Danfoss 80G8429 Case Controller Type EKC 224 Installation Guide

Contents

Danfoss 80G8429 Case Controller Type EKC 224

Specifications

- **Model:** Case controller Type EKC 224
- **Power Supply:** 115 V AC / 230 V AC, 50/60 Hz
- **Rated Power:** Less than 0.7 W
- **Inputs:** Sensor inputs, Digital inputs, Programming key
- **Allowed Sensor Types:** SELV limited energy

Product Usage Instructions

Installation

- Refer to the installation guide for detailed steps on mounting and dismounting the controller. Ensure proper wiring based on the provided wiring diagrams.

Data Communication

- The EKC 22x controller can be integrated into a Modbus network via the RS-485 adapter (EKA 206) using an interface cable (080N0327). Follow the installation guide for EKA 206 for detailed installation instructions.

Wiring

- Follow the provided wiring diagrams to connect the controller to the power supply and sensors. Use appropriate cables and connectors for secure connections.

Interface

- For data communication, use the RS-485 adapter (EKA 206) and interface cable (080N0327) as specified. Ensure proper configuration for seamless integration into the Modbus network.

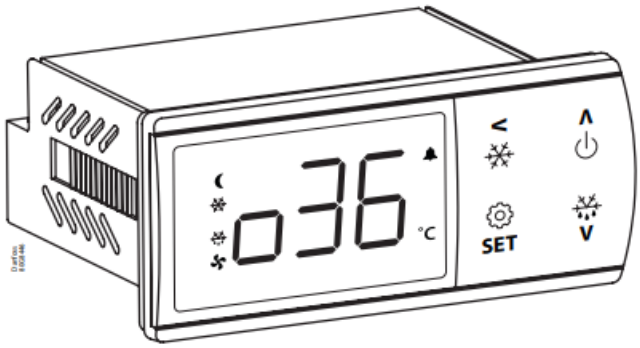
Controller Features

- **Purpose of Control:** Operating temperature sensing control for air-conditioning and refrigeration applications
- **Construction:** Incorporated control with galvanic isolated low voltage regulated power supply
- **Accuracy:** High precision control with less than 0.7 W power consumption

FAQ

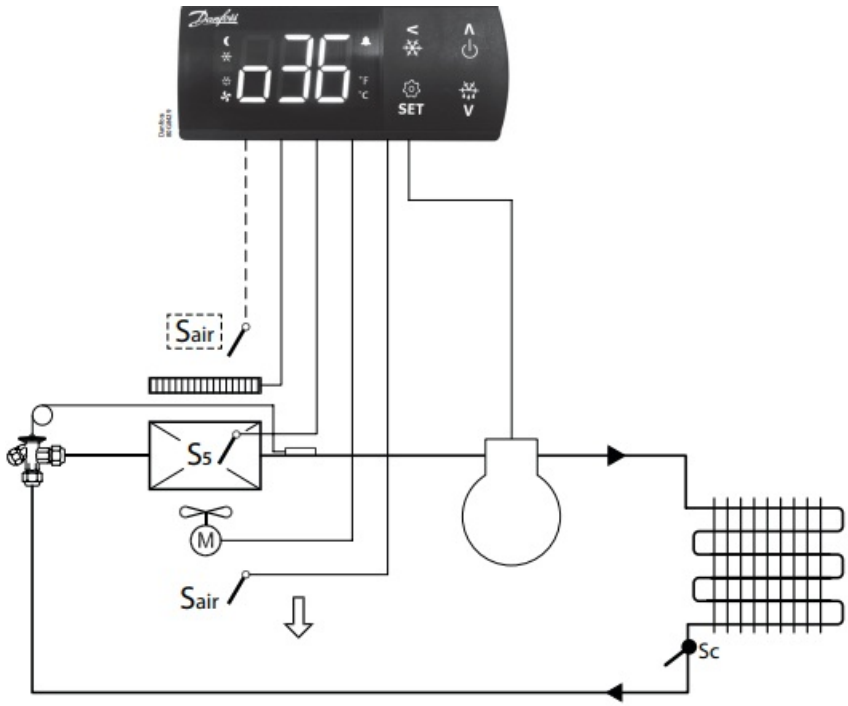
- **Q: How do I mount the controller?**
  - **A:** The controller can be mounted using rear mounting with clips as indicated in the dimensions section of the manual.
- **Q: What types of inputs are supported by the controller?**
  - **A:** The controller supports sensor inputs, digital inputs, and programming key inputs, connected to SELV-limited energy sources.

Identification

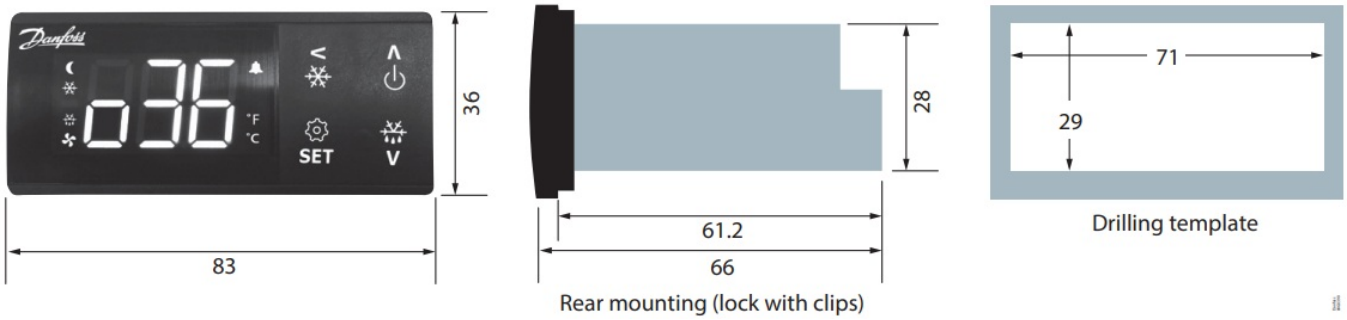


084B4055 (115 V AC)
084B4056 (230 V AC)

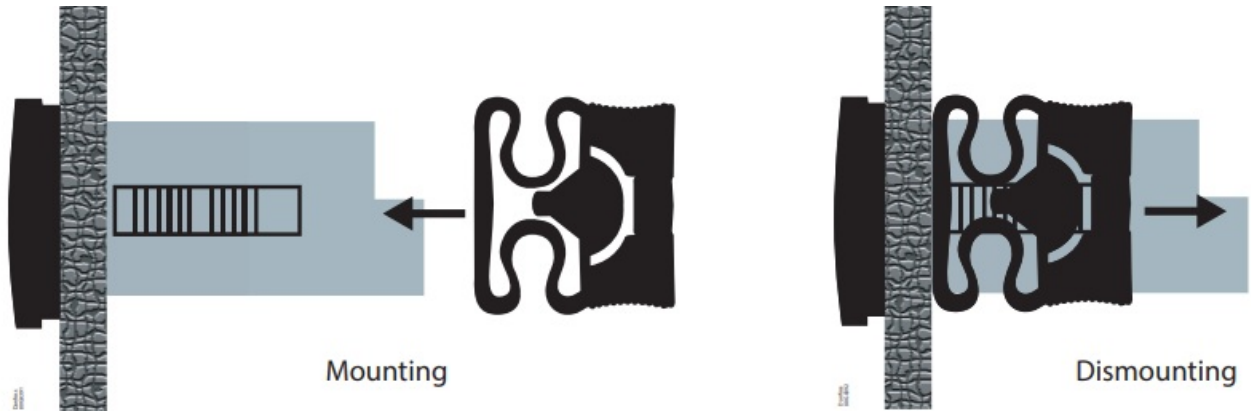
Application



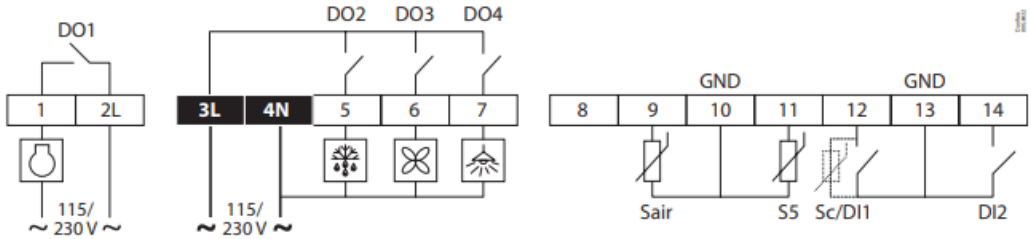
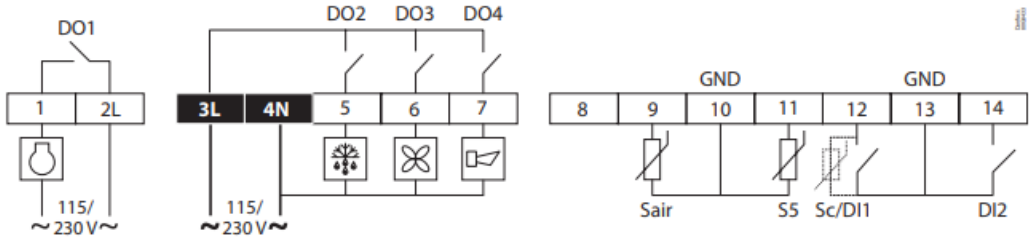
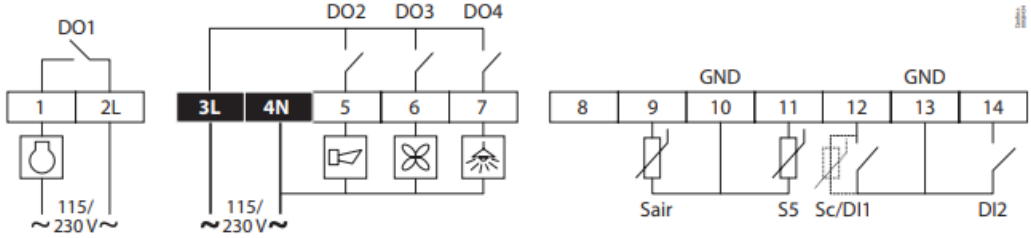
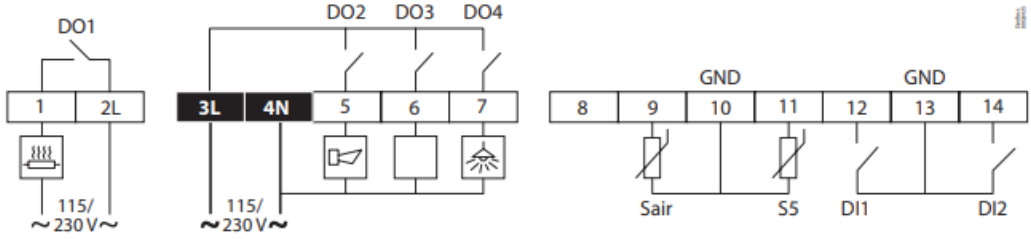
Dimensions



Mounting



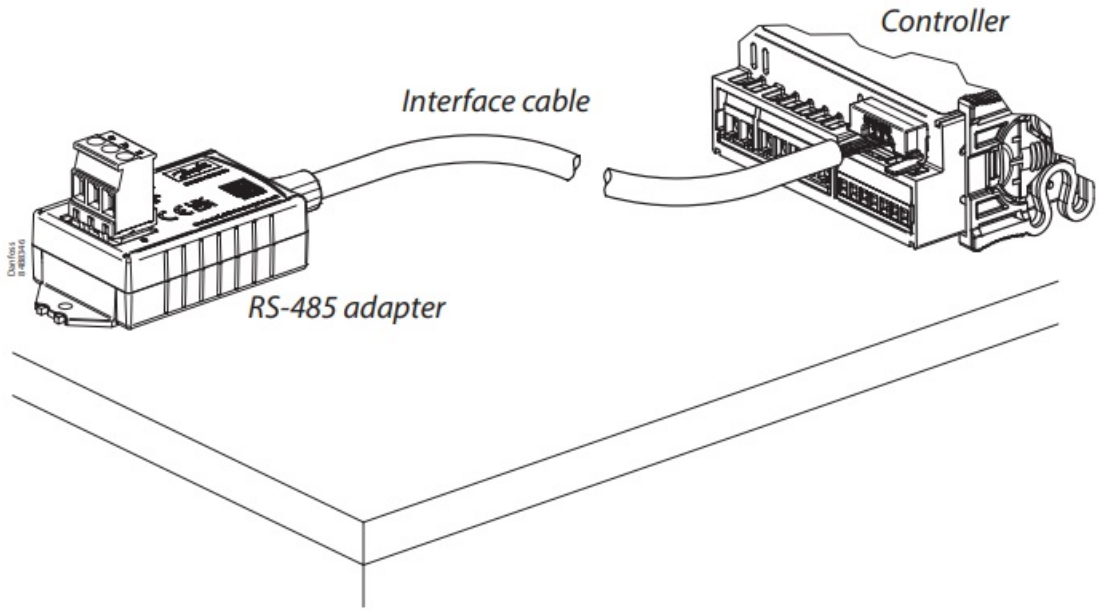
Wiring diagrams

Application	Wiring diagrams
1.	
2.	
3.	
4.	

- **Note:** Power connectors: wire size = 0.5 – 1.5 mm2, max. tightening torque = 0.4 Nm
- Low voltage signal connectors: wire size = 0.15 – 1.5 mm2, max. tightening torque = 0.2 Nm 2L and 3L must be connected to the same phase.

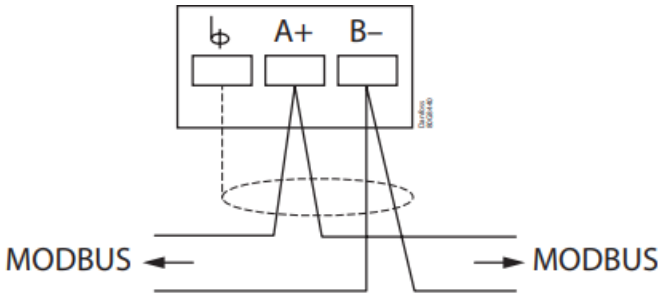
Data communication

Installation



- The EKC 22x controller can be integrated into a Modbus network via the RS-485 adapter (EKA 206) using an interface cable (080N0327).
- For installation details please refer to the installation guide for EKA 206 – RS485 adapter.

Wiring



Technical data

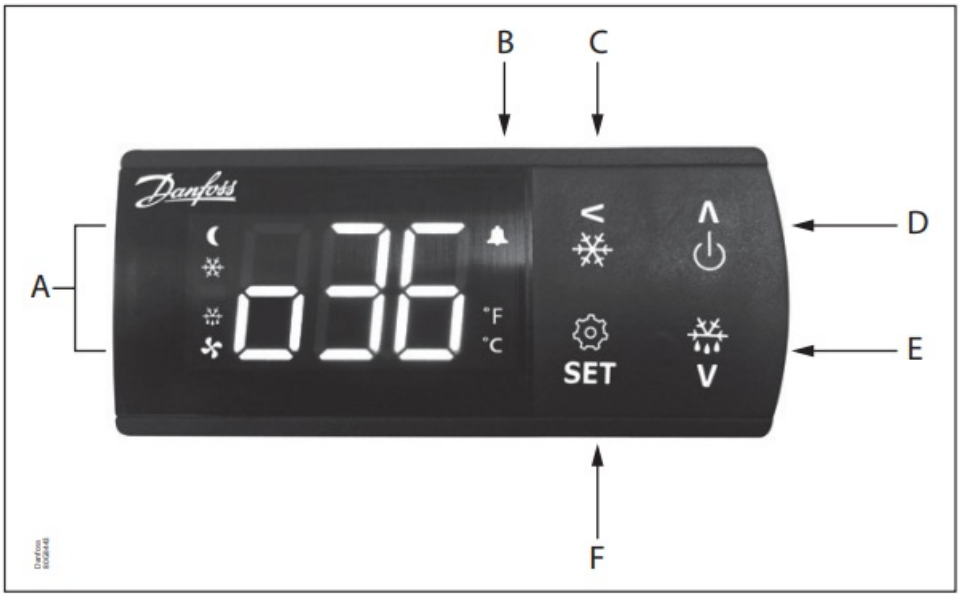
Features	Description
Purpose of control	Operating temperature sensing control suitable for incorporation into commercial air-conditioning and refrigeration applications
Construction of control	Incorporated control
Power supply	084B4055 – 115 V AC / 084B4056 – 230 V AC 50/60 Hz, galvanic isolated low voltage regulated power supply
Rated power	Less than 0.7 W

Inputs	Sensor inputs, Digital inputs, Programming key Connected to SELV limited energy <15 W
Allowed sensor types	NTC 5000 Ohm at 25 °C, (Beta value=3980 at 25/100 °C – EKS 211) NTC 10000 Ohm at 25 °C, (Beta value=3435 at 25/85 °C – EKS 221) PTC 990 Ohm at 25 °C, (EKS 111) Pt1000, (AKS 11, AKS 12, AKS 21)
Accuracy	Measuring range: -40 – 105 °C (-40 – 221 °F)
	Controller accuracy: ±1 K below -35 °C, ±0.5 K between -35 – 25 °C, ±1 K above 25 °C
Type of action	1B (relay)
Output	DO1 – Relay 1: 16 A, 16 (16) A, EN 60730-1 10 FLA / 60 LRA at 230 V, UL60730-1 16 FLA / 72 LRA at 115 V, UL60730-1
	DO2 – Relay 2: 8 A, 2 FLA / 12 LRA, UL60730-1 8 A, 2 (2 A), EN60730-1
	DO3 – Relay 3: 3 A, 2 FLA / 12 LRA, UL60730-1 3 A, 2 (2 A), EN60730-1
	DO4 – Relay 4: 2 A
Display	LED display, 3 digits, decimal point and multi-function icons, °C + °F scale
Operating conditions	-10 – 55 °C (14 – 131 °F), 90% Rh
Storage conditions	-40 – 70 °C (-40 – +158 °F), 90% Rh
Protection	Front: IP65 (Gasket integrated) Rear: IP00
Environmental	Pollution degree II, non-condensing
Overvoltage category	II – 230 V supply version – (ENEC, UL recognized) III – 115 V supply version – (UL recognized)
Resistance to heat and fire	Category D (UL94-V0) Temperature for ball pressure test statement According to Annex G (EN 60730-1)
EMC category	Category I

Approvals	UL recognition (US & Canada) (UL 60730-1) CE (LVD & EMC Directive) EAC (GHOST) UKCA UA CMIM ROHS2.0 Hazloc approval for flammable refrigerants (R290/R600a). R290/R600a end-use applications employing under the IEC60079-15 requirements.

Display operation

The buttons on the front of the display can be operated with short and long (3s) presses.



A	**Status indication:** LEDs light up at ECO/Night mode, cooling, defrost, ing, and fan running.
B	**Alarm indication: The alarm** icon flashes in case of an alarm.
C	**Short press** = Navigate back **Long press** = Initiate pulldown cycle. The display will show “Pud” to confirm the start.
D	**Short press** = Navigate up **Long press** = Switch controller ON/OFF (setting r12 Main switch in ON/OFF position)
E	**Short press** = Navigate down **Long press** = Start the defrosting cycle. The display will show the code “-d-“ to confirm the start.
F	**Short press** = Change set point **Long press** = Go to the parameter menu

View alarms:

- Temperature and alarm codes alternate ¸ashes until the alarm is resolved. The alarm bell ¸ashes during alarm

condition.

Lock keyboard:

- After 5 minutes of no activity, the keypad is locked (if P76=yes).
- When the keypad is locked any button press shows “LoC” in the display.
- Press the UP and DOWN buttons simultaneously for 3 seconds to unlock the keyboard. “until” is displayed for 3 s

Factory resetting

The controller can be set back to factory settings by using the following procedure.

1. Power OFF controller
2. Keep up “ ∧ ” and down “ ∨ ” arrow buttons pressed while reconnecting the supply voltage
3. When the code “Fac” is shown in the display, select “yes

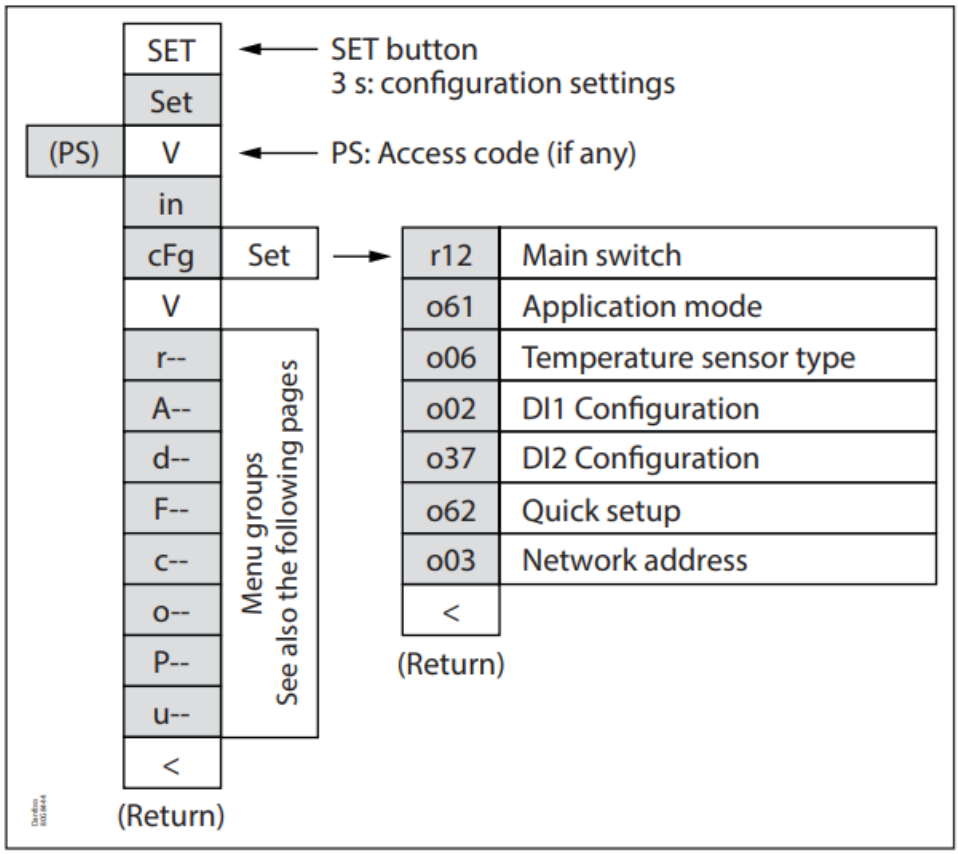
Note: The OEM factory setting will either be the Danfoss factory settings or a user deÿned factory setting if one has been made. The user can save his setting as OEM factory setting via parameter o67.

Display codes

Display co de	Description
-d-	The defrost cycle is in progress
Pud	A temperature pulldown cycle has been initiated
Err	The temperature cannot be displayed due to a sensor error
—	Shown at the top of the display: The parameter value has reached the max. Limit
—	Shown at the bottom of the display: The parameter value has reached min. Limit
Loc	The display keyboard is locked
URL	The display keyboard has been unlocked
PS	The access code is required to enter the parameter menu
Axx/Exx	Alarm or error code flashing with normal temp. readout
OFF	Control is stopped as the r12 Main switch is set OFF
On	Control is started as r12 Main switch is set ON (code shown in 3 seconds)
Fac	The controller is reset to the factory setting

Navigation

- The parameter menu is accessed by pressing the “SET” key for 3 seconds. If an access protection code “o05” has been deÿned the display will ask for the access code by showing the code “PS”.
- Once the access code has been provided by the user, the parameter list will be accessed.



Get a good start

With the following procedure, you can start regulation very quickly.

1. Press the “SET” button for 3 seconds and access the parameter menu (display will show “in”)
2. Press the down button “ v ” to go to the “cFg” menu (display will show “cFg”)
3. Press the right/“>” key to open the conÿguration menu (display will show r12)
4. Open the “r12 Main switch” parameter and stop control by setting it OFF (Press SET)
5. Open the “o61 application mode” and select the needed application mode (Press SET)
6. Open the “o06 Sensor type” and select the temperature sensor type used (n5=NTC 5 K, n10=NTC 10 K, Ptc=PTC, Pt1=Pt1000) – (Press “SET”).
7. Open the “o02 DI1 Conÿguration” and select the function associated with digital input 1 (Please refer to parameter list) – (Press “SET”).
8. Open the “o37 DI2 Conÿguration” and select the function associated with digital input 2 (Please refer to parameter list) –(Press “SET”).
9. Open the “o62 Quick setting” parameter and select the presetting that ÿts with the application in use (please refer to the preset table below) – (Press “SET”).
10. Open the “o03 Network address” and set the Modbus address if required.
11. Navigate back to parameter “r12 Main switch” and set it in the “ON” position to start control.
12. Go through the entire parameter list and change the factory settings where needed.

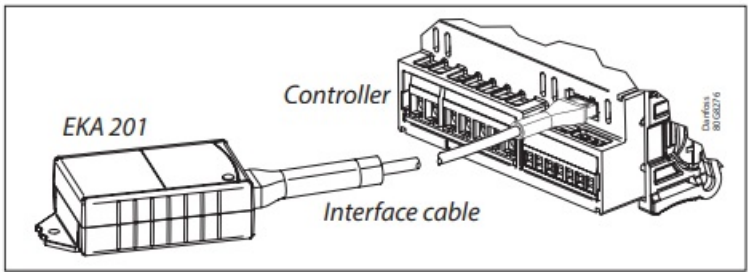
Selection of quick settings

Quick setting	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	Cabinet MT Natural def. Stop on time	**Cabinet MT El. def. Stop on time**	**Cabinet MT El. def. Stop on temp**	**Cabinet LT El. def. Stop on temp**	**Room MT El. def. Stop on time**	**Room MT El. def. Stop on temp**	**Room LT El. def. Stop on temp**
r00 Cut-out	4 °C	2 °C	2 °C	-24 °C	6 °C	3 °C	-22 °C
r02 Max Cut-out	6 °C	4 °C	4 °C	-22 °C	8 °C	5 °C	-20 °C
r03 Min Cut-out	2 °C	0 °C	0 °C	-26 °C	4 °C	1 °C	-24 °C
A13 HighLim Air	10 °C	8 °C	8 °C	-15 °C	10 °C	8 °C	-15 °C
A14 LowLim Air	-5 °C	-5 °C	-5 °C	-30 °C	0 °C	0 °C	-30 °C
d01 Def. Method	Natural	Electrical	Electrical	Electrical	Electrical	Electrical	Electrical
d03 Def.Interval	6 hour	6 hour	6 hour	12 hour	8 hour	8 hour	12 hour
d10 DefStopSens.	Time	Time	S5 Sensor	S5 Sensor	Time	S5 Sensor	S5 Sensor
o02 DI1 Config.					Door FCT.	Door FCT.	Door FCT.

Programming key

Programming controller with Mass Programming Key (EKA 201)

1. Power up the controller. Make sure the controllers are connected to the mains.
2. Connect the EKA 201 to the controller using the respective controller interface cable.
3. The EKA 201 will automatically start the programming process.



Parameter list

Code	Short text manual	Min.	Max.	Def.	Unit	R/W	EKC 224 Appl.			
							1	2	3	4
CFg	**Configuration**									
r12	Main switch (-1=service / 0=OFF / 1=ON)	-1	1	0		R/W	*	*	*	*
o61 1)	Selection of application mode (1) *AP1*: Cmp/Def/Fan/Light (2) *AP2*: Cmp/Def/Fan/Alarm (3) *AP3*: Cmp/Al/Fan/Light (4) *AP4*: Heat/Alarm/Light	1	4	1		R/W	*	*	*	*
o06 1)	Sensor type selection (0) n5 = NTC 5k, (1) n10 = NTC 10k, (2) Pt = Pt1000 , (3) Ptc = PTC 1000	0	3	2		R/W	*	*	*	*
o02 1)	DI1 configuration (0) *oFF*=not used, (1) *Sdc*=status, (2) *doo*=door function, (3) *doA*=door alarm, (4) *SCH*=main switch, (5) *nig*=day/night mode, (6) *rFd*=reference displacement, (7) *EAL*=external alarm, (8) *dEF*=defrost, (9) *Pud*=pull down, (10) *Sc*=condenser sensor	0	10	0		R/W	*	*	*	*

o37 [1)]	DI2 configuration (0) *oFF*=not used, (1) *Sdc*=status, (2) *doo*=door function, (3) *doA*=door alarm, (4) *SCH*=main switch, (5) *nig*=day/night mode, (6) *rFd*=reference displacement, (7) *EAL*=external alarm, (8) *dEF*=defrost, (9) *Pud*=pull down	0	9	0		R/W	*	*	*	*
o62 [1)]	Quick presetting of primary parameters 0 = Not used 1 = MT, Natural defrost, stop on time 2 = MT, El defrost, stop on time 3 = MT, El defrost, stop on temp. 4 = LT, El defrost, stop on temp. 5 = Room, MT, El defrost, stop on time 6 = Room, MT, El defrost, stop on temp. 7 = Room, LT, El defrost, stop on temp.	0	7	0		R/W	*	*	*	
o03 [1)]	Network address	0	247	0		R/W	*	*	*	*
r–	**Thermostat**									
r00	Temperature setpoint	r03	r02	2.0	°C	R/W	*	*	*	*
r01	Di erential	0.1	20.0	2.0	K	R/W	*	*	*	*
r02	Max. limitation of setpoint setting	r03	105.0	50.0	°C	R/W	*	*	*	*
r03	Min. limitation of setpoint setting	-40.0	r02	-35.0	°C	R/W	*	*	*	*
r04	Adjustment of the display’s temperature readout	-10.0	10.0	0.0	K	R/W	*	*	*	*
r05	Temperature unit (°C / °F)	0 / C	1 / F	0 / C		R/W	*	*	*	*
r09	Correction of the signal from the Sair sensor	-20.0	20.0	0.0	°C	R/W	*	*	*	*
r12	Main switch (-1=service / 0=OFF / 1=ON)	-1	1	0		R/W	*	*	*	*
r13	Displacement of reference during night operation	-50.0	50.0	0.0	K	R/W	*	*	*	*
r40	Thermostat reference displacement	-50.0	20.0	0.0	K	R/W	*	*	*	*
r96	Pull-down duration	0	960	0	min	R/W	*	*	*	

r97	Pull-down limit temperature	-40.0	105.0	0.0	°C	R/W	*	*	*	
A–	**Alarm settings**									
A03	Delay for temperature alarm (short)	0	240	30	min	R/W	*	*	*	*
A12	Delay for temperature alarm at pulldown (long)	0	240	60	min	R/W	*	*	*	*
A13	High alarm limit	-40.0	105.0	8.0	°C	R/W	*	*	*	*
A14	Low alarm limit	-40.0	105.0	-30.0	°C	R/W	*	*	*	*
A27	Alarm delay DI1	0	240	30	min	R/W	*	*	*	*
A28	Alarm delay DI2	0	240	30	min	R/W	*	*	*	*
A37	Alarm limit for condenser temperature alarm	0.0	200.0	80.0	°C	R/W	*	*	*	

Code	**Short text manual**	**Min.**	**Max.**	**Def.**	**Unit**	**R/W**	**EKC 224 Appl.**			
							1	**2**	**3**	**4**
A54	Limit for condenser block alarm and comp. Stop	0.0	200.0	85.0	°C	R/W	*	*	*	
A72	Voltage protection enable	0/No	1/ Yes	0/No		R/W	*	*	*	
A73	Minimum cut-in voltage	0	270	0	Volt	R/W	*	*	*	
A74	Minimum cut-out voltage	0	270	0	Volt	R/W	*	*	*	
A75	Maximum cut-in voltage	0	270	270	Volt	R/W	*	*	*	
d–	**Defrost**									
d01	Defrost method (0) *non* = None, (1) *nat* = Natural, (2) *El* = Electrical , (3) *gas* = Hot gas	0	3	2		R/W	*	*	*	
d02	Defrost stop temperature	0.0	50.0	6.0	°C	R/W	*	*	*	
d03	The interval between defrost starts	0	240	8	hour	R/W	*	*	*	

d04	Max. defrost duration	0	480	30	min	R/W	*	*	*	
d05	Time o set for start of first defrost at start-up	0	240	0	min	R/W	*	*	*	
d06	Drip o time	0	60	0	min	R/W	*	*	*	
d07	Delay for fan start after defrost	0	60	0	min	R/W	*	*	*	
d08	Fan start temperature	-40.0	50.0	-5.0	°C	R/W	*	*	*	
d09	Fan operation during defrosting	0/O	1/ On	1/On		R/W	*	*	*	
d10 1)	Defrost sensor (0=time, 1=Sair, 2=S5)	0	2	0		R/W	*	*	*	
d18	Max. comp. runtime between two defrosts	0	96	0	hour	R/W	*	*	*	
d19	Defrost on demand – S5 temperature's permitted va riation during frost build-up. On the central plant choose 20 K (=o)	0.0	20.0	20.0	K	R/W	*	*	*	
d30	Defrost delay after pull-down (0 = OFF)	0	960	0	min	R/W	*	*	*	
F–	**Fan**									
F01	Fan at the top of the compressor (0) *FFC* = Follow comp., (1) *Fao* = ON, (2) *FPL* = Fa n pulsing	0	2	1		R/W	*	*	*	
F04	Fan stop temperature (S5)	-40.0	50.0	50.0	°C	R/W	*	*	*	
F07	Fan pulsing ON cycle	0	180	2	min	R/W	*	*	*	
F08	Fan pulsing OFF cycle	0	180	2	min	R/W	*	*	*	
c–	**Compressor**									
c01	Min. ON-time	0	30	1	min	R/W	*	*	*	
c02	Min. OFF-time	0	30	2	min	R/W	*	*	*	
c04	Compressor OFF delay at door open	0	900	0	sec	R/W	*	*	*	

c70	Zero crossing selection	0/No	1/ Yes	1/ Yes		R/W	*	*	*	
o–	**Miscellaneous**									
o01	Delay of outputs at start-up	0	600	10	sec	R/W	*	*	*	*
o02 [1)]	DI1configuration (0) *oFF*=not used, (1) *Sdc*=status, (2) *doo*=door function, (3) *doA*=door alarm, (4) *SCH*=main switch, (5) *nig*=day/night mode, (6) *rFd*=reference displacement, (7) *EAL*=external alarm, (8) *dEF*=defrost, (9) *Pud*=pull down, (10) *Sc*=condenser sensor	0	10	0		R/W	*	*	*	*
o03 [1)]	Network address	0	247	0		R/W	*	*	*	*
o05	Access code	0	999	0		R/W	*	*	*	*
o06 [1)]	Sensor type selection (0) n5 = NTC 5k, (1) n10 = NTC 10k, (2) Pt = Pt1000, (3) Ptc = PTC 1000	0	3	2		R/W	*	*	*	*
o15	Display resolution (0) 0.1, (1) 0.5, (2) 1.0	0	2	0		R/W	*	*	*	*
o16	Max. standby time after coordinated defrost	0	360	20	min	R/W	*	*	*	

Code	**Short text manual**	**Min.**	**Max.**	**Def.**	**Unit**	**R/W**	**EKC 224 Appl.**			
							1	**2**	**3**	**4**

o37 1)	DI2 configuration (0) *oFF*=not used, (1) *Sdc*=status, (2) *doo*=door function, (3) *doA*=door alarm, (4) *SCH*=main switch, (5) *nig*=day/night mode, (6) *rFd*=reference displacement, (7) *EAL*=external alarm, (8) *dEF*=defrost, (9) *Pud*=pull down	0	9	0		R/W	*	*	*	*
o38	Configuration of light function (0) *on*=always on, (1) *dAn*=day/night, (2) *doo*=based on door action, (3) *nEt* = Network	0	3	1		R/W	*		*	*
o39	Light control via a network (only if o38=3 (nEt))	0/O	1/ On	1/ On		R/W	*		*	*
o61 1)	Selection of application mode (1) *AP1*: Cmp/Def/Fan/Light (2) *AP2*: Cmp/Def/Fan/Alarm (3) *AP3*: Cmp/Al/Fan/Light (4) *AP4*: Heat/Alarm/Light	1	4	1		R/W	*	*	*	*
o62 1)	Quick presetting of primary parameters 0 = Not used 1 = MT, Natural defrost, stop on time 2 = MT, El defrost, stop on time 3 = MT, El defrost, stop on temp. 4 = LT, El defrost, stop on temp 5 = Room, MT, El defrost, stop on time 6 = Room, MT, El defrost, stop on temp. 7 = Room, LT, El defrost, stop on temp.	0	7	0		R/W	*	*	*	
o67	Replace the controller factory settings with the present settings	0/No	1/ Yes	0/No		R/W	*	*	*	*
o91	Display at defrost (0) *Air*=Sair temperature / (1) *FrE*=freeze temperature / (2) *-d-*=”-d-” is displayed	0	2	2		R/W	*	*	*	
P–	**Polarity**									

P75	Invert alarm relay (1) = Invert relay action	0	1	0		R/W		*	*	*
P76	Keyboard lock enable	0/No	1/ Yes	0/No		R/W	*	*	*	*
u–	**Service**									
u00	Control state *S0*: Normal, *S1*: Wait after defrosting, *S2*: Min ON timer, *S3*: Min OFF timer, *S4*: Drip o , *S10*: r12 Main switch set OFF, *S11*: Thermostat cut-out, *S14*: Defrosting, *S15*: Fan delay, *S17*: Door open, *S20*: Emergency cooling, *S25*: Manual control, *S30*: Pulldown cycle, *S32*: Power up delay, *S33*: Heating	0	33	0		R	*	*	*	*
u01	Sair Air temperature	-100.0	200.0	0.0	°C	R	*	*	*	*
u09	S5 Evaporator temperature	-100.0	200.0	0.0	°C	R	*	*	*	*
u10	Status of DI1 input	0/O	1/ On	0/O		R	*	*	*	*
u13	Night condition	0/O	1/ On	0/O		R	*	*	*	*
u37	Status of DI2 input	0/O	1/ On	0/O		R	*	*	*	*
u28	Actual thermostat reference	-100.0	200.0	0.0		R	*	*	*	*
u58	Compressor / Liquid line solenoid valve	0/O	1/ On	0/O		R	*	*	*	
u59	Fan relay	0/O	1/ On	0/O		R	*	*	*	
u60	Defrost relay	0/O	1/ On	0/O		R	*	*		

u62	Alarm relay	0/O	1/ On	0/O		R		*	*	*
u63	Light relay	0/O	1/ On	0/O		R	*		*	*
u80	Firmware version readout					R	*	*	*	*
u82	Controller code no.					R	*	*	*	*
u84	Heat relay	0/O	1/ On	0/O		R				*
U09	Sc Condenser temperature	-100.0	200.0	0.0		R	*	*	*	

Alarm codes

In an alarm situation, the display will alternate between the readout of the actual air temperature and the readout of the alarm codes of active alarms.

Code	Alarms	Description	Network alarm
E29	Sair sensor error	The air temperature sensor is defective or the electrical connection is lost	— Sair Error
E27	Def sensor error	S5 Evaporator sensor is defective or the electrical connection is lost	— S5 Error
E30	Sc sensor error	Sc Condenser sensor is a defect or electrical connection is lost	— Sc Error
A01	High temp alarm	The air temperature in the cabinet is too high	— High t.alarm
A02	Low temp alarm	The air temperature in the cabinet is too low	— Low t. Alarm
A99	High Volt alarm	The supply voltage is too high (compressor protection)	— High Voltage
AA1	Low Volt alarm	The supply voltage is too low (compressor protection)	— Low Voltage
A61	Condenser alarm	Condenser temp. too high – check airflow	— Cond Alarm
A80	Cond. block alarm	Condenser temp. too high – Manual reset of alarm required)	— Cond Blocked
A04	Door alarm	The door has been open for too long	— Door alarm
A15	DI Alarm	External alarm from DI input	— DI Alarm
A45	Standby Alarm	Control has been stopped by “r12 Main switch”	— Standby mode

- The condenser block alarm can be reset by setting the r12 Main switch OFF and ON again or by powering down the controller.

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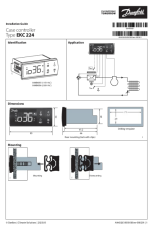	Danfoss 80G8429 Case Controller Type EKC 224 [pdf] Installation Guide 80G8429, 80G8446, 80G8390, 80G8392, 80G8391, 80G8432, 80G8433, 80G8434, 84B8346, 80G8435, 80G8440, 80G8429 Case Controller Type EKC 224, 80G8429, Case Controller Type EKC 224, Controller Type EKC 224, Type EKC 224, EKC 224

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- User Manual