



Case/room controller (TXV)

AK-CC25 Pro

Description

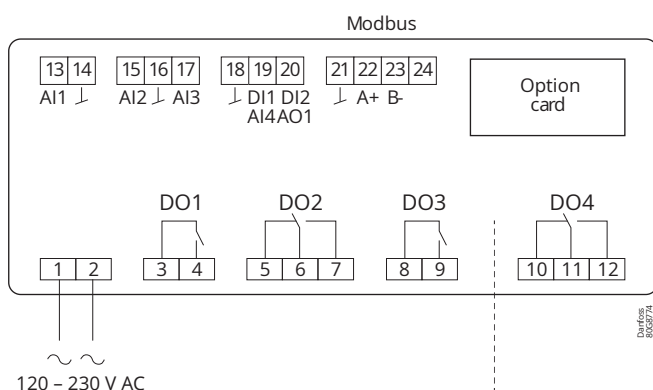
The AK-CC25 Pro is a case/room controller designed for TXV based applications. Focus application coverage is for plug-in units with one compressor (fixed or variable speed) or two compressors in either single or dual circuit configuration. It is also suitable for basic remote cases, cold rooms and evaporators. It offers a wide range of advanced functionality as described in this document.

Features & benefits

- Intuitive display operation with large digits, icons for status read-out and 10 buttons for easy start/stop of direct actions and navigation in menu structure.
- Broad application coverage as AK-CC25 Pro supports multiple compressor application like: single compressor, variable speed compressor, dual circuit cabinets with individual compressor per circuit and single circuit cabinets with dual compressor.
- Quick and easy selection of 8 predefined applications or alternatively a fully flexible programming of all controller in- and outputs.
- Easy start-up via a quick set-up of the main application settings.
- Easy configuration and service using a mobile app with Bluetooth.
- Safety monitoring of high condenser temperature and compressor safety chain with option for lock out of compressor operation at repeated safety stops.
- Dynamic switch between two individual controller setups supporting specific controller configurations for MT and LT operation, respectively.

Applications

The general wiring diagram of the AK-CC25 Pro controller is shown below:



Overall, the hardware features the following IO:

- 4 digital outputs
- 2 digital inputs
- 4 analogue inputs (AI4 is mutual exclusive with DI1)
- 1 Analogue output (AO1 is mutual exclusive with DI2)

The AK-CC25 Pro controller has 9 application modes. For the application modes 1-8, most of the input and output functions are predefined making it fast and foolproof to configure the controller. However, application 9 offers a fully flexible IO configuration where all input and output functions can be defined by the user, please refer to the table below for further details.

Applications 1-4	These are typical applications for a single refrigeration circuit with on/off or variable speed compressor. To use a variable speed compressor the analogue output AO1 must be set for compressor speed control.
Applications 5-8	These are applications for either a single refrigeration circuit with dual on/off compressors or for a cabinet with two individual refrigeration circuits each having an on/off compressor.
Application 9	For this flexible application mode, the function of all inputs and outputs can be defined individually.



The selection gives the following IO configurations:

Table: Overview of application mode and IO configuration

	Application	DO1 SPST	DO2 SPDT	DO3 SPST	DO4 SPDT	AI1	AI2	AI3	AI4 DI1 ⁽¹⁾	AO1 DI2 ⁽²⁾	Modbus
1	Standard case MT/LT (Alarm)					S3	S4	S5	•	•	Built-in
2	Standard case MT/LT (Light)					S3	S4	S5	•	•	Built-in
3	Standard case MT/LT (Rail heat)					S3	S4	S5	•	•	Built-in
4	Case with condenser fan ctrl					S3	S4	S5	Sc	•	Built-in
5	Dual comp. with alarm					S3	S4	S5	•	•	Built-in
6	Dual comp. with light					S3	S4	S5	•	•	Built-in
7	Dual comp. with rail heat					S3	S4	S5	•	•	Built-in
8	Dual comp. with fan					S3	S4	S5	•	•	Built-in
9	Flexible case	•	•	•	•	•	•	•	•	•	Built-in

• The Input/Output function can be freely configured.

(1) AI4/DI1 can be used for sensor signals or digital input signals

(2) AO1/DI2 can be used for compressor speed signal (Hz) or digital input signals

Application examples

Figure: Single circuit with on/off or variable speed compressor

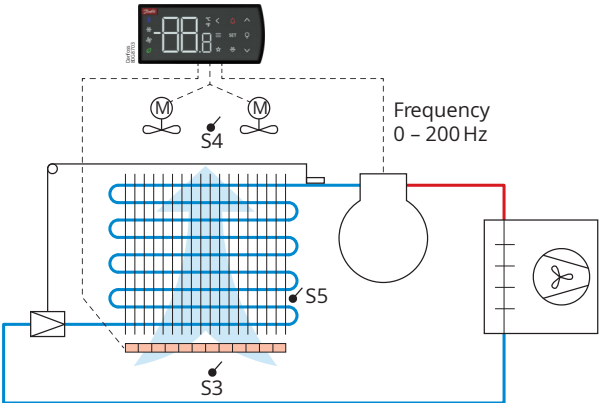


Figure: Single circuit with two on/off compressors

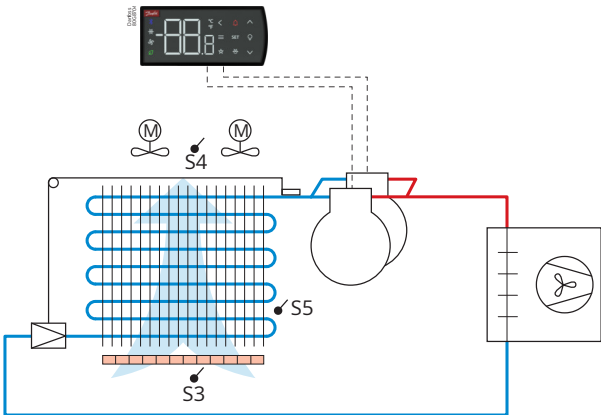


Figure: Dual circuits with separate on/off compressors

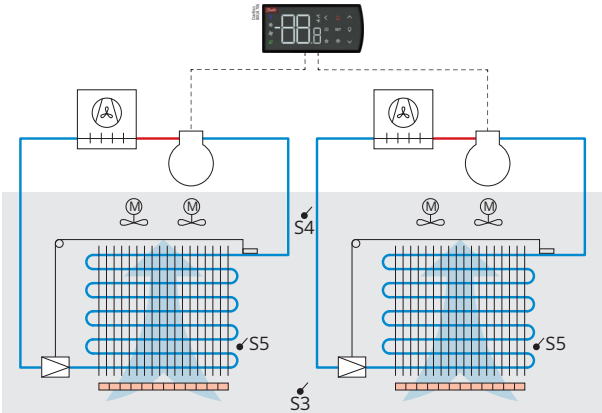
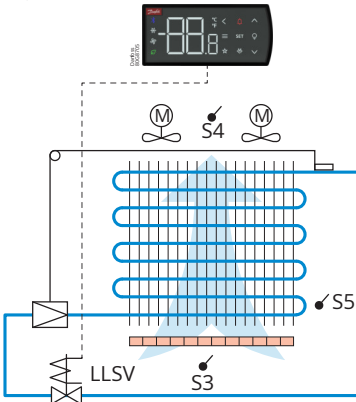


Figure: Remote cabinet with liquid line solenoid valve



Ordering

Product code numbers

Type	Packaging format	Quantity	Code no.
AK-CC25 Pro	Single pack	1	084B4022
AK-CC25 Pro	Industrial pack	27	084B4122
AK-CC25 Pro BT	Single pack	1	084B4023
AK-CC25 Pro BT	Industrial pack	27	084B4123

Accessories code numbers



084B4714

**Electron. control accessories,
Connector kit AK-CC25 IP, AK-
CC25 Pro**

Connector kit AK-CC25 IP, Used for
product: AK-CC25 Pro, Packing
format: Industrial pack, Quantity
per packing format: 81

Related products

[084B4021](#) [084B4022](#) [084B4023](#) [084B4121](#) [084B4122](#) [084B4123](#)


080N0334

**Electron. control accessories,
Koolkey Cable - AK-CC25, AK-
CC25 Pro**

Koolkey Cable - AK-CC25, Used for
product: AK-CC25 Pro, Packing
format: Single pack, Quantity per
packing format: 1

Related products

[084B4021](#) [084B4022](#) [084B4023](#) [084B4121](#) [084B4122](#) [084B4123](#)


080N0020

**Electron. control accessories,
EKA 200 KoolKey, ERC, EET,
AK-CC, EKE**

EKA 200 KoolKey, Used for product:
ERC, EET, AK-CC, EKE, Packing
format: Single pack, Quantity per
packing format: 1

Related products

[084B4021](#) [084B4022](#) [084B4023](#) [084B4121](#) [084B4122](#) [084B4123](#)



Overview

Product portfolio


	AK-CC25 Pro	AK-CC25 Pro BT
Product image		
Communication	Modbus	Modbus & Bluetooth
Configuration Wizard	-	Yes

AK-CC25 Pro: programming tools

Configuration wizard

The configuration wizard is designed to simplify setup by guiding users in selecting the appropriate application and assisting with I/O configuration. Its intuitive interface is easy to follow and provides clear wiring diagrams tailored to the chosen application. These diagrams are displayed at the end of the configuration process and can be downloaded and shared as PNG files. The wizard is accessible both with and without a connection to the controller, ensuring flexibility and convenience during setup. The wizard is only used with the AK-CC25 Pro BT variant.

Wizard



Select your controller

Start wizard by scanning the matrix code on your controller, or selecting your controller from a list

Scan matrix code

Select controller

Select application

Step 1 of 5

1: Comp/def/fan/alarm

Compressor 1

Defrost A

Fan

Alarm relay

2: Comp/def/fan/light

Compressor 1

Defrost A

Fan

Light

3: Comp/def/fan/rail

Compressor 1

Defrost A

Fan

Rail heat

4: Comp/def/fan/cond

Compressor 1

Defrost A

Fan

Condenser fan

5: Two comp/def/alarm

Compressor 1

Defrost A

Compressor 2

Alarm relay

6: Two comp/def/light

Compressor 1

Defrost A

Compressor 2

Light

Wiring diagram

Step 5 of 5

AI1 Function

S3 Air ON evap.

AI2 Function

S4 Air OFF evap.

AI3 Function

S5 Evaporator A

AI4 Function

None

DI1 Function

None

DI2 Function

None

AO1 Function

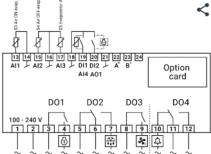
None

DO1 Function

Compressor 1

DO2 Function

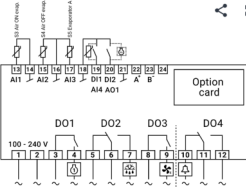
Defrost A



Wizard completed

Exit

Create a setting file with your configuration. Once connected you can copy the file to a controller



Connect and apply

Create setting file

KoolProg

KoolProg is an OEM tool for offline and on-line programming of the AK-CC25 controller as well as for production line programming of multiple controllers. The KoolKey can be used as a USB/RS485 converter eliminating the need to connect AC power to the controller while programming. A standard USB/RS485 converter can also be used, but this will require AC power to operate the controller while performing the programming.

KoolKey 2

Besides working as a USB/RS485 converter for KoolProg, KoolKey can also be used as a copy key for the AK-CC25 controller. KoolKey just must be connected to the RS485 port of the controller and then the setting file placed on the KoolKey by KoolProg, is transferred to the controller via a push on the transfer button.

Figure: KoolKey as USB/RS485 gateway

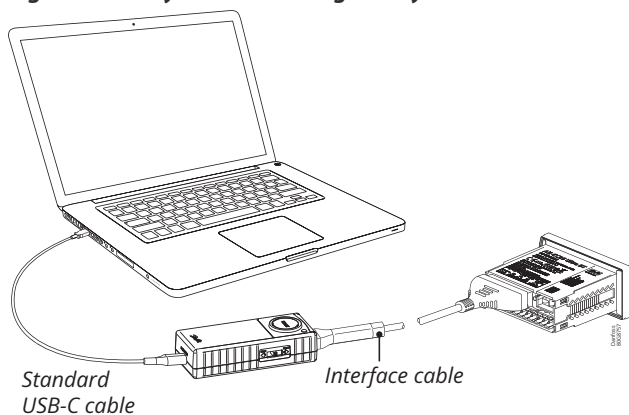
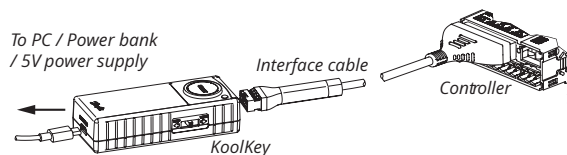
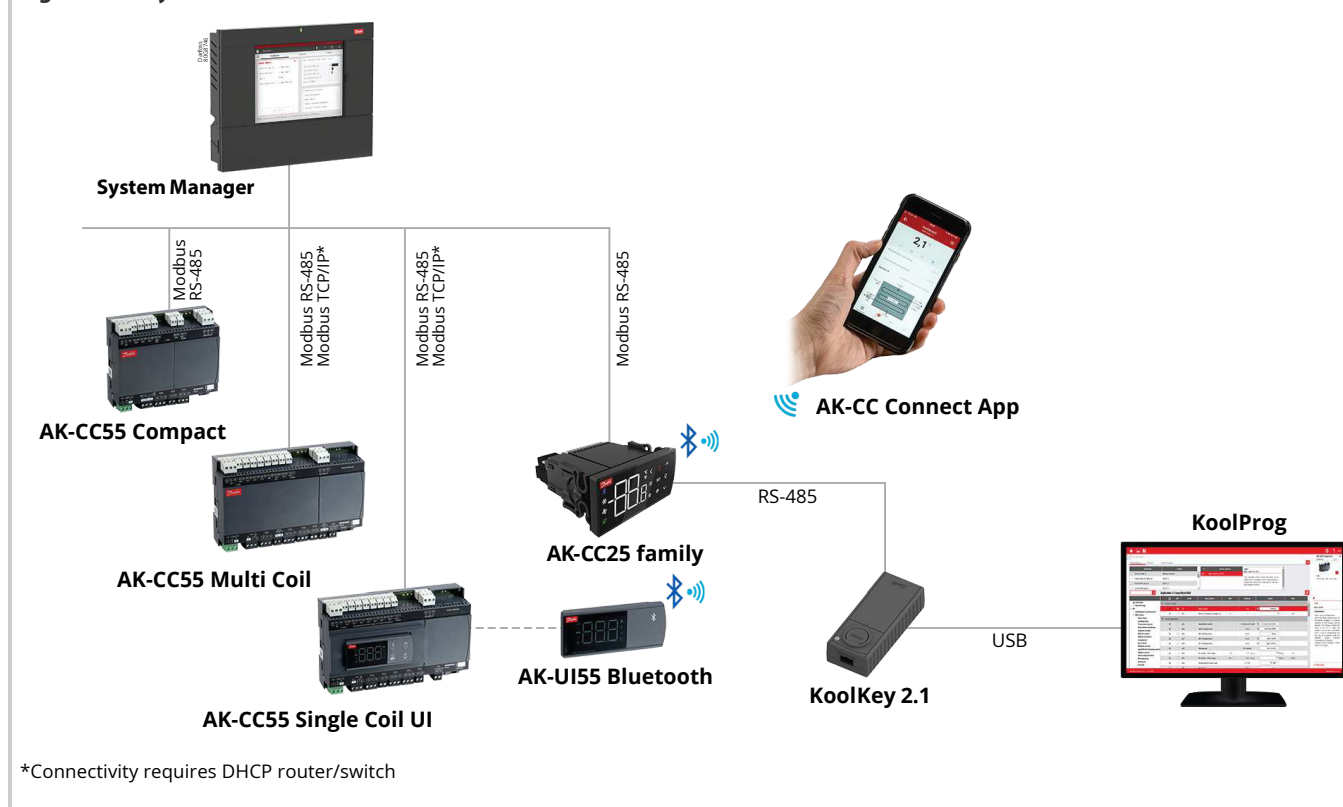


Figure: Controller without main power



System architecture

Figure: ECO system



Functions

- Single refrigeration circuit with single or dual compressor
- Dual refrigeration circuits with individual compressors
- Modulating temperature control via capacity control of variable speed compressor
- Variable speed control via frequency signal
- Oil return management for extended lifetime of VSC compressor
- Resonance avoidance range for eliminating mechanical noise from unit
- Temperature and operational performance monitoring
- Safety monitoring of condenser temperature and compressor safety chain with option of lock-out if safety limits are violated repeatedly
- Switch between MT and LT operation modes via digital input or display
- Start of defrost via schedule, runtime, digital input, network or setting display
- Natural, electrical, hot gas or pulsing electrical defrost
- Stop of defrost on time and/or temperature
- Coordination of defrosting among several controllers in a line-up
- Pulsing control of fans when thermostat is satisfied
- Appliance cleaning function for documentation of HACCP procedure
- Rail heat control via day/night load or dew point
- Door function and alarm monitoring
- Light control according to schedule, door signal or network signal
- Heating thermostat
- High accuracy inputs guaranteeing a better measuring accuracy than stated in the standard EN ISO 23953-2 without subsequent calibration (Pt1000 ohm sensor)
- Integrated MODBUS communication



Operation

User interface

Display

The front display features 2 large digits, a smaller decimal digit, and a sign for negative values. It has 3 status icons and 10 capacitive touch buttons that are backlit when active in each context.

Figure: AK-CC25 front display



Icons	Name	Description
	ECO mode	Lights up when in night/ECO mode
	Cooling	Lights up when cooling
	Fan	Lights when evaporator fans are running
Navigation buttons		
	Back	Navigates back to previous menu
	Up	Navigates up in menu structure Increase value when in setting mode
	Down	Navigates down in menu structure Increase value when in setting mode
	Info menu	Navigates to the controller info menu

Icons	Name	Description
Direct action buttons		
	SET	Short press: Change thermostat setpoint Long press: Navigate to parameter menu
	Alarm	Short press: Navigates to list of active alarms Long press while in menu: Reset of alarms
	Light	Long press: Switches light status
	Defrost	Long press: Start/stop of a defrost cycles
	Bluetooth	Long press: Initiate/Terminate Bluetooth connection
	Star	Function can be configured (not supported yet)

Product details

General data

Table: Mechanical

Features	Description
Enclosure	Self-extinguishing polycarbonate

Table: Electrical specifications

Features	Description
Purpose of control	Electrical control device
Power supply	100 – 240 V AC
Power consumption	3 V A
Frequency	50/60 Hz
Terminal blocks	L, N, DO1, DO2, DO3, DO4
	Removable male-female 12 – 24 AWG / 0.34 – 2.5 mm ²
	AI1-AI3, DI1-DI2
	Removable male-female 16 – 28 AWG / 0.081 – 1.5 mm ²
	Modbus:
	Removable male-female 16 – 28 AWG / 0.081 – 1.5 mm ²
Rated impulse voltage	2500 V
Overvoltage category	II
Construction of control	Incorporated control
Environmental pollution class	2

Table: User interface

Features	Description
Display	3 digits, decimal point and multifunction icons
Keypad	10 backlit capacitive touch buttons
Status icons	3 backlit icons

Table: Connectivity

Features	Description
Bluetooth	Bluetooth Low Energy ver. 5.1, max distance 10 m, variable according to the mobile device used
Fieldbus	RS485 Transceiver oktal load. (allows up to 256 units), non isolated Speed: up to 115.2 kbps Fail safe: means accept 0 V on bus line Cable length: ≤1200 m

Table: Analogue inputs (AI1-AI4)

Features	Description
Sensor types	Pt1000, (AKS 11, AKS 12, AKS 21) PTC 990 Ohm at 25 °C NTC 5K Ohm at 25 °C, (EKS 211) NTC 10K Ohm at 25 °C, (EKS 221) User defined type
Measuring range	Pt1000: -60 – 120 °C PTC1000: -60 – 80 °C NTC 5K: -40 – 80 °C NTC 10K: -40 – 120 °C User defined type: 400 – 200k ohm Note: Each AI/DI/AO signal must have a separate ground wire
Accuracy	Pt1000: ±0.5 K PTC 1000: ±0.5 K NTC 5K: ±0.5 K NTC 10K: ±0.5 K

Table: Digital inputs (DI1-DI2)

Features	Description
DI1	Dry contact, open loop. 3.3 V DC, contact current. 2.2 mA
DI2	Dry contact, open loop. 12 V DC, contact current. 3.5 mA OBS: Defrost co-ordination: max. 5 controllers in parallel, max. 100 m cable total

Table: Analogue output (AO1)

Features	Description
AO1	Frequency: 0 – 200 Hz (min. 0 V and max. 12 V) Sink: 25 mA, cable length < 30 m

Table: Digital outputs (DO1-DO4)

Terminals/Action type	Load type	EN Ratings	UL ratings
DO1, 3-4 (NO) DO2, 5-6-7 (NO/NC) Type 1.B	Resistive	NC/NO: 10 A, 240 V AC	NC/NO: 10 A resistive 240 V AC
	Motor compressor	DO1: 10A (cos ϕ = 0.6), 240 V AC DO1/DO2: 3.5A (cos ϕ = 0.4), 240 V AC	NO: 1 1/2 HP or 10FLA/60LRA 240 V AC NC/NO: 1/2 HP 125 V AC NC/NO: 1 HP 240 V AC
	Inductive	Not rated for this load type	NO: Pilot duty: B300
	Lamp elect. ballast	Not rated for this load type	DO1: NO: TV-5, 125 V AC DO2: NO: TV-5, 240 V AC
DO3, 8-9 (NO) DO4, 10-11-12 (NC/NO) Type 1.B	Resistive	NC/NO: 6A resistive, 240 V AC	NC/NO: 6A resistive, 240 V AC
	Motor compressor	NC/NO: 3A (cos ϕ 0.4), 240 V AC	1/4 HP 125/240 V AC
	Inductive	NC/NO: 6(4), 240 V AC	NC/NO: Pilot duty: B300
	Lamp elect. ballast	Not rated for this load type	NO: TV-4, 120/240 V AC
Plugable connector		Max. 15 A	

Table: Others

Features	Description
5 V DC Supply Supply for external accessories	Total load from all external accessory: max 50 mA, cable length: ≤3 m
Real time clock	Accuracy. typ. 20 ppm, 10 min/year, back-up time 4 days



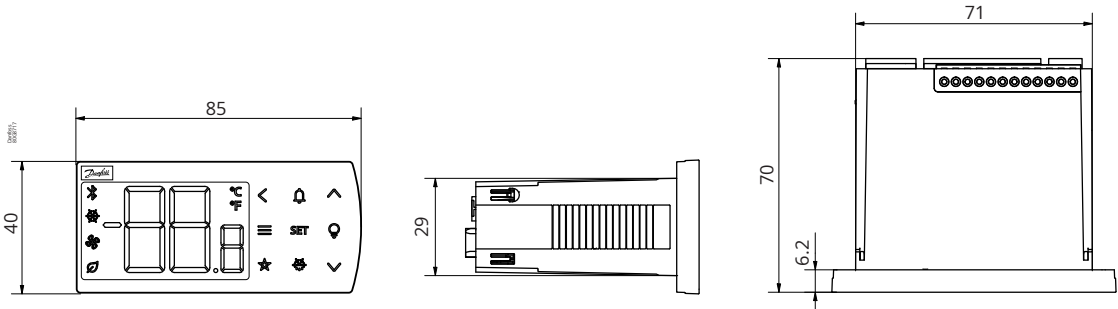
Performance and environmental conditions

Table: Environmental conditions

Features	Description
Ingress protection	Panel mounting with fixing mounting brackets EN: Front IP65, Back IPX0 UL: Type 1
Operating temperature	-20 – 55 °C; 20 – 80 rH% (non-condensing humidity)
Storage temperature	-40 – 70 °C; 20 – 80 rH% (non-condensing humidity)

Dimensions

Figure: Dimensions

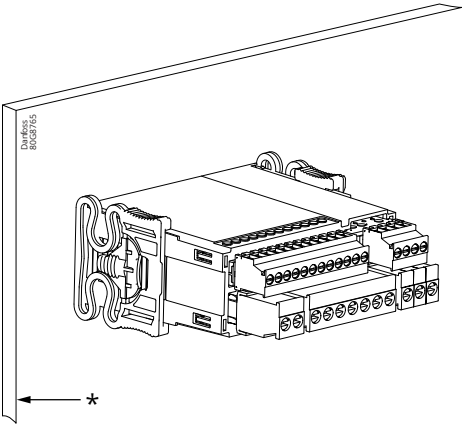


Installation

Panel mounting

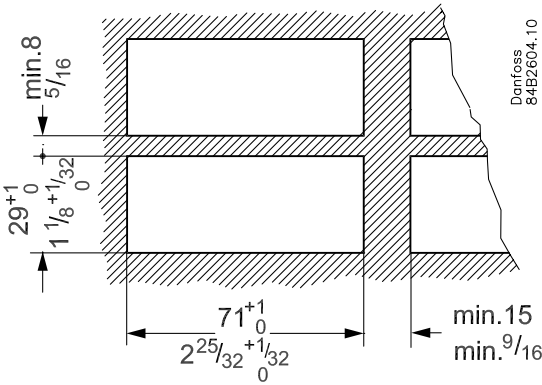
To guarantee IP65 protection, the controller must be fixated with the mounting brackets pushed tight on to the mounting plate (force: min. 245 nm per bracket).
Maximum deviation between the edges of the rectangular mounting hole from flat surface: ≤ 0.5 mm (0.02 in).
Maximum roughness of the surface where the gasket is applied: ≤ 120 µm.

Figure: Panel mounting



* The allowed thickness of the mounting plate are min. 0.8 mm (0.03 inch) and max. 18 mm (0.70 inch).

Figure: Panel dimension



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The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

When you click on the link you will be directed to the latest version of the 'Declaration of Conformity'. Products developed and sold before this date of issue conform to the directives/standards in force at the time of their sale.

Approval type	Title	Certification body	Approval topic
EU Declaration	Danfoss EU Declaration 084R6596	Danfoss	LVD
Manufacturer's Declaration	Danfoss MD 084R6598	Danfoss	EU RoHS
Manufacturer's Declaration	Danfoss MD 084R6599	Danfoss	China RoHS
EU Declaration	Danfoss EU Declaration 084R6597	Danfoss	LVD

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