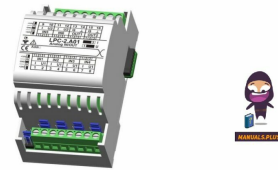


SMARTEH LPC-3.GOT.012 Longo Programmable Controller



SMARTEH LPC-3.GOT.012 Longo Programmable Controller User Manual

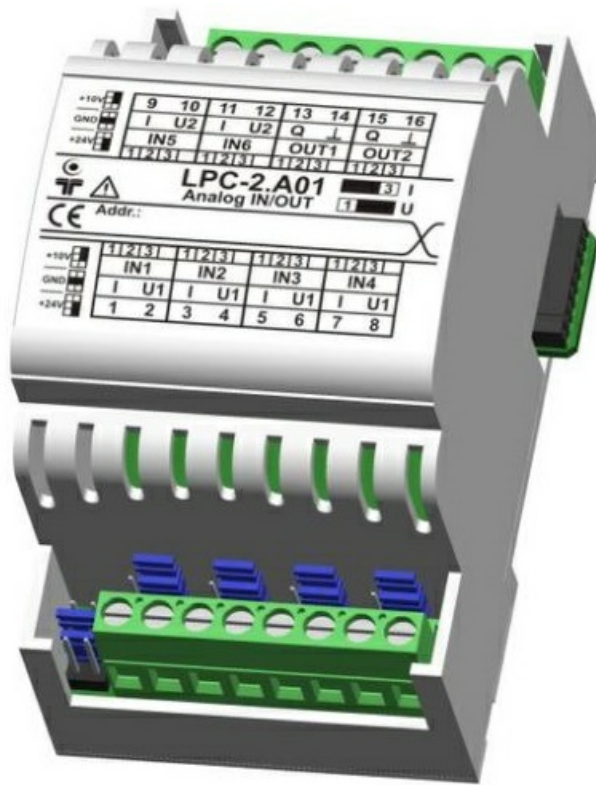
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SMARTEH LPC-3.GOT.012 Longo Programmable Controller



Product Usage Instructions

Installation

- Before installation, ensure that all safety standards and provisions of the operating country are considered.
- Installation on a 100-230 V AC network should only be done by authorized personnel.
- Follow the mounting instructions provided in the manual to set up the device securely.

Connection & Configuration

- Refer to the block diagram and input/output connection interfaces sections for proper connection setup.
- Follow the main connection scheme and configuration guide to establish connectivity.

Programming

- Explore the basic functionalities of the Longo programmable controller as outlined in the programming guide.
- Configure WiFi settings and design graphical user interfaces using the provided instructions.

Maintenance

- Regularly check for moisture, dirt, and damage to ensure optimal performance.
- Handle spare parts carefully when needed and refer to the module labelling for identification.

FAQ

- **Q:** Can I operate the Longo programmable controller without proper authorization?
- **A:** No, operating on a 100-230 V AC network should be done by authorized personnel only to ensure safety.

- **Q:** How do I configure WiFi on the Longo programmable controller?
- **A:** Follow the WiFi configuration section in the programming guide for step-by-step instructions on setting up WiFi.
- **Q:** What should I do if I encounter moisture or dirt on the device?
- **A:** Immediately disconnect the device and clean it as per the maintenance instructions to prevent damage.

Longo programmable controller LPC-3.GOT.012

- **STANDARDS AND PROVISIONS:** Standards, recommendations, regulations and provisions of the country in which the devices will operate, must be considered while planning and setting up electrical devices. Work on 100 .. 230 V AC network is allowed for authorized personnel only.
- **DANGER WARNINGS:** Devices or modules must be protected from moisture, dirt and damage during transport, storage and operation.
- **WARRANTY CONDITIONS:** For all modules LONGO LPC-3 – if no modifications are performed upon and are correctly connected by authorized personnel – in consideration of the maximum allowed connecting power, a warranty of 24 months is valid from the date of sale to the end buyer, but not more than 36 months after delivery from Smarteh. In case of claims within warranty time, which are based on material malfunctions the producer offers free replacement. The method of return of the malfunctioned module, together with the description, can be arranged with our authorized representative. Warranty does not include damage due to transport or because of unconsidered corresponding regulations of the country, where the module is installed.



- This device must be connected properly by the provided connection scheme in this manual. Misconnections may result in device damage, fire or personal injury.



- Hazardous voltage in the device can cause electric shock and may result in personal injury or death.



- **NEVER SERVICE THIS PRODUCT YOURSELF!**
- This device must not be installed in systems critical for life (e.g. medical devices, aircraft, etc.).
- If the device is used in a manner not specified by the manufacturer, the degree of protection provided by the equipment may be impaired.



- Waste electrical and electronic equipment (WEEE) must be collected separately!
- LONGO LPC-3 complies with the following standards:
- EMC: EN 55032:2012, EN 55035:2017, EN 61000-3-2:2014, 61000-3-3:2013
- LVD: IEC 61010-1:2010 (3rd Ed.), IEC 61010-2-201:2013 (1st Ed.)

Smarteh d.o.o. operates a policy of continuous development. Therefore we reserve the right to make changes and improvements to any of the products described in this manual without any prior notice.

ABBREVIATIONS

SOM	System on module
ARM	Advanced RISC machines
OS	Operating system
TCP	Transmission control protocol
SSL	Secure sockets layer
IEC	International electrotechnical commission
CAN	Controller area network
COM	Communication
USB	Universal serial bus
USB OTG	Universal serial bus On the go
PLC	Programmable logic controller
LED	Light emitting diode
RAM	Random access memory
NV	Non volatile
PS	Power supply
GUI	Graphical user interface
RTU	Remote terminal unit
RTC	Real time clock
IDE	Integrated development environment
FBD	Function block diagram
LD	Ladder diagram
SFC	Sequential function chart
ST	Structured text
IL	Instruction list

DESCRIPTION

SmarteH LPC-3.GOT.012 PLC-based graphical operation terminal offers improved performance and a wide range of new features within a single compact SOM-based package. The graphical operation terminal based on an ARM architecture processor running a Linux-based OS adds more computing power, more control, and additional interface connection offering capability for future core SOM module upgrades without hardware changes. LPC-3.GOT.012 has an integrated USB programming and debugging port, connection for Smarteh intelligent peripheral modules, Ethernet port and WiFi connectivity that can be used as a programming and debugging port, as a Modbus TCP/IP Master and/or Slave device, and as BACnet IP (B-ASC). LPC-3.GOT.012 is also equipped with an RS-485 port for Modbus RTU Master or Slave communication with other Modbus RTU equipment. Hardware configuration is done using Smarteh IDE programming software, used to select the required graphical operation terminal.

This software provides you with a simple entry in the IEC programming languages such as:

- Instruction List (IL)
- Function Block Diagram (FBD)
- Ladder Diagram (LD)
- Structured Text (ST)
- Sequential Function Chart (SFC)

This provides a large number of operators such as:

- Logic operators such as AND, OR, ...
- Arithmetic operators such as ADD, MUL, ...
- Comparison operators such as <, =, >
- Other ...

Programming software is used to create, debug, test and document a project. Functions for analog processing, closed-loop control and function blocks such as timers and counters simplify programming. Smarteh IDE programming software also provides you with a simple entry in the GUI design tool supports a large set of dynamic controls from buttons to indicators and enables connectivity between the PLC program and the graphical user interface.

FEATURES



Table 1: Features

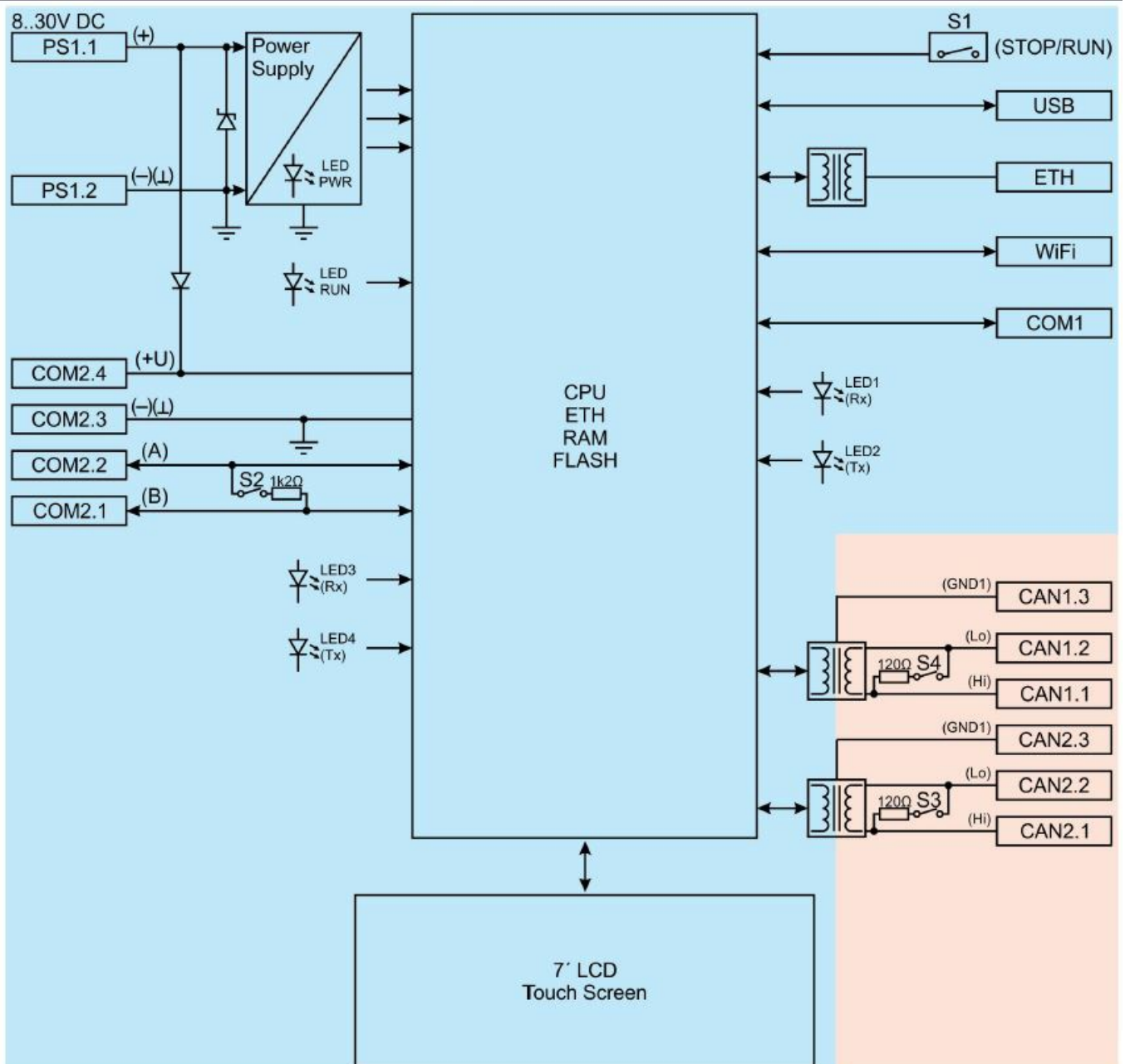
- Frameless glass screen with 7" LCD and capacitive touch screen, landscape or portrait orientation
- Real-Time Linux OS ARM-based main module
- The graphical interface is freely designed by the user with a GUI editor in SmartehIDE software
- Ethernet & WiFi connectivity for debugging and application transfer, Modbus TCP/IP Slave (server) and/or Master (client) functionality, BACnet IP (B-ASC), web server and SSL certificate
- USB port for debugging and application transfer, USB OTG
- Modbus RTU Master or Slave
- Smarteh bus for connection with LPC-2 Smarteh intelligent peripheral modules

- Remote access and application transfer
- 2 galvanic isolated (2500 V DC) CAN port – one for master, one for slave
- RTC and 512 kB NV RAM with supercapacitor for needed energy storage
- Micro SD Card slot
- Built-in buzzer controlled by PLC program
- Display brightness level controlled from PLC program
- Disconnectable spring-type connectors
- Status LEDs
- Flush mount
- Quality design

INSTALLATION

Block diagram

Figure 2: LPC-3.GOT block diagram¹



Input & output connection interfaces

Table 2: Power supply²

PS1.1 (+)	Power supply input	8 .. 30 V DC, 2 A
PS1.2 (-)	– (⊥)	GND

Table 3: CAN1 & CAN2³

CAN1.1	CAN1 High (Hi) (Master)	0 .. 5 V
CAN1.2	CAN1 Low (Lo) (Master)	
CAN1.3	CAN1 reference point (GND1)	0 V to CAN1
CAN2.1	CAN2 High (Hi) (Slave)	0 .. 5 V
CAN2.2	CAN2 Low (Lo) (Slave)	
CAN2.3	CAN2 reference point (GND1)	0 V to CAN2

Table 4: COM2 RS-485⁴

COM2.1	RS-485 (A) Modbus RTU	0 .. 3.3 V
COM2.2	RS-485 (B) Modbus RTU	
COM2.3	– (⊥)	GND
COM2.4	+U	Power supply output (from PS1.1)

Table 5: COM1 Smarteh bus

COM1.1	N.C.	
COM1.2	(-)(⊥)	GND
COM1.3	+U	Power supply output (from PS1.1)
COM1.4	RS-485 (A) Smarteh bus	0 .. 3.3 V
COM1.5	RS-485 (B) Smarteh bus	
COM1.6	N.C.	

Table 6: WiFi

WiFi	WiFi antenna connector	SMA
------	------------------------	-----

- Wires connected to the module must have a cross cross-sectional area of at least 0.75 mm². The minimum temperature rating of wire insulation must be 85 °C.
- Wires connected to the module must have a cross cross-sectional area of at least 0.14 mm². Use twisted-pair cables of type CAT5+ or better, shielding is recommended. The minimum temperature rating of wire insulation must be 85 °C. Galvanic isolation of 2500 V DC between CAN1, CAN2 and the rest of the PLC circuit is provided.
- Different protocols like Modbus RTU Master can be selected inside Smarteh IDE. Wires connected to the module must have cross cross-sectional area of at least 0.14 mm². Use twisted-pair cables of type CAT5+ or better, shielding is recommended.

Table 7: USB and Ethernet

USB	USB	mini B type, device mode or host mode, USB On-The-Go
ETH	Ethernet	RJ-45 shielded

Table 8: Switches

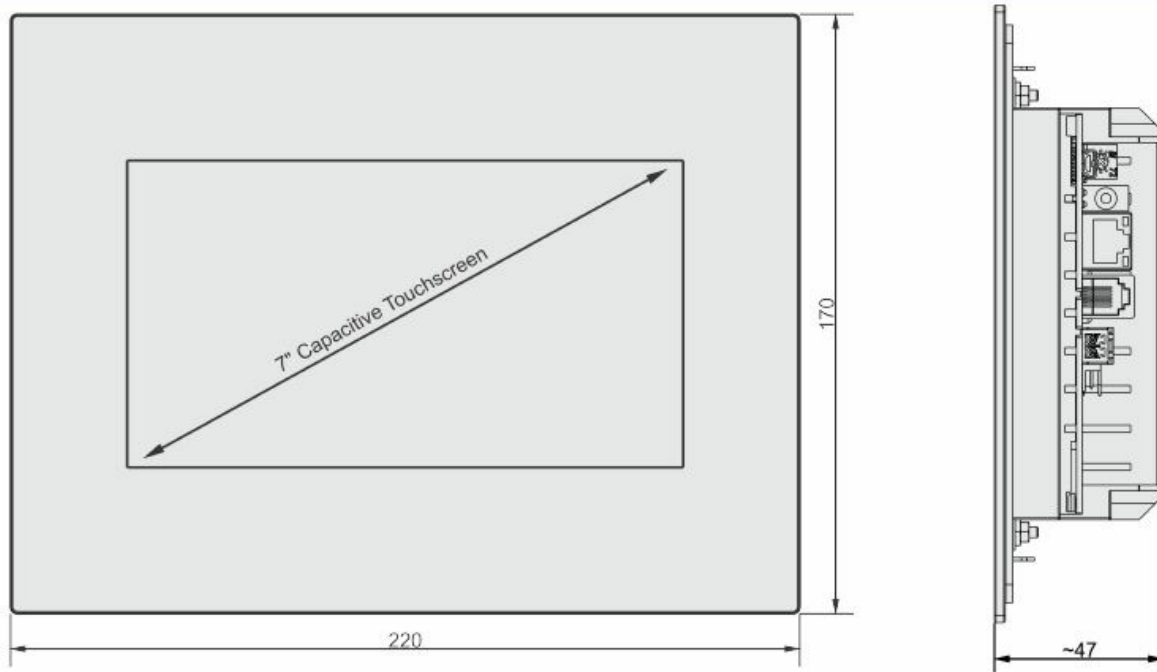
S1	Operation mode (RUN/STOP)	RUN: PLC normal operational mode STOP: application not running
S2	COM2 RS-485 termination (Trm1)	ON: corresponding channel is internally terminated with 1k2 Ω OFF: no internal termination present
S3	CAN2 bus termination (Trm2)	ON: corresponding channel is internally terminated with 120 Ω OFF: no internal termination present
S4	CAN1 bus termination (Trm3)	ON: corresponding channel is internally terminated with 120 Ω OFF: no internal termination present

Table 9: LEDs

LED RUN	Application running (green)	ON: Application is running OFF: Application is stopped or PLC in boot mode
LED PWR	Power (green)	ON: PLC is powered on OFF: PLC has no power supply
LED1 (Rx)	COM1 Rx status (red)	OFF: No receiving packets Blink: Receiving packets ON: A and/or B line in the shortcut
LED2 (Tx)	COM1 Tx status (green)	OFF: Not transmitting packets Blink: Transmitting packets ON: A and/or B line in the shortcut
LED3 (Rx)	COM2 Rx status (red)	OFF: No receiving packets Blink: Receiving packets ON: A and/or B line in the shortcut
LED4 (Tx)	COM2 Tx status (green)	OFF: Not transmitting packets Blink: Transmitting packets ON: A and/or B line in the shortcut

Mounting instructions

Figure 3: Housing dimensions



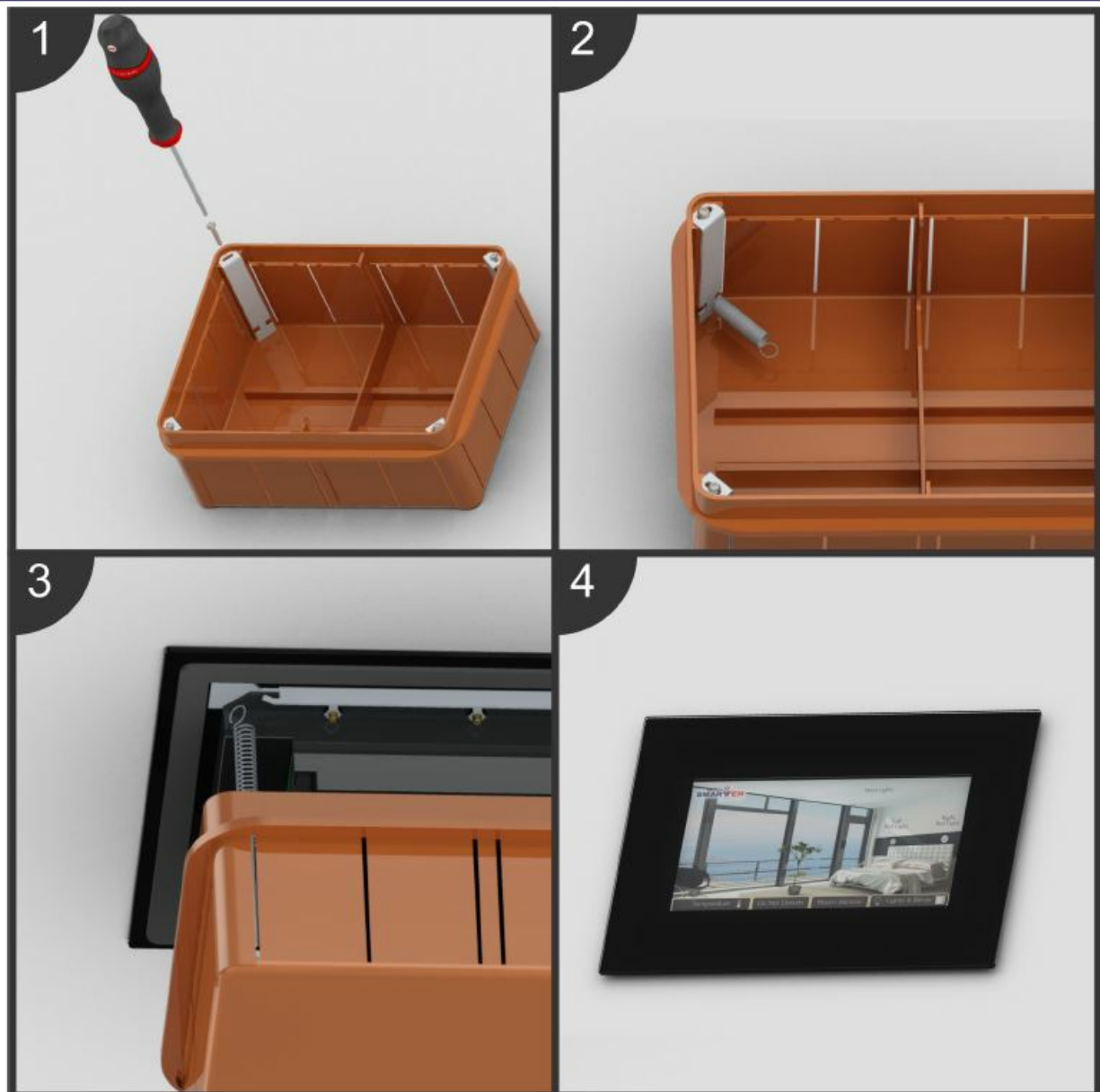
Dimensions in millimetres

- **EXTERNAL SWITCH OR CIRCUIT-BREAKER AND EXTERNAL OVERCURRENT PROTECTION:** The unit is allowed to be connected to installation with over-current protection that has a nominal value of 6 A or less.
- All connections, PLC attachments and assembling must be done while LPC-3.GOT.012 is not connected to the main power supply.
- Wires connected to the PLC must have cross cross-sectional area of at least 0.75 mm².
- Minimum temperature rating of wire insulation must be 85 °C.

Mounting instructions for wall mounting

1. Switch off the power supply.
2. Fasten holders⁵ with screws⁵ into Gewiss 48006 flush mounting box⁶ – see Figure 4.
3. Connect input, output and communication wires.
4. Mount LPC-3.GOT.012 into a flush mounting box, using provided springs.
5. Switch on the power supply.

Figure 4: Mounting instructions for wall mounting



- Holders, screws and springs are provided in a package with LPC-3.GOT.012.
- Gewiss 48006 flush mounting box must be ordered separately. See chapter spare parts.

Figure 5: Gewiss 48006 flush mounting box dimensions

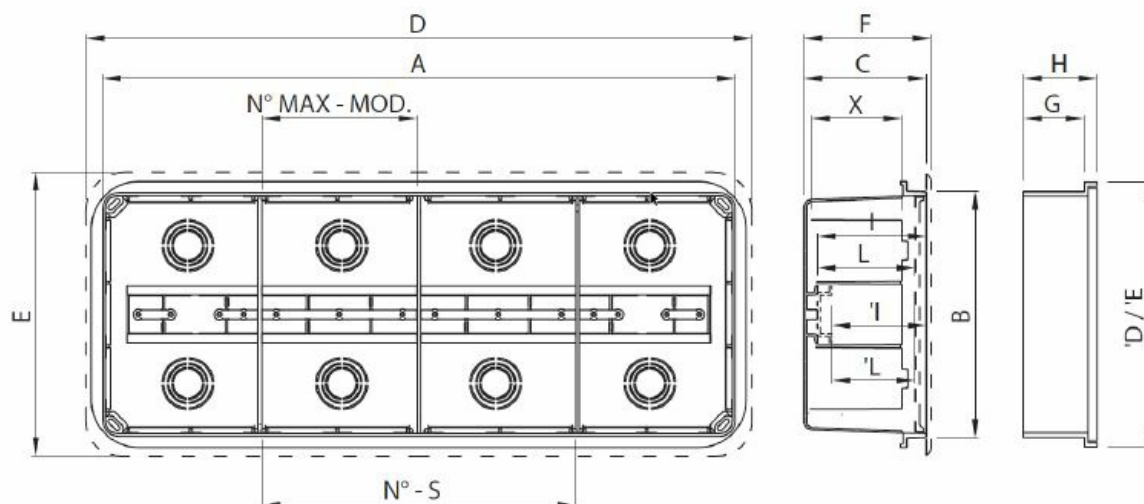


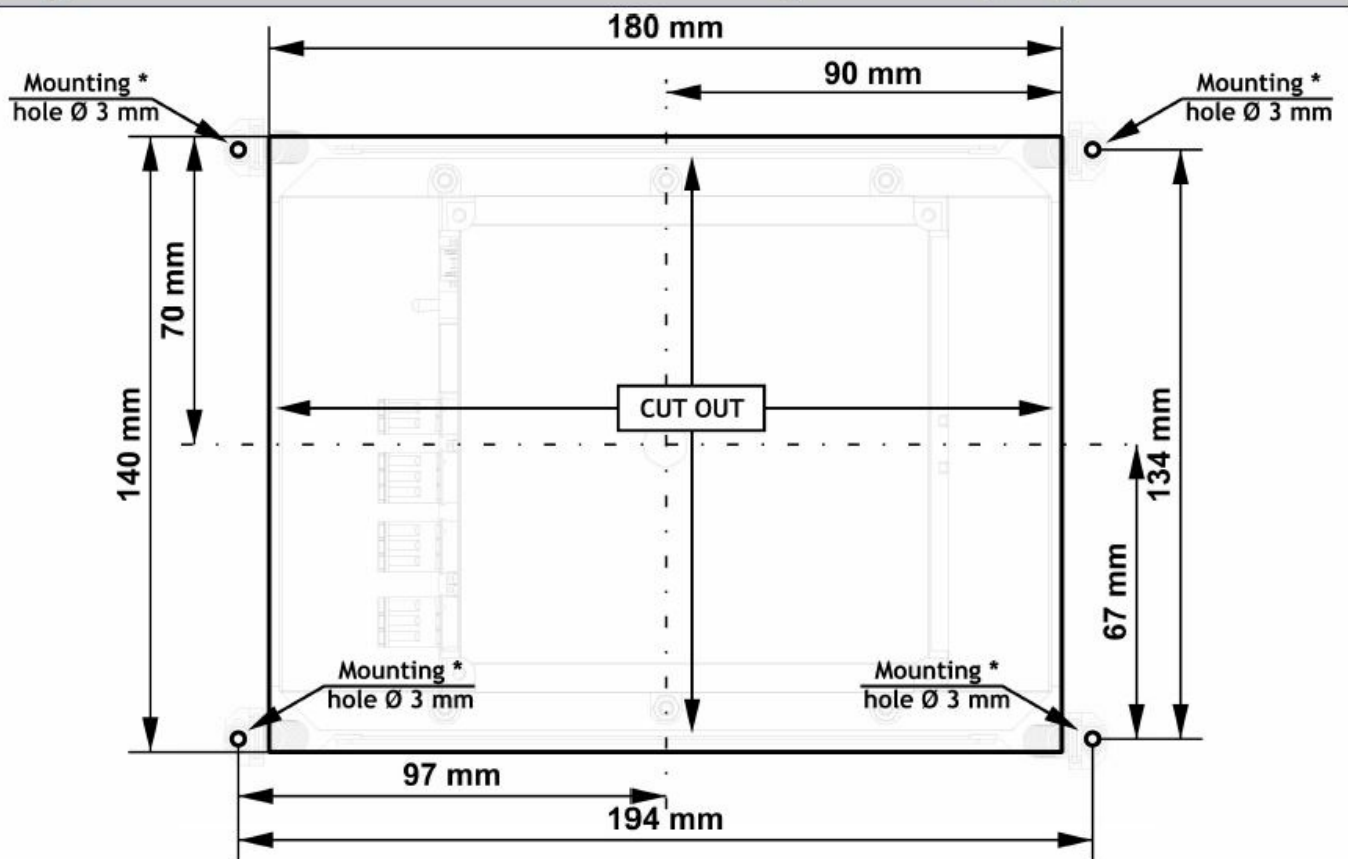
Table 10: Gewiss 48006 flush mounting box dimensions (in millimetres)

Modular boxes										Cover			Deep lid			
A	B	C	X	N° - S	No. modules N° - M	I	L	I	L	D	E	F	D	E	G	H
196	152	75	57	2	4.5	69	61	62	53.3	222	178	79	214	170	49	56

Mounting instructions for enclosure door with springs

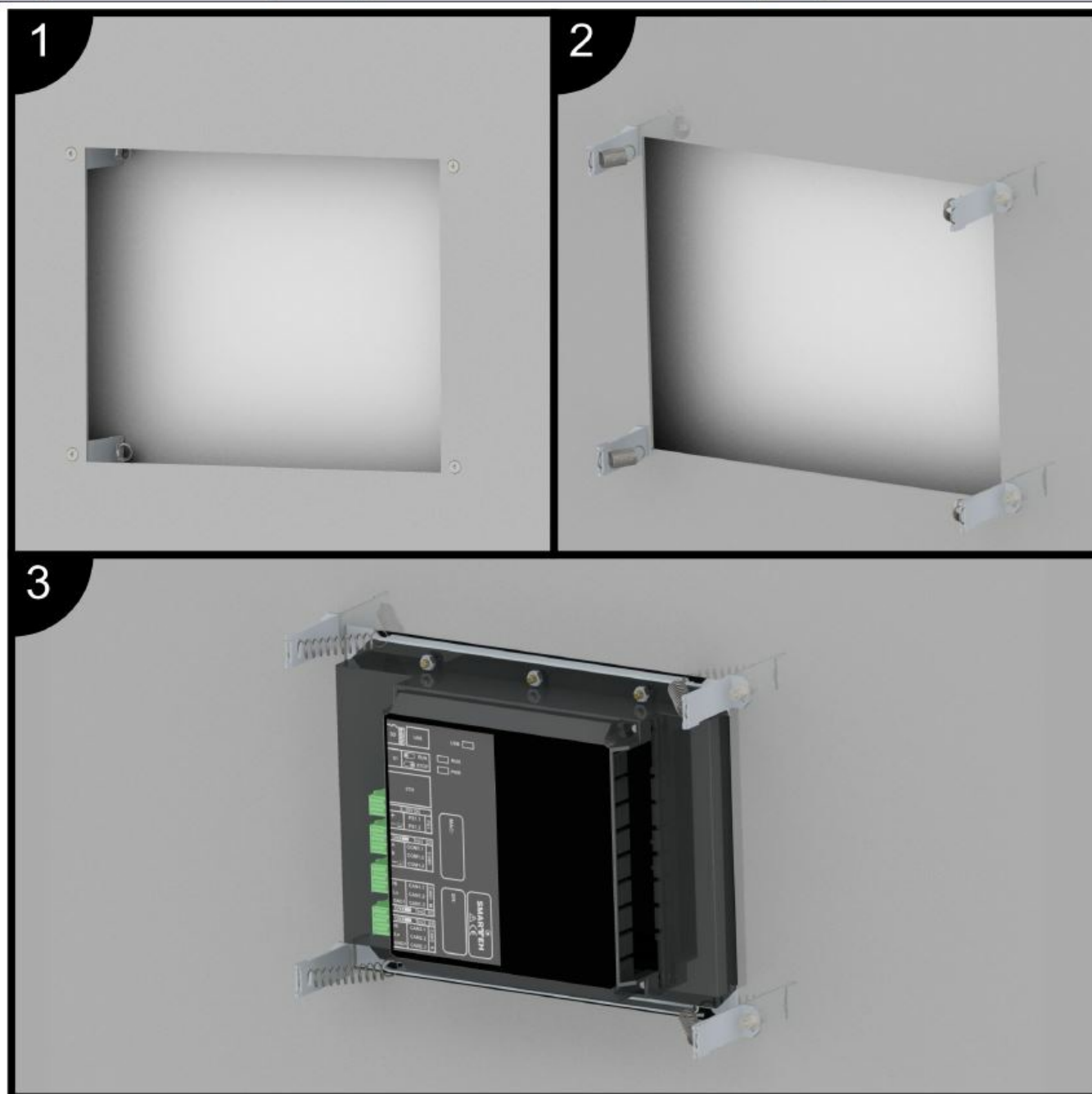
1. Switch off the power supply.
2. Make cut-out and mounting holes – see Figure 6.
3. Fasten holders with screws7 on the enclosure door – see Figure 7.
4. Mount LPC-3.GOT.012 into cut out, using provided springs.
5. Connect input, output and communication wires.
6. Switch on the power supply.

Figure 6: Dimensions for cut out and mounting holes for spring holders



*Mounting hole for screw with countersunk head

Figure 7: Mounting example on enclosure door with springs



Mounting instructions for enclosure door with metal holders

1. Switch off the power supply.
2. Make cut out – see Figure 8.
3. Mount LPC-3.GOT.012 into cut out, using metal holders – see Figure 9..
4. Connect input, output and communication wires.
5. Switch on the power supply.

Figure 8: Dimensions for cut out for mounting with holders

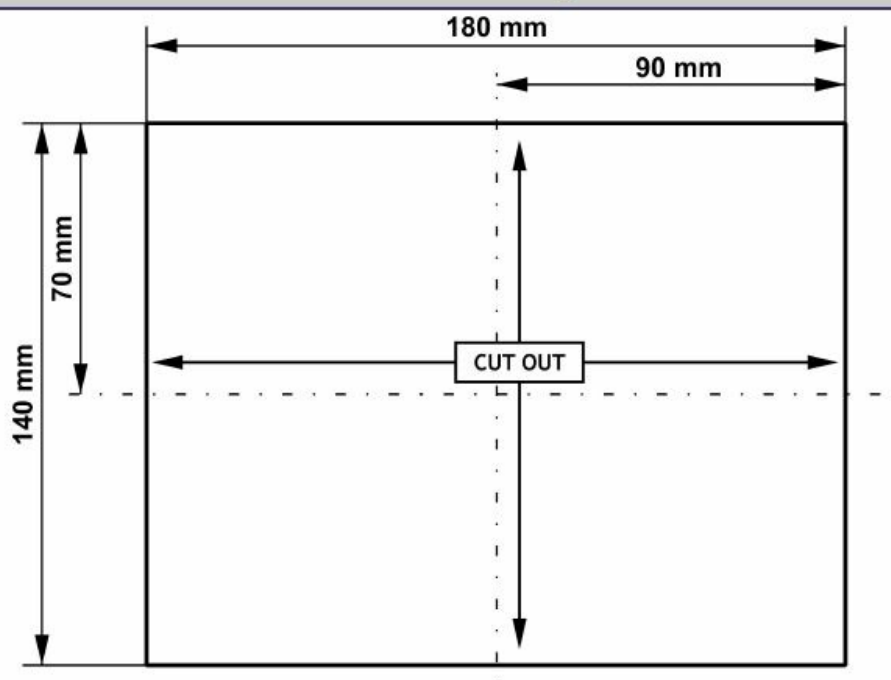


Figure 9: Mounting example on enclosure door with holders

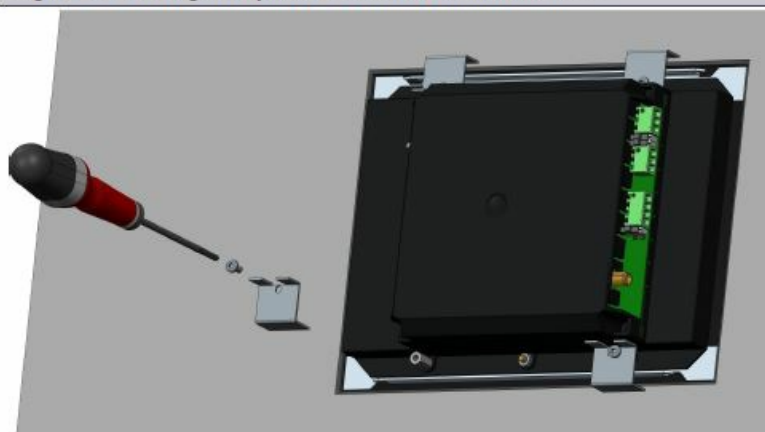


Figure 10: Mounting example on enclosure door with holders

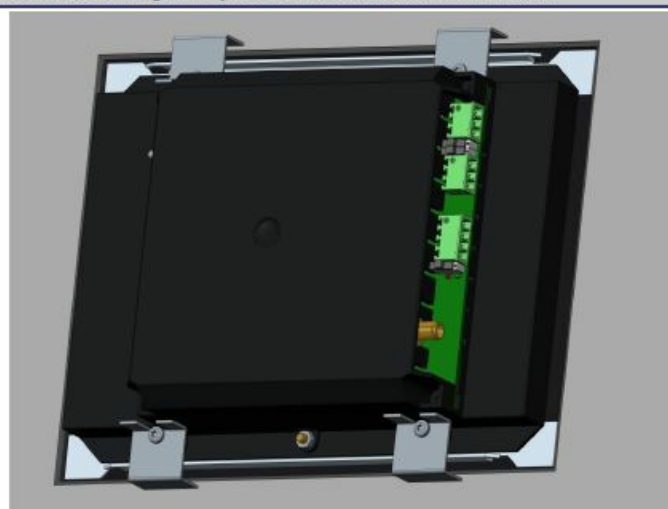


Table 11: Technical specifications

- **Rated power supply PS1:** 24 V DC, 2A
- **Operational power supply PS1:** 8 .. 30 V DC
- **Power consumption PS1:** max. 5 W
- **Connection type for PS1:** disconnectable spring-type connectors for stranded wire 0.75 to 1.5 mm²
- **Connection type for CAN1, CAN2, COM2:** disconnectable spring type connectors for stranded wire 0.14 to 1.5 mm²
- **Connection type for COM1:** RJ-12 6/4
- **CAN1, CAN2 isolation voltage to PS1:** 2500 V DC
- **COM2 RS-485 port:** non isolated, 2 wire
- **COM1 Smarteh bus:** non isolated
- **Ethernet:** RJ-45, 10/100/1000T IEEE 802.3
- **WiFi:** IEEE 802.11 b/g/n, SMA female connector
- **USB:** mini B type, device mode or host mode (USB On-The- Go), high-speed/full-speed
- **RTC:** capacitor backed up with retention of cca. 14 days
- **Operating system:** Linux
- **CPU:** i.MX6 Single (ARM® Cortex™-A9) @ 1GHz
- **RAM:** 1GB DDR3
- **Flash:** 4 GB eMMC 8bits (MLC type)
- **NV RAM:** 512 kB, capacitor backed up with retention cca. 14 days
- **Display:** 7", 800 × 480 resolution, 24 bit colour depth
- **Dimensions (L x W x H):** 170 x 220 x 47 mm
- **Display dimensions (L x W):** 85.5 x 154 mm
- **Weight:** 650 g
- **Ambient temperature:** 0 to 50°C
- **Ambient humidity:** max. 95 %, no condensation
- **Maximum altitude:** 2000 m
- **Mounting position:** vertical
- **Transport and storage temperature:** -20 to 60 °C
- **Pollution degree:** 2
- **Over-voltage category:** II
- **Electrical equipment:** class II (double insulation)
- **Protection class front side:** IP 65
- **Protection class back side:** IP 30

CONNECTION & CONFIGURATION GUIDE

Main connection scheme & configuration

Figure 11: Main connection scheme⁸

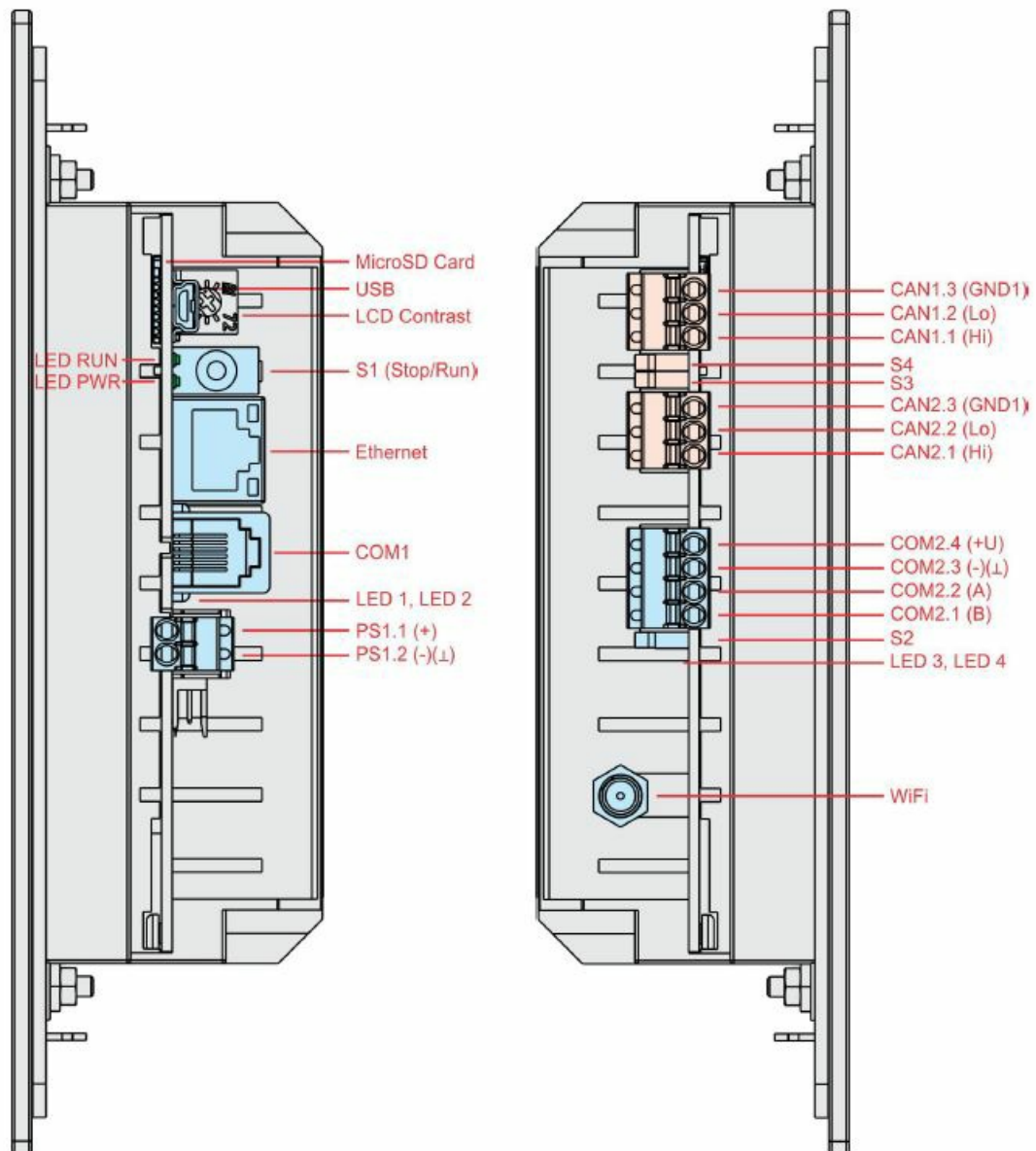
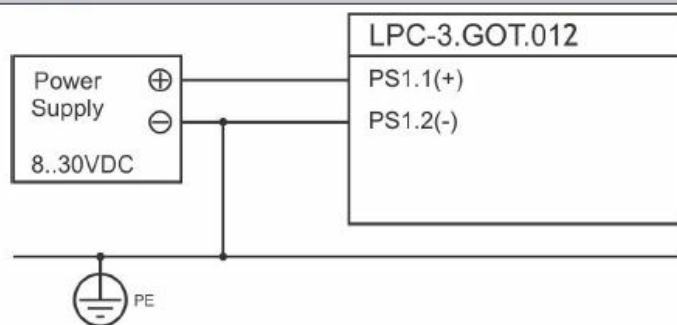
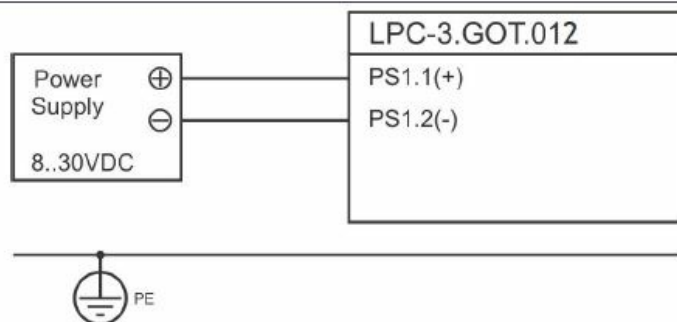


Figure 12: Grounding possibilities



LPC-3.GOT negative power supply pole connected to the Protective Earth (PE) functional earthing.



LPC-3.GOT negative power supply poles not connected to the Protective Earth (PE) functional earthing.

PROGRAMMING GUIDE

This chapter is intended to offer the programmer additional information about some of the functionalities and units integrated in this module.

Basic functionalities

RTC unit

For RTC back-up and for Retain variables there is Super Capacitor instead of battery integrated inside PLC. This way, replacement of the discharged battery is avoided. The Retention time is minimum 14 days from the power down. RTC time provides date and time information.

Ethernet

Ethernet port can be used as a programming and debugging port, as a Modbus TCP/IP Master and/or Slave device and as BACnet IP (B-ASC).

WiFi

WiFi port can be used as a programming and debugging port, as a Modbus TCP/IP Master and/or Slave device and as BACnet IP (B-ASC).

Modbus TCP/IP master unit

When configured for Modbus TCP/IP Master / Client mode, the LPC-3.GOT.012 functions as a master device, controlling the communications with other slave devices such as sensors, inverters, other PLCs, etc. LPC-3.GOT.012 sends Modbus TCP/IP commands to and receives Modbus TCP/IP responses from the slave units. Following commands are supported:

- 01 – Read Coil Status
- 02 – Read Input Status
- 03 – Read Holding Registers
- 04 – Read Input Registers
- 05 – Write Single Coil

- 06 – Write Single Register
- 15 – Write Multiple Coils
- 16 – Write Multiple Registers

Note: each of this command can read/write up to 10000 addresses.

Modbus TCP/IP slave unit

Modbus TCP slave has 10000 addresses in each memory section:

- Coils: 00000 to 09999
- Discrete inputs: 10000 to 19999
- Input register: 30000 to 39999
- Holding registers: 40000 to 49999

Supports up to 5 connections to the slave units (defined with MaxRemoteTCPClient parameter).

Highest scan rate is 100 ms.

Modbus RTU master unit

When configured for Modbus RTU Master mode, the the LPC-3.GOT.012 functions as a master device,controlling the communications with other slave devices such as sensors, inverters, other PLCs, etc.

LPC-3.GOT.012 sends Modbus RTU commands to and receives Modbus RTU responses from the slave devices.

Following commands are supported:

- 01 – Read Coil Status
- 02 – Read Input Status
- 03 – Read Holding Registers
- 04 – Read Input Registers
- 05 – Write Single Coil
- 06 – Write Single Register
- 15 – Write Multiple Coils
- 16 – Write Multiple Registers

Note: each of this commands can read/write up to 246 bytes of data. For analog (Input and Holding registers) this means 123 values, while for digital (Statuses and Coils) this means 1968 values. When higher quantity of data is required, LPC-3.GOT.012 can execute up to 32 same or different supported commands simultaneous.

Physical layer: RS-485

Supported baud rates: 9600, 19200, 38400, 57600 and 115200bps Parity: None, Odd, Even. Stop bit: 1

Modbus RTU slave unit

Modbus TCP slave has 1023 addresses in each memory section:

- Coils: 00000 to 01023
- Discrete inputs: 10000 to 11023
- Input register: 30000 to 31023
- Holding registers: 40000 to 41023

Highest scan rate is 100 ms.

SmarteH RS485 bus for connectivity with LPC-2 system Port COM1 is used for communication with LPC-2 slave modules. All communication settings are configured in SmarteHIDE software program.

BACnet IP unit

When configured for BACnet IP (B-ACS), following commands are supported:

Data Sharing

- ReadProperty-B (DS-RP-B)
- WriteProperty-B (DS-WP-B)

Device and Network Management

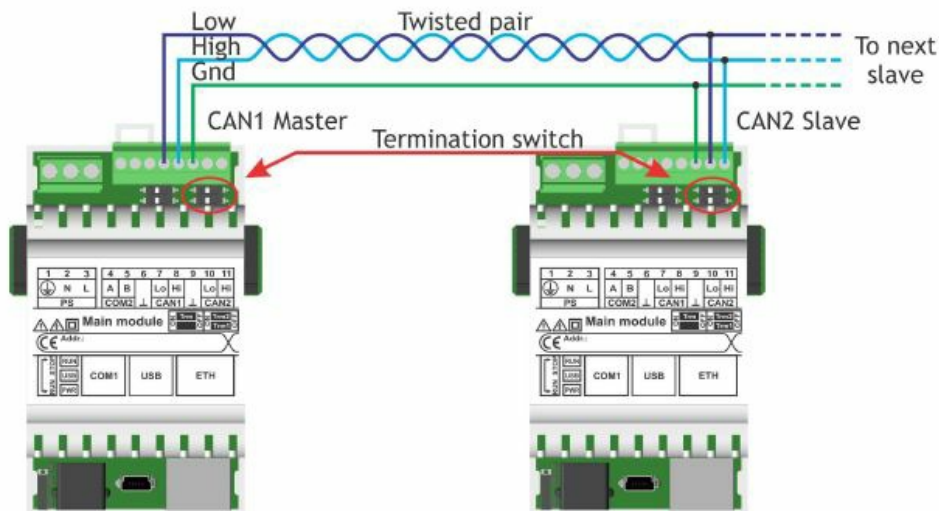
- Dynamic Device Binding-B (DM-DDB-B)
- Dynamic Object Binding-B (DM-DOB-B)
- Device Communication Control-B (DM-DCC-B)
- Time Synchronization-B (DM-TS-B)
- UTCTimeSynchronization-B (DM-UTC-B)

For more information, please contact producer.

CANopen unit

- CANopen unit consists of Master and Slave communication ports. They are independent, thus can be connected to two different CAN network at the same time.
- The ports can operate at baud rates 50 kbps, 125 kbps or 250 kbps.
- It follows the internationally standardized (EN 50325-4) CAN-based higher-layer protocol for embedded control systems. Advised rules and concepts by this standard must be followed to fulfil the conditions and so achieving normal operation and results.
- The structure of the network as cable type and lengths, baud rates, number of the nodes and termination must be taken into account within the recommendations and requirements, when designing the network.
- The bus network can consist of at least one Master and at list one Slave node by the standard, but it is advised that with increased number of nodes, the Master node fastest interval is extended. Below are two examples:
- Example 1: network with 1 master and 9 slaves, every slave have defined 32 (4×8) byte of data and baud rate 125 Kbps. Fastest Cycle time for this configuration is 50 ms.
- Example 2: network with 1 master and 4 slaves, every slave have defined 4 byte of data and baud rate 250 Kbps. Fastest Cycle time for this configuration is 5 ms.
- 5 ms is the fastest recommended cycle time.
- It is recommended to power-up all the nodes on the same network at the same time, if some or all nodes had been reprogrammed (to reinitialize the communication properly).

Figure 13: CAN Master and Slave wiring diagram example



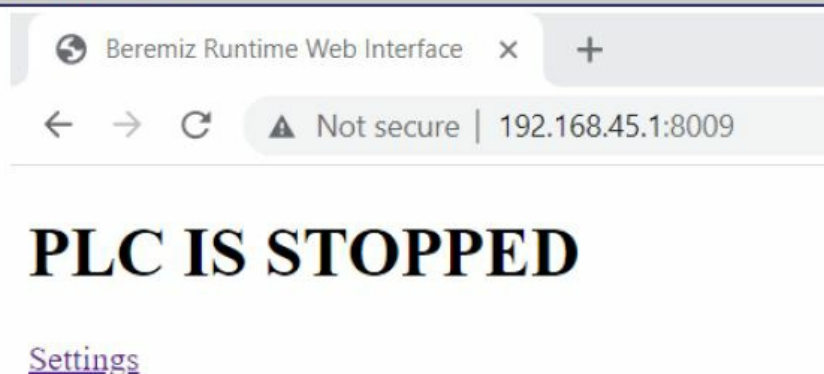
RUN/STOP Switch

- Run: Status RUN status LED “on” indicate that the user graphical application is up and user program is running.
- Stop: When the switch is turn to STOP state, the RUN status LED is “off” and application is stopped.
- PLC task cycle time
- Main PLC task interval (under Project tab -> Resource Tasks Interval) time → → is not recommended to be set lower than 50 ms.

WiFi configuration

1. Connect terminal to the PC via USB connector and switch ON power supply.
2. Using web browser, type default IP address 192.168.45.1 and port 8009.
3. Click on “Settings”.

Figure 14: Web interface



4. The Settings page opens. In the “Network Settings for eth() interface (wired)” section select “Disabled”, from the “Configuration type” drop-down menu.
5. Click on “Set” at the bottom of that section.
6. Then in the “Network Settings for wlan() interface (wireless)” section set the parameters of the wireless network

to which you want to connect: “Configuration type”, “Authentication type”, “Network name” and “Password”.

7. Click on “Set” at the bottom of that section.

Figure 15: Web interface settings

The screenshot shows a web browser window with the title "Beremiz Runtime Settings". The address bar displays "192.168.45.1:8009/settings/" with a "Not secure" warning. The page is divided into two main sections for network configuration.

Network Settings for eth0 interface (wired)

Configuration type	Disabled
IP address	
Gateway address	
Network mask	
DNS address	
MAC address	20:41:5a:3d:00:0b
<input type="button" value="Set"/>	

Network Settings for wlan0 interface (wireless)

Configuration type	DHCP
IP address	
Gateway address	
Network mask	
DNS address	
MAC address	24:cd:8d:16:60:c7
Authentication type	WPA2
Network name	Smarteh-WiFi
Password	••••••••
<input type="button" value="Set"/>	

GUI design and programming

Figure 16: SmartehIDE software tool⁹

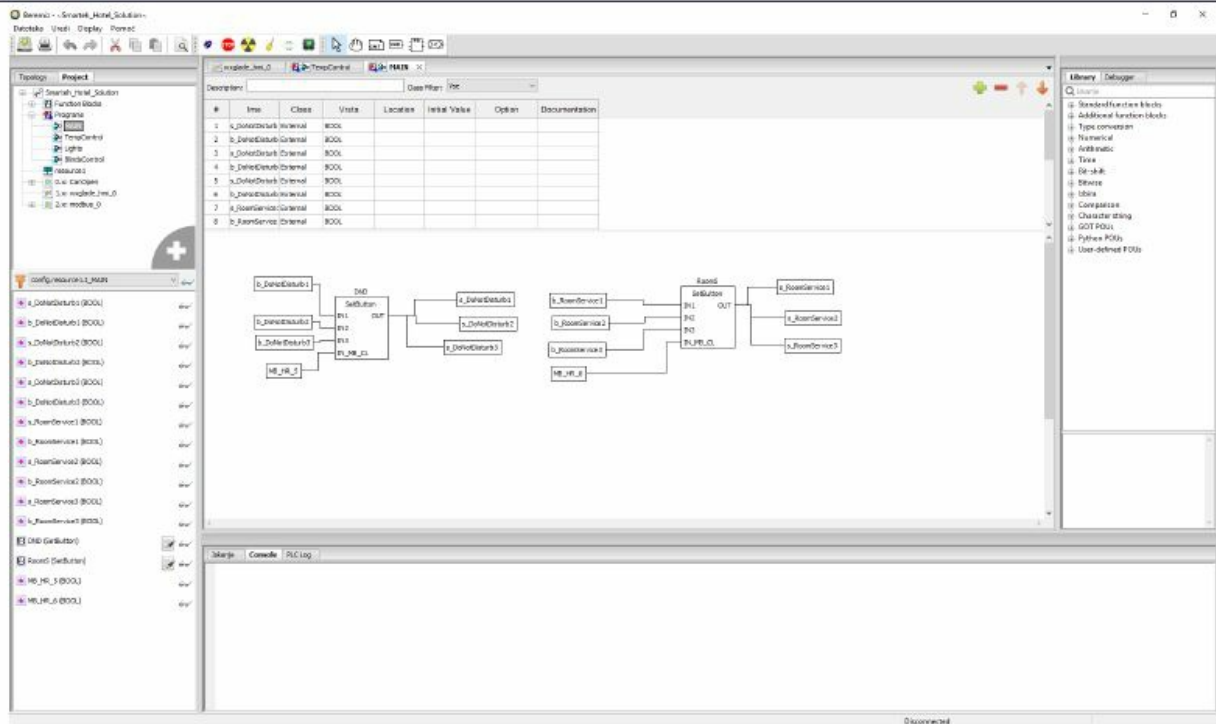
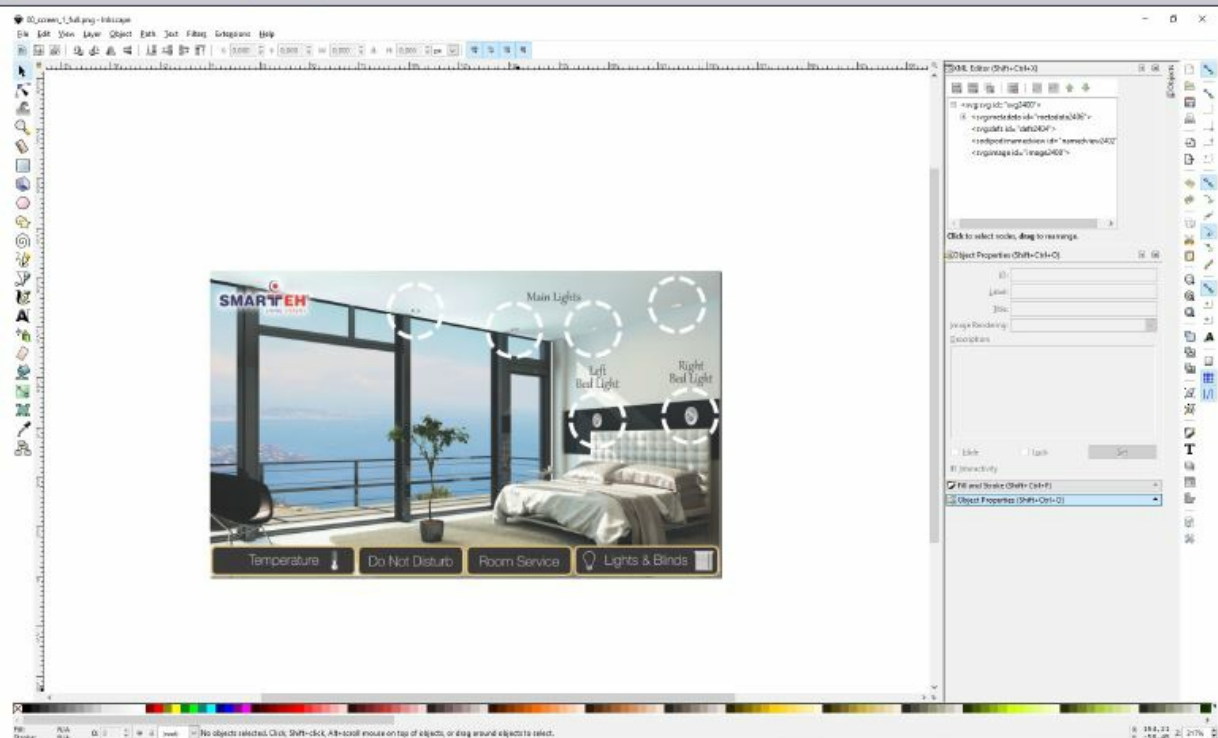


Figure 17: Inkscape open source tool¹⁰



NOTE: Recommended minimum size of the touch object is 10 x 10 mm.

- Configuration of the PLC is done using Smarteh IDE software tool. Please refer to SmartehIDE and LPC Manager user manual for details.
- Configuration of the PLC is done using Inkscape open source tool.

MODULE LABELING

Figure 18: Label

Label (sample):

XXX-N.ZZZ
P/N: AAABBBCCDDDEEE
S/N: SSS-RR-YYXXXXXXXXXX
D/C: WW/YY

Label description

1. XXX-N.ZZZ – full product name.
 - XXX-N – Product family
 - ZZZ – product
2. P/N: AAABBBCCDDDEEE – part number.
 - AAA – general code for product family,
 - BBB – short product name,
 - CCDDD – sequence code,
 - CC – year of code opening,
 - DDD – derivation code,
 - EEE – version code (reserved for future HW and/or SW firmware upgrades).
3. S/N: SSS-RR-YYXXXXXXXXXX – serial number.
 - SSS – short product name,
 - RR – user code (test procedure, e.g. Smarteh person xxx),
 - YY – year,
 - XXXXXXXXXXXX – current stack number.
4. D/C: WW/YY – date code.
 - WW – week and
 - YY – year of production.

Optional

1. MAC
2. Symbols
3. WAMP
4. QR code
5. Other

SPARE PARTS

- For ordering spare parts following Part Numbers should be used:

LPC-3.GOT.012 Graphical operation terminal	
LPC-3.GOT.012	P/N: 226GOT17012001
Flush mounting box	
Flush mounting box Gewiss 48006	P/N: 206FMB10001001

CHANGES

The following table describes all the changes to the document.


Date	V.	Description
19.12.2023	2	Revision of the document.
19.11.2020	1	The initial version, issued as <i>LPC-3.GOT.012 User Manual</i> .

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Documents / Resources

	<p>SMARTEH LPC-3.GOT.012 Longo Programmable Controller [pdf] User Manual LPC-3.GOT.012, LPC-3.GOT.012 Longo Programmable Controller, Longo Programmable Controller, Programmable Controller, Controller</p>
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References

- [User Manual](#)

[Manuals+.](#) [Privacy Policy](#)

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