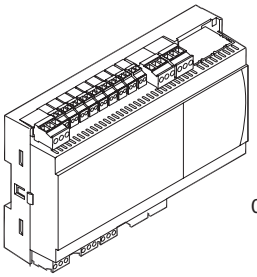
**Installation Guide**

084R8055

AN300030680307en-000601

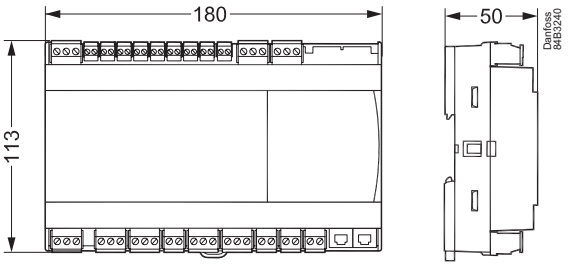
# Case/room controller (EEV)
# Type **AK-CC55 Multi Coil**

## Identification

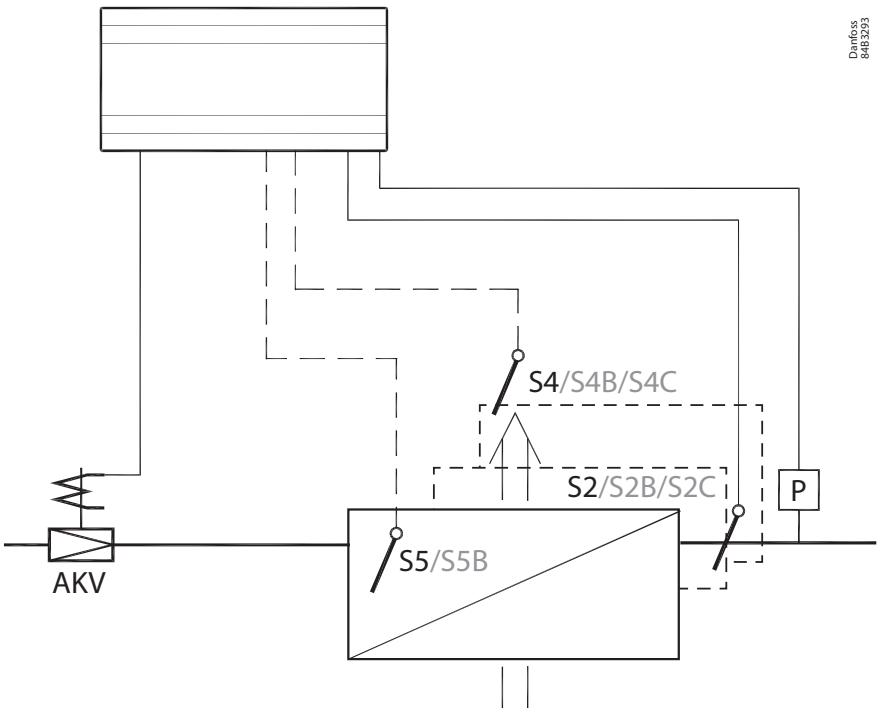


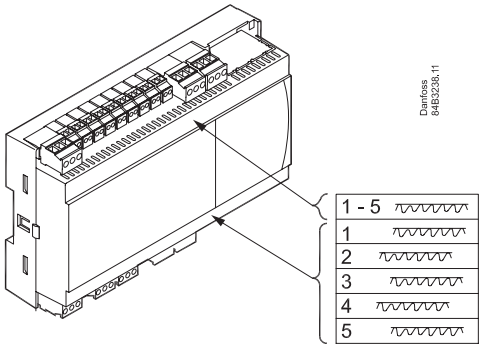
084B4084

## Dimensions



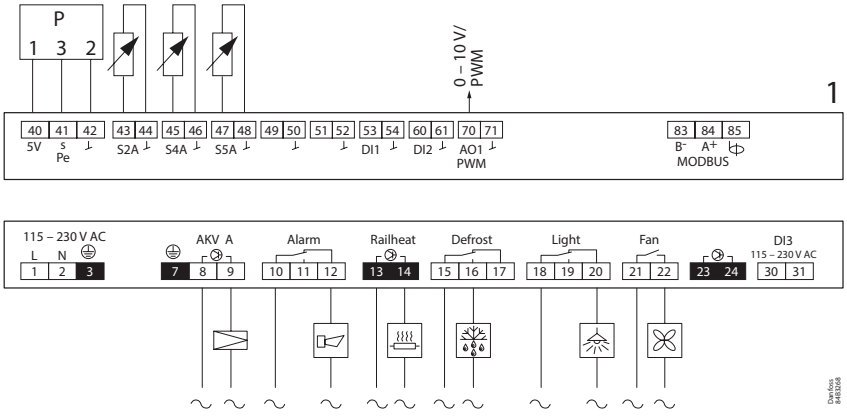

## Principle



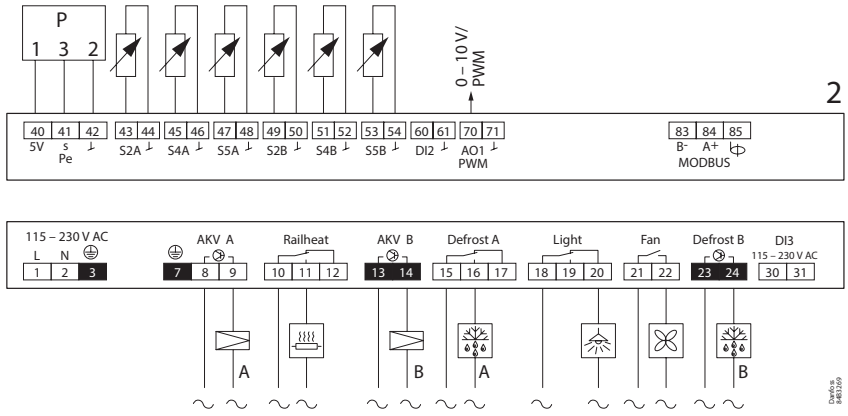



The controller is provided with labels from the factory indicating a generic application. When selecting the required application, specific labels are provided so that you can mount the relevant one.

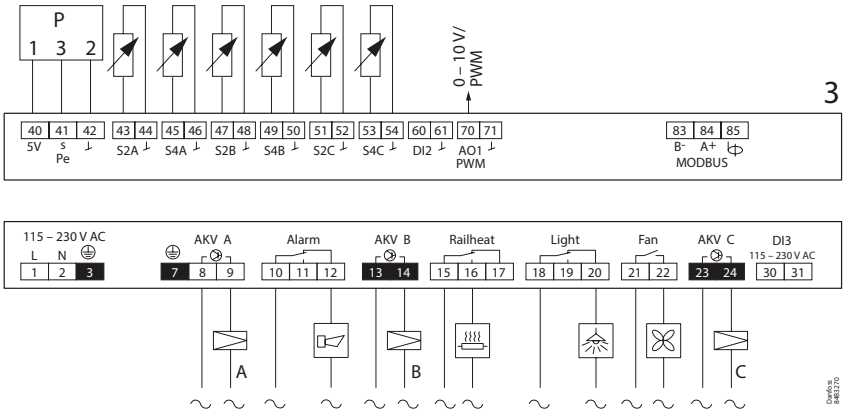
1.




2.



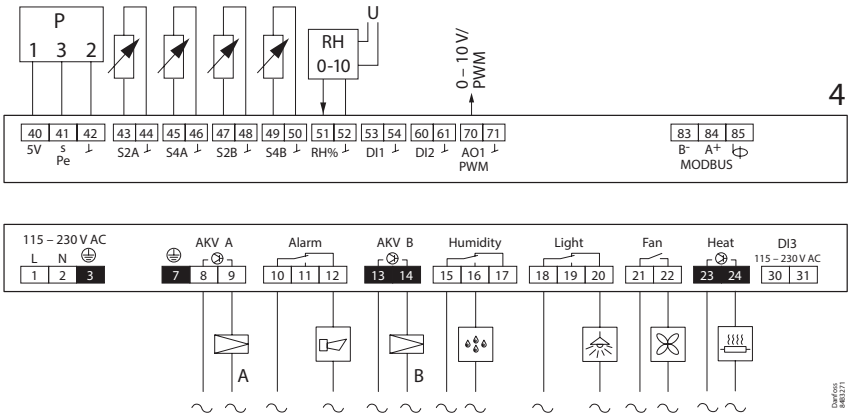

3.





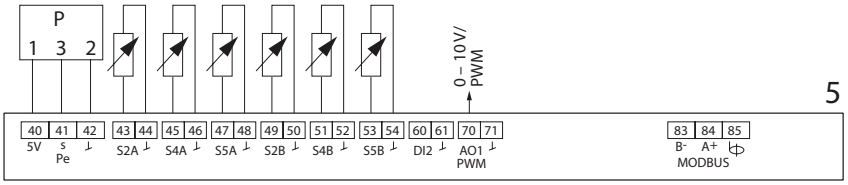
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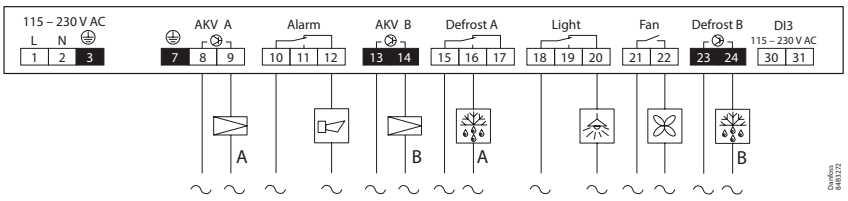
4.


P
1 3 2
RH
0-10
U
0 – 10 V/
PWM
4
40 41 42
5V s Pe
43 44
S2A
45 46
S4A
47 48
S2B
49 50
S4B
51 52
RH%
53 54
DI1
60 61
DI2
70 71
AO1
PWM
83 84 85
B- A+
MODBUS

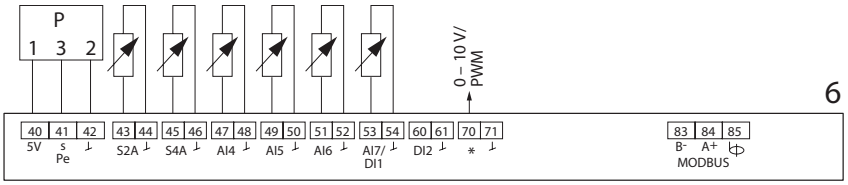

115 – 230 V AC
L N
1 2 3
AKV A
7 8 9
Alarm
10 11 12
AKV B
13 14
Humidity
15 16 17
Light
18 19 20
Fan
21 22
Heat
23 24
DI3
115 – 230 V AC
30 31
A
B

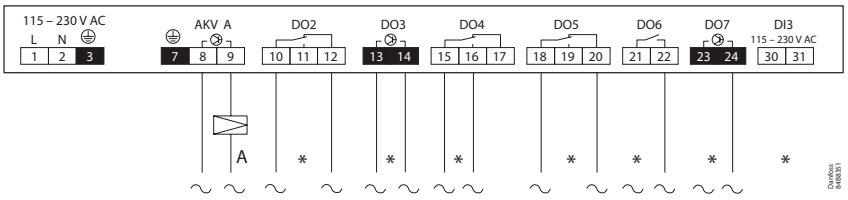
5.


P
1 3 2
0 – 10 V/
PWM
5
40 41 42
5V s Pe
43 44
S2A
45 46
S4A
47 48
S5A
49 50
S2B
51 52
S4B
53 54
S5B
60 61
DI2
70 71
AO1
PWM
83 84 85
B- A+
MODBUS

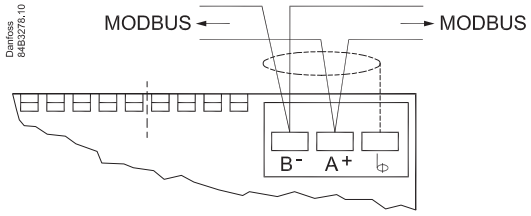

115 – 230 V AC
L N
1 2 3
AKV A
7 8 9
Alarm
10 11 12
AKV B
13 14
Defrost A
15 16 17
Light
18 19 20
Fan
21 22
Defrost B
23 24
DI3
115 – 230 V AC
30 31
A
B
A
B

6.


P
1 3 2
0 – 10 V/
PWM
6
40 41 42
5V s Pe
43 44
S2A
45 46
S4A
47 48
AI4
49 50
AI5
51 52
AI6
53 54
AI7/
DI1
60 61
DI2
70 71
*
83 84 85
B- A+
MODBUS

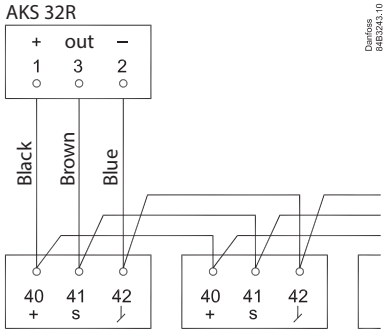

115 – 230 V AC
L N
1 2 3
AKV A
7 8 9
DO2
10 11 12
DO3
13 14
DO4
15 16 17
DO5
18 19 20
DO6
21 22
DO7
23 24
DI3
115 – 230 V AC
30 31
A
*
*
*
*
*
*
*

## Data communication



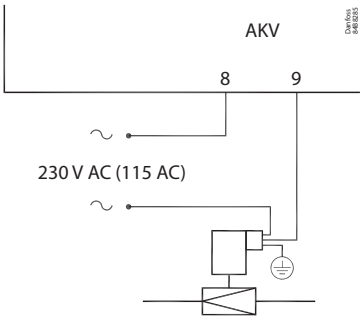

**Important:** It is important that the installation of the data communication cable is performed correctly with sufficient distance to high voltage cables.

## AKS 32R info

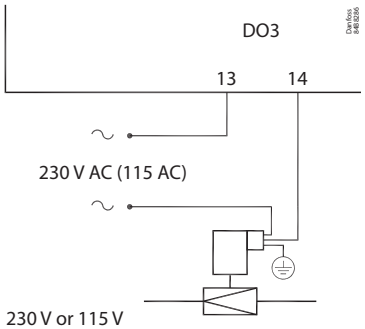



The signal from one pressure transmitter can be received by up to 10 controllers.
There must not be a significant pressure drop from the pressure transmitter's position in the suction line to the individual evaporators.

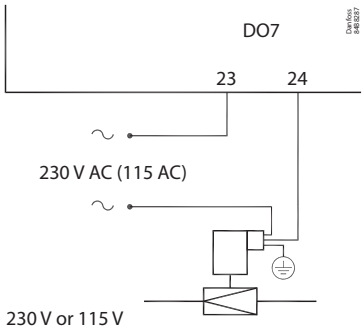
## AKV info




230 V or 115 V
AC coil
Max. 0.5 A

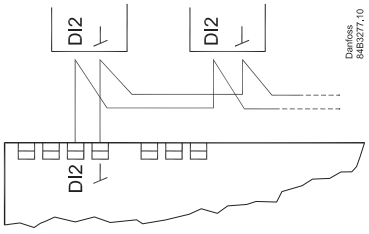



230 V or 115 V
AC coil
Max. 0.5 A
Not overload protected




230 V or 115 V
AC coil
Max. 0.5 A
Not overload protected

## Coordinated defrost via cable connections

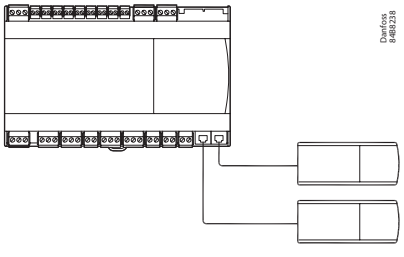



Max. 10

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




Display
084B4075 / 084B4076 / 084B4077

Cable 3 m: 084B4078
Cable 6 m: 084B4079

$L_1 + L_2$: MAX. = 100 m

## 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 fit the necessary 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.


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## 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 S4, S5 | Pt 1000 AKS11<br>PTC 1000 EKS111<br>NTC5K EKS211<br>NTC10K EKS221 sensor<br><br>(Both must be of the same type) |
| Temperature measuring accuracy | Pt1000: -60 – 120 °C. ±0.5 K<br>PTC1000: -60 – 80 °C. ±0.5 K<br>NTC5K: -40 – 80 °C. ±1.0 K<br>NTC10K: -40 – 120 °C. ±1.0 K |
| Pt1000 sensor specification | ±0.3 K at 0 °C<br>±0.005 K per degree |
| Pe measuring | AKS 32R Ratiometric pressure transmitter: 10 – 90% |
| RH measuring | 0 – 10 V<br>Ri > 10K ohm<br>Accuracy ±0.3% FS |

### Input and output relay specifications

| Input and output relay specifications | Input/ output | Description |
|---|---|---|
| Digital input | DI1<br>DI2 | Signal from dry contact functions<br>Requirements to contacts: Gold plating<br>Cable length must be max. 15 m<br>Use auxiliary relays when the cable is longer<br>Open loop: 12 V (SELV)<br>Contact 3.5 mA |
| Digital input | DI3 | 115 V / 230 V AC |
| Solid state output | DO1 (for AKV coil)<br>DO3<br>DO7 | 115 V / 230 V AC<br>Max. 0.5 A<br>DO3 and DO7 (No overload protection!)<br>Max. 1 x 20 W AKV for 115 V AC<br>2 x 20 W AKV for 230 V AC<br>**Note:** 2 EC coils are not supported. |
| Relays | DO2<br>DO4<br>DO5<br>DO6 | 115 V / 230 V AC<br>Load max.: CE. 8 (6)A<br>UL. 8A res. 3FLA 18LRA<br>Load min.: 1VA<br>Inrush: DO5 DO6 TV-5 80A |
| Analogue output/PWM | AO1 | 0 / 10 V Pulse Width Modulated (PWM) max. 15 mA.<br>0 – 10 V variable, max. 2 mA |

**NOTE:**
- DO2, DO4, DO5 and DO6 are 16 A relays.
- Max. load must be observed
- DO5 / DO6 is recommended for load with high inrush current e.g. EC Fan and LED light.
- All relays are sealed for use with flammable refrigerant like Propane R290.
- Compliance with EN 60 335-2-89: 2010 Annex BB.

### Function data

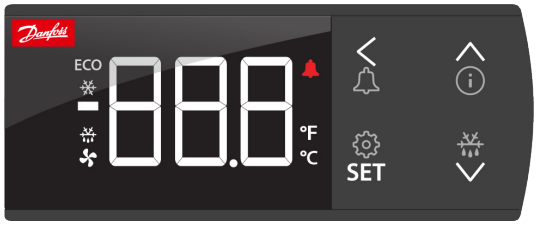
| Function data | Value |
|---|---|
| Display | LED 3 digit |
| External display, AK-CC55 Multi Coil | 2 external display |
| External display connection | RJ12 |
| Max. display cable length [m] | 100 m |
| Data communication built-in | MODBUS |
| Data communication option | AK-OB55 Lon RS485 module |
| 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.




Lights in event of alarm — Long press on alarm button — alarm relay is reset — alarm code displayed
e.g. "A1" Long press while in alarm menu resets active alarms

Alarm codes are shown on page 8

Lights up in event of:
Energy optimization
Cooling
Defrosting
Fan operation

Long press (3 seconds) gives access to the information menu "InF".

Up arrow / Down arrow / Arrow to left:
Navigation in the menu and setting of values.

Long press (3 seconds) will start a defrost, "-d-" is shown in the display. Ongoing defrosting can be stopped by a long press.

SET:
Long press (3 seconds) gives access to the "SEt" menu.
If the operation is locked with a password, "PS" is shown. Enter the code.

Shows the setting for a chosen parameter / saves a changed setting.
Short press gives access to entering of the thermostat's cut-out limit.

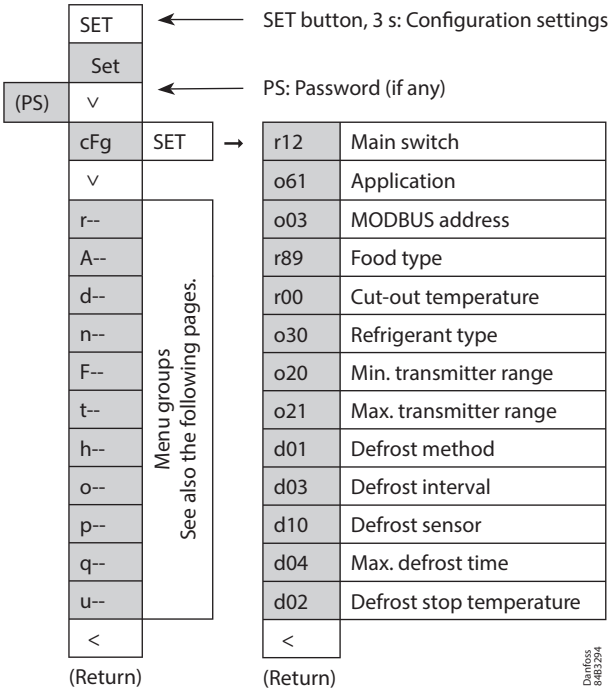
The display can give the following messages:

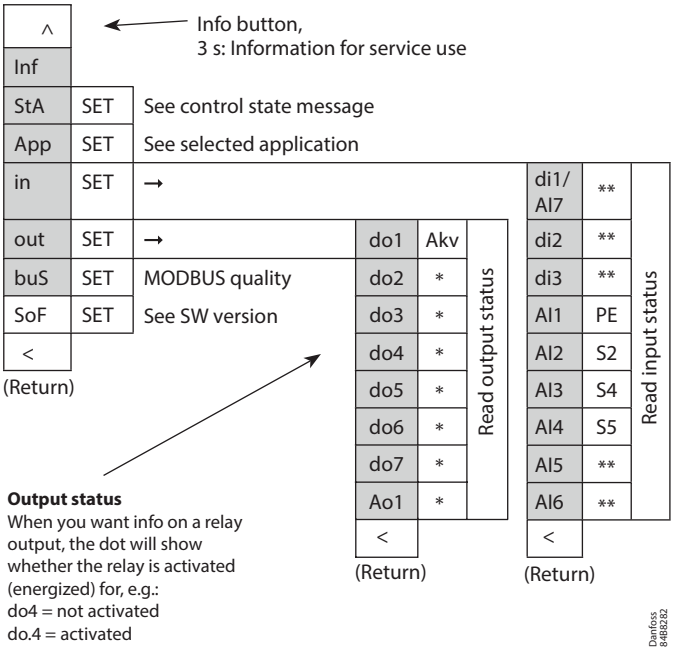
| | |
|---|---|
| -d- | Defrost is in progress |
| Err | The temperature cannot be displayed due to a sensor error |
| Err1 | The display cannot load data from the controller. Disconnect and then reconnect the display |
| Err2 | Lost display communication |
| ALA | The alarm button is activated. The first 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 Off |
| 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 $CO_2$ |

**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".


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**Parameter grouping at display operation**




*)
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).

**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 2-3
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. Select refrigerant via parameter o30
9. Set the pressure transmitter min. and max. range via parameter o20 and o21.
10. Set the desired defrost method in d01
11. Set the interval time between defrost starts in d03
12. Set the desired defrost sensor in d10
13. Set the maximum defrost time in d04
14. Set the defrost stop temperature in d02
15. Open parameter r12 and start the regulation
16. Go through the parameter list and change the factory values where needed.
17. Get the controller up and running on network:
    - MODBUS: Activate scan function in system unit
    - If another data communication card is used in the controller:
      - Lon RS485: Activate the function o04

**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 |

Can only be set when r12=0.

| Fault message | | |
|---|---|---|
| In an error situation the alarm LED on the front will be on and the alarm relay will be activated (depending on priority).<br>If you push the alarm button for 3 seconds you can see the alarm report in the display.<br>(Alarm priorities can be changed. See the User Guide.)<br>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 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 error | Sensor signal is out of range. Please check the sensor for correct operation |
| E37 | S5 Evaporator B - Sensor error | Sensor signal is out of range. Please check the sensor for correct operation |
| E59 | Humidity sensor - Sensor error | Sensor signal is out of range. Please check the sensor for correct operation |
| E60 | S4 Air OFF evap. B - Sensor error | Sensor signal is out of range. Please check the sensor for correct operation |
| E61 | S4 Air OFF evap. C - Sensor error | Sensor signal is out of range. Please check the sensor for correct operation |
| E62 | S2 Gas outlet B - Sensor error | Sensor signal is out of range. Please check the sensor for correct operation |
| E63 | S2 Gas outlet C - Sensor error | 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 time 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-ordinated 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 control. Alternatively a digital input set up for "main switch" function, has stopped control |
| A59 | Case in cleaning mode | A case cleaning operation has been started on a case |
| A70 | High temperature alarm B | The alarm temperature has been above the max alarm limit for a longer time period than the set alarm delay. |
| A71 | Low temperature alarm B | The alarm temperature has been below the min alarm limit for a longer time period than the set alarm delay. |
| AA2 | $CO_2$ leak detected | $CO_2$ is leaking from the refrigerantion system |
| AA3 | Refrigerant leak detected | Refrigerant is leaking from the refrigeration system |
| a02 | High humidity alarm | The humidity level is too high |
| a03 | Low humidity alarm | The humidity level is too low |
| a04 | Wrong IO config | An illegal IO configuration has been made. Control cannot be started (r12 Main switch cannot be set ON). |
| a05 | High temperature alarm C | The alarm temperature has been above the max alarm limit for a longer time period than the set alarm delay. |
| a06 | Low temperature alarm C | The alarm temperature has been below the min alarm limit for a longer time period than the set alarm delay. |
| **Data communication**<br>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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