (positive curve, convex, radius constant, 2 parts), for AT9011-0050-xxxx, consisting of 1 x AT9040-1250-1050 guide rail, 750 mm, 90° curve, suitable for 1 x straight motor module AT200x-0250 with/without feed and 2 x 45° motor module AT204x-0250 with/without feed 1 x AT9040-1250-2050 guide rail, 500 mm, 90° curve, suitable for 2 x 45° motor module AT204x-0250 with/without feed
AT9040-1250-0070	guide rail set, 1250 mm, 180° curve (positive curve, convex, radius constant, 2 parts), for AT9011-0070-xxxx, consisting of 1 x AT9040-1250-1070 guide rail, 750 mm, 90° curve, suitable for 1 x straight motor module AT200x-0250 with/without feed and 2 x 45° motor module AT204x-0250 with/without feed 1 x AT9040-1250-2070 guide rail, 500 mm, 90° curve, suitable for 2 x 45° motor module AT204x-0250 with/without feed
AT9142-2000	guide rail set, 2000 mm, 360° circle (positive curve, convex, radius constant, 4 parts), for AT9011-0050-xxxx, consisting of 1 x AT9142-2000-1050 guide rail, 500 mm, 90° curve with gate, suitable for 2 x 45° motor module AT204x-0250 with/without feed 3 x AT9142-2000-2050 guide rail, 500 mm, 90° curve, suitable for 2 x 45° motor module AT204x-0250 with/without feed

Ordering information	XTS guide rails, suitable for 180° motor modules (clothoid)
AT9050-0500	guide rail, 500 mm, 180° curve (clothoid, radius not constant), for AT9011-0050-xxxx or AT9012-0050-xxxx, suitable for 1 x 180° motor module AT2050-0500
AT9050-0500-0070	guide rail, 500 mm, 180° curve (clothoid, radius not constant), for AT9011-0070-xxxx, suitable for 1 x 180° motor module AT2050-0500

▶ **www.beckhoff.com/AT9000**

We reserve the right to make technical changes.

AT2000-xx00 | XTS starter kit

The XTS starter kit facilitates fast and effective entry to the new technology. Mechanical tests and the programming of your own motion profiles are simple to accomplish. Programming experience in IEC 61131-3 and knowledge of TwinCAT NC are required for this. The XTS starter kit contains all components required for the operation of an XTS system. Depending on the required path length, a choice of three starter kits is available. The construction is fully functional and completely pre-assembled.

Basic components

- stand and holder for all mechanical parts
- Industrial PC with all necessary interfaces and sufficient system performance
- TwinCAT NC PTP and XTS function package
- installed in a control cabinet, fully wired, ready for operation
- power supply units 24 V DC and 48 V DC
- 1 day instruction and programming support

Required user skills

- practical experience with TwinCAT
- basic knowledge of Motion Control

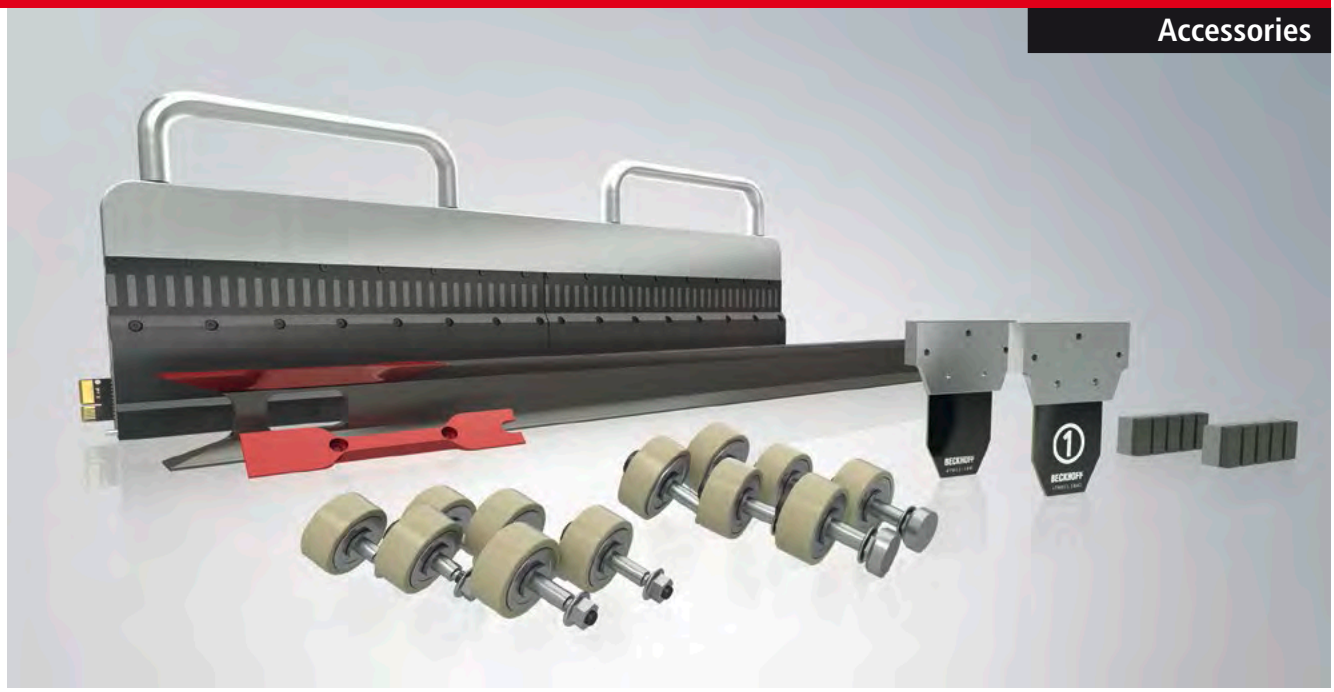
For information on the Beckhoff training offers see page 572

Starter kit small	AT2000-0500
Motor module, straight	3 x AT2000-0250, 1 x AT2001-0250 (feed)
Motor module, 180°	2 x AT2050-0500
Guide rail, straight	1 x AT9000-0500, 1 x AT9100-0500 (gate)
Guide rail, 180°	2 x AT9050-0500
Mover	5 x AT9011-0050-0550

Starter kit medium	AT2000-1000
Motor module, straight	7 x AT2000-0250, 1 x AT2001-0250 (feed)
Motor module, 180°	2 x AT2050-0500
Guide rail, straight	1 x AT9000-1000, 1 x AT9100-1000 (gate)
Guide rail, 180°	2 x AT9050-0500
Mover	10 x AT9011-0050-0550

Starter kit large	AT2000-1500
Motor module, straight	10 x AT2000-0250, 2 x AT2001-0250 (feed)
Motor module, 180°	2 x AT2050-0500
Guide rail, straight	1 x AT9000-1500, 1 x AT9100-1500 (gate)
Guide rail, 180°	2 x AT9050-0500
Mover	10 x AT9011-0050-0550

We reserve the right to make technical changes.



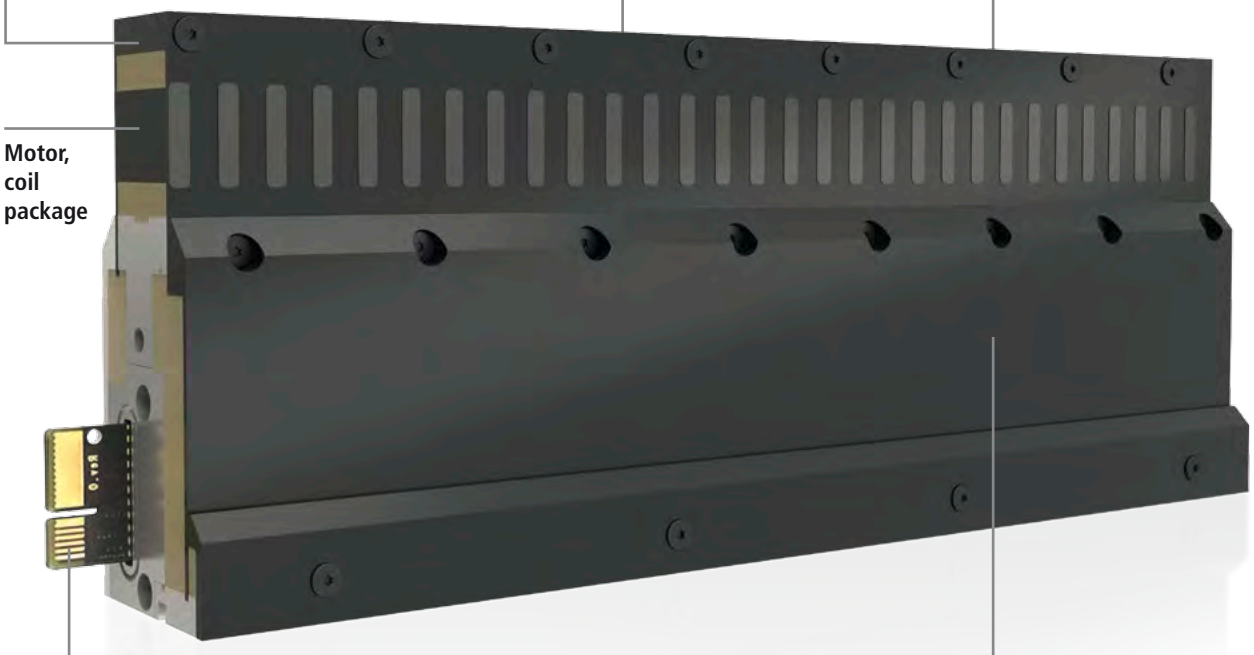
Accessories

The XTS accessories include ready-made roller sets for maintenance of XTS movers, magnetic plate sets for various applications and further auxiliaries for commissioning of an XTS linear transport system.

Ordering information	
ZX2000-0500	device for alignment of straight XTS standard motor modules
AT9001-0550	magnetic plate set mover standard, 5-pin, length 50 mm, preinstalled with 1.2 mm thick encoder flag, suitable for XTS standard movers
AT9001-0550-1840	magnetic plate set mover standard, 5-pin, length 50 mm, preinstalled with 1.8 mm thick encoder flag, suitable for external movers
AT9001-1550	magnetic plate set mover 1, 5-pin, length 50 mm, preinstalled with 1.2 mm thick encoder flag, suitable for XTS standard movers
AT9001-1550-1840	magnetic plate set mover 1, 5-pin, length 50 mm, preinstalled with 1.8 mm thick encoder flag, suitable for external movers
ZX9011-0050	set of rollers, 6 rollers (plastic coated), suitable for mover AT9011-0050-xxxx
ZX9011-0070	set of rollers, 6 rollers (plastic coated), suitable for mover AT9011-0070-xxxx
ZX9012-0050	set of rollers, 12 rollers (plastic coated), suitable for mover AT9012-0050-xxxx
ZX9001-0000	rail on support for XTS standard movers, suitable for XTS standard guide rails AT9100-xxxx

XTS Black Line | Motor modules

▶ www.beckhoff.com/XTS-Black-Line



Straight motor module

We reserve the right to make technical changes.

Curved motor modules

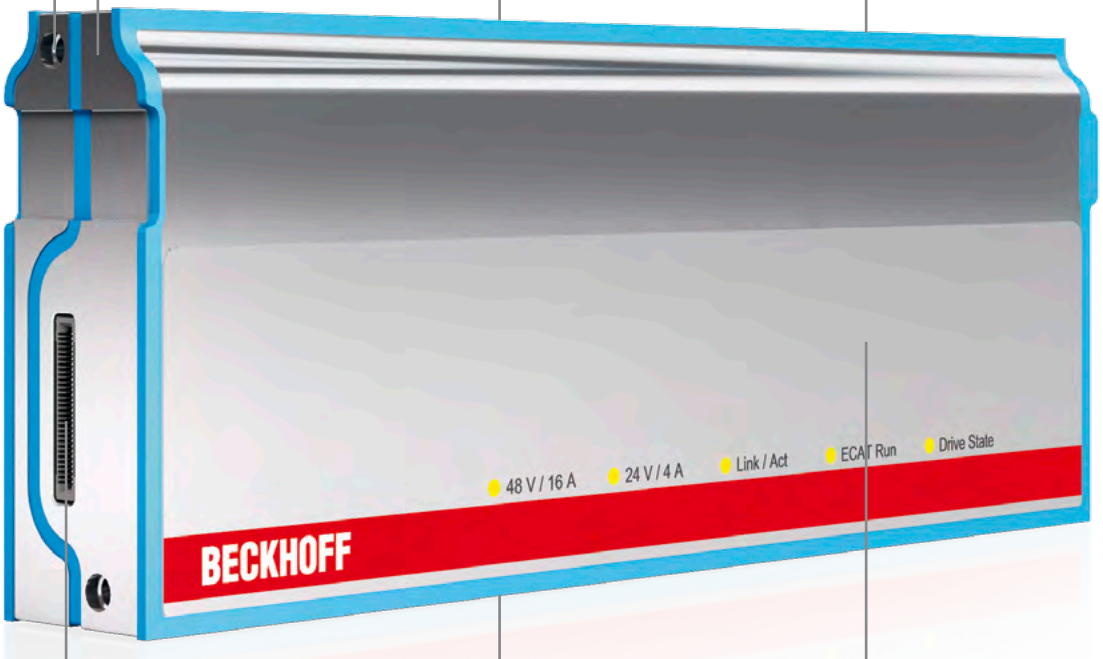
The motor modules of the new XTS Black Line supplement the existing product range by variants without holes in the upper profiles of the motor module. The motor modules in the XTS Black Line are intended for use with guide rails that are not screwed onto the modules.

Straight and curved motor modules can be combined with each other and also with standard modules as desired. The Black Line motor modules are easier to clean because there are no holes in the upper profile.

Ordering information	XTS Black Line: motor modules
AT2000-0250-0002	motor module, straight (top profile without drilling hole), 48 V DC/24 V DC, 250 mm x 39.1 mm x 96 mm (L x W x H), 2.0 kg
AT2001-0250-0002	motor module with feed, straight (top profile without drilling hole), 48 V DC/24 V DC, cable length 5 m, 250 mm x 39.1 mm x 96 mm (L x W x H), 3.1 kg
AT2001-0250-0004	motor module with feed, straight (top profile without drilling hole), 48 V DC/24 V DC, cable length 5 m, 250 mm x 39.1 mm x 96 mm (L x W x H), 3.1 kg, UL-listed
AT2020-0250-0002	motor module, 22.5° (positive curve, convex, radius constant, top profile without drilling hole), 48 V DC/24 V DC, 256.2 mm x 39.1 mm x 106.8 mm (L x W x H), 2.2 kg
AT2021-0250-0002	motor module, 22.5° (positive curve, convex, radius constant, top profile without drilling hole), 48 V DC/24 V DC, cable length 5 m, 256.2 mm x 39.1 mm x 106.8 mm (L x W x H), 3.3 kg
AT2025-0250-0002	motor module, -22.5° (negative curve, concave, radius constant, top profile without drilling hole), 48 V DC/24 V DC, 278.1 mm x 39.1 mm x 107.8 mm (L x W x H), 2.2 kg
AT2026-0250-0002	motor module with feed, -22.5° (negative curve, concave, radius constant, top profile without drilling hole), 48 V DC/24 V DC, cable length 5 m, 278.1 mm x 39.1 mm x 107.8 mm (L x W x H), 3.3 kg
AT2040-0250-0002	motor module, 45° (positive curve, convex, radius constant, top profile without drilling hole), 48 V DC/24 V DC, 58.9 mm x 39.1 mm x 114.4 mm (L x W x H), 1.9 kg
AT2041-0250-0002	motor module with feed, 45° (positive curve, convex, radius constant, top profile without drilling hole), 48 V DC/24 V DC, cable length 5 m, 258.9 mm x 39.1 mm x 114.4 mm (L x W x H), 3.0 kg
AT2041-0250-0004	motor module with feed, 45° (positive curve, convex, radius constant, top profile without drilling hole), UL-listed, 48 V DC/24 V DC, cable length 5 m, 258.9 mm x 39.1 mm x 114.4 mm (L x W x H), 3.0 kg
AT2050-0500-0002	motor module, 180° (clothoid, radius not constant, top profile without drilling hole), 48 V DC/24 V DC, 306.7 mm x 39.1 mm x 194.5 mm (L x W x H), 4.1 kg

XTS Hygienic | The construction kit

▶ www.beckhoff.com/XTS-Hygienic



To create a track the single parts with protection class IP 69K are mounted at the machine frame.

Centering hole

Installation area guide rail

Circumferential seals prevent the ingress of dirt particles.

When mounting two modules, control voltage (24 V DC), power supply (48 V DC) and EtherCAT are automatically connected through.

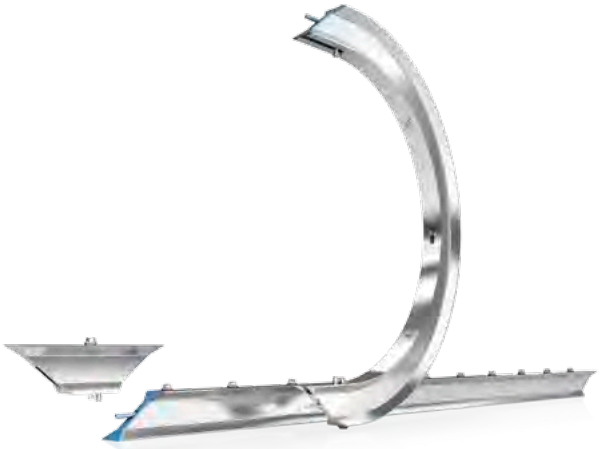
Mounting area: This surface enables mounting at the machine base.

Position feedback integrated in motor module
- non-contact
- absolute positions of all movers
- multi-position measurement
- resistant to dirt

Straight motor module

We reserve the right to make technical changes.

Curved motor module



Guide rail system

Mover

The fully encapsulated mechatronic transport system, XTS Hygienic combines the advantages of rotary and linear drive systems for demanding environmental conditions.
The stainless steel version of the XTS linear transport system (with IP 69K protection rating) provides all functions required for system operation:

– modular, fully integrated linear motor combines power electronics and position feedback in a single component
– multiple movers used as moved parts for controlling the material flow
– mechanical guide rails for configuration of any desired geometry

With this matching set of only a few components, the most diverse applications in the food and pharmaceutical industries can be realised. All surfaces are chemically resistant and provide ease of cleaning. A system implementation with XTS Hygienic offers hygienic design without any hidden edges or undercuts. All components are sealed at the joints with a high-quality elastic material and enable high-pressure washdown. As a result, the XTS Hygienic meets all EHEDG requirements for system certification according to EL Class I AUX. Due to the reduced construction volume of the XTS components, users benefit from a smaller machine footprint in a clear layout providing ease of maintenance.

System properties	XTS Hygienic
Max. force	90 N at standstill
Continuous force	30 N (at ~30 °C temperature increase in the motor compared to mounting frame)
Speed	4 m/s @ 48 V DC supply
Acceleration	> 50 m/s² (without payload)
Mover length	80 mm in direction of movement
Mover weight	approx. 910 g (complete mover without attachments)
Max. system length	> 100 m (dependent on computing power, no system limit)
Surface	electropolished
Material	housing: stainless steel 1.4404 AISI 316L; sealing: FPM
Operating/storage temperature	-10…+40 °C/-25…+85 °C (for further information see documentation)
Protection class	IP 69K
Approvals	CE, EHEDG EL Class I AUX (standard-compliant when assembled)
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4

Electrical data	XTS Hygienic
Supply voltage	control voltage 24 V DC, power supply 48 V DC
Current consumption	power supply: 16 A nominal current
Power consumption 24 V DC	motor modules: 30 W/m (communication, electronics, position determination)
Length per feed	max. 3 m (voltage supply, EtherCAT)
Power consumption per mover	approx. 15 W @ 4 m/s without payload

We reserve the right to make technical changes.

ATH2000 | **XTS Hygienic motor modules**

The motor modules of the new XTS Hygienic series combine the advantages of the XTS and compliance with the high requirements of the food industry in relation to media resistance and easy cleaning.

Power electronics and position feedback are integrated in an electropolished stainless steel housing made of 1.4404 AISI 316L and are ready to connect.

When assembled, the motor modules seal to the machine bed and the guide rails without leaving any gaps or dead spaces. The required FPM seals are a fixed part of the housing, considerably simplifying system assembly. As usual, all motor modules can be combined with as desired. In the assembled state, compliance with protection class IP 69K is ensured.

The XTS components in hygienic design meet the requirements of the EHEDG recommendation with regard to cleanability and sealing. Certification of a system into which XTS Hygienic components are installed is possible according to the "Hygienic Design Weihenstephan Certified System".

The ATH2050-0500 curved modules can be connected to the straight modules ATH2000-0250 or ATH2001-0250. By adding two curved modules, a closed circuit track can be designed with the movers running on the circumference. To ensure the high IP 69K protection rating, the system is completely sealed.

Technical data	ATH2000-0250	ATH2001-0250	ATH2050-0500
Infeed	–	yes	–
Design form	straight	straight	curved
Dimensions (L x W x H)	250 mm x 34 mm x 96 mm	250 mm x 34 mm x 96 mm	315 mm x 34 mm x 200 mm
Weight	4.0 kg	5.4 kg	8.0 kg
Surface	electropolished		
Material	housing: stainless steel 1.4404 AISI 316L; sealing: FPM		
Protection class	IP 69K		
Approvals	CE		

Ordering information	XTS Hygienic: stainless steel motor modules
ATH2000-0250	stainless steel motor module, straight, 48 V DC/24 V DC, protection class IP 69K, 250 mm x 34 mm x 96 mm (L x W x H), 4.0 kg
ATH2001-0250	stainless steel motor module with feed, straight, 48 V DC/24 V DC, cable length 5 m, protection class IP 69K, 250 mm x 34 mm x 96 mm (L x W x H), 5.4 kg
ATH2050-0500	stainless steel motor module, 180° (clothoid, radius not constant), 48 V DC/24 V DC, protection class IP 69K, 315 mm x 34 mm x 200 mm (L x W x H), 8.0 kg

For availability status see Beckhoff website at: www.beckhoff.com/ATH2000

▶ **www.beckhoff.com/ATH2000**

We reserve the right to make technical changes.

ATH9011 | **XTS Hygienic mover**

The new ATH9011 mover is adapted to the new fields of application of the ATH2000 motor modules of the XTS Hygienic in order to guarantee good cleanability. The design and the materials of the movers allow cleaning in a washing machine. The feedback flag is an integrated component of the completely encapsulated magnetic plate set of the mover. Customer-specific attachments and tools can be mounted on the mover using a seal that is included in the delivery contents to ensure that the same hygienic requirements can also be met with customer connections.

Ordering information	XTS Hygienic: stainless steel mover suitable for the ATH900 guide rail system
ATH9011-0075-0550	stainless steel mover, 6 rollers (plastic coated), length 75 mm, 1.04 kg, mounted with magnetic plate set ATH9001-0550 and set of rollers ZXH9011-0075

▶ **www.beckhoff.com/ATH9011**

Accessories

Ordering information	XTS Hygienic accessories
ATH9001-0550	magnetic plate set, 5-pin, 50 mm, 3 mm thick encoder flags with electronic labeling mover standard, suitable for stainless steel mover ATH9011-00xx-0550
ZXH9011-0075	set of rollers, 6 rollers (plastic coated), suitable for stainless steel mover ATH9011-0075-xxxx

For availability status see Beckhoff website at: www.beckhoff.com

ATH9000 | **XTS Hygienic guide rails**

The guide rails of the new XTS Hygienic are entirely made of stainless steel. The interface between individuals rails has been revised for simple sealing. A lock allows fast exchange of the movers for cleaning and maintenance purposes after loosening just one screw. The curved rail is optimally matched to the ATH9011 mover of the XTS Hygienic. Small manufacturing tolerances and additional fits at the connection points to the motor modules allow both simple and precise mounting on the motor modules, ensuring a seal free of gaps and dead spaces at such junctions, too. The ATH9200 guide rails are designed in such a way that several straight guide rails can be combined.

Ordering information	XTS Hygienic guide rails, suitable for straight motor modules
ATH9000-0250	stainless steel guide rail, 250 mm, straight, suitable for 1 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-0500	stainless steel guide rail, 500 mm, straight, suitable for 2 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-0750	stainless steel guide rail, 750 mm, straight, suitable for 3 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-1000	stainless steel guide rail, 1000 mm, straight, suitable for 4 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-1250	stainless steel guide rail, 1250 mm, straight, suitable for 5 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-1500	stainless steel guide rail, 1500 mm, straight, suitable for 6 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-1750	stainless steel guide rail, 1750 mm, straight, suitable for 7 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-2000	stainless steel guide rail, 2000 mm, straight, suitable for 8 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-2250	stainless steel guide rail, 2250 mm, straight, suitable for 9 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9000-2500	stainless steel guide rail, 2500 mm, straight, suitable for 10 x straight stainless steel motor module ATH200x-0250 with/without feed

We reserve the right to make technical changes.

Ordering information	XTS Hygienic guide rails with gate, suitable for straight motor modules
ATH9100-0500	stainless steel guide rail, 500 mm, straight with gate, suitable for 2 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-0750	stainless steel guide rail, 750 mm, straight with gate, suitable for 3 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-1000	stainless steel guide rail, 1000 mm, straight with gate, suitable for 4 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-1250	stainless steel guide rail, 1250 mm, straight with gate, suitable for 5 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-1500	stainless steel guide rail, 1500 mm, straight with gate, suitable for 6 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-1750	stainless steel guide rail, 1750 mm, straight with gate, suitable for 7 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-2000	stainless steel guide rail, 2000 mm, straight with gate, suitable for 8 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-2250	stainless steel guide rail, 2250 mm, straight with gate, suitable for 9 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9100-2500	stainless steel guide rail, 2500 mm, straight with gate, suitable for 10 x straight stainless steel motor module ATH200x-0250 with/without feed

Ordering information	XTS Hygienic guide rails, suitable for 180° motor modules (clothoid)
ATH9050-0500-0075	stainless steel guide rail, 500 mm, 180° curve (clothoid, radius not constant), for ATH901x-0075-0550, suitable for 1 x stainless steel motor module ATH2050-0500

Ordering information	XTS Hygienic guide rails, connectors
ATH9200-0250	stainless steel guide rail, 250 mm, connector for straight stainless steel guide rails, suitable for 1 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-0500	stainless steel guide rail, 500 mm, connector for straight stainless steel guide rails, suitable for 2 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-0750	stainless steel guide rail, 750 mm, connector for straight stainless steel guide rails, suitable for 3 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-1000	stainless steel guide rail, 1000 mm, connector for straight stainless steel guide rails, suitable for 4 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-1250	stainless steel guide rail, 1250 mm, connector for straight stainless steel guide rails, suitable for 5 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-1500	stainless steel guide rail, 1500 mm, connector for straight stainless steel guide rails, suitable for 6 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-1750	stainless steel guide rail, 1750 mm, connector for straight stainless steel guide rails, suitable for 7 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-2000	stainless steel guide rail, 2000 mm, connector for straight stainless steel guide rails, suitable for 8 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-2250	stainless steel guide rail, 2250 mm, connector for straight stainless steel guide rails, suitable for 9 x straight stainless steel motor module ATH200x-0250 with/without feed
ATH9200-2500	stainless steel guide rail, 2500 mm, connector for straight stainless steel guide rails, suitable for 10 x straight stainless steel motor module ATH200x-0250 with/without feed

For availability status see Beckhoff website at: www.beckhoff.com/ATH9000

▶ **www.beckhoff.com/ATH9000**

We reserve the right to make technical changes.

Software

TwinCAT 3
- one engineering environment, based on Microsoft Visual Studio®
- IEC 61131, C/C++, MATLAB®/Simulink®
- integrated modules:
  - real-time
  - PLC, NC, CNC
  - HMI
  - robotics
  - measurement technology
  - Safety
- TwinCAT 3 modules: standardised programming framework for modular programming
- automatic code generation and project implementation with the TwinCAT Automation Interface

We reserve the right to make technical changes.

TE5910 | **TC3 Motion Designer**
- design tool for dimensioning a drive system, including detailed report function
- predefined load cases and motion profiles
- optimisation function and parts list generator

See page 450

TE5950 | **TC3 Drive Manager 2**
- intuitive commissioning of an AX8000 multi-axis servo system and the EL72xx servomotor terminals
- clear display of parameter and startup lists with integrated search function

See page 452

TF5850 | **TC3 XTS Extension**
- mapping of XTS movers as a servo axis
- All Motion Control functions can be used.
- automated system configuration
- intuitive 2D representation of the movers with XTS Viewer

See page 454

TE5910 | **TC3 Motion Designer**

The dimensioning of drive axes, in conjunction with the optimum selection of motor, gear unit, drive controllers and accessories, is the basis for an efficient machine design. The TC3 Motion Designer is optionally integrated in the TwinCAT automation platform, or it can be used as a stand-alone project engineering tool for mechanical design.

Mechanics
The TC3 Motion Designer supports the designer in the configuration of typical mechanical systems such as pinion rack, spindle nut, winder, crank drive, etc.

Motion profiles
Rough estimates for simple load cases with motion profiles, e.g. based on a $^1/_2$ or $^1/_3$ rule or a 7-segment profile, are easy to realise with a few mouse clicks. More complex tasks and kinematic systems, perhaps in conjunction with more sophisticated motion profiles, including cam gears according to VDI 2143, are also taken account of in the TC3 Motion Designer. Export functions enable the configuration to be transferred directly to the TwinCAT System Manager, without the need for repeated inputs.

Optimisation function
An optimisation algorithm makes the selection of gear units and motors straightforward. It suggests the optimum combination based on mechanical and cost considerations, taking into account adjustable filters. The connected database provides access to all available gear units, motors and servo drives offered by Beckhoff, including the compact Drive Technology range with servo terminals.

The automatic geometry matching feature checks the compatibility of motor and gear unit and prevents selection of unsuitable combinations.

Report functions
The axis configuration is documented in a report. A choice of short or detailed report is available.

With a single click the designer can call up the technical data sheet for the motor and gear unit, and with a further click the corresponding 3D model of the drive components for integration in the design software.

Parts list generator
The integrated parts list generator can be used directly for preparing the purchase order. Accessories such as cables, chokes and installation material are also considered.

Multi-axis design
The TC3 Motion Designer regards the machine as a holistic unit, including all drive axes: All load cycles, including their temporal dependence and their influence on the common DC-Link, are taken into account. Selection of the optimum supply module or the common brake resistor is guaranteed.

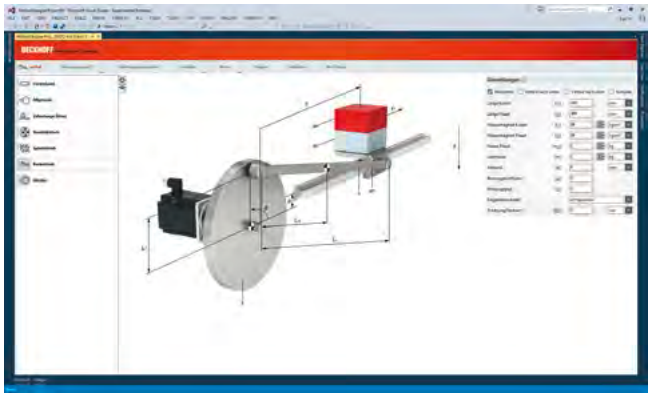
We reserve the right to make technical changes.

Description	Value	Importance
Desired inertia ratio	1	Low
Maximal velocity utilization	0,7	Low
Maximal torque utilization	0,7	Low
Power		Low
Price		Low

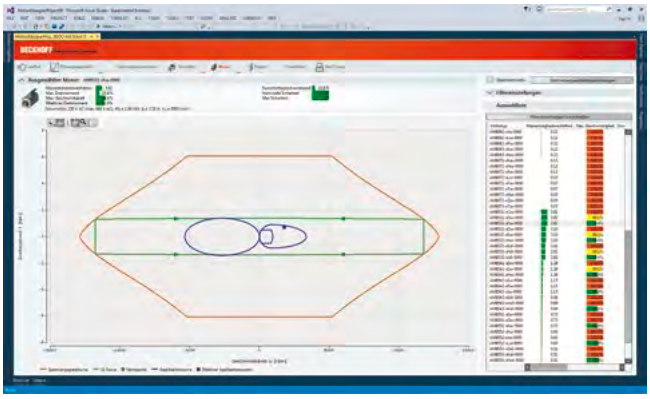
Optimizer settings

Description	Value	Importance
Maximal velocity utilization	0,7	Low
Maximal torque utilization	0,7	Low

The optimisation algorithm suggests the economically and mechanically optimal motor/gear unit combination according to the criteria that have been set.

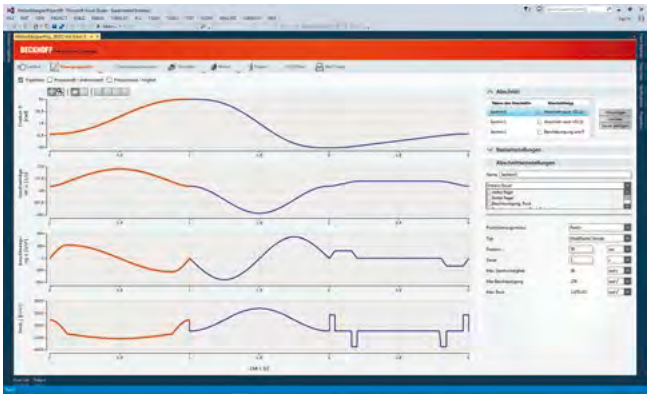


The selected mechanism is graphically displayed and can be adapted precisely to the real application through further settings.



The axis utilisation can be directly classified in the 4-quadrant view.

With the parts list editor all required components can be directly added. The complete parts list of all components can be exported in common formats, e.g. Excel.



The Motion Designer enables the direct observation of the curves of position, speed, torque and acceleration over time for each axis.

Ordering information	
TE5910	TC3 Motion Designer for drive dimensioning

▶ **www.beckhoff.com/TE5910**

TE5950 | **TC3 Drive Manager 2**

The TC3 Drive Manager 2 is used for commissioning the AX8000 or the EL72xx, EP72xx and EJ72xx I/O components. It is optionally available as an integrated version in the TwinCAT automation platform or an update version independently of TwinCAT. The TC3 Drive Manager 2 is integrated into a TwinCAT solution as a project and enables a separate assessment of supply modules, axis modules and axis channels.

Automatic startup list
The menu structure enables intuitive axis commissioning. Via the electronic identification plate, TC3 Drive Manager 2 automatically identifies the motor and corresponding parameter data. As a result, a startup list is automatically generated for each axis.

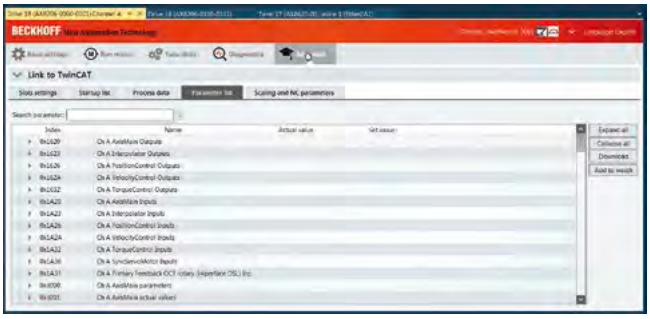
Scope View is integrated
Using the Run Motor function, the motor is ready for operation with an NC control system.

The combination of NC control with the Scope View tool provides an optimal overview of the motor in operation. A fine-tuning of the axis and a minimisation of the tracking error is easy and straightforward.

Further adaptations are possible directly in the TC3 Drive Manager 2 via the Tune Drive function, such as the adjustment of parameter settings and the configuration of filters.

We reserve the right to make technical changes.

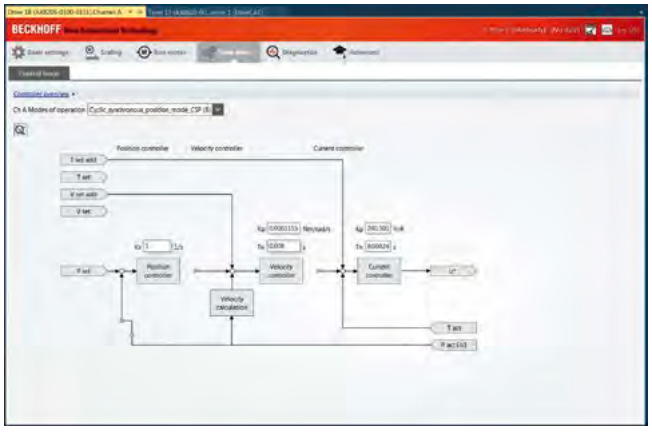
Detailed visualisation of the motor characteristic according to the electronic identification plate



Structured parameter list with integrated search function

Integrated scope in the NC control overview of the motor

All diagnostic messages at a glance and an additional watch window with individual user options



Direct fine-tuning of the drive during commissioning

Ordering information	
TE5950	TC3 Drive Manager 2

▶ **www.beckhoff.com/TE5950**

TF5850 | TC3 XTS Extension

The TC3 XTS Extension decouples servo algorithms from the hardware and calculates them centrally. TwinCAT maps each XTS mover as a normal servo axis, enabling simple movement handling. Each output stage/coil is supplied with a current setpoint via EtherCAT.

All Motion Control functions such as flying saw, electrical gears and cam plates are usable. Function extensions in TwinCAT take over typical XTS requirements:

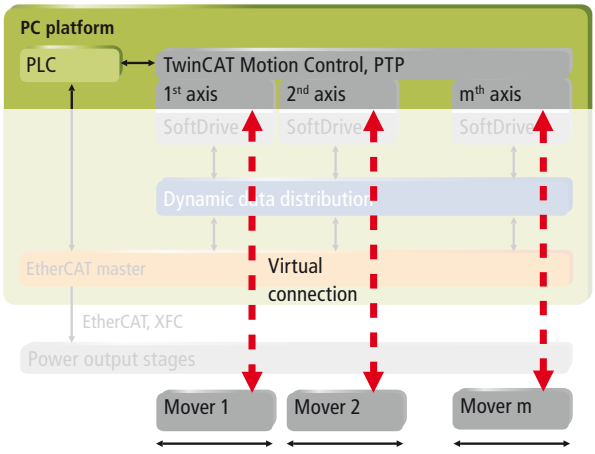
- automatic accumulation
- collision avoidance
- jerk avoidance
- centrifugal force limitation

The integration of the XTS system into a production plant is easily possible thanks to support of numerous fieldbuses. All TwinCAT interfaces and functions simplify development and maintenance:

- application-specific programming in IEC 61131
- remote access over Ethernet
- synchronisation (with external application)
- setting of breakpoints
- visualisation of arbitrary variables

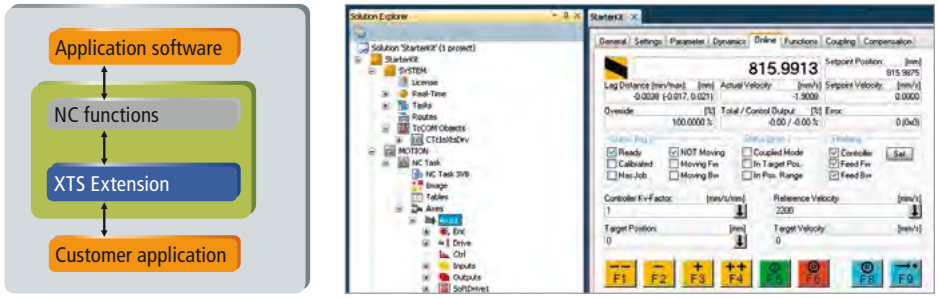
Distance monitoring | TF5400 TC3 Advanced Motion Pack integrated

The TF5850 contains the TwinCAT 3 function TF5400 TC3 Advanced Motion Pack with integrated distance monitoring (CA Collision Avoidance). This function is used by the mover axes for automatic monitoring of a pre-set safety distance between each other. If necessary, the axes will automatically brake the movers, taking into account the current dynamic parameters and velocity. Application programming is optimised and simplified significantly.



In IEC 61131 a mover can be programmed like a servo axis: simple movement commands are sufficient.

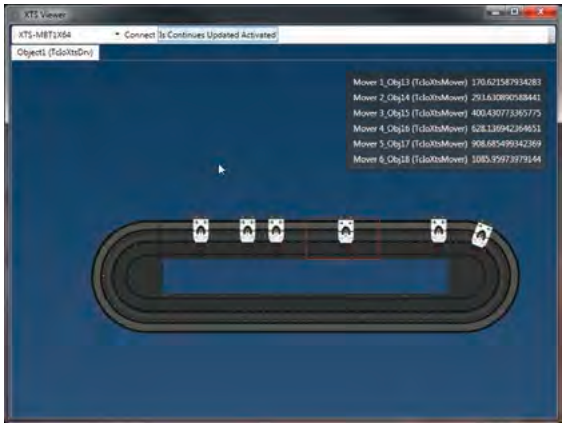
We reserve the right to make technical changes.



TC3 XTS Extension | In application programming, a mover is handled like a conventional servo axis.

The XTS configurator enables largely automated system configuration.

Axis and controller parameters of a mover can simply be copied within the XTS configurator.



The XTS viewer renders an intuitive online 2D represenation of the movers in motion and can be used as a diagnostics and simulation tool.

Ordering information	
TF5850-0050	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P50 (performance plus)
TF5850-0060	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P60 (mid performance)
TF5850-0070	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P70 (high performance)
TF5850-0080	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P80 (very high performance)
TF5850-0081	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P81 (Many Core, 5-8 Cores)
TF5850-0082	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P82 (Many Core, 9-16 Cores)
TF5850-0083	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P83 (Many Core, 17-32 Cores)
TF5850-0084	software license, TwinCAT 3 XTS Extension, TwinCAT 3 platform P84 (Many Core, 33-64 Cores)

▶ **www.beckhoff.com/TwinCAT3**

Highlights

- One software platform for engineering and runtime
- Integrated real-time support
- Software modules for PLC, NC, CNC, robotics, HMI, measurement technology, analytics, safety

TwinCAT

PLC and Motion Control on the PC

▸ **www.beckhoff.com/TwinCAT**

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470 TwinCAT 3

472 eXtended Automation Architecture (XAA)
473 eXtended Automation Engineering (XAE)
482 eXtended Automation Runtime (XAR)

484 TwinCAT 3 Engineering TExxxx

488 TwinCAT 3 Base TC1xxx

492 TwinCAT 3 Functions
492 System TF1xxx
493 HMI TF2xxx
495 Measurement TF3xxx
498 Controller TF4xxx
499 Motion Control TF5xxx
508 Connectivity TF6xxx
516 Industry specific TF8xxx

518 TwinCAT 2

520 TwinCAT 2 PLC TX1200

521 TwinCAT 2 NC PTP TX1250

521 TwinCAT 2 NC I TX1260

522 TwinCAT 2 CNC TX1270

523 TwinCAT 2 I/O TX1100

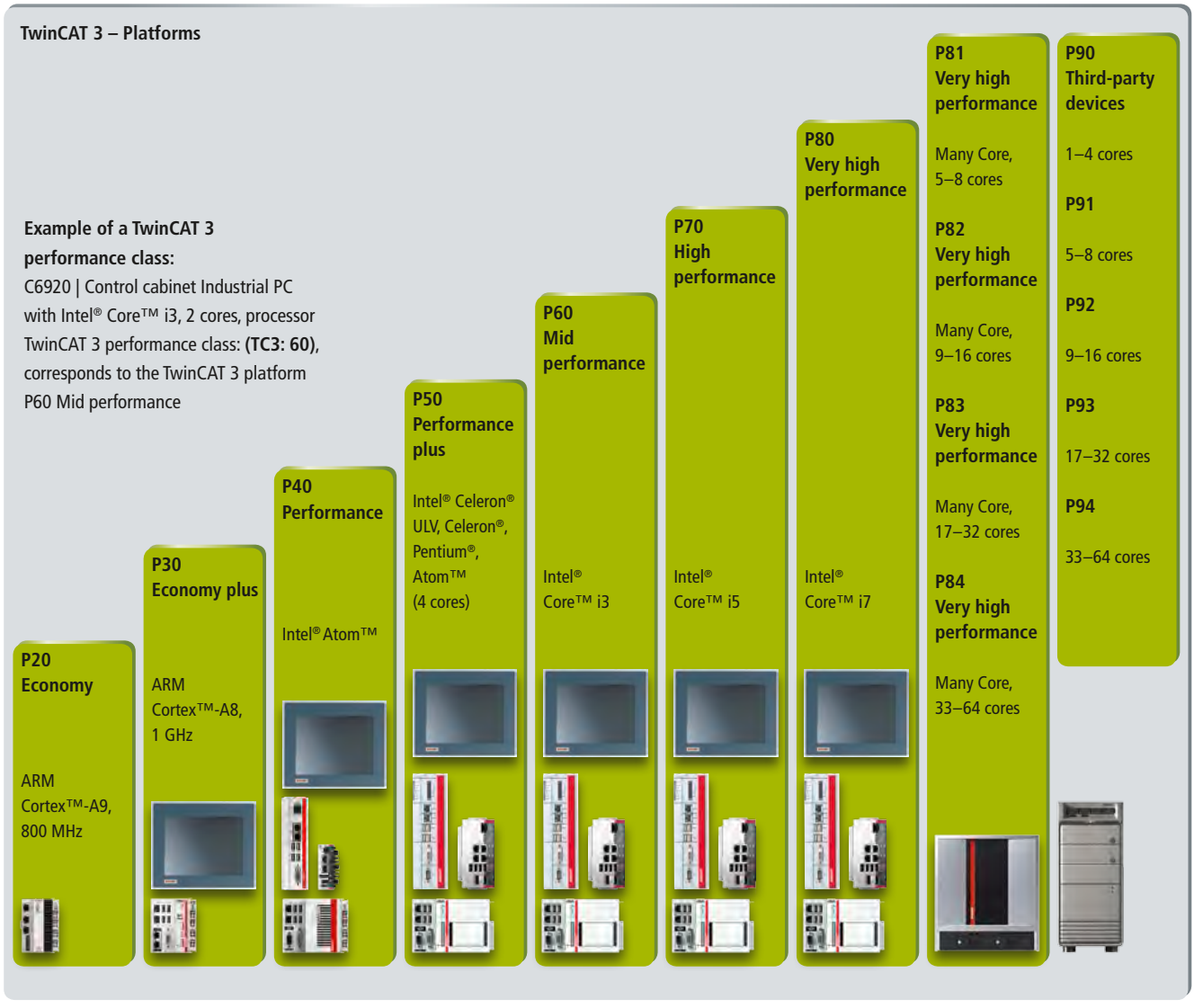
523 TwinCAT 2 CP TX1000

524 TwinCAT 2 Supplements
524 System TSxxxx
528 Controller TS4xxx
529 Motion TS5xxx
533 Communication TS6xxx
540 Building Automation TS8xxx

Product overview TwinCAT 3

The TwinCAT 3 runtime components are available for different platforms. The platform levels correspond to the various TwinCAT 3 performance classes of the Beckhoff PCs. The TwinCAT 3 performance class of a Beckhoff PC depends on the configuration and the technical data of the PC (including the processor).

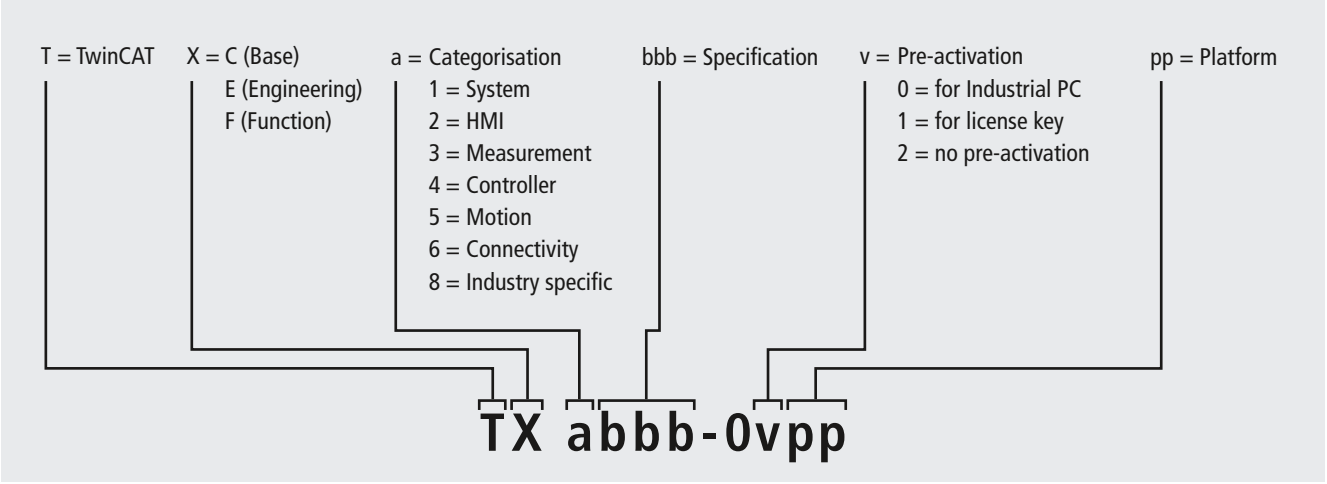
The following overview shows the various TwinCAT 3 platforms. The controllers integrated in the platform classifications represent sample configurations. The TwinCAT 3 performance class required for a TwinCAT 3 Runtime component can be found in the product description of the respective Beckhoff PC.

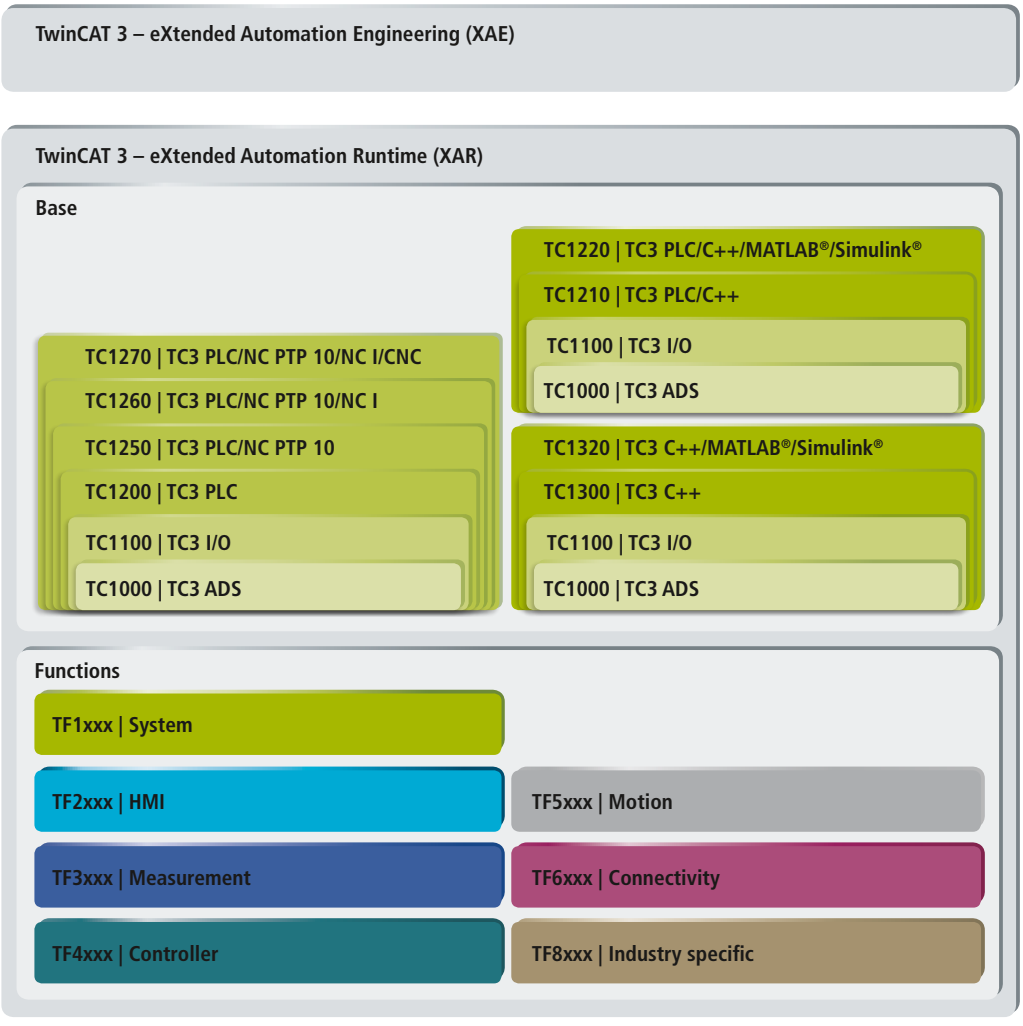


The controllers integrated in the platform categorisation are only example configurations.

We reserve the right to make technical changes.

TwinCAT 3 designation system





TwinCAT 3 is divided into components. The TwinCAT 3 engineering components enable the configuration, programming and debugging of applications. The TwinCAT 3 runtime consists of further components – basic components and functions. The basic components can be extended by functions.

TwinCAT 3 | Engineering

TE1000 | **TC3 Engineering**	TwinCAT 3 engineering environment	484
TE1111 | **TC3 EtherCAT Simulation**	easy configurations of simulation environments with several EtherCAT slaves	484
TE1120 | **TC3 XCAD Interface**	transfer of existing engineering results from ECAD tools	484
TE1130 | **TC3 CAD Simulation Interface**	link between TwinCAT and a 3D CAD system for SiL simulation	484
TE1200 | **TC3 PLC Static Analysis**	analysis tool that tests PLC software on the basis of coding rules	485
TE1300 | **TC3 Scope View Professional**	software oscilloscope for the graphical display of data captured from several target systems	485
TE1310 | **TC3 Filter Designer**	graphic engineering tool for determining coefficient digital filters	485
TE1400 | **TC3 MATLAB®/Simulink® Target**	TwinCAT target for MATLAB®/Simulink® for generating TwinCAT 3 modules	485
TE1410 | **TC3 Interface for MATLAB®/Simulink®**	communication interface between MATLAB®/Simulink® and the TwinCAT 3 runtime	486
TE1420 | **TC3 Target for FMI**	interface for simulation tools that support the Functional Mockup Interface (FMI)	486
TE1500 | **TC3 Valve Diagram Editor**	graphical tool for designing the characteristic curve of a hydraulic valve	486
TE1510 | **TC3 Cam Design Tool**	graphic design tool for electronic cam plates	486
TE1610 | **TC3 EAP Configurator**	a tool for visualising and configuring communication networks, in which data exchange based on the EtherCAT Automation Protocol (EAP) takes place or is to be established	487
TE2000 | **TC3 HMI**	tool for developing platform-independent user interfaces	487
TE3500 | **TC3 Analytics Workbench**	complete solution for 24/7 monitoring of machines and systems incl. visualisation on analysis dashboards	487
TE3520 | **TC3 Analytics Service Tool**	process data analysis tool for commissioning and service technicians	487
TE5910 | **TC3 Motion Designer**	TC3 Motion Designer for drive dimensioning	450
TE5950 | **TC3 Drive Manager 2**	for commissioning the AX8000 multi-axis servo system or the I/O components EL72xx, EP72xx and EJ72xx	452

TwinCAT 3 | Base

TC1000 | **TC3 ADS**	TwinCAT 3 ADS	488
TC1100 | **TC3 I/O**	TwinCAT 3 I/O	488
TC1200 | **TC3 PLC**	TwinCAT 3 PLC	489
TC1210 | **TC3 PLC/C++**	TwinCAT 3 PLC and C++	489
TC1220 | **TC3 PLC/C++/MATLAB®/Simulink®**	TwinCAT 3 PLC, C++ and modules generated in MATLAB®/Simulink®	489
TC1250 | **TC3 PLC/NC PTP 10**	TwinCAT 3 PLC and NC PTP 10	490
TC1260 | **TC3 PLC/NC PTP 10/NC I**	TwinCAT 3 PLC, NC PTP 10 and NC I	490
TC1270 | **TC3 PLC/NC PTP 10/NC I/CNC**	TwinCAT 3 PLC, NC PTP 10, NC I and CNC	491
TC1275 | **TC3 PLC/NC PTP 10/NC I/CNC E**	TwinCAT 3 PLC, NC PTP 10, NC I and CNC E	491
TC1300 | **TC3 C++**	TwinCAT 3 C++	491
TC1320 | **TC3 C++/MATLAB®/Simulink®**	TwinCAT 3 C++ and modules generated in MATLAB®/Simulink®	491

We reserve the right to make technical changes.

TwinCAT 3 | Functions

System

TF1800 | **TC3 PLC HMI**	stand-alone tool for displaying visualisations from the PLC development environment	492
TF1810 | **TC3 PLC HMI Web**	display of visualisations from the PLC development environment in a web browser	492
TF1910 | **TC3 UML**	UML (Unified Modeling Language) for modelling of PLC software	492

HMI

TF2000 | **TC3 HMI Server**	modular web server, includes a client connection and a target connection	493
TF2010 | **TC3 HMI Clients Pack 1**	extension of TC3 HMI server for one additional client connection	493
TF2020 | **TC3 HMI Clients Pack 3**	extension of TC3 HMI server for 3 additional client connections	493
TF2030 | **TC3 HMI Clients Pack 10**	extension of TC3 HMI server for 10 additional client connections	493
TF2040 | **TC3 HMI Clients Pack 25**	extension of TC3 HMI server for 25 additional client connections	493
TF2050 | **TC3 HMI Targets Pack 1**	extension of TC3 HMI server for one additional control system	493
TF2060 | **TC3 HMI Targets Pack 3**	extension of TC3 HMI server for 3 additional control systems	493
TF2070 | **TC3 HMI Targets Pack 10**	extension of TC3 HMI server for 10 additional control systems	493
TF2080 | **TC3 HMI Targets Pack 25**	extension of TC3 HMI server for 25 additional control systems	493
TF2090 | **TC3 HMI Targets Pack 100**	extension of TC3 HMI server for 100 additional control systems	493
TF2110 | **TC3 HMI OPC UA**	server extension for access to TwinCAT target systems or other controllers via OPC UA	494
TF2200 | **TC3 HMI Extension SDK**	software development kit (C++/.NET) for programming application-specific solutions	494
TF2210 | **TC3 HMI Recipe Management**	server extension for recipe management	494
TF2300 | **TC3 HMI Scope**	software oscilloscope for graphic display of time sequences	494

Measurement

TF3300 | **TC3 Scope Server**	data preparation for visual display in the TwinCAT 3 Scope View	495
TF3500 | **TC3 Analytics Logger**	The TwinCAT Analytics Logger enables the cyclic archiving of the process image.	495
TF3510 | **TC3 Analytics Library**	PLC library used for online or offline analysis in the PLC runtime of the TwinCAT Analytics Workbench	495
TF3520 | **TC3 Analytics Storage Provider**	IoT client: interface to one or more storage facilities for raw and analysis data from various sources	496
TF3550 | **TC3 Analytics Runtime**	runtime "container" for the Analytics application, which was configured and developed in the Analytics Workbench	496
TF3560 | **TC3 Analytics Controller Pack 4**	extension of the TC3 Analytics Workbench for the analysis of 4 additional controllers	496
TF3561 | **TC3 Analytics Controller Pack 8**	extension of the TC3 Analytics Workbench for the analysis of 8 additional controllers	496
TF3562 | **TC3 Analytics Controller Pack 16**	extension of the TC3 Analytics Workbench for the analysis of 16 additional controllers	496
TF3563 | **TC3 Analytics Controller Pack 32**	extension of the TC3 Analytics Workbench for the analysis of 32 additional controllers	496
TF3564 | **TC3 Analytics Controller Pack 64**	extension of the TC3 Analytics Workbench for the analysis of 64 additional controllers	496
TF3565 | **TC3 Analytics Controller Pack 128**	extension of the TC3 Analytics Workbench for the analysis of 128 additional controllers	496
TF3600 | **TC3 Condition Monitoring Level 1**	PLC library for the implementation of Condition Monitoring for machines	497
TF3601 | **TC3 Condition Monitoring Level 2**	expanded PLC library for the implementation of Condition Monitoring for machines	497
TF3650 | **TC3 Power Monitoring**	TwinCAT Power Monitoring PLC library	497
TF3900 | **TC3 Solar Position Algorithm**	precise calculation of the sun's position	497

Controller

TF4100 | **TC3 Controller Toolbox**	basic controllers (P, I, D), complex controllers (PI, PID), pulse width modulation, ramps, signal generators and filters	498
TF4110 | **TC3 Temperature Controller**	temperature control for monitoring and controlling different temperature ranges	498

TwinCAT 3 | Functions

Motion

TF5000 | **TC3 NC PTP 10 Axes**	NC PTP (point-to-point movements) for up to 10 axes	499
TF5010 | **TC3 NC PTP Axes Pack 25**	extension of TwinCAT 3 NC PTP to up to 25 axes	499
TF5020 | **TC3 NC PTP Axes Pack unlimited**	extension of TwinCAT 3 NC PTP to over 25 axes	499
TF5050 | **TC3 NC Camming**	using the TwinCAT NC cam plate functionality (table coupling)	500
TF5055 | **TC3 NC Flying Saw**	implementing flying saw functionality	500
TF5060 | **TC3 NC FIFO Axes**	implementation of a pre-defined user setpoint generator for an NC axis	501
TF5065 | **TC3 Motion Control XFC**	high-precision logging and switching of digital signals in relation to axis positions	501
TF5100 | **TC3 NC I**	NC I with 3 interpolating axes and 5 additional axes	501
TF5110 | **TC3 Kinematic Transformation L1**	realisation of different kinematic transformations Level 1	502
TF5111 | **TC3 Kinematic Transformation L2**	realisation of different kinematic transformations Level 2	502
TF5112 | **TC3 Kinematic Transformation L3**	realisation of different kinematic transformations Level 3	502
TF5113 | **TC3 Kinematic Transformation L4**	realisation of different kinematic transformations Level 4	502
TF5120 | **TC3 Robotics mxAutomation**	direct communication between the PLC and the KUKA KR C4 robot control	503
TF5130 | **TC3 Robotics uniVAL PLC**	direct communication between the PLC and the CS8C robotics controller from Stäubli	503
TF5200 | **TC3 CNC**	CNC path control software	503
TF5210 | **TC3 CNC E**	CNC path control software export version	504
TF5220 | **TC3 CNC Axes Pack**	extension to up to a total of 64 axes/controlled spindles, of which a maximum of 32 can be path axes and a maximum of 12 can be controlled spindles	504
TF5230 | **TC3 CNC Channel Pack**	further CNC channel, extension to a maximum of 12 channels, channel synchronisation, axis transfer between channels	504
TF5240 | **TC3 CNC Transformation**	transformation functionality (5-axis functionality)	505
TF5250 | **TC3 CNC HSC Pack**	extending the CNC with HSC technology (high-speed cutting)	505
TF5260 | **TC3 CNC Spline Interpolation**	path programming via splines with programmable spline type, Akima-spline, B-spline	505
TF5270 | **TC3 CNC Virtual NCK Basis**	virtual TwinCAT CNC for simulation in a Windows environment	505
TF5271 | **TC3 CNC Virtual NCK Options**	virtual TwinCAT CNC for simulation in a Windows environment	506
TF5280 | **TC3 CNC Volumetric Compensation**	extension for compensating geometric machine errors based on an ISO-standardised parametric model	506
TF5290 | **TC3 CNC Cutting Plus**	technology package for extending the CNC functionality for cutting operations	506
TF5410 | **TC3 Motion Collision Avoidance**	collision avoidance and controlled accumulation when operating a number of linearly and/or translationally dependent axes with TC3 NC PTP	507
TF5420 | **TC3 Motion Pick-and-Place**	for handling tasks carried out by gantry robots and other kinematics	507
TF5800 | **TC3 Digital Cam Server**	fast cam controller with monitoring for various fieldbuses	507
TF5810 | **TC3 Hydraulic Positioning**	algorithms for control and positioning of hydraulic axes	507
TF5850 | **TC3 XTS Extension**	decouples servo algorithms from the hardware and calculates them centrally	454

We reserve the right to make technical changes.

TwinCAT 3 | Functions

Connectivity

TF6100 | **TC3 OPC UA**	access to TwinCAT in accordance with OPC UA with UA server (DA/HA/AC) and UA client (DA)	508
TF6120 | **TC3 OPC DA**	access to TwinCAT variables, in accordance with OPC DA and OPC XML DA specification	508
TF6220 | **TC3 EtherCAT Redundancy 250**	extension of the TwinCAT EtherCAT master with cable redundancy capability for up to 250 slaves	509
TF6221 | **TC3 EtherCAT Redundancy 250+**	extension of the TwinCAT EtherCAT master with cable redundancy capability for more than 250 slaves	509
TF6225 | **TC3 EtherCAT External Sync**	extension of the TwinCAT EtherCAT master with an option to synchronise the Beckhoff real-time communication with external signals	509
TF6250 | **TC3 Modbus TCP**	communication with Modbus TCP devices (server and client functionality)	509
TF6255 | **TC3 Modbus RTU**	serial communication with Modbus end devices	510
TF6270 | **TC3 PROFINET RT Device**	communication via PROFINET (PROFINET slave)	510
TF6271 | **TC3 PROFINET RT Controller**	communication via PROFINET (PROFINET master)	510
TF6280 | **TC3 Ethernet/IP Slave**	communication via EtherNet/IP (EtherNet/IP slave)	510
TF6281 | **TC3 Ethernet/IP Master**	communication via EtherNet/IP (EtherNet/IP master)	511
TF6300 | **TC3 FTP**	easy access from TwinCAT PLC to FTP server	511
TF6310 | **TC3 TCP/IP**	communication via generic TCP server	511
TF6311 | **TC3 TCP/UDP Realtime**	direct access from real-time to Ethernet communication	511
TF6340 | **TC3 Serial Communication**	communication via serial Bus Terminals or PC COM ports with the 3964R and RK512 protocol	511
TF6350 | **TC3 SMS/SMTP**	sending SMS and e-mails from the PLC	512
TF6360 | **TC3 Virtual Serial COM**	virtual serial COM driver for Windows platforms	512
TF6420 | **TC3 Database Server**	accessing databases from the PLC	512
TF6421 | **TC3 XML Server**	read and write access to XML files from the PLC	512
TF6500 | **TC3 IEC 60870-5-10x**	communication according to IEC 60870-101, -102, -103, -104	513
TF6510 | **TC3 IEC 61850/400-25**	communication according to IEC 61850 and IEC 61400-25	513
TF6600 | **TC3 RFID Reader Communication**	connection of RFID readers to the TwinCAT PLC	513
TF6610 | **TC3 S5/S7 Communication**	communication with S5/S7 controllers	513
TF6650 | **TC3 DBC File Import for CAN**	reading of DBC file formats	513
TF6701 | **TC3 IoT Communication (MQTT)**	provides basic publisher/subscriber-based data connectivity via MQTT	514
TF6710 | **TC3 IoT Functions**	provides connectivity for cloud-based communication services	514
TF6720 | **TC3 IoT Data Agent**	gateway application for data connectivity between TwinCAT runtime and IoT services	515
TF6721 | **TC3 IoT Data Agent Pack 4**	extension of TC3 IoT Data Agent for 4 additional ADS target runtimes or OPC UA namespaces	515
TF6722 | **TC3 IoT Data Agent Pack 16**	extension of TC3 IoT Data Agent for 16 additional ADS target runtimes or OPC UA namespaces	515
TF6723 | **TC3 IoT Data Agent Pack 64**	extension of TC3 IoT Data Agent for 64 additional ADS target runtimes or OPC UA namespaces	515
TF6724 | **TC3 IoT Data Agent Pack 256**	extension of TC3 IoT Data Agent for 256 additional ADS target runtimes or OPC UA namespaces	515
TF6730 | **TC3 IoT Communicator**	sends process data and push notifications from TwinCAT to smartphones and tablets through a messaging service	515
TF6735 | **TC3 IoT Communicator App**	smartphone and tablet app to receive and visualise live data and push notifications sent from TwinCAT	515

Industry specific

TF8000 | **TC3 HVAC**	library covering all technical systems in building automation	516
TF8010 | **TC3 Building Automation Basic**	executing basic room automation functions	516
TF8020 | **TC3 BACnet/IP**	communication with data networks of building automation and building control systems	516
TF8040 | **TC3 Building Automation**	software package covering all technical building automation services	517
TF8310 | **TC3 Wind Framework**	framework for the development of operational management software for wind turbines	517
TF8810 | **TC3 AES70 (OCA)**	communication library for the operation of a system as an OCA (Open Control Architecture) controller or OCA device in an OCA network	517

Product overview TwinCAT 2

TX1200 | TwinCAT PLC

520

PC hardware	standard PC/IPC hardware, no extras
Operating systems	Windows 7/10, Windows CE*
Real-time	Beckhoff real-time kernel
I/O system	EtherCAT, Lightbus, PROFIBUS DP/MC, Interbus, CANopen, DeviceNet, SERCOS, Ethernet
Runtime system	4 multi-tasking PLCs each with 4 tasks in each PLC runtime system, development and runtime systems on one PC or separately (CE: only runtime)
Memory	process image size, flags area, program size, POU size, number of variables only limited by the size of the user memory (max. 2 GB with NT/2000/XP/Vista)
Cycle time	adjustable from 50 µs
Link time	1 µs (Intel® Core™ 2 Duo)
Programming	IEC 61131-3: IL, FBD, LD, SFC, ST, powerful library management, convenient debugging

TX1250 | TwinCAT NC PTP

521

TwinCAT PLC	inclusive 520
PC hardware	standard PC/IPC hardware, no extras
Operating systems	Windows 7/10, Windows CE*
Real-time	Beckhoff real-time kernel
I/O system	EtherCAT, Lightbus, PROFIBUS DP/MC, Interbus, CANopen, DeviceNet, SERCOS, Ethernet
Programming	performed using function blocks for TwinCAT PLC according to IEC 61131-3 (standardised PLCopen Motion Control libraries), convenient axis commissioning menus in the System Manager
Runtime system	NC point-to-point including TwinCAT PLC
Number of axes	up to 255
Axis types	electrical and hydraulic servo drives, frequency converter drives, stepper motor drives, switched drives (fast/crawl axes)
Cycle time	50 µs upwards, typically 1 ms (selectable)
Axis functions	standard axis functions: start/stop/ reset/reference, speed override, special functions: master/slave cascading, cam plates, electronic gearings, online distance compensation of segments, flying saw

TX1100 | TwinCAT I/O

523

PC hardware	standard PC/IPC hardware, no extras
Operating systems	Windows 7/10, Windows CE*
Real-time	Beckhoff real-time kernel

Multi-purpose I/O interface for all common fieldbus systems, PC Fieldbus Cards and interfaces with integrated real-time driver

TX1000 | TwinCAT CP

523

PC hardware	standard PC/IPC hardware, no extras
Operating systems	Windows 7/10, Windows Embedded WES2009/WES7*
Real-time	Beckhoff real-time kernel

Windows driver for Beckhoff Control Panel

* Version-dependent/older operating system versions are available on request from our service department.

We reserve the right to make technical changes.

TX1260 | TwinCAT NC I

521

TwinCAT PLC	inclusive 520
TwinCAT NC PTP	inclusive 521
PC hardware	standard PC/IPC hardware, no extras
Operating systems	Windows 7/10, Windows CE*
Real-time	Beckhoff real-time kernel
I/O system	EtherCAT, Lightbus, PROFIBUS DP/MC, Interbus, CANopen, DeviceNet, SERCOS, Ethernet
Programming	DIN 66025 programs for NC interpolation, access via function blocks from TwinCAT PLC according to IEC 61131-3
Runtime system	NC interpolation, including TwinCAT NC PTP and PLC
Number of axes	max. 3 axes and up to 5 auxiliary axes per group, 1 group per channel, max. 31 channels
Axis types	electrical servo axes, stepper motor drives
Interpreter functions	subroutines and jumps, programmable loops, zeroshifts, tool compensations, M and H functions
Geometries	straight lines and circular paths in 3D space, circular paths in all main planes, helixes with base circles in all main planes linear, circular, helical interpolation in the main lanes and freely definable planes, Bezier splines, look-ahead function
Axis functions	online reconfiguration of axes in groups, path override, slave coupling to path axes, auxiliary axes, axis error and sag compensation, measuring functions
Operation	automatic operation, manual operation (jog/inching), single block operation, referencing, handwheel operation (motion/superposition)

TS511x | TwinCAT NC I Options

Options	TS511x | **TwinCAT Kinematic Transformation** 532

TX1270 | TwinCAT CNC

522

TwinCAT PLC	inclusive 520
TwinCAT NC PTP	inclusive 521
TwinCAT NC I	inclusive 521
PC hardware	standard PC/IPC hardware, no extras
Operating systems	Windows 7/10*
Real-time	Beckhoff real-time kernel
I/O system	EtherCAT, Lightbus, PROFIBUS DP/MC, CANopen, DeviceNet, SERCOS, Ethernet
Programming	DIN 66025 programming language with high-level language extensions, access via function blocks from TwinCAT PLC according to IEC 61131-3
Runtime system	CNC, including TwinCAT NC I, NC PTP, PLC
Number of axes/spindles	8 path axes/controlled spindles, max. of 64 axes/controlled spindles (optional), max. 12 channels (optional)
Axis types	electrical servo-axes, analog/encoder interface via fieldbus, digital interface via fieldbus
Interpreter functions	subroutines and jumps, programmable loops, zero shifts, tool compensations, M and H functions, mathematical functions, programming of parameters/variables, user macros, spindle and help functions, tool functions
Geometries	linear, circular, helical interpolation in the main planes and freely definable planes, max. 32 interpolating path axes per channel, look-ahead function
Axis functions	coupling and gantry axis function, override, axis error and sag compensation, measuring functions
Operation	automatic operation, manual operation (jog/inching), single block operation, referencing, block search, handwheel operation (motion/superposition)

TS52xx | TwinCAT CNC Options

Options	TS5220 | **TwinCAT CNC Axes Pack**
	TS5230 | **TwinCAT CNC Channel Pack**
	TS5240 | **TwinCAT CNC Transformation**
	TS5250 | **TwinCAT CNC HSC Pack**
	TS5260 | **TwinCAT CNC Spline Interpolation**

TwinCAT 2 Supplements

TwinCAT 2 Supplements | System

TS1010 | **TwinCAT Eventlogger**	alarm and diagnostic system for logging events which occur in the TwinCAT system	524
TS1110 | **TwinCAT Simulation Manager**	simplified preparation and configuration of a simulation environment	525
TS1120 | **TwinCAT ECAD Import**	importing engineering results from an ECAD program	524
TS1140 | **TwinCAT Management Server**	central administration of Beckhoff CE control systems	527
TS1150 | **TwinCAT Backup**	backing up and restoring files, operating system and TwinCAT settings	525
TS1600 | **TwinCAT Engineering Interface Server**	co-ordinating programming tasks via a central source code management system	524
TS1800 | **TwinCAT PLC HMI**	displaying visualisations created in PLC Control	526
TS1800 | **TwinCAT PLC HMI CE** -0030	displaying visualisations created in PLC Control on Windows CE platforms	526
TS1810 | **TwinCAT PLC HMI Web**	displaying visualisations created in PLC Control in a web browser	526
TS3300 | **TwinCAT Scope 2**	graphical analysis tool for displaying time-continuous signals	527
TS3900 | **TwinCAT Solar Position Algorithm**	precise calculation of the sun's position	527
TS622x | **TwinCAT EtherCAT Redundancy**	extension of the TwinCAT EtherCAT master with cable redundancy capability	527
TS6420 | **TwinCAT Database Server**	accessing databases from the PLC	525
TS6420 | **TwinCAT Database Server CE** -0030	accessing databases from the PLC for Windows CE platforms	526
TS6421 | **TwinCAT XML Data Server**	reading and writing of XML-based data by the PLC	524
TS6421 | **TwinCAT XML Data Server CE** -0030	reading and writing of XML-based data by the PLC for Windows CE platforms	525

TwinCAT 2 Supplements | Controller

TS4100 | **TwinCAT PLC Controller Toolbox**	modules for basic controllers (P, I, D), complex controllers (PI, PID), pulse width modulation, ramps, signal generators and filters	528
TS4110 | **TwinCAT PLC Temperature Controller**	instanced temperature control function block for monitoring and controlling different temperature ranges	528

TwinCAT 2 Supplements | Motion

TS1500 | **TwinCAT Valve Diagram Editor**	graphical tool for designing the characteristic curve of a hydraulic valve	532
TS1510 | **TwinCAT Cam Design Tool**	graphic design tool for electronic cam plates	531
TS5050 | **TwinCAT NC Camming**	using the TwinCAT NC cam plate functionality (table coupling)	531
TS5055 | **TwinCAT NC Flying Saw**	implementing flying saw functionality	530
TS5060 | **TwinCAT NC FIFO Axes**	implementation of a pre-defined user setpoint generator for an NC axis	530
TS5065 | **TwinCAT PLC Motion Control XFC**	high-precision logging and switching of digital signals in relation to axis positions	529
TS5066 | **TwinCAT PLC Remote Synchronisation**	remote synchronisation	530
TS511x | **TwinCAT Kinematic Transformation**	implementation of different kinematic transformations for TwinCAT PTP or TwinCAT NC I	532
TS5800 | **TwinCAT Digital Cam Server**	software implementation of fast cam controller	531
TS5810 | **TwinCAT PLC Hydraulic Positioning**	control and adjustment of hydraulic axes	529

We reserve the right to make technical changes.

TwinCAT 2 Supplements | Communication

TS6100 | **TwinCAT OPC UA Server**	access to TwinCAT in accordance with OPC UA with UA server (DA/HA/AC) and UA client (DA)	536
TS6100 | **TwinCAT OPC UA Server CE** -0030	access to TwinCAT in accordance with OPC UA with UA server (DA/HA/AC) and UA client (DA) for Windows CE platforms	536
TS6120 | **TwinCAT OPC Server**	access to TwinCAT variables in accordance with the OPC DA/OPC XML DA specification	536
TS6250 | **TwinCAT Modbus TCP Server**	communication with Modbus TCP devices (server and client functionality)	534
TS6250 | **TwinCAT Modbus TCP Server CE** -0030	communication with Modbus TCP devices (server and client functionality) for Windows CE platforms	534
TS6255 | **TwinCAT PLC Modbus RTU**	serial communication with Modbus end devices	533
TS6270 | **TwinCAT PROFINET RT Device**	TwinCAT PROFINET RT device turns every PC-based controller into a PROFINET RT device.	538
TS6271 | **TwinCAT PROFINET RT Controller**	TwinCAT PROFINET RT controller turns every PC-based controller into a PROFINET RT controller.	538
TS6280 | **TwinCAT EtherNet/IP Slave**	TwinCAT EtherNet/IP slave turns every PC-based controller into an EtherNet/IP slave.	538
TS6300 | **TwinCAT FTP Client**	basic access from TwinCAT PLC to FTP server	539
TS6310 | **TwinCAT TCP/IP Server**	communication via generic TCP servers	537
TS6310 | **TwinCAT TCP/IP Server CE** -0030	communication via generic TCP servers for Windows CE platforms	537
TS6340 | **TwinCAT PLC Serial Communication**	communication via serial Bus Terminals or PC COM ports	533
TS6341 | **TwinCAT PLC Serial Communication 3964R/RK512**	communication via serial Bus Terminals or PC COM ports with the 3964R and RK512 protocol	533
TS6350 | **TwinCAT SMS/SMTP Server**	sending SMS and e-mails from the PLC	537
TS6350 | **TwinCAT SMS/SMTP Server CE** -0030	sending SMS and e-mails from the PLC for Windows CE platforms	537
TS6360 | **TwinCAT Virtual Serial COM Driver**	virtual serial COM driver for Windows and Windows CE platforms	539
TS6370 | **TwinCAT DriveCOM OPC Server**	fieldbus-independent communication connections between the engineering tool and the drive	535
TS6371 | **TwinCAT DriveTop Server**	configuring Indramat SERCOS drives with DriveTop software on TwinCAT systems	535
TS650x | **TwinCAT PLC IEC 60870-5-101, -102, -103, -104 Master**	implementation of IEC 60870-101, -102, -103 and -104 masters	534
TS650x | **TwinCAT PLC IEC 60870-5-104** -0030 **Master CE**	implementation of IEC 60870-104 masters under Windows CE	534
TS6507 | **TwinCAT PLC IEC 60870-5-101, -104 Slave**	implementation of IEC 60870-101 and -104 slaves	534
TS6507 | **TwinCAT PLC IEC 60870-5-104** -0030 **Slave CE**	implementation of IEC 60870-104 slaves under Windows CE	534
TS6509 | **TwinCAT PLC IEC 61400-25 Server**	IEC 61400-25 communication	535
TS6511 | **TwinCAT PLC IEC 61850 Server**	IEC 61850 communication	535
TS6600 | **TwinCAT PLC RFID Reader Communication**	connection of RFID readers to the TwinCAT PLC	539
TS6610 | **TwinCAT PLC S5/S7 Communication**	communication with S5/S7 controllers	539

TwinCAT 2 Supplements | Building Automation

TS8000 | **TwinCAT PLC HVAC**	automation of HVAC and sanitary installations	540
TS8010 | **TwinCAT PLC Building Automation Basic**	executing basic room automation functions	540
TS8020 | **TwinCAT BACnet/IP**	communication with the data networks of the building automation and building control systems	540
TS8035 | **TwinCAT FIAS Server**	communication between TwinCAT PLC and a system using the FIAS standard	541
TS8036 | **TwinCAT Crestron Server**	communication between a TwinCAT PLC and a Crestron controller	541
TS8040 | **TwinCAT Building Automation**	software package covering all technical building automation services	541
TS8100 | **TwinCAT Building Automation Framework**	configuration and commissioning of building automation projects	541

The Automation Company

Beckhoff offers comprehensive system solutions in numerous performance classes for all areas of automation. The control technology is exceptionally scalable – from high-performance Industrial PCs to mini-PLCs – and can be adapted precisely to application-specific requirements. TwinCAT automation software integrates real-time control with PLC, NC and CNC functions in a single feature-filled package.

▶ **www.beckhoff.com/Automation**

Efficient engineering
- Integration into Microsoft Visual Studio®
- Wide selection of programming languages: IEC 61131-3, C/C++, MATLAB®/Simulink®, Safety C/FBD
- Modular software development
- Automatic code generation interface
- Link to source code control systems

High performance
- Cycle times from 50 µs
- Multi-core support
- Support of 32-bit and 64-bit operating systems
- Pre-emptive multitasking

Connectivity
- Useable with all fieldbus systems
- Open and expandable for IT trends – today and tomorrow
- Adheres to industry-specific and standard protocols
- Ideal for IoT and cloud computing applications

▶ **www.beckhoff.com/TwinCAT3**

We reserve the right to make technical changes.

TwinCAT 3 470

- One software platform for engineering and runtime
- Integrated real-time support
- Software modules for PLC, NC, CNC, robotics, HMI, measurement technology, analytics, safety, machine vision

TwinCAT 2 518

- Open, compatible PC hardware
- Embedded IEC 61131-3 software PLC, software NC and software CNC
- Connection to all common fieldbuses

▶ **www.beckhoff.com/TwinCAT2**

TwinSAFE 542

- Integrated safety system from I/Os to drives
- Compact safety PLC
- Certified for solutions up to IEC 61508 SIL 3 and DIN EN ISO 13849-1:2008 PL e
- Safety engineering integrated into TwinCAT 3

▶ **www.beckhoff.com/TwinSAFE**

- **Efficient, universal engineering**
- **Programming in different languages**
- **Open, hardware-independent control system gives freedom of choice in terms of automation and control components.**
- **Scalable control platform from single- to multi-core CPUs**
- **All control functions on a single, centralised platform: PLC, motion control, robotics, measurement technology, a.o.**

We reserve the right to make technical changes.

TwinCAT 3 |
eXtended Automation Technology (XAT)

▶ **www.beckhoff.com/TwinCAT3**

We reserve the right to make technical changes.

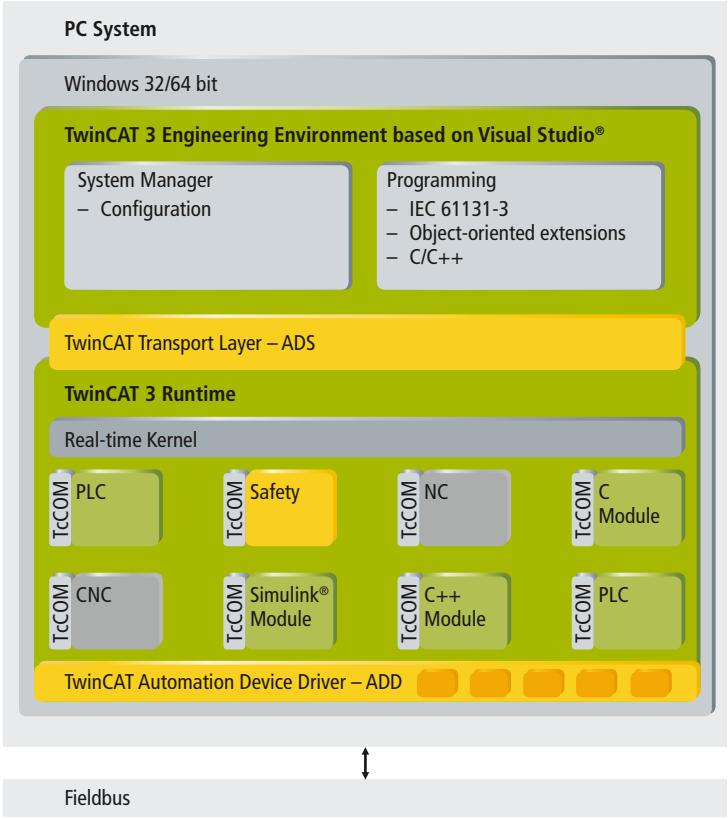
With TwinCAT 3 a PC-based control software is available which will expand the standard automation world considerably. In addition to the object-oriented IEC 61131-3 extensions, the languages of the IT world are available in C and C++. The integration of MATLAB®/Simulink® enables the application in scientific fields. And all of that in just one engineering environment. The modules run in different languages in a common runtime. The advantage of this modularity is the improved reuse of modules, once they have been written and tested. The runtime runs under harsh real-time conditions with the use of multi-core technology and the support of 32- or 64-bit operating systems.

Current operating systems can be found in the respective product tables under target systems. Older operating systems are available on request from our service department.

TwinCAT 3 highlights

- only one software for programming and configuration
- Visual Studio® integration
- more freedom in selecting programming languages
- support for the object-oriented extension of IEC 61131-3
- use of C/C++ as the programming language for real-time applications
- link to MATLAB®/Simulink®
- open interfaces for expandability and adaptation to the tools landscape
- flexible runtime environment
- active support of multi-core and 64-bit systems
- migration of TwinCAT 2 projects
- automatic code generation and project implementation with the TwinCAT Automation Interface

TwinCAT 3 | eXtended Automation Architecture (XAA)



In addition to the possibilities of controller programming according to the 3rd edition of IEC 61131-3, the new TwinCAT 3 architecture allows the use of C and C++ as the programming language. This opens up completely new application possibilities, as well as the expansion of or integration in existing systems. The link to MATLAB®/Simulink® is just one example of this new openness.

TwinCAT 3 extends the standard automation world

eXtended Automation Architecture
- supports all main fieldbuses
- supports IEC 61131, C/C++, MATLAB®/Simulink®
- supports Motion Control: from point-to-point to CNC
- supports TwinSAFE configuration
- supports Scientific Automation: robotics, measurement technology, Condition Monitoring

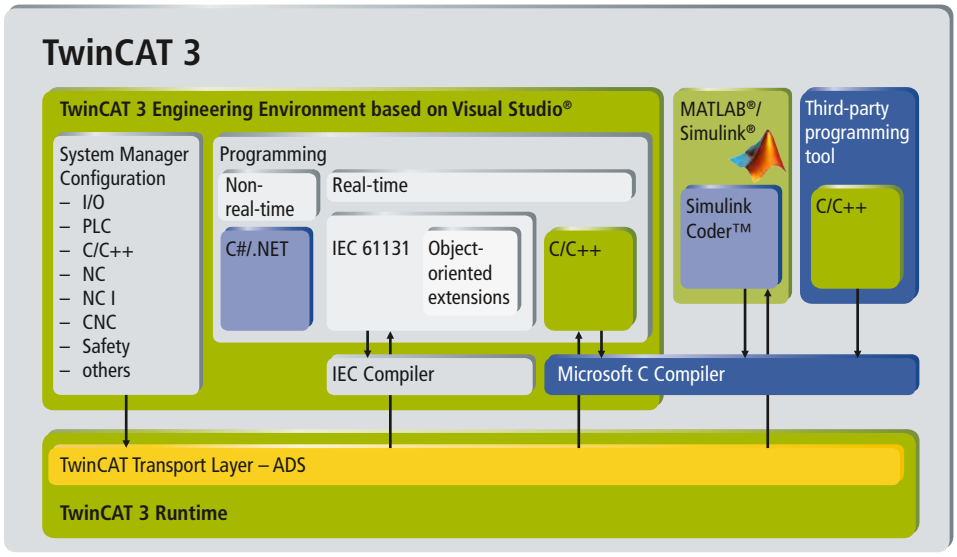
eXtended Automation Engineering
- one tool – Microsoft Visual Studio®
- integrated: IEC 61131 – worldwide standard in automation
- integrated: C/C++ – worldwide standard in IT
- integrated: TwinCAT System Manager – well-known configuration tool
- link to MATLAB®/Simulink®: worldwide standard in science
- expandable with other tools: editors, compilers
- TwinCAT 2 projects can be migrated.
- TwinCAT 3 modules: standardised programming frames
- using the .NET programming languages for non-real-time capable applications (e.g. HMI)

eXtended Automation Runtime
- IEC 61131, C/C++, MATLAB®/Simulink® objects in one runtime
- integrated TwinSAFE runtime
- extended real-time functionality: min. 50 µs cycle time and low jitter
- enhanced performance: support of multi-core CPUs
- future-proof: supports 64-bit operating systems

We reserve the right to make technical changes.

TwinCAT 3 | eXtended Automation Engineering (XAE)

Integration in Microsoft Visual Studio® makes it possible to program automation objects in parallel with the aid of the 3rd edition of IEC 61131-3 and the C or C++ languages. The objects (modules) generated can exchange data with each other and call each other independently of the language they were written in. The TwinCAT System Manager has been integrated into the development environment. This way, only one software is required to configure, parameterise, program and to diagnose automation devices.



Visual Studio® integration can be accomplished in two different ways. TwinCAT Standard only uses the basic framework of Visual Studio® with all its benefits in terms of handling, connection to source code control software, etc., while TwinCAT Integrated, as the name implies, integrates itself into Visual Studio®. In this version, the C/C++, C#, VB.NET programming languages and link to MATLAB®/Simulink® are available.

Flexible use of programming languages

C and C++ programming languages
- standardised
- widely used programming languages
- very powerful programming languages
- run under the same runtime as PLC programs
- for the implementation of drivers

Extended debugging of C++ programs
- debugging of C++ programs that run in real-time
- use of breakpoints
- use of watch lists
- use of call stacks

.NET programming languages
- used for non-real-time programming (e.g. HMI)
- source code management in the same project

Link to MATLAB®/Simulink®
- great variety of toolboxes
- possibilities for use
  - building of control circuits
  - in simulation
  - in optimisation
- automatic code generation
- debug interface between MATLAB®/Simulink® and TwinCAT

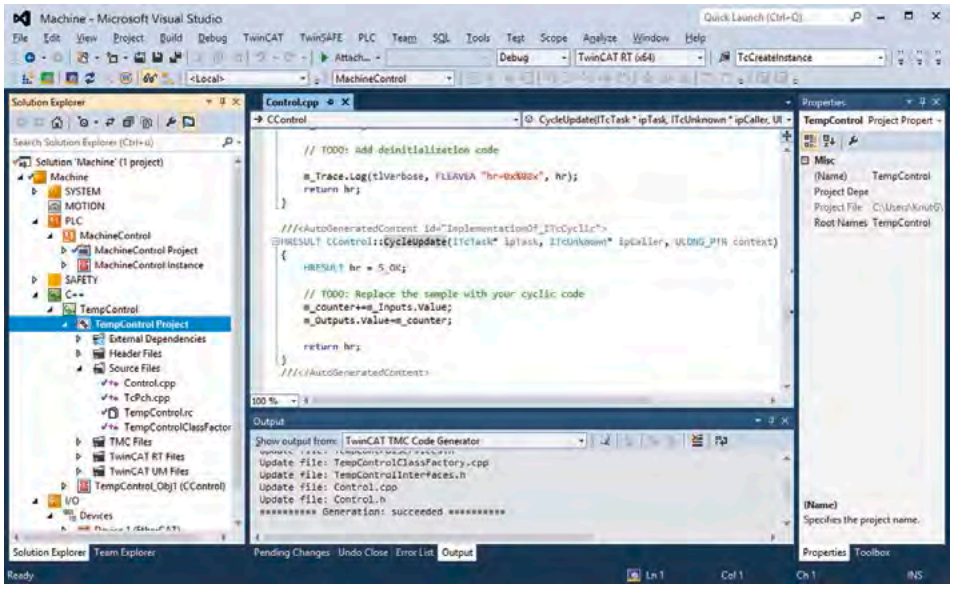
TwinCAT 3 | eXtended Automation Language Support

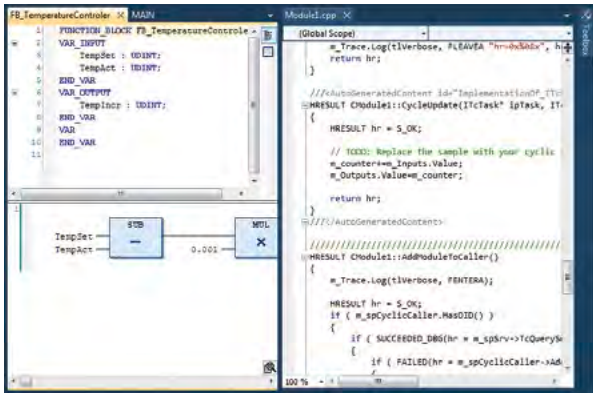
Real-time

- System Manager
- LD editor
- FBD editor
- SFC editor
- IL editor
- ST editor
- CFC editor
- Visual C/C++ editor

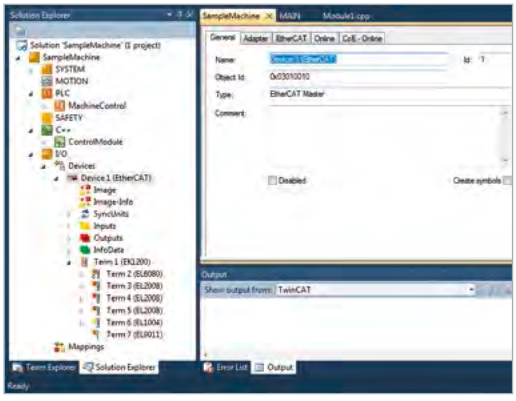
Non-real-time

- C#
- .NET
- Visual Basic
- C++
- Silverlight





Parallel use of the C++ and FBD programming languages



TwinCAT System Manager integrated into Visual Studio®

Integration of Visual Studio®

Automation devices and application programming in one environment

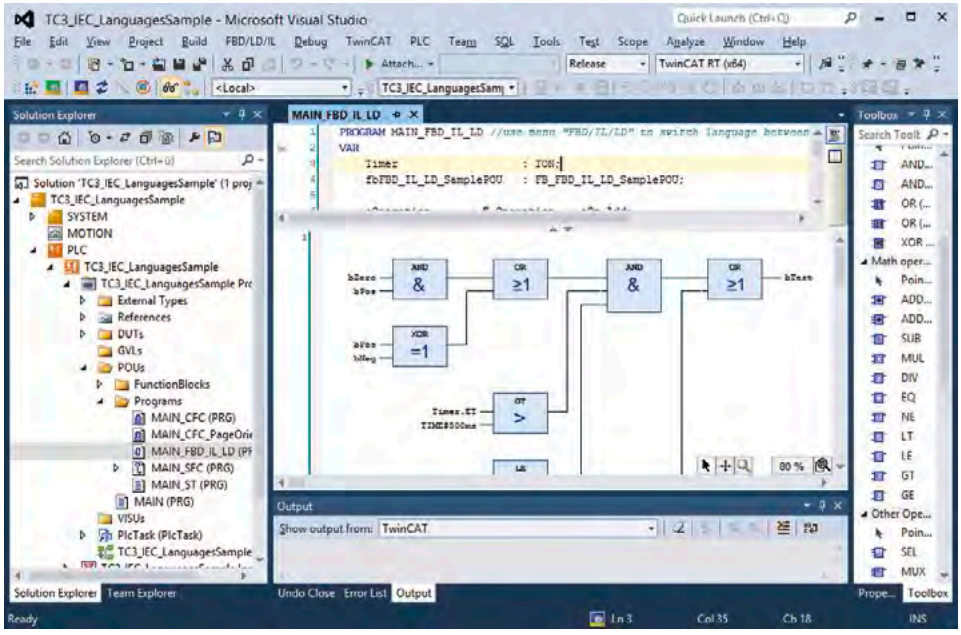
- use of the most famous and best supported development suite
- future-proof
- editing of PLC programs and complex visualisations in one environment
- multi-language support
- modern look and feel
- context-sensitive online help
- automatic syntax checking
- IntelliSense
- syntax highlighting
- use of the well-known source code control tools
- open architecture
- extendable by plug-ins

Visual Studio Microsoft Partner

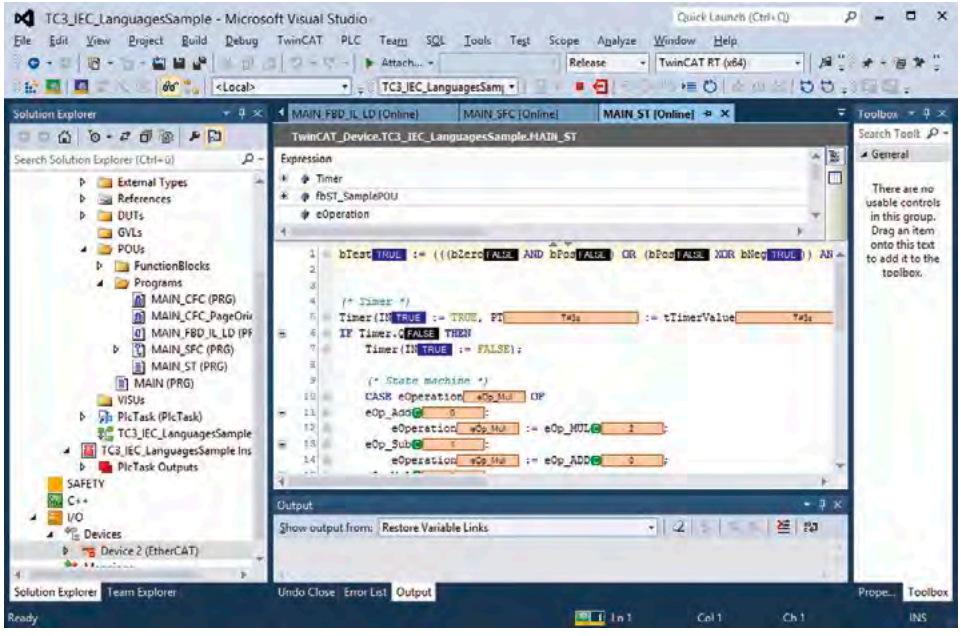
We reserve the right to make technical changes.

TwinCAT 3 | **XA Language Support: IEC 61131-3**

For more efficient programming of automation devices, the editors for IEC 61131-3 programming in TwinCAT have been significantly improved. The operability in particular has been optimised and the debugging options have been extended. The new options include improved inline monitoring, conditional break points and more.



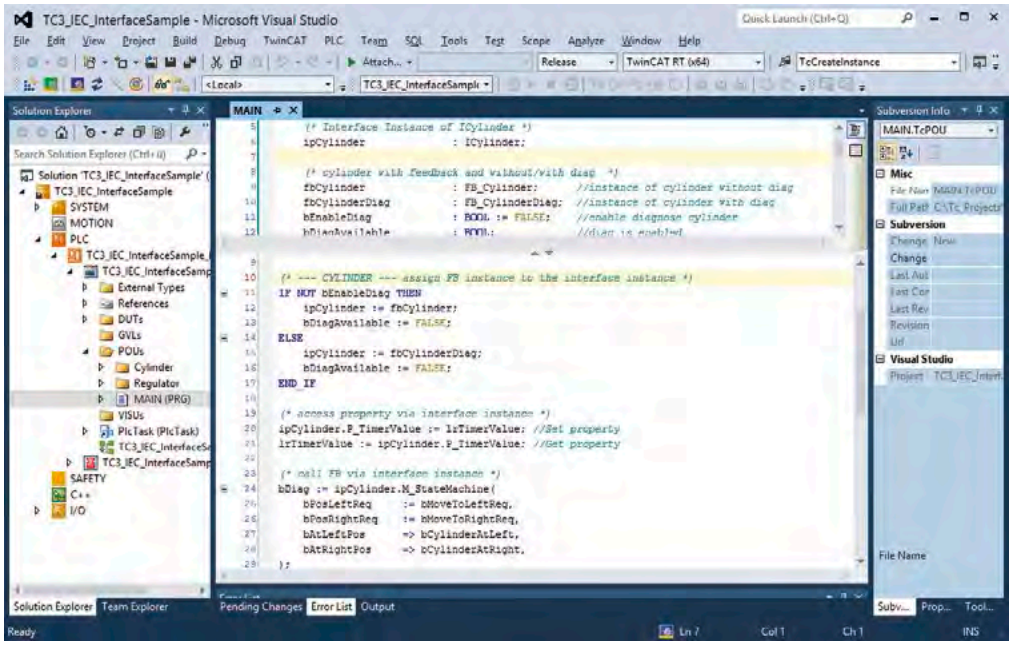
In TwinCAT 3, the editors of the IEC 61131-3 have been integrated seamlessly into the Visual Studio® environment. As a result, the editors use the original Visual Studio® toolbox for the graphical languages, for example.



Improved inline monitoring for the Structured Text (ST) programming language

TwinCAT 3 | **XA Language Support: IEC 61131-3**

TwinCAT 3 completely supports the 3rd edition of the IEC 61131-3. It enables among other things the use of object-oriented techniques such as single inheritance, interfaces, methods and attributes, which significantly increase both the reusability and the quality of the control code.



Example of the use of polymorphism within an IEC 61131-3 POU (Program Organisation Unit)

IEC 61131-3 programming

- supplier-independent programming standard
- PLCopen certification
- portable, reusable software
- 5 graphic and text-based programming languages
  - Structured Text and Instruction List
  - Function Block Diagram and Ladder Diagram
  - Sequential Function Chart
- data encapsulation by user-defined data types

Extended options in TwinCAT 3

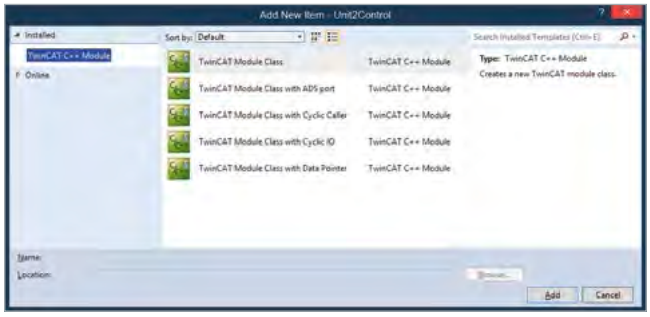
- improved usability
  - auto-complete
  - marking of associated keywords
  - collapsing of programming structures
- extended debugging
  - use of conditional break points
  - improved inline monitoring
- object-oriented extensions
  - single inheritance
  - interfaces
  - methods
  - attributes

We reserve the right to make technical changes.

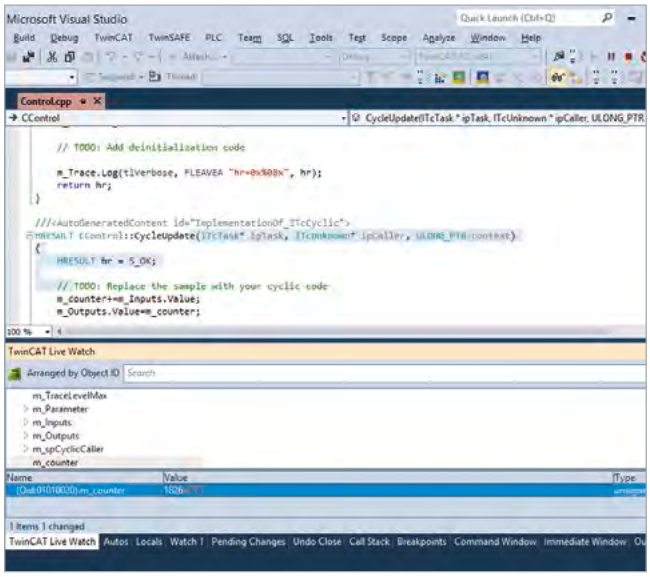
TwinCAT 3 | XA Language Support: C/C++

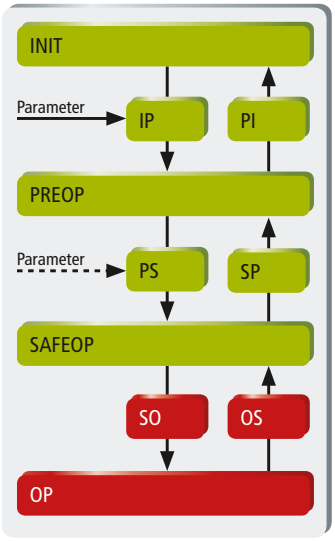
TwinCAT 3 offers the possibility to program TwinCAT runtime modules in C/C++ languages. For code generation, the C compiler integrated in Microsoft Visual Studio® 2010 is used. With TwinCAT 3 C++ libraries, functions for reading/writing files, starting threads, allocating memory or communicating with a database are provided. This corresponds to the IEC 61131-3 mechanism when using libraries.

Wizards for the creation of basic projects, classes and I/O variables make rapid engineering possible.



The routine CycleUpdate is cyclically processed. The internal variables are available for monitoring in the TwinCAT online watch window even without having to set a breakpoint.





State machine with transitions for the TwinCAT modules

C/C++ as programming languages in automation technology

C and C++ programming languages
- powerful, widely used programming languages
- standardised, object-orientated programming languages
- generation of efficient object code
- run under the same runtime as PLC programs
- for the implementation of drivers

- Beckhoff C++ Libraries for extended functionality in the real-time context

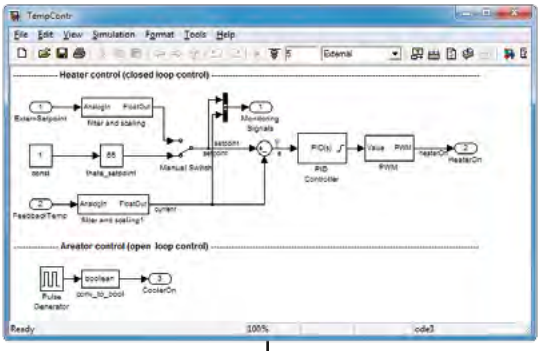
Extended debugging of C++ programs
- debugging of C++ programs that run in real-time
- monitoring, watch lists also without the use of break points

.NET programming languages
- used for non-real-time programming (e.g. HMI)
- source control in the same project

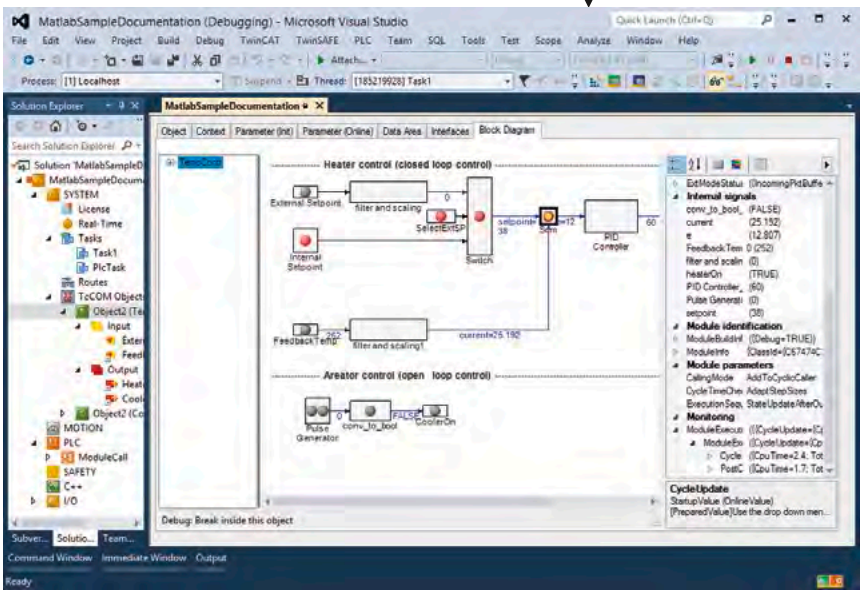
TwinCAT 3 | **XA Language Support: MATLAB®/Simulink®**

The integration of MATLAB®/Simulink® enables execution of TwinCAT modules that were generated as models in the Simulink® simulation environment. The chosen interfacing type displays the parameters and variables in the graphic interface of TwinCAT 3 and enables viewing and modification in the real-time environment at runtime.

MathWorks Partner



Example for temperature controller in MATLAB®/Simulink®



Parameter view of the generated module in TwinCAT

Integration with the simulation software MATLAB®/Simulink®

- standard tool in scientific and measuring applications
- wide range of toolboxes (e.g. Fuzzy Logic Toolbox)
- development, simulation and optimisation of complex control loops
- automatic code generation via Realtime Workshop
- debug interface between TwinCAT 3 and Simulink®
- parameterisation of the generated module in TwinCAT 3
- download and execution of the module in TwinCAT 3 runtime
- multiple module instantiation possible
- Modules can be used without MATLAB®/Simulink®.

We reserve the right to make technical changes.

TwinCAT 3 | eXtended Motion Control

With eXtended Motion Control, TwinCAT automation software offers an integrated and scalable solution for Motion Control applications including simple point-to-point movements, CNC and robot control.

Functionality

NC PTP	NC I	CNC	Robotics
Point-to-point movement – gearing – camming – superposition – flying saw PLCopen motion control	**Interpolated motion with 3 axes and 5 additional axes** – programming according to DIN 66025 – technological features – straightforward utilisation through function blocks from the PLC	**Complete CNC functionality** – interpolated movement for up to 32 axes per channel – various transformations	**Interpolated motion for robotic control** – support for a wide range of kinematic systems – optional torque pre-control

Interpolated motion for robotic control

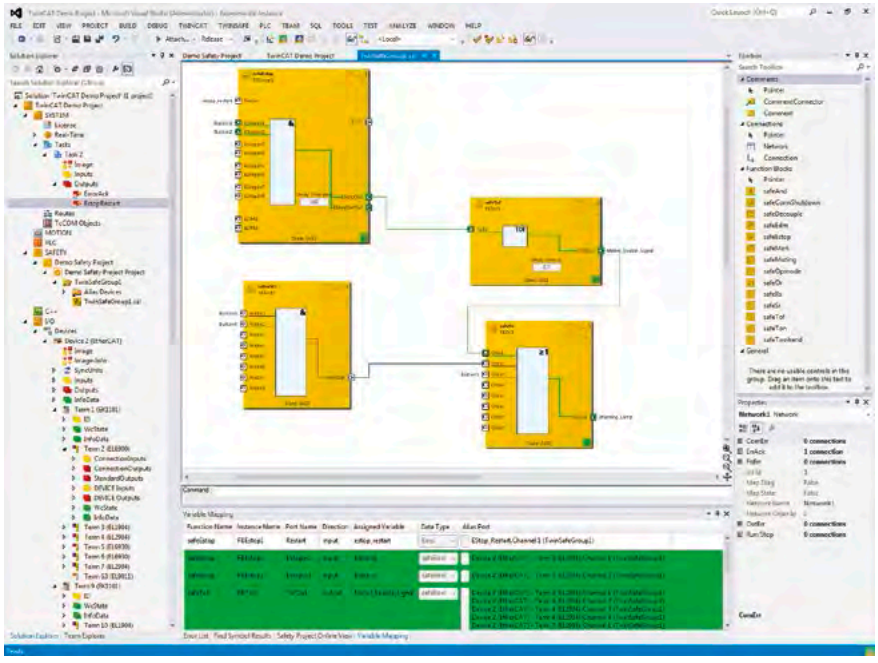
Advantages of the integration of robotic control in TwinCAT
- configuration, parameterisation, diagnostics and programming in TwinCAT
- optimum synergy between PLC, Motion Control and robot control system
- high performance and precision through direct interfaces

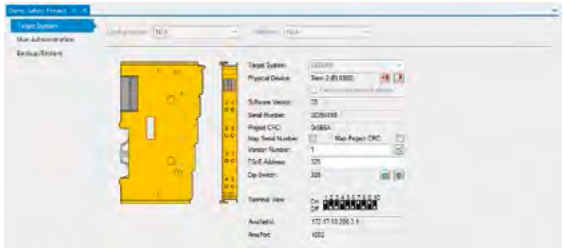
Kinematic calculation process
- forward transformation
- inverse transformation
- calculation of the dynamic model

TwinCAT 3 | **Safety Editor**

The Safety Editor integrated in TwinCAT 3 allows the creation of a safety application in a graphical environment. The user can program the desired logic directly with function blocks. The logic can initially be developed independently of the hardware configuration, leading to increased flexibility and portability. Additionally, the editor can automatically generate documentation for the application, making both the act of documenting and commissioning significantly easier.

For further safety-relevant features of the TwinSAFE system and the TwinSAFE products see page 542





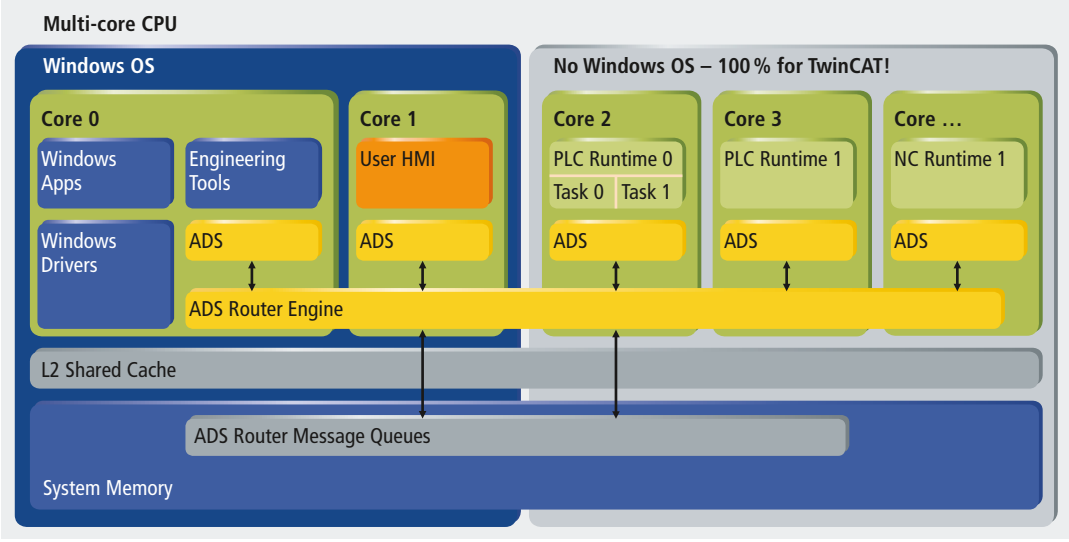
TwinCAT Safety Editor

- fully integrated in TwinCAT 3
- graphical programming
- convenient diagnostics through the direct display of online values in the graphical environment
- overview of the online state of relevant groups, connections and function blocks
- multi-level verification of the application for consistency
- automatic project download verification
- automatic generation of the documentation for acception and commissioning

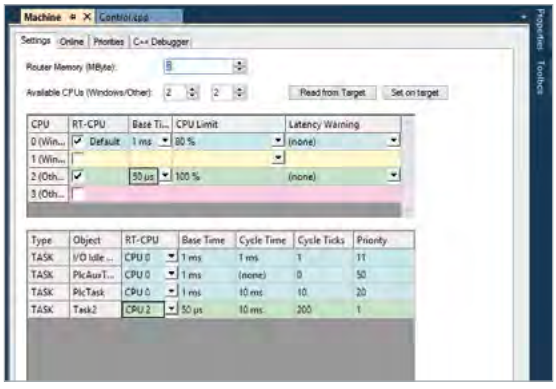
We reserve the right to make technical changes.

TwinCAT 3 | eXtended Automation Performance

Current developments in computer technology, which offer CPUs with more and more cores, enable the distribution of tasks across different cores. The TwinCAT 3 runtime environment follows this concept. It can be used to distribute functional units such as HMI, PLC runtime or MC to dedicated cores. For each of the cores used by the runtime environment the maximum load as well as the base time and therefore the possible cycle times can be set separately.



Due to the use of multi-core systems, functional units (e.g. PLC and NC runtimes, HMI) are distributed to individual processor cores.



Dialog for the distribution of tasks to processor cores: Moreover, in the so-called "core isolation" mode it is possible to make individual cores exclusively available for the use of TwinCAT. The context change between TwinCAT and the Windows operating system is thus avoided for these cores, which increases the attainable performance still further.

Multi-core and multi-tasking support

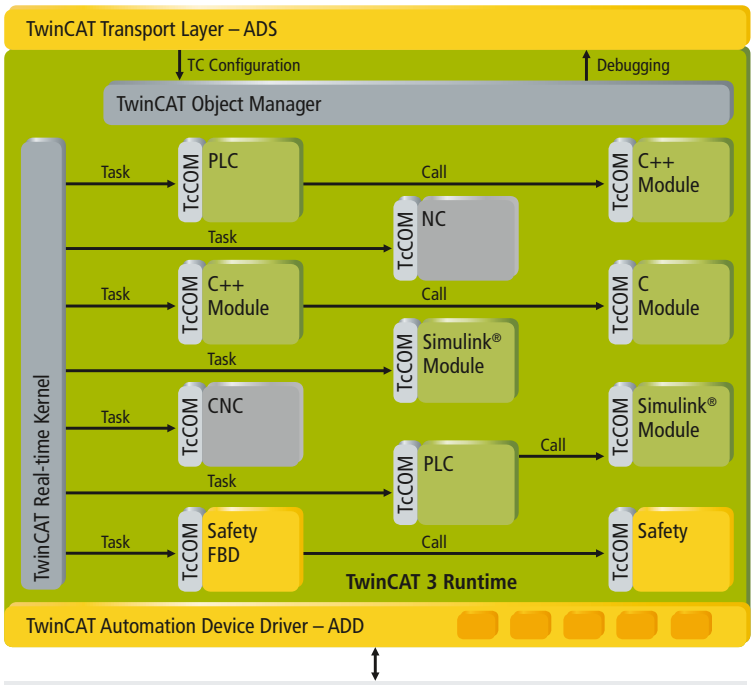
Support of multi-core systems
- distribution from applications to cores (e.g. PLC, NC and HMI can run on different cores)

Support of multi-tasking
- preemptive multi-tasking
- parallel processing of tasks

Support of 64-bit operating systems
- usage of more resources (memory)

TwinCAT 3 | eXtended Automation Runtime (XAR)

Standardised modules enable open and flexible design of the TwinCAT 3 runtime. It makes an environment available in which the TwinCAT 3 modules can run. Whether the modules are PLC, NC, CNC, RC (Robotic Control) or C/C++ code-based modules (e.g. created with MATLAB®/ Simulink®) is irrelevant.



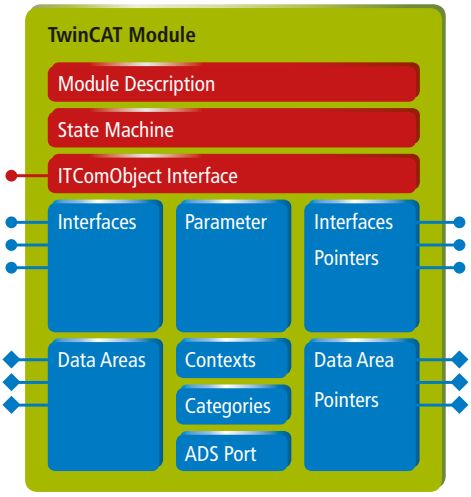
Modular TwinCAT 3 runtime

Modular design, openness, extendibility

Open runtime interface
- separation of complete functionality into modules
- use of services from system modules (e.g. real-time)
- defined interfaces
- extension of the runtime by own modules (e.g. bus drivers)
- Scalability: modules can contain simple functions; complex algorithms and real-time tasks.

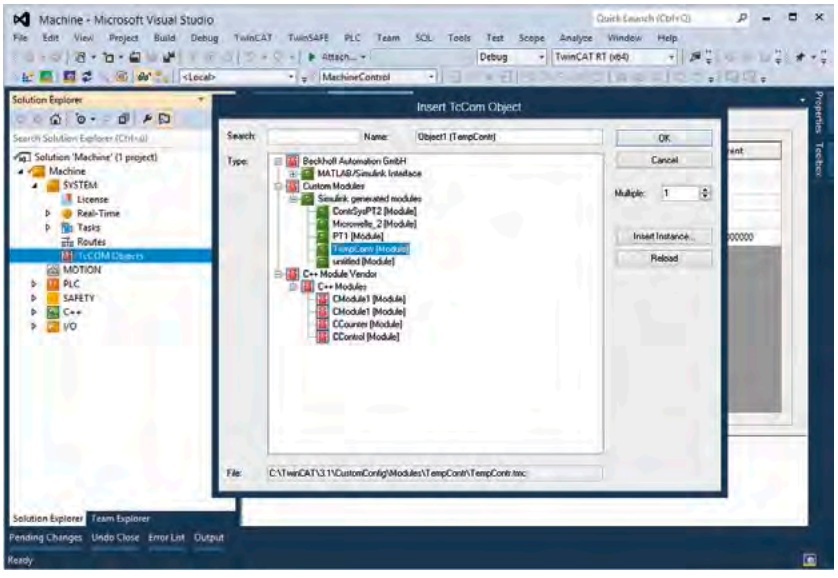
We reserve the right to make technical changes.

TwinCAT 3 modules consist of a range of formally defined attributes and interfaces. They enable general application of the modules with each other and externally. The predefined interfaces enable cyclic calling of the internal module logic, for example. Each module implements a state machine that controls the initialisation, parameterisation and linking of the respective module.



Structure of a TwinCAT 3 module

In addition to user modules, a number of system modules are already available which provide basic runtime functionality (e.g. TwinCAT real-time). These modules have fixed object IDs and are therefore accessible from each module.



Selection and parameterisation of a MATLAB®/Simulink® module

Fast communication, reusability

- Functionality of the modules is scalable.
- direct and therefore very fast communication between modules
- Modules are sealed.
- Modules can be developed, serviced and tested independent of each other.
- high reusability

TE1xxx | TwinCAT 3 Engineering

	TC3 Engineering	TC3 EtherCAT Simulation	TC3 XCAD Interface	TC3 CAD Simulation Interface
Technical data	**TE1000**	**TE1111**	**TE1120**	**i TE1130**
	TwinCAT Engineering contains the engineering environment of the TwinCAT 3 control software: – integration into Visual Studio® 2010/2012/2013/2015/2017 (if available) – support for the native Visual Studio® interfaces (e.g. connection to source code management systems) – IEC 61131-3 (IL, ST, LD, FBD, SFC) and CFC editors – IEC 61131-3 compiler – integrated system manager for the configuration of the target system – instancing and parameterisation of TwinCAT modules – integrated C++ debugger – user interface for the parameterisation of modules generated by MATLAB®/Simulink® – if integrated into Visual Studio®, instancing of .NET projects in the same solution (e.g. for HMI) – integrated Scope View Base as charting tool for machine commissioning in Visual Studio® – integrated Bode Plot Base for the optimisation of drive axes	Virtual machine commissioning becomes possible if the EtherCAT cable of the machine computer can simply be plugged into a simulation computer, without the need for reconfiguration. With the TC3 EtherCAT Simulation function and a network adapter the simulation computer can simulate a number of EtherCAT slaves. For configuration purposes the EtherCAT slaves of the original machine configuration are inverted. All EtherCAT features necessary for machine simulation are modelled – including distributed clocks. Since the communication protocols CoE and SoE are implemented, acyclic commands can also be processed in the simulation environment.	TC3 XCAD Interface serves the purpose of importing already existing engineering results from an ECAD program. The TC3 XCAD Interface enables the import of information about the structure of the I/Os and their links to PLC variables, which is exported from the ECAD tool by means of XML description. On the basis of this information a system manager configuration and a basic PLC program with the I/O variables used are generated. The generation of NC and CNC axes is also possible.	The TC3 CAD Simulation Interface is a user-friendly tool that can be used to configure a link between TwinCAT and a 3D CAD system. The aim of this connection is a software-in-the-loop simulation (SiL) of the intended sequence on a machine or system to support virtual commissioning. The 3D simulation of machine and system components is a key element in the implementation of virtual commissioning. In the simulation, the movements and interactions of all individual installed components are represented in combination, so that collisions as well as critical system states can be determined in advance. In addition, simulation can be used to train operators and maintenance personnel in advance for regular operation and to define troubleshooting instructions based on simulated critical machine states. Another typical application would be pre-sales training courses on machines or machine components for sales personnel using 3D simulations. The TC3 CAD Simulation interface facilitates the implementation of a 3D simulation, in that it uses the design data of the CAD tool and establishes links to the corresponding automation data. As usual, convenient drag-and-drop functions can be used for link configuration. The parameterisation can be extended to map complex relationships if required. This means that software-in-the-loop simulation of machines, systems or installed components is easily and conveniently possible, even in the event of system expansions.
Required	TC1000	TC1000	TC1000	TC1000
Target system	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10
Further information	www.beckhoff.com/TE1000	www.beckhoff.com/TE1111	www.beckhoff.com/TE1120	www.beckhoff.com/TE1130

i For availability status see Beckhoff website at: www.beckhoff.com

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	TC3 PLC Static Analysis	TC3 Scope View Professional	TC3 Filter Designer	TC3 Target for MATLAB®/Simulink®
	TE1200	TE1300	TE1310	TE1400
	With the integration of the static code analysis, a further tool is available in TwinCAT 3.1 that supports the PLC software development process. The static code analysis is an analysis tool that tests PLC software on the basis of coding rules and identifies potential weak points of an implementation even during the development stage. The analysis extends from checking compliance with naming conventions through to examining the use of objects and operators. Easier readability and an improved program structure are achieved through the analysis. Furthermore, the user's attention is drawn to possibly unintentional and faulty implementations, so that these program points can be optimised at an early stage.	TwinCAT 3 Scope View is a software oscilloscope for the graphical display of data in a YT, XY or bar chart. Scope View Professional extends the Scope View Base version which is included in TwinCAT 3 XAE by further functionalities. It can be used for tracking and monitoring processes over a longer period of time. Long-term recordings, printout function, trigger-controlled data logging are part of the functionality. With multi-core support Scope View ensures optimised performance in the display of signals. Like TwinCAT 3 XAE, Scope View integrates itself into Microsoft Visual Studio®. It can be used as a standalone project or in combination with a TwinCAT project within a solution. Furthermore, Scope View Professional can be integrated into a user's .NET-based visualisation. Thus, seamless integration into an existing machine visualisation is possible.	The TC3 Filter Designer is a graphic engineering tool for determining coefficient digital filters. In Microsoft Visual Studio® it integrates seamlessly with the existing TwinCAT engineering landscape. Selectable filter designs are Butterworth, Chebyshev and Inverse-Chebyshev, while the possible filter types are lowpass, highpass, bandpass and bandstop. The filter coefficients can be modified graphically or by means of a tabular specification. Once the filter coefficients have been determined, they can be used in the PLC as an input for digital filter function blocks or transferred into the ELM measurement modules by drag & drop. Each channel of an ELM measurement module has two freely configurable digital filters connected in series, which as a result are very easy to adjust using the Filter Designer.	The TwinCAT MATLAB®/Simulink® Target offers System Target Files for the use of the MATLAB®/Simulink® coder. It enables the generation of TwinCAT 3 runtime modules, which can be instanced and parameterised in the TwinCAT 3 engineering environment.
	TC1200	TC1000	TC1000	TC1000
	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10
	www.beckhoff.com/TE1200	www.beckhoff.com/TE1300	www.beckhoff.com/TE1310	www.beckhoff.com/TE1400

TExxxx | TwinCAT 3 Engineering

	TC3 Interface for MATLAB®/Simulink®	TC3 Target for FMI	TC3 Valve Diagram Editor	TC3 Cam Design Tool
Technical data	**TE1410**	**TE1420**	**TE1500**	**TE1510**

	The interface for MATLAB®/Simulink® provides a communication interface between MATLAB®/Simulink® and the TwinCAT 3 runtime. It supports the acquisition and visualisation of real-time parameters. It can be used both for software-in-the-loop simulation (SiL) and (in combination with TE1400) hardware-in-the loop simulation (HiL) of the controller.
	
	Features
	– data exchange between fieldbus devices and MATLAB®/Simulink®, for example for the simple realisation of control loops with low real-time requirements
	– Data exchange between the TwinCAT controller and MATLAB®/Simulink®; this enables controller testing by SiL simulation, for example.
	– acquisition and visualisation of process data via MATLAB®/Simulink®
	– configuration via graphic editor
	– various data exchange options, access via:
	  – symbol name of a variable
	  – configurable interface module
		The TC3 Target for FMI provides an interface for simulation tools that support the Functional Mockup Interface (FMI). The interface enables the generation of TwinCAT 3 runtime modules, which can be instantiated and parameterised in the TwinCAT 3 engineering environment. Models exported with FMI 2.0 – both Model Exchange and Co-Simulation – are supported. There are already a number of solvers available in TwinCAT 3 for the calculations of models exported as Model Exchange.	The TwinCAT Valve Diagram Editor allows the linearisation of non-linear curves of hydraulic valves with the aid of a graphical editor. On the basis of a few base points, straight lines or 5th degree polynomials can be determined that connect the points. The characteristic linearisation curve thus determined can be loaded into the TwinCAT NC real-time and taken into account when the voltages are output in the drive.	The TC3 Cam Design Tool allows the generation and modification of cam plates with the aid of a graphical editor. These are composed of sections of laws of motion such as modified sine waves, harmonic combinations, or of various polynomial functions. Velocity, acceleration and jerk are displayed in addition to the slave position. The generated cam plates can be transferred to the NC as tables with specified step size or as so-called motion functions.

Required	TC1000	TC1000	TC1000	TC1000
Target system	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10
Further information	www.beckhoff.com/TE1410	www.beckhoff.com/TE1420	www.beckhoff.com/TE1500	www.beckhoff.com/TE1510

i For availability status see Beckhoff website at: www.beckhoff.com

We reserve the right to make technical changes.

	TC3 EAP Configurator	TC3 HMI	TC3 Analytics Workbench	TC3 Analytics Service Tool
	TE1610	TE2000	i TE3500	i TE3520
	The TwinCAT 3 EAP Configurator is a tool for visualising and configuring communication networks, in which data exchange based on the EtherCAT Automation Protocol (EAP) takes place or is to be established. EAP is used for master/master communication.	The TC3 HMI (human-machine interface) integrates itself into the well-known Visual Studio® development environment. Based on the latest web technologies (HTML5, JavaScript), it allows the user to develop platform-independent user interfaces that are "responsive", i.e. they automatically adapt to the screen resolution, size and orientation at hand. With the graphical WYSIWYG (what-you-see-is-what-you-get) editor, controls can be easily arranged via drag-and-drop and linked with real-time variables. The HMI is extensible on all levels. Mixing standard controls with custom design elements makes designing your own HMI easy. User controls can also be created and configured by modifying the standard controls to create your own toolbox. To create more complex pages, predefined designer templates can be integrated. On the client side, the HMI logic can be implemented in JavaScript or as a so-called server extension in C++ or .NET, which allows users to protect their know-how.	The TwinCAT 3 Analytics Workbench is a TC3 engineering product for the creation of continual data analyses from various spatially distributed machine controllers. The configuration of the workbench is integrated in Microsoft Visual Studio® and serves as the graphic user interface. Many algorithms are available in a toolbox for the configuration of the analysis, such as cycle time monitoring, life count, lifetime and minimum/maximum/mean value. The TC3 Analytics Workbench contains the TE1300 TC3 Scope View Professional for the simple visualisation of the signal curves: The user can drag the analysis results from the analytics configurator and drop them into the charting tool in order to mark significant points in the data stream. Such markings can be simple minima or maxima, counter values or, for example, the results of a logic operator that logically links the results from the machine controller so that they can be found in the data stream. Correlation with other signals in the Scope View is thus possible to the exact cycle. The MQTT input data are selected via the TwinCAT Target Browser, in which live data and, via the TF3520 TC3 Analytics Storage Provider, historical data are available. If the created analysis is complete and has been tested in the graphic editor, this configuration can be converted into readable PLC code with just one click. The automatically generated PLC code can be downloaded directly to a device with the TF3550 TC3 Analytics Runtime, where it can run 24/7 in parallel to the actual production machine and supply analysis results. The use of Beckhoff standard PLC libraries is also possible. In conjunction with TwinCAT 3 HMI, individual HTML 5 dashboards can be created and used to display the results for machine operators, production managers and machine manufacturers.	The TwinCAT 3 Analytics Service Tool is used for commissioning the machine and for service engineers. Live and historical data can be retrieved for an analysis via the IoT connection. The analysis is configured in Microsoft Visual Studio® where the user has access to a toolbox of algorithms for implementing the relevant life time, cycle time, envelope or component counter analysis. The outputs of the algorithms can be used as inputs for other algorithms or can be output as a result directly in the graphical editor. Signal paths can be visualised with ease by means of parallel recording with the TwinCAT Scope. Analysis results can be dragged by the user from the analytics configurator and dropped in the charting tool so as to mark the significant positions in the data stream. The interaction between the product components offers advantages in particular for diagnosing machine behavior and can highlight optimisation potential. The user's location is immaterial owing to the IoT technologies used, which means that service technicians can perform system and machine diagnostics from practically any location.
	TC1000	TC1000	TC1000	TC1000
	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10
	www.beckhoff.com/TE1610	www.beckhoff.com/TE2000	www.beckhoff.com/TE3500	www.beckhoff.com/TE3520

TC1xxx | TwinCAT 3 Base

	TC3 ADS	TC3 I/O
Technical data	**TC1000-00pp**	**TC1100-00pp**
	The Automation Device Specification (ADS) is the communication protocol of TwinCAT. It enables the data exchange and the control of TwinCAT systems. ADS is media-independent and can communicate via serial or network connections. ADS enables: – access to the process image – consistent data exchange – access to I/O tasks – detection of status changes – read-out of the PLC symbol information – access by variable name – sum commands – synchronous and asynchronous access – cyclic and event-based messages Libraries and runtime components are provided for common programming languages (including .NET, C/C++, Delphi and Java). In addition, interfaces are provided for communication with third-party software (e.g. MATLAB®, NI LabView, Office). The ADS web services enable the development of device-independent web applications (HTML5, WCF). The message router manages multiple connections and efficiently distributes the messages. The data packets can be recorded via the ADS monitor using the integrated diagnostic interface. The free TC3 ADS supplies the basic components required in order to communicate with TwinCAT systems. The setup can be integrated in your own installation routines.	Using TwinCAT I/O, cyclic data can be collected by different fieldbuses in process images. Cyclic tasks drive the corresponding fieldbuses. Various fieldbuses can be operated with different cycle times on one CPU. Applications can directly access the process image. The fieldbuses and the process images are configured in TwinCAT Engineering. – provides variable-oriented linkage of I/O devices to tasks – tasks are variable-oriented among each other – the smallest unit is one bit – upports both synchronous and asynchronous relationships – consistent exchange of data areas and process images – online display in the directory tree – online watch window – "Force and Write" for commissioning and for testing task variables and I/O devices – supported fieldbuses: – EtherCAT – Lightbus – PROFIBUS DP (master and slave) – Interbus – CANopen – SERCOS interface – DeviceNet – Ethernet – USB – SMB (System Management Bus)
Performance class (pp)	20 | 30 | 40 | 50 x | x | x | x 60 | 70 | 8x | 9x x | x | x | x	20 | 30 | 40 | 50 x | x | x | x 60 | 70 | 8x | 9x x | x | x | x
Target system	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE
Further information	www.beckhoff.com/TC1000	www.beckhoff.com/TC1100

We reserve the right to make technical changes.

	TC3 PLC				TC3 PLC/C++				TC3 PLC/C++/MATLAB®/Simulink®			
	TC1200-00pp				TC1210-00pp				TC1220-00pp			
	TwinCAT PLC realises one or more PLCs with the international standard IEC 61131-3 3rd edition on one CPU. All programming languages described in the standard can be used for programming. The blocks of the type PROGRAM can be linked with real-time tasks. Various convenient debugging options facilitate fault-finding and commissioning. Program modifications can be carried out at any times and in any size online, i.e. when the PLC is running. All variables are available symbolically by ADS and can be read and written in appropriate clients. – process image size, flag range, program size, POU size and number of variables are limited only by size of RAM – cycle times from 50 µs – link time: typically 1 µs (Intel® Core™ 2 Duo) – IEC 61131-3: IL, FBD, LD, SFC, ST, CFC – online changes in programs and variables – remote debugging via TCP/IP – online connection with PLC runtime system worldwide via TCP/IP or fieldbus – online monitoring of variables in variable lists, watch windows, editors – online status and powerflow (accumulator contents) of programs and instances – triggering, forcing and setting variables – powerful debugging with single cycle, break points, step in, step over, display of the current call stack, watchlist shows selection of variable, trace functions – online management of all variable names and structures across the whole system – remanent and persistent data, UPS supported storage on hard disk, storage in NOVRAM as option – variable reading and writing access via ADS, OPC – certified in accordance with PLCopen base level (IL/ST) – structured programming with modular program management – source code is stored in the target system – convenient library management – powerful compiler with incremental compilation – all common data types, structures, arrays, including multi-dimensional arrays – convenient creation of programs with: autoformat, autodeclare, cross-reference, search/replace, project comparison – simple linking to source code administration tools by embedding in Microsoft Visual Studio®				Extension of the TwinCAT PLC TC1200 with additional C++ functionalities: – online connection to PLC/C++ runtime system locally or worldwide via TCP/IP or via fieldbus – online monitoring of variables in variable lists, watch windows and editors without setting break points – online setting of variables				Extension of the TwinCAT PLC/C++ TC1210 by the possibility to execute modules generated in MATLAB®/Simulink®: – contains the TwinCAT 3 PLC and C++ runtime – allows the execution of modules generated in MATLAB®/Simulink® – multiple instancing of modules – parameterisation of these modules at runtime – online access to all parameters (can be deactivated) – generic modules (no hardware connection necessary within the models) – connection to the external mode of Simulink® – connection to the TwinCAT C++ debugger, with graphical representation of the blocks – modules can be called from other modules or directly by tasks			
	20	30	40	50	20	30	40	50	20	30	40	50
	x	x	x	x	–	–	x	x	–	–	x	x
	60	70	8x	9x	60	70	8x	9x	60	70	8x	9x
	x	x	x	x	x	x	x	x	x	x	x	x
	Windows 7/8/10, Windows CE				Windows 7/8/10 (Windows CE is not supported)				Windows 7/8/10 (Windows CE is not supported)			
	www.beckhoff.com/TC1200				www.beckhoff.com/TC1210				www.beckhoff.com/TC1220			

TC1xxx | TwinCAT 3 Base

	TC3 PLC/NC PTP 10	TC3 PLC/NC PTP 10/NC I
Technical data	**TC1250-00pp**	**TC1260-00pp**
	Extension of the TwinCAT PLC TC1200 by the possibility to realise point-to-point movements in software (TwinCAT Motion Control PTP 10). The axes are represented by axis objects and provide a cyclic interface, e.g. for the PLC. This axis object is then linked to a corresponding physical axis. In this way the most diverse axis types with the most diverse fieldbus interfaces can be connected abstractly with the axis objects, which always offer an identical configuration interface. The control of the axes can be configured in various constellations (position or velocity interface) and various controllers. The axes are configured in TwinCAT Engineering. – up to a maximum of 255 axes on one CPU – supports electrical and hydraulic Servo Drives, frequency converter drives, stepper motor drives, DC drives, switched drives (fast/slow axes), simulation axes and encoder axes – supports various encoders such as incremental encoder, absolute encoder, digital interface to the drives such as EtherCAT, SERCOS, SSI, Lightbus, PROFIBUS DP/MC, pulse train – standard axis functions such as start/stop/reset/ reference, velocity override, master/slave couplings, electronic gearbox, online distance compensation, programming is carried out via PLCopen-compliant IEC 61131-3 function blocks – convenient axis commissioning options – online monitoring of all axis state variables such as actual/set values, releases, control values – online axis tuning – forcing of axis variables – configuration of all axis parameters, such as measuring system, drive parameters and position controller – configurable controller structures: P control, PID control, PID with velocity pre-control, PID with velocity and acceleration pre-control – online master/slave and slave/master conversion – flying saw (diagonal saw [optional]) – cam plates (support by TC3 Cam Design Tool [optional]) – FIFO axes (optional) – external set value generators – multi-master coupling	Extension of the TwinCAT PLC/NC PTP 10 by the possibility to realise movements with up to three interpolating and up to five auxiliary axes. Various axis types with various fieldbus interfaces are supported. The movement is usually programmed in DIN 66025, but it can also alternatively be carried out via PLC function blocks. – max. 3 path axes and up to 5 auxiliary axes per group – 1 group per channel, max. 31 channels – supports electric servo axes, stepper motor drives – interpreter functions such as subroutine and jump technology, programmable loops, zero point shifts, tool corrections, M and H functions – geometry functions: straight lines and circles in 3D space, circles at all main levels, helices with base circles at all main levels, linear, circular and helical interpolation at the main levels and freely definable levels, Bezier splines, look-ahead function – online reconfiguration of axes in groups, path override, slave coupling to path axes, auxiliary axes, axis error and sag compensation, measuring functions – programming in DIN 66025 – access alternatively via function blocks according to IEC 61131-3 – operation in automatic mode, manual mode (jog/inch), single block mode, referencing, handwheel mode (movement/overlay) – convenient debugging with online monitoring of current set/actual position (position lag of all axes), NC program line currently being processed, NC program line currently being interpreted, channel status – support of kinematic transformations in combination with TF511x
Performance class (pp)	20 | 30 | 40 | 50 – | x | x | x 60 | 70 | 8x | 9x x | x | x | x	20 | 30 | 40 | 50 – | – | x | x 60 | 70 | 8x | 9x x | x | x | x
Target system	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE
Further information	www.beckhoff.com/TC1250	www.beckhoff.com/TC1260

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	TC3 PLC/NC PTP 10/NC I/CNC	TC3 PLC/NC PTP 10/NC I/CNC E	TC3 C++	TC3 C++/ MATLAB®/Simulink®
	TC1270-00pp	TC1275-00pp	TC1300-00pp	TC1320-00pp
	Extension of the TwinCAT PLC/NC PTP 10 by the possibility to realise an interpolation with up to 32 simultaneously interpolating axes. The number of axes and/or the number of channels can be adapted to the requirements of the application via the option packages. Various transformations can be supplemented via option packages. Programming takes place according DIN 66025. The axes and channels are configured in TwinCAT Engineering. – 8 path axes/controlled spindles, max. 64 axes/controlled spindles (optional), max. 12 channels (optional) – supports electric servo axes, stepper motor drives subroutine and jump technology, programmable loops, zero point shifts, tool corrections, M and H functions, mathematical functions, programming of parameters/variables, user macros, spindle and auxiliary functions, zero point shifts, tool functions – geometry functions: linear, circular and helical interpolation at the main levels and freely definable levels, max. 32 interpolating path axes per channel (optional), look-ahead function – axis functions, coupling and gantry axis function, override, axis error and sag compensation, measuring functions – programming in DIN 66025 with high-level language extension – access via function blocks from TwinCAT PLC according to IEC 61131-3 – operation with automatic mode, manual mode (jog/inch), single block mode, referencing, block advance, handwheel mode (movement/overlay) – convenient debugging with online monitoring of all states	TwinCAT CNC export version (E version): extension of the TwinCAT PLC/NC PTP 10 by the possibility to realise an interpolation with up to 4 simultaneously interpolating axes. The number of axes and/or the number of channels can be adapted to the requirements of the application via the option packages. Various transformations can be supplemented via option packages. Programming takes place according DIN 66025. The axes and channels are configured in TwinCAT Engineering. – max. 8 path axes/controlled spindles, max. 64 axes/controlled spindles (optional), max. 12 channels (optional) – max. 4 simultaneously interpolating path axes – supports electric servo axes, stepper motor drives subroutine and jump technology, programmable loops, zero point shifts, tool corrections, M and H functions, mathematical functions, programming of parameters/variables, user macros, spindle and auxiliary functions, zero point shifts, tool functions – geometry functions: linear, circular and helical interpolation at the main levels and freely definable levels, max. 4 interpolating path axes per channel (optional), look-ahead function – axis functions, coupling and gantry axis function, override, axis error and sag compensation, measuring functions – programming in DIN 66025 with high-level language extension – access via function blocks from TwinCAT PLC according to IEC 61131-3 – operation with automatic mode, manual mode (jog/inch), single block mode, referencing, block advance, handwheel mode (movement/overlay) – convenient debugging with online monitoring of all states	The TwinCAT 3 C++ runtime environment enables the execution of real-time modules written in C++. The following functions are supported, among others: – online connection to C++ runtime system locally or worldwide via TCP/IP or via fieldbus – online monitoring of variables in variable lists, watch windows and editors without setting break points – online setting of variables	Extension of the TC1300 by the possibility to execute modules generated by MATLAB®/Simulink®. – contains the TwinCAT 3 C++ runtime – allows the execution of modules generated in MATLAB®/Simulink® – multiple instancing of modules – parameterisation of these modules at runtime – online access to all parameters (can be deactivated) – generic modules (no hardware connection necessary within the models) – connection to the external mode of Simulink® – connection to the TwinCAT C++ debugger with graphical representation of the blocks – modules can be called from other modules or directly by tasks
	20 30 40 50	20 30 40 50	20 30 40 50	20 30 40 50
	– – – x	– – – x	– – x x	– – x x
	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x
	x x x x	x x x x	x x x x	x x x x
	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10 (Windows CE is not supported)	Windows 7/8/10 (Windows CE is not supported)
	www.beckhoff.com/TC1270	www.beckhoff.com/TC1275	www.beckhoff.com/TC1300	www.beckhoff.com/TC1320

TF1xxx | TwinCAT 3 System

	TC3 PLC HMI	TC3 PLC HMI Web	TC3 UML
Technical data	**TF1800-00pp**	**TF1810-00pp**	**TF1910-00pp**
	TC3 PLC HMI is a stand-alone tool for the presentation of visualisations which are created in the TwinCAT PLC development environment. They are shown in full-screen as soon as the system starts up.	TC3 PLC HMI Web is a web-based visualisation system. The TwinCAT PLC development environment can be used as an editor for creating web pages. The web pages are hosted by the Internet Information Server (IIS). For display of the web pages HTML5 and JavaScript is needed.	With the integration of UML (Unified Modeling Language) in TwinCAT 3.1, two additional editors for modelling of PLC software are available. The existing TwinCAT PLC programming languages are extended with the UML state and UML class diagrams. Generally speaking, UML is a modelling language for software analysis, design and documentation. UML is particularly suitable for object-oriented implementations. The unified modelling of the PLC application creates an easy to follow software documentation, which can also be analysed by other departments. The UML class diagram belongs to the group of UML structure diagrams and can be used for schematic representation of the software architecture. In this way, it is possible to represent object classes and the elements contained within them, as well as object relationships in a transparent manner. The UML state diagram is part of the UML behaviour diagrams and is used for dynamic software modelling. It can be used for a graphic specification of the dynamic response or the state-dependent system behaviour. Compilation of the state diagram generates program code, so that the state machine can be executed directly. The development process is supported by an online debugging option.
Performance class (pp)	20 30 40 50 x x x x 60 70 8x 9x x x x x	20 30 40 50 x x x x 60 70 8x 9x x x x x	20 30 40 50 – x x x 60 70 8x 9x x x x x
Required	TC1200	TC1200	TC1200
Target system	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE
Further information	www.beckhoff.com/TF1800	www.beckhoff.com/TF1810	www.beckhoff.com/TF1910

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TF2xxx | TwinCAT 3 HMI

	TC3 HMI Server	TC3 HMI Clients Pack	TC3 HMI Targets Pack
Technical data	TF2000-00pp	TF2010-00pp, TF2020-00pp, TF2030-00pp, TF2040-00pp	TF2050-00pp, TF2060-00pp, TF2070-00pp, TF2080-00pp, TF2090-00pp
	The TC3 HMI Server is a modular web server that provides the human-machine interface (HMI). It supports all CPU classes from ARM to multi-core. The powerful architecture enables a wide range of application scenarios from local panel solutions to multi-client, multi-server and multi-runtime concepts. All that is needed to start an HMI Client is an HTML5-capable browser, which is available for all major operating systems. Accordingly, clients can run on PCs as well as on mobile devices such as tablets and smartphones. Whatever the platform, security is of the utmost importance, which is why the data traveling between client and server is encrypted. The integrated user management features a configurable user rights system that can be linked to the user's own IT infrastructure. The HMI is linked to respective controllers via automation protocols like the Automation Device Specification (ADS) or OPC UA. The HMI Server can be extended with so-called server extensions like an alarms & events system or a recipe management system. Server extensions can also be developed in C++ or .NET with a software development kit, which allows users to develop their own logic and implement additional communication protocols. The TC3 HMI Server includes a connection to one client (browser) and a connection to one controller as standard.	The TC3 HMI Server includes a connection to one client (browser) as standard. Optional client packages are available for establishing further connections at the same time, e.g. to a mobile device or panel. The number of supported clients is not tied to the devices employed, the HMI Server only counts simultaneous (browser) connections. Optional packets are available for 1, 3, 10 or 25 clients.	The TC3 HMI Server includes a connection to one controller as standard. Optional target packages for 1, 3, 10, 25 or 100 targets are available for connecting further control systems. The HMI Server only stores the number of physical targets, based on the unique addressing. The engineering process can be more flexible and modular, and the efficiency increased.

Performance class (pp)	20	30	40	50	20	30	40	50	20	30	40	50
	x	x	x	x	–	–	x	x	–	x	x	x
	60	70	8x	9x	60	70	8x	9x	60	70	8x	9x
	x	x	x	x	x	x	x	x	x	x	x	x
Required	TC1000				TF2000				TF2000			
Target system	Windows 7/8/10, Windows CE				Windows 7/8/10, Windows CE				Windows 7/8/10, Windows CE			
Further information	www.beckhoff.com/TF2000				www.beckhoff.com/TF2010				www.beckhoff.com/TF2050			

For availability status see Beckhoff website at: www.beckhoff.com

TF2xxx | TwinCAT 3 HMI

	TC3 HMI OPC UA	TC3 HMI Extension SDK	TC3 HMI Recipe Management	TC3 HMI Scope
Technical data	**TF2110-00pp**	**TF2200-00pp**	**i TF2210-00pp**	**i TF2300-00pp**
	OPC Unified Architecture is a vendor-independent communication interface for linking TwinCAT or other controllers. The extension includes the OPC UA client, which enables integration of an OPC UA server.	The TwinCAT HMI Server can be expanded modularly and flexibly via extensions. The software development kit (C++/.NET) can be used for programming application-specific solutions (e.g. business logics, proprietary protocols). In addition, user IP (intellectual property) is protected, and existing functions can be accessed by the server (e.g. ADS, logging).	The TwinCAT HMI Recipe Management offers the possibility to manage machine data in various recipes. General descriptions can be created by means of recipe definitions so that machine data for different states can be saved in recipes derived from them. It is possible to load these recipe data to the PLC runtime both for engineering and at the visualisation runtime. When optimising production processes, recipes can additionally be changed at runtime. TF2210 is integrated in TE2000 and cannot be ordered separately.	The TwinCAT Scope software oscilloscope can be used to display time sequences with high resolution. The extension enables integration of the software oscilloscope into the TwinCAT HMI and provides ready-made scope control.
Performance class (pp)	20 30 40 50 – x x x 60 70 8x 9x x x x x	20 30 40 50 – x x x 60 70 8x 9x x x x x	20 30 40 50 – x x x 60 70 8x 9x x x x x	20 30 40 50 – x x x 60 70 8x 9x x x x x
Required	TF2000	TF2000	TE2000	TF2000
Target system	Windows 7/8/10, Windows CE	Windows 7/8/10	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE
Further information	www.beckhoff.com/TF2110	www.beckhoff.com/TF2200	www.beckhoff.com/TF2210	www.beckhoff.com/TF2300

i For availability status see Beckhoff website at: www.beckhoff.com

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TF3xxx | TwinCAT 3 Measurement

	TC3 Scope Server	TC3 Analytics Logger	TC3 Analytics Library
Technical data	**TF3300-00pp**	**i TF3500-00pp**	**i TF3510-00pp**
	The TwinCAT 3 Scope Server prepares data for visual display in the TwinCAT 3 Scope View. It can be used for autarkic data recordings in distributed systems within production, plant or machine networks. The Scope Server not only features TwinCAT-specific communication interfaces, it also offers support for the OPC UA communication standard.	The TwinCAT 3 Analytics Logger records process and application data of the machine controller in synchronisation with machine cycles. The logger is characterised by its high performance as it operates directly in the real-time context of the TwinCAT controller. The recorded data can optionally be stored locally in a file on the hard disk of the machine controller and played back with ring buffer functionality or transmitted to a message broker by means of the IoT communication protocol. The configuration required in this instance is performed in Microsoft Visual Studio®. All variables of the process image and the PLC application can be added easily to the configuration via a check box without the need for programming.	The TwinCAT 3 Analytics Library is a PLC library with analysis functions and application data. The library can be used locally on the machine controller or on a remote analysis system with IoT communication connection. In particular for the second application, PLC code can be generated automatically on the basis of this library with the engineering tool TE3500 TC3 Analytics Workbench. Function modules are available with simple and more complex functions. The spectrum ranges from flank counters, life time monitoring, machine cycle analysis through to mathematical functions and envelope curve monitoring. Minimum and maximum input signal values can be calculated in just the same way and linked together by means of logical operators. All modules are suitable for object-oriented application design and use the features of IEC 61131-3 programming.
Performance class (pp)	20	20	20
	–	–	–
	60	60	60
	x	x	x
	30	30	30
	–	x	x
	70	70	70
	x	x	x
	40	40	40
	x	x	x
	8x	8x	8x
	x	x	x
	50	50	50
	x	x	x
	9x	9x	9x
	x	x	x
Required	TC1000	TC1000	TC1200
Target system	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10
Further information	www.beckhoff.com/TF3300	www.beckhoff.com/TF3500	www.beckhoff.com/TF3510

i For availability status see Beckhoff website at: www.beckhoff.com

TF3xxx | TwinCAT 3 Measurement

	TC3 Analytics Storage Provider	TC3 Analytics Runtime	TC3 Analytics Controller Packs
Technical data	TF3520-00pp	TF3550-00pp	TF3560-00pp, TF3561-00pp, TF3562-00pp, TF3563-00pp, TF3564-00pp, TF3565-00pp
	The TwinCAT 3 Analytics Storage Provider is an IoT client and forms the interface to one or more storage facilities or databases for raw and analysis data from various sources. The data is stored as a binary blob in the storage medium. Microsoft Azure Blob supports a public cloud, while Microsoft SQL supports an on-premises database. In this way, both applications can be covered. The Analytics Storage Provider automatically structures and stores the data. The storage interface can be configured via TwinCAT Engineering in Microsoft Visual Studio®. Data is selected centrally for reading and writing via the TwinCAT Target Browser. The user selects the data via the user-defined variable name in the machine application and the corresponding time period; no complex SQL commands are required. Historical data can be sourced via the TF3500 TC3 Analytics Logger, the TF6720 TC3 IoT Data Agent or the EK9160 IoT Bus Coupler. The corresponding data sinks are the TE3520 TC3 Analytics Service Tool and the TE3500 TC3 Analytics Workbench.	The TwinCAT 3 Analytics Runtime is the runtime "container" for the Analytics application, which was configured and developed in the TE3500 TC3 Analytics Workbench. The runtime can be installed locally, on remote hardware or in a virtual machine. It also contains the TF2000 TC3 HMI Server, which hosts the analytics dashboard. In summary, the TC3 Analytics Runtime represents a bundle of different licenses. It contains a PLC runtime, the Analytics PLC library, the IoT connection, the TC3 HMI Server and a corresponding client package, so that several users can view the designed Analytics Dashboard simultaneously.	The TC3 Analytics Runtime enables the parallel analysis of up to four controllers as standard. With the TC3 Analytics Controller Packs, the analysis can be extended to further controllers for each application individually. Optional packs are available for 4, 8, 16, 32, 64 or 128 further controllers.
Performance class (pp)	20 30 40 50	20 30 40 50	20 30 40 50
	– – x x	– – x x	– – x x
	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x
	x x x x	x x x x	x x x x
Required	TC1000	TC1000	TE3500
Target system	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10
Further information	www.beckhoff.com/TF3520	www.beckhoff.com/TF3550	www.beckhoff.com/TF3560

For availability status see Beckhoff website at: www.beckhoff.com

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	TC3 Condition Monitoring Level 1	TC3 Condition Monitoring Level 2	TC3 Power Monitoring	TC3 Solar Position Algorithm
	TF3600-00pp	TF3601-00pp	TF3650-00pp	TF3900-00pp
	In order to implement Condition Monitoring for machines and plants, the TwinCAT Condition Monitoring library offers a modular construction kit of mathematical algorithms using which measured values can be analysed. The functionality of the library is independent of the physical background of the measured data, however, a focus is placed on vibration measurement. From the available range of components, users can select software modules to suit specific application requirements and to develop solutions that are scaled to different platforms. The library's functions primarily cover the areas of signal analysis or signal transformation, statistics and classification. In addition to spectral analysis via FFT or using, for instance, an envelope spectrum, it is possible to calculate key statistical values such as the kurtosis or the crest factor. Combining these algorithms with limit value monitoring is, for instance, ideally suited to monitoring roller bearings. Moreover, it is possible to implement an evaluation of machine vibrations according to DIN ISO 10816. Condition Monitoring Level 1 contains the following algorithms: – signal processing – statistics – classification – frame-based buffer handling	TwinCAT Condition Monitoring Level 2 includes further algorithms in addition to the Level 1 functions.	The TwinCAT Power Monitoring function is a PLC library for the evaluation of raw current and voltage data, which are usually supplied by EL3773 and EL3783 EtherCAT Terminals. Function blocks are available for the calculation of RMS values for current, voltage and power. These can be output as a momentary or average values. Maximum and minimum values are also available on the function block. Frequency and frequency spectra can be determined, such as e.g. harmonics in the network and their load in the form of the Total Harmonic Distortion (THD). All function blocks are available for single-phase and three-phase systems. The TwinCAT products TE1300 Scope View Professional and TF6420 Database Server are suitable for displaying or permanently saving acquired data.	With the TwinCAT Solar Position Algorithm it is possible to determine the sun angle using the date, time, geographical longitude and latitude as well as further parameters (depending on the desired accuracy). The function block works with a maximum inaccuracy of ±0.001°.
20	–	–	x	x	–	–	x	x	–	x	x	x	x	x	x	x
30	–	–	x	x	–	–	x	x	–	x	x	x	x	x	x	x
40	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
60	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
70	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
8x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
9x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	TC1200				TC1200				TC1200				TC1200			
	Windows 7/8/10				Windows 7/8/10				Windows 7/8/10				Windows 7/8/10, Windows CE			
	www.beckhoff.com/TF3600				www.beckhoff.com/TF3601				www.beckhoff.com/TF3650				www.beckhoff.com/TF3900			

TF4xxx | TwinCAT 3 Controller

	TC3 Controller Toolbox	TC3 Temperature Controller
Technical data	**TF4100-00pp**	**TF4110-00pp**
	The TwinCAT Controller Toolbox covers all essential blocks for control applications. – controllers satisfy industrial requirements such as anti-reset windup – simple basic controllers (P, I, D) – complex controllers (PI, PID, switching controllers) – filter blocks – control value generators (limiters, PWM) – ramp and signal generator blocks	Temperature controllers can be simply implemented using TwinCAT Temperature Controller. Simple commissioning through self-adjustment of the controller (auto-tuning) is included. – automatic and manual operation with shock-free set up – control value analog or pulse-width modulated signal – tolerance monitoring, absolute value monitoring – scalable reaction to sensor error and heating power faults – limitation of set and control values – optional ramping of the set value – optional start-up phase for the setpoint variables – industrial PID controller as base control algorithm inside the temperature controller

Performance class (pp)	20	30	40	50	20	30	40	50
	x	x	x	x	x	x	x	x
	60	70	8x	9x	60	70	8x	9x
	x	x	x	x	x	x	x	x
Required	TC1200				TC1200			
Target system	Windows 7/8/10, Windows CE				Windows 7/8/10, Windows CE			
Further information	www.beckhoff.com/TF4100				www.beckhoff.com/TF4110			

We reserve the right to make technical changes.

TF5xxx | TwinCAT 3 Motion Control

	TC3 NC PTP 10 Axes	TC3 NC PTP Axes Pack 25	TC3 NC PTP Axes Pack unlimited
Technical data	**TF5000-00pp**	**TF5010-00pp**	**TF5020-00pp**
	TC3 NC PTP 10 Axes implements Motion Control for point-to-point movements in software. The axes are represented by axis objects and provide a cyclic interface, e.g. for the PLC. This axis object is then linked to a corresponding physical axis. In this way, the most diverse axis types with the most diverse fieldbus interfaces can be connected abstractly with the axis objects, which always offer an identical configuration interface. The control of the axes can be configured in various conformations (position or velocity interface) and various controllers. The axes are configured in TwinCAT Engineering. – up to 10 axes, developable to a maximum of 255 axes – supports electrical and hydraulic servo drives, frequency converter drives, stepper motor drives, DC drives, switched drives (fast/slow axes), simulation axes and encoder axes – supports various encoders such as incremental encoder, absolute encoder, digital interface to the drives such as EtherCAT, SERCOS, SSI, Lightbus, PROFIBUS DP/MC, pulse train – standard axis functions such as start/stop/reset/reference, velocity override, master/slave couplings, electronic gearbox, online distance compensation – programming is carried out via PLCopen-compliant IEC 61131-3 function blocks – convenient axis commissioning options – online monitoring of all axis state variables such as actual/setpoint values, releases, control values, online axis tuning – forcing of axis variables – configuration of all axis parameters, such as measuring system, drive parameters and position controller – configurable controller structures: P control, PID control, PID with velocity pre-control, PID with velocity and acceleration pre-control – online master/slave and slave/master conversion – flying saw (diagonal saw) – cam plates (support by TC3 Cam Design Tool [optional]) – FIFO axes (optional) – external set point value generators – multi-master coupling – OMAC PackML PLC library	Extension of TF5000-00pp up to a maximum of 25 axes	Extension of TF5000-00pp up to a maximum of 255 axes

Performance class (pp)	20	30	40	50	20	30	40	50	20	30	40	50
	–	x	x	x	–	–	x	x	–	–	x	x
	60	70	8x	9x	60	70	8x	9x	60	70	8x	9x
	x	x	x	x	x	x	x	x	x	x	x	x
Required	TC1200				TC1250				TC1250			
Target system	Windows 7/8/10, Windows CE				Windows 7/8/10, Windows CE				Windows 7/8/10, Windows CE			
Further information	www.beckhoff.com/TF5000				www.beckhoff.com/TF5010				www.beckhoff.com/TF5020			

TF5xxx | TwinCAT 3 Motion Control

	TC3 NC Camming				TC3 NC Flying Saw			
Technical data	TF5050-00pp				TF5055-00pp			
	TwinCAT NC Camming (cam plate) is a non-linear relationship between a master and a slave axis. The camming package offers various options for the storage of cam plates. Convenient PLC blocks enable the loading, coupling and uncoupling of cam plates. It is possible to load new cam plates or to modify cam plates during operation. The TwinCAT Cam Design Tool offers support for the creation of the cam plates. – position tables with master interpolation points and corresponding slave positions; interpolation between the points is done linearly or by splines – motion function table describing a cam plate via motion laws according to VDI guideline 2143 – cyclic or linear processing – cam plate with offset and scale, can be modified on the master or slave side – high flexibility through online change of the motion functions				TwinCAT NC Flying Saw implements the coupling of a slave axis to a master axis in a certain synchronous position (flying saw). PLC function blocks enable coupling and uncoupling as well as parameterisation. – The master axis can be a real axis, a virtual axis, or some other external source of actual values. – synchronisation of the slave axis from any motion situation (stop, forward or reverse travel) with the master in motion – simple synchronisation with the master velocity – precise position synchronisation with the master axis (velocity and position) – synchronous velocity can be set via a coupling factor – optional return prevention as additional safety function – superimposed section compensation during the synchronous phase for dynamic position correction			
Performance class (pp)	20	30	40	50	20	30	40	50
	–	–	x	x	–	–	x	x
	60	70	8x	9x	60	70	8x	9x
	x	x	x	x	x	x	x	x
Required	TC1250				TC1250			
Target system	Windows 7/8/10, Windows CE				Windows 7/8/10, Windows CE			
Further information	www.beckhoff.com/TF5050				www.beckhoff.com/TF5055			

We reserve the right to make technical changes.

	TC3 NC FIFO Axes	TC3 Motion Control XFC	TC3 NC I
	TF5060-00pp	TF5065-00pp	TF5100-00pp
	Using TwinCAT NC FIFO Axes, externally generated set position values can be output to the axes in the form of a velocity pre-control. The set value generation is designed in such a way that both the set position and the set velocity are determined as the FIFO inputs are worked through in sequence. It is also possible, if necessary, to interpolate between two neighbouring FIFO inputs.	eXtreme Fast Control (XFC) is the technique that enables very fast, temporally high-precision reactions using EtherCAT, special I/O terminals and TwinCAT on the PC. Using EtherCAT Distributed Clocks (DC) and appropriate terminals, distributed latches or cam controllers can be implemented simply in this way. – function blocks for the high-precision acquisition and switching of digital signals related to axis positions – EtherCAT Distributed Clocks with the timestamp-based EtherCAT EL1252, EL2252 or EL2262 input and output terminals – blocks for the conversion of DC time to position and vice versa – convenient PLCopen-compliant TouchProbe block – digital cam controller as PLCopen-compliant block In conjunction with TwinCAT NC I, function blocks are available for high-precision switching of signals depending on the path position.	Using TwinCAT NC I, movements can be implemented with up to three interpolating and up to five auxiliary axes in the interpolation package. Various axis types with various fieldbus interfaces are supported. The movement is usually programmed in DIN 66025, but it can also alternatively be carried out via PLC function blocks. – max. 3 path axes and up to 5 auxiliary axes per group – 1 group per channel, max. 31 channels – supports electric servo axes, stepper motor drives – interpreter functions such as subroutine and jump technology, programmable loops, zero point shifts, tool corrections, M and H functions – geometry functions: straight lines and circles in 3D space, circles at all main levels, helices with base circles at all main levels, linear, circular and helical interpolation at the main levels and freely definable levels, Bezier splines, look-ahead function – online reconfiguration of axes in groups, path override, slave coupling to path axes, auxiliary axes, axis error and sag compensation, measuring functions – programming in DIN 66025 – access alternatively via function blocks according to IEC 61131-3 – operation of automatic mode, manual mode (jog/inch), single block mode, referencing, handwheel mode (movement/overlay) – convenient debugging with online monitoring of current setpoint/actual position (position lag of all axes), NC program line currently being processed, NC program line currently being interpreted, channel status – support of kinematic transformations in combination with TF511x
	20 / 30 / 40 / 50	20 / 30 / 40 / 50	20 / 30 / 40 / 50
	– / – / x / x	– / – / x / x	– / – / x / x
	60 / 70 / 8x / 9x	60 / 70 / 8x / 9x	60 / 70 / 8x / 9x
	x / x / x / x	x / x / x / x	x / x / x / x
	TC1250	TC1250, TC1260	TC1250
	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE
	www.beckhoff.com/TF5060	www.beckhoff.com/TF5065	www.beckhoff.com/TF5100

TF5xxx | TwinCAT 3 Motion Control

	TC3 Kinematic Transformation L1	TC3 Kinematic Transformation L2	TC3 Kinematic Transformation L3	TC3 Kinematic Transformation L4
Technical data	TF5110-00pp	TF5111-00pp	TF5112-00pp	TF5113-00pp
	Various robot types kinematics can be realised using TwinCAT Kinematic Transformation. The programming of the robot movements takes place in Cartesian coordinates using either DIN 66025 instructions or the PLCopen-compliant blocks from the PLC. An integrated dynamic pre-control ensures high precision of the movement even at high accelerations and speeds. Configuration takes place in TwinCAT Engineering. – supports various parallel and also serial kinematics, e.g. for pick-and-place tasks – supports the programming of interpolating movements in G-code (DIN 66025) – alternatively, standard PTP and cam plate applications can be realised – simple programming in the Cartesian coordinate system – automatic calculation of the inverse kinematic for the relevant motor positions – kinematics configured in TwinCAT 3 Engineering; in addition to the type (e.g. delta), the bar lengths and offsets must also be parameterised – mass and mass inertia values can be specified for dynamic pre-control – optimised for the Beckhoff Servo Drives from the AX5000 series – basic package integrating the following kinematics: cartesian portals	Extension of the TwinCAT Kinematic Transformation L1 with additional kinematics: – 2D parallel kinematics – shear kinematics – crane and roll kinematics	Extension of the TwinCAT Kinematic Transformation L1/L2 with additional kinematics: – 3D Delta – SCARA	Extension of the TwinCAT Kinematic Transformation L1/L2/L3 with additional kinematics: – 5D kinematics – serial 6-axis kinematics – Stewart platform
Performance class (pp)	20 30 40 50	20 30 40 50	20 30 40 50	20 30 40 50
	– – x x	– – x x	– – x x	– – x x
	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x
	x x x x	x x x x	x x x x	x x x x
Required	TC1260	TC1260	TC1260	TC1260
Target system	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE
Further information	www.beckhoff.com/TF5110	www.beckhoff.com/TF5111	www.beckhoff.com/TF5112	www.beckhoff.com/TF5113

For availability status see Beckhoff website at: www.beckhoff.com/TF5130

We reserve the right to make technical changes.

	TC3 Robotics mxAutomation				TC3 Robotics uniVAL PLC				TC3 CNC			
	TF5120-00pp				i TF5130-00pp				TF5200-00pp			
	TC3 Robotics mxAutomation allows direct communication between the PLC and the KUKA KR C4 robot control via a common interface. The robot movements can be programmed directly in the PLC, and the actual values of the robot can be synchronised in real time. TC3 Robotics mxAutomation combines PLC control and robot on a single platform and enables programming from an existing system without knowledge of a specific robot programming language. Communication takes place via EtherCAT, with the TwinCAT EtherCAT master and the KR C4 controller from KUKA exchanging data via the EL6695-1001 EtherCAT bridge terminal. In doing so, drive commands are transmitted from the controller to the robot and actual values from the robot to the controller. The robot position data are transmitted to the PLC in every cycle. In addition, the PLC programmer has access to the robot position data at all times in real-time.				The TC3 Robotics uniVAL PLC allows direct communication between the PLC and the CS8C robotics controller from Stäubli via a common interface. The robot's movements can be programmed directly in the PLC and compared with the robot's actual values in real-time. The TC3 Robotics uniVAL PLC combines PLC control and robotics on a single platform and enables programming from a single system without having to know a special robot programming language. The communication takes place via EtherCAT, with TwinCAT and the CS8C controller from Stäubli exchanging the data as master and slave, respectively. TwinCAT sends the motion commands to the robot via EtherCAT. Thanks to this efficient communication, commands can be sent from the PLC to the robot at high speed. In addition, the PLC programmer has real-time access to the robot's position data at all times. Other motion programs which are located in the robot controller's database can also be activated via this interface.				TwinCAT CNC offers the option to implement interpolation with up to 32 simultaneously interpolating axes. The number of axes and/or the number of channels can be adapted to the requirements of the application via the option packages. Various transformations can be supplemented via option packages. Programming takes place according DIN 66025. The axes and channels are configured in TwinCAT Engineering. – 8 path axes/controlled spindles, max. 64 axes/controlled spindles (optional), max. 12 channels (optional) – supports electric servo axes, stepper motor drives – subroutine and jump technology, programmable loops, zero point shifts, tool corrections, M and H functions, mathematical functions, programming of parameters/variables, user macros, spindle and auxiliary functions, tool functions – geometry functions linear, circular and helical interpolation at the main levels and freely definable levels, max. 32 interpolating path axes per channel (optional), look-ahead function – axis functions, coupling and gantry axis function, override, axis error and sag compensation, measuring functions – programming in DIN 66025 with high-level language extension – access via function blocks from TwinCAT PLC according to IEC 61131-3 – operation with automatic mode, manual mode (jog/inch), single block mode, referencing, block advance, handwheel mode (movement/overlay) – convenient debugging with online monitoring of all states			
	20	30	40	50	20	30	40	50	20	30	40	50
	–	–	–	x	–	–	–	x	–	–	–	x
	60	70	8x	9x	60	70	8x	9x	60	70	8x	9x
	x	x	x	x	x	x	x	x	x	x	x	x
	TC1200				TC1200				TC1260			
	Windows 7/8/10, Windows CE				Windows 7/8/10, Windows CE				Windows 7/8/10			
	www.beckhoff.com/TF5120				www.beckhoff.com/TF5130				www.beckhoff.com/TF5200			

TF5xxx | TwinCAT 3 Motion Control

	TC3 CNC E	TC3 CNC Axes Pack	TC3 CNC Channel Pack
Technical data	TF5210-00pp	TF5220-00pp	TF5230-00pp
	TwinCAT CNC in the export version (E-version) offers the option to implement an interpolation with up to four simultaneously interpolating axes. The number of axes and/or the number of channels can be adapted to the requirements of the application via the option packages. Various transformations can be supplemented via option packages. Programming takes place according DIN 66025. The axes and channels are configured in TwinCAT Engineering. – maximum 8 path axes/controlled spindles, max. 64 axes/controlled spindles (optional), max. 12 channels – maximum 4 interpolationg path axes – supports electric servo axes, stepper motor drives – subroutine and jump technology, programmable loops, zero point shifts, tool corrections, M and H functions, mathematical functions, programming of parameters/variables, user macros, spindle and auxiliary functions, tool functions – geometry functions linear, circular and helical interpolation at the main levels and freely definable levels, max. 64 path axes per channel, look-ahead function – axis functions, coupling and gantry axis function, override, axis error and sag compensation, measuring functions – programming in DIN 66025 with high-level language extension – access via function blocks from TwinCAT PLC according to IEC 61131-3 – operation with automatic mode, manual mode (jog/inch), single block mode, referencing, block advance, handwheel mode (movement/overlay) – convenient debugging with online monitoring of all states	Using the TwinCAT CNC Axes Pack, extension is possible up to a total of 64 axes/controlled spindles, of which a maximum of 32 can be path axes and a maximum of 12 can be controlled spindles.	Using TwinCAT CNC Channel Pack, a further CNC channel can be extended to a maximum of 12 channels. – channel synchronisation – axis transfer between channels

Performance class (pp)	20	30	40	50	20	30	40	50	20	30	40	50
	–	–	–	x	–	–	–	x	–	–	–	x
	60	70	8x	9x	60	70	8x	9x	60	70	8x	9x
	x	x	x	x	x	x	x	x	x	x	x	x
Required	TC1260				TC1270				TC1270			
Target system	Windows 7/8/10				Windows 7/8/10				Windows 7/8/10			
Further information	www.beckhoff.com/TF5210				www.beckhoff.com/TF5220				www.beckhoff.com/TF5230			

We reserve the right to make technical changes.

	TC3 CNC Transformation	TC3 CNC HSC Pack	TC3 CNC Spline Interpolation	TC3 CNC Virtual NCK Basis
	TF5240-00pp	TF5250-00pp	TF5260-00pp	TF5270-00pp
	TwinCAT CNC Transformation is an optional function for the TwinCAT CNC. – transformation functionality (5-axis functionality) – kinematics selection from the kinematics library – RTCP function – TLC function – definition of different coordinate systems, linking/transition of coordinate systems	TwinCAT CNC HSC Pack is an optional high-speed cutting solution for the TwinCAT CNC: – cross-block velocity and acceleration control for optimum utilisation of the axis dynamics and thus higher path speeds – high surface quality through smoothed dynamics and associated reduction of vibrational excitation of the machine – effective control of specified contour tolerances – path programming via splines with programmable spline type (Akima-spline, B-spline) for reduction of NC blocks for free-form surfaces	TwinCAT CNC Spline Interpolation is an optional package for the TwinCAT CNC for path programming via splines with programmable spline type, Akima-spline, B-spline.	TwinCAT CNC Virtual NCK Basis is a virtual TwinCAT CNC for simulation in a Windows environment as an option for the TwinCAT CNC.
	20 30 40 50	20 30 40 50	20 30 40 50	20 30 40 50
	– – – x	– – – x	– – – x	– – – x
	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x
	x x x x	x x x x	x x x x	x x x x
	TC1270	TC1270	TC1270	TC1000
	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10
	www.beckhoff.com/TF5240	www.beckhoff.com/TF5250	www.beckhoff.com/TF5260	www.beckhoff.com/TF5270

We reserve the right to make technical changes.

TF5xxx | TwinCAT 3 Motion Control

	TC3 CNC Virtual NCK Options	TC3 CNC Volumetric Compensation	TC3 CNC Cutting Plus
Technical data	TF5271-00pp	i TF5280-00pp	i TF5290-00pp
	TwinCAT CNC Virtual NCK Options is a virtual TwinCAT CNC for simulation in a Windows environment as a further option package for the TwinCAT CNC and TwinCAT CNC Virtual NCK Basis.	TC3 CNC Volumetric Compensation is an optional package for compensating geometric machine errors based on an ISO-standardised parametric model. Application – highly effective option for increasing the machine accuracy and therefore the manufacturing accuracy, simply through control measures – correction of the TCP position through dynamic calculation of axis correction values – suitable for machines with 3 Cartesian and up to 3 rotary axes – any kinematic axis order (head/table kinematics) Features – several parameter files per compensation, several compensations per controller – parameter update via NC command or HMI – interpolation of parameter sets (sag compensation, etc.) – smoothing of parameter step changes during modulo transitions – diagnostics possible via ADS, Microsoft Excel file Safety – configurable limitation of the compensating values – configurable limitation of the travel-out velocity of the compensating values Supported file formats – tabular CSV format – Etalon exchange format Standards – DIN ISO 230 "Test code for machine tools" – ISO/TR 16907 "Machine tools – Numerical compensation of geometric errors"	TC3 CNC Cutting Plus is a technology package and enhances the CNC functionality for cutting. Automatic lifting/lowering of an axis (lifts) – block-overlapping automatic lifting and lowering of an axis – to prevent collisions between the tool head and ridges or cut-out parts – jerk-limited profile without affecting the path speed Microsteps, fast laser switching signal – highly accurate output of an M function (1 µs) at a certain position – use of time stamps – supports various types of synchronisation – parameterisation by configuration of the M functions or programming the M functions via NC programs Tube transformation – multi-axis transformation for sheath surface processing – supports various profiles such as multi-edge pipes and profile pipes – processing of the programmed contour on the surface of the profile
Performance class (pp)	20 30 40 50	20 30 40 50	20 30 40 50
	– – – x	– – – x	– – – x
	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x
	x x x x	x x x x	x x x x
Required	TC1000	TC1270	TC1270
Target system	Windows 7/8/10	Windows 7/8/10	Windows 7/8/10
Further information	www.beckhoff.com/TF5271	www.beckhoff.com/TF5280	www.beckhoff.com/TF5290

i For availability status see Beckhoff website at: www.beckhoff.com

We reserve the right to make technical changes.

	TC3 Motion Collision Avoidance	TC3 Motion Pick-and-Place	TC3 Digital Cam Server	TC3 Hydraulic Positioning
	TF5410-00pp	TF5420-00pp	i TF5800-00pp	TF5810-00pp
	TC3 Motion Collision Avoidance is an optional package that prevents collisions when operating a number of linearly and/or translationally dependent axes with TC3 NC PTP. The underlying algorithm ensures the maintenance of a minimum distance from the previous axis. In this way, TC3 Motion Collision Avoidance actively prevents collisions when a number of motors are using e.g. the same rail. As well as active collision avoidance, TF5410 can also be used to allow axes to accumulate in a controlled way, for example when carrying out linear movements such as with XTS (eXtended Transport System). Programming of the PLC's movement commands is based on the standard PTP motion library with an additional input "gap". For example, when using TC3 Motion Collision Avoidance, all the axes can be given the same target position. The algorithm then ensures that only the first axis actually moves to that position. The remaining axes automatically line up while maintaining their minimum distance. This means that no further programming effort is needed in order to implement a dynamic buffer in which products can accumulate.	TC3 Motion Pick-and-Place is an extension of TC3 NC I (TF5100) and was especially designed for handling tasks carried out by gantry robots and other kinematics. It smooths the transition of complex path segments. Special methods are used to blend movement commands, facilitating optimised cycle times when they are processed. This reduces the bumpiness of motion along the path, making it run more smoothly, which is vital for high cycle times, gentle treatment of the robot and careful handling of the products. The TF5420 is programmed using a PLC library. There is no limit on the number of axes in a pick-and-place group, the only limiting factor is the processing power of the controller. Given an appropriate level of processing power, interpolating movement commands can be processed even for complex machines with more than three or eight axes (three path plus five auxiliary axes).	The TwinCAT Digital Cam Server is a fast cam controller with monitoring for various fieldbuses. The cams are configured in TwinCAT Engineering. – high-performance fieldbus-independent cam controller with many functions – up to 320 outputs – up to 180 cams per output – path-path cams, path-time cams, brake cams – dynamic speed correction – measurement and monitoring of rotary speed	Algorithms for the control and positioning of hydraulic axes are combined in TwinCAT Hydraulic Positioning and are available as PLCopen-compliant PLC blocks. – programming via certified PLCopen motion blocks – set value generators especially for hydraulic applications – coupling of the set value generators to NC PTP/NC I/CNC possible – free profile design through connection of customer-specific set value generators – support of non-linear gears – multiple-segmented movements (blending) – support of all necessary interfaces via Beckhoff I/O system – support of all common fieldbus systems – all process values in physical units, determination of force true to surface – support of standardised and application-specific controllers for position, force/pressure – bumpless transfer of force and position control – automatic identification of valve characteristics and axis properties – linearisation of characteristic curves – maintenance and commissioning tool for – axis parameterisation – valve parameterisation incl. characteristic curves – controller parameterisation – triggering of test commands – display of actual values
20	–	60	x	TC1250	Windows 7/8/10	www.beckhoff.com/TF5410
30	–	70	x			
40	x	8x	x			
50	x	9x	x			
20	–	60	x	TC1260	Windows 7/8/10	www.beckhoff.com/TF5420
30	–	70	x			
40	x	8x	x			
50	x	9x	x			
20	–	60	x	TC1200	Windows 7/8/10, Windows CE	www.beckhoff.com/TF5800
30	–	70	x			
40	x	8x	x			
50	x	9x	x			
20	–	60	x	TC1200	Windows 7/8/10, Windows CE	www.beckhoff.com/TF5810
30	–	70	x			
40	x	8x	x			
50	x	9x	x			

TF6xxx | TwinCAT 3 Connectivity

	TC3 OPC UA	TC3 OPC DA
Technical data	**TF6100-00pp**	**TF6120-00pp**
	OPC Unified Architecture offers secure, reliable and manufacturer-neutral transport of raw data and pre-processed information from the manufacturing level into the production planning or ERP system. With OPC UA, all desired information is available to every authorised application and every authorised person at any time and in any place. TwinCAT OPC UA Server – certified in the OPC Laboratory, Europe – functions: DataAccess/HistoricalAccess/Alarm&Condition – PLC blocks for diagnosis and restart – intermediate storage of data on the server: interruption of the communication connection does not lead to loss of data – configurator for simple handling and diagnostics of local/remote OPC UA servers TwinCAT OPC UA Gateway – wrapper technology for an OPC DA (Data Access) interface according to OPC UA – high-performance OPC DA access – aggregation of TwinCAT OPC UA servers TwinCAT OPC UA Client – PLCopen PLC function blocks for OPC UA Data Access – demo OPC UA client for diagnostic purposes Security – secured access to name spaces, variables, structures and the OPC UA Server in general – authorisation levels and a configuration option for consistently encrypted access OPC UA Pub/Sub UDP Realtime – deterministic and real-time capable communication channel – ideal for heterogeneous M2M scenarios	OPC is the standard for supplier-independent communication in automation technology. OPC DA (Data Access) is based on the Microsoft COM/DCOM standard. TwinCAT OPC DA Server – specifications OPC-DA2x and OPC-XML-DA – configurator for the set-up – demo DA client for diagnostic purposes and the loading of recipes TF6120 can be replaced by the software component TwinCAT OPC UA Gateway of the TF6100 product.

Performance class (pp)	20	30	40	50	20	30	40	50
	x	x	x	x	–	x	x	x
	60	70	8x	9x	60	70	8x	9x
	x	x	x	x	x	x	x	x
Required	TC1000				TC1000			
Target system	Windows 7/8/10, Windows CE				Windows XP			
Further information	www.beckhoff.com/TF6100				www.beckhoff.com/TF6120			

We reserve the right to make technical changes.

	TC3 EtherCAT Redundancy 250	TC3 EtherCAT Redundancy 250+	TC3 EtherCAT External Sync	TC3 Modbus TCP
	TF6220-00pp	**TF6221-00pp**	**TF6225-00pp**	**TF6250-00pp**
	TwinCAT EtherCAT Redundancy 250 extends the TwinCAT EtherCAT Master by the possibility to implement cable redundancy for up to 250 EtherCAT devices: from the last logical device a cable is returned back to the master. Configuration and diagnostics take place in the TwinCAT 3 engineering environment.	TwinCAT EtherCAT Redundancy 250+ extends the TwinCAT EtherCAT Master by the possibility to implement cable redundancy for more than 250 EtherCAT devices: from the last logical device a cable is returned back to the master. Configuration and diagnosis take place in the TwinCAT 3 engineering environment.	TC3 EtherCAT External Sync extends the TwinCAT EtherCAT master with an option to synchronise the Beckhoff real-time communication with external digital signals. The digital signals are read via terminals supporting timestamping, such as the EL1252 EtherCAT Terminal.	TwinCAT Modbus acts as gateway between Modbus TCP devices and TwinCAT runtime systems. It provides both server and client functionalities. In server mode the memory areas of several TwinCAT runtime systems can be mapped directly to the Modbus memory areas. A PLC library is provided for implementing a Modbus TCP client, so that the memory areas of a Modbus TCP device can be accessed.
	20 30 40 50	20 30 40 50	20 30 40 50	20 30 40 50
	– – x x	– – x x	x x x x	x x x x
	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x
	x x x x	x x x x	x x x x	x x x x
	TC1100	TC1100	TC1100	TC1200
	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE
	www.beckhoff.com/TF6220	www.beckhoff.com/TF6221	www.beckhoff.com/TF6225	www.beckhoff.com/TF6250

TF6xxx | TwinCAT 3 Connectivity

	TC3 Modbus RTU	TC3 PROFINET RT Device	TC3 PROFINET RT Controller	TC3 EtherNet/IP Slave
Technical data	**TF6255-00pp**	**TF6270-00pp**	**TF6271-00pp**	**TF6280-00pp**
	TwinCAT Modbus RTU implements Modbus RTU communication via a serial RS232, RS422 or RS485 interface and is thus suitable both for the PC/CX interfaces and for operation with the KL6xxx serial Bus Terminals. It contains function blocks for master and slave operating mode with simple configuration.	The TwinCAT PROFINET RT Device (slave) is a supplement that turns any PC-based controller with an Intel® chipset and the real-time Ethernet driver developed by Beckhoff into a PROFINET RT device. By installing the function, a standard Ethernet interface becomes a PROFINET slave.	The TwinCAT PROFINET RT Controller (master) is a supplement that turns any PC-based controller with an Intel® chipset and the real-time Ethernet driver developed by Beckhoff into a PROFINET RT controller. By installing the function, a standard Ethernet interface becomes a PROFINET master.	The TwinCAT EtherNet/IP Slave is a supplement that turns any PC-based controller with an Intel® chipset and the real-time Ethernet driver developed by Beckhoff into an EtherNet/IP slave. Through this supplement the Ethernet interface becomes an EtherNet/IP slave. The product can be used on all PC controllers and Embedded PC controllers with an Intel® chipset. A further feature of the supplements is that it enables up to eight slaves to be parameterised using a single physical interface. For this purpose, a virtual MAC address is created in order to be able to operate a total of up to eight EtherNet/IP slaves on one PC via a single Ethernet interface. This feature can be used, for example, to exchange larger amounts of data using one EtherNet/IP master or to establish a connection to several EtherNet/IP masters in different subnets.
Performance class (pp)	20 30 40 50 x x x x 60 70 8x 9x x x x x	20 30 40 50 – – x x 60 70 8x 9x x x x x	20 30 40 50 – – x x 60 70 8x 9x x x x x	20 30 40 50 – – x x 60 70 8x 9x x x x x
Required	TC1200	TC1100	TC1100	TC1100
Target system	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE
Further information	www.beckhoff.com/TF6255	www.beckhoff.com/TF6270	www.beckhoff.com/TF6271	www.beckhoff.com/TF6280

We reserve the right to make technical changes.

	TC3 EtherNet/IP Master	TC3 FTP Client	TC3 TCP/IP	TC3 TCP/UDP Realtime	TC3 Serial Communication
	TF6281-00pp	TF6300-00pp	TF6310-00pp	TF6311-00pp	TF6340-00pp
	The TwinCAT EtherNet/IP Master is a supplement that turns any PC-based controller with an Intel® chipset and the real-time Ethernet driver developed by Beckhoff into an EtherNet/IP master. Through this supplement, the Ethernet interface becomes an EtherNet/IP master. The product can be used on all PC controllers and Embedded PC controllers with an Intel® chipset. The process data is configured using TwinCAT 3 allowing various process data and various sizes. The supplement supports both multicast and unicast connections. Up to 16 simple EtherNet/IP slave devices can be connected via one generic node.	TwinCAT FTP enables easy access from the PLC to one or several FTP servers with the aid of various function blocks. Files can be loaded to or from a server after the establishment of a connection (optional with authentication). Additional function blocks allow files or directories to be searched for, created, deleted and renamed.	TwinCAT TCP/IP enables the implementation and realisation of one or several TCP/IP servers and/or TCP/IP clients within the TwinCAT 3 PLC. Corresponding blocks exist for the establishment/disconnection of communication as well as for the pure exchange of data (send and receive). The function blocks also support the use of multicast addresses.	TwinCAT 3 already offers an option to access the network card of the operating system (TF6310) from the PLC via the user mode. As an enhancement, TC3 TCP/UDP Realtime (TF6311) now enables fast and convenient access from the real-time directly to the network card. The TwinCAT 3 network card driver handles the access via a dedicated stack. The implementation facilitates cooperative use of the network card by the operating system. TF6311 provides both server and client functionality, so that the TCP/IP, UDP/IP and Ping/ARP protocols can be implemented. Unlike the TF6310 function modules, TF6311 is realised as a TcCOM (TwinCAT Component Object Model) module and directly implements the TwinCAT 3 philosophy: modules encapsulate functionality and can be used without knowledge of the internal workings. In addition, this approach enables seamless integration of the module in the two PLC and C++ programming environments. Examples of client and server applications in different protocols illustrate the use of the TcCOM module, making implementation of an application efficient and easy.	TwinCAT Serial Communication implements communication with serial devices such as printers, bar code scanners, etc. The serial interface of the PC and the serial Beckhoff EL6xxx EtherCAT Terminals and KL6xxx Bus Terminals are supported. Via the network-based fieldbus system from Beckhoff the serial terminals can be accessed over a distance of up to 100 m. In addition, it is possible to address virtual COM interfaces of the operating system from the PLC.
20	–	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
30	–	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
40	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
60	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
70	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
8x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
9x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	TC1100				TC1200				TC1200				TC1200, TC1300				TC1200			
	Windows 7/8/10, Windows CE				Windows 7/8/10, Windows CE				Windows 7/8/10, Windows CE				Windows 7/8/10, Windows CE				Windows 7/8/10, Windows CE			
	www.beckhoff.com/TF6281				www.beckhoff.com/TF6300				www.beckhoff.com/TF6310				www.beckhoff.com/TF6311				www.beckhoff.com/TF6340			

TF6xxx | TwinCAT 3 Connectivity

	TC3 SMS/SMTP	TC3 Virtual Serial COM	TC3 Database Server	TC3 XML Server
Technical data	**TF6350-00pp**	**TF6360-00pp**	**TF6420-00pp**	**TF6421-00pp**
	TwinCAT SMS/SMTP enables the transmission of SMS messages or e-mails using PLC function blocks. The latter also allows the transmission of file attachments, HTML texts and the setting of message priorities. Support for STARTTLS/SSL enables encrypted e-mail communication to be configured.	TwinCAT Virtual Serial COM allows the EL60xx EtherCAT Terminals or EP6002 EtherCAT Box modules to be integrated into Windows XP, Windows 7/8/10 or Windows CE as normal serial interfaces. The computer on which a serial interface is to be generated for it is defined individually for each EL60xx/EP6002. Access to the device connected to the terminal takes place via Windows API for serial interfaces.	TwinCAT Database Server enables the exchange of data between databases and the TwinCAT system. PLC variables or direct values of the EtherCAT I/Os can be logged cyclically when changes occur or event-controlled by means of PLC function blocks. A TwinCAT 3 PLC library for the Database Server utilises the object-oriented extensions of the IEC 61131-3. As a result, the program code is more structured and much simpler to extend. The performance of command processing is also considerably higher. Furthermore, a C++ interface is implemented for the Database Server. This allows the user to communicate with the Database Server not just from the PLC, but also directly from a C++ application.	The TwinCAT XML Server provides a PLC library enabling write/read access for XML data. The user-friendly XML Server facilitates e.g. the loading of initialisation data, which is often required at machine startup.
Performance class (pp)	20 30 40 50	20 30 40 50	20 30 40 50	20 30 40 50
	x x x x	– x x x	x x x x	x x x x
	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x
	x x x x	x x x x	x x x x	x x x x
Required	TC1200	TC1100	TC1200	TC1200
Target system	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE
Further information	www.beckhoff.com/TF6350	www.beckhoff.com/TF6360	www.beckhoff.com/TF6420	www.beckhoff.com/TF6421

For availability status see Beckhoff website at: www.beckhoff.com

We reserve the right to make technical changes.

	TC3 IEC 60870-5-10x	TC3 IEC 61850/ IEC 61400-25	TC3 RFID Reader Communication	TC3 S5/S7 Communication	TC3 DBC File Import for CAN
	TF6500-00pp	i TF6510-00pp	TF6600-00pp	TF6610-00pp	i TF6650-00pp
	TwinCAT IEC 60870-5-10x enables communication according to the IEC standard 60870-5-10x from the PLC. Both server and client operating modes are possible. PLC library for the realisation of masters for – IEC 60870-5-101 – IEC 60870-5-102 – IEC 60870-5-103 – IEC 60870-5-104 PLC library for the realisation of slaves for – IEC 60870-5-101 – IEC 60870-5-104	For the standard-compliant communication between client and server, corresponding servers can be realised directly in the TwinCAT PLC with IEC 61850/IEC 61400-25 Telecontrol in TwinCAT 3. IEC 61850 provides data models for substation communication. IEC 61400-25 is based on IEC 61850 and offers specific extensions of the data model for wind farm communication. The respective server is configured using the TwinCAT telecontrol configurator. This decouples the configuration work from the programming work in the PLC and generates the corresponding PLC code. The PLC code can be imported into new or existing PLC projects.	RFID Reader Communication allows various RFID readers to be addressed via a serial interface. The new TwinCAT RFID reader library offers a general abstract interface that can be used for all readers. The configuration can easily be adapted to a specific reader.	TwinCAT S5/S7 Communication allows the simple connection of TwinCAT to an S5 or S7 controller. The data blocks, flags, inputs, outputs, counters and timers of an S5 or S7 controller can be accessed using function blocks. The communication takes place using TCP/IP.	The TwinCAT 3 Function enables the reading of DBC file formats (.dbc). The DBC data format is a CAN network description and allows the definition of attributes as well as the assignment of these attributes to the elements of a network. DBC files are text files that contain e.g. scaling information for CAN data and signal definitions. The TF6650 Function can be used for data import and pre-processing according to the parameters that are stored in the DBC file. As an additional function, network nodes can also be simulated according to the DBC files. The function uses the EL6751 CANopen master terminal as hardware interface.
	20 30 40 50	20 30 40 50	20 30 40 50	20 30 40 50	20 30 40 50
	x x x x	x x x x	x x x x	x x x x	x x x x
	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x
	x x x x	x x x x	x x x x	x x x x	x x x x
	TC1200	TC1200	TC1200	TC1200	TC1100, EL6751
	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE
	www.beckhoff.com/TF6500	www.beckhoff.com/TF6510	www.beckhoff.com/TF6600	www.beckhoff.com/TF6610	www.beckhoff.com/TF6650

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TF6xxx | TwinCAT 3 Connectivity

	TC3 IoT Communication (MQTT)	TC3 IoT Functions
Technical data	**TF6701-00pp**	**TF6710-00pp**
	TC3 IoT Communication provides basic functionalities in the form of PLC libraries for sending and receiving data via the so-called MQ Telemetry Transport (MQTT) protocol. By enabling the transmission and receipt of publisher/subscriber-based MQTT messages directly from the controller, this function makes easy data communication between diverse devices possible. MQTT is an open, standardised communication protocol that is becoming increasingly popular for fast and efficient data transmission applications due to its low overhead. Many IT providers, but particularly those in the cloud computing field, provide access to their services via this protocol.	The TwinCAT 3 Function can be used to establish connectivity for cloud-based communication services. The focus is not on the protocol implementation itself (such as with the TF6701, for example), but on targeted communication with a cloud-based system, e.g. the Microsoft Azure IoT hub or Amazon Web Services IoT. Several PLC function blocks are available for sending process data from the TwinCAT runtime to such cloud-based communication services or receiving data from such services.

Performance class (pp)	20	30	40	50	20	30	40	50
	x	x	x	x	–	–	x	x
	60	70	8x	9x	60	70	8x	9x
	x	x	x	x	x	x	x	x
Required	TC1200				TC1200			
Target system	Windows 7/8/10, Windows CE				Windows 7/8/10			
Further information	www.beckhoff.com/TF6701				www.beckhoff.com/TF6710			

We reserve the right to make technical changes.

	TC3 IoT Data Agent				TC3 IoT Communicator				TC3 IoT Communicator App
	TF6720-00pp				**TF6730-00pp**				**TF6735**
	The TC3 IoT Data Agent provides IoT communication functions bi-directional in the form of a gateway application that can be configured and operated independently from the TwinCAT real-time environment. The data agent picks up configured process data and transmits it to a specific communication or data service in the Microsoft Azure or Amazon Web Services (AWS) cloud, or it sends the process data to an MQTT or AMQP message broker. To pick up the process data, both TwinCAT ADS and the OPC UA IEC standard with their security mechanisms are available. This ensures data protection down to the controller or the respective end device. To reduce the amount of traffic and associated costs, the data agent supports advanced sampling mechanisms, such as on-data-change transmissions. If the connection is interrupted, buffering algorithms are available to prevent the loss of data. The entire parameterisation of the data agent can be done via a graphical editor. This makes it easy to use and reduces set-up times when commissioning the system. The TF672x TC3 IoT Data Agent Packs extend the TC3 IoT Data Agent with 4, 16, 64 or 256 additional ADS target runtimes or OPC UA namespaces.				The TC3 IoT Communicator makes it possible to easily transmit process data to multiple end devices, monitor status changes, and send information back to the machine. The TC3 IoT Communicator connects the TwinCAT controller to a messaging service, making it easy to set it up within the TwinCAT engineering environment to send and receive push messages and process data between the PLC and mobile operating systems. Since each end device is registered with a unique ID, messages can be transmitted to specific people and/or controllers. A flag within the message indicates whether messages and status data is buffered in the messaging service and available on demand. Since the TC3 IoT Communicator is based on the publish-subscribe pattern, it does not require any special firewall settings but can be easily integrated into an existing IT network. To receive, send and display such messages, apps can be downloaded from the app stores free of charge.				The TC3 IoT Communicator App provides a simple solution for monitoring and analysing TwinCAT process data on mobile end devices. To receive, send and display selected TwinCAT messages, apps can be downloaded from the app stores free of charge. The TC3 IoT Communicator App communicates with the TwinCAT controller via a messaging service in the cloud or in a local network. Various mechanisms are available for authentication and encryption.
	20	30	40	50	20	30	40	50	–
	x	x	x	x	x	x	x	x	
	60	70	8x	9x	60	70	8x	9x	
	x	x	x	x	x	x	x	x	
	TC1000				TC1200				TF6730
	Windows 7/8/10				Windows 7/8/10				–
	www.beckhoff.com/TF6720				www.beckhoff.com/TF6730				www.beckhoff.com/TF6735

TF8xxx | TwinCAT 3 Industry specific

	TC3 HVAC	TC3 Building Automation Basic	TC3 BACnet/IP
Technical data	**TF8000-00pp**	**TF8010-00pp**	**TF8020-00pp**
	The TF8000 TC3 HVAC software library allows the implementation of all functions for automating all building services. In addition to conventional HVAC functions relating to energy generation and distribution, it also includes room automation functions for lighting, shading and air-conditioning.	The TC3 Building Automation Basic software library allows the implementation of all functions which are important for room automation. Among these are lighting (constant light control, light dimmer…), facade control, scaling functions, filter blocks, timer functions and peak load limiter for energy optimisation.	BACnet (Building Automation Control Network) is a standardised, manufacturer-independent communication protocol for building automation. Areas of application include HVAC, lighting control, safety and fire alarm technology. Implementation of this protocol is carried out as server as well as client and can be run on all Beckhoff Industrial PCs and Embedded PCs. All services of a BBC (BACnet Building Controller) are supported such as for example, common data use (DS), alarm and event processing (AE), time-tabling (SCHED), trend recording (T) as well as device and network management (DM).
Performance class (pp)	20 30 40 50 x x x x 60 70 8x 9x x x x x	20 30 40 50 x x x x 60 70 8x 9x x x x x	20 30 40 50 x x x x 60 70 8x 9x x x x x
Required	TC1200	TC1200	TC1000
Target system	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE	Windows 7/8/10, Windows CE
Further information	www.beckhoff.com/TF8000	www.beckhoff.com/TF8010	www.beckhoff.com/TF8020

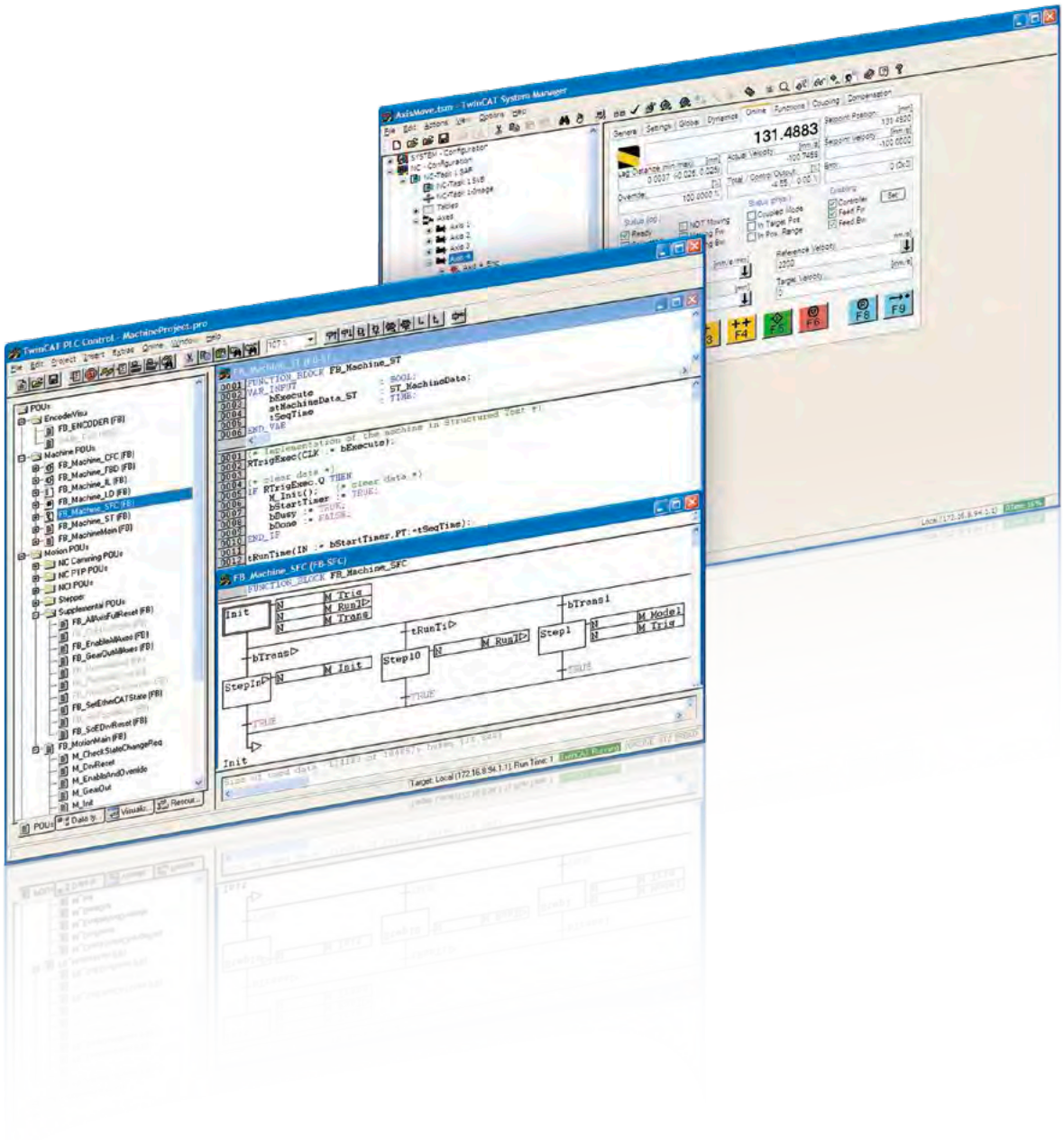
For availability status see Beckhoff website at: www.beckhoff.com/TF8020

We reserve the right to make technical changes.

	TC3 Building Automation	TC3 Wind Framework	TC3 AES70 (OCA)
	TF8040-00pp	TF8310-00pp	TF8810-00pp
	TC3 Building Automation TF8040 is the latest and most comprehensive software package for building automation applications. The library contains around 180 function blocks. The wide range of functions covered by this library enables system integrators to implement all conceivable heating, ventilation, air conditioning and room automation projects. Extensive templates offer support for system integrators in familiarisation and application. TF8040 meets the high requirements of advanced, interoperable building automation and provides the basis for safe and energy-efficient operation of building services such as HVAC, lighting, air conditioning and shading devices.	The TwinCAT 3 Wind Framework is based on the modular architecture of TwinCAT 3 and provides control technology and industry expertise in the form of encapsulated modules and an application template. TcCOM modules provide higher-level system services. The status module enables the monitoring of all components and includes error detection, event management, error handling and reporting. The parameter and command modules provide services for configuration and interaction with the system. The acquisition of signals and their statistical analysis is supported by the capture and statistic module. The user module checks, manages and logs all interactions by the user. The recording of all events and signals as well as the saving and loading of the entire configuration are enabled by the database module, which is based on an SQL database. The programming of the operational management using these services is simplified by a PLC library and a complete sample application. When using the TC3 Wind Framework, each subsystem of the wind turbine system (such as converters, pitch, etc.) is representing an individual module. Each subsystem module comes with a specific set of information and settings. These properties integrate themselves via specific objects from the framework into the higher-level services and operational management. When replacing a subsystem module, the associated objects are automatically integrated into the services. In this way a group of objects is created that represent the complete system and enable the monitoring and parametrisation of the turbine. Nevertheless, these subsystem modules are self-contained and reusable in another operational management or test environment.	The TC3 AES70 (OCA) communication library provides functions for the operation of a system as an OCA (Open Control Architecture) controller in an OCA network. Such various function modules as gain, mute or switch are available. These function modules can be used to implement arbitrary OCA architectures and to represent any type of OCA devices. With the TF8810, OCA-enabled audio systems can be connected to the PC-based control platform from Beckhoff and combined with components from the wide range of operating panels and I/O components. More information on our webpage Applications & Solutions for Stage and Show Technology.
	20 30 40 50	20 30 40 50	20 30 40 50
	x x x x	– – x x	x x x x
	60 70 8x 9x	60 70 8x 9x	60 70 8x 9x
	x x x x	x x x –	x x x x
	TC1200	TC1000	TC1200
	Windows 7/8/10, Windows CE	Windows 7/8/10	Windows 7/8/10, Windows CE
	www.beckhoff.com/TF8040	www.beckhoff.com/TF8310	www.beckhoff.com/TF8810

TwinCAT 2

▶ **www.beckhoff.com/TwinCAT2**



We reserve the right to make technical changes.

The Windows Control and Automation Technology

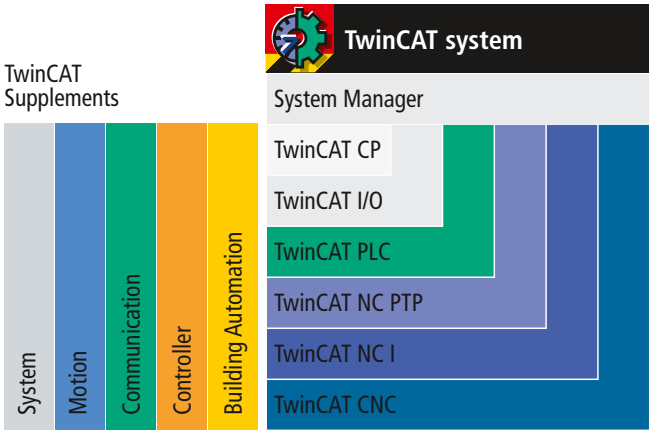
The Beckhoff TwinCAT software system transforms almost any compatible PC into a real-time controller with multi-PLC system, NC axis control, programming environment and operating station. At the same time, TwinCAT integrates the programming environment for all Beckhoff controllers: from high-end Industrial PC control to embedded controller.

TwinCAT architecture

TwinCAT consists of runtime systems for real-time execution of control programs and development environments for programming, configuration and diagnostics:

- TwinCAT I/O: versatile I/O interface for all common fieldbuses
- TwinCAT PLC: enables programming of up to four PLC runtimes on a single PC. The PLC program can optionally be written in one or several IEC 61131-3 languages (IL, LD, FBD, SFC, ST) or CFC.
- TwinCAT NC: enables simultaneous positioning of many axes. The levels NC PTP (point-to-point positioning), NC I (linear and circular interpolating movements of axis groups with up to eight drives) and CNC (extension of NC I with conventional CNC features for up to 32 interpolating axes per channel) are available for this purpose.

Current operating systems can be found in the respective product tables under target systems. Older operating systems are available on request from our service department.



TX12xx | TwinCAT 2

TwinCAT PLC

Technical data	TX1200

TwinCAT PLC realises one or more PLCs with the international standard IEC 61131-3 on one CPU. All programming languages described in the standard can be used for programming. The blocks of the type PROGRAM can be linked with real-time tasks. Various convenient debugging options facilitate fault-finding and commissioning. Program modifications can be carried out at any times and in any size online, i.e. when the PLC is running. All variables are available symbolically by ADS and can be read and written in appropriate clients.

- process image size, flag range, program size, POU size and number of variables are limited only by size of RAM
- cycle times from 50 µs
- link time: typically 1 µs (Intel® Core™ 2 Duo)
- IEC 61131-3: IL, FBD, LD, SFC, ST, CFC
- online changes in programs and variables
- remote debugging via TCP/IP
- online connection with PLC runtime system worldwide via TCP/IP or fieldbus
- online monitoring of variables in variable lists, watch windows, editors
- online status and powerflow (accumulator contents) of programs and instances
- triggering, forcing and setting variables
- powerful debugging with single cycle, break points, step in, step over, display of the current call stack, watchlist shows selection of variable, trace functions
- online management of all variable names and structures across the whole system
- remanent and persistent data, UPS supported storage on hard disk, storage in NOVRAM as option
- variable reading and writing access via ADS, OPC
- certified in accordance with PLCopen base level (IL/ST)
- source code is stored in the target system
- convenient library management
- powerful compiler with incremental compilation
- all common data types, structures, arrays, including multi-dimensional arrays
- convenient creation of programs with autoformat, autodeclare, cross-reference, search/replace, project comparison

Target system	version-dependent: Windows 7/10, Windows CE
Further information	www.beckhoff.com/TX1200

We reserve the right to make technical changes.

	TwinCAT NC PTP	TwinCAT NC I
	TX1250	TX1260
	TwinCAT NC PTP implements Motion Control for point-to-point movements in software. The axes are represented by axis objects and provide a cyclic interface, e.g. for the PLC. This axis object is then linked to a corresponding physical axis. In this way, the most diverse axis types with the most diverse fieldbus interfaces can be connected abstractly with the axis objects, which always offer an identical configuration interface. The control of the axes can be configured in various conformations (position or velocity interface) and various controllers. The axes are configured in TwinCAT Engineering. – max. 255 axes – supports electrical and hydraulic servo drives, frequency converter drives, stepper motor drives, DC drives, switched drives (fast/slow axes), simulation axes and encoder axes – supports various encoders such as incremental encoder, absolute encoder, digital interface to the drives such as EtherCAT, SERCOS, SSI, Lightbus, PROFIBUS DP/MC, pulse train – standard axis functions such as start/stop/reset/reference, velocity override, master/slave couplings, electronic gearbox, online distance compensation – programming is carried out via PLCopen-compliant IEC 61131-3 function blocks – convenient axis commissioning options – online monitoring of all axis state variables such as actual/setpoint values, releases, control values, online axis tuning – forcing of axis variables – configuration of all axis parameters, such as measuring system, drive parameters and position controller – configurable controller structures: P control, PID control, PID with velocity pre-control, PID with velocity and acceleration pre-control – online master/slave and slave/master conversion – flying saw (diagonal saw [optional]) – cam plates (support by TwinCAT Cam Design Tool [optional]) – FIFO axes – external set point value generators – multi-master coupling	Using TwinCAT NC I, movements can be implemented with up to three interpolating and up to five auxiliary axes in the interpolation package. Various axis types with various fieldbus interfaces are supported. The movement is usually programmed in DIN 66025, but it can also alternatively be carried out via PLC function blocks. – max. 3 path axes and up to 5 auxiliary axes per group – 1 group per channel, max. 31 channels – supports electric servo axes, stepper motor drives – interpreter functions such as subroutine and jump technology, programmable loops, zero point shifts, tool corrections, M and H functions – geometry functions: straight lines and circles in 3D space, circles at all main levels, helices with base circles at all main levels, linear, circular and helical interpolation at the main levels and freely definable levels, Bezier splines, look-ahead function – online reconfiguration of axes in groups, path override, slave coupling to path axes, auxiliary axes, axis error and sag compensation, measuring functions – programming in DIN 66025 – access alternatively via function blocks according to IEC 61131-3 – operation of automatic mode, manual mode (jog/inch), single block mode, referencing, handwheel mode (movement/overlay) – convenient debugging with online monitoring of current setpoint/actual position (position lag of all axes), NC program line currently being processed, NC program line currently being interpreted, channel status
	version-dependent: Windows 7/10, Windows CE	version-dependent: Windows 7/10, Windows CE
	www.beckhoff.com/TX1250	www.beckhoff.com/TX1260

TX1xxx | TwinCAT 2

TwinCAT CNC

Technical data	TX1270

TwinCAT CNC offers the option to implement interpolation with up to 32 simultaneously interpolating axes. The number of axes and/or the number of channels can be adapted to the requirements of the application via the option packages. Various transformations can be supplemented via option packages. Programming takes place according DIN 66025. The axes and channels are configured in TwinCAT Engineering.

- 8 path axes/controlled spindles, max. 64 axes/controlled spindles (optional), max. 12 channels (optional)
- supports electric servo axes, stepper motor drives
- subroutine and jump technology, programmable loops, zero point shifts, tool corrections, M and H functions, mathematical functions, programming of parameters/variables, user macros, spindle and auxiliary functions, tool functions
- geometry functions linear, circular and helical interpolation at the main levels and freely definable levels, max. 32 interpolating path axes per channel (optional), look-ahead function
- axis functions, coupling and gantry axis function, override, axis error and sag compensation, measuring functions
- programming in DIN 66025 with high-level language extension
- access via function blocks from TwinCAT PLC according to IEC 61131-3
- operation with automatic mode, manual mode (jog/inch), single block mode, referencing, block advance, handwheel mode (movement/overlay)
- convenient debugging with online monitoring of all states

Target system	version-dependent: Windows 7/10
Further information	www.beckhoff.com/TX1270

We reserve the right to make technical changes.

	TwinCAT I/O	TwinCAT CP
	TX1100	**TX1000**

	Using TwinCAT I/O, cyclic data can be collected by different fieldbuses in process images. Cyclic tasks drive the corresponding fieldbuses. Various fieldbuses can be operated with different cycle times on one CPU. Applications can directly access the process image. The fieldbuses and the process images are configured in TwinCAT Engineering.
	– provides variable-oriented linkage of I/O devices to tasks
	– tasks are variable-oriented among each other
	– the smallest unit is one bit
	– supports both synchronous and asynchronous relationships
	– consistent exchange of data areas and process images
	– online display in the directory tree
	– online watch window
	– "Force and Write" for commissioning and for testing task variables and I/O devices
	– supported fieldbuses:
	  – EtherCAT
	  – Lightbus
	  – PROFIBUS DP (master and slave)
	  – Interbus
	  – CANopen
	  – SERCOS interface
	  – DeviceNet
	  – Ethernet
	  – USB
	– SMB (System Management Bus)
		TwinCAT CP is a driver for the Beckhoff Control Panels CP6xxx and CP7xxx, the industrial operating and display devices.
		Control Panels are optimised for use as a human-machine interface. Operating and display elements create an independent unit, separated from the PC by a simple cable link.
		TwinCAT CP creates the driver connection between general Windows programs and the operating and display elements on the Beckhoff Control Panel:
		– direct switches for fast machine functions
		– switch feedback by LEDs
		– UPS support
		The driver permits variable-oriented operation of the Control Panel's functions by the Windows programs.

	version-dependent: Windows 7/10, Windows CE	version-dependent: Windows 7/10, Windows Embedded WES2009/WES7
	www.beckhoff.com/TX1100	www.beckhoff.com/TX1000

TSxxxx | TwinCAT 2 Supplements, System

	TwinCAT ECAD Import	TwinCAT Engineering Interface Server	TwinCAT Eventlogger	TwinCAT XML Data Server
Technical data	**TS1120**	**TS1600**	**TS1010**	**TS6421**
	TwinCAT ECAD Import serves the purpose of importing already existing engineering results from an ECAD program. It enables the import of information about the structure of the I/Os and their links to PLC variables, which is exported from the ECAD tool by means of XML description. On the basis of this information a system manager configuration and a basic PLC program with the I/O variables used are generated. The generation of NC devices is also possible.	With the TwinCAT Engineering Interface (ENI) server it is possible for the work of a number of programmers to be coordinated via a central source code management system. The TwinCAT ENI server offers interfaces with Microsoft Visual Source Safe and a driver for Subversion (SVN). A user and rights management is as much part of the product as a database-independent diagnostic tool, which gives an overview of all current tasks of the various users.	The TwinCAT Eventlogger is an alarm and diagnostic system for TwinCAT-based controllers. The TwinCAT Eventlogger has the task of managing all messages (events) appearing in the TwinCAT system; to forward them and where necessary to write them into the TwinCAT log file. In this context "events" are understood to comprise alarms, warnings, notes or instructions. Messages can be acknowledged. The Message Formatter produces the connection between the actual event and its message text. This is stored in an external database. By integration of the TcEventViewer type library it is possible, to create your own message display. Configuration of the message text is done by the TcEvent configurator. The event logger is included in the main TwinCAT delivery.	The TwinCAT XML Data Server permits direct access to an XML file from the PLC. The values of variables can be read by the PLC or written to the XML file. Access to structures in the PLC is also possible.
Target system	Windows 7/10	Windows NT/2000/XP	Windows 7/10, Windows CE	Windows 7/10
Min. TwinCAT level	TwinCAT PLC/ TwinCAT NC PTP (for NC devices)	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC
Further information	www.beckhoff.com/TS1120	www.beckhoff.com/TS1600	www.beckhoff.com/TS1010	www.beckhoff.com/TS6421

	TwinCAT XML Data Server CE	TwinCAT Backup	TwinCAT Simulation Manager	TwinCAT Database Server
	TS6421-0030	TS1150	TS1110	TS6420
	The TwinCAT XML Data Server CE permits direct access to an XML file from the PLC. The values of variables can be read by the PLC or written to the XML file. Access to structures in the PLC is also possible.	Files, directories, OS-specific information, settings and TwinCAT configurations can be backed up and restored using the TwinCAT Backup Server. This can be carried out on all connected media and also via the network.	The TwinCAT Simulation Manager is a tool for simplified configuration of a simulation environment, which integrates into the TwinCAT system environment. It supports the creation of a "virtual machine", which corresponds to a real one in its runtime performance.	TwinCAT Database Server enables the exchange of data between databases and the TwinCAT system. PLC variables or direct values of the EtherCAT I/Os can be logged cyclically when changes occur or event-controlled by means of PLC function blocks.
	Windows CE	Windows NT/2000/XP	Windows 7/10	Windows 7/10
	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC
	www.beckhoff.com/TS6421-0030	www.beckhoff.com/TS1150	www.beckhoff.com/TS1110	www.beckhoff.com/TS6420

TSxxxx | TwinCAT 2 Supplements, System

	TwinCAT Database Server CE	TwinCAT PLC HMI	TwinCAT PLC HMI CE	TwinCAT PLC HMI Web
Technical data	**TS6420-0030**	**TS1800**	**TS1800-0030**	**TS1810**
	The TwinCAT Database Server CE has the same functional attributes as the version which runs on non-CE operating systems. The only difference is the range of supported databases: MS SQL, MS SQL Compact and ASCII files.	TwinCAT PLC HMI is a stand-alone tool for the presentation of visualisations which are created in TwinCAT PLC Control. They are shown in full-screen as soon as the system starts up.	TwinCAT PLC HMI CE is a stand-alone tool for the presentation of visualisations which are created in TwinCAT PLC Control. They are shown in full-screen as soon as the system starts up.	TwinCAT PLC HMI Web is a web-based visualisation system. The TwinCAT PLC Control acts as an editor for the generation of web pages. Activation is carried out simply by setting an option in the TwinCAT PLC Control. The web pages are hosted by the Internet Information Server (IIS). For display of the web pages a Java VM is needed.
Target system	Windows CE	Windows 7/10	Windows CE	Windows 7/10, Windows CE
Min. TwinCAT level	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC
Further information	www.beckhoff.com/TS6420-0030	www.beckhoff.com/TS1800	www.beckhoff.com/TS1800-0030	www.beckhoff.com/TS1810

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	TwinCAT Management Server	TwinCAT Scope 2	TwinCAT EtherCAT Redundancy	TwinCAT Solar Position Algorithm
	TS1140	**TS3300**	**TS622x**	**TS3900**
	The TwinCAT Management Server enables the central administration of Beckhoff CE controllers. Software updates, for example, can thus be loaded onto controllers in the network from a central location. In addition to operating system updates, device-specific components (PLC boot projects) can also be loaded. By the option of separating known network devices into groups, individual actions can be defined for each group.	With the TwinCAT Scope 2 Beckhoff offers a graphical tool for signal analysis and data collection. Due to the separation of the data logger and viewer it is possible to show the signal processes of multiple systems in the field in a central Scope 2 view. Depending on the system it is possible to browse, for example in the PLC, NC or directly in the connected EtherCAT I/Os, in order to select the corresponding values. Alongside the possibility of long-term recording, various trigger functionalities and cursors are available in the TwinCAT Scope 2.	With TwinCAT EtherCAT Redundancy the TwinCAT EtherCAT master offers the possibility of implementing cable redundancy. From the last logical device a cable is returned back to the master. The TwinCAT System Manager is used for configuration and diagnostics.	With the TwinCAT Solar Position Algorithm it is possible to determine the sun angle using the date, time, geographical longitude and latitude as well as further parameters (depending on the desired accuracy). The function block works with a maximum inaccuracy of ±0.001°.
	Windows 7/10	Windows 7/10	Windows 7/10, Windows CE	Windows CE
	TwinCAT I/O	TwinCAT I/O	TwinCAT I/O	TwinCAT PLC
	www.beckhoff.com/TS1140	www.beckhoff.com/TS3300	www.beckhoff.com/TS622x	www.beckhoff.com/TS3900

TS4xxx | TwinCAT 2 Supplements, Controller

	TwinCAT PLC Controller Toolbox	TwinCAT PLC Temperature Controller
Technical data	**TS4100**	**TS4110**
	The TwinCAT Controller Toolbox covers all essential blocks for control applications. – controllers satisfy industrial requirements such as anti-reset windup – simple basic controllers (P, I, D) – complex controllers (PI, PID, switching controllers) – filter blocks – control value generators (limiters, PWM) – ramp and signal generator blocks	Temperature controllers can be simply implemented using TwinCAT Temperature Controller. Simple commissioning through self-adjustment of the controller (auto-tuning) is included. – automatic and manual operation with shock-free set up – control value analog or pulse-width modulated signal – tolerance monitoring, absolute value monitoring – scalable reaction to sensor error and heating power faults – limitation of set and control values – optional ramping of the set value – optional start-up phase for the setpoint variables – industrial PID controller as base control algorithm inside the temperature controller
Target system	Windows 7/10, Windows CE	Windows 7/10, Windows CE
Min. TwinCAT level	TwinCAT PLC	TwinCAT PLC
Further information	www.beckhoff.com/TS4100	www.beckhoff.com/TS4110

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TS5xxx | TwinCAT 2 Supplements, Motion

	TwinCAT PLC Motion Control XFC	TwinCAT PLC Hydraulic Positioning
Technical data	**TS5065**	**TS5810**

	eXtreme Fast Control (XFC) is the technique that enables very fast, temporally high-precision reactions using EtherCAT, special I/O terminals and TwinCAT on the PC. Using EtherCAT Distributed Clocks (DC) and appropriate terminals, distributed latches or cam controllers can be implemented simply in this way.
	– function blocks for the high-precision acquisition and switching of digital signals related to axis positions
	– EtherCAT Distributed Clocks with the timestamp-based EtherCAT EL1252, EL2252 or EL2262 input and output terminals
	– blocks for the conversion of DC time to position and vice versa
	– convenient PLCopen-compliant TouchProbe block
	– digital cam controller as PLCopen-compliant block
		Algorithms for the control and positioning of hydraulic axes are combined in TwinCAT Hydraulic Positioning and are available as PLCopen-compliant PLC blocks.
		– programming via certified PLCopen motion blocks
		– set value generators especially for hydraulic applications
		– coupling of the set value generators to NC PTP/NC I/CNC possible
		– free profile design through connection of customer-specific set value generators
		– support of non-linear gears
		– multiple-segmented movements (blending)
		– support of all necessary interfaces via Beckhoff I/O system
		– support of all common fieldbus systems
		– all process values in physical units, determination of force true to surface
		– support of standardised and application-specific controllers for position, force/pressure
		– bumpless transfer of force and position control
		– automatic identification of valve characteristics and axis properties
		– linearisation of characteristic curves
		– maintenance and commissioning tool for
		  – axis parameterisation
		  – valve parameterisation incl. characteristic curves
		  – controller parameterisation
		  – triggering of test commands
		  – display of actual values

Target system	Windows 7/10, Windows CE	Windows 7/10, Windows CE
Min. TwinCAT level	TwinCAT NC PTP	TwinCAT PLC
Further information	www.beckhoff.com/TS5065	www.beckhoff.com/TS5810

TSxxxx | TwinCAT 2 Supplements, Motion

	TwinCAT NC FIFO Axes	TwinCAT NC Flying Saw	TwinCAT PLC Remote Synchronisation
Technical data	**TS5060**	**TS5055**	**TS5066**
	Using TwinCAT NC FIFO Axes, externally generated set position values can be output to the axes in the form of a velocity pre-control. The set value generation is designed in such a way that both the set position and the set velocity are determined as the FIFO inputs are worked through in sequence. It is also possible, if necessary, to interpolate between two neighbouring FIFO inputs.	TwinCAT NC Flying Saw implements the coupling of a slave axis to a master axis in a certain synchronous position (flying saw). PLC function blocks enable coupling and uncoupling as well as parameterisation. – The master axis can be a real axis, a virtual axis, or some other external source of actual values. – synchronisation of the slave axis from any motion situation (stop, forward or reverse travel) with the master in motion – simple synchronisation with the master velocity – precise position synchronisation with the master axis (velocity and position) – synchronous velocity can be set via a coupling factor – optional return prevention as additional safety function – superimposed section compensation during the synchronous phase for dynamic position correction	Due to the increasing use of decentralised controllers, time synchronisation of different systems is becoming an increasingly important issue. The implementation of cyclically-sent information on systems without identical timebase leads to a beat effect. These manifest themselves for example as periodic operational faults in the synchronisation of drives, whose axis information is transferred via network. The TwinCAT PLC Remote Synchronisation library offers options for general time synchronisation of information with distributed systems as well as special techniques for synchronising NC axes (“distributed axes”).
Target system	Windows 7/10, Windows CE	Windows 7/10, Windows CE	Windows 7/10, Windows CE
Min. TwinCAT level	TwinCAT NC PTP	TwinCAT NC PTP	TwinCAT PLC
Further information	www.beckhoff.com/TS5060	www.beckhoff.com/TS5055	www.beckhoff.com/TS5066

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	TwinCAT NC Camming	TwinCAT Cam Design Tool	TwinCAT Digital Cam Server
	TS5050	TS1510	TS5800
	TwinCAT NC Camming (cam plate) is a non-linear relationship between a master and a slave axis. The camming package offers various options for the storage of cam plates. Convenient PLC blocks enable the loading, coupling and uncoupling of cam plates. It is possible to load new cam plates or to modify cam plates during operation. The TwinCAT Cam Design Tool offers support for the creation of the cam plates. – position tables with master interpolation points and corresponding slave positions; interpolation between the points is done linearly or by splines – motion function table describing a cam plate via motion laws according to VDI guideline 2143 – cyclic or linear processing – cam plate with offset and scale, can be modified on the master or slave side – high flexibility through online change of the motion functions	The TwinCAT CAM Design Tool allows the generation and modification of cam plates with the aid of a graphical editor. These are composed of sections of laws of motion such as modified sine waves, harmonic combinations, or of various polynomial functions. Velocity, acceleration and jerk are displayed in addition to the slave position. The generated cam plates can be transferred to the NC as tables with specified step size or as so-called motion functions.	The TwinCAT Digital Cam Server is a fast cam controller with monitoring for various fieldbuses. The cams are configured in TwinCAT Engineering. – high-performance fieldbus-independent cam controller with many functions – up to 320 outputs – up to 180 cams per output – path-path cams, path-time cams, brake cams – dynamic speed correction – measurement and monitoring of rotary speed
	Windows 7/10, Windows CE	Windows 7/10	Windows 7/10, Windows CE
	TwinCAT NC PTP	TwinCAT NC PTP	TwinCAT NC PTP
	www.beckhoff.com/TS5050	www.beckhoff.com/TS1510	www.beckhoff.com/TS5800

TSxxxx | TwinCAT 2 Supplements, Motion

	TwinCAT Valve Diagram Editor	TwinCAT Kinematic Transformation
Technical data	**TS1500**	**TS511x**

	The TwinCAT Valve Diagram Editor allows the linearisation of non-linear curves of hydraulic valves with the aid of a graphical editor. On the basis of a few base points, straight lines or 5th degree polynomials can be determined that connect the points. The characteristic linearisation curve thus determined can be loaded into the TwinCAT NC real-time and taken into account when the voltages are output in the drive.	Various robot types kinematics can be realised using TwinCAT Kinematic Transformation. The programming of the robot movements takes place in Cartesian coordinates using either DIN 66025 instructions or the PLCopen-compliant blocks from the PLC. An integrated dynamic pre-control ensures high precision of the movement even at high accelerations and speeds. Configuration takes place in the TwinCAT Engineering Interface Server.
		– supports various parallel and also serial kinematics, e.g. for pick-and-place tasks
		– supports the programming of interpolating movements in G-code (DIN 66025)
		– alternatively, standard PTP and cam plate applications can be realised
		– simple programming in the Cartesian coordinate system
		– automatic calculation of the inverse kinematic for the relevant motor positions
		– kinematics configured in the TwinCAT Engineering Interface Server; in addition to the type (e.g. delta), the bar lengths and offsets must also be parameterised
		– mass and mass inertia values can be specified for dynamic pre-control
		– tracking with the aid of flying saw and cam plates for synchronisation (e.g. to conveyor belts)
		– optimised for the Beckhoff Servo Drives from the AX5000 series
		– The following kinematics are integrated:
		  – cartesian portals
		  – 2D parallel kinematics
		  – shear kinematics
		  – crane and roll kinematics
		  – 3D Delta
		  – SCARA
		– separated in different product levels, depending on the complexity of the kinematics

Target system	Windows 7/10	Windows 7/10, Windows CE
Min. TwinCAT level	TwinCAT NC PTP	TwinCAT NC I
Further information	www.beckhoff.com/TS1500	www.beckhoff.com/TS511x

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TS6xxx | TwinCAT 2 Supplements, Communication

	TwinCAT PLC Serial Communication	TwinCAT PLC Serial Communication 3964R/RK512	TwinCAT PLC Modbus RTU
Technical data	**TS6340**	**TS6341**	**TS6255**
	TwinCAT Serial Communication implements communication with serial devices such as printers, bar code scanners, etc. The serial interface of the PC and the serial Beckhoff EL6xxx EtherCAT Terminals and and KL6xxx Bus Terminals are supported. Via the network-based fieldbus system from Beckhoff the serial terminals can be accessed over a distance of up to 100 m. In addition, it is possible to address virtual COM interfaces of the operating system from the PLC.	Serial communication via the 3964R or the RK512 protocols is implemented via the TwinCAT PLC Serial Communication 3964R/RK512 software library. The PCs serial interface and the Beckhoff KL6xxx serial Bus Terminals are supported. The library also contains the TwinCAT PLC Serial Communication library. The TwinCAT Serial Communication RK512 PLC library supports transmission and reception of PLC variables of any type. Data up to 128 bytes long is transferred transparently in the form of data blocks. To ensure secure data transmission, the 3964R protocol is used underneath the RK512 protocol.	TwinCAT Modbus RTU implements Modbus RTU communication via a serial RS232, RS422 or RS485 interface and is thus suitable both for the PC/CX interfaces and for operation with the KL6xxx serial Bus Terminals. It contains function blocks for master and slave operating mode with simple configuration.
Target system	Windows 7/10, Windows CE	Windows 7/10, Windows CE	Windows 7/10, Windows CE
Min. TwinCAT level	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC
Further information	www.beckhoff.com/TS6340	www.beckhoff.com/TS6341	www.beckhoff.com/TS6255

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TS6xxx | TwinCAT 2 Supplements, Communication

	TwinCAT Modbus TCP Server	TwinCAT Modbus TCP Server CE	TwinCAT PLC IEC 60870-5-10x	TwinCAT PLC IEC 60870-5-104 CE
Technical data	**TS6250**	**TS6250-0030**	**TS650x**	**TS650x-0030**
	TwinCAT Modbus TCP Server acts as gateway between Modbus TCP devices and TwinCAT runtime systems. It provides both server and client functionalities. In server mode the memory areas of several TwinCAT runtime systems can be mapped directly to the Modbus memory areas. A PLC library is provided for implementing a Modbus TCP client, so that the memory areas of a Modbus TCP device can be accessed.	TwinCAT Modbus TCP Server CE acts as gateway between Modbus TCP devices and TwinCAT runtime systems. It provides both server and client functionalities. In server mode the memory areas of several TwinCAT runtime systems can be mapped directly to the Modbus memory areas. A PLC library is provided for implementing a Modbus TCP client, so that the memory areas of a Modbus TCP device can be accessed.	The TS650x enable IEC 60870-5-10x-compliant communication from the TwinCAT PLC. Both master and slave libraries are available. PLC library for the realisation of masters for – IEC 60870-5-101 – IEC 60870-5-102 – IEC 60870-5-103 – IEC 60870-5-104 PLC library for the realisation of slaves for – IEC 60870-5-101 – IEC 60870-5-104	The TS650x-0030 enable IEC 60870-5-10x-compliant communication from the TwinCAT PLC. Both master and slave libraries are available for applications under Windows CE. PLC library for the realisation of masters for – IEC 60870-5-104 PLC library for the realisation of slaves for – IEC 60870-5-104
Target system	Windows 7/10	Windows CE	Windows 7/10, Windows CE	Windows CE
Min. TwinCAT level	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC
Further information	www.beckhoff.com/TS6250	www.beckhoff.com/TS6250-0030	www.beckhoff.com/TS650x	www.beckhoff.com/TS650x-0030

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	TwinCAT PLC IEC 61850 Server	TwinCAT PLC IEC 61400-25 Server	TwinCAT DriveTop Server	TwinCAT DriveCOM OPC Server
	TS6511	TS6509	TS6371	TS6370
	IEC 61850 defines a communication protocol which is used particularly in electrical switchgears. Such standardised communication can be implemented using the PLC library TwinCAT IEC 61850 Server. The communication stack developed by Beckhoff is based on the MMS protocol and as well as the basic IEC 61850 standard also supports the related specialisations. For easy configuration the TwinCAT Telecontrol Configurator can be used, which is delivered with the PLC library. Thanks to the created configuration a PLC code export can be carried out, which can be integrated into existing PLC projects.	IEC 61400-25 is a specialisation of IEC 61850 for wind turbines. The data model is especially extended for objects, such as, for example wind turbine generators. The TwinCAT Telecontrol Configurator can also be used here. Beside PLC codes it can also generate TwinCAT Scope 2 configurations.	The TwinCAT DriveTop Server is a communication server for linking the Indramat DriveTop Tools to TwinCAT. This means that the DriveTop tool can be used for configuration and commissioning of Indramat drives. Configuration with a number of SERCOS rings is also supported.	The DriveCOM user organisation has set itself the aim of facilitating uniform, standardised communication between configuration, commissioning and diagnostic tools from different drive manufacturers, independent of the fieldbus. The TwinCAT DriveCOM OPC Server offers precisely this type of communication connection. It enables data flow from the engineering tool to the drive, independent of the fieldbus. Based on the network-capable ADS TwinCAT communication system, distributed drives can be configured and diagnosed from a central point. The TwinCAT DriveCOM OPC Server requires a subordinate TwinCAT system with an FCxxxx-type Beckhoff fieldbus card. The TwinCAT DriveCOM configurator finds supported drives in the TwinCAT configuration and makes this information available for the engineering tool. The configurator features an automation interface and can therefore be operated remotely by other tools.
	Windows 7/10, Windows CE	Windows 7/10, Windows CE	Windows 7/10	Windows 7/10
	TwinCAT PLC	TwinCAT PLC	TwinCAT NC PTP	TwinCAT NC PTP
	www.beckhoff.com/TS6511	www.beckhoff.com/TS6509	www.beckhoff.com/TS6371	www.beckhoff.com/TS6370

TS6xxx | TwinCAT 2 Supplements, Communication

	TwinCAT OPC Server	TwinCAT OPC UA Server	TwinCAT OPC UA Server CE
Technical data	**TS6120**	**TS6100**	**TS6100-0030**
	The TwinCAT OPC Server is a standardised data exchange interface. It supports the DataAccess (DA) and XML DA specifications. DataAccess is based on the Microsoft COM technology and provides data for the client. The OPC XML DA specification enables data exchange through XML via HTTP. Configuration of the server is carried out in a configuration tool or via XML.	OPC Unified Architecture (IEC 62541) is the newest technology generation of the OPC Foundation for the secure, reliable and manufacturer-neutral transport of raw data and pre-processed information from the manufacturing level into the production planning or ERP system. With OPC UA, all desired information is available to every authorised application and every authorised person at any time and in any place. TwinCAT OPC UA Server – certified in the OPC Laboratory, Europe – functions: DataAccess/ HistoricalAccess/Alarm&Condition – PLC blocks for diagnosis and restart – intermediate storage of data on the server: interruption of the communication connection does not lead to loss of data TwinCAT OPC UA Client – PLC function blocks for UA DataAccess – Demo UA client for diagnostic purposes	OPC Unified Architecture (IEC 62541) is the newest technology generation of the OPC Foundation for the secure, reliable and manufacturer-neutral transport of raw data and pre-processed information from the manufacturing level into the production planning or ERP system. With OPC UA, all desired information is available to every authorised application and every authorised person at any time and in any place. TwinCAT OPC UA Server CE – certified in the OPC Laboratory, Europe – functions: DataAccess/ HistoricalAccess/Alarm&Condition – PLC blocks for diagnosis and restart – intermediate storage of data on the server: interruption of the communication connection does not lead to loss of data TwinCAT OPC UA Client CE – PLC function blocks for UA DataAccess – Demo UA client for diagnostic purposes
Target system	Windows NT/2000/XP	Windows 7/10	Windows CE
Min. TwinCAT level	TwinCAT I/O	TwinCAT I/O	TwinCAT I/O
Further information	www.beckhoff.com/TS6120	www.beckhoff.com/TS6100	www.beckhoff.com/TS6100-0030

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	TwinCAT SMS/SMTP Server	TwinCAT SMS/SMTP Server CE	TwinCAT TCP/IP Server	TwinCAT TCP/IP Server CE
	TS6350	TS6350-0030	TS6310	TS6310-0030
	TwinCAT SMS/SMTP Server enables the transmission of SMS messages or e-mails using PLC function blocks. The latter also allows the transmission of file attachments, HTML texts and the setting of message priorities. Support for STARTTLS/SSL enables encrypted e-mail communication to be configured.	TwinCAT SMS/SMTP Server CE enables the transmission of SMS messages or e-mails using PLC function blocks. The latter also allows the transmission of file attachments, HTML texts and the setting of message priorities. Support for STARTTLS/SSL enables encrypted e-mail communication to be configured.	TwinCAT TCP/IP Server enables the implementation and realisation of one or several TCP/IP servers and/or clients within the TwinCAT PLC. Corresponding blocks exist for the establishment/disconnection of communication as well as for the pure exchange of data (send and receive). The SNMP library provided enables messages to be sent (traps) and queries to be answered (get) for monitoring TwinCAT runtimes.	TwinCAT TCP/IP Server CE enables the implementation and realisation of one or several TCP/IP servers and/or clients within the TwinCAT PLC. Corresponding blocks exist for the establishment/disconnection of communication as well as for the pure exchange of data (send and receive). The SNMP library provided enables messages to be sent (traps) and queries to be answered (get) for monitoring TwinCAT runtimes.
	Windows 7/10	Windows CE	Windows 7/10	Windows CE
	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC
	www.beckhoff.com/TS6350	www.beckhoff.com/TS6350-0030	www.beckhoff.com/TS6310	www.beckhoff.com/TS6310-0030

TS6xxx | TwinCAT 2 Supplements, Communication

	TwinCAT PROFINET RT Controller	TwinCAT PROFINET RT Device	TwinCAT EtherNet/IP Slave	TwinCAT EtherNet/IP Slave CE
Technical data	**TS6271**	**TS6270**	**TS6280**	**TS6280-0030**
	The TwinCAT PROFINET RT Controller (master) is a supplement that turns any PC-based controller with an Intel® chipset and the real-time Ethernet driver developed by Beckhoff into a PROFINET RT controller. An Ethernet interface becomes a PROFINET controller by enabling a key. The PROFINET supplement is part of the TwinCAT installation and can be operated without key in Config mode. It runs on PCs and Embedded PCs and can be used from TwinCAT 2.11 R3. In conjunction with the EL6631 PROFINET terminal for the EtherCAT I/O system, PROFINET can also be tunnelled via EtherCAT. In this case the supplement is not required. In this way, any EtherCAT network can exchange data with PROFINET RT devices.	The TwinCAT PROFINET RT Device (slave) is a supplement that turns any PC-based controller with an Intel® chipset and the real-time Ethernet driver developed by Beckhoff into a PROFINET RT device. By installing the supplement, an Ethernet interface becomes a PROFINET slave. The supplement can be used on PCs and Embedded PCs. PROFINET can also be tunnelled via EtherCAT in conjunction with the EL6631-0010 PROFINET terminal for the EtherCAT I/O system. In this way, any EtherCAT network can exchange data with PROFINET IO controllers. If the EL6631-0010 is used, the TwinCAT PROFINET RT controller supplement is not required.	The TwinCAT EtherNet/IP Slave is a supplement turns any PC-based controller with an Intel® chipset and the real-time Ethernet driver developed by Beckhoff into an EtherNet/IP slave. By installing the supplement, the Ethernet interface becomes an EtherNet/IP slave. This product can be used on all PC controllers and Embedded PC controllers running Windows XP and Windows CE.	The TwinCAT EtherNet/IP Slave is a supplement turns any PC-based controller with an Intel® chipset and the real-time Ethernet driver developed by Beckhoff into an EtherNet/IP slave. By installing the supplement, the Ethernet interface becomes an EtherNet/IP slave. This product can be used on all PC controllers and Embedded PC controllers running Windows CE.
Target system	Windows 7/10, Windows CE	Windows 7/10, Windows CE	Windows 7/10, Windows CE	Windows CE
Min. TwinCAT level	TwinCAT I/O	TwinCAT I/O	TwinCAT I/O	TwinCAT I/O
Further information	www.beckhoff.com/TS6271	www.beckhoff.com/TS6270	www.beckhoff.com/TS6280	www.beckhoff.com/TS6280

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	TwinCAT Virtual Serial COM Driver	TwinCAT FTP Client	TwinCAT PLC RFID Reader Communication	TwinCAT PLC S5/S7 Communication
	TS6360	TS6300	TS6600	TS6610
	TwinCAT Virtual Serial COM Driver allows the EL60xx EtherCAT Terminals or EP6002 EtherCAT Box modules to be integrated into Windows CE or Windows as normal serial interfaces. The computer on which a serial interface is to be generated for it is defined individually for each EL60xx/EP6002. Access to the device connected to the terminal takes place via Windows API for serial interfaces.	TwinCAT FTP Client enables simple access from the PLC to several FTP servers with the aid of various function blocks. This way, files can be loaded to or from a server after the establishment of a connection (optional with authentication). Additional function blocks allow files or directories to be searched for, created, deleted and renamed.	TwinCAT PLC RFID Reader Communication allows various RFID readers to be addressed via a serial interface. The new TwinCAT RFID reader library offers a general abstract interface that can be used for all readers. The configuration can easily be adapted to a specific reader.	TwinCAT PLC S5/S7 Communication allows the simple connection of TwinCAT to an S5 or S7 controller. The data blocks, flags, inputs, outputs, counters and timers of an S5 or S7 controller can be accessed using function blocks. The communication takes place using TCP/IP.
	Windows 7/10, Windows CE	Windows 7/10, Windows CE	Windows 7/10, Windows CE	Windows 7/10, Windows CE
	TwinCAT I/O	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC
	www.beckhoff.com/TS6360	www.beckhoff.com/TS6300	www.beckhoff.com/TS6600	www.beckhoff.com/TS6610

TS8xxx | TwinCAT 2 Supplements, Building Automation

	TwinCAT PLC HVAC	TwinCAT PLC Building Automation Basic	TwinCAT BACnet/IP
Technical data	**TS8000**	**TS8010**	**TS8020**
	TwinCAT PLC HVAC is an extensive TwinCAT PLC library with function blocks for automating all building services. In addition to conventional HVAC functions relating to energy generation and distribution, it also includes room automation functions for lighting, shading and air-conditioning.	The TwinCAT PLC Building Automation Basic software library allows the implementation of all functions which are important for room automation. Among these are lighting (constant light control, light dimmer…), facade control, scaling functions, filter blocks, timer functions and peak load limiter for energy optimisation.	BACnet (Building Automation Control Network) is a standardised, manufacturer-independent communication protocol for building automation. Areas of application include HVAC, lighting control, safety and fire alarm technology. Implementation of this protocol is carried out as server as well as client and can be run on all Beckhoff Industrial PCs and Embedded PCs. All services of a BBC (BACnet Building Controller) are supported such as for example, common data use (DS), alarm and event processing (AE), time-tabling (SCHED), trend recording (T) as well as device and network management (DM). **BACnet revision 12** Embedded PCs corresponding to the ISO 16484-5:2012 standard: **Ordering information CX8091 and CX9020 with BACnet/IP image (license key included)** – ordering number of the CX8091 (no further ordering option necessary) (see page 203) – ordering number of the CX9020-xxxx (see page 210) + CX1800-1052 **Ordering information CX5010/CX5020 (see page 220)** – CX50x0 with Windows CE | Ordering number of the CX + CX1800-1052 (BACnet/IP image, license key included) – CX50x0 with Windows XPe | Ordering number of the CX + supplement TwinCAT BACnet/IP (TS8020, license key necessary), TwinCAT 2.11 R3 **BACnet revision 6** Embedded PCs corresponding to the ISO 16484-5:2010 standard: **Ordering information CX5010/CX5020 (see page 220)** – CX50x0 with Windows CE | Ordering number of the CX + CX1800-1044 (BACnet/IP image, license key included) – CX50x0 with Windows XPe | Ordering number of the CX + Supplement TwinCAT BACnet/IP (TS8020, license key necessary), TwinCAT 2.11 R3
Target system	Windows 7/10, Windows CE	Windows 7/10, Windows CE	Windows 7/10, Windows CE
Min. TwinCAT level	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC
Further information	www.beckhoff.com/TS8000	www.beckhoff.com/TS8010	www.beckhoff.com/TS8020

We reserve the right to make technical changes.

	TwinCAT FIAS Server	TwinCAT Crestron Server	TwinCAT Building Automation	TwinCAT Building Automation Framework
	TS8035	**TS8036**	**TS8040**	**TS8100**
	The FIAS (Fidelio Interface and Application Specification) interface is a world-leader in hotel management software. The TwinCAT FIAS Server is a software package for communication between TwinCAT PLC and a system with a FIAS standard interface. The communication takes place using TCP/IP. The connection of hotel management software and automation system helps to optimise the energy consumption: e.g. the climate control is automatically adjusted for an unoccupied room; if there is strong sunlight the shading is automatically activated.	Crestron is one of the leading manufacturers of AV control systems. The TwinCAT Crestron Server enables communication between a TwinCAT PLC and a Crestron control. Both systems are connected by Ethernet. SIMPL user macros are available for programming the Crestron controller. The required function blocks are included in the TwinCAT PLC library. Read and write access to the other device is available from the Crestron controller and the TwinCAT PLC.	TwinCAT Building Automation is a software package that covers all technical building automation services. In addition to modules for conventional HVAC applications it also covers room automation including lighting, air-conditioning and shading. Essentially, the software package consists of three components: **TwinCAT BA PLC Libraries** The TwinCAT BA PLC libraries contain basic functions for control, signal processing, special mathematical functions, alarm processing and general system functions. **TwinCAT BA PLC Templates** TwinCAT BA PLC templates consist of ready-made TwinCAT program blocks for sensors, actuators, complete modules for system components and for entire heating, ventilation and air-conditioning system installations/plants. **TwinCAT BA Project Builder** The TwinCAT BA Project Builder is a configuration program for defining system components and assigning them to individual templates. Based on this information, the project files for TwinCAT PLC Control functions and the TwinCAT System Manager can be generated for each controller.	The TwinCAT Building Automation Framework includes a configuration program (TwinCAT Building Automation Manager) and a PLC library. The PLC library is configured such that a complete application program with the main room automation functions is available, including lighting, shading, climate control, time switching functions, scene management, weather stations and energy consumption monitoring. All actuators and sensors are registered in the TwinCAT Building Automation Manager, grouped together and linked with the Bus Terminals. The logical ordering of sensors to actuators is also done in the TwinCAT Building Automation Manager. From this information the configuration program generates and activates the I/O links for all devices entered in the system and writes all necessary parameters in the controller.
	Windows 7/10, Windows CE	Windows 7/10, Windows CE	Windows 7/10, Windows CE	Windows 7/10, Windows CE
	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC	TwinCAT PLC
	www.beckhoff.com/TS8035	www.beckhoff.com/TS8036	www.beckhoff.com/TS8040	www.beckhoff.com/TS8100

Highlights

- Integrated safety system from I/Os to drives
- Compact safety PLC
- Safety engineering integrated into TwinCAT 3

TwinSAFE

Open and scalable safety technology

▸ **www.beckhoff.com/TwinSAFE**

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556 Controller/Logic

556 EtherCAT Box EP1957
557 Compact Controller EK1960
558 EtherCAT Terminals EL69xx
559 EtherCAT plug-in module EJ6910
559 Bus Terminal KL6904

560 Digital input

560 EtherCAT Terminals EL19xx
560 EtherCAT Box EP1908
561 EtherCAT plug-in modules EJ191x
561 Bus Terminal KL1904

562 Digital output

562 EtherCAT Terminal EL2904
562 EtherCAT plug-in modules EJ291x
563 Bus Terminal KL2904

564 Digital combi

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Product overview TwinSAFE

TwinSAFE

Dedicated controller

EtherCAT Terminal	**EL6900** TwinSAFE Logic	558
	EL6910 TwinSAFE Logic	558
	EL6930 TwinSAFE Logic and PROFIsafe gateway	559
EtherCAT Plug-in Modules	**EJ6910** TwinSAFE Logic	559
Bus Terminal	**KL6904** TwinSAFE Logic, 4 safe outputs	559

Integrated controller

EtherCAT Terminal	**EK1960** TwinSAFE Logic, 20 safe inputs, 24 safe outputs	557
	EL1918 TwinSAFE Logic, 8 safe inputs	560
	EL2911 TwinSAFE Logic, 4 safe inputs, 1 safe output	564
EtherCAT Box	**EP1957-0022** TwinSAFE Logic, 8 safe inputs, 4 safe outputs	556
EtherCAT Plug-in Modules	**EJ1914** TwinSAFE Logic, 4 safe inputs	561
	EJ1918 TwinSAFE Logic, 8 safe inputs	561
	EJ1957 TwinSAFE Logic, 8 safe inputs, 4 safe outputs	564
	EJ2914 TwinSAFE Logic, 4 safe outputs	562
	EJ2918 TwinSAFE Logic, 8 safe outputs	563
Drive Technology	**AX81xx-0100, AX82xx-0100** TwinSAFE Logic, feedback: OCT, TwinSAFE: STO/SS1	570
	AX81xx-0200, AX82xx-0200 TwinSAFE Logic, feedback: OCT, TwinSAFE: Safe Motion	569

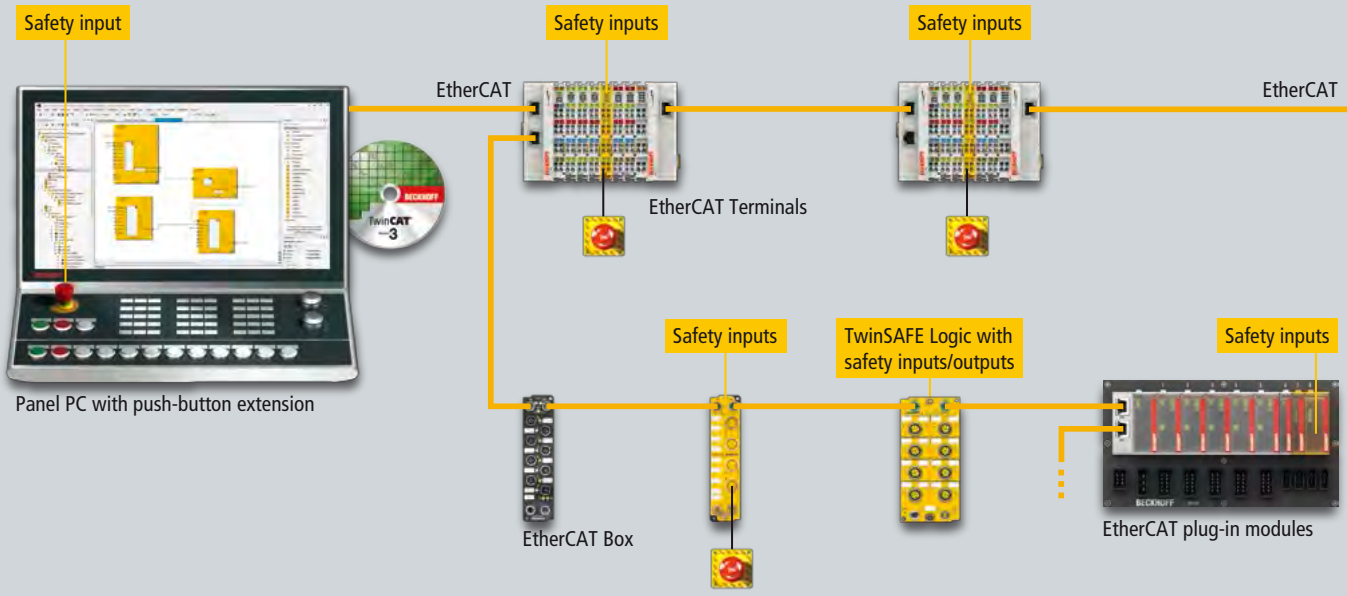
We reserve the right to make technical changes.

I/O

EtherCAT Terminal	**EK1914** 4 standard inputs, 4 standard outputs, 2 safe inputs, 2 safe outputs	565
	EK1960 TwinSAFE Logic, 20 safe inputs, 24 safe outputs	557
	EL1904 TwinSAFE, 4 safe inputs	560
	EL1918 TwinSAFE Logic, 8 safe inputs	560
	EL2904 TwinSAFE, 4 safe outputs	562
	EL2911 TwinSAFE Logic, 4 safe inputs, 1 safe output	564
EtherCAT Box	**EP1908-0002** TwinSAFE, 8 safe inputs	560
	EP1957-0022 TwinSAFE Logic, 8 safe inputs, 4 safe outputs	556
EtherCAT Plug-in Modules	**EJ1914** TwinSAFE Logic, 4 safe inputs	561
	EJ1918 TwinSAFE Logic, 8 safe inputs	561
	EJ1957 TwinSAFE Logic, 8 safe inputs, 4 safe outputs	564
	EJ2914 TwinSAFE Logic, 4 safe outputs	562
	EJ2918 TwinSAFE Logic, 8 safe outputs	563
Bus Terminal	**KL1904** TwinSAFE, 4 safe inputs	561
	KL2904 TwinSAFE, 4 safe outputs	563
	KL6904 TwinSAFE Logic, 4 safe outputs	559

Drive Technology

Option cards	**AX5801-0200** drive-integrated safety functions: STO, SS1	570
	AX5805, AX5806 drive-integrated safety functions: STO, SOS, SS1, SS2, SLS, SSM, SSR, SMS, SLP, SCA, SLI, SAR, SMA, SDIp and SDIn	568
Axis modules	**AX81xx-0100, AX82xx-0100** TwinSAFE Logic, feedback: OCT, TwinSAFE: STO/SS1	570
	AX81xx-0200, AX82xx-0200 TwinSAFE Logic, feedback: OCT, TwinSAFE: Safe Motion	569
Servomotor terminal	**EL7201-9014** I_{rms} = 2.8 A, 50 V DC, OCT, STO	566
	EL7211-9014 I_{rms} = 4.5 A, 50 V DC, OCT, STO	566
	EL7221-9014 I_{rms} = 7…8 A with ZB8610, 50 V DC, OCT, STO	566
Servomotor module	**EP7211-9034** I_{rms} = 4.5 A, 50 V DC, OCT, STO	567
Servomotor output stage	**EJ7211-9414** I_{rms} = 4.5 A, 50 V DC, OCT, STO, TwinSAFE SC	567
Stepper motor terminal	**EL7047-9014** I_{max} = 5.0 A, 50 V DC, incremental encoder, vector control, STO	567
DC motor	**EL7411-9014** I_{rms} = 4.5 A, 50 V DC, STO	567



TwinSAFE | Open and scalable safety solution

The TwinSAFE integrated safety solution represents the consistent continuation of the open and PC-based control philosophy from Beckhoff. Due to their modularity and versatility, the TwinSAFE terminals fit seamlessly into the Beckhoff control system. The I/O components are available as Bus Terminals, EtherCAT Terminals, EtherCAT plug-in modules and EtherCAT Box modules.

With the fieldbus-neutral safety protocol (TwinSAFE/Safety over EtherCAT), TwinSAFE devices can be integrated into any desired fieldbus system. To this end, the IP 20 TwinSAFE Bus Terminals are integrated into existing stations with K-bus or EtherCAT or used directly in the machine as IP 67 modules. These safety I/Os provide the interfaces to safety-relevant sensors and actuators.

The possibility to transmit safety-relevant signals over a standard bus system creates significant advantages in terms of planning, installation, operation, maintenance, diagnostics and costs.

The safety-relevant application is configured or programmed in TwinCAT software. This application is then transmitted over the bus system to a TwinSAFE Logic terminal. These logic terminals are at the heart of the TwinSAFE system. Due to the enormous flexibility of the system, however, several TwinSAFE Logic terminals can be operated simultaneously in one network. All safety devices in an installation communicate with these logic terminals.

Communication via independent safety circuits

Communication between distributed TwinSAFE Logic terminals is very simple to implement with TwinCAT software. This applies not only to terminals in a network, but also to devices connected to different controllers. Safety-relevant data and signals can also be exchanged as soon as the controllers have established a communication connection via a fieldbus or via network variables. Of course, the response times and capabilities of the systems employed need to be considered.

For this purpose, TwinCAT software assumes the task of distributing the data. This central distribution of the data has two significant advantages:

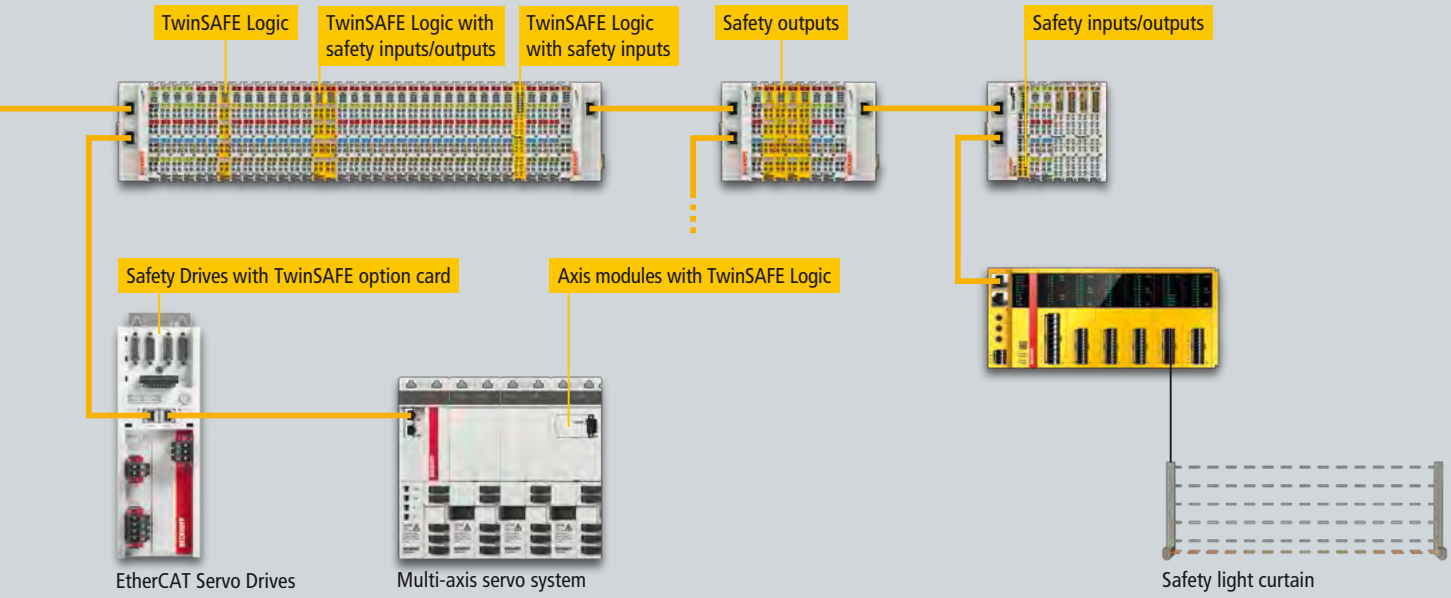
– Since all safety-relevant data are fed via the functional controller, it can be used by the controller for diagnostic purposes. The generation of diagnostic data on the safety controller is not necessary. That saves programming effort as well as computing performance and thus costs.
– All fieldbus systems that are interoperable with TwinCAT software are also accessible to the safety equipment. The TwinSAFE/Safety over EtherCAT protocol is so safe that even heterogeneous fieldbus environments as well as the safety-relevant exchange of data between modules on different fieldbus systems are not a problem.

Certified safety function blocks and customising options facilitate configuration

The certified safety function blocks of the TwinSAFE Logic terminals allow the simple, error-free and inexpensive implementation of all safety tasks: from the simple monitoring of a safety door to complex muting functions based on digital signals and the safe control of highly complex process based on analog signals. It's also possible to implement connected and daisy-chained systems in compliance with safety requirements. For this purpose, the so-called customising capability is especially useful: Within a safety application, safety-relevant subgroups can be formed. Subsequently they can be deactivated or passivated permanently or temporarily during ongoing operation. These are essential functions that are required to reliably operate networked safety systems. Without these functions, commissioning, maintenance and partial operation of linked machines is not possible or a highly complex task.

With the TwinSAFE Logic terminals, all diagnostic and status data of the function blocks can be merged into the cyclic EtherCAT telegram. In addition, diagnostic data are stored directly in the logic component to enable asynchronous access. Extensive diagnostics is thus easy to implement without additional application requirements.

We reserve the right to make technical changes.



A backup and restore mechanism facilitates exchange in the event of a fault

Since all parameters and settings as well as the application software are stored on TwinSAFE Logic components, the safety controller can be programmed either in the plant over the bus system or at the workstation and then simply plugged into the system.

The logic components provide a special backup and restore mechanism. Therefore, no additional exchangeable storage medium is required as in other systems. The user can activate this function in TwinCAT software or by the application.

If the original terminal has been exchanged, e.g. due to a defect, the system automatically recognises a new TwinSAFE Logic component and the valid TwinSAFE application is loaded automatically into the new terminal. The safety-related check takes place fully automatically and requires no intervention by the user.

The maintenance staff only needs to exchange the Bus Terminal, everything else is accomplished reliably and securely by the TwinSAFE system.

Safety over EtherCAT – Open safety protocol according to IEC 61784-3

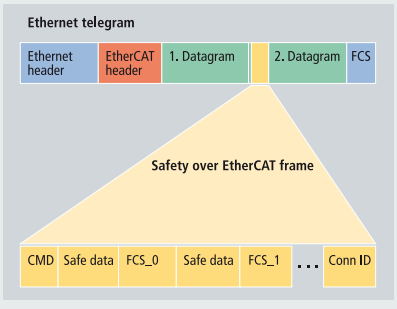
The open Safety over EtherCAT protocol (FSoE for short: "Failsafe over EtherCAT") defines a safety-related communication layer for EtherCAT. It meets the requirements of IEC 61508 SIL 3 and enables the transmission of secure and standard information on the same communication system without restrictions regarding transmission rates and cycle time.

Thanks to this openness any transmission media and transmission path can be used with Safety over EtherCAT. FSoE is focused on EtherCAT, the high-performance Ethernet fieldbus, and the transmission of safety-related process data is based on the Black Channel principle.

Thus, Safety over EtherCAT is also supported by other fieldbus systems and protocols such as PROFIBUS, CANopen or Ethernet. Copper or optical fibre cables, radio links or transmission technologies such as data light barriers can be used as transmission path. The telegram is arranged in such a way that a minimal container length of 6 bytes is sufficient for the transmission of all safety information including one byte of safe process data.

Safe data are cyclically exchanged between a Safety over EtherCAT master and a Safety over EtherCAT slave. This mechanism is called a connection (TwinSAFE connection). A master can establish and monitor several connections to different slaves.

Further information see page 2 67



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Stand-alone controller, small controller and classic architecture (from left to right)

TwinSAFE | Free choice of architecture

With the introduction of the new Logic generation in the I/O level (from EL6910), Beckhoff has triggered a revolution in safety technology. The functionality of the TwinSAFE Logic is integrated in all new TwinSAFE components, which results in a great variety of possible architectures of TwinSAFE applications.

Stand-alone

As the first step after introducing the new Logic generation, the functionality of the EL6910 TwinSAFE Logic was transferred to the EK1960 Compact Controller. This is a TwinSAFE Logic component with safe local inputs and outputs. Unlike previous TwinSAFE components, the EK1960 can also be operated without EtherCAT connection.

The same applies to the EP1957 EtherCAT Box. In addition to the availability of safe outputs in an IP 67 environment, Beckhoff provides the possibility of implementing a complete safety loop in an IP 67 environment through integration of the TwinSAFE Logic in this component. Like the EK1960, the EP1957 can also be operated in stand-alone mode.

Possible components for stand-alone architectures:

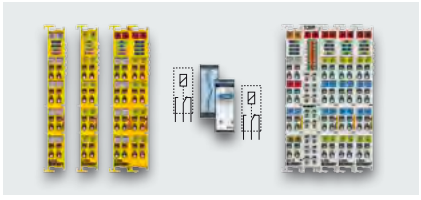
– EK1960 Compact Controller
– EP1957 digital combi module

Small controllers

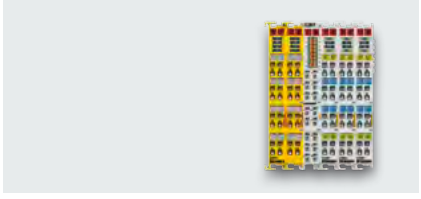
Following the introduction of stand-alone architectures in addition to classic safety architectures, Beckhoff is now also closing the gap between these two solutions. Whereas the stand-alone components can be used integrated in the EtherCAT network as usual, they are often oversized for very small applications. For this reason Beckhoff has introduced further small controllers enabling highly efficient and cost-effective implementation of very small safety applications.

As a small controller, the EL2911 terminal has four safe inputs and one safe output rated at 10 A. It allows very simple implementation of safe potential groups within a terminal segment. Standard terminals can be placed in the safe state with the help of the EL2911. Note, however, that this is only possible for non-reactive components (a corresponding list of possible components can be found on the Beckhoff website). The EL2911 allows the cost-effective substitution of previous solutions for this function. For an existing architecture as shown in the illustration, the following components can be replaced by the simple use of an EL2911:

– 1 x EL69x0
– 1 x EL1904
– 1 x EL2904
– 2 contactors
– 1 potential supply terminal



Before



After

Possible small controllers:

– EK1960 Compact Controller
– EP1957 digital combi module
– EL2911 potential supply terminal
– EJ1957 8-channel digital input, 4-channel digital output

Classic architecture

The classic architecture is based on a safety application with a dedicated safety controller, which can exchange data with 1 to n safe communication devices. In this architecture, all safety-relevant data is transmitted to this controller and processed there. As a general rule, all components with logic functionality can be used; however, below please find a list of components that do not have safe inputs as well as safe outputs.

We reserve the right to make technical changes.

Distributed controllers

Possible components for classic architectures:

- EtherCAT Terminals
  - EL6910 TwinSAFE Logic
  - EL1918 8-channel digital input terminal
  - EL6900 TwinSAFE Logic
  - EL6930 TwinSAFE/PROFIsafe logic and gateway terminal
- EtherCAT plug-in modules
  - EJ6910 TwinSAFE Logic
  - EJ1914 4-channel digital input
  - EJ1918 8-channel digital input
  - EJ2914 4-channel digital output
  - EJ2918 8-channel digital output
- AX8911 TwinSAFE drive option

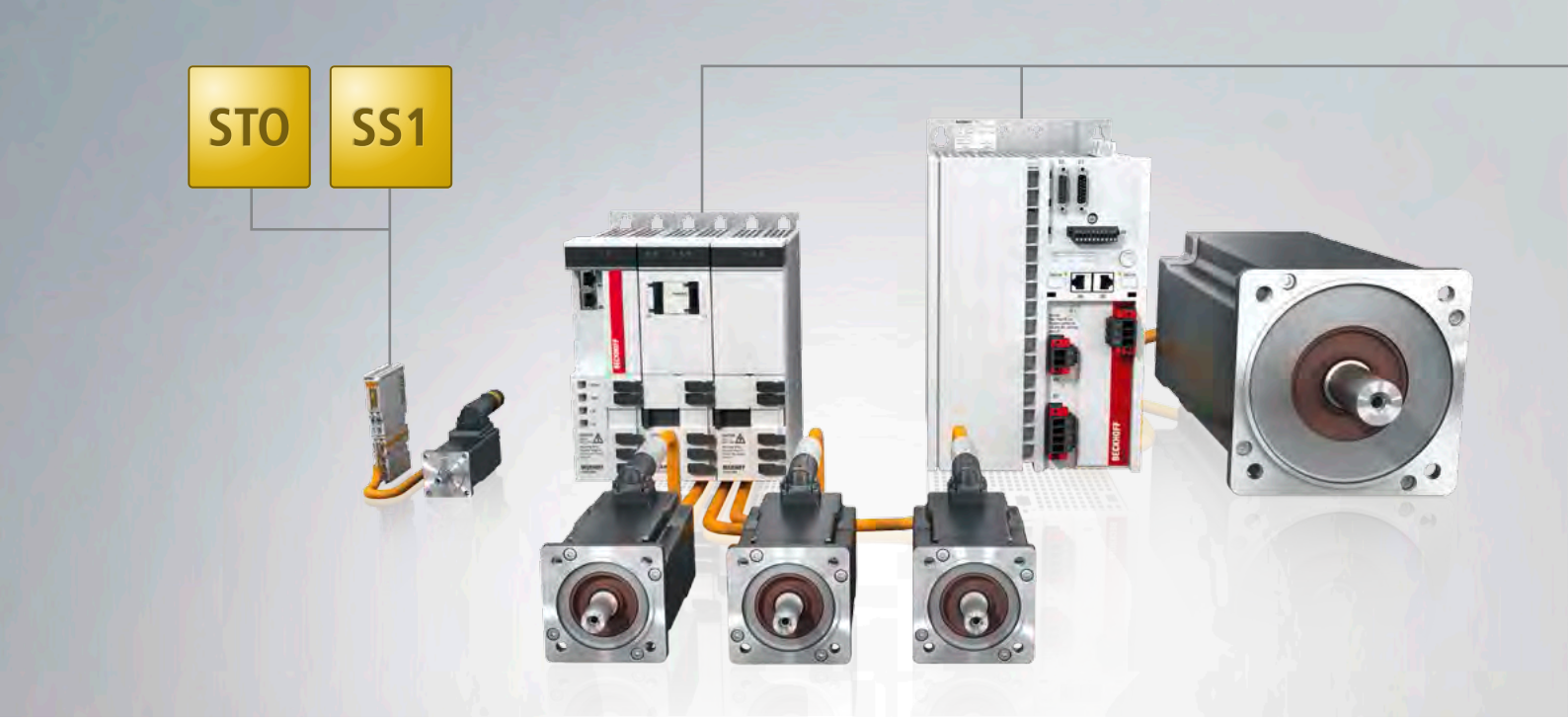
Distributed controllers

The integration of the TwinSAFE Logic functionality in all new TwinSAFE components also provides an additional option to adopt a further method of modularisation. Based on the customising functionality, fine-granular modularisation is already possible at software level and also flexibly at runtime. This modularity can now also be implemented at the safety project level in TwinCAT 3 and at the hardware level. Whereas in a classic architecture all safety-relevant data is processed in the form of a large, complex safety project by a dedicated safety controller, the introduction of the new possibilities allows safety applications to be distributed directly to the individual and possibly to a certain degree independent modules. With previous components this is possible only by using additional dedicated safety controllers in these modules, which means an additional cost expense. In future it will be very simple to implement this by providing individual components in these modules with a safety project. For example, a classic architecture can be used inside the modules. A module can thus be individually developed, validated and verified, whereas any from a safety aspect central safety controller that exists only has to process aggregated data from a defined interface to the modules. Through customisation, modules can be individually developed very efficiently and the commissioning of the partial or complete system is very easy to accomplish.

The distribution of the safety controller is not only very useful for the modularisation of the complete system. It may also be used, for example, for a simplified pre-processing of sensor data. Whereas previously the specific processing of input data was only possible in the dedicated safety controller, if an input component was not able to provide adequate functions, this can now be implemented very simply directly inside the input component. In this way, the actual safety project becomes less complex and is easier to manage, because any special treatment is no longer necessary.

Possible components for distributed controllers:

- EtherCAT Terminals
  - EK1960 Compact Controller
  - EL6910 TwinSAFE Logic
  - EL1918 8-channel digital input terminal
  - EL2911 potential supply terminal
- EtherCAT Box
  - EP1957 digital combi module
- EtherCAT plug-in modules
  - EJ6910 TwinSAFE Logic
  - EJ1914 4-channel digital input
  - EJ1918 8-channel digital input
  - EJ2914 4-channel digital output
  - EJ2918 8-channel digital output
  - EJ1957 8-channel digital input, 4-channel digital output
- AX8911 TwinSAFE drive option



TwinSAFE | Safe drive technology

Dynamic movements of the electrical drive technology used in a machine can create considerable hazards to people and the environment. From a normative point of view, drive technology components must be considered in a safety-oriented manner by co-ordinating and monitoring certain movements and motion sequences. The integrated safety solution TwinSAFE enables the implementation of safe drive technology in three levels corresponding to the complexity of the machine.

The safe drive components are able to switch the motor torque-free or to monitor speed, position and direction of rotation. No further devices such as contactors or circuit breakers are necessary in the supply lines for this. This enables a very lean installation and helps to lower costs and control cabinet space requirements.

Even safe position monitoring or position range monitoring is simple to implement with the aid of the safe drive technology. This does not require any additional wiring, because the EtherCAT communication is used in the servo drives, enabling seamless communication between TwinSAFE Logic components and the safe drive technology.

Like the programming or configuration of a safety application, the entire parameterisation of the safe drive technology is performed from the TwinCAT software. All system-specific settings are stored together with the application in the TwinSAFE Logic components. For that reason, the safe drive components can be exchanged at any time without software modification. The respective component receives all the parameters necessary for operation at the next power-on or boot-up.

STO/SS1 according to IEC 61800-5-2

The safety functions Safe Torque Off (STO) and Safe Stop 1 (SS1 | Monitored braking, STO after time or standstill) in accordance with IEC 61800-5-2 can be implemented with the following TwinSAFE components:

- stand-alone AX5000 Servo Drive with AX5801-0200 option card
- AX8000 multi-axis servo system with TwinSAFE AX81xx-x1xx and AX82xx-x1xx axis modules
- servo terminals variant: EL72xx-9014
- servomotor box variant: EP7211-9034

Safe Motion according to IEC 61800-5-2

More complex safety functions can be implemented with the aid of the Safe Motion function package:

- Stop functions (STO, SOS, SS1, SS2)
- Speed functions (SLS, SSM, SSR, SMS) with up to 8 speeds
- Position functions (SLP, SCA, SLI) with reference cams
- Acceleration functions (SAR, SMA)
- Direction of rotation functions (SDIp, SDIn)

The following TwinSAFE components support the Safe Motion function package:

- stand-alone AX5000 Servo Drive with AX5805-0200 and AX5806-0020 option cards
- AX8000 multi-axis servo system with TwinSAFE AX81xx and AX82xx axis modules

The above-mentioned safety functions can be implemented with AX58xx option cards for the AX5000. No special encoder system is necessary in order to implement the safety functions SDI (Safe Direction) or SLS (Safely Limited Speed); many standard motors from Beckhoff support these functions without further expense and without additional encoder system when the AX5000 is used. A detailed list of permissible motors can be found under

▶ **www.beckhoff.com/Documentation**

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The SBC function (Safe Brake Control) can additionally be implemented with the AX8000 and the ordering option AX8xxx-x2xx.

Programmable, safe drive technology through integrated logic

The AX8000 multi-axis servo drive encompasses new functions of safe drive technology with TwinSAFE: With the ordering options -0100 and -0200, the AX8108, AX8118 and AX8206 axis modules feature a programmable TwinSAFE Logic corresponding to an EL6910 and enable the direct implementation of safety applications in the servo drives. The number of TwinSAFE connections is limited to eight. The user achieves greater degrees of freedom in the implementation of a drive technology safety application and the flexibility of programming allows the design of safe drive technology to suit the specific system requirements.

The STO and SS1 safety functions can be implemented with TwinSAFE axis modules selecting the ordering option -0100 (STO/SS1). These functions can be initiated both via hard wiring and via FSoE. For TwinSAFE axis modules with the ordering option -0200 (Safe Motion), various drive-integrated signals are available for the implementation of an application-specific safety function. As is familiar from the EL6910, internal and external signals can be used inside the TwinSAFE axis modules -0100 and -0200 in conjunction with the well-known pre-certified function blocks in order to implement complex drive functions. Depending on the application, the safety-oriented information can be pre-processed directly in the drive so that the central TwinSAFE Logic needs only process the aggregated information.

For AX8000 multi-axis servo drive system
see page 336

For AX5000 Digital Compact Servo Drives
see page 344

For compact Drive Technology
see page 410

With a safety development environment and a safety runtime, the next step in the field of safety solutions is completed with TwinCAT 3.

TwinCAT 3 and Safety | Simplified engineering

TwinCAT 3 as a universal development tool creates further possibilities for safety-relevant fields of application. First, TwinCAT 3 offers additional functionality for creating and managing safety-relevant applications with the safety editor. Second, a standard Industrial PC can be used as a safety controller for the first time. This is possible due to the new safety runtime.

Safety editor

The safety editor integrated in TwinCAT 3 allows the implementation of a safety application in a graphical environment. The desired logic is programmed according to a function block diagram (FBD). The application can be represented in the network infrastructures for increased clarity. The functions blocks known from the logic components can be used as logic elements (digital function blocks for KL6904 and EL69xx; additional analog function blocks for EL6910, EJ6910, EK1960, AX8xxx-x1xx, AX8xxx-x2xx etc.).

The safety editor offers increased flexibility and portability. This is achieved by initially programming independently of the actual hardware used. To this end, both the target system and all input and output devices are made available as so-called alias devices. At this level, all safety-relevant settings can be selected in advance. Before the project is finally transferred to the executing hardware, these alias devices must be assigned to the actually installed physical devices.

In addition to using pre-specified function blocks, there is also the possibility to create custom function blocks. These can be created by combining existing – pre-certified – function blocks or by using Safety C (this can only be done for the safety runtime). Safety C is an almost unrestricted derivative of standard C. This allows well-known control structures such as IF-THEN-ELSE, SWITCH CASE and the data types usual in C to be used for safety applications.

An important novelty in the programming of safety-relevant applications in TwinCAT 3 is the extended user management. In the so-called basic mode, the user can create an application exclusively from pre-specified – and thus certified – function blocks. These also include function blocks that the user has created on the basis of pre-certified function blocks. In the expert mode on the other hand, it is possible to create function blocks in Safety C and thus to create custom libraries. Before loading it into the safety controller, a check is made as to whether the programmed logic consists of already certified function blocks or whether the created application requires renewed examination.

In addition to programming, improved tools optimally support the debugging and test phase. Programs can be debugged as usual in the Visual Studio® environment: the online values of variables and states of the function blocks are displayed directly in the graphical environment, enabling fast and simple debugging of the application. Furthermore, the project can be simulated offline in order to considerably speed up and simplify commissioning.

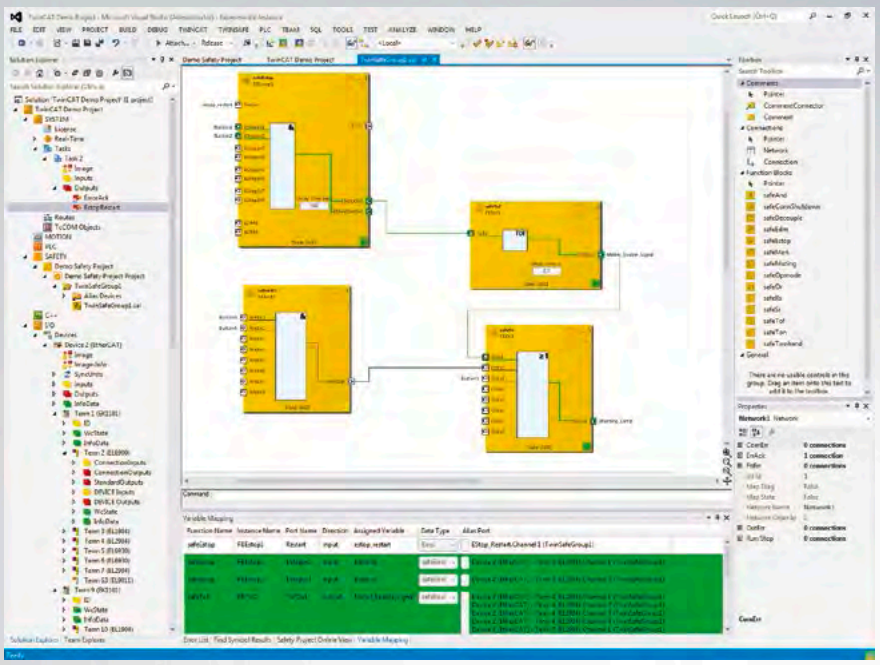
The editor is equipped with an automatic verification mechanism which automatically checks whether the saved project corresponds to the one created in the editor. The previously required manual comparison by uploading the project back to the safety controller is no longer necessary.

In addition, the safety editor automatically generates documentation containing a detailed view of all relevant project data. From the representation of the hardware terminals with their safety-relevant settings through to an exact listing of the function blocks used and their interconnections, this documentation contains all important data required to facilitate the wiring of the plant, debugging and maintenance.

TwinCAT Safety PLC

The enormous advances in the field of Industrial PCs and the associated increase in reliability and quality allow a standard IPC to be used as a safety controller. This is enabled on a strictly mathematical basis, so that the proof of safety does not only hold for a specific processor and its environment. The independence from the hardware component used that this creates, enables the use of standard components up to a SIL 3 safety level according to IEC 61508.

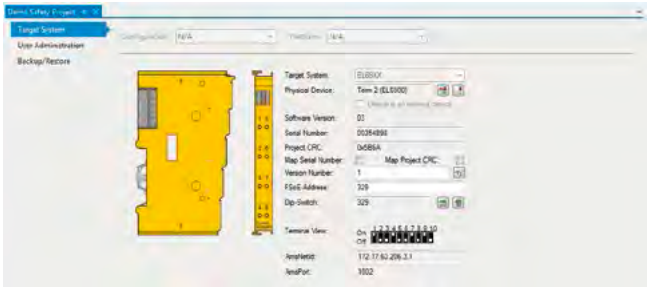
We reserve the right to make technical changes.



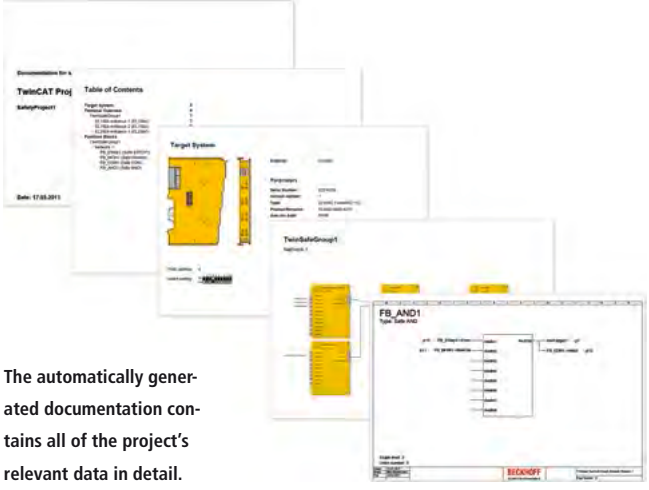
View of the fully graphical safety editors in TwinCAT 3

For this purpose, mathematical coding is used that creates diverse data redundancy, which ensures that the correct execution of operations within the safety application can be verified and a safe reaction initiated in the case of an error. In addition to pre-specified function blocks, the use of Safety C allows custom function blocks to be created and saved in a library for later use.

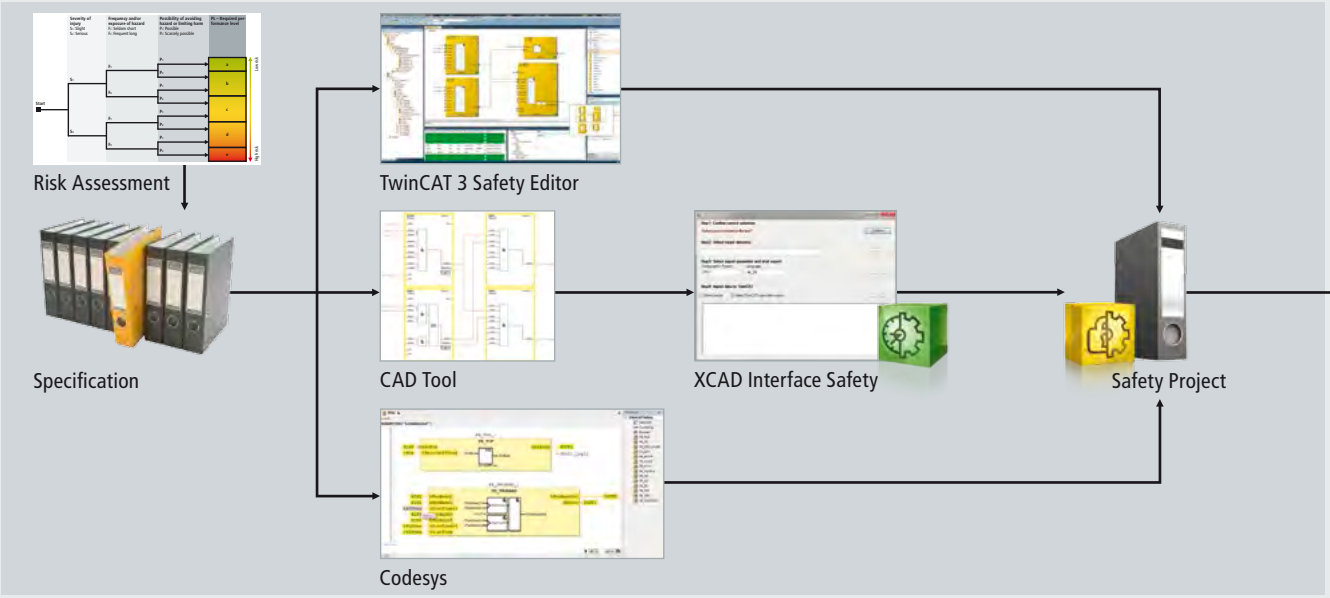
Further information on TwinCAT 3
see page 470 or
▶ **www.beckhoff.com/TwinCAT3**



Configuring the target system



The automatically generated documentation contains all of the project's relevant data in detail.



Development

TwinSAFE | Workflow support

Application manual

To simplify the design of safety functions, Beckhoff has made the TwinSAFE application manual available for download via the website. The user-friendly manual contains a compilation of application samples for TwinSAFE with a collection of widely used safety functions. Each sample shows the interconnection of the hardware components and the corresponding mapping inside the safety application itself, i.e. the implementation with the help of pre-certified function blocks and the parameterisation of the input and output components. For further support the verification of the respective safety level as confirmed by the TÜV SÜD authority is executed for each sample, so that the samples can either be adopted 1:1 or adapted very simply to specific application requirements.

TwinCAT 3 and TwinCAT 2

In the Beckhoff world the safety application is implemented either with TwinCAT 2 or 3. Whereas TwinCAT 2 can be used exclusively for the TwinSAFE Logic components EL6900, EL6930 and KL6904, all Logic components with the exception of the KL6904 can be configured with TwinCAT 3.

XCAD Interface Safety

Beckhoff provides the possibility to create a safety application directly in a CAD tool. With the help of XCAD Interface Safety the application can subsequently be converted into a functional safety project in TwinCAT 3.

Codesys

The Beckhoff TwinSAFE Logic components can also be configured with Codesys Safety.

TwinSAFE Loader

The TwinSAFE Loader tool represents a possibility to download the safety project entirely without the TwinCAT development environment. It is a command line tool that can be integrated into customer-specific processes. It enables, for example, the loading of TwinSAFE Logic components during series production without the use of a development environment. Furthermore, an existing system can be customised at runtime with the help of the TwinSAFE Loader.

When using the TwinSAFE Loader in the context of a customer-specific process, the FMEDA given in the user manual must always be observed.

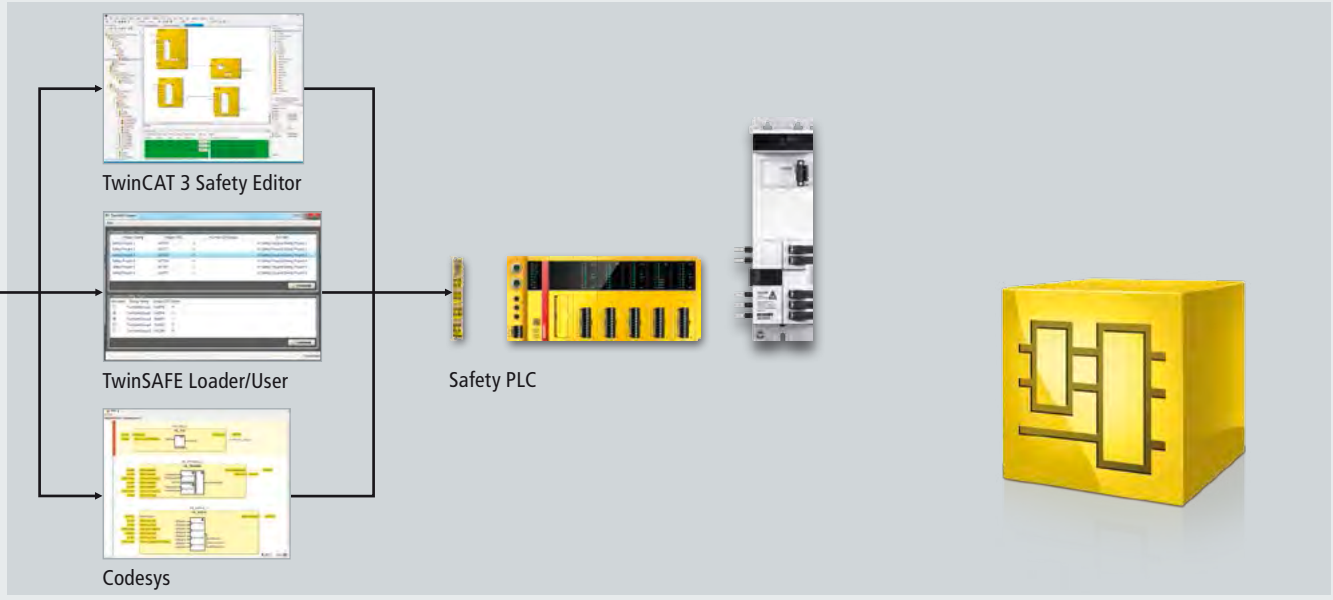
TwinSAFE User

The TwinSAFE User tool is used to handle the user administration of a TwinSAFE Logic component. For example, the user administration on a TwinSAFE Logic component can be configured during series production without the use of a development environment.

Deployment on TwinSAFE Logic components

The safety project generated with the help of the TwinSAFE workflow can be transferred to the TwinSAFE Logic components using the tools described above. The TwinSAFE components listed in the table are available as target systems.

We reserve the right to make technical changes.



Deployment

Ordering information	Integrated TwinSAFE Logic: modularity and scalability on all levels	
EtherCAT Terminal		
EK1960	TwinSAFE Compact Controller	557
EL1918	8-channel digital input terminal, TwinSAFE, 24 V DC, TwinSAFE Logic	560
EL2911	potential supply terminal, TwinSAFE Logic, 24 V DC, 10 A, 4 safe inputs, 1 safe output	564
EL6900	TwinSAFE Logic	558
EL6910	TwinSAFE Logic	558
EL6930	FSoE/PROFIsafe logic and gateway terminal	559
EtherCAT Box		
EP1957-0022	digital combi module, TwinSAFE Logic, 24 V DC, 8 safe inputs, 4 safe outputs	556
EtherCAT Plug-in Modules		
EJ1914	4-channel digital input, TwinSAFE, 24 V DC	561
EJ1918	8-channel digital input, TwinSAFE, 24 V DC	561
EJ1957	8 fail-safe inputs, 4 fail-safe outputs, TwinSAFE, 24 V DC	564
EJ2914	4-channel digital output, TwinSAFE, 24 V DC, 0.5 A	562
EJ2918	8-channel digital output, TwinSAFE, 24 V DC, 0.5 A	563
EJ6910	TwinSAFE Logic	559
Drive Technology		
AX8108-0100	single-axis module 8 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated	570
AX8108-0200	single-axis module 8 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated	569
AX8118-0100	single-axis module 18 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated	570
AX8118-0200	single-axis module 18 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated	569
AX8206-0100	double-axis module 2 x 6 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic integrated	570
AX8206-0200	double-axis module 2 x 6 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic integrated	569

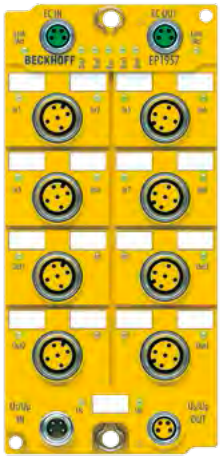
Stand-alone | TwinSAFE Logic without EtherCAT network

The EK1960 TwinSAFE Compact Controller extends the application range of the integrated TwinSAFE safety solution. Based on its compact design with 20 safe digital inputs and 24 safe digital outputs, it is ideal to cover the safety requirements of compact machines in particular. The EK1960 can be operated in stand-alone mode or it can be networked with other controllers via the EtherCAT connections. Like every EtherCAT Coupler, the EK1960 can be extended by all EL/ES terminals if operated in an EtherCAT network. It can, however, not be extended by terminals when operated as a stand-alone device.

The TwinSAFE Compact Controller is programmed via the TwinCAT Safety Editor in the same way as other TwinSAFE components. A TwinSAFE project is created and loaded over EtherCAT into the EK1960. The EK1960 supports the establishment of 128 TwinSAFE connections. For flexible adaptation to different safety tasks, the TwinSAFE Compact Controller can be combined with the TwinSAFE I/O components with IP 20 and IP 67 protection and the TwinSAFE drive option cards.

The EP1957-0022 TwinSAFE box is a safe small controller for the IP 67 environment with eight safe digital inputs, four safe digital outputs and integrated TwinSAFE Logic for pre-processing of safety-related information directly in the field. Apart from use within an EtherCAT network, it can also be used in stand-alone mode outside the control cabinet without a connection to an EtherCAT master.

EK1960 with M8 bus interface

	TwinSAFE Logic, EtherCAT Box, 8 safe inputs, 4 safe outputs
Technical data	**EP1957-0022**
Connection technology	M12, screw type
Specification	link unit between safe input and output signals
Number of inputs	8
Number of outputs	4
Max. output current	0.5 A
	
Protocol	TwinSAFE/Safety over EtherCAT
Cycle time	approx. 1 ms/according to project size
Fault response time	≤ watchdog time (parameterisable)
Current consumption from U_S/U_P	max. 120 mA/max. 60 mA
Installation position	variable
Safety standard	EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)
Approvals	CE, TÜV SÜD
Weight	approx. 315 g
Protection class	IP 67 (according to EN 60529)
Further information	www.beckhoff.com/EP1957-0022
Variants	
Distinguishing features	

We reserve the right to make technical changes.

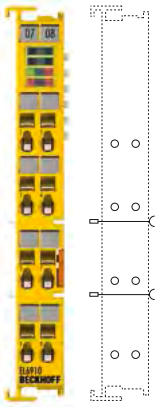
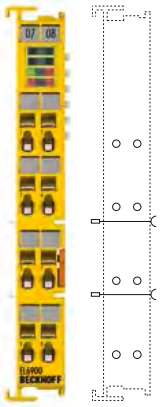
	TwinSAFE Compact Controller, EtherCAT Coupler, 20 safe inputs, 24 safe outputs (4 optional relay outputs)
	EK1960-0000
	1-wire
	20
	24 (4 optional relay outputs)
	2 A (simultaneity factor 50 % at 2 A)
	TwinSAFE/Safety over EtherCAT
	approx. 1 ms/according to project size
	≤ watchdog time (parameterisable)
	typ. 80 mA/typ. 2 mA
	horizontal
	EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)
	CE, TÜV SÜD
	approx. 500 g (without relay outputs), approx. 560 g (with relay outputs)
	IP 20
	www.beckhoff.com/EK1960

EK1960-0008	**EK1960-2600**	**EK1960-2608**
without relay outputs, M8 bus interface	with relay outputs, RJ45 bus interface	with relay outputs, M8 bus interface

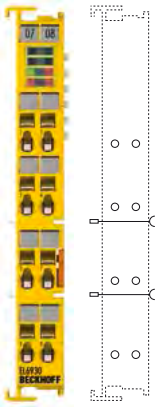
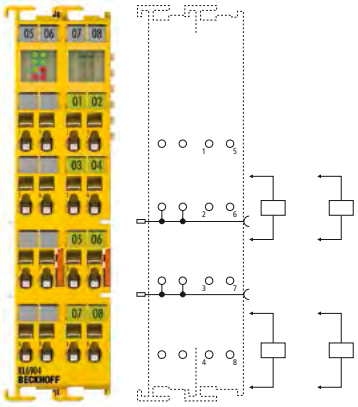
TwinSAFE | **TwinSAFE Logic in the EtherCAT network**

With the new generation of safety controllers based on the EL6910, Beckhoff ushers in a new era in safety technology by further expanding the concept of modularity within the TwinSAFE system. Apart from adding functionalities for the highly granular and flexible modularisation of each safety project in order to optimally meet the respective safety requirements, Beckhoff enables all new safe I/O modules to directly execute customer-specific safety projects, including communication with multiple devices. Since the intelligence of the entire safety application can be distributed over the involved safety-relevant devices, the user can adapt the TwinSAFE system even more specifically to the needs of each machine concept.

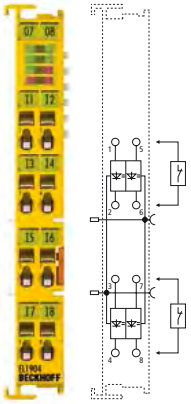
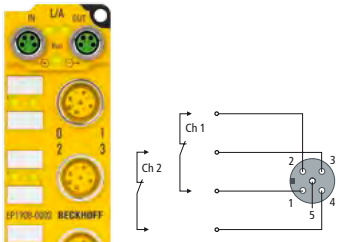
For an overview of all products with integrated TwinSAFE Logic see page 555

	TwinSAFE Logic, EtherCAT Terminal	TwinSAFE Logic, EtherCAT Terminal
Technical data	**EL6910**	**EL6900**
Connection technology	–	
Specification	link unit between safe input and output signals	
Number of outputs	–	–
Max. output current	–	–
	 The TwinSAFE Logic can establish 212 connections to other TwinSAFE devices.	 The TwinSAFE Logic can establish 128 connections to other TwinSAFE devices.
Protocol	TwinSAFE/Safety over EtherCAT	TwinSAFE/Safety over EtherCAT
Cycle time	approx. 1 ms/according to project size	approx. 500 µs/according to project size
Fault response time	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)
Current consumption power contacts	–	–
Current consumption E-bus	typ. 160 mA	typ. 188 mA
Current consumption K-bus	–	–
Installation position	horizontal	horizontal
Safety standard	EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)	DIN EN ISO 13849-1:2008 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)
Approvals	CE, UL, TÜV SÜD	CE, UL, Ex, TÜV SÜD
Weight	approx. 50 g	approx. 50 g
Protection class	IP 20	IP 20
Further information	www.beckhoff.com/EL6910	www.beckhoff.com/EL6900
Special terminals		
Distinguishing features		

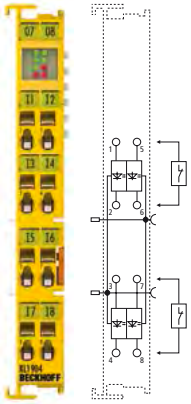
We reserve the right to make technical changes.

	TwinSAFE/PROFIsafe logic and gateway terminal, EtherCAT Terminal	TwinSAFE Logic, EtherCAT plug-in module	TwinSAFE Logic, Bus Terminal, 4 safe outputs
	EL6930	**EJ6910**	**KL6904**
		distribution board	2-wire
	–	–	4
	–	–	0.5 A/20 mA min. (per channel)
			
	The EL6930 logic terminal can establish 127 connections to other TwinSAFE/Safety over EtherCAT devices and one PROFIsafe slave connection to a PROFIsafe master.	The TwinSAFE Logic can establish 212 connections to other TwinSAFE devices.	The KL6904 can establish up to 15 connections (TwinSAFE connections).
	TwinSAFE/Safety over EtherCAT, PROFIsafe	TwinSAFE/Safety over EtherCAT	TwinSAFE/Safety over EtherCAT
	approx. 500 µs/according to project size	approx. 1 ms/according to project size	4…100 ms
	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)
	–	–	load-dependent
	typ. 188 mA	typ. 222 mA	–
	–	–	max. 250 mA
	horizontal	horizontal	horizontal
	DIN EN ISO 13849-1:2008 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)	EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)	DIN EN ISO 13849-1:2008 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)
	CE, UL, TÜV SÜD	CE, TÜV SÜD	CE, UL, Ex, TÜV SÜD
	approx. 50 g	approx. 27 g	approx. 100 g
	IP 20	IP 20	IP 20
	www.beckhoff.com/EL6930	www.beckhoff.com/EJ6910	www.beckhoff.com/KL6904
			KL6904-0001
			pre-configured ex factory to 15 TwinSAFE connections

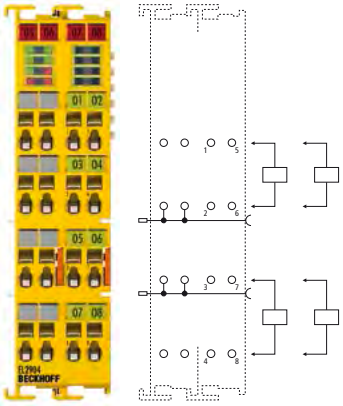
TwinSAFE | **Digital inputs**

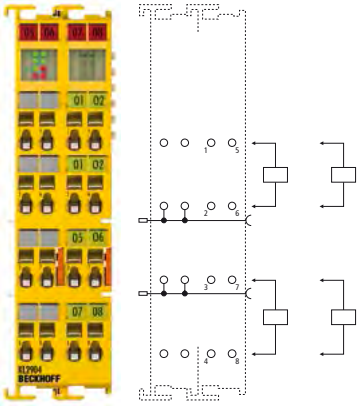
	TwinSAFE, EtherCAT Terminal, 4 safe inputs	TwinSAFE Logic, EtherCAT Terminal, 8 safe inputs	TwinSAFE, EtherCAT Box, 8 safe inputs
Technical data	**EL1904**	**EL1918**	**EP1908-0002**
Connection technology	1-/2-wire		M12, screw type
Specification	recording of input signals	link unit between safe input and output signals	recording of input signals
Number of inputs	4	8	8
			
Protocol	TwinSAFE/Safety over EtherCAT	TwinSAFE/Safety over EtherCAT	TwinSAFE/Safety over EtherCAT
Response time	typ. 4 ms (read input/write to E-bus)	typ. 4 ms (read input/write to E-bus)	typ. 5.5 ms (read input/write to bus)
Fault response time	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)
Current consumption power contacts	see documentation	see documentation	–
Current consumption E-bus	typ. 200 mA	typ. 165 mA	–
Current consumption from U_S/U_P	–	–	max. 87 mA/max. 27 mA
Current consumption K-bus	–	–	–
Installation position	horizontal	horizontal	variable
Safety standard	DIN EN ISO 13849-1:2008 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)	EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)	EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)
Approvals	CE, UL, Ex, TÜV SÜD	CE, TÜV SÜD	CE, UL, TÜV SÜD
Weight	approx. 50 g	approx. 50 g	approx. 170 g
Protection class	IP 20	IP 20	IP 65/66/67 (according to EN 60529)
Further information	www.beckhoff.com/EL1904	www.beckhoff.com/EL1918	www.beckhoff.com/EP1908

We reserve the right to make technical changes.

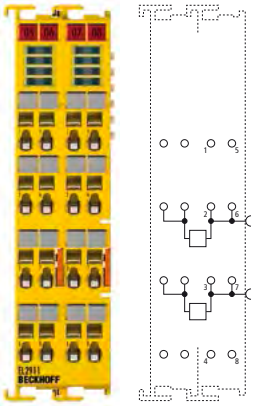
	TwinSAFE Logic, EtherCAT plug-in module, 4 safe inputs	TwinSAFE Logic, EtherCAT plug-in module, 8 safe inputs	TwinSAFE, Bus Terminal, 4 safe inputs
	EJ1914	**EJ1918**	**KL1904**
	distribution board		2-wire
	link unit between safe input and output signals		recording of input signals
	4	8	4
			
	TwinSAFE/Safety over EtherCAT	TwinSAFE/Safety over EtherCAT	TwinSAFE/Safety over EtherCAT
	typ. 4 ms (read input/write to E-bus)	typ. 4 ms (read input/write to E-bus)	typ. 4 ms (read input/write to K-bus)
	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)
	–	–	–
	typ. 260 mA	typ. 290 mA	–
	–	–	–
	–	–	48 mA
	horizontal	horizontal	horizontal
	EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)	EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)	DIN EN ISO 13849-1:2008 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)
	CE, TÜV SÜD	CE, TÜV SÜD	CE, UL, Ex, TÜV SÜD
	approx. 45 g	approx. 60 g	approx. 50 g
	IP 20	IP 20	IP 20
	www.beckhoff.com/EJ1914	www.beckhoff.com/EJ1918	www.beckhoff.com/KL1904

TwinSAFE | **Digital outputs**

	TwinSAFE, EtherCAT Terminal, 4 safe outputs	TwinSAFE Logic, EtherCAT plug-in module, 4 safe outputs
Technical data	**EL2904**	**EJ2914**
Connection technology	1-/2-wire	distribution board
Specification	output of output signals	link unit between safe input and output signals
Number of outputs	4	4
Max. output current	0.5 A (per channel), min. 20 mA (with active current measurement)	0.5 A
		
Protocol	TwinSAFE/Safety over EtherCAT	TwinSAFE/Safety over EtherCAT
Fault response time	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)
Current consumption power contacts	load-dependent	–
Current consumption E-bus	typ. 221 mA	typ. 260 mA
Current consumption K-bus	–	–
Installation position	horizontal	horizontal
Safety standard	DIN EN ISO 13849-1:2008 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)	EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)
Approvals	CE, UL, Ex, TÜV SÜD	CE, TÜV SÜD
Weight	approx. 100 g	approx. 47 g
Protection class	IP 20	IP 20
Further information	www.beckhoff.com/EL2904	www.beckhoff.com/EJ2914

	TwinSAFE Logic, EtherCAT plug-in module, 8 safe outputs	TwinSAFE, Bus Terminal, 4 safe outputs
	EJ2918	**KL2904**
		2-wire
		output of output signals
	8	4
	0.5 A	0.5 A/20 mA min. (per channel)
		
	TwinSAFE/Safety over EtherCAT	TwinSAFE/Safety over EtherCAT
	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)
	–	load-dependent
	typ. 310 mA	–
	–	250 mA
	horizontal	horizontal
	EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)	DIN EN ISO 13849-1:2008 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)
	CE, TÜV SÜD	CE, UL, Ex, TÜV SÜD
	approx. 62 g	approx. 100 g
	IP 20	IP 20
	www.beckhoff.com/EJ2918	www.beckhoff.com/KL2904

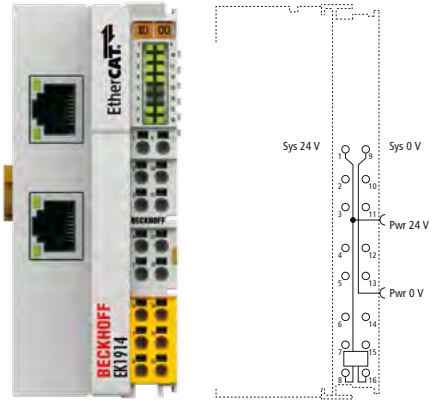
TwinSAFE | **Digital combi**

	TwinSAFE, EtherCAT Terminal, 4 safe inputs, 1 safe output, potential power supply terminal	TwinSAFE Logic, EtherCAT plug-in module, 8 safe inputs, 4 safe outputs
Technical data	**EL2911**	**EJ1957**
Connection technology	1-/2-wire and/or via power contacts	distribution board
Specification	link unit between safe input and output signals	
Number of inputs	4	8
Number of outputs	1	4
Max. output current	10 A	0.5 A
		
Protocol	TwinSAFE/Safety over EtherCAT	TwinSAFE/Safety over EtherCAT
Fault response time	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)
Current consumption power contacts	load-dependent	–
Current consumption E-bus	typ. 180 mA	typ. 330 mA
Installation position	horizontal	horizontal
Safety standard	EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)	EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)
Approvals	CE, TÜV SÜD	CE, TÜV SÜD
Weight	approx. 98 g	approx. 64 g
Protection class	IP 20	IP 20
Further information	www.beckhoff.com/EL2911	www.beckhoff.com/EJ1957

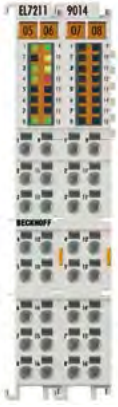
TwinSAFE | **E-bus coupler**

The EK1914 EtherCAT Coupler combines the functionalities of the EK1100 EtherCAT Coupler with standard and safe digital I/Os. This results in a compact design that is especially suitable for applications with a low number of I/Os.

Like the EK1100, the EK1914 can be extended by all EL/ES terminals. The EK1914 has four digital inputs and four digital outputs as well as two fail-safe inputs and two fail-safe outputs.

	TwinSAFE, EtherCAT Coupler, 4 standard inputs, 4 standard outputs, 2 safe inputs, 2 safe outputs
Technical data	**EK1914**
Connection technology	1-/2-wire
Specification	EtherCAT Coupler with standard and safety I/Os
Number of inputs	6 digital inputs, 2 of which are fail-safe inputs
Number of outputs	6 digital outputs, 2 of which are fail-safe outputs
Max. output current	per standard output: 0.5 A, per safe output: 0.5 A, min. 20 mA
	
Protocol	EtherCAT
Fault response time	≤ watchdog time
Current consumption power contacts	–
Current consumption E-bus	–
Installation position	horizontal
Safety standard	DIN EN ISO 13849-1:2008 (Cat. 4, PL e)
Approvals	CE, UL, TÜV SÜD
Weight	approx. 123 g
Protection class	IP 20
Further information	www.beckhoff.com/EK1914

STO/SS1 | Compact Drive Technology

	Servomotor terminal with OCT and STO, 50 V DC, 2.8 A (I_{rms})	Servomotor terminal with OCT and STO, 50 V DC, 4.5 A (I_{rms})	Servomotor terminal with OCT and STO, 50 V DC, 7…8 A (I_{rms}), for operation with the ZB8610 fan cartridge
Technical data	**EL7201-9014**	**EL7211-9014**	**EL7221-9014**
Technology	compact Drive Technology		
Function	servo drive in IP 20 for one drive axis		
Number of channels	1	1	1
Number of inputs	2 x end position, 1 x feedback, 1 x STO	2 x end position, 1 x feedback, 1 x STO	2 x end position, 1 x feedback, 1 x STO
Output current (rms)	2.8 A	4.5 A	7…8 A only with ZB8610
			
Realisation STO	hard-wired via safe output	hard-wired via safe output	hard-wired via safe output
Stop functions	Safe Torque Off (STO), Safe Stop 1 (SS1)	Safe Torque Off (STO), Safe Stop 1 (SS1)	Safe Torque Off (STO), Safe Stop 1 (SS1)
Protocol	EtherCAT	EtherCAT	EtherCAT
Fault response time	see documentation	see documentation	see documentation
Safety standard	DIN EN ISO 13849-1:2015 (Cat. 3, PL d)	DIN EN ISO 13849-1:2015 (Cat. 3, PL d)	DIN EN ISO 13849-1:2015 (Cat. 3, PL d)
Approvals	CE, UL, TÜV SÜD	CE, UL, TÜV SÜD	CE, UL, TÜV SÜD
Weight	approx. 60 g	approx. 95 g	approx. 95 g
Further information	www.beckhoff.com/EL7201-9014	www.beckhoff.com/EL7211-9014	www.beckhoff.com/EL7221-9014

We reserve the right to make technical changes.

	Servomotor module with OCT and STO, 50 V DC, 4.5 A (I_{rms})	Servomotor module with OCT, STO and TwinSAFE SC, 50 V DC, 4.5 A (I_{rms})	Stepper motor terminal 50 V DC, 5 A, with incremental encoder, vector control, STO	BLDC motor terminal with incremental encoder and STO, 50 V DC, 4.5 A (I_{rms})
	EP7211-9034	**EJ7211-9414**	**EL7047-9014**	**EL7411-9014**
	servo drive in IP 67 for one drive axis	servo drive in IP 20 for one drive axis	stepper motor output stage in IP 20 for one drive axis	BLDC motor output stage in IP 20 for one drive axis
	1	1	1	1
	2 x end position, 1 x feedback, 1 x STO	2 x end position, 1 x feedback, 1 x STO	2 x end position, 1 x feedback, 1 x STO	2 x end position, 1 x feedback, 1 x STO, 1 x fan diag, 3 x hall sensor
	4.5 A	4.5 A	–	4.5 A
	hard-wired via safe output	hard-wired via safe output	hard-wired via safe output	hard-wired via safe output
	Safe Torque Off (STO), Safe Stop 1 (SS1)	Safe Torque Off (STO), Safe Stop 1 (SS1)	Safe Torque Off (STO), Safe Stop 1 (SS1)	Safe Torque Off (STO), Safe Stop 1 (SS1)
	EtherCAT	EtherCAT	EtherCAT	EtherCAT
	see documentation	see documentation	see documentation	see documentation
	DIN EN ISO 13849-1:2015 (Cat. 3, PL d)	DIN EN ISO 13849-1:2015 (Cat. 3, PL d)	DIN EN ISO 13849-1:2015 (Cat. 3, PL d)	DIN EN ISO 13849-1:2015 (Cat. 3, PL d)
	CE, UL in preparation, TÜV SÜD (certification in preparation)	CE, UL, TÜV SÜD (certification in preparation)	CE, TÜV SÜD (certification in preparation)	CE, UL in preparation, TÜV SÜD (certification in preparation)
	approx. 440 g	approx. 95 g	approx. 90 g	approx. 95 g
	www.beckhoff.com/EP7211-9034	www.beckhoff.com/EJ7211-9414	www.beckhoff.com/EL7047-9014	www.beckhoff.com/EL7411-9014

Safe Motion | **Drive Technology**

	TwinSAFE drive option card for AX5000 up to 40 A, TwinSAFE: Safe Motion	TwinSAFE drive option card for AX5000 from 60 A, TwinSAFE: Safe Motion
Technical data	**AX5805-0000**	**AX5806-0000**
Technology	digital compact servo drives	
Function	option card	
Number of channels	1	1
Number of inputs	–	–
Output current (rms)	servo drives up to 40 A	servo drives from 60 A
Realisation STO	initiated by TwinSAFE Logic via FSoE	initiated by TwinSAFE Logic via FSoE
Stop functions	Safe Torque Off (STO), Safe Stop 1 (SS1), Safe Stop 2 (SS2), Safe Operating Stop (SOS)	Safe Torque Off (STO), Safe Stop 1 (SS1), Safe Stop 2 (SS2), Safe Operating Stop (SOS)
Safe position functions	Safely Limited Position (SLP), Safe CAM (SCA), Safely Limited Increment (SLI)	Safely Limited Position (SLP), Safe CAM (SCA), Safely Limited Increment (SLI)
Safe speed functions	Safe Speed Range (SSR), Safely Limited Speed (SLS), Safe Speed Monitor (SSM)	Safe Speed Range (SSR), Safely Limited Speed (SLS), Safe Speed Monitor (SSM)
Direction functions	Safe Direction positive (SDIp), Safe Direction negative (SDIn)	Safe Direction positive (SDIp), Safe Direction negative (SDIn)
Acceleration functions	Safe Maximum Acceleration (SMA), Safe Acceleration Range (SAR)	Safe Maximum Acceleration (SMA), Safe Acceleration Range (SAR)
Braking functions	–	–
Protocol	TwinSAFE/Safety over EtherCAT	TwinSAFE/Safety over EtherCAT
Fault response time	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)
Safety standard	EN ISO 13849-1:2006 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)	EN ISO 13849-1:2006 (Cat. 4, PL e) and EN 61508:2010 (SIL 3)
Approvals	CE, UL, TÜV SÜD	CE, UL, TÜV SÜD
Weight	approx. 75 g	approx. 75 g
Further information	www.beckhoff.com/AX5805	www.beckhoff.com/AX5806

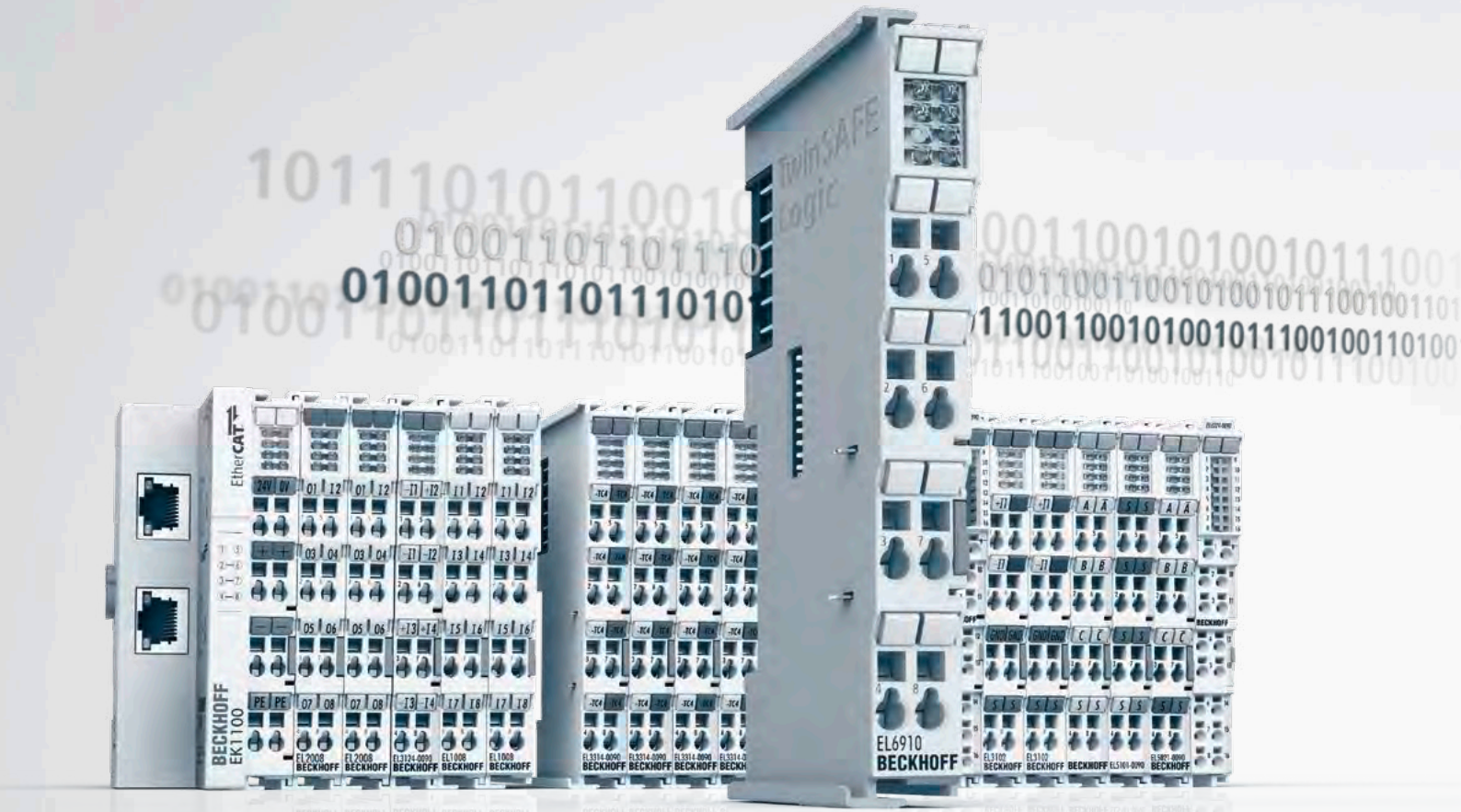
We reserve the right to make technical changes.

	Single-axis module, 8 A/18 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic	Double-axis module 2 x 6 A, feedback: OCT, TwinSAFE: Safe Motion, TwinSAFE Logic
	AX81xx-0200	**AX82xx-0200**
	multi-axis servo system	
	axis module with TwinSAFE Logic	
	1	2
	2 x digital inputs per channel (X15, X25)	2 x digital inputs per channel (X15, X25)
	AX8101: 8 A, AX8118: 18 A	2 x 6 A
	initiated by TwinSAFE Logic via FSoE or hard-wired via safe output	initiated by TwinSAFE Logic via FSoE or hard-wired via safe output
	Safe Torque Off (STO), Safe Stop 1 (SS1), Safe Stop 2 (SS2), Safe Operating Stop (SOS)	Safe Torque Off (STO), Safe Stop 1 (SS1), Safe Stop 2 (SS2), Safe Operating Stop (SOS)
	Safely Limited Position (SLP), Safe CAM (SCA), Safely Limited Increment (SLI)	Safely Limited Position (SLP), Safe CAM (SCA), Safely Limited Increment (SLI)
	Safe Speed Range (SSR), Safely Limited Speed (SLS), Safe Speed Monitor (SSM)	Safe Speed Range (SSR), Safely Limited Speed (SLS), Safe Speed Monitor (SSM)
	Safe Direction positive (SDIp), Safe Direction negative (SDIn)	Safe Direction positive (SDIp), Safe Direction negative (SDIn)
	Safe Maximum Acceleration (SMA), Safe Acceleration Range (SAR)	Safe Maximum Acceleration (SMA), Safe Acceleration Range (SAR)
	Safe Brake Control (SBC)	Safe Brake Control (SBC)
	TwinSAFE/Safety over EtherCAT	TwinSAFE/Safety over EtherCAT
	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)
	EN ISO 13849-1:2015 (Cat. 4, PL e) and IEC 61508:2010 (SIL 3)	EN ISO 13849-1:2015 (Cat. 4, PL e) and IEC 61508:2010 (SIL 3)
	CE, UL in preparation, TÜV SÜD	CE, UL in preparation, TÜV SÜD
	AX8108: 2.0 kg, AX8118: 2.5 kg	approx. 2.0 kg
	www.beckhoff.com/AX81xx	www.beckhoff.com/AX82xx

STO/SS1 | Drive Technology

	TwinSAFE drive option card for AX5000 up to 40 A, TwinSAFE: STO/SS1	Single-axis module, 8 A/18 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic	Double-axis module 2 x 6 A, feedback: OCT, TwinSAFE: STO/SS1, TwinSAFE Logic
Technical data	**AX5801-0200**	**AX81xx-0100**	**AX82xx-0100**
Technology	digital compact servo drives	multi-axis servo system	
Function	option card	axis module with TwinSAFE Logic	
Number of channels	1	1	2
Number of inputs	1 x STO (2 channel), 1 x feedback loop	2 x digital inputs per channel (X15, X25)	2 x digital inputs per channel (X15, X25)
Output current (rms)	–	AX8101: 8 A, AX8118: 18 A	2 x 6 A
Realisation STO	hard-wired via safe output	initiated by TwinSAFE Logic via FSoE or hard-wired via safe output	initiated by TwinSAFE Logic via FSoE or hard-wired via safe output
Stop functions	Safe Torque Off (STO), Safe Stop 1 (SS1)	Safe Torque Off (STO), Safe Stop 1 (SS1)	Safe Torque Off (STO), Safe Stop 1 (SS1)
Protocol	–	TwinSAFE/Safety over EtherCAT	TwinSAFE/Safety over EtherCAT
Fault response time	–	≤ watchdog time (parameterisable)	≤ watchdog time (parameterisable)
Safety standard	ISO 13849-1:2006 (Cat. 4, PL e) and IEC 61508 (ed.2) (SIL 3)	EN ISO 13849-1:2015 (Cat. 4, PL e) and IEC 61508:2010 (SIL 3)	EN ISO 13849-1:2015 (Cat. 4, PL e) and IEC 61508:2010 (SIL 3)
Approvals	CE, UL, TÜV SÜD	CE, UL in preparation, TÜV SÜD	CE, UL in preparation, TÜV SÜD
Weight	approx. 85 g	AX8108: 2.0 kg, AX8118: 2.5 kg	approx. 2.0 kg
Further information	www.beckhoff.com/AX5801	www.beckhoff.com/AX81xx	www.beckhoff.com/AX82xx

We reserve the right to make technical changes.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1100110010100101110010011010
TwinSAFE Logic
EL6910
BECKHOFF
EK1100
EtherCAT

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- Support in all matters of after-sales service
- Worldwide training for Beckhoff system components

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574 Support, Service
575 Training

576 **TwinCAT 3 Training**

Basics
576 Maintenance, repairs and service TR3010, TR3012
576 Basic PLC programming TR3020
577 PLC basics, NC PTP, ADS TR3030
577 How to switch from TC2 to TC3 TR3040

Extended
577 C++ module creation, wizards, TMC editor TR3042
577 Object-oriented programming with the PLC TR3044

Motion Control
578 NC Point-to-Point TR3050
578 NC Point-to-Point and NC Interpolation TR3052
578 CNC TR3054
579 Beckhoff XTS – eXtended Transport System TR3056

Advanced
579 Basic training: TwinSAFE Terminals TR3060
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579 Extended training: TwinSAFE Terminals TR3064
580 TwinSAFE: Servicing and maintenance TR3066
580 OPC UA TR3072
580 EtherCAT TR3076
580 Automation Interface TR3080

Building Automation
581 Fieldbus systems in building automation programming TR5041
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HMI
582 Basics TwinCAT HMI TR7050
582 Add-on TwinCAT HMI Controls TR7060
582 Add-on TwinCAT HMI Server Extension TR7065

583 **TwinCAT 2 Training**

Basics
583 Compact programming TR1000
583 Programming for those switching from PLCs TR1020
583 Maintenance, repairs and service TR1010, TR1012

Motion Control
584 NC Point-to-Point TR2020
584 NC Point-to-Point and NC Interpolation TR2030

Building Automation
584 Basic course in building automation for electricians TR5010, TR5012
584 BACnet training: Basics of BACnet communication TR5030

Advanced
585 TwinSAFE TR8010
585 TwinSAFE AX5805 drive option card TR8011
585 TwinSAFE: Servicing and maintenance TR8016
585 EtherCAT TR8020

585 **Individual**

Support, Service

▶ **www.beckhoff.com/support**

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- training program for Beckhoff system components

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▶ **www.beckhoff.com/training**

Beckhoff offers a comprehensive training program worldwide for Beckhoff system components. The training takes place at training centres at the headquarters in Germany or at the Beckhoff subsidiaries. Please contact the appropriate companies in your country with regard to training with the partner firms around the world. For addresses see page 12

TwinCAT 3 Training

TR3010, TR3012 | **Maintenance, repairs and service**

Information	TR3010	TR3012
Content	TwinCAT PLC: introduction to TwinCAT eXtended Automation Technology (XAT); TwinCAT system architecture: configuration and diagnostics, basics of IEC 61131-3 programming; TwinCAT NC PTP: basics of axis commissioning and Motion Control blocks	same as TR3010, additionally overview of Structured Text programming
Requirements	sound knowledge of basic Windows functionalities; basics of PLC systems	
Duration	4 days	5 days
Further information	www.beckhoff.com/TR3010	www.beckhoff.com/TR3012

TR3020 | **Basic PLC programming**

Information	TR3020
Content	basic PLC principles: introduction to TwinCAT eXtended Automation Technology (XAT); eXtended Automation Engineering environment (XAE), Microsoft Visual Studio® integration; hardware configuration; IEC 61131-3 programming; FBD and ST editors; basic principles of ADS communication; TwinCAT NC PTP: basis of axis commissioning, motion control function blocks, TcMC2 library
Requirements	sound knowledge of PLC programming; no prior knowledge of TwinCAT 2 or IEC 61131-3 is necessary
Duration	5 days
Further information	www.beckhoff.com/TR3020

TR3030 | PLC basics, NC PTP, ADS

Information	TR3030
Content	TwinCAT PLC: introduction to TwinCAT eXtended Automation Technology (XAT), eXtended Automation Engineering environment (XAE), Microsoft Visual Studio® integration, hardware configuration, IEC 61131-3 programming, FBD and ST editors, TwinCAT NC PTP: principles of axis commissioning, motion control components: TcMC2 library, basics in ADS communication, ADS: communication interface, high-level language link
Requirements	sound knowledge of PLC or high-level language concepts such as declaration of variables, variable classes and structures; no prior knowledge of TwinCAT 2 is necessary
Duration	5 days
Further information	www.beckhoff.com/TR3030

TR3040 | How to switch from TC2 to TC3

Information	TR3040
Content	TwinCAT PLC: introduction to TwinCAT eXtended Automation Technology (XAT), eXtended Automation Engineering environment (XAE), Microsoft Visual Studio® integration, basic differences between TC2 and TC3, principles of object-oriented programming in the PLC, integration of TcCOM modules, MATLAB®/Simulink®, C/C++
Requirements	sound knowledge of TwinCAT 2 programming; basics of high-level language programming
Duration	2 days
Further information	www.beckhoff.com/TR3040

TR3042 | C++ module creation, wizards, TMC editor

Information	TR3042
Content	TwinCAT PLC: TwinCAT architecture, TwinCAT XAE (Engineering) and XAR (Runtime), opportunities and limitations of C++ programming in the TwinCAT 3 real-time environment, requirements on the development PC; TwinCAT Class Wizard: creating and debugging examples, TwinCAT TMC editor, real-time settings, task configuration multi-core support, consolidation of the above topics using practical examples
Requirements	sound knowledge of the C++ programming language
Duration	2 days
Further information	www.beckhoff.com/TR3042

TR3044 | Object-oriented programming with the PLC

Information	TR3044
Content	introduction to OOP, keywords of IEC 61131-3 3rd edition, implementation of a PLC example in a FB with OOP elements, inheritance, overwrite, interfaces
Requirements	sound knowledge of PLC programming with TwinCAT 3, training contents of TR3030
Duration	1 day
Further information	www.beckhoff.com/TR3044

TR3050 | **NC Point-to-Point**

Information	TR3050
Content	operation of TwinCAT NC: functional plan, operating modes; NC control with NC MC2 library, cyclic interface, axis function blocks; TwinCAT Measurement: recording of set value profiles; programming examples; TwinCAT cam plates and MC function blocks for cam plate functionality
Requirements	assured handling of TwinCAT 3 PLC programming; solid knowledge of PLC programming; level of knowledge corresponding to courses TR3020/TR3030, or corresponding experience in IEC 61131-3 programming; programming languages: ST
Duration	2 days
Further information	www.beckhoff.com/TR3050

TR3052 | **NC Point-to-Point and NC Interpolation**

Information	TR3052
Content	TwinCAT NC PTP: same as TR3050 without cam plates; TwinCAT NC I: creation of interpolation channels for single axes, creating CNC programs in accordance with DIN 66025, sequential control with the System Manager, PLC libraries for creating NC channels and for controlling the interpreter, sequential control from the PLC, communication between NC and PLC program (M functions), exchange of parameters between NC program and PLC (H, S and T), set value path monitoring with TwinCAT Scope
Requirements	assured handling of TwinCAT PLC programming; solid knowledge of PLC programming; level of knowledge corresponding to courses TR3020/TR3030, or corresponding experience in IEC 61131-3 programming; programming languages: ST
Duration	3 days
Further information	www.beckhoff.com/TR3052

TR3054 | **CNC**

Information	TR3054
Content	introduction to TwinCAT CNC, creating and processing CNC configurations in the System Manager, creating NC programs compliant with DIN 66025 and extensions of the CNC kernel, operating CNC interfaces via structures in the PLC, data and communication exchange between PLC and CNC using M functions and V. E. variables, recording and displaying CNC quantities using ScopeView, system diagnostics facilities, operation and use of the "HLI" (high level interface), kinematic transformations, commissioning of servo drives using the CNC
Requirements	basics of programming and automation technology using TwinCAT; familiarity with TwinCAT 3 system configuration and programming; in-depth knowledge of PLC programming; contents of the courses TR3030/TR3020, or equivalent experience of IEC 61131-3 programming (we recommend advanced TwinCAT 2 users to first take the course "TR3040 | How to switch from TC2 to TC3" as a basis); ST programming language
Duration	2 days
Further information	www.beckhoff.com/TR3054

TR3056 | **Beckhoff XTS – eXtended Transport System**

Information	TR3056
Content	presentation of the XTS system: mechanical structure, initial commissioning, module diagnostics; integration of the TcloXts TcCOM module; configuration with the help of the XTS wizard; encoder system teaching procedure, error diagnostics; introduction and tuning of the TcSoftDrive, introduction to the TC3 XTS extension (automatic accumulation and collision avoidance); diagnostic options
Requirements	confidence in dealing with TwinCAT 3 NC PTP; solid knowledge of PLC programming; knowledge level of the TR3020/ TR3030 courses; programming languages: ST and Sequential Function Chart
Duration	2 days
Further information	www.beckhoff.com/TR3056

TR3060 | **Basic training: TwinSAFE Terminals**

Information	TR3060
Content	introduction to the TwinSAFE system, integration of TwinSAFE Terminals, development of a TwinSAFE project, overview of the TwinSAFE function blocks
Requirements	experience in handling of TwinCAT 3 software, experience in dealing with EtherCAT
Duration	1 day
Further information	www.beckhoff.com/TR3060

TR3061 | **TwinSAFE AX5805 drive option card**

Information	TR3061
Content	overview of the functions of the AX5805 option card, development of an example project, configuration of the option card
Requirements	experience in handling of TwinCAT 3 software, experience in TwinCAT NC PTP, training contents of TR3060, experience in TwinSAFE Terminals
Duration	1 day
Further information	www.beckhoff.com/TR3061

TR3064 | **Extended training: TwinSAFE Terminals**

Information	TR3064
Content	presentation of new analog function blocks; TwinSAFE SC; group parameterisation, replacement values and deactivation; user management
Requirements	experience in handling TwinCAT 3 software, experience in dealing with EtherCAT, training contents TR3060
Duration	1 day
Further information	www.beckhoff.com/TR3064

We reserve the right to make changes.

TR3066 | **TwinSAFE: Servicing and maintenance**

Information	TR3066
Content	introduction to the EtherCAT bus system; diagnostics and service; introduction to the TwinSAFE system; development of a TwinSAFE project; diagnostics of the TwinSAFE system; hardware exchange service case
Requirements	training contents TR3010/TR3012
Duration	2 days
Further information	www.beckhoff.com/TR3066

TR3072 | **OPC UA**

Information	TR3072
Content	overview and benefits of OPC Unified Architecture (OPC UA); basic components of TF6100 TC3 OPC UA; operating principle of the TwinCAT OPC UA Server (architecture, configuration, symbol files, communication patterns, security, setup scenarios); operating principle of the TwinCAT OPC UA Configurator (architecture, online panel, diagnostics, certificate management); operating principle of the TwinCAT OPC UA Client (architecture, function blocks of the PLCopen_Opc_Ua library, read/write workflow, MethodCall workflow, security)
Requirements	knowledge of handling the TwinCAT system is required, such as I/O configuration, PLC handling, linking of PLC variables
Duration	1 day
Further information	www.beckhoff.com/TR3072

TR3076 | **EtherCAT**

Information	TR3076
Content	EtherCAT basics, diagnostics, Hot Connect, XFC, redundancy, simulation
Requirements	knowledge of handling the TwinCAT 3 software
Duration	1 day
Further information	www.beckhoff.com/TR3076

TR3080 | **Automation Interface**

Information	TR3080
Content	basic functions of the TwinCAT Automation Interface (combination of two technologies: Visual Studio® and TwinCAT XAE, adding TwinCAT configurations); using TwinCAT I/O functions (adding I/O devices, managing I/O templates); using TwinCAT PLC functions (adding PLC projects, adding POUs, modifying PLC program code, managing libraries, placeholders and repositories); using TwinCAT TcCOM functions (adding and parameterising TcCOM modules); using TwinCAT measurement functions (adding TwinCAT measurement projects, adding and parameterising charts, axes and channels); mapping between I/O, PLC and TcCOM modules
Requirements	knowledge of handling the TwinCAT system is required, such as I/O configuration, PLC handling, linking of PLC variables
Duration	1 day
Further information	www.beckhoff.com/TR3080

We reserve the right to make changes.

TR5041 | **Fieldbus systems in building automation programming**

Information	TR5041
Content	TwinCAT PLC: TwinCAT handling, IEC 61131-3 programming; TwinCAT ADS: communication interface, high-level language communication; introduction to the communication between TwinCAT control systems; introduction to building fieldbus systems and programming concepts; network analysis with Wireshark; functions in room automation
Requirements	assured handling of Windows operating systems, experience in PLC programming
Duration	5 days
Further information	www.beckhoff.com/TR5041

TR5042 | **Connectivity in building automation programming**

Information	TR5042
Content	TwinCAT PLC: TwinCAT handling, IEC 61131-3 programming; TwinCAT ADS: communication interface, high-level language communication; introduction to the communication between TwinCAT control systems; introduction to building automation protocols and libraries; basic knowledge of the Modbus/RTU, Modbus/TCP and M-Bus communication protocols; network analysis with Wireshark; programming of building automation functions with the HVAC library
Requirements	assured handling of Windows operating systems, basic knowledge of PLC systems
Duration	5 days
Further information	www.beckhoff.com/TR5042

TR5050 | **Building automation programming with BACnet and TwinCAT HMI**

Information	TR5050
Content	TwinCAT PLC: TwinCAT handling, IEC 61131-3 programming; TwinCAT ADS: communication interface, high-level language communication; introduction to the communication between TwinCAT control systems; BACnet basics and possible implementation scenarios; BACnet basics in the TwinCAT 3 development environment; getting to know the TC3 BA TwinCAT Library
Requirements	assured handling of Windows operating systems, experience in PLC programming, knowledge of PLC programming with high-level languages, such as e.g. variable declaration, variable classes and structures, basic knowledge of BACnet
Duration	5 days
Further information	www.beckhoff.com/TR5050

TR7050 | **Basics TwinCAT HMI**

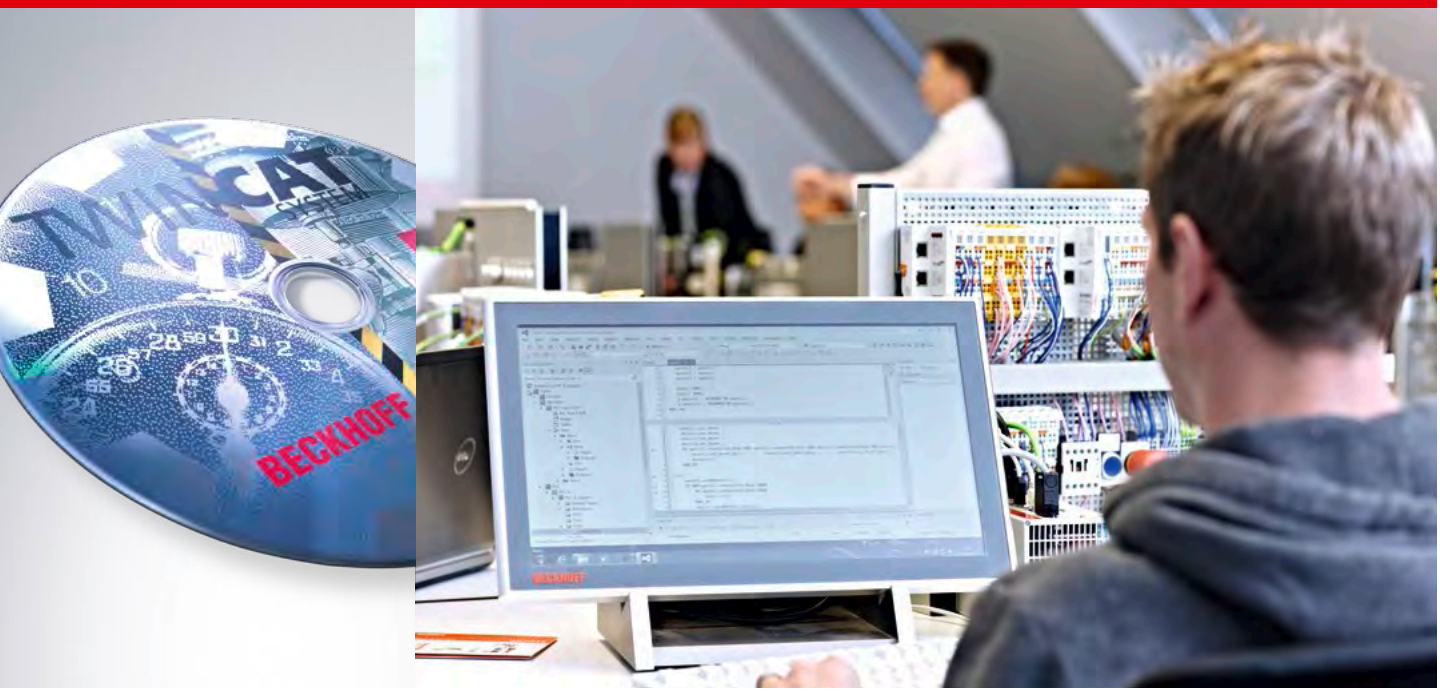
Information	TR7050
Content	presentation of the system architecture; introduction to the development environment of TE2000 TC3 HMI; page switching and navigation; language and unit switching; creation of user controls; creation of specific themes; administration of alarms and messages; administration of users and groups; historical data and trend charts; responsive and fluid design; brief introduction to programming interfaces; presentation of diagnostic options; transfer of HMI to TF2000 TC3 HMI Server; configuration of TF2000 TC3 HMI Server
Requirements	assured handling of Windows operating systems
Duration	3 days
Further information	www.beckhoff.com/TR7050

TR7060 | **Add-on TwinCAT HMI Controls**

Information	TR7060
Content	HTML, CSS and JavaScript basics; introduction to framework API; creation of individual framework controls; introduction to package management; integration of external libraries
Requirements	assured handling of Windows operating systems; experience with high-level languages; experiences with HTML, CSS and JavaScript are of advantage; contents of TR7050
Duration	1 day
Further information	www.beckhoff.com/TR7060

TR7065 | **Add-on TwinCAT HMI Server Extension**

Information	TR7065
Content	presentation of TF2000 TC3 HMI Server; introduction to TF2200 TC3 HMI Server Extension SDK; creation of an individual server extension in C# .NET; introduction to package management; enhancement of the extension with a settings page, messages and individual error codes; integration of external libraries
Requirements	assured handling of Windows operating systems; experience with high-level languages; experiences with C# .NET are of advantage; contents of TR7050
Duration	1 day
Further information	www.beckhoff.com/TR7065



TwinCAT 2 Training

TR1000 | **Compact programming**

Information	TR1000
Content	TwinCAT PLC: TwinCAT handling, IEC 61131-3 programming; TwinCAT NC PTP: basics of axis commissioning; TwinCAT ADS: communication interface, high-level language communication
Requirements	sound knowledge of Windows operating systems; experience in PLC programming; knowledge of PLC or high-level language concepts such as declaration of variables, variable classes and structures
Duration	5 days
Further information	www.beckhoff.com/TR1000

TR1020 | **Programming for those switching from PLCs**

Information	TR1020
Content	TwinCAT PLC: TwinCAT handling, IEC 61131-3 programming; TwinCAT NC PTP: basics of axis commissioning
Requirements	sound knowledge of Windows operating systems; experience in PLC programming
Duration	5 days
Further information	www.beckhoff.com/TR1020

TR1010, TR1012 | **Maintenance, repairs and service**

Information	TR1010	TR1012
Content	TwinCAT PLC: TwinCAT handling, commissioning, IEC 61131-3 programming; TwinCAT NC PTP: basics of axis commissioning; TwinCAT ScopeView for diagnostics	same as TR1010, additionally overview of Structured Text programming
Requirements	sound knowledge of Windows basic functionalities; handling of PLC systems, such as logging in and out, saving PLC programmes, etc.	
Duration	4 days	5 days
Further information	www.beckhoff.com/TR1010	www.beckhoff.com/TR1012

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TR2020 | **NC Point-to-Point**

Information	TR2020
Content	operation of TwinCAT NC: functional plan, operating modes; NC control with NC MC2 library, cyclic interface, axis function blocks; TwinCAT ScopeView: recording of set value profiles; programming examples; TwinCAT cam plates and MC function blocks for cam plate functionality
Requirements	assured handling of TwinCAT PLC programming; solid knowledge of PLC programming; level of knowledge corresponding to courses TR1000/TR1020, or corresponding experience in IEC 61131-3 programming; programming languages: ST, Structured Text
Duration	2 days
Further information	www.beckhoff.com/TR2020

TR2030 | **NC Point-to-Point and NC Interpolation**

Information	TR2030
Content	TwinCAT NC PTP: same as TR2020 without cam plates; TwinCAT NC I: creation of interpolation channels for single axes, creating NC programs in accordance with DIN 66025, sequential control with the System Manager, PLC libraries for creating NC channels and for controlling the interpreter, sequential control from the PLC, communication between NC program and PLC program (M functions), exchange of parameters between NC program and PLC (H, S and T), set value path monitoring with TwinCAT Scope
Requirements	assured handling of TwinCAT PLC programming, solid knowledge of PLC programming, level of knowledge corresponding to courses TR1000/TR1020 or corresponding experience in IEC 61131-3 programming, programming languages: ST
Duration	3 days
Further information	www.beckhoff.com/TR2030

TR5010, TR5012 | **Basic course in building automation for electricians**

Information	TR5010	TR5012
Content	TwinCAT PLC: TwinCAT handling, overview of IEC 61131-3; handling Embedded PC CX; building automation library	same as TR5010, additionally overview of Structured Text programming
Requirements	sound knowledge of Windows operating systems	
Duration	3 days	4 days
Further information	www.beckhoff.com/TR5010	www.beckhoff.com/TR5012

TR5030 | **BACnet training: Basics of BACnet communication**

Information	TR5030
Content	BACnet – the idea of an open standard for building automation; BACnet network media (data link layer); BACnet objects, structure and areas of application; services for data processing; alarms in BACnet; calendar and timer functions; logging objects (trendlog, eventlog); device and network management; analysis tools, diagnostic options; planning and tendering; BACnet certificate: what are the key issues?; Common directives and customer requirements for BACnet projects: What is required?; PICS, BIBBS – How is interoperability specified?; Integration of BACnet/IP in IT infrastructures; current status of BACnet for IPv4; IPv6 outlook; BBMD – area of use and application; MS/TP – The BACnet master/slave fieldbus; outlook on future developments: Web services, new objects, CSML
Requirements	beginner's seminar; no special knowledge required
Duration	2 days
Further information	www.beckhoff.com/TR5030

TR8010 | TwinSAFE

Information	TR8010
Content	integration of TwinSAFE Terminals, handling the TwinSAFE configurator, using the TwinSAFE library
Requirements	experience in handling TwinCAT software
Duration	1 day
Further information	www.beckhoff.com/TR8010

TR8011 | TwinSAFE AX5805 drive option card

Information	TR8011
Content	overview of the AX5805 option card functions, development of an example project, configuration of the option card
Requirements	experience in handling of TwinCAT software, experience in TwinCAT NC PTP, training contents of TR8010 or experience in TwinSAFE Terminals
Duration	1 day
Further information	www.beckhoff.com/TR8011

TR8016 | TwinSAFE: Servicing and maintenance

Information	TR8016
Content	introduction to the EtherCAT bus system; diagnostics and service; introduction to the TwinSAFE system; development of a TwinSAFE project; diagnostics of the TwinSAFE system; hardware exchange service case
Requirements	training contents TR1010/TR1012
Duration	2 days
Further information	www.beckhoff.com/TR8016

TR8020 | EtherCAT

Information	TR8020
Content	EtherCAT basics, configuration in the System Manager, EtherCAT diagnostics (topology view, emergency scan), oversampling terminals
Requirements	experience in handling of TwinCAT software
Duration	1 day
Further information	www.beckhoff.com/TR8020

TR1900 | TwinCAT Training: Individual

Information	TR1900
Content	agreed upon with the customer
Requirements	agreed upon with the customer
Duration	by arrangement
Further information	www.beckhoff.com/TR1900

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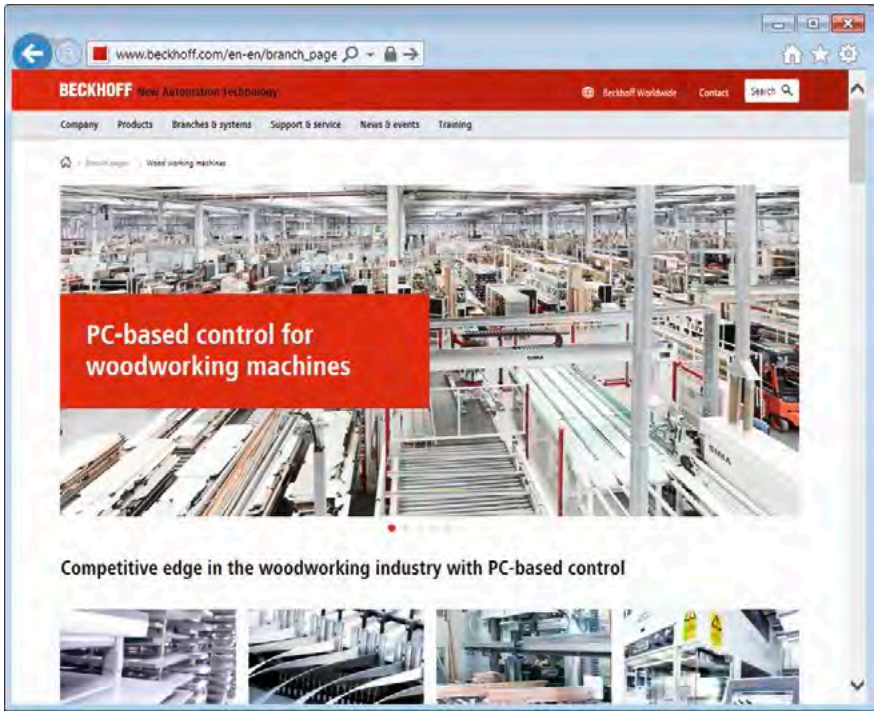

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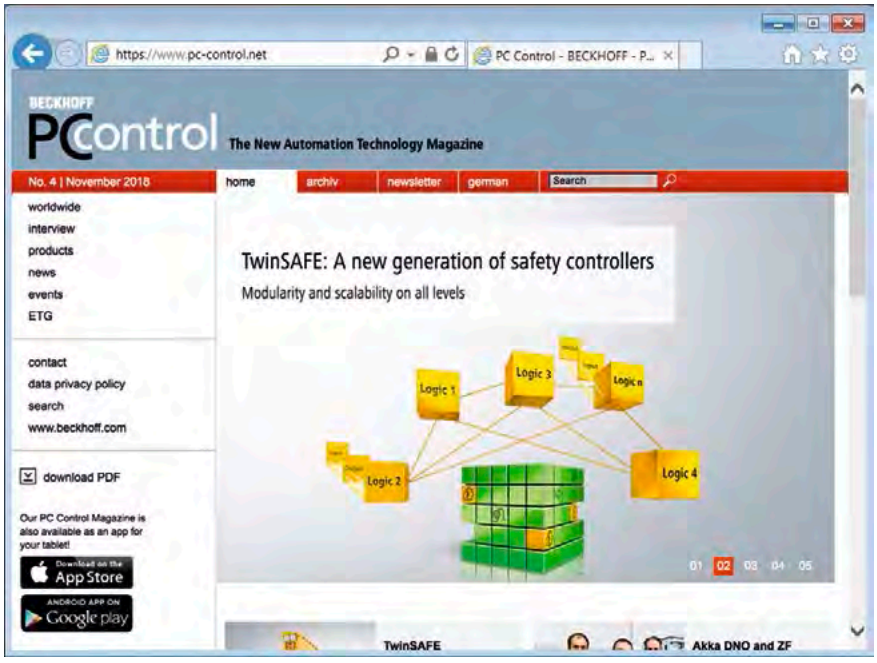

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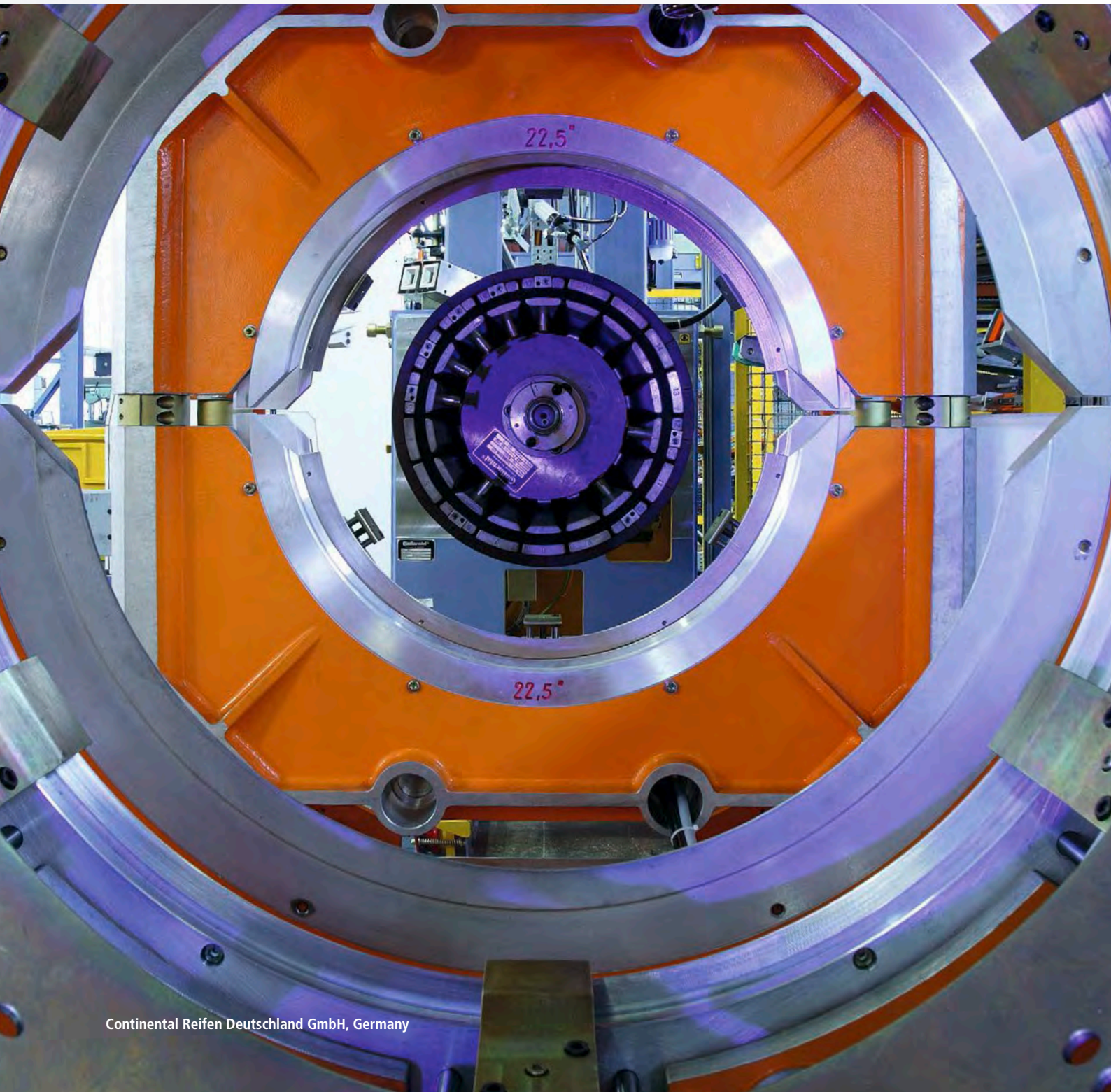
In use worldwide:
PC-based Control.



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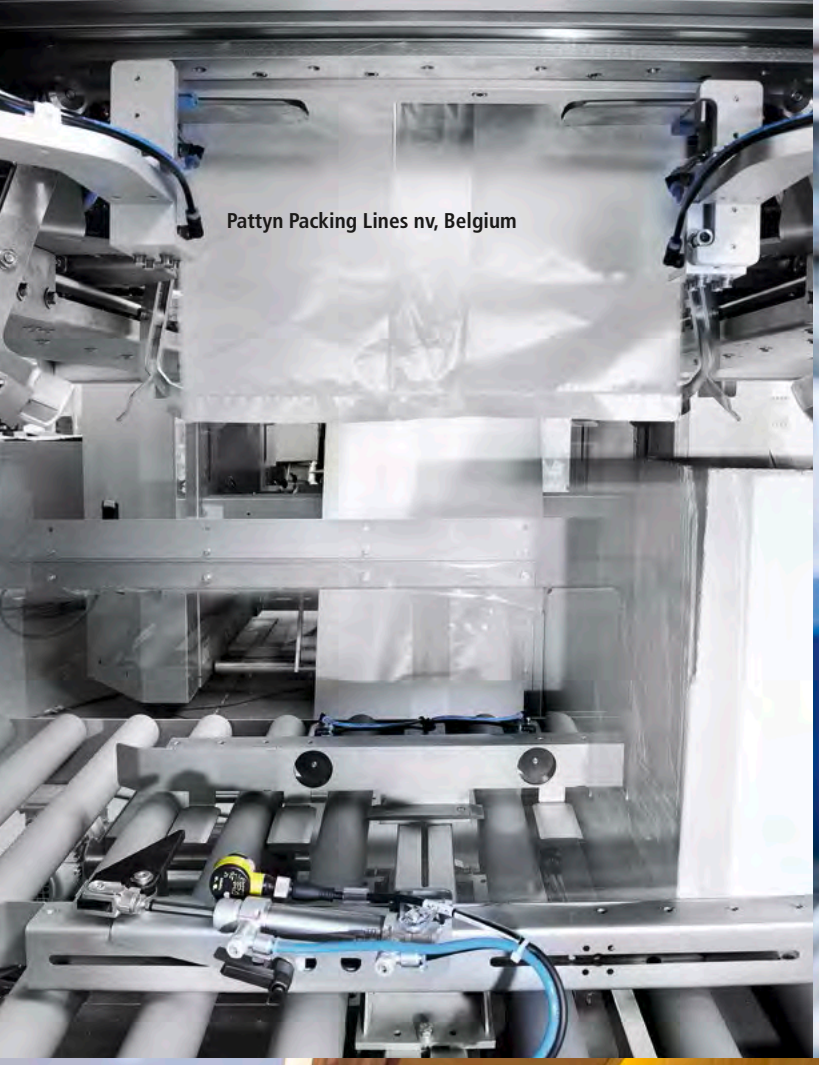

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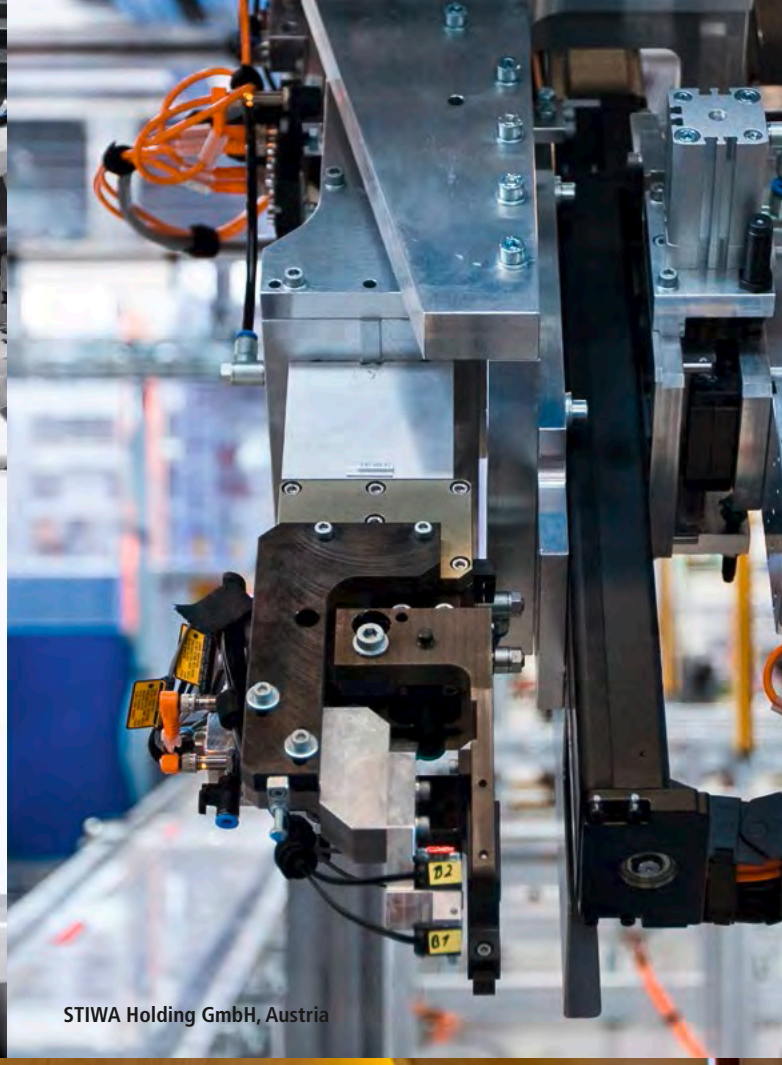

STIWA Holding GmbH, Austria

Jilin City People's Grand Theatre, China

International units | Measures, weights and temperature

Linear measures	
1 inch (in)	25.4 mm
1 foot (ft)	30.48 cm

Square measures	
1 square inch (sq in)	6.4516 cm^2
1 square foot (sq ft)	0.09290306 m^2

Weights	
1 pound (lb)	453.59237 g
1 ounce (oz)	28.3495 g

Fahrenheit (°F)	Celsius (°C)
$t_F = 9/5 * t_C+32$	$t_C = 5/9 * (t_F-32)$

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Beckhoff Main Catalogs 2019

Volume 1

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