

Installation Guide

**AK-CC55**  
Single Coil

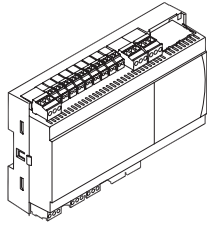


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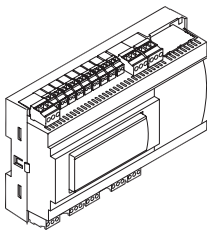


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Identification

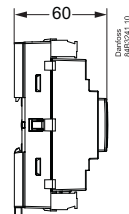
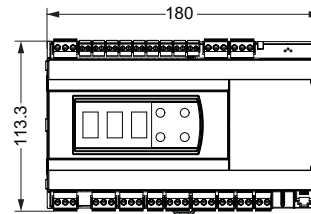
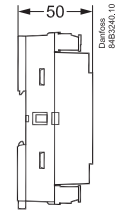
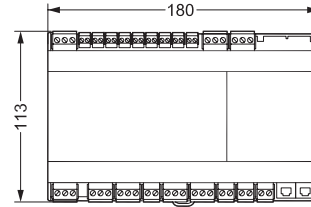


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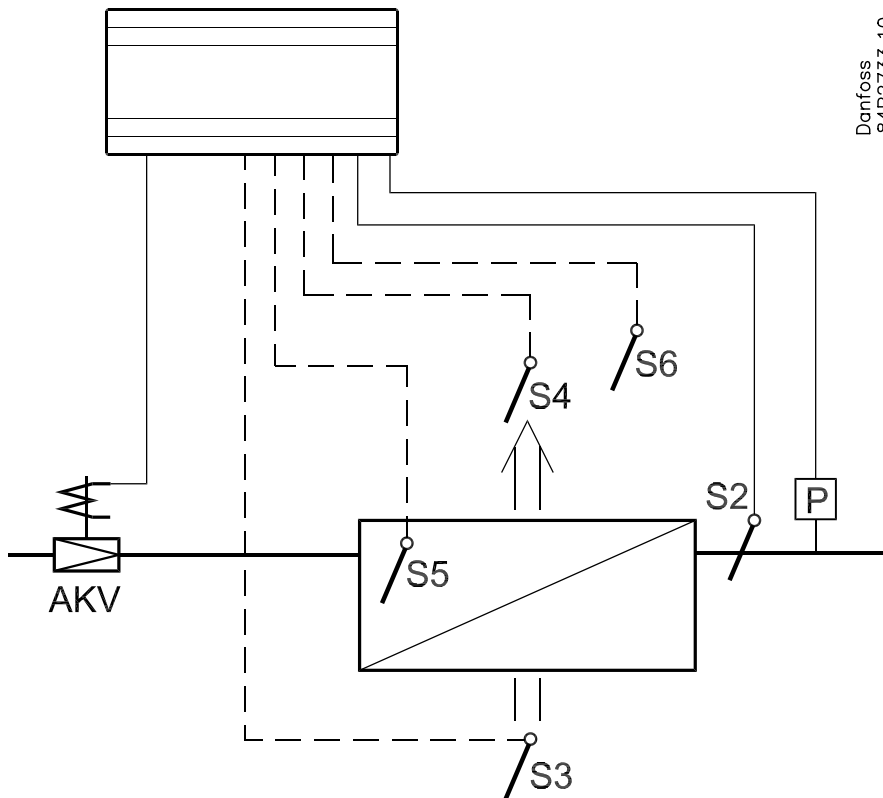


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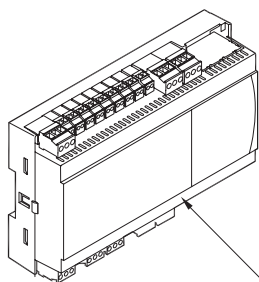
Dimensions



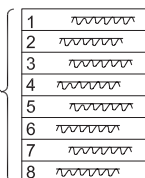
Principle



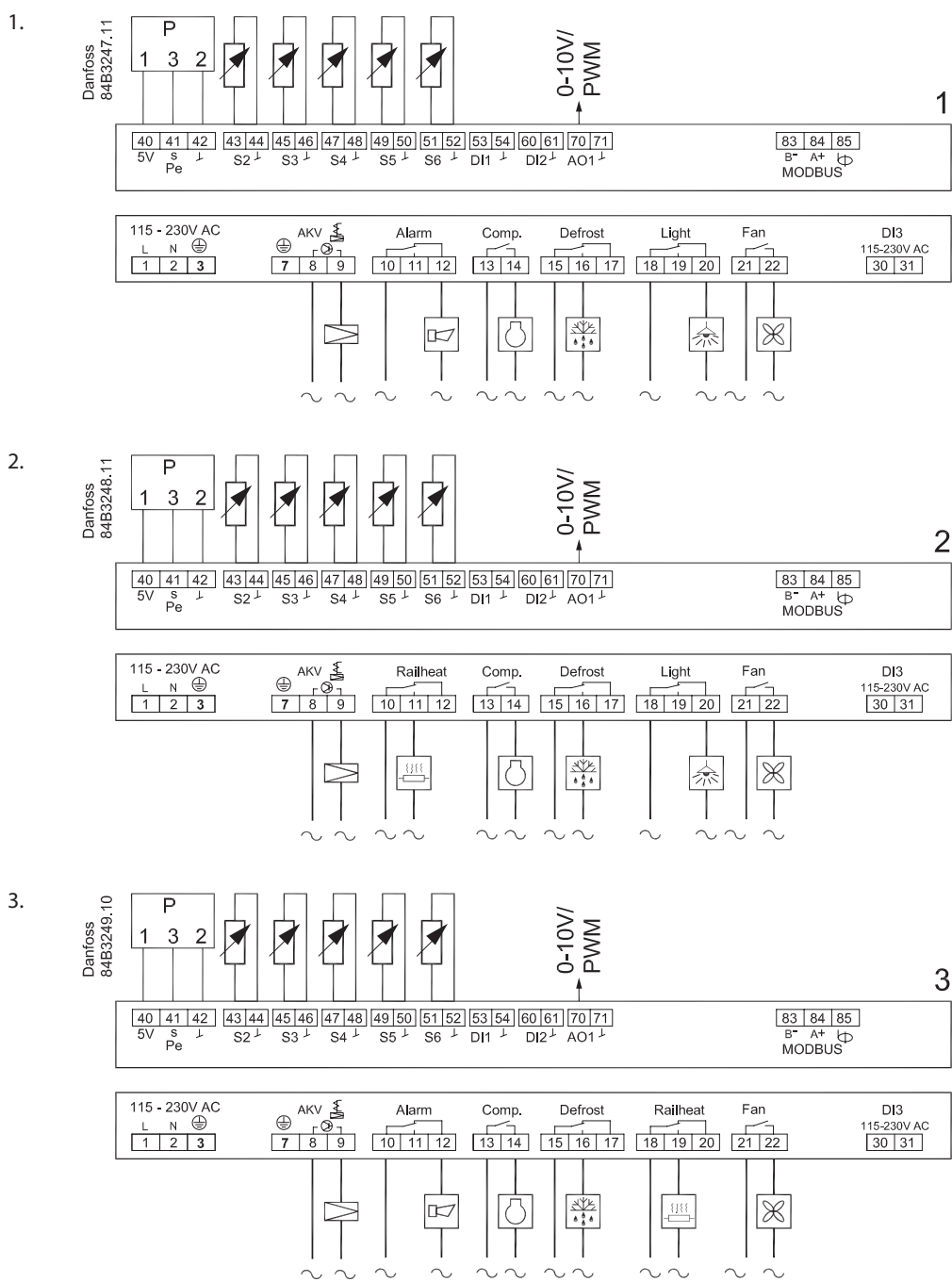
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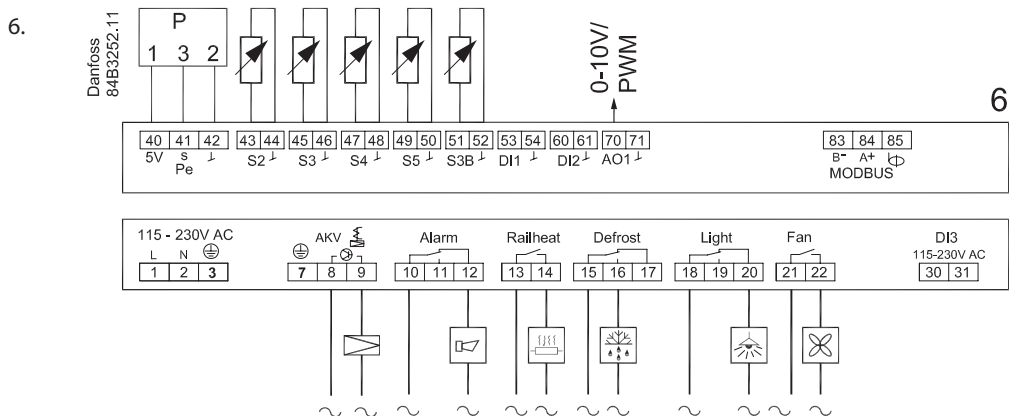
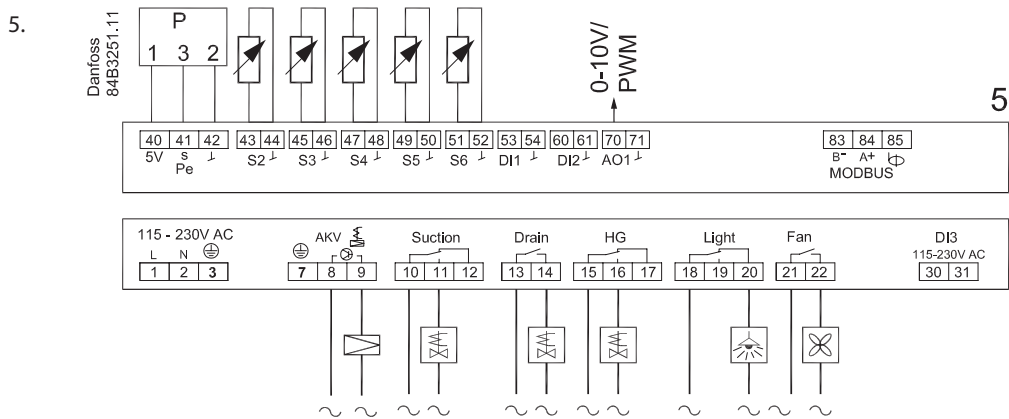
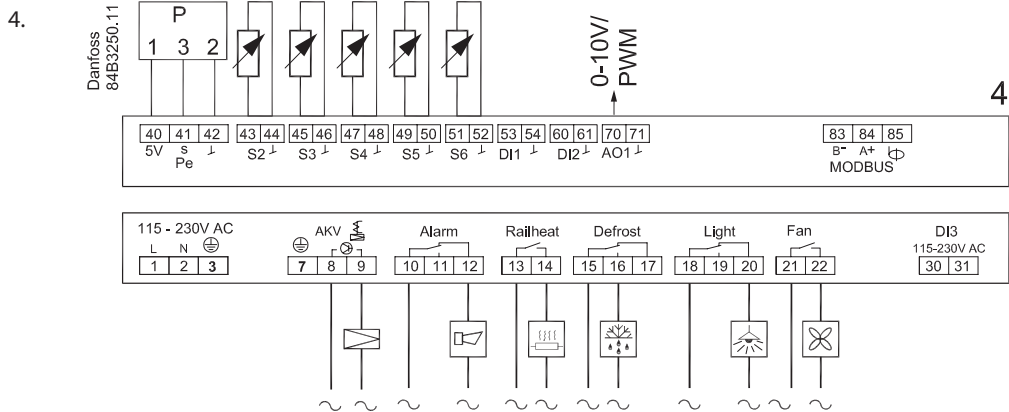


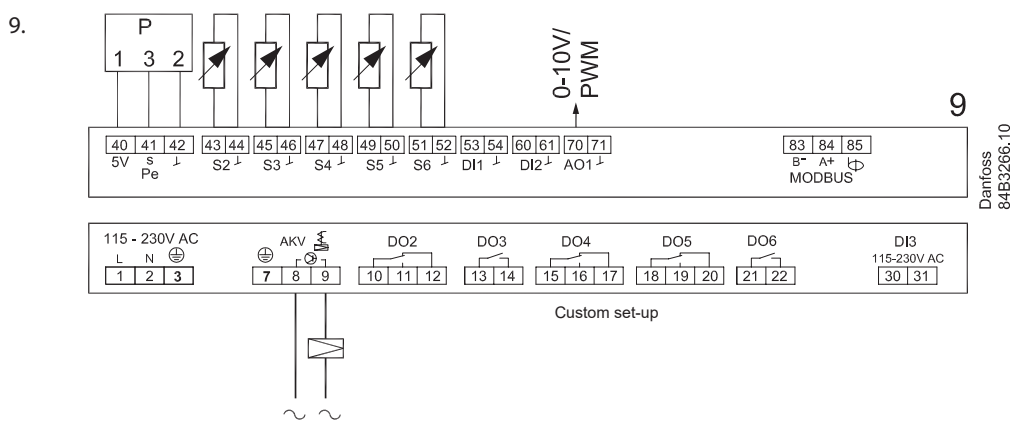
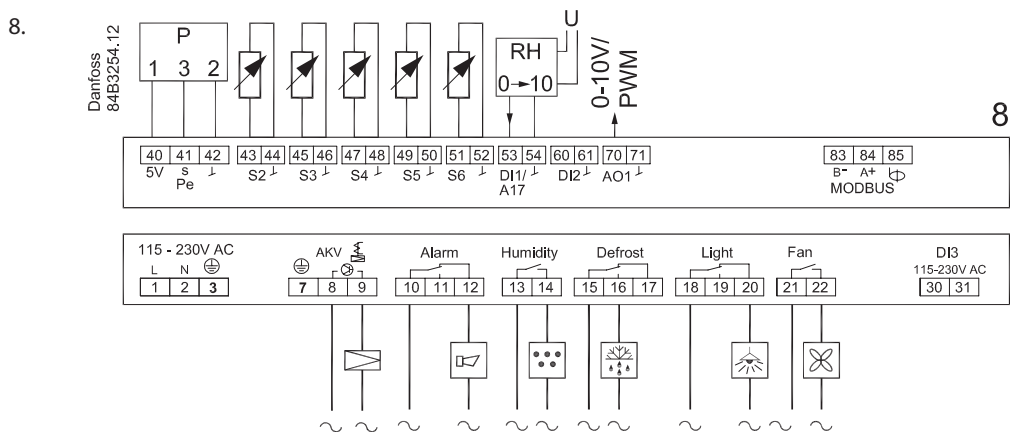
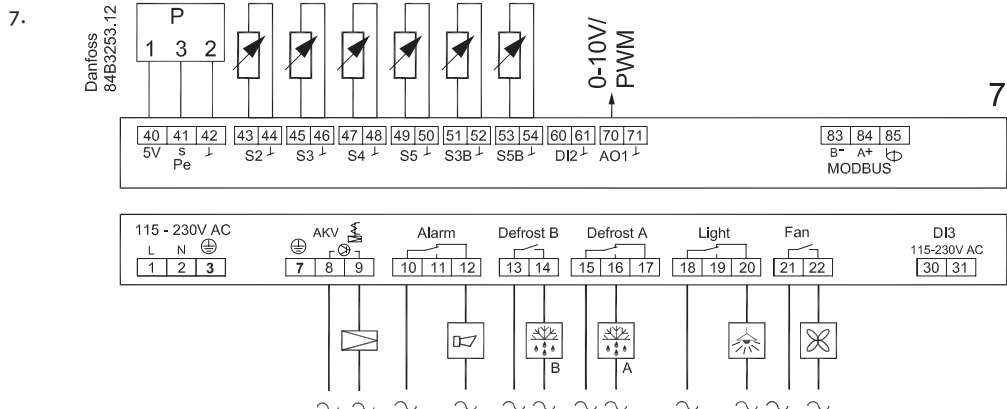
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The controller is provided with labels from the factory indicating a generic application. When selecting the required application, specific labels are provided so that you can mount the relevant one.

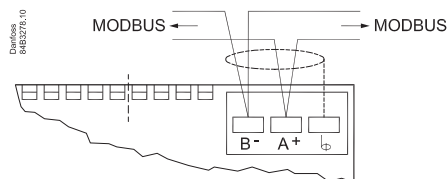






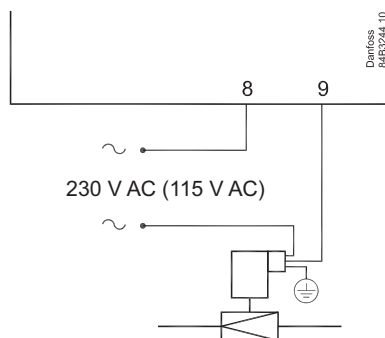
### Data communication

### Important



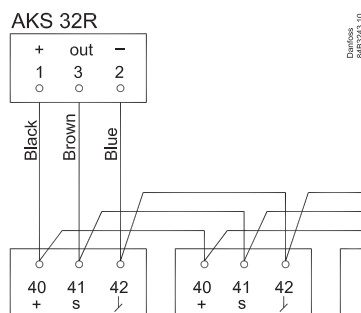
It is **important** that the installation of the data communication cable is performed correctly. See separate literature no. RC8AC902

### AKV info



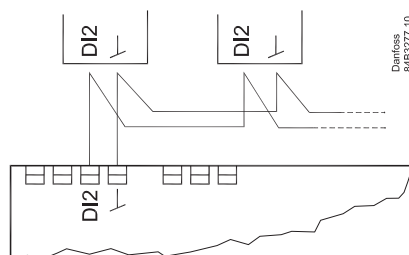
230 V or 115 V  
AC coil

### 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.

### Coordinated defrost via cable connections

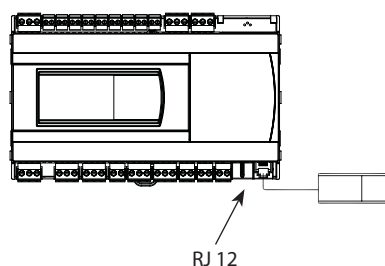


Max. 10

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.

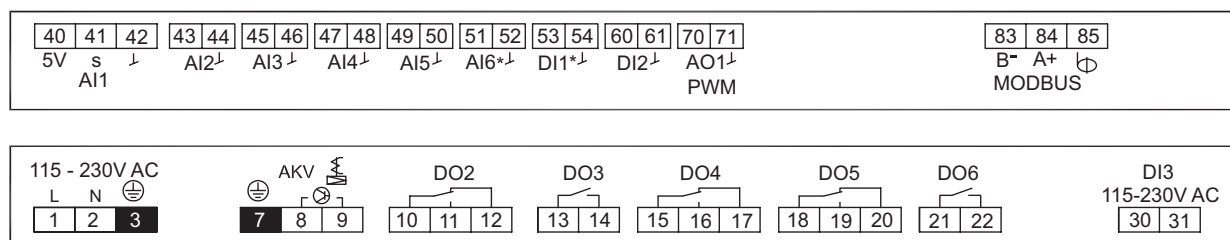
### External display AK-UI55



Display  
084B4075 / 084B4076 / 084B4077

Cable 3 m: 084B4078  
Cable 6 m: 084B4079  
(L: Max. 100 m)

## Connections



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## Overview of outputs and applications

| Application | DO1 | DO2             | DO3             | DO4             | DO5             | DO6             |  | AO1 | AI1 | AI2 | AI3 | AI4 | AI5 | AI6 | AI7/<br>DI1 | DI2 | DI3 |
|-------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|--|-----|-----|-----|-----|-----|-----|-----|-------------|-----|-----|
| 1           |     |                 |                 |                 |                 |                 |  | ●   | Pe  | S2  | S3  | S4  | S5  | S6  | ●           | ●   | ●   |
| 2           |     |                 |                 |                 |                 |                 |  | ●   | Pe  | S2  | S3  | S4  | S5  | S6  | ●           | ●   | ●   |
| 3           |     |                 |                 |                 |                 |                 |  | ●   | Pe  | S2  | S3  | S4  | S5  | S6  | ●           | ●   | ●   |
| 4           |     |                 |                 |                 |                 |                 |  | ●   | Pe  | S2  | S3  | S4  | S5  | S6  | ●           | ●   | ●   |
| 5           |     |                 |                 |                 |                 |                 |  | ●   | Pe  | S2  | S3  | S4  | S5  | S6  | ●           | ●   | ●   |
| 6           |     |                 |                 |                 |                 |                 |  | ●   | Pe  | S2  | S3  | S4  | S5  | S3B | ●           | ●   | ●   |
| 7           |     |                 |                 |                 |                 |                 |  | ●   | Pe  | S2  | S3  | S4  | S5  | S3B | S5B         | ●   | ●   |
| 8           |     |                 |                 |                 |                 |                 |  | ●   | Pe  | S2  | S3  | S4  | S5  | S6  | RH%         | ●   | ●   |
| 9           |     | ● <sup>1)</sup> | ● <sup>1)</sup> | ● <sup>1)</sup> | ● <sup>1)</sup> | ● <sup>1)</sup> |  | ●   | Pe  | S2  | S3  | S4  | S5  | S6  | ●           | ●   | ●   |

See also wiring diagrams earlier in the Installation Guide.

● = Optional

●<sup>1)</sup> Custom set-up of relays

### AI1

#### Pressure transmitter

AKS 32R

Connect to terminal 40, 41 and 42.

(Use cable 060G1034: Black=40, Brown=41, Blue=42)

The signal from one pressure transmitter can be received by up to 10 controllers. But only if there are no significant pressure drops between the evaporators to be controlled. See drawing on page 5.

**Please note:** when replacing AK-CC550 with AK-CC55, S and ground must be switched.

### AI2 - AI7

#### Primarily for temperature inputs

S2

Pt 1000 ohm sensor AKS11, placed at the evaporator outlet  
S3, S4, S5

Pt 1000 AKS11, PTC 1000 EKS111, NTC5K EKS211 or NTC10K EKS221 sensor. All have to be of the same type.

S3, return air sensor, placed in the warm air before the evaporator

S4, discharge air sensor, placed in the cold air after the evaporator  
(the need for either S3 or S4 can be selected in the configuration)

S5, defrost sensor, placed in the evaporator

S6, Pt 1000 ohm sensor, food temperature sensor placed in-between the food products

(If the Di1 input is used for a temperature measurement, it will appear as AI7.)

### DI1

Digital input signal.

The defined function is active when the input is short-circuited or opened, depending on the function defined in o02.

### DI2

Digital input signal.

The defined function is active when the input is short-circuited or opened, depending on the function defined in o37.

### AO1

#### Analogue output signal

Analogue 0-10 V (currently not used)

Pulse width modulated signal

Can be used for fast control of rail heat via an external power solid state relay.

### MODBUS

For data communication.

Terminal 83 = B-

Terminal 84 = A+

Terminal 85 = screen

It is important that the installation of the data communication cable is performed correctly.

See separate literature no. RC8AC902

## Supply voltage

230 V AC or 115 V AC

### DO1

*AKV valve*

Connection of expansion valve type AKV, AKVA, AKVH or AKVP.  
The coil must be a **230 V or 115 V AC coil**.

### DO2

*Alarm*

There is a connection between terminal 10 and 12 in alarm situations and when the controller is without power.

*Light, Rail heat, Compressor, Night blind*

There is connection between terminal 10 and 11 (10 and 12 at light) when the function is on.

*Suction line valve*

There is connection between terminal 10 and 11 when the suction line must be open.

### DO3

*Compressor, Rail heat, Defrost, Drain valve, Humidity*

There is connection between terminal 13 and 14 when the function must be active.

### DO4

*Defrost*

There is connection between terminal 15 and 16 when defrosting takes place.

*Hot gas*

There is connection between terminal 15 and 16 when the hot gas valves must open.

**Please note:** when replacing AK-CC550 with AK-CC55, wires must be switched.

### DO5

*Light*

There is connection between terminal 18 and 20 when the function must be active.

*Rail heat*

There is connection between terminal 18 and 19 when the rail heat must be on.

### DO6

*Fan*

There is connection between terminal 21 and 22 when the fan is on.

## DO2-DO6 + AO1 and Application 9

Here, the different outputs can be custom defined in q02-q09

### DI3

Digital input signal.

The signal must have a voltage of 0 / 230 V AC (115 V AC)

The function is defined in o84.

## Display (RJ12 plug)

If external readings/operation of the controller is required, a display can be connected. If there is no display on the front, two external displays can be connected.

For one display the max. cable length is 100 m.

For two displays the sum of the two cable lengths must not exceed 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.

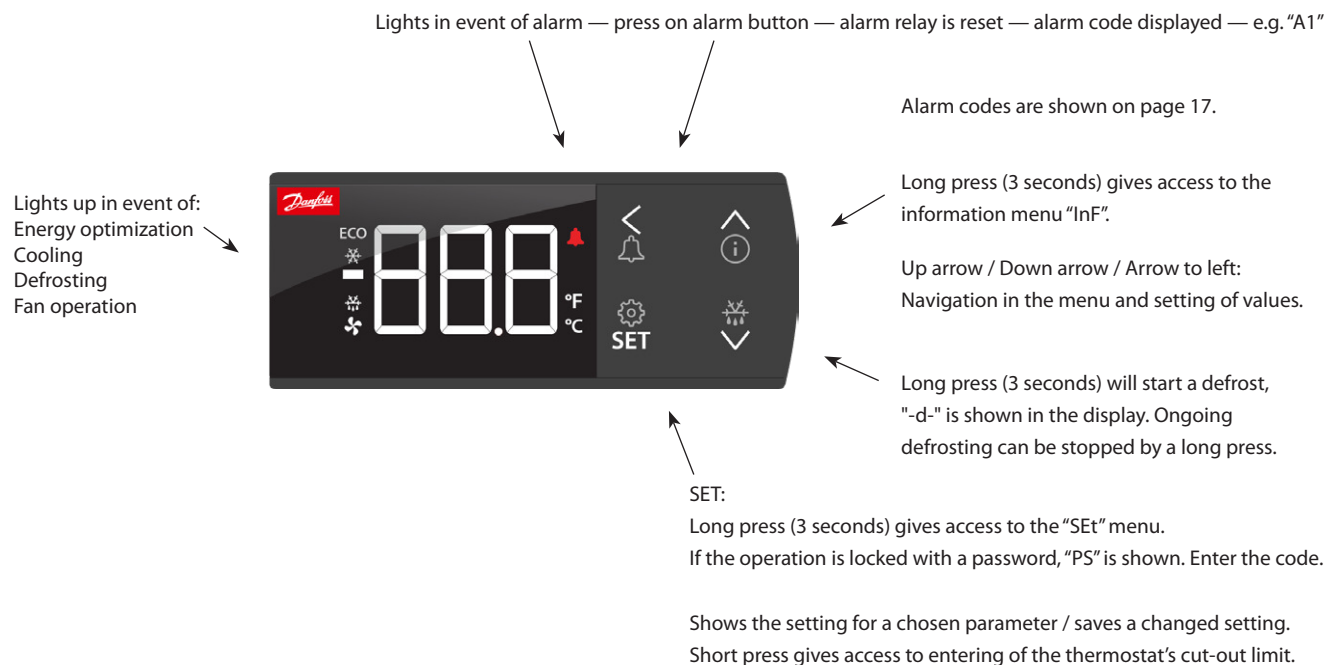
Special reference is made to the necessity of signals to the controller when the compressor is stopped and to the need of liquid receivers before the compressors.

Your local Danfoss agent will be pleased to assist with further advice, etc.

## Operation with setting display

### Display AK-UI55 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  |
| Err             | The display cannot load data from the controller. Disconnect and then reconnect the display                              |
| 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 configuration is locked. Unlock by pressing (for 3 seconds) on the 'up arrow' and 'down arrow' simultaneously        |
| UnL             | The configuration 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   |
| CO <sub>2</sub> | Flashes: Will display in event of a refrigerant leakage alarm, but only if the refrigerant is set up for CO <sub>2</sub> |

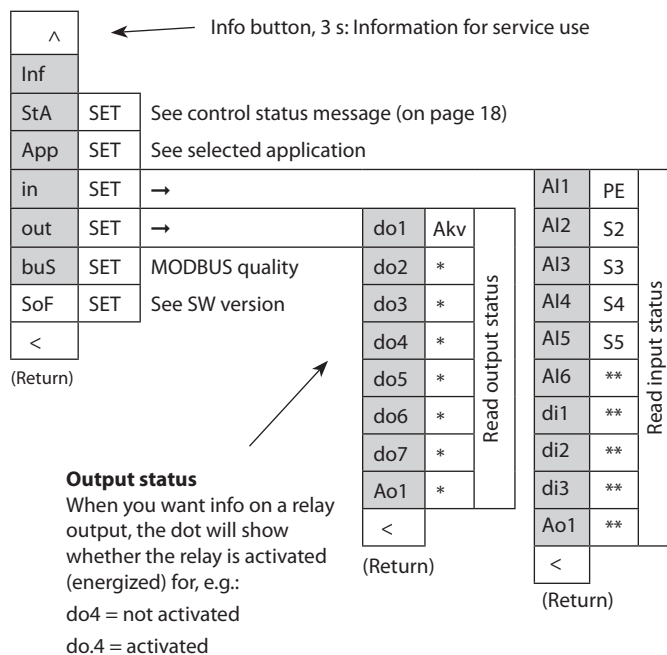
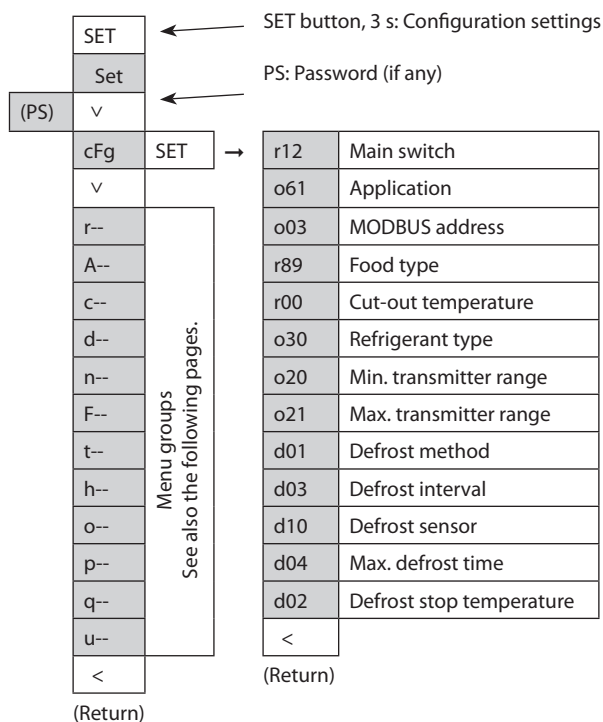
### Factory setting

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:

- 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)
- Select application based on the wiring diagrams on pages 2-4
- Open parameter o61 and set the application number
- For network. Set the address in o03
- Then select a set of presets from the "Food type" help table
- Open parameter r89 and set the number for the array of presets. The few selected settings will now be transferred to the menu
- Set the desired cut-out temperature r00
- Select refrigerant via parameter o30
- Set the pressure transmitter min. and max. range via parameter o20 and o21
- Set the desired defrost method in d01
- Set the interval time between defrost starts in d03
- Set the desired defrost sensor in d10
- Set the maximum defrost time in d04
- Set the defrost stop temperature in d02
- Open parameter r12 and start the regulation
- Go through the parameter list and change the factory values where needed.
- 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
    - Ethernet: Use the MAC address

\*)  
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 presets (r89). After setting 1-5, setting is returned to 0. | 1          | 2     | 3         | 4           | 5         |
|--|------------|-------|-----------|-------------|-----------|
| Food type =  | Vegetables | Milk  | Meat/fish | Frozen food | 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.

## Menu survey

### Menu set via display

SW = 2.0x

| Function  | Parameter |      | Wiring diagram pages 2-4 |   |   |   |   |   |   |   |   | Min. value | Max. value | Factory setting | Actual setting |  |
|---|-----------|------|--------------------------|---|---|---|---|---|---|---|---|------------|------------|-----------------|----------------|--|
|   | R-W       | Code | 1                        | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |            |            |                 |                |  |
| <b>Normal operation</b>   |           |      |                          |   |   |   |   |   |   |   |   |            |            |                 |                |  |
| Temperature (setpoint)  | 0-0       | r00  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | "r03"      | "r02"           | 2              |  |
| <b>Thermostat</b>   |           |      |                          |   |   |   |   |   |   |   |   |            |            |                 |                |  |
| Differential  | 1-2       | r01  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | 0.1 K      | 20 K            | 2              |  |
| Max. limitation of setpoint setting   | 0-2       | r02  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | "r03"      | 50 °C           | 50             |  |
| Min. limitation of setpoint setting   | 0-2       | r03  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | -50 °C     | "r02"           | -50            |  |
| Temperature unit (°C/°F)  | 1-2       | r05  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | 0/°C       | 1/F             | 0/°C           |  |
| Correction of the signal from S4  | 1-2       | r09  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | -10 K      | 10 K            | 0              |  |
| Correction of the signal from S3  | 1-2       | r10  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | -10 K      | 10 K            | 0              |  |
| Manual service, stop regulation, start regulation (-1, 0, 1)  | 0-2       | r12  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | -1         | 1               | 0              |  |
| Displacement of reference during night operation  | 1-2       | r13  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | -50 K      | 50 K            | 0              |  |
| Define thermostat function<br>1=ON/OFF, 2=Modulating  | 1-2       | r14  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | 1          | 2               | 1              |  |
| Definition and weighting, if applicable, of thermostat sensors - S4% (100%=S4, 0%=S3)                   | 1-2       | r15  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | 0 %        | 100 %           | 100            |  |
| Time between melt periods   | 1-2       | r16  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | 0 hrs      | 10 hrs          | 1              |  |
| Duration of melt periods  | 1-2       | r17  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | 0 min.     | 30 min.         | 5              |  |
| Temperature setting for thermostat band 2 . As differential use r01                                     | 0-2       | r21  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | -50 °C     | 50 °C           | 2              |  |
| Correction of the signal from S3B   | 1-2       | r53  |                          |   |   |   |   |   | 1 | 1 |   |            | -10 K      | 10 K            | 0              |  |
| Correction of the signal from S6  | 1-2       | r59  | 1                        | 1 | 1 | 1 | 1 |   |   |   | 1 | 1          | -10 K      | 10 K            | 0              |  |
| Definition and weighting, if applicable, of thermostat sensors when night cover is on. (100%=S4, 0%=S3) | 1-2       | r61  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | 0 %        | 100 %           | 100            |  |
| Heat function<br>Neutral zone between refrigeration and heat function                                   | 1-2       | r62  |                          |   |   |   |   |   |   |   |   | 1          | 0 K        | 50 K            | 5              |  |
| Time delay at switch between refrigeration and heat function  | 1-2       | r63  |                          |   |   |   |   |   |   |   |   | 1          | 0 min.     | 240 min.        | 240            |  |
| Food type: use settings listed in table.  | 1-2*      | r89  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | 0          | 5               | 0              |  |
| Min. limit for S4 temperature   | 1-2       | r98  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | -50 °C     | 50 °C           | -50            |  |
| <b>Alarms</b>   |           |      |                          |   |   |   |   |   |   |   |   |            |            |                 |                |  |
| Delay for temperature alarm   | 1-2       | A03  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | 0 min.     | 240 min.        | 30             |  |
| Delay for door alarm  | 1-2       | A04  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | 0 min.     | 240 min.        | 60             |  |
| Delay for temperature alarm after defrost   | 1-2       | A12  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | 0 min.     | 240 min.        | 90             |  |
| High alarm limit for thermostat 1   | 1-2       | A13  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | -50 °C     | 50 °C           | 8              |  |
| Low alarm limit for thermostat 1  | 1-2       | A14  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | -50 °C     | 50 °C           | -30            |  |
| High alarm limit for thermostat 2   | 1-2       | A20  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | -50 °C     | 50 °C           | 8              |  |
| Low alarm limit for thermostat 2  | 1-2       | A21  | 1                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1          | -50 °C     | 50 °C           | -30            |  |
| High alarm limit for sensor S6 at thermostat 1  | 1-2       | A22  | 1                        | 1 | 1 | 1 | 1 |   |   |   | 1 | 1          | -50 °C     | 50 °C           | 8              |  |
| Low alarm limit for sensor S6 at thermostat 1   | 1-2       | A23  | 1                        | 1 | 1 | 1 | 1 |   |   |   | 1 | 1          | -50 °C     | 50 °C           | -30            |  |
| High alarm limit for sensor S6 at thermostat 2  | 1-2       | A24  | 1                        | 1 | 1 | 1 | 1 |   |   |   | 1 | 1          | -50 °C     | 50 °C           | 8              |  |
| Low alarm limit for sensor S6 at thermostat 2   | 1-2       | A25  | 1                        | 1 | 1 | 1 | 1 |   |   |   | 1 | 1          | -50 °C     | 50 °C           | -30            |  |

R-W

If the operation is limited by a setting of one or more passwords, reading and setting the parameter will be limited to:

R: This setting can be seen with password no. \_ or higher.

W: This setting can be performed with password no. \_ or higher (3 is the highest level).

\*) In order to change this parameter the regulation must be stopped via the parameter r12 Main switch = OFF.

\*\*) In order to change this parameter the parameter r12 Main switch must be set in position "SEr" allowing manual control of outputs.

| Single Coil - continued  | R-W  | Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Min.      | Max.     | Fac.    | Actual |
|--|------|------|---|---|---|---|---|---|---|---|---|-----------|----------|---------|--------|
| S6 alarm time delay<br>With setting = 240 the S6 alarm will be omitted   | 1-2  | A26  | 1 | 1 | 1 | 1 | 1 |   |   | 1 | 1 | 0 min.    | 240 min. | 60      |        |
| Alarm time delay or signal on the DI1 input  | 1-2  | A27  | 1 | 1 | 1 | 1 | 1 | 1 |   |   | 1 | 0 min.    | 240 min. | 30      |        |
| Alarm time delay or signal on the DI2 input  | 1-2  | A28  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 min.    | 240 min. | 30      |        |
| Signal for alarm thermostat. S4% (100%=S4, 0%=S3)  | 1-2  | A36  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 %       | 100 %    | 100     |        |
| Delay for S6 (product sensor alarm) after defrost  | 1-2  | A52  | 1 | 1 | 1 | 1 | 1 |   |   | 1 | 1 | 0 min.    | 240 min. | 90      |        |
| Delay for temperature alarm, section B   | 1-2  | A53  |   |   |   |   |   | 1 | 1 |   |   | 0 min.    | 240 min. | 30      |        |
| Product sensor S6 function   | 1-2* | a01  | 1 | 1 | 1 | 1 | 1 |   |   | 1 | 1 | 0/Off     | 1/On     | 0/Off   |        |
| <b>Compressor</b>  |      |      |   |   |   |   |   |   |   |   |   |           |          |         |        |
| Min. ON-time   | 1-2  | c01  | 1 | 1 | 1 |   |   |   |   |   | 1 | 0 min.    | 30 min.  | 0       |        |
| Min. OFF-time  | 1-2  | c02  | 1 | 1 | 1 |   |   |   |   |   | 1 | 0 min.    | 30 min.  | 0       |        |
| Time delay for cut-in of comp. 2   | 1-2  | c05  |   |   |   |   |   |   |   |   | 1 | 0 sec     | 999 sec  | 5       |        |
| Switch mode for 2 compressor operation.<br>= 1 sequentially. = Cyclic 2  | 1-2  | c08  |   |   |   |   |   |   |   |   | 1 | 1         | 2        | 2       |        |
| <b>Defrost</b>   |      |      |   |   |   |   |   |   |   |   |   |           |          |         |        |
| Defrost method: 0=No, 1= EL, 2= gAs. 4=air   | 1-3  | d01  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/No      | 4/Air    | 1/EL    |        |
| Defrost stop temperature   | 1-2  | d02  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0°C       | 50 °C    | 6       |        |
| Interval between defrost starts  | 1-2  | d03  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 hrs/Off | 240 hrs  | 8       |        |
| Max. defrost duration  | 1-2  | d04  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 min.    | 360 min. | 45      |        |
| Displacement of time on cut-in of defrost at start-up  | 1-2  | d05  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 min.    | 240 min. | 0       |        |
| Drip off time  | 1-2  | d06  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 min.    | 60 min.  | 0       |        |
| Delay for fan start after defrost  | 1-2  | d07  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 min.    | 60 min.  | 0       |        |
| Fan start temperature  | 1-2  | d08  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -50 °C    | 10 °C    | -5      |        |
| Fan cut-in during defrost<br>0: Stopped<br>1: Running<br>2: Running during pump down and defrost<br>3: Running but stops at the temperature set in d41 | 1-2  | d09  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0         | 3        | 1       |        |
| Defrost sensor: 0 =Stop on time, 1=S5, 2=S4  | 1-2  | d10  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0         | 2        | 0       |        |
| Pump down delay  | 1-2  | d16  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 min.    | 60 min.  | 0       |        |
| Drain delay (used at hot gas defrost only)   | 1-2  | d17  |   |   |   |   | 1 |   |   |   |   | 0 min.    | 60 min.  | 0       |        |
| Max. aggregate refrigeration time between two defrosts   | 1-2  | d18  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 hrs     | 240 hrs  | 0/OFF   |        |
| Adaptive defrost:<br>0=not active, 1=monitoring only, 2=skip allowed day,<br>3=skip allowed both day and night, 4=full adaptive+<br>all schedules      | 1-2* | d21  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0         | 4        | 0       |        |
| Time delay before opening of hot gas valve   | 1-2  | d23  |   |   |   |   | 1 |   |   |   |   | 0 min.    | 60 min.  | 0       |        |
| Rail heat during defrost<br>0=off. 1=on. 2=Pulsating   | 1-2  | d27  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0         | 2        | 1       |        |
| Max. duration of -d- in display  | 1-2  | d40  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 5 min.    | 240 min. | 30 min. |        |
| Temperature limit for fan stop during defrost when d09 is set to 3   | 1-2  | d41  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -20 °C    | 20 °C    | 0       |        |
| <b>Injection control function</b>  |      |      |   |   |   |   |   |   |   |   |   |           |          |         |        |
| Max. value of superheat reference  | 1-2  | n09  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | "n10"     | 20 °C    | 12      |        |
| Min. value of superheat reference  | 1-2  | n10  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 °C      | "n09"    | 3       |        |
| MOP temperature. Off if MOP temp. = 15.0 °C  | 1-2  | n11  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -50 °C    | 15 °C    | 15      |        |
| Cycle time of AKV pulsation<br>Only for trained personnel  | 1-2* | n13  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 sec     | 6 sec    | 6       |        |
| <b>Fan</b>   |      |      |   |   |   |   |   |   |   |   |   |           |          |         |        |
| Fan stop temperature (S5)  | 1-2  | F04  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -50 °C    | 50 °C    | 50      |        |
| Pulse operation on fans: 0=No pulse operation, 1=At thermostat cut-outs only, 2= Only at thermostat cut-outs during night operation                    | 1-2  | F05  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0         | 2        | 0       |        |
| Cycle time for fan pulsation (on-time + off-time)  | 1-2  | F06  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 min.    | 30 min.  | 5       |        |
| On-time in % of cycle time   | 1-2  | F07  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 %       | 100 %    | 100     |        |

| Single Coil - continued  | R-W  | Code         | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Min.    | Max.     | Fac.     | Actual |
|--|------|--------------|---|---|---|---|---|---|---|---|---|---------|----------|----------|--------|
| <b>Real time clock</b>   |      |              |   |   |   |   |   |   |   |   |   |         |          |          |        |
| Defrost start via defrost schedule: 0/off=no.<br>1/on=yes  | 1-2  | t00          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/off   | 1/on     | 0/off    |        |
| Six start times for defrost.<br>Setting of hours.<br>0=OFF   | 1-2  | t01 -<br>t06 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 hrs   | 23 hrs   | 0        |        |
| Six start times for defrost.<br>Setting of minutes.<br>0=OFF   | 1-2  | t11 -<br>t16 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 min.  | 59 min.  | 0        |        |
| Clock - Setting of hours   | 0-1  | t07          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 hrs   | 23 hrs   | 0        |        |
| Clock - Setting of minutes   | 0-1  | t08          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 min.  | 59 min.  | 0        |        |
| Clock - Setting of date  | 0-1  | t45          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 day   | 31 days  | 1        |        |
| Clock - Setting of month   | 0-1  | t46          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 mon.  | 12 mon.  | 1        |        |
| Clock - Setting of year  | 0-1  | t47          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 years | 99 years | 0        |        |
| Defrost schedule for Mondays is active at On/1   | 1-2  | t51          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off   | 1/On     | 1/On     |        |
| Defrost schedule for Tuesdays is active at On/1  | 1-2  | t52          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off   | 1/On     | 1/On     |        |
| Defrost schedule for Wednesdays is active at On/1  | 1-2  | t53          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off   | 1/On     | 1/On     |        |
| Defrost schedule for Thursdays is active at On/1   | 1-2  | t54          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off   | 1/On     | 1/On     |        |
| Defrost schedule for Fridays is active at On/1   | 1-2  | t55          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off   | 1/On     | 1/On     |        |
| Defrost schedule for Saturdays is active at On/1   | 1-2  | t56          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off   | 1/On     | 1/On     |        |
| Defrost schedule for Sundays is active at On/1   | 1-2  | t57          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off   | 1/On     | 1/On     |        |
| <b>Humidity</b>  |      |              |   |   |   |   |   |   |   |   |   |         |          |          |        |
| Setpoint for cut-in of humidity function   | 0-2  | h23          |   |   |   |   |   |   |   |   |   | 0 %     | 100 %    | 70       |        |
| Difference for humidity function   | 1-2  | h24          |   |   |   |   |   |   |   |   |   | 1 %     | 30 %     | 5        |        |
| Alarm limit for high humidity (too damp)   | 1-2  | h25          |   |   |   |   |   |   |   |   |   | 1       | 0 %      | 100 %    | 100    |
| Alarm limit for low humidity (too dry)   | 1-2  | h26          |   |   |   |   |   |   |   |   |   | 1       | 0 %      | 100 %    | 0      |
| Delay time for a humidity alarm  | 1-2  | h27          |   |   |   |   |   |   |   |   |   | 1       | 0 min.   | 240 min. | 60     |
| Humidity function during defrosting  | 1-2  | h28          |   |   |   |   |   |   |   |   |   | 1       | 0/Off    | 1/On     | 0/Off  |
| Setpoint for RH% at input signal on 0 V  | 1-2* | h29          |   |   |   |   |   |   |   |   |   | 1       | 0 %      | "h30"    | 0      |
| Setpoint for RH% at input signal on 10 V   | 1-2* | h30          |   |   |   |   |   |   |   |   |   | 1       | "h29"    | 100 %    | 100    |
| Use humidity control   | 1-2* | h31          |   |   |   |   |   |   |   |   |   | 1       | 0/Off    | 1/On     | 0/Off  |
| <b>Miscellaneous</b>   |      |              |   |   |   |   |   |   |   |   |   |         |          |          |        |
| Delay of output signals after power failure  | 1-2  | o01          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 sec   | 600 sec  | 5        |        |
| Input signal on DI1. Function:<br>0=not used. 1=status on DI1. 2=door function with<br>alarm when open. 3=door alarm when open. 4=defrost<br>start (pulse-signal). 5=ext.main switch. 6=night<br>operation. 7=thermostat band changeover (activate<br>r21). 8=alarm function when closed. 9=alarm function<br>when open. 10=Appliance cleaning (pulse signal).<br>11=forced cooling at hot gas defrost. 12=Open night<br>cover. 14=Refrigeration stopped (forced closing).<br>15=case shutdown. 16=light. 20=Refrigerant alarm.<br>21= adaptive liquid control when short-circuited. | 1-2* | o02          | 1 | 1 | 1 | 1 | 1 | 1 |   |   |   | 1       | 0        | 21       | 0      |
| Network address  | 1-3* | o03          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0       | 240      | 0        |        |
| On/Off switch (Service Pin message)<br><b>IMPORTANT!</b> o61 <b>must</b> be set prior to o04<br>(used at Lon 485)  | 1-2  | o04          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off   | 1/On     | 0/Off    |        |
| Access code 3 (all settings)   | 3-3  | o05          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0       | 999      | 0        |        |
| Used sensor type: 0=Pt1000, 1=PTC1000, 2=Ntc5K,<br>3=Ntc10K. (S2 and S6 are not affected. They are always<br>Pt1000 ohms)  | 1-3* | o06          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/Pt    | 3/N10    | 0/Pt     |        |
| Max. hold time after coordinated defrost   | 1-2  | o16          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 min.  | 360 min. | 20       |        |
| Select signal for display view. S4%<br>(100%=S4, 0%=S3)  | 1-2  | o17          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 %     | 100 %    | 100      |        |
| Pressure transmitter working range - min. value  | 1-3* | o20          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -1 bar  | 5 bar    | -1       |        |
| Pressure transmitter working range - max. value  | 1-3* | o21          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 6 bar   | 200 bar  | 12       |        |

| Single Coil - continued   | R-W  | Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Min.   | Max.     | Fac.  | Actual |
|---|------|------|---|---|---|---|---|---|---|---|---|--------|----------|-------|--------|
| Refrigerant setting:<br>1=User defined. 3-digits. 2=R22. 3=R134a. 4=R502.<br>5=R717. 6=R13. 7=R13b1. 8=R23. 9=R500. 10=R503.<br>11=R114. 12=R142b. 13=User defined. 14=R32.<br>15=R227. 16=R401A. 17=R507. 18=R402A. 19=R404A.<br>20=R407C. 21=R407A. 22=R407B. 23=R410A. 24=R170.<br>25=R290. 26=R600. 27=R600a. 28=R744. 29=R1270.<br>30=R417A. 31=R422A. 32=R413A. 33=R422D.<br>34=R427A. 35=R438A. 36=R513A. 37=R407F.<br>38=R1234ze. 39=R1234yf. 40=R448A. 41=R449A.<br>42=R452A. 43=R450A. 44=R452B. 45=R454B.<br>46=R1233zdE. 47=R1234zeZ. 48=R449B. 49=R407H  | 1-3* | o30  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0      | 42       | 0     |        |
| Input signal on DI2. Function:<br>0=not used. 1=status on DI2. 2=door function with<br>alarm when open. 3=door alarm when open. 4=defrost<br>start (pulse-signal). 5=ext. main switch. 6=night<br>operation. 7=thermostat band changeover (activate<br>r21). 8=alarm function when closed. 9=alarm function<br>when open. 10=Appliance cleaning (pulse signal).<br>11=forced cooling at hot gas defrost. 12=Open night<br>cover. 13=coordinated defrost.14=Refrigeration<br>stopped (forced closing). 15=case shutdown. 16=light.<br>20=Refrigerant alarm. 21= adaptive liquid control<br>when short-circuited. | 1-2* | o37  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0      | 21       | 0     |        |
| Configuration of light function: 1=Light follows<br>day /night operation, 2=Light control via data<br>communication via 'o39', 3=The light is controlled with<br>a door switch on a DI input, 4=As "2", but light switches<br>on and night cover will open if the network cuts out<br>for more than 15 minutes, 5=Light controlled via a DI<br>input.   | 1-2  | o38  | 1 | 1 |   | 1 | 1 | 1 | 1 | 1 | 1 | 1      | 5        | 1     |        |
| Activation of light relay (only if o38=2) On=light  | 1-2  | o39  | 1 | 1 |   | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off  | 1/On     | 0/Off |        |
| Rail heat On time during day operations   | 1-2  | o41  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 %    | 100 %    | 100   |        |
| Rail heat On time during night operations   | 1-2  | o42  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 %    | 100 %    | 100   |        |
| Rail heat cycle time (On time + Off time)   | 1-2  | o43  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 min. | 60 min.  | 5     |        |
| Appliance cleaning. 0=no Appliance cleaning. 1=Fans<br>only. 2=All output Off.  | 1-2  | o46  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0      | 2        | 0     |        |
| Selection of wiring diagram. See overview pages 2-4   | 1-3* | o61  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1      | 9        | 1     |        |
| Access code 2 (partial access)  | 2-2  | o64  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0      | 999      | 0     |        |
| Replace the controller's factory settings with the<br>present settings  | 3-3* | o67  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off  | 1/On     | 0/Off |        |
| Input signal on DI3. Function: (high voltage input)<br>(0=not used. 1=status on DI2. 2=door function with<br>alarm when open. 3=door alarm when open. 4=defrost<br>start (pulse-signal). 5=ext. main switch 6=night<br>operation. 7=thermostat band changeover (activate<br>r21). 8=Not used. 9=Not used. 10=Appliance cleaning<br>(pulse signal). 11=forced cooling at hot gas defrost.<br>12=Open night cover. 13=Not used. 14=Refrigeration<br>stopped (forced closing)). 15=case shutdown.<br>16=light. 20=Refrigerant alarm. 21= adaptive liquid<br>control when short-circuited.                          | 1-2* | o84  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0      | 21       | 0     |        |
| Rail heat control<br>0=not used, 1=pulse control with timer function (o41<br>and o42), 2=pulse control with dew point function A  | 1-2  | o85  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0      | 2        | 0     |        |
| Dew point value where the rail heat is minimum  | 1-2  | o86  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -10°C  | "o87"    | 8     |        |
| Dew point value where the rail heat is 100% on  | 1-2  | o87  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | "o86"  | 50 °C    | 17    |        |
| Lowest permitted rail heat effect in %  | 1-2  | o88  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 %    | 100 %    | 30    |        |
| Time delay from "open door" refrigeration is started  | 1-2  | o89  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 min. | 240 min. | 30    |        |
| Fan operation at stopped cooling (forced closing):<br>0= Stopped (defrost allowed)<br>1= Running (defrost allowed)<br>2= Stopped (defrost not allowed)<br>3= Running (defrost not allowed)  | 1-2  | o90  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0      | 3        | 1     |        |

| Single Coil - continued  | R-W   | Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Min.   | Max.    | Fac.  | Actual |
|--|-------|------|---|---|---|---|---|---|---|---|---|--------|---------|-------|--------|
| Readout of temperature value shown in display 1<br>1= u56 air temperature<br>2= u36 product temperature  | 1-2   | o97  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1      | 2       | 1     |        |
| Light and night blinds defined:<br>0: Light is switched off and night blind is opened when the main switch is off<br>1: Light and night blind is independent of main switch  | 1-2   | o98  | 1 | 1 |   | 1 | 1 | 1 | 1 | 1 | 1 | 0      | 1       | 0     |        |
| Configuration of alarm relay:<br>The alarm relay will be activated by an alarm in one or more of the following priorities.<br>Setting:<br>0 = The relay is not activated by alarms<br>1 = Only high priority alarms<br>2 = High and medium priority alarms<br>3 = High, medium and low priority alarms | 1-2   | P41  | 1 |   | 1 | 1 |   | 1 | 1 | 1 | 1 | 0      | 3       | 2     |        |
| Max. opening time of night blinds after a manual override with DI activation.  | 1-2   | P60  |   |   |   |   |   |   |   |   | 1 | 0 min. | 60 min. | 5     |        |
| Stop time for fans while the night blinds roll down  | 1-2   | P65  |   |   |   |   |   |   |   |   | 1 | 0 sec  | 300 sec | 0     |        |
| Cycle time for rail heat at PWM on AO1   | 1-2   | P82  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 sec  | 60 sec  | 10    |        |
| User defined refrigerant 3-digit Rfg. factor K1  | 1-3*  | P83  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -999   | 999     | 300   |        |
| User defined refrigerant 3-digit Rfg. factor K2  | 1-3*  | P84  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -999   | 999     | 300   |        |
| User defined refrigerant 3-digit Rfg. factor K3  | 1-3*  | P85  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -999   | 999     | 300   |        |
| Max. limitation of the superheat reference when regulated with liquid-filled evaporator  | 1-2   | P86  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | "P87"  | 20°C    | 3     |        |
| Min. limitation of the superheat reference when regulated with liquid-filled evaporator  | 1-2   | P87  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0°C    | "P86"   | 1     |        |
| Access code 1 (simple access)  | 1-1   | P88  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0      | 999     | 0     |        |
| Locking the display control. 0/Off=operation. 1/On=locked  | 1-2   | P89  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off  | 1/On    | 0/Off |        |
| Configuration of relay output DO2: 0=not used, 1=fan, 2=fan Eco, 3=defrost, 4=rail heat, 5=alarm, 6=light, 7=night blinds, 8=compressor, 9=compressor 2, 10=heating element  | 1-3*  | q02  |   |   |   |   |   |   |   |   | 1 | 0      | 10      | 5     |        |
| Configuration of relay output DO3: 0=not used, 1=fan, 2=fan Eco, 3=defrost, 4=rail heat, 5=alarm, 6=light, 7=night blinds, 8=compressor, 9=compressor 2, 10=heating element  | 1-3*  | q03  |   |   |   |   |   |   |   |   | 1 | 0      | 10      | 8     |        |
| Configuration of relay output DO4: 0=not used, 1=fan, 2=fan Eco, 3=defrost, 4=rail heat, 5=alarm, 6=light, 7=night blinds, 8=compressor, 9=compressor 2, 10=heating element  | 1-3*  | q04  |   |   |   |   |   |   |   |   | 1 | 0      | 10      | 9     |        |
| Configuration of relay output DO5: 0=not used, 1=fan, 2=fan Eco, 3=defrost, 4=rail heat, 5=alarm, 6=light, 7=night blinds, 8=compressor, 9=compressor 2, 10=heating element  | 1-3*  | q05  |   |   |   |   |   |   |   |   | 1 | 0      | 10      | 3     |        |
| Configuration of relay output DO6: 0=not used, 1=fan, 2=fan Eco, 3=defrost, 4=rail heat, 5=alarm, 6=light, 7=night blinds, 8=compressor, 9=compressor 2, 10=heating element  | 1-3*  | q06  |   |   |   |   |   |   |   |   | 1 | 0      | 10      | 1     |        |
| Configuration of analogue output AO1: 0=not used. 1=rail heat PWM  | 1-3*  | q09  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0      | 1       | 0     |        |
| Manual control of output: AKV valve 0-100%   | 1-2** | q11  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 %    | 100 %   | 0     |        |
| Manual control of output: Compressor1/LLSV   | 1-2** | q12  | 1 | 1 | 1 |   |   |   |   |   | 1 | 0/Off  | 1/On    | 0/Off |        |
| Manual control of output: Fan  | 1-2** | q13  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off  | 1/On    | 0/Off |        |
| Manual control of output: Defrost  | 1-2** | q14  | 1 | 1 | 1 | 1 |   | 1 | 1 | 1 | 1 | 0/Off  | 1/On    | 0/Off |        |
| Manual control of output: Rail heat  | 1-2** | q15  |   | 1 | 1 | 1 |   | 1 |   |   | 1 | 0/Off  | 1/On    | 0/Off |        |
| Manual control of output: Alarm  | 1-2** | q16  | 1 |   | 1 | 1 |   | 1 | 1 | 1 | 1 | 0/Off  | 1/On    | 0/Off |        |
| Manual control of output: Light  | 1-2** | q17  | 1 | 1 |   | 1 | 1 | 1 | 1 | 1 | 1 | 0/Off  | 1/On    | 0/Off |        |
| Manual control of output: Valve in suction line  | 1-2** | q18  |   |   |   |   | 1 |   |   |   |   | 0/Off  | 1/On    | 0/Off |        |
| Manual control of output: Compressor 2   | 1-2** | q19  |   |   |   |   |   |   |   |   | 1 | 0/Off  | 1/On    | 0/Off |        |
| Manual control of output: Hot gas valve  | 1-2** | q20  |   |   |   |   | 1 |   |   |   |   | 0/Off  | 1/On    | 0/Off |        |
| Manual control of output: Night blinds   | 1-2** | q21  |   |   |   |   |   |   |   |   | 1 | 0/Off  | 1/On    | 0/Off |        |

| Single Coil - continued  | R-W   | Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Min.  | Max.  | Fac.  | Actual |
|--|-------|------|---|---|---|---|---|---|---|---|---|-------|-------|-------|--------|
| Manual control of output: Defrost 2  | 1-2** | q22  |   |   |   |   |   |   | 1 |   |   | 0/Off | 1/On  | 0/Off |        |
| Manual control of output: Heating element  | 1-2** | q23  |   |   |   |   |   |   |   |   | 1 | 0/Off | 1/On  | 0/Off |        |
| Manual control of output: Fan Eco  | 1-2** | q24  |   |   |   |   |   |   |   |   | 1 | 0/Off | 1/On  | 0/Off |        |
| Manual control of output: Drain  | 1-2** | q25  |   |   |   |   | 1 |   |   |   |   | 0/Off | 1/On  | 0/Off |        |
| Manual control of output: Humidity   | 1-2** | q26  |   |   |   |   |   |   |   | 1 |   | 0/Off | 1/On  | 0/Off |        |
| Manual control of output: Rail heat PWM  | 1-2** | q27  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 %   | 100 % | 0     |        |
| Define which food temperature measurement to display in U72: 1=thermostat temperature, 2=alarm temperature, 3=S3, 4=S6 | 1-2*  | q39  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     | 4     | 2     |        |
| <b>Service</b>   |       |      |   |   |   |   |   |   |   |   |   |       |       |       |        |
| Control mode   | 0-0   | u00  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Temperature measured with S5 sensor  | 0-0   | u09  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Status on DI1 input. on/1=closed   | 0-0   | u10  | 1 | 1 | 1 | 1 | 1 | 1 |   |   |   |       |       |       | 1      |
| Actual defrost time (minutes)  | 0-0   | u11  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Temperature measured with S3 sensor  | 0-0   | u12  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Status on night operation (on or off) 1=on   | 0-0   | u13  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Temperature measured with S4 sensor  | 0-0   | u16  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Thermostat temperature   | 0-0   | u17  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Runtime of thermostat (cooling time) in minutes  | 0-0   | u18  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Temperature of S2 evaporator outlet temp.  | 0-0   | u20  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Superheat across evaporator  | 0-0   | u21  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Reference of superheat control   | 0-0   | u22  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Opening degree of AKV valve  | 0-0   | u23  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Evaporating pressure Po (relative)   | 0-0   | u25  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Evaporator temperature To (Calculated)   | 0-0   | u26  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Temperature measured with S6 sensor (product temperature)  | 0-0   | u36  | 1 | 1 | 1 | 1 | 1 |   |   |   | 1 | 1     |       |       |        |
| Status on DI2 input. on/1=closed   | 0-0   | u37  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Air temperature . Weighted S3 and S4   | 0-0   | u56  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Measured temperature for alarm thermostat  | 0-0   | u57  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Status on relay for compressor/solenoid valve  | 0-0   | u58  | 1 | 1 | 1 |   |   |   |   |   |   |       |       |       | 1      |
| Status on relay for fan  | 0-0   | u59  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Status on relay for defrost  | 0-0   | u60  | 1 | 1 | 1 | 1 |   |   | 1 | 1 | 1 | 1     |       |       |        |
| Status on relay for rail heat  | 0-0   | u61  |   | 1 | 1 | 1 |   |   | 1 |   |   |       |       |       | 1      |
| Status on relay for alarm  | 0-0   | u62  | 1 |   | 1 | 1 |   |   | 1 | 1 | 1 | 1     |       |       |        |
| Status on relay for light  | 0-0   | u63  | 1 | 1 |   | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Status on relay for valve in suction line  | 0-0   | u64  |   |   |   |   | 1 |   |   |   |   |       |       |       |        |
| Status on relay for compressor 2   | 0-0   | u67  |   |   |   |   |   |   |   |   |   |       |       |       | 1      |
| Temperature measured with S5B sensor   | 0-0   | u75  |   |   |   |   |   |   | 1 |   |   |       |       |       |        |
| Temperature measured with S3B sensor   | 0-0   | u76  |   |   |   |   |   | 1 | 1 |   |   |       |       |       |        |
| Status on relay for hot gas / drain valve  | 0-0   | u80  |   |   |   |   | 1 |   |   |   |   |       |       |       |        |
| Status on relay for night blinds   | 0-0   | u82  |   |   |   |   |   |   |   |   |   |       |       |       | 1      |
| Status on relay for defrost B  | 0-0   | u83  |   |   |   |   |   |   | 1 |   |   |       |       |       |        |
| Status on relay for heat function  | 0-0   | u84  |   |   |   |   |   |   |   |   |   |       |       |       | 1      |
| Readout of the actual rail heat effect via relay   | 0-0   | u85  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| 1:Thermostat 1 operating, 2:Thermostat 2 operating   | 0-0   | u86  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Status on high voltage input DI3   | 0-0   | u87  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Readout of thermostat band in use  | 0-0   | u90  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |
| Readout of thermostat's actual cut-out value   | 0-0   | u91  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1     |       |       |        |

| Single Coil - continued   | R-W | Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Min. | Max. | Fac. | Actual |
|---|-----|------|---|---|---|---|---|---|---|---|---|------|------|------|--------|
| Readout of status on the adaptive defrost<br>0: Off. Function is not activated and are zero-set<br>1: Sensor error or S3/S4 are reversed.<br>2: Tuning is in progress<br>3: Normal<br>4: Light build-up of ice<br>5: Medium build-up of ice<br>6: Heavy build-up of ice | 0-0 | U01  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |      |      |      |        |
| Number of defrosts carried out since the initial power up or since the resetting of the function  | 0-0 | U10  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |      |      |      |        |
| Number of defrosts skipped since the initial power up or since the resetting of the function  | 0-0 | U11  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |      |      |      |        |
| Readout of alarm air temp. Section B  | 0-0 | U34  |   |   |   |   |   | 1 | 1 |   |   |      |      |      |        |
| Readout of display 2 value  | 0-0 | U35  |   |   |   |   |   | 1 | 1 |   |   |      |      |      |        |
| Status of relay for ECO fan   | 0-0 | U37  |   |   |   |   |   |   |   |   |   |      |      |      | 1      |
| Readout of signal quality for MODBUS communication  | 0-0 | U45  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |      |      |      |        |
| Status of relay to drain valve  | 0-0 | U55  |   |   |   |   | 1 |   |   |   |   |      |      |      |        |
| Readout of measured humidity in %   | 0-0 | U57  |   |   |   |   |   |   |   |   | 1 |      |      |      |        |
| Status of relay for humidity  | 0-0 | U58  |   |   |   |   |   |   |   |   | 1 |      |      |      |        |
| Readout of rail heat effect via AO1 in %  | 0-0 | U59  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |      |      |      |        |
| Readout of measured food temperature (defined in q39)   | 0-0 | U72  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |      |      |      |        |
| Readout of measured defrost stop temperature (defined in d10)   | 0-0 | U73  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |      |      |      |        |

#### 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 "∨" buttons depressed at the same time as you reconnect the supply voltage
- When FAc is shown in the display, select "yes".



| <b>Fault message</b>   |   |                                 |
|--|---|---------------------------------|
| <p>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:</p> |   |                                 |
| <b>Code / Alarm text via data communication</b>  | <b>Description</b>  | <b>Alarm relay groups (P41)</b> |
| A1/--- High t.alarm  | High temperature alarm  | 1                               |
| A2/--- Low t. alarm  | Low temperature alarm   | 2                               |
| A4/--- Door alarm  | Door alarm  | 4                               |
| A5/--- Max. hold time  | The "o16" function is activated during a coordinated defrost                                    | 5                               |
| A11/--- No Rfg. sel.   | No refrigerant selected   | 7                               |
| A13/--- High temp S6   | Temperature alarm. High S6  | 1                               |
| A14/--- Low temp S6  | Temperature alarm. Low S6   | 2                               |
| A15/--- DI1 alarm  | DI1 alarm   | 4                               |
| A16/--- DI2 alarm  | DI2 alarm   | 4                               |
| A45/--- Standby mode   | Standby position (stopped refrigeration via r12 or DI input)                                    | 8                               |
| A59/--- Case clean   | Appliance cleaning. Signal from DI input  | 8                               |
| A70/--- HighTemp.B   | Temperature alarm. High S3B   | 1                               |
| A71/--- Low Temp. B  | Temperature alarm. Low S3B  | 2                               |
| AA2/---Refrig Leak   | A refrigerant leak detection signal is received   | 9                               |
| AA3/--- CO <sub>2</sub> alarm  | A refrigerant leak detection signal is received and the selected refrigerant is CO <sub>2</sub> | 9                               |
| a02/--- HighHumidity   | Too high humidity   | 10                              |
| a03/--- Low Humidity   | Too low humidity  | 10                              |
| a04/--- Wrong IO cfg   | The configuration of inputs and outputs is incorrect  | 6                               |
| --- AD Iced  | Evaporator is iced up. Reduction of air flow  | 5                               |
| --- AD flashgas  | Flash gas is formed at the valve  | 5                               |
| --- Max. Def. Time (A,B)   | Defrost stopped based on time instead of, as wanted, on temperature. Section A / B              | 5                               |
| E1/--- Ctrl. error   | Faults in the controller  | 6                               |
| E6/--- RTC error   | Check clock   | 6                               |
| E20/--- Pe error   | Error on pressure transmitter Pe  | 3                               |
| E24/--- S2 error   | Error on S2 sensor  | 3                               |
| E25/--- S3 error   | Error on S3 sensor  | 3                               |
| E26/--- S4 error   | Error on S4 sensor  | 3                               |
| E27/--- S5 error   | Error on S5 sensor  | 3                               |
| E28/--- S6 error   | Error on S6 sensor  | 3                               |
| E34/--- S3 error B   | Error on S3B sensor   | 3                               |
| E37/--- S5 error B   | Error on S5B sensor   | 3                               |
| E59/---RH input err  | Missing signal from the humidity meter  | 3                               |
| <b>Data communication</b>  |   |                                 |
| The importance of individual alarms can be defined with a setting. The setting must be carried out in the group "Alarm destinations"   |   |                                 |

| Operating status   |     | (Measurement)                                |
|--|-----|--|
| The controller goes through some regulating situations where it is just waiting for the next sequence of the regulation. To make these “why is nothing happening” situations visible, you can see an operating status on the display. Push the info button for 3 seconds to see status. If there is a status code, it will be shown on the display. The individual status codes have the following meanings: |     | Ctrl. state:<br>(Shown in all menu displays) |
| Normal regulation  | S0  | 0  |
| Waiting for end of the coordinated defrost   | S1  | 1  |
| When the compressor is operating, it must run for at least x minutes   | S2  | 2  |
| When the compressor is stopped, it must remain stopped for at least x minutes  | S3  | 3  |
| The evaporator drips off and waits for the time to run out   | S4  | 4  |
| Refrigeration stopped by main switch. Either with r12 or a DI-input  | S10 | 10   |
| Refrigeration stopped by thermostat  | S11 | 11   |
| The refrigeration is stopped due to too low S4 temperature   | S12 | 12   |
| Defrost sequence. Defrost in progress  | S14 | 14   |
| Defrost sequence. Fan delay — water attaches to the evaporator   | S15 | 15   |
| Refrigeration stopped due to open ON input or stopped regulation   | S16 | 16   |
| Door is open. DI input is open   | S17 | 17   |
| Melt function in progress. Refrigeration is interrupted  | S18 | 18   |
| Modulating thermostat control  | S19 | 19   |
| Emergency cooling *)   | S20 | 20   |
| Adaptive control of superheat  | S23 | 23   |
| Start-up phase 1. Signal reliability from sensors is controlled  | S24 | 24   |
| Manual control of outputs  | S25 | 25   |
| No refrigerant selected  | S26 | 26   |
| Appliance cleaning   | S29 | 29   |
| Forced cooling   | S30 | 30   |
| Delay on outputs during start-up   | S32 | 32   |
| Heat function is active  | S33 | 33   |
| Case shutdown  | S45 | 45   |
| Operation with adaptive liquid control   | S48 | 48   |
| <i>Other displays:</i>   |     |  |
| Defrost in progress / first cooling after the defrost where the temperature is still above the thermostat band.  | -d- |  |
| Password required. Set password  | PS  |  |
| Regulation is stopped via main switch or case cleaning   | OFF |  |
| The main switch is set to service/manual operation   | SEr |  |

\*) Emergency cooling will take effect when there is lack of signal from a defined S3 or S4 sensor or signal from the pressure transmitter is outside signal range. The regulation will continue with a registered average cut-in frequency. There are two registered values – one for day operation and one for night operation.