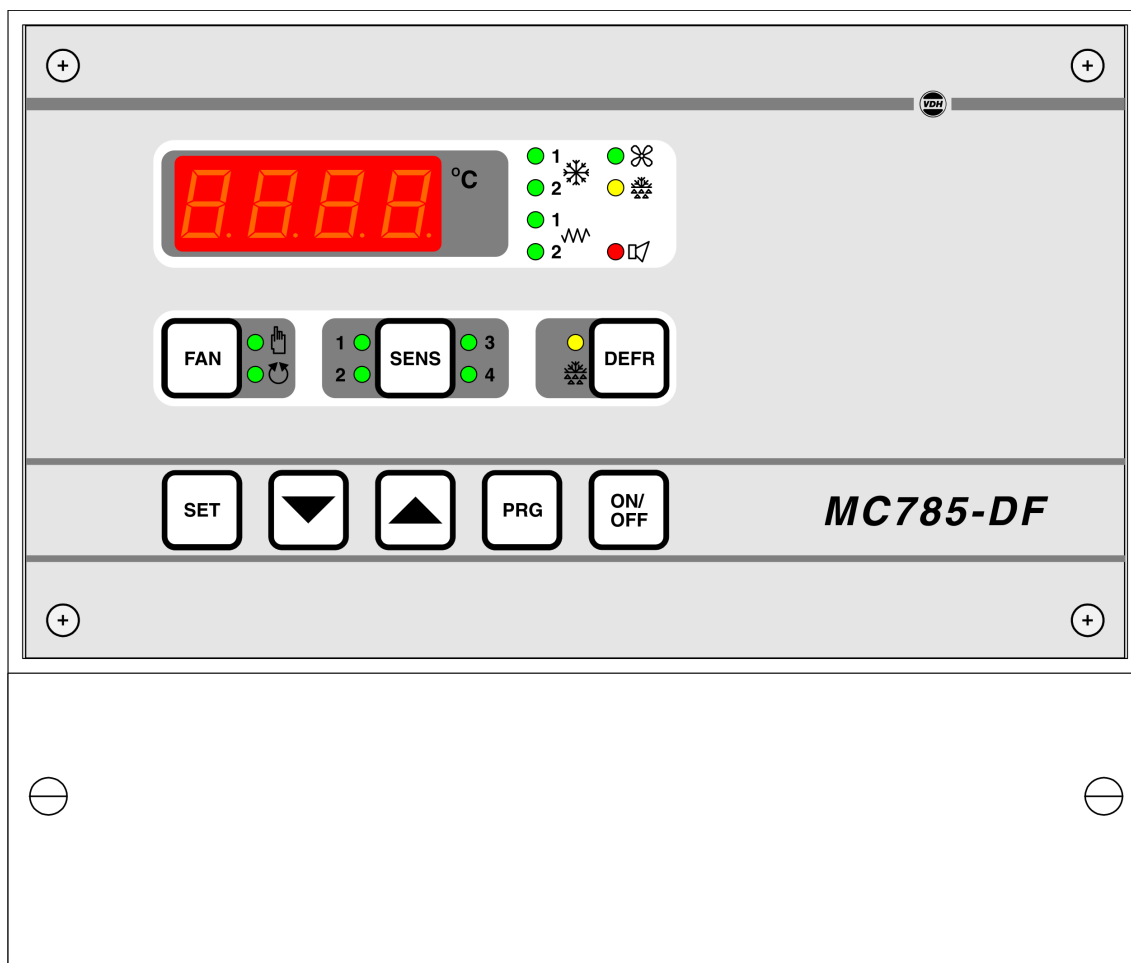


MC 785-DF ALFANET

with access code

wall and panel mounting

Operating Manual



Description : MC 785-DF ALFANET Thermostat		Doc.nr.: 060795
Type: MANUAL	Number of pages: 16	Version: V1.1
File: Do060795 MC785-DF Alfabet v11 EN.wpd Software: MC785-DF AN (060775): V2.01	By: BJB	Date: 11-09-2008
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1. Technical specifications

1.1 General

Type : MC 785-DF

Wall mounting:

Housing : Grey plastic
Material : Polystyrol 454h KG 2 natur BASF
Dimensions : 213 x 180 x 85mm (whd)
Front : Polycarbonat











Panel mounting:

Housing : Steel plate panel
Material : Steel in silvergrey
Dimensions : 217 x 155 x 85mm (whd)
Panel cutout : min. 208 x 146mm (wh)
Front : Polycarbonat
Range : -50/+50°C per 0,1°C
Supply : 230 Vac; 50/60 Hz (-10/+5%).
Used power : 9 VA
Operation temperature : -20/+50°C
Operating rel. humidity : 10/+90 % RH not condensing
Store temperature : -20/+60°C
Accuracy : ± 0,5 % of the range

1.2 Front

Display : 4-number digital display for temperature read-out

LED's :

- 1 = LED Relay cooling 1 active
- 2 = LED Relay cooling 2 active
- 1 = LED Relay heating 1 active
- 2 = LED Relay heating 2 active
-  = LED Fan active
-  = LED Defrost active
-  = LED Alarm active (blinking)
-  = LED Fan in auto mode
-  = LED Fan in manual mode (hand)
- S1 = Temperature sensor 1 read-out
- S2 = Temperature sensor 2 read-out
- S3 = Temperature sensor 3 read-out (defrost sensor 1)
- S4 = Temperature sensor 4 read-out (defrost sensor 2)
-  = LED Defrost in manual mode

Keys :

- ON/OFF = On/Off key controller with LED indication
- SET = Setpoint push button with LED indication
- ▲ = Up key
- ▼ = Down key
- PRG = Program key with LED indication
- FAN = Fan auto/manual key with LED indication
- SENS = Sensor read-out key
- DEFR = Manual defrost key

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1.3 In- and outputs

Sensors	: Control sensor 1	(Pt-100, 3-wire to DIN/IEC 751)
	Control sensor 2	(Pt-100, 3-wire to DIN/IEC 751)
	Defrost sensor 1	(Pt-100, 3-wire to DIN/IEC 751)
	Defrost sensor 2	(Pt-100, 3-wire to DIN/IEC 751)
Digital inputs	: Alarm/door input	(potential free input contact)
Analog output	0/+10Vdc, Rbmin 10Kohm.	
Communication	: RS485 network (optional)	(2x twisted pair shielded, min 0,5mm ²)
Relays	: RY1 Alarm	(C/NO/NC, 250Vac/10A not inductive)
		Normally C-NO is closed, at alarm C-NC is closed.
	The next relays have a central common;	
	RY2 Function-1	(NO, 250Vac/10A not inductive)
	RY3 Function-2	(NO, 250Vac/10A not inductive)
	RY4 Fan	(NO, 250Vac/10A not inductive)
	RY5 Defrost	(NO/NC, 250Vac/10A not inductive)

2. Functional specifications

The MC 785-DF has three different operating modes. These are:

- Mode 0 - 2x cooling
- Mode 1 - cooling/heating
- Mode 2 - 2x heating

The MC 785-DF has an analog P(I)-output with a range of 0/+10 Vdc. The function of this output is programmable as measuring signal, setpoint signal or a P(I) output for the cooling or heating.

A selection between three different modes of defrost can be made: no defrost, natural defrost or electric defrost.

Also the function of the sensor(s) can be programmed. There is a choice between control, control/alarm and only read-out or alarm.

The above mentioned settings are made via the Internal Parameters.

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3. Control of the thermostat

Normally the display shows the temperature of the control sensor(s).

3.1 Key access

If parameter P90 is not zero a access code is asked. The text 'code' appears in the display and after this a access code can be given in. The first number of the access code is blinking this number can be changed by pressing the **UP** and/or **DOWN** keys if the correct value is given in it can be confirmed by pressing the **SET** key. Afterwards the next number can be entered. As the last number is altered and confirmed by pressing the **SET** key, the controller checks the access code. If the correct access code is entered the controller can be operated. If a false access code is entered the controller returns to it's normal operation and the keys are blocked.

3.2 Read-out of the sensors.

Press the **SENS** key. The display shows the temperature of sensor 1. Also starts the LED 1, next to the **SENS** to flash, to indicate sensor 1 is shown. By pressing the **SENS** key again, the other sensors can be displayed.

3.3 View at and changing the setpoint.

Press the **SET** key. The setpoint appears in the display. To change the setpoint, press the **SET** key simultaneously with the **UP** or **DOWN** keys. After releasing the **SET** key, the measured temperature appears in the display.

3.4 Manual start of defrost

By pressing the **DEFR** key, the defrost can be started manually, and therefor independent of the defrost timer. The defrost release temperature is not taken into account. The defrost will always start.

3.5 Changing method of deforst

Press the **SET** key and than at the **DEFR** key. The display shows the set method of defrost. Use the **UP** and **DOWN** keys to make a change.

The settings are:

- 0 = No defrost
- 1 = Natural defrost
- 2 = Electric defrost
- 3 = Hot gas defrost

3.6 Operation of fan control

With the **FAN** key can be switched between the manual and automatic fan mode. In the manual mode the fan will run continuously, in the auto mode the fan will only run during cooling or heating, including the fan off delay time. During electric or hot gas defrost the fan will always stop.

3.7 Reset the alarm

As soon as an alarm situation occurs and an error message appears on the display can, by pressing the **SET** key, the alarm be reset.
The error message remains in the display, until the cause of the error is solved.

3.8 Digital inputs

Via the Internal Parameters an option can be selected to use the digital input as alarm or as door contact.

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4. Programming internal settings

By pressing the **PRG** and **SET** key for more than 5 seconds, the Internal Parameter menu is entered. The display shows a P followed by a number. Use the **UP** and **DOWN** keys to selected the required number.

If the desired parameter is selected, press the **SET** key to look at the value of the parameter. By pressing the **SET** and **UP** or **DOWN** keys at the same time, the value can be changed. After releasing the keys, the number of the parameter appears again in the display.

If during 30 seconds no key is touched or the **PRG** key is pressed, the display returns to the normal operating mode.

4.1 Parameter table

Number	Description	Range	Value	Default
P 01	Function thermostat 0 = 2x cooling 1 = cooling/heating 2 = 2x heating	0..2	-	0
P 02	Change between the two stages (if P01 = 0)	0 = no, 1 = yes	-	0
P 03	Start delay 2nd stage (if P01 = 0 or 2)	0 = temp, 1 = time	-	0
P 04	Start delay second stage	0..99	minutes	15
P 05	Differential function 1	0.1..10	°C	1.0
P 06	Differential function 2	0.1..10	°C	1.0
P 07	Offset function 1	-10..+10	°C	0.0
P 08	Offset function 2	-10..+10	°C	0.0
P 10	Function sensor 1 0 = not present 1 = control 2 = control & alarm 3 = read-out 4 = alarm	0..4	-	2
P 11	Function sensor 2 (same as sensor-1)	0..4	-	2
P 12	Defrost sensor 1 present	0 = no, 1 = yes	-	1
P 13	Defrost sensor 2 present	0 = no, 1 = yes	-	0
P 14	Offset sensor 1	-10/+10	°C	0.0
P 15	Offset sensor 2	-10/+10	°C	0.0
P 16	Offset defrost sensor 1	-10/+10	°C	0.0
P 17	Offset defrost sensor 2	-10/+10	°C	0.0
P 20	Minimum setpoint	-50..+50	°C	-50.0
P 21	Maximum setpoint	-50..+50	°C	+50.0
P 22	Read-out above -10°C per 1°C	0 = no, 1 = yes	-	0
P 23	Read-out below -10°C per 1°C	0 = no, 1 = yes	-	1
P 30	Start delay cooling	0..99	-	0
P 31	Stop delay cooling	0..99	-	0
P 32	Parameter 30/31 in seconds or minutes	0 = sec, 1 = min	-	0
P 33	Minimum on time cooling	0..99	minutes	0
P 34	Minimum off time cool.	0..99	minutes	0
P 40	Switch off delay fan	0..99	minutes	0
P 41	Switch on temperature fan after defrost	-50..+50	°C	2.0
P 42	Switch on delay fan after defrost	0..99	minutes	0
P 43	Drainage time	0..99	minutes	0

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Number	Description	Range	Value	Default
P 50	Defrost 0 = no 1 = natural 2 = electric 3 = hot gas	0..3	--	0
P 51	Defrost interval	1..99	hours	12
P 52	Maximum defrost time	1..99	minutes	30
P 53	End of defrost temperature	-10/+30	°C	5.0
P 54	Defrost release temperature If the evaporator temperature is higher than the release temperature the defrost is not started	-50/+50	°C	2.0
P 55	Defrost relay during natural defrost on	0 = no, 1 = yes	-	0
P 56	Defrost based on compressor run hours	0 = no, 1 = yes	-	0
P 57	Display fixed during defrost	0 = no, 1 = yes	-	0
P 58	Maximum time display fixed	1..99	minutes	15
P 60	Alarm type 0 = No 1 = Absolute 2 = Relative to setp.	0..2	-	1
P 61	Alarm only active during control	0 = no, 1 = yes	-	1
P 62	Control off at minimum alarm	0 = no, 1 = yes	-	0
P 63	Control off at maximum alarm	0 = no, 1 = yes	-	0
P 64	Minimum alarm temperature	-50..+50	°C	-50.0
P 65	Maximum alarm temperature	-50..+50	°C	+50.0
P 66	Minimum alarm delay	0..99	minutes	0
P 67	Maximum alarm delay	0..99	minutes	0
P 70	Function analog output 0 = Control temperature 1 = Sensor 1 2 = Sensor 2 3 = Defrost sensor 1 4 = Defrost sensor 2 5 = Temperature setpoint 6 = P(I) cooling 7 = P(I) heating	0..7	-	0
P 71	0V out at temperature	-50..+50	°C	-50.0
P 72	10V out at temperature	-50..+50	°C	+50.0
P 73	Proportional band cooling	0.1..10	°C	1.0
P 74	Integral value cooling (999 gives only P)	1..999	minutes	999
P 75	Proportional band heating	0.1..10	°C	1.0
P 76	Integral value heating (999 gives only P)	1..999	minutes	999
P 80	Control off when all control sensors broken	0 = no, 1 = yes	-	0
P 81	Control off at external alarm	0 = no, 1 = yes	-	0
P 82	External alarm as door contact (control off, no alarm)	0 = no, 1 = yes	-	0
P 83	External contact as NC contact	0 = no, 1 = yes	-	0
P 84	Auto reset external alarm	0 = no, 1 = yes	-	0
P90	Access code (key-lock) (0 = not active)	0..9999	-	0
P 95	Network number	1..250	-	1
P 96	Log-interval time	1..120	minutes	5
P 97	Software version	-	-	-
P 98	Series number	-	-	-
P 99	Production date	-	year/wk	-

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5. Operation of relay outputs

5.1 Operation of cooling and heating

2x cooling:

Cooling 1 (RY2) switches on if the temperature is higher than **setpoint + offset_1 + differential_1** and switches off if the temperature is below **setpoint + offset_1**.

Second stage switches on:

Temperature: Cooling 2 (RY3) switches on if the temperature is higher than **setpoint + offset_2 + differential_2** and switches off if the temperature is below **setpoint + offset_2**.

Time: Cooling 2 (RY3) switches on if the set delay time for the second stage is passed and cooling 1 is still active. Cooling 2 switches off if cooling 1 switches off.

2x heating:

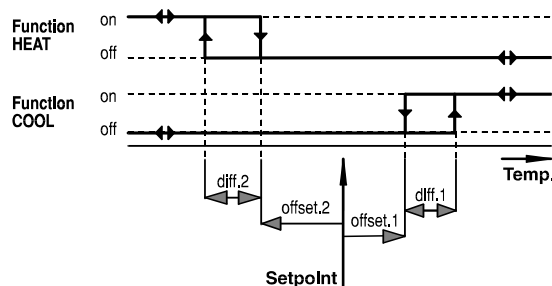
Heating 1 (RY2) switches on if the temperature is lower than **setpoint + offset_1 - differential_1** and switches off if the temperature is higher than **setpoint + offset_1**.

Heating 2 (RY3) switches on if the set delay time for the second stage is passed and heating 1 is still active. Heating 2 switches off if heating 1 switches off.

Cooling/heating:

Cooling (RY2) switches on if the temperature is higher than **setpoint + offset_1 + differential_1** and switches off if the temperature is lower than **setpoint + offset_1**.

Heating (RY3) switches on if the temperature is lower than **setpoint + offset_2 - differential_2** and switches off if the temperature is higher than **setpoint + offset_2**.



Function Diagram Cool / Heat

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5.2 Operation of defrost

There are four different methods for the defrost.

1. No defrost.
2. Natural defrost.

Before the defrost is started, a check is done to see if the temperature of the defrost sensor is lower than the defrost release temperature (P 53). If this is not the case, the defrost is skipped.

If the defrost starts, the cooling is switched off and the defrost relay (RY5) is on. The fan will run continuously during the defrost. The defrost is stopped if the end-of-defrost temperature is reached (P 52), with a limit of the maximum defrost time (P 54).

- 3/4. Electric/hot gas defrost.

Before the defrost is started, a check is done to see if the temperature of the defrost sensor is lower than the defrost release temperature (P 53). If this is not the case, the defrost is skipped.

When the defrost starts, the cooling is switched off, the fan stops and the defrost relay is switched on (RY5). The defrost is stopped if the end-of-defrost temperature is reached (P 52), with a limit of the maximum defrost time (P 54).

After the defrost the fan will start when the defrost sensor reaches a temperature lower than the fan release temperature (P 55).

If two defrost sensors are used, the defrost is stopped when both sensors have reached the end-of-defrost temperature.

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6. Sensor calibration

With the parameters P14, P15, P16 and P17 can the control and defrost sensor be calibrated. If e.g. a sensor indicates 0,2°C too much, the belonging offset parameter has to be set at -0,2°C.

7. Alarms

In normal position the alarm relay is on and drops during alarm. This to give an alarm if there is a power failure. During alarm the alarm LED on the front flashes. Depending on the settings of the Internal Parameters the control will stop or continu.

An alarm can be caused by:

- No control sensor present (F1).
- Sensor broken (E1, E2, E3 or E4).
- The alarm sensors give a minimum or maximum alarm (LO or HI).
- External alarm (EC)

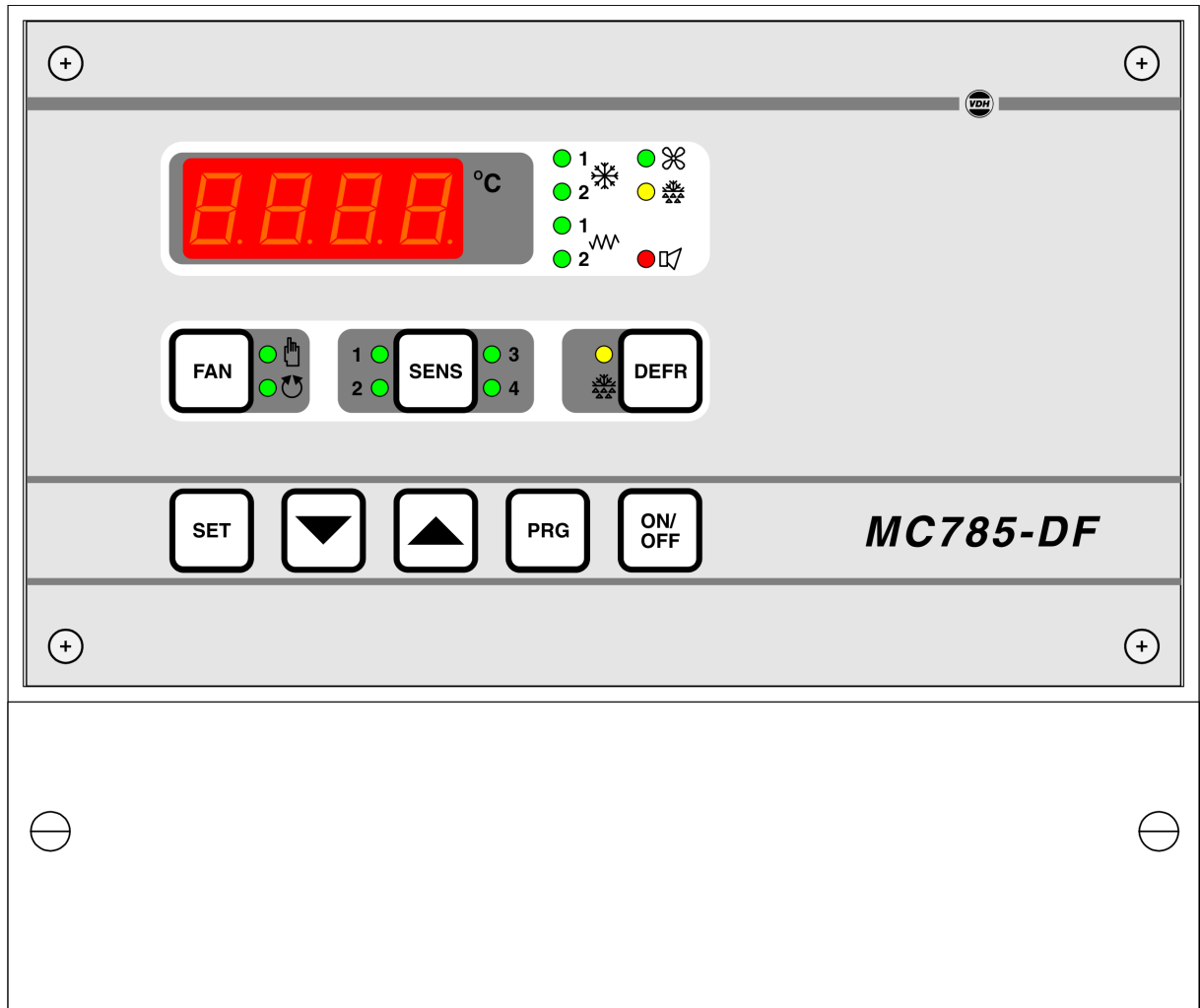
By pressing the **SET** key, the alarm relay is reset. The error message will remain in the display until the alarm is solved. Also the alarm LED will remain flashing.

Temperature alarm:	LO = Minimum alarm
	HI = Maximum alarm
No control sensor:	F1 = No control sensor present
Sensor failure:	E1 = Sensor 1 broken
	E2 = Sensor 2 broken
	E3 = Defrost sensor 1 broken
	E4 = Defrost sensor 2 broken
External contact:	EC = External Alarm input active

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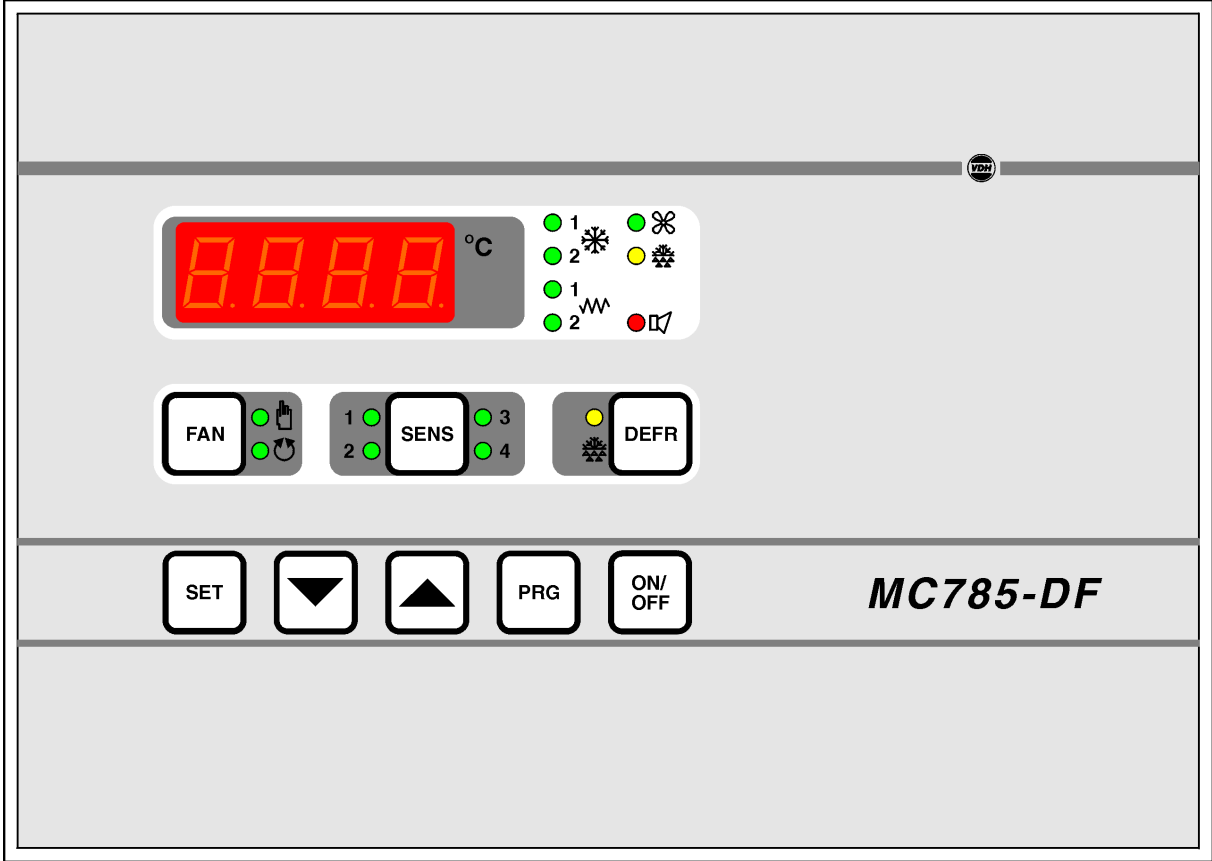
8. Front views

Frontview MC 785-DF wall mounting drawing 960442



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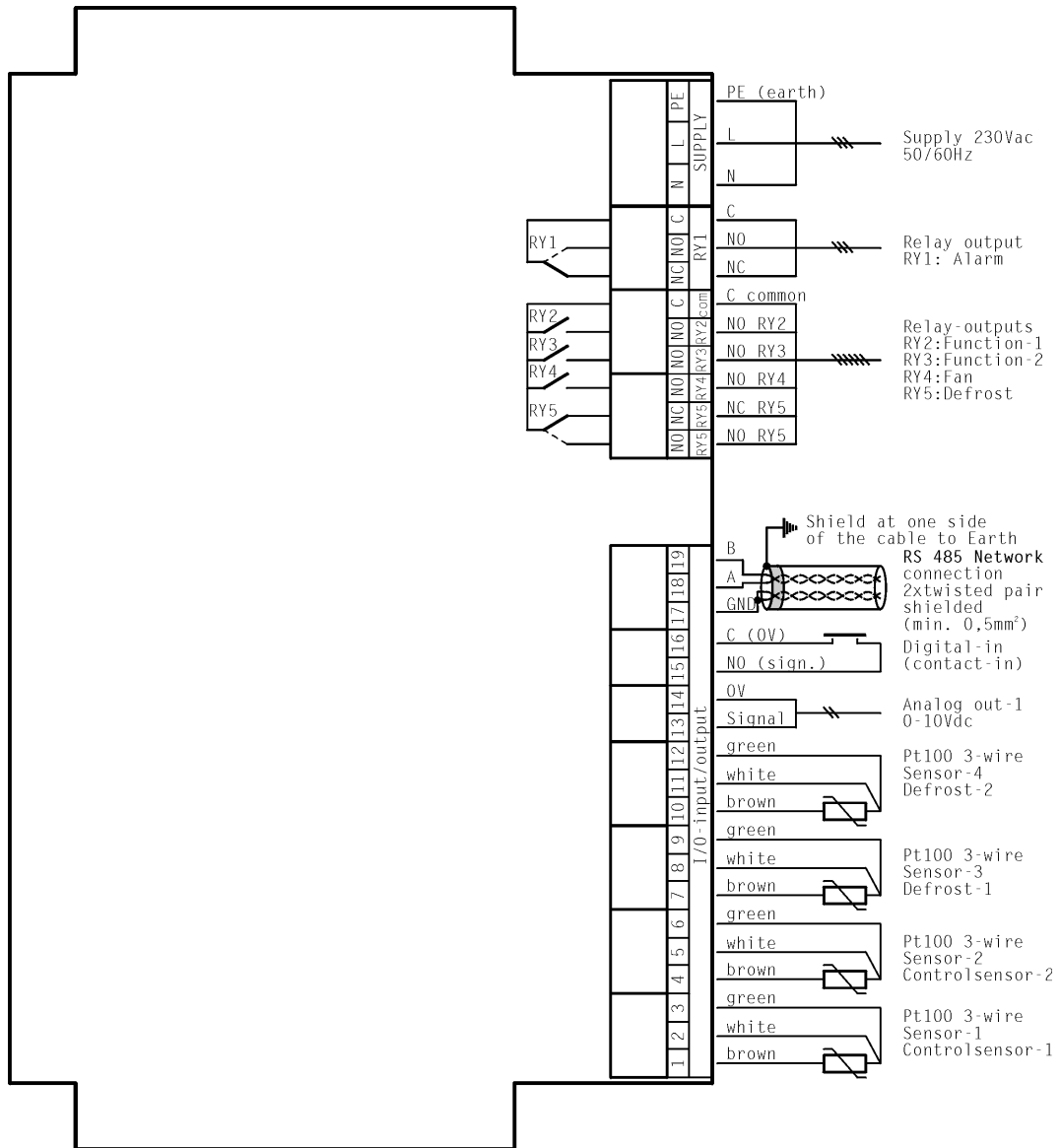
Frontview MC 785-DF Panel mounting drawing 961478



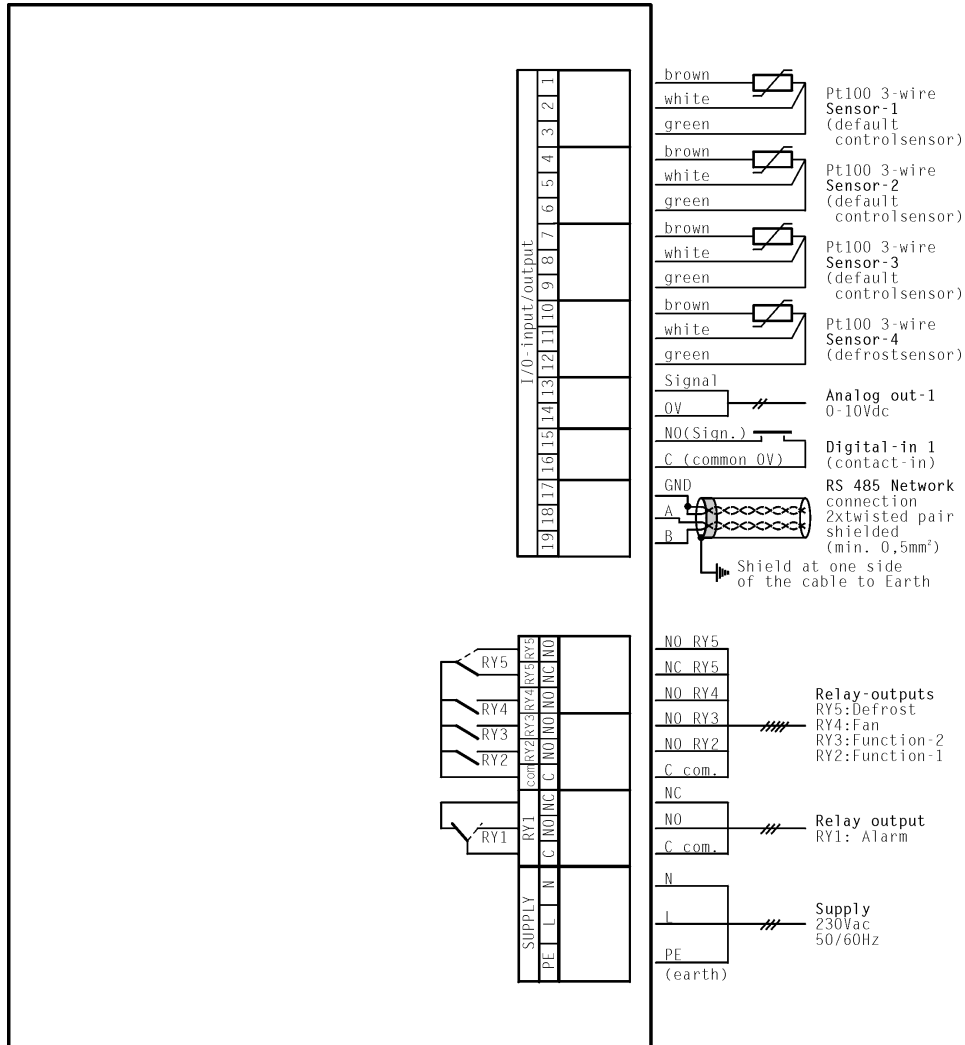
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9. Connection diagrams

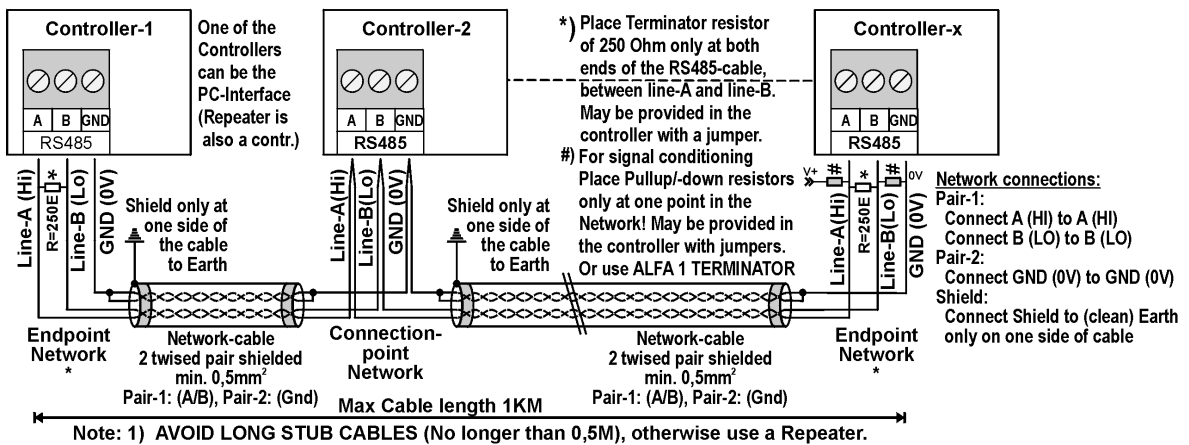
Connection Diagram MC 785-DF wall mounting drawing 060796



Connection Diagram MC 785-DF panel mounting drawing 060797



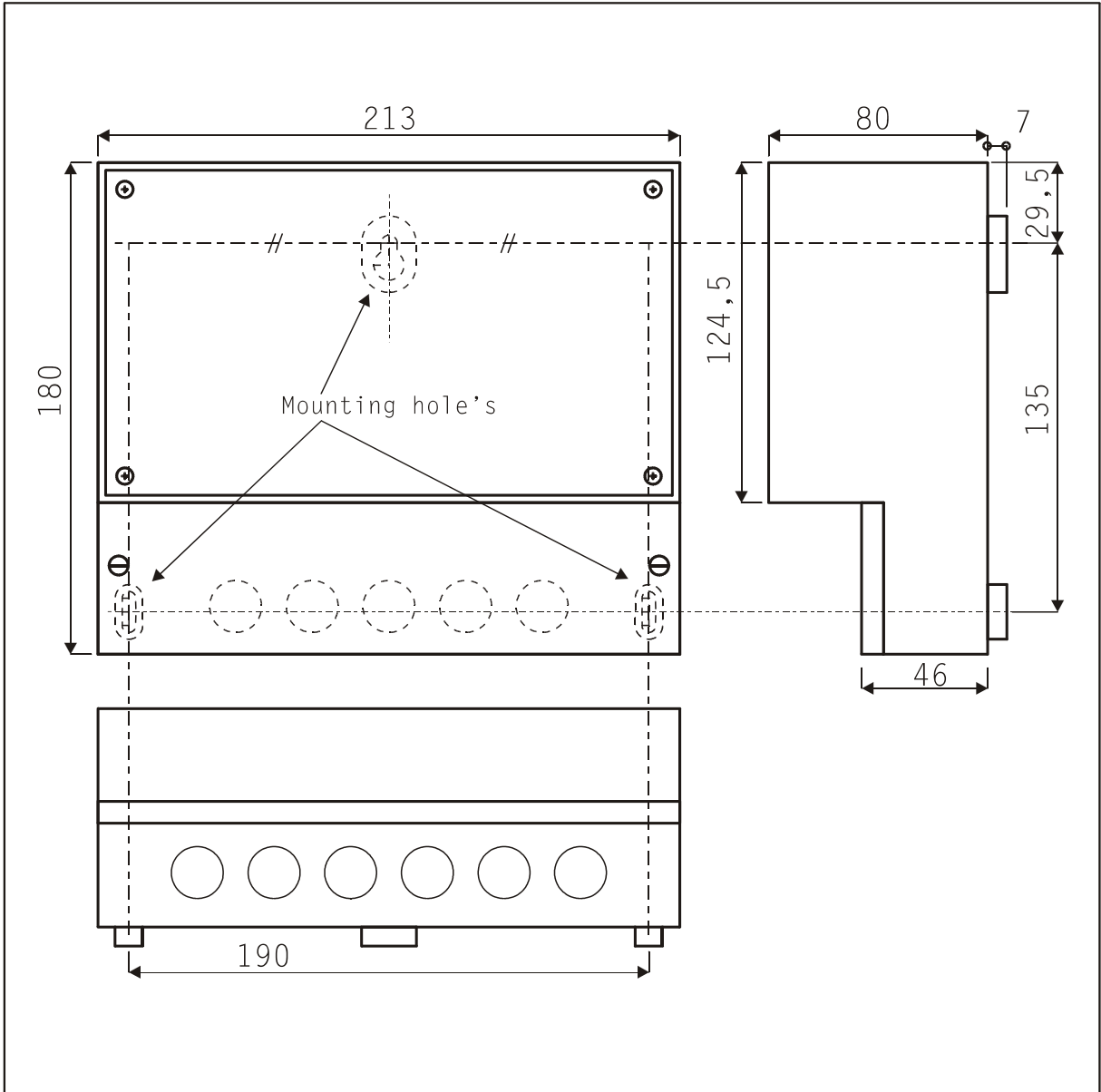
RS 485 NETWORK CONNECTIONS 2-twisted pair shielded cable:



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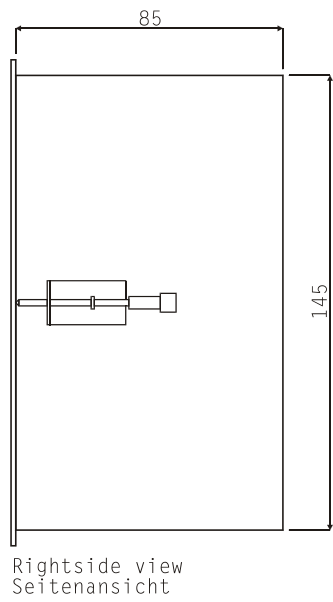
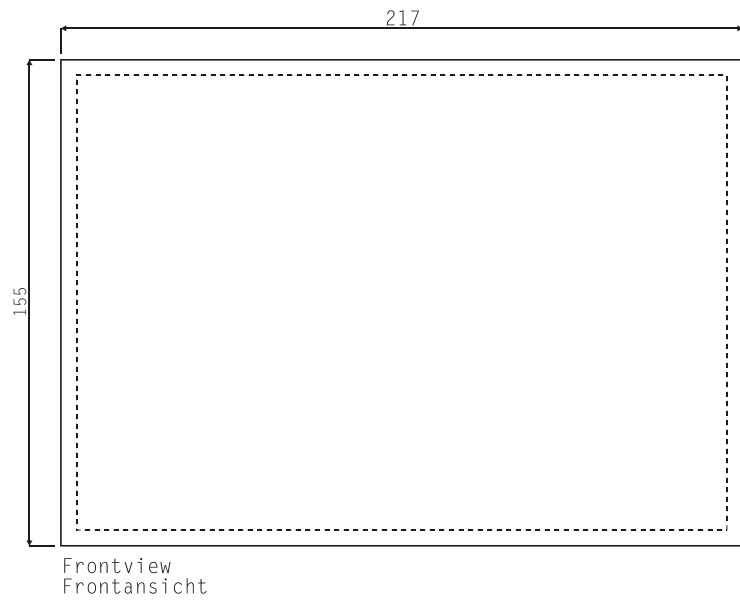
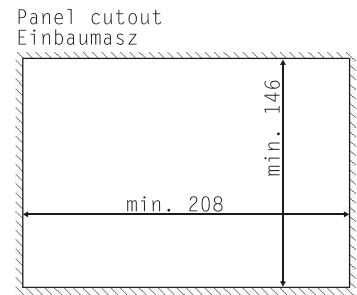
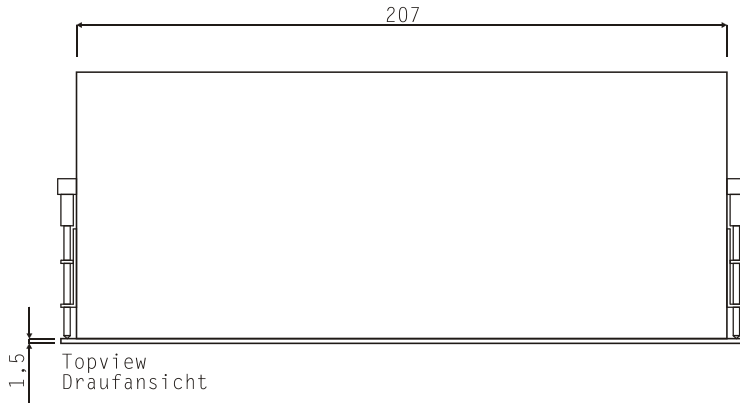
10. Dimensions

Dimensions MC785-DF wall mounting drawing 940024



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Dimensions MC 785-DF panel mounting drawing 961271



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