Danfoss AK-CC55 Compact Case Room Controller Installation Guide

Contents

Danfoss AK-CC55 Compact Case Room Controller

Product Information

Specifications

- Product Name: Case/room controller (EEV) Type AK-CC55 Compact
- Model Number: 084B4081
- Brand: Danfoss

Principle

The controller is designed to regulate various functions such as compressor, fan, defrost, and more in a refrigeration system.

Dimensions

Dimensions: Refer to the user manual for detailed dimension specifications.

Installation Guide

The controller comes with factory labels for general application. Specific labels are provided for mounting the relevant application.

Product Usage Instructions

1. Select the appropriate labels for the desired application.
2. Ensure correct installation of data communication cables with adequate distance from high voltage cables.
3. Coordinate defrost via cable connections with other compatible controllers.
4. Maintain separate wiring for sensors, low voltage DI inputs, and data communication to minimize electric noise.

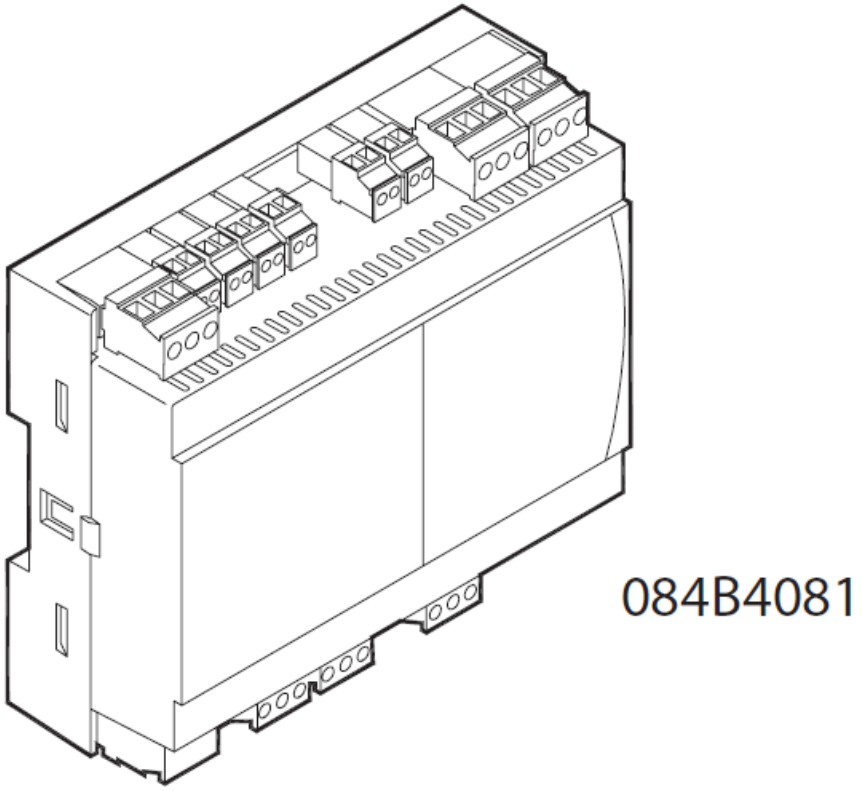
FAQ

- Q: How many controllers can be connected for coordinateddefrost?

  A: Maximum of 10 controllers can be connected for coordinateddefrost, including models EKC 204A, AK-CC 210, AK-CC 250, AK-CC 450, AK-CC 550, and AK-CC55.
- Q: What is the maximum distance for the external displaycable?

  A: The external display cable can be up to 100 meters long. Use cables with model numbers 084B4078 (3m) or 084B4079 (6m).

Identification



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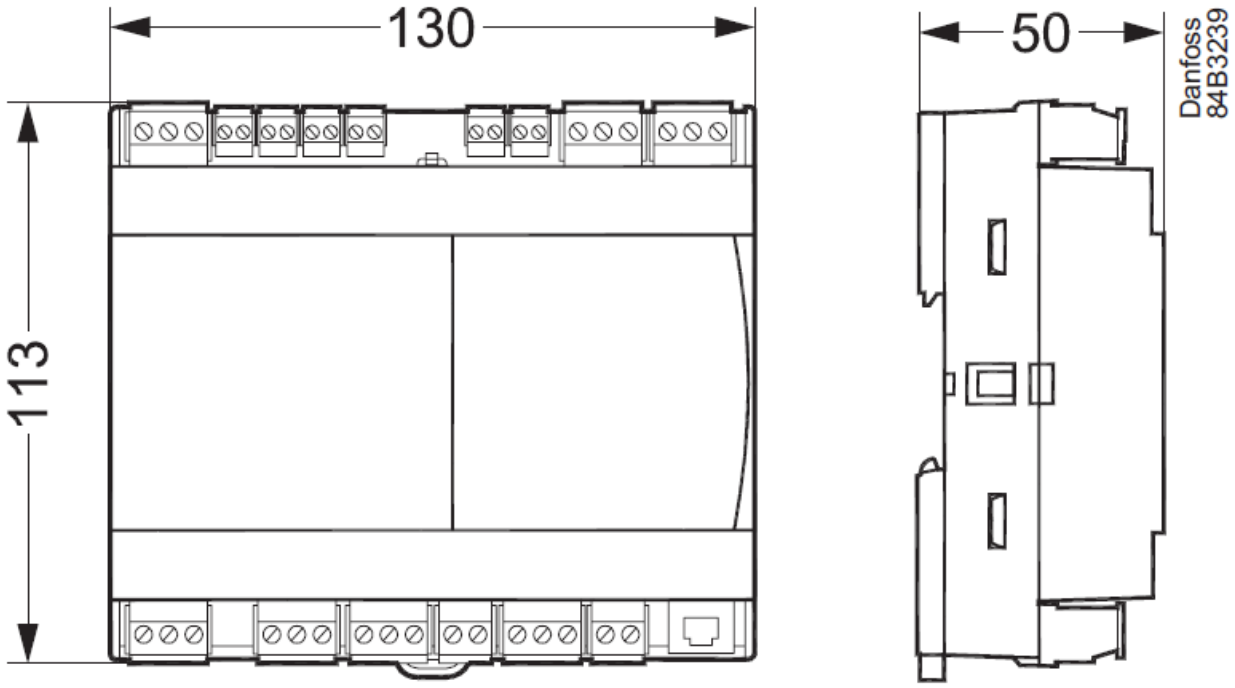
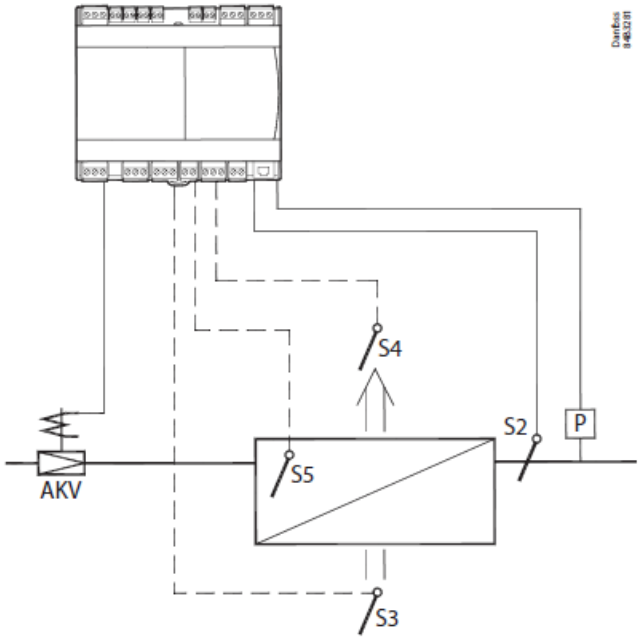


Principle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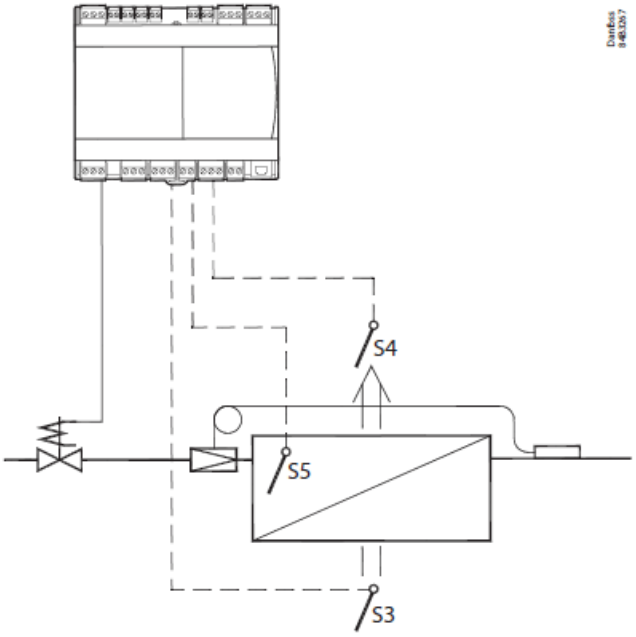
S2
P
AKV
S5
S3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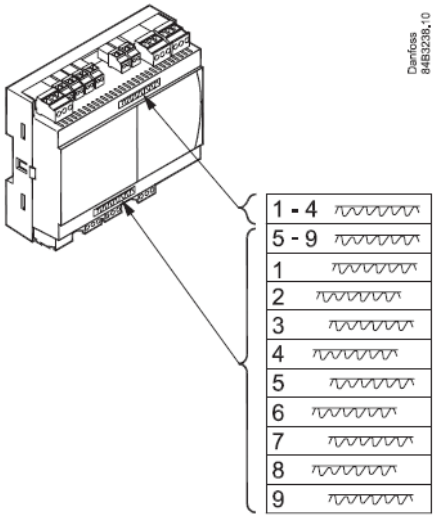
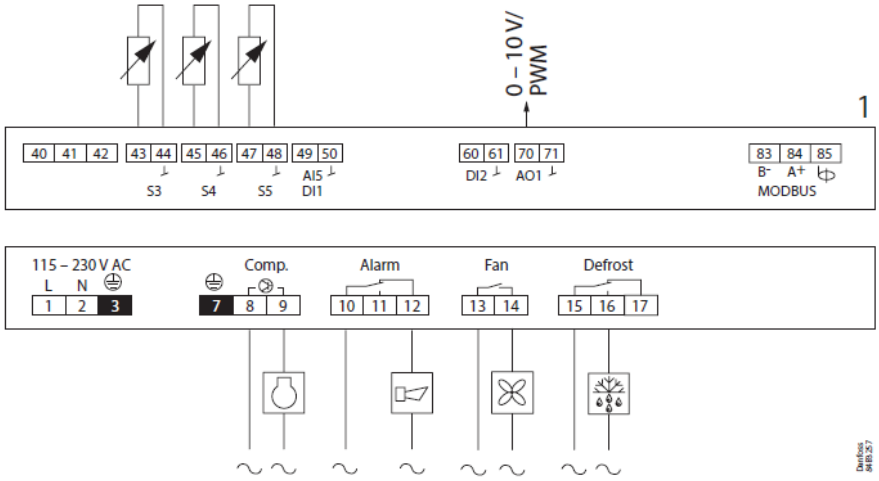


The controller is provided with labels from the factory indicating a general application. When selecting the required application, specific labels are provided so that you can mount the relevant one.

1.



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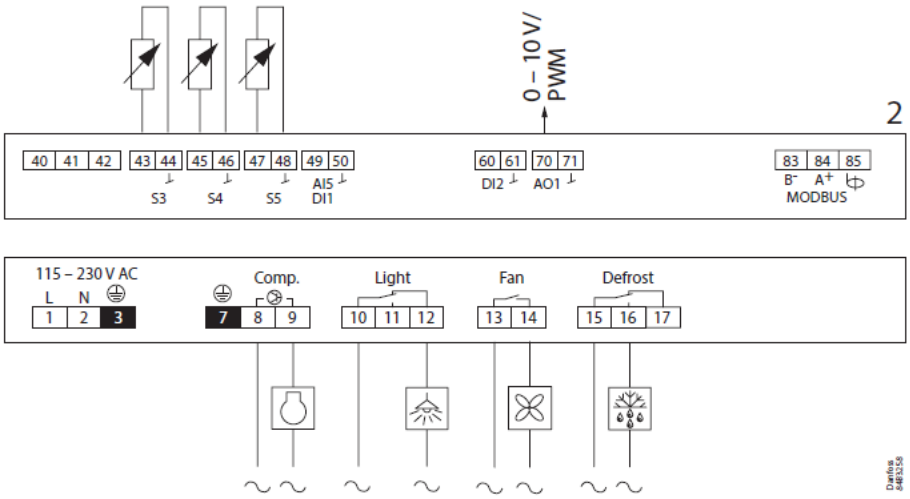
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45 46
47 48
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S5
AI5
DI1
60 61
70 71
DI2
AO1
83 84 85
B-
A+
MODBUS
115 – 230 V AC
L N
1 2 3
Comp.
7 8 9
Light
10 11 12
Fan
13 14
Defrost
15 16 17

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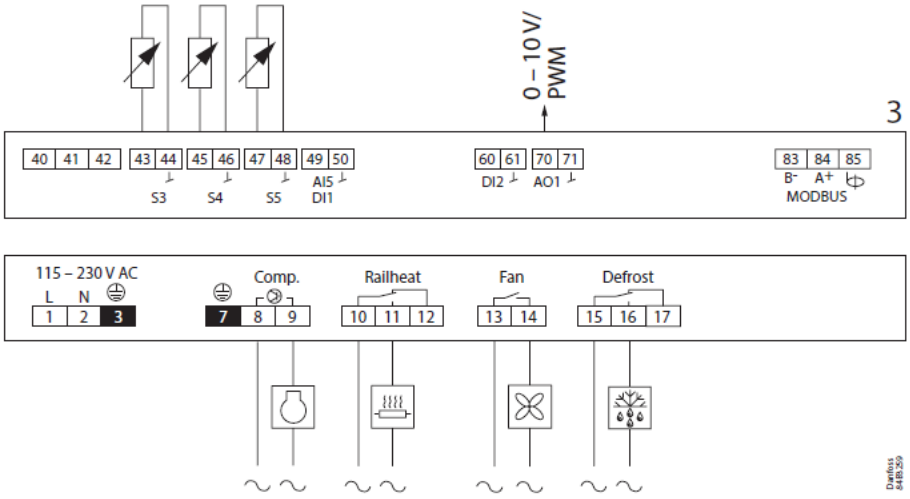
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DI2
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MODBUS
115 – 230 V AC
L N
1 2 3
Comp.
7 8 9
Railheat
10 11 12
Fan
13 14
Defrost
15 16 17

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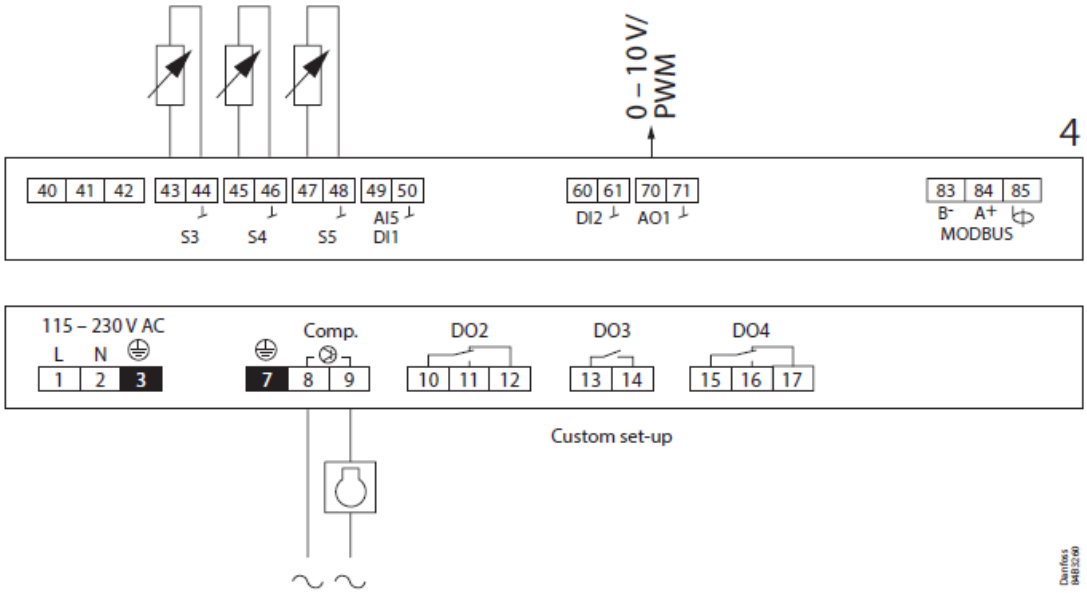
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B- A+
MODBUS
115 – 230 V AC
L N
1 2 3
Comp.
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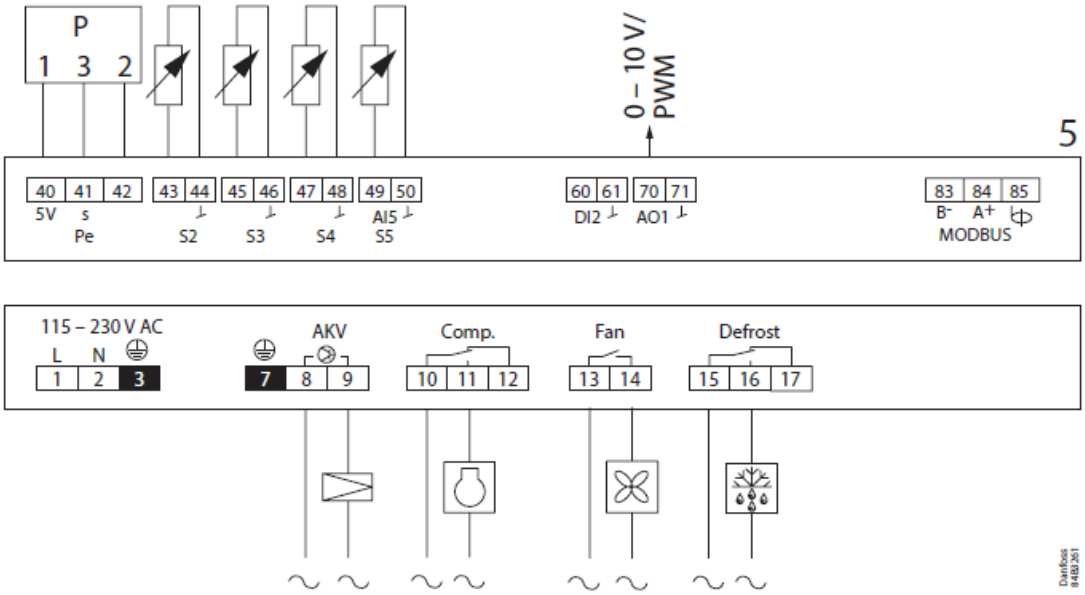
DO2
10 11 12
DO3
13 14
DO4
15 16 17
Custom set-up

5.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B- A+
MODBUS
115 – 230 V AC
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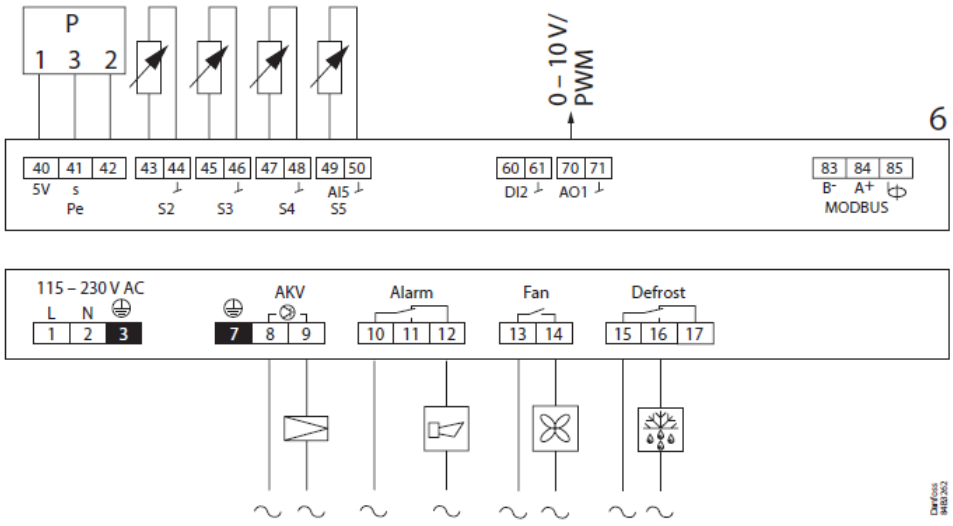
AKV
7 8 9
Comp.
10 11 12
Fan
13 14
Defrost
15 16 17

6.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DI2 AO1
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B- A+
MODBUS
115 – 230 V AC
L N
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AKV
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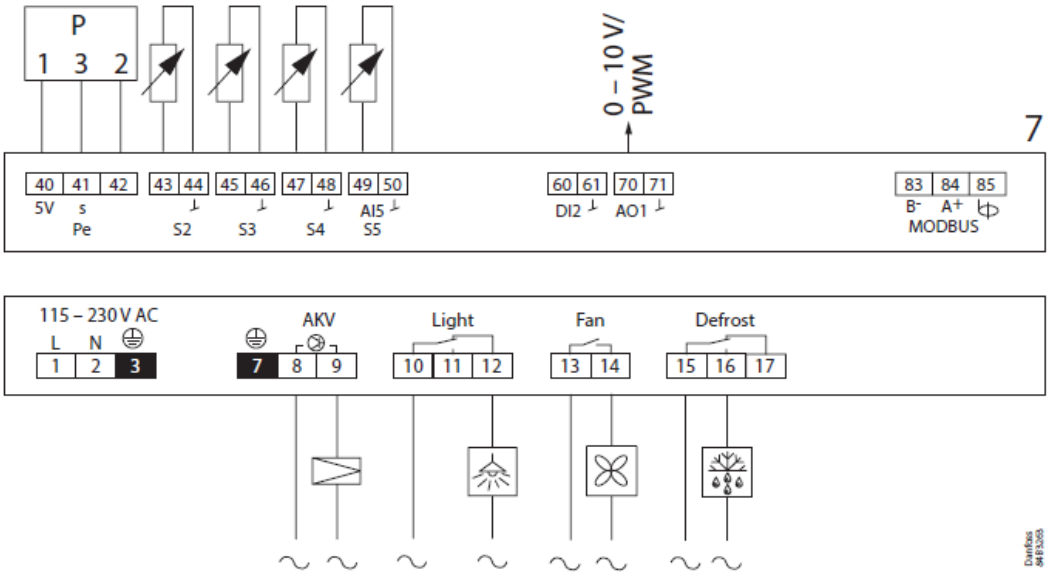
Alarm
10 11 12
Fan
13 14
Defrost
15 16 17

7.


P
1 3 2
0 – 10 V/
PWM
7
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MODBUS
115 – 230 V AC
L N
1 2 3
AKV
7 8 9
Light
10 11 12
Fan
13 14
Defrost
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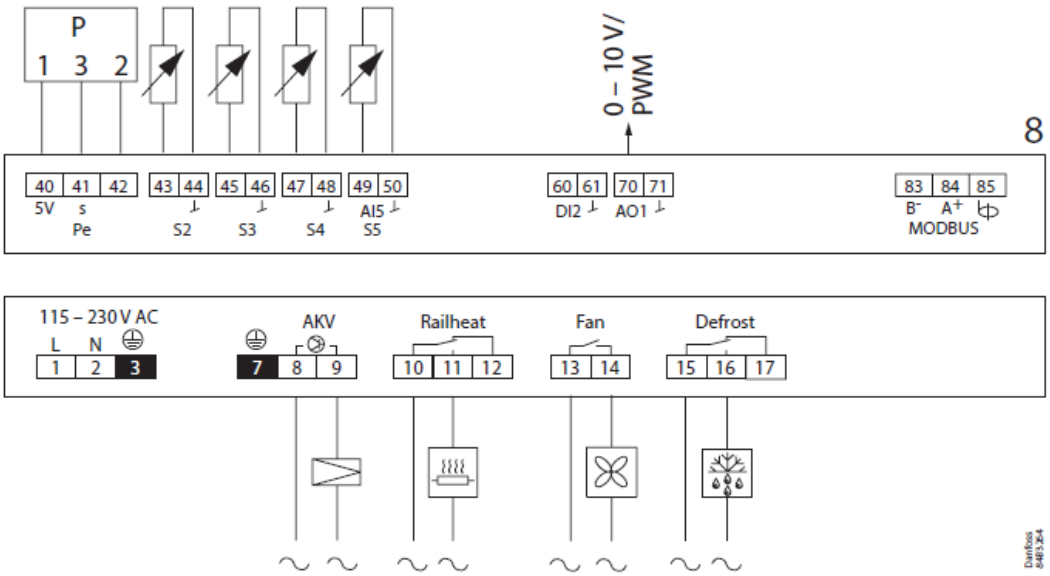
8.


P
1 3 2
0 – 10 V/
PWM
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AI5
S5
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DI2
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MODBUS
115 – 230 V AC
L N
1 2 3
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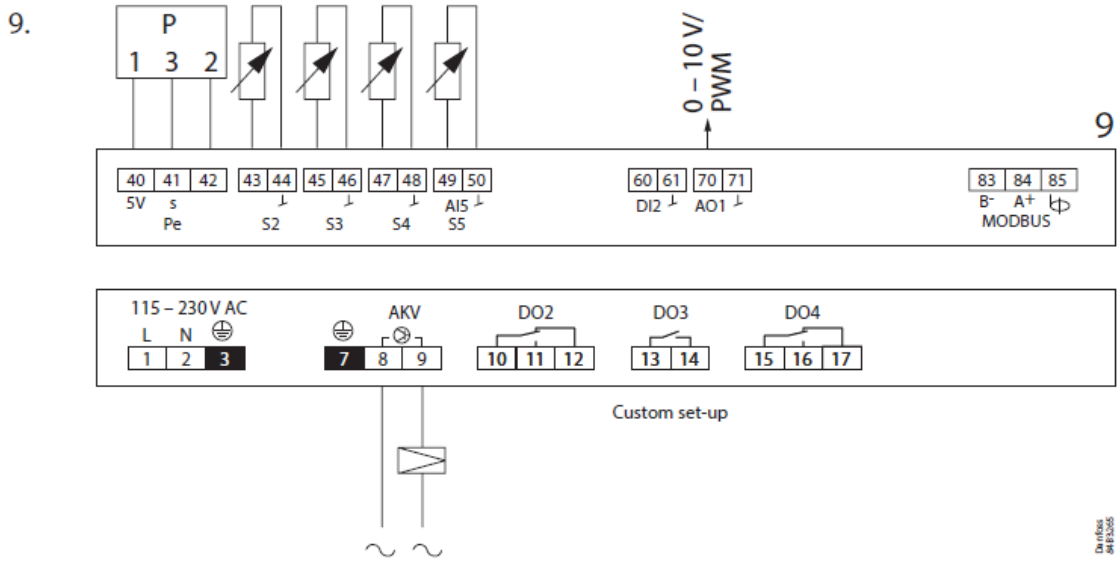

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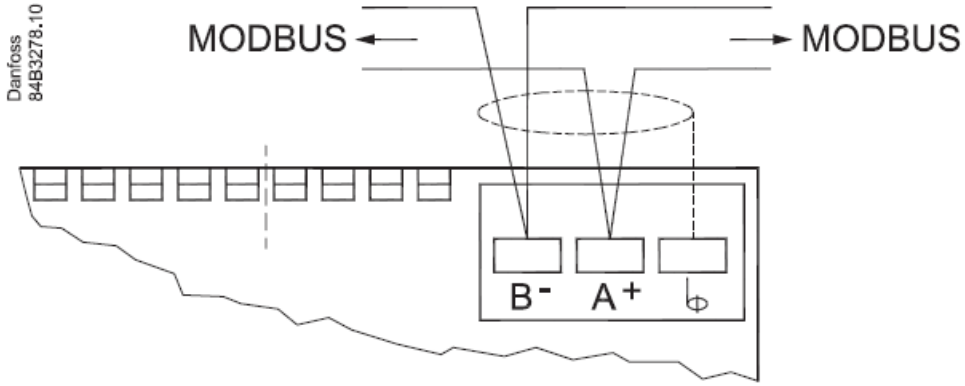
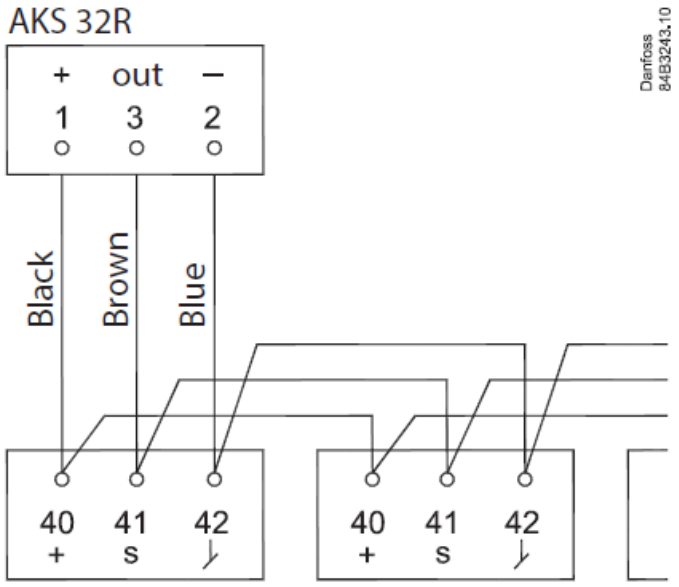
Data communication



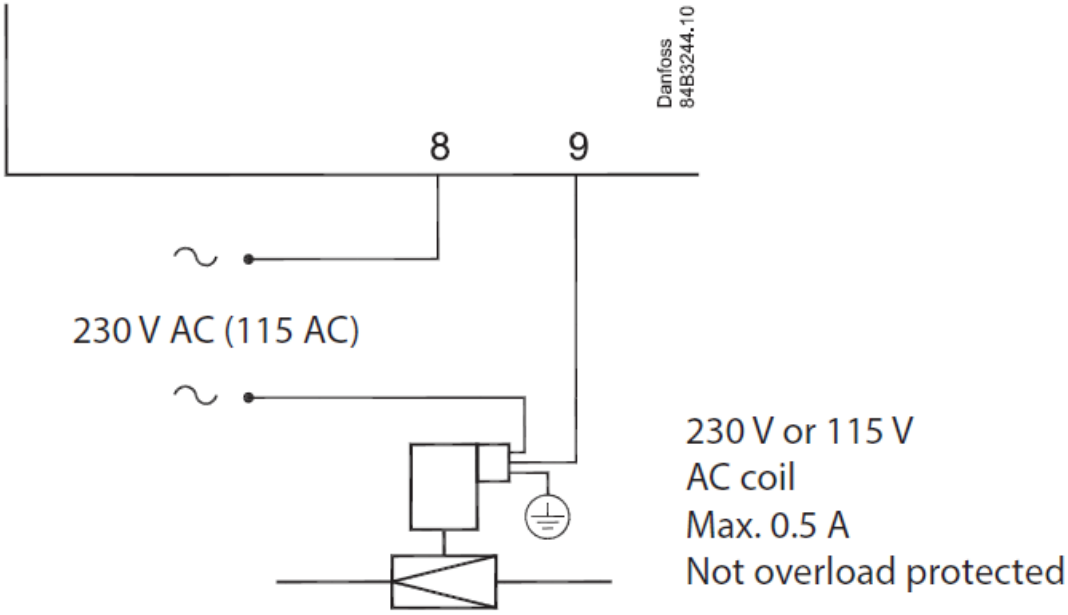
Important: It is important that the installation of the data communication cable is performed correctly with sufficient distance to high voltage cables

AKS 32R info (Application 5 – 9)

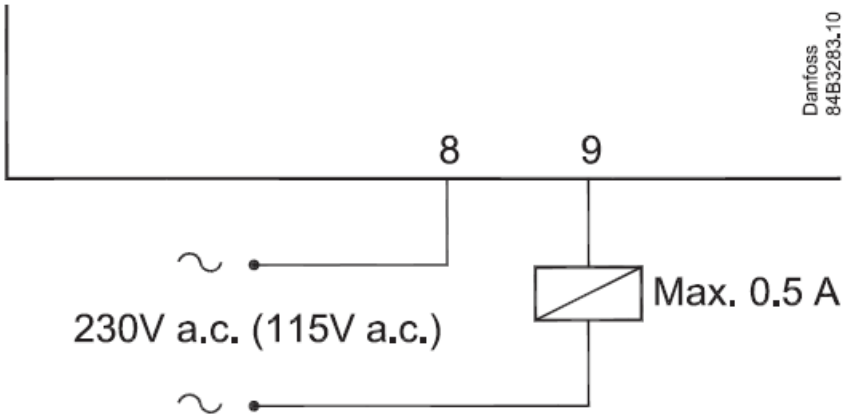


The signal from one pressure transmitter can be received by up to 10 controllers.
There must not be a significant pressure drop from the pressure transmitter's position in the suction line to the individual evaporators.

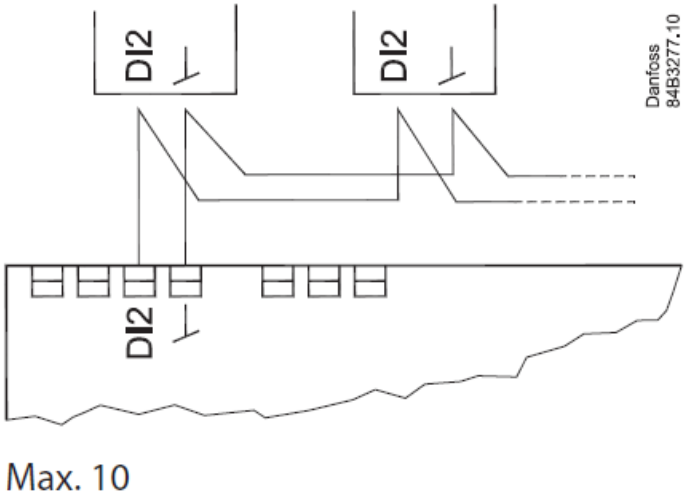
AKV info (Application 5 – 9)



Relay info (Application 1 – 4)



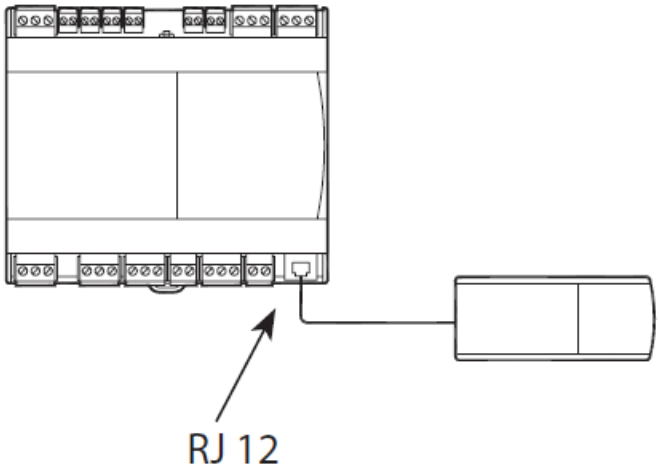
Coordinated defrost via cable connections



The following controllers can be connected in this way:
EKC 204A, AK-CC 210, AK-CC 250, AK-CC 450, AK-CC 550 and AK-CC55.

Refrigeration is resumed at the same time when all controllers have terminated defrost.

External display AK-UI55



Electric noise
Cables for sensors, low voltage DI inputs and data communication must be kept separate from other electric

cables:

- Use separate cable trays
- Keep a distance between cables of at least 10 cm
- Long cables at the low voltage DI input should be avoided

Installation considerations

- Accidental damage, poor installation, or site conditions, can give rise to malfunctions of the control system, and ultimately lead to a plant breakdown.
- Every possible safeguard is incorporated into our products to prevent this. However, a wrong installation could still present problems. Electronic controls are no substitute for normal, good engineering practice.
- Danfoss will not be responsible for any goods, or plant components, damaged as a result of the above defects. It is the installer's responsibility to check the installation thoroughly, and to t thenecessary safety devices.
- Special reference is made to the necessity of signals to the controller when the compressor is stopped and to the need of liquid receivers before the compressors.
- Your local Danfoss agent will be pleased to assist with further advice, etc..

Technical data

Electrical specifications

Electrical data	Value
Supply voltage AC [V]	115 V / 230 V, 50/60 Hz
Power consumption [VA]	5 VA
Power ON indicator	Green LED
Electrical cable dimensioning [mm2]	Max. 1.5 mm2 multi-core cable

Sensor and measuring data

Sensor and measuring data	Value
Sensor S2	Pt 1000 AKS11
Sensor S3, S4, S5	Pt 1000 AKS11 PTC 1000 EKS111 NTC5K EKS211 NTC10K EKS221 sensor (All 3 must be of the same type)
Temperature measuring accuracy	Pt1000: -60 – 120 °C. ±0.5 K PTC1000: -60 – 80 °C. ±0.5 K NTC5K: -40 – 80 °C. ±1.0 K NTC10K: -40 – 120 °C. ±1.0 K
Pt1000 sensor specification	±0.3 K at 0 °C ±0.005 K per degree
Pe measuring	AKS 32R Ratiometric pressure transmitter: 10 – 90%

Input and output relay specifications

Input and output relay specifications	Input/ output	Description
Digital input	DI1 DI2	Signal from dry contact functions Requirements to contacts: Gold plating Cable length must be max. 15 m Use auxiliary relays when the cable is longer Open loop: 12 V (SELV) Contact 3.5 mA
Solid state output	DO1 (for AKV coil)	115 V / 230 V AC Max. 0.5 A (No overload protection!) Max. 1 x 20 W AKV for 115 V AC 2 x 20 W AKV for 230 V AC **Note**: 2 EC coils are not supported.
Relays	DO2 DO3 DO4	115 V / 230 V AC Load max.: CE. 8 (6)A UL. 8A res. 3FLA 18LRA Load min.: 1VA Inrush: DO2 DO3 TV-5 80A
Analogue output/ PWM	AO1	0 / 10 V Pulse Width Modulated (PWM) max. 15 mA. 0 – 10 V variable, max. 2 mA

NOTE:

- DO2 to DO4 are 16 A relays
- Max. load must be observed
- DO2 / DO3 is recommended for load with high inrush current e.g. EC Fanand LED light
- All relays are sealed for use with ammable refrigerant like Propane R290
- Compliance with EN 60 335-2-89: 2010 Annex BB

Function data

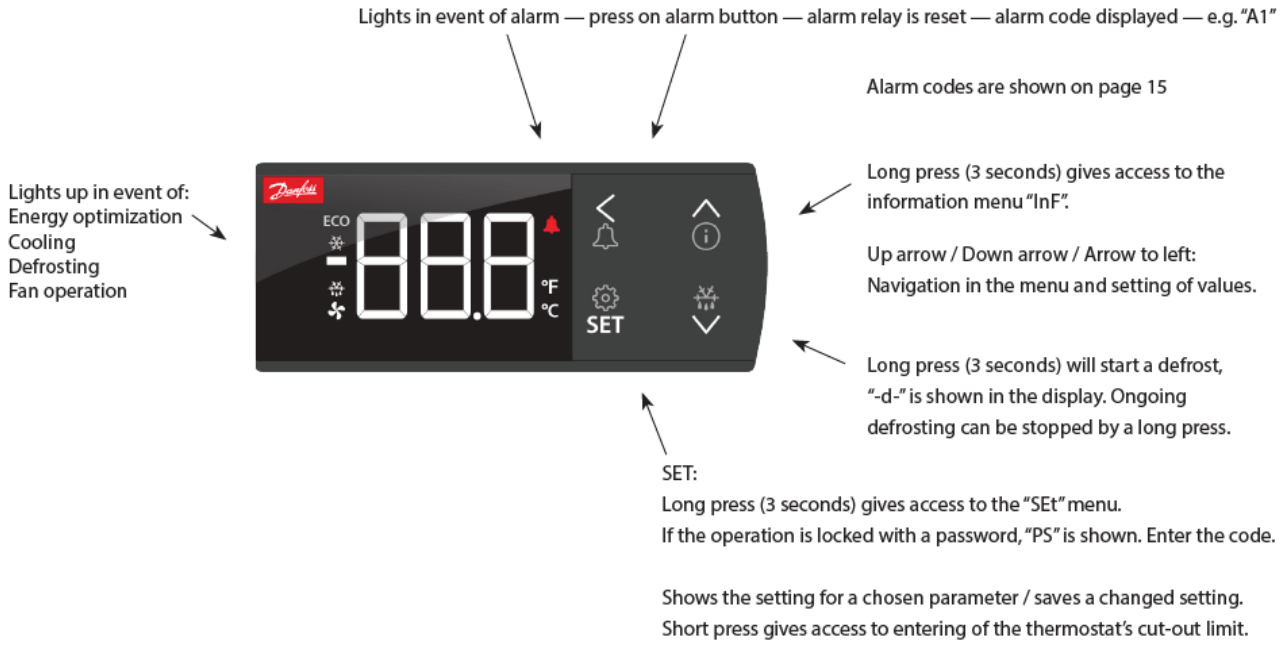
Function data	Value
Display	LED 3 digit
External display, AK-CC55 Compact	1 external display
External display connection	RJ12
Max. display cable length [m]	100 m
Data communication built-in	MODBUS
Clock battery backup power reserve	4 days
Mounting	DIN rail

Environmental conditions

Environmental conditions	Value
Ambient temperature range, operating [°C]	0 – 55 °C
Ambient temperature range, transport [°C]	-40 – 70 °C
Enclosure rating IP	IP20
Relative humidity range [%]	20 – 80%, non-condensing
Shocks/Vibrations	No shocks and vibrations allowed

Operation with setting display

Display AK-UI 55 Set
The values will be shown with three digits, and with a setting you can determine whether the temperature is to be shown in °C or in °F.



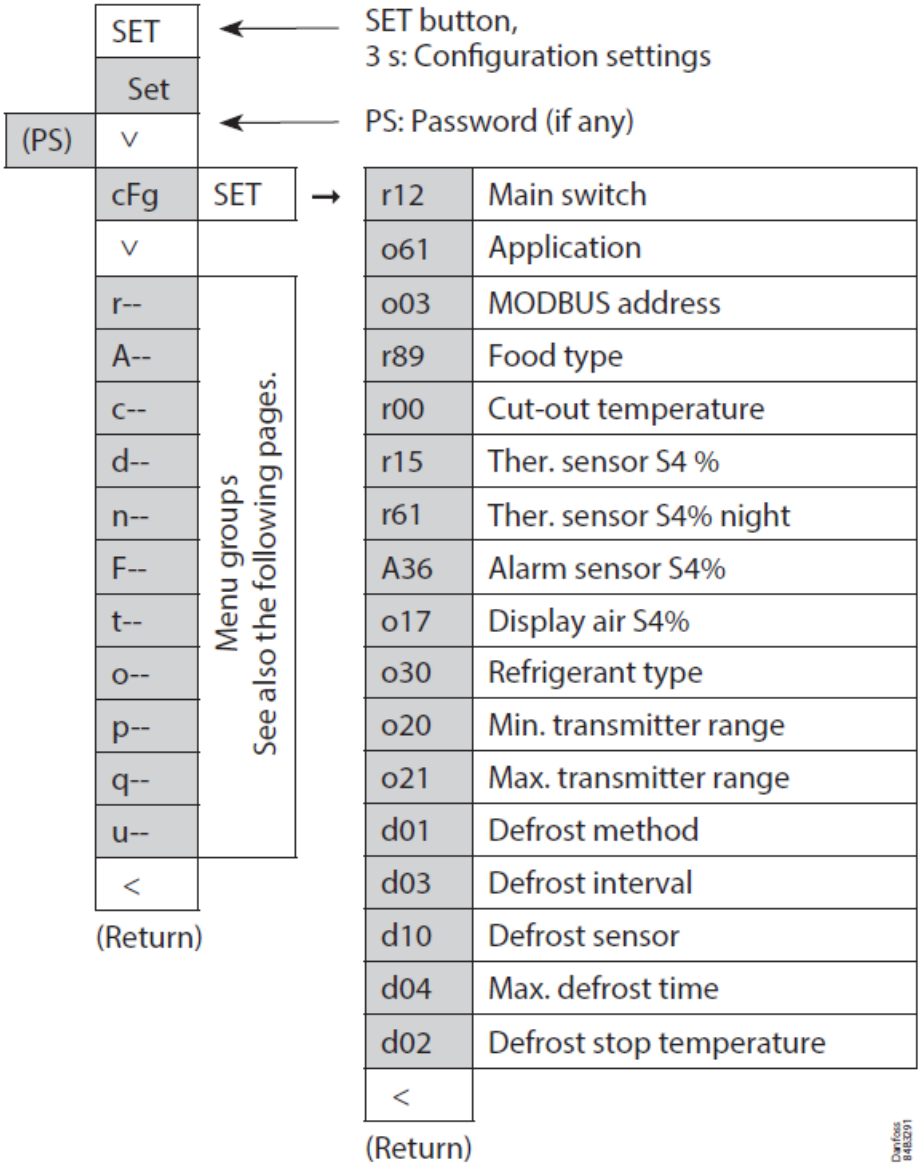
The display can give the following messages:

- -d- Defrost is in progress
- Err The temperature cannot be displayed due to a sensor error
- Err1 The display cannot load data from the controller. Disconnect and then reconnect the display
- Err2 Lost display communication
- ALA The alarm button is activated. The rst alarm code is then shown
- – – – At top position of the menu or when max. value has been reached, the three dashes are shown in the top of the display
- – – – At bottom position of menu or when min. value has been reached, the three dashes are shown in the bottom of the display
- Loc The menu operation is locked. Unlock by pressing (for 3 seconds) on the ‘up arrow’ and ‘down arrow’ simultaneously
  UnL The menu operation is unlocked
- – – – The parameter has reached min. or max. limit
- PS A password is required for access to the menu
- Fan Appliance cleaning has been initiated. The fans are running
- OFF Appliance cleaning is activated and the appliance can now be cleaned
- OFF The main switch is set to O
- SEr The main switch is set to service / manual operation
- CO2 Flashes: Will display in event of a refrigerant leakage alarm, but only if the refrigerant is set up for CO2

Factory setting
If you need to return to the factory-set values, do the following:

- – Cut off the supply voltage to the controller
- – Keep up “ ∧ ” and down “ ∨ ” arrow buttons depressed at the same time as you reconnect the supply voltage
- – When FAc is shown in the display, select “yes”.

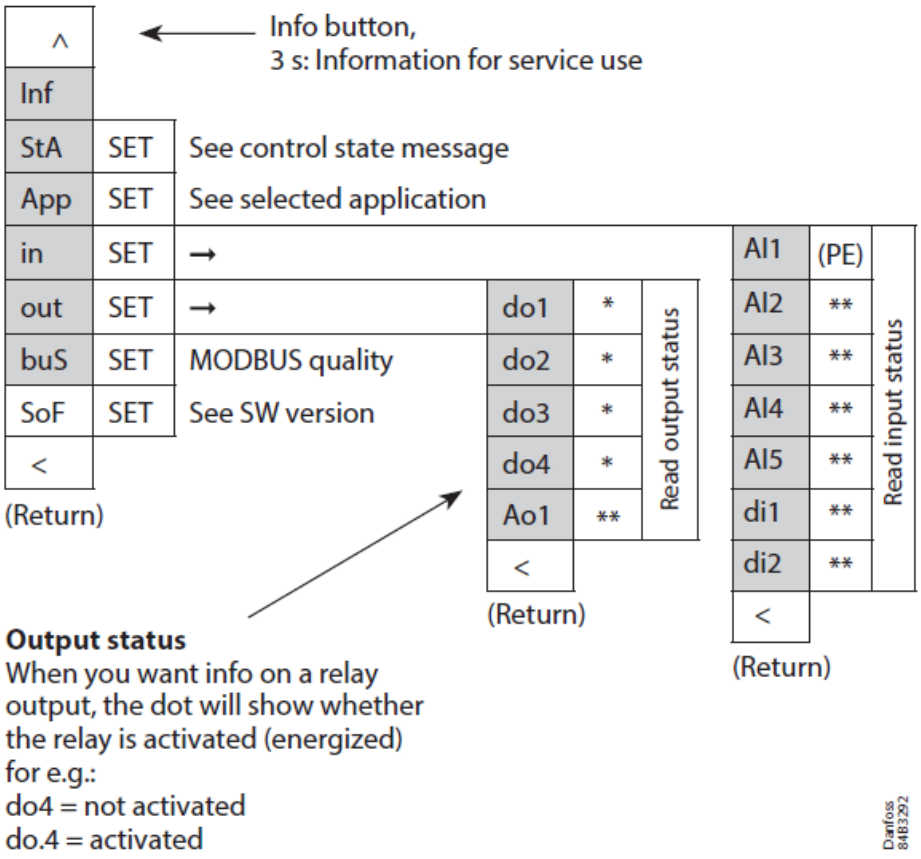
Parameter grouping at display operation



Get a good start
With the following procedure you can start regulation very quickly:

1. Open parameter r12 and stop the regulation (in a new and not previously set unit, r12 will already be set to 0 which means stopped regulation.)
2. Select application based on the wiring diagrams on pages 2-4
3. Open parameter o61 and set the application number
4. For network. Set the address in o03
5. Then select a set of presets from the “Food type” help table
6. Open parameter r89 and set the number for the array of presettings. The few selected settings will now be transferred to the menu
7. Set the desired cut-out temperature r00
8. Set the weighted thermostat air temperature between S4 and S3 sensor r15
9. Set the weighted thermostat air temperature between S4 and S3 during night operation r61
10. Set the weighted alarm air temperature between S4 and S3 A36
11. Set the weighted display readout between S4 and S3 o17
12. Select refrigerant via parameter o30 (only application 5-9)

13. Set the pressure transmitter min. and max. range via parameter o20 and o21 (only application 5-9)
14. Set the desired defrost method in d01
15. Set the interval time between defrost starts in d03
16. Set the desired defrost sensor in d10
17. Set the maximum defrost time in d04
18. Set the defrost stop temperature in d02
19. Open parameter r12 and start the regulation
20. Go through the parameter list and change the factory values where needed.
21. Get the controller up and running on network:
    1. MODBUS: Activate scan function in system unit
    2. If another data communication card is used in the controller: – Lon RS485: Activate the function o04



*)
The output's function.
(Determined at configuration).
The DOs and AOs can also be forced controlled from this menu, when r12 Main switch has been set in position "service".
Forced control of a function can also be performed in codes q11 to q27.

**)
The input's function.
(Determined at configuration).

Food type

Setting of presettings (r89). After setting 1-5, setting is returned to 0. **Food type =**	**1** **Vege- tables**	**2** **Milk**	**3** **Meat/ fish**	**4** **Frozen food**	**5** **Ice cream**
Temperature (r00)	8 °C	0 °C	-2 °C	-20 °C	-24 °C
Max. temp. setting (r02)	10 °C	4 °C	2 °C	-16 °C	-20 °C
Min. temp. setting (r03)	4 °C	-4 °C	-6 °C	-24 °C	-28 °C
Upper alarm limit (A13)	14 °C	8 °C	8 °C	-15 °C	-15 °C
Lower alarm limit (A14)	0 °C	-5 °C	-5 °C	-30 °C	-30 °C
Upper alarm limit for S6 (A22)	14 °C	8 °C	8 °C	-15 °C	-15 °C
Lower alarm limit for S6 (A23)	0 °C	-5 °C	-5 °C	-30 °C	-30 °C

Can only be set when r12=0.

Fault message

Fault message

In an error situation the alarm LED on the front will be on and the alarm relay will be activated (depending on prio rity). If you push the alarm button for 3 seconds you can see the alarm report in the display.

(Alarm priorities can be changed. See the User Guide.) Here are the messages that may appear:

Code	Alarm text	Description
E01	Hardware failure	The controller has a hardware failure
E06	Clock lost time	Clock has lost valid time
E20	Pe Evap. pressure A – Sensor error	Sensor signal is out of range. Please check the sensor for correct operation
E24	S2 Gas outlet A – Sensor er ror	Sensor signal is out of range. Please check the sensor for correct operation
E25	S3 Air ON evap. A – Sensor error	Sensor signal is out of range. Please check the sensor for correct operation
E26	S4 Air OFF evap. A – Sensor error	Sensor signal is out of range. Please check the sensor for correct operation
E27	S5 Evaporator A – Sensor e rror	Sensor signal is out of range. Please check the sensor for correct operation
A01	High temperature alarm A	The alarm temperature has been above the max alarm limit for a longer time period than the set alarm delay.
A02	Low temperature alarm A	The alarm temperature has been below the min alarm limit for a longer ti me period than the set alarm delay.
A04	Door open alarm	The door has been open for a too long time
A05	Max defrost hold time exceeded	The controller has been waiting longer time than permitted after a co-ord inated defrost.
A11	Refrigerant not selected	The refrigerant has not been selected hence control can not be initiated
A15	DI alarm 1	Alarm signal from digital input signal
A16	DI alarm 2	Alarm signal from digital input signal
A45	Main switch set OFF	The controller manin switch has been set to either Stop or Manaual cont rol. Alternatively a digital input set up for “main switch” function, has stop ped control
A59	Case in cleaning mode	A case cleaning operation has been started on a case
AA2	CO2 leak detected	CO2 is leaking from the refrigerantion system
AA3	Refrigerant leak detected	Refrigerant is leaking from the refrigeration system
a04	Wrong IO configuration	Inputs and outputs have not been configured correctly

Data communication

The importance of individual alarms can be defined with a setting. The setting must be carried out in the group “ Alarm destinations”

Additional information not relevant for safe installation and use can be found on Danfoss Store:

For more detailed information, please see the respective User Guide.

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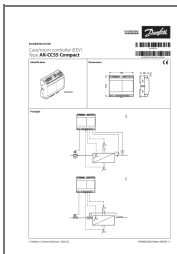
Documents / Resources

	Danfoss AK-CC55 Compact Case Room Controller [pdf] Installation Guide AK-CC55 Compact Case Room Controller, AK-CC55, Compact Case Room Controller, Case Room Controller, Room Controller, Controller

References

- User Manual