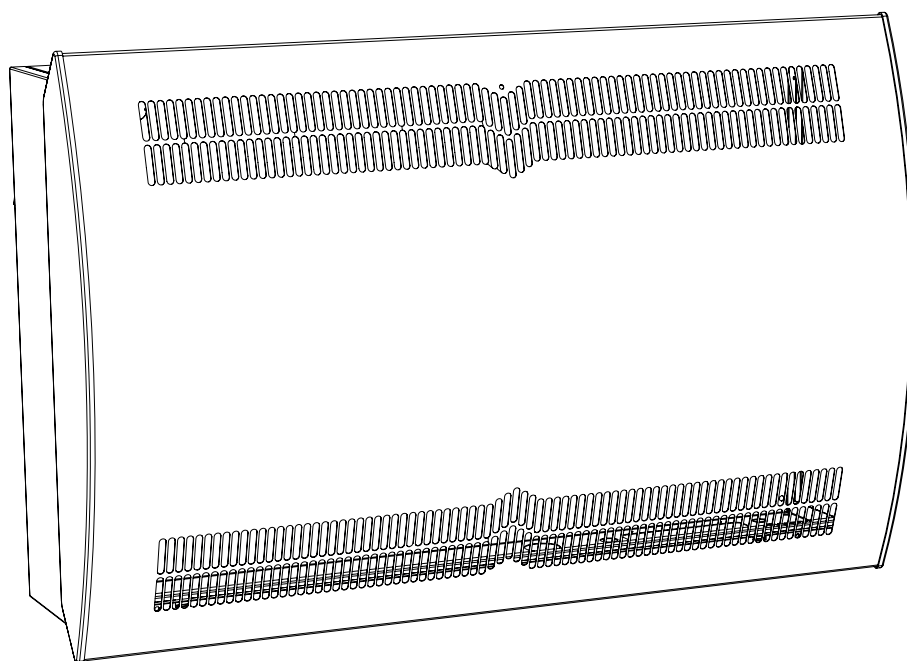


SERVICE MANUAL

CDF 40-50-70









Introduction

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Overview

Target group	The target group for this service manual is the technicians who install and maintain the CDF 40-50-70 and dehumidifier. Thus the manual covers instructions about installation, operation and maintenance.
Safety precautions	<p>It is the responsibility of the operator to read and understand this service manual and other information provided and to use the correct operating procedure.</p> <p>Read the entire manual before the initial start-up of the unit. It is important to know the correct operating procedures for the unit and all safety precautions to prevent the possibility of property damage and/or personal injury.</p> <p>It is the responsibility of the installer to ensure the conformity of all, not supplied cables towards national regulations.</p>
Copyright	Copying of this service manual, or part of it, is forbidden without prior written permission from Dantherm.
Reservations	Dantherm reserves the right to make changes and improvements to the product and the service manual at any time without prior notice or obligation.
Recycling	The unit is designed to last for many years. When the time comes for the unit to be recycled, it should be recycled according to national rules and procedures to protect the environment. The CDF dehumidifiers contain R407C refrigerant and compressor oil. The compressor must be returned to authorities for disposal according to local regulations.
 DANGER	<p>Type and source of hazard</p> <p>This symbol in connection with the word "Danger" warns of a high risk or severe injury or acute danger to life.</p> <ul style="list-style-type: none"> Measures to avert danger or immediate measures if the risk occurs are described in this way
 WARNING	<p>Type and source of hazard</p> <p>This symbol in connection with the word "Warning" warns of a risk involving severe injury.</p> <ul style="list-style-type: none"> Measures to avert danger or immediate measures if the risk occurs are described in this way
 CAUTION	<p>Type and source of hazard</p> <p>This symbol in connection with the word "Caution" warns of a risk of minor or moderate injury and material damage.</p> <ul style="list-style-type: none"> Measures to avert danger or immediate measures if the risk occurs are described in this way
 NOTICE	In connection with this symbol you will find further tips and information concerning the use of the device.

Declaration of Conformity

Declaration

Dantherm hereby, declare that the unit mentioned below:

No.: 351513, 351514 & 351515

Type: CDF 40, CDF 50, CDF 70

- complies with the following directives:

2006/42/EC	Machinery Directive
2014/30/EU	EMC Directive
2011/65/EU	RoHS Directive
1907/2006/EC	REACH Regulation

- and is manufactured in compliance with the following harmonized standards:

DS/EN ISO 12100-2010	Safety of machinery - General principles for design
EN 60 335-1:2012	Household and similar electrical appliances - Safety - Part 1
EN 60 335-2-40:2003	Household and similar electrical appliances - Safety - Part 2-40
EN 60335-2-40: A1 2006	Household and similar electrical appliances - Safety - Part 2-40
EN 378-1:2016	Refrigerating systems and heat pumps - Safety and environmental requirements - Part 1
EN 378-2:2016	Refrigerating systems and heat pumps - Safety and environmental requirements - Part 1

Skive, 18.03.2021


Mikkel Haldrup Jensen
Project manager designer


Jakob Bonde Jessen
Managing director

Product description

Overall description

Air flow direction This illustrates the functional principle of the CDF 40-50-70.

CDF

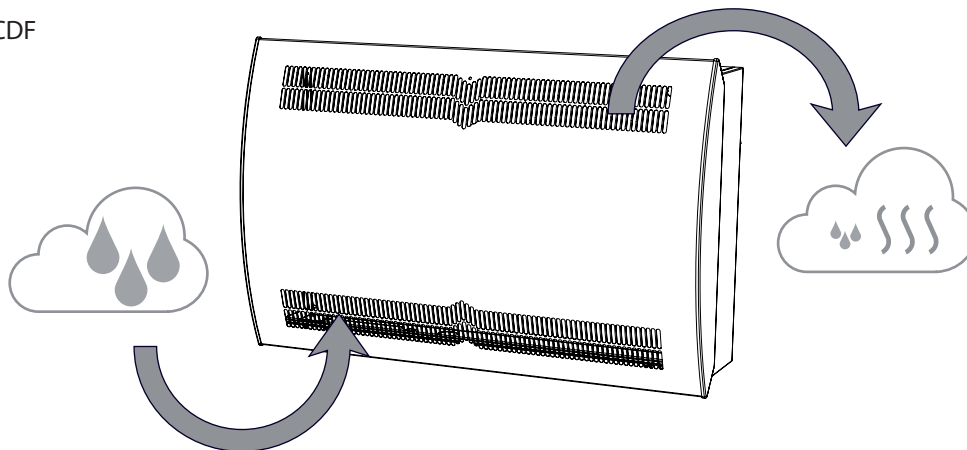


Fig. 1

Functionality of the dehumidifier

CDF 40-50-70 work in accordance with the condensation principle.

Humid air from the room is drawn into the unit by one or two fans.

When passing through the evaporator the air is cooled down to below dew point and water vapour is condensed into water, which is drained.

The dry air is then passed through the condenser where it is heated and returned to the room. As a result of the latent heat from the condensation process and the compressor energy the return air temperature to the room is approx. 5°C higher than the air from the room.

Fan control

When the dehumidifier is started by the hygrostat, the fan(s) are activated at the same time as the compressor.

Compressor control

To protect the compressor against overloading there is a timer which prevents the dehumidifier from starting more than 10 times pr hour. It means, that there is at least 6 minutes between every start up.

Defrosting

This unit is equipped with an intelligent defrosting strategy.

The unit monitors the temperature of the evaporator, and when the temperature has been below a certain temperature for a period of time, the dehumidifier will switch to active defrosting, the fans will stop, and the magnetic valve will open.

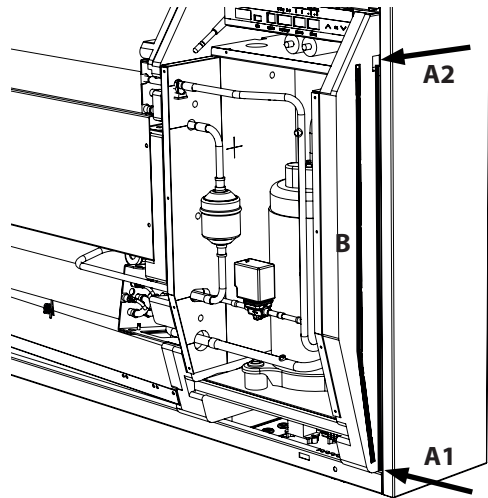
The hot gas can now pass through the evaporator.

When the evaporator has the right temperature again the magnet valve will close and the dehumidification will continue.

Safety circuit

If the temperature in the dehumidifier increases to a temperature of more than 55 °C (in case of fan failure or room air temperature higher than 36 °C), the compressor stops automatically to avoid damaging it. When the temperature allows it the dehumidification will continue.

**Cable groove
(accessory)**



Two cable grooves for accessory make it easy to guide the cables from the control panel to the mains electricity connection and out of the unit.

Groove B is for use with cable from external RH sensor as it requires a separate groove to avoid interference.

All other accessory cables are to be placed in groove A1-A2.

LED

An LED is placed at the front of the unit. The LED light indicates different modes of the unit. Find a description of the different modes in section "LED light and troubleshooting" on page 23.



**CDF
Presentation**

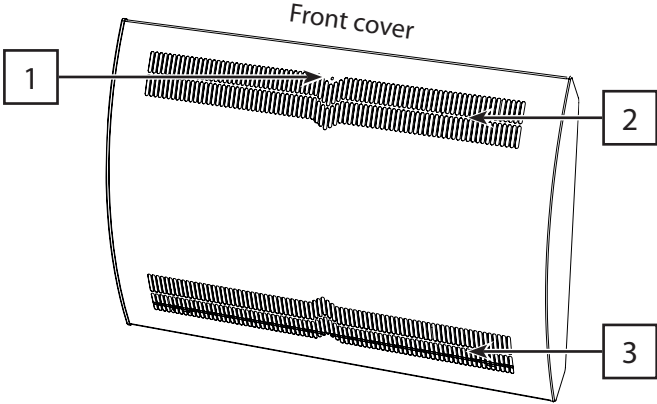
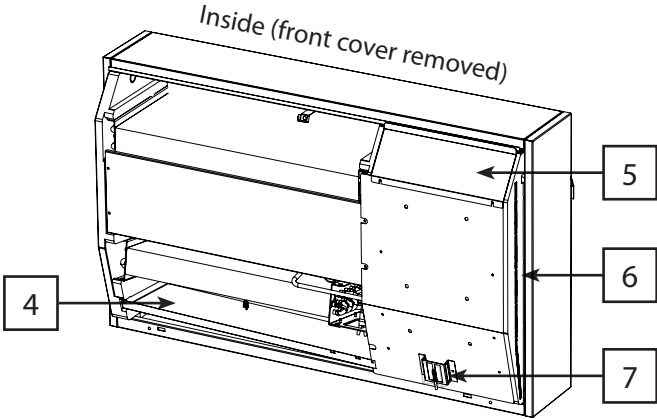
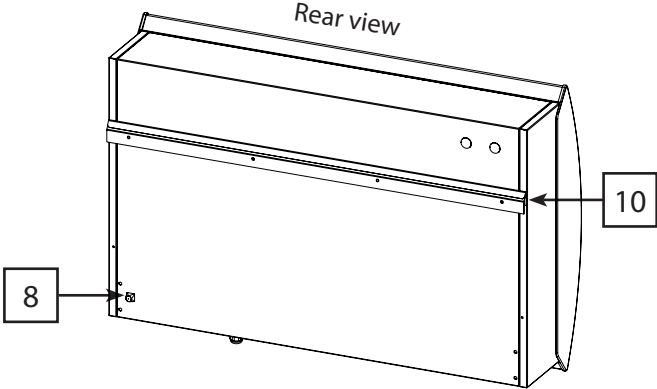
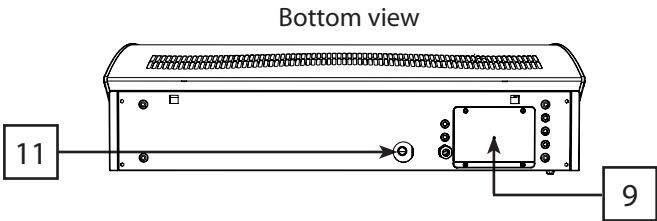
Pos.	Part	Illustration
1	LED lamp	
2	Air outlet	
3	Air inlet	
4	Drip tray	
5	Control panel (behind the cover)	
6	Cable groove (for accessory only)	
7	Humidity sensor	
8	Wall mounting spacers (incl. in delivery)	
9	Mains electricity connection (behind the lid)	
10	Wall bracket	
11	Water drain	
		

Fig. 2

Enclosure dimensions

CDF 40-50-70

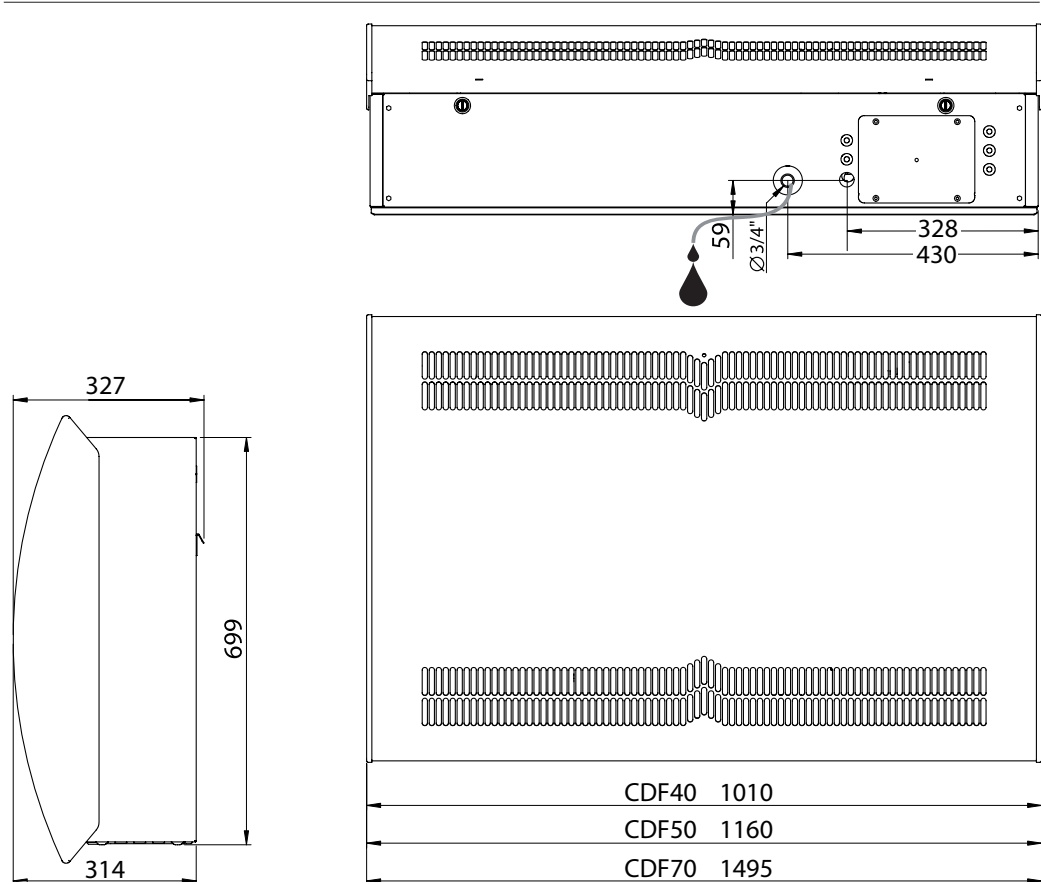


Fig. 3

Technical data

Data sheet

Specification	unit	CDF 40	CDF 50	CDF 70
Operating range, humidity	%RH	40-100	40-100	40-100
Operating range, temperature	°C	3-32	3-32	3-32
Air volume at max. external pressure	m ³ /h	400	680	900
Capacity at 20°C - RH 60	l/day	16	35	42
SEC 20°C - RH 60	kWh/l	0,80	0,62	0,58
Power supply	V/Hz	1 × 230/50	1 × 230/50	1 × 230/50
Max. power consumption	kW	0,9	1,5	1,8
Max Ampere consumption	A	3,8	6,6	8,0
Refrigerant	-	R407C		
Quantity of refrigerant	kg	0.7	0.9	1.2
GWP (Global Warming Potential)	-	1774		
Noise level* (1 m from unit)	dB(A)	46	47	50
Weight	kg	56,5	65,0	75,5
Filter Type	PPI 15			
Protection class	IPX4			

Installation

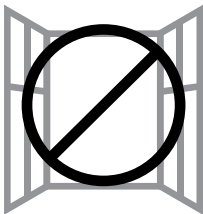
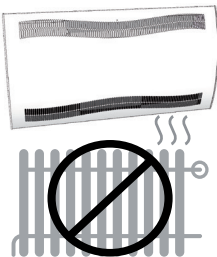
Wall mounting

Optimal conditions



NOTICE

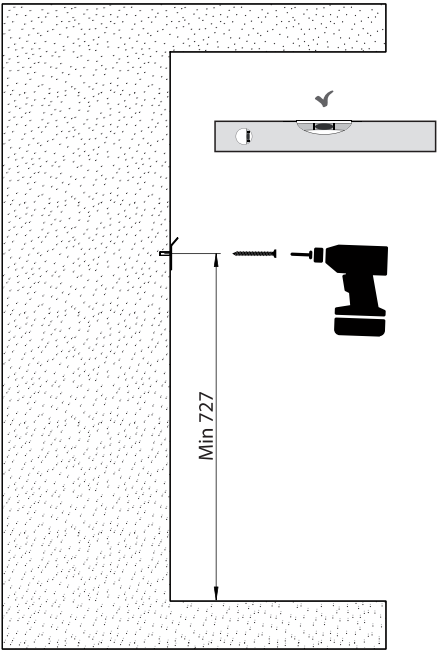
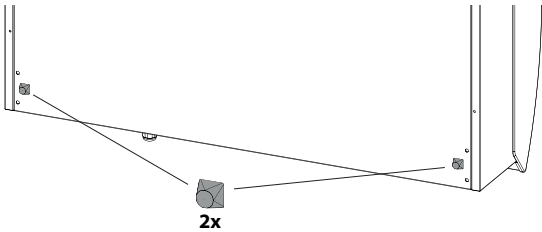

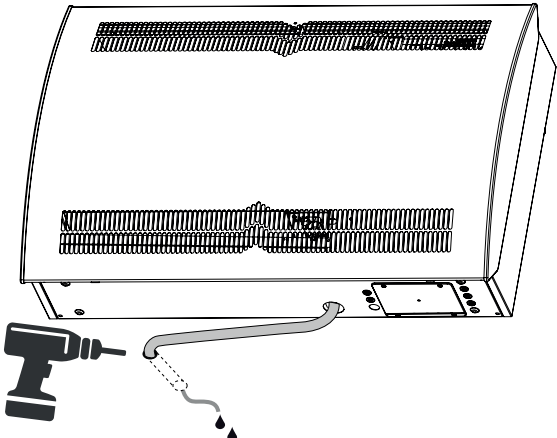
- Do not place the dehumidifier close to a heating source, e.g. a radiator.
- Doors and windows must be kept closed when the dehumidifier is in function.
- To make sure that the room air passes freely through the dehumidifier, air inlet and air outlet openings must be free.

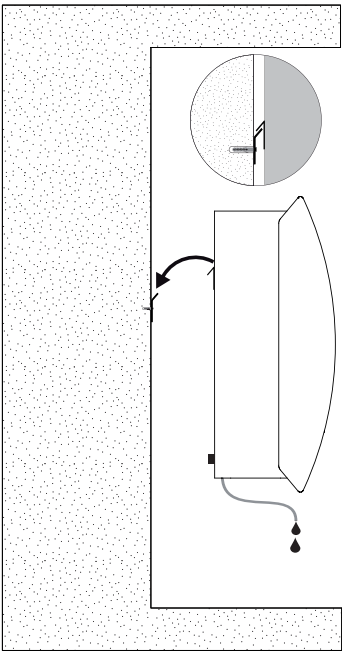


**Mounting
CDF 40-50-70**

Please follow this procedure to mount the CDF 40-50-70:

Step	Description	Illustration
1	<p>Find the right spot for the CDF dehumidifier and measure where the wall suspension bar has to be mounted.</p> <p>Recommended distance from dehumidifier to:</p> <ul style="list-style-type: none">• Ceiling: min 225 mm• Floor: min 225 mm	

2	<p>Fix the wall suspension bar supplied with the unit to the wall.</p> <p>NB: It is important to fix it horizontally to ensure correct condensate outlet.</p>	
3	<p>Fasten the two wall mounting spacers (included in the delivery) on the back of the unit.</p>	
4	<p>Drain outlet: Connect a drain hose and make a condensate outlet through the wall.</p> <p> Connect a 3/4" flexible or fixed water hose to the spigot at the base of the dehumidifier. Make sure the drainage has a drop of at least 2 %.</p> <p>Alternatively:</p> <ul style="list-style-type: none"> A condensate pump can be fitted at the water outlet in order to pump the water to a drain. 	

5	Hang the dehumidifier on the wall suspension bar.	
---	---	--

en

Electrical connection



Risk of damaging the dehumidifier, if it has been lying down.
The compressor can be damaged permanently, when the unit is started up just after it has been lying down.

- Wait 1 hour with the start up of the dehumidifier, if the unit has been lying down (e.g. during transport or installation).



Risk of electric shock
An electric shock can cause severe burning and in most extreme cases shock to the brain, strain to the heart, injury to other organs or result in death.

- Switch off the power on the main switch, while you open the dehumidifier.
- Remember also to switch off the power, while you close the dehumidifier.

Connection of power supply

Step	Description	Illustration
1	Loosen the two screws that secure the lid to the mains electricity connection. Tilt the lid in order to get access to the terminals.	
2	Guide the cable for the power supply through the PG cable restrainer.	
3	Connect the power to the unit in accordance with the description stated on the name plate. See also “Wiring diagram” on page 28.	
4	Close the lid and fix it with screws again.	

NOTICE

It is the responsibility of the installer to ensure the conformity towards national regulations of all, not supplied cables.

Control panel interfaces

The interfaces and terminals on the control panel make it possible to communicate with the dehumidifier and connect accessory such as a RH/T sensor, an alarm and a heating coil. The figure and table below describe the different functions of the interface.

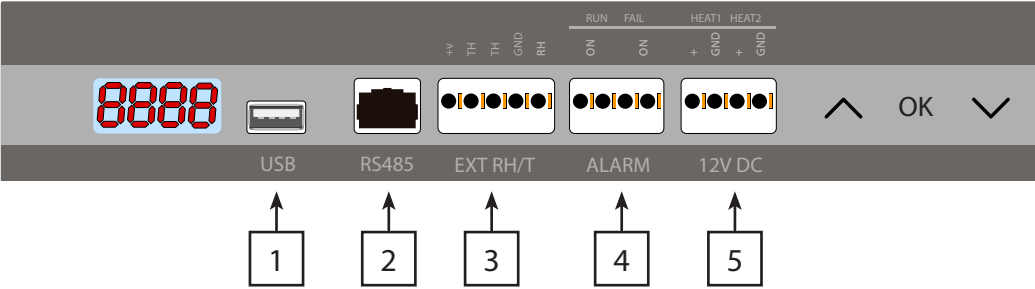


Fig. 4

Pos.	Interface	Description
1	USB	USB is used for datalogging/ software update. See more information in section "Software update and log files" on page 20.
2	Modbus RTU (RS-485)	Connection via modbus. A list of data for the Modbus interface can be downloaded on support.dantherm.com
3	External RH/T sensor	Terminals for connecting an external humidity/ temperature sensor. See wiring example in Fig. 5
4	Alarm	An external alarm can reveal, if the dehumidifier is operating normally or has an error. See wiring example in Fig. 6
5	12 VDC Heat control	Connection of LPHW (water) or electric heating helps controlling the indoor temperature. Contact your Dantherm dealer for more information.

External RH/T sensor connection (Optional)

There is an option for connecting an external RH/T sensor, which makes it possible to overrule the internal sensors. In Fig. 5 there is an example on how it could be connected.

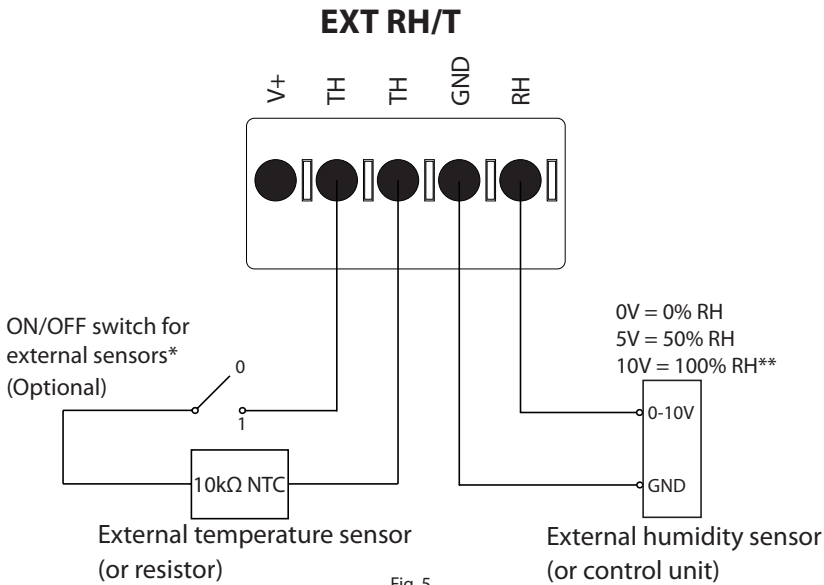


Fig. 5

*Switch in position: 0 = Internal sensors in use, 1 = External sensors in use
**Note, operational range is within 40-99% RH, if out of range the dehumidifier will be in stand by mode

**Alarm
Run/ fail
connection
(Optional)**

There is an option for connecting an external alarm, which makes it possible to see, when the dehumidifier is operating normally or has an error. In order to use this option you must create your own external electrical circuit and connect it to the run/fail terminal on the main PCB (see page 27).

This illustration is an example of how the run/fail circuit could be used.

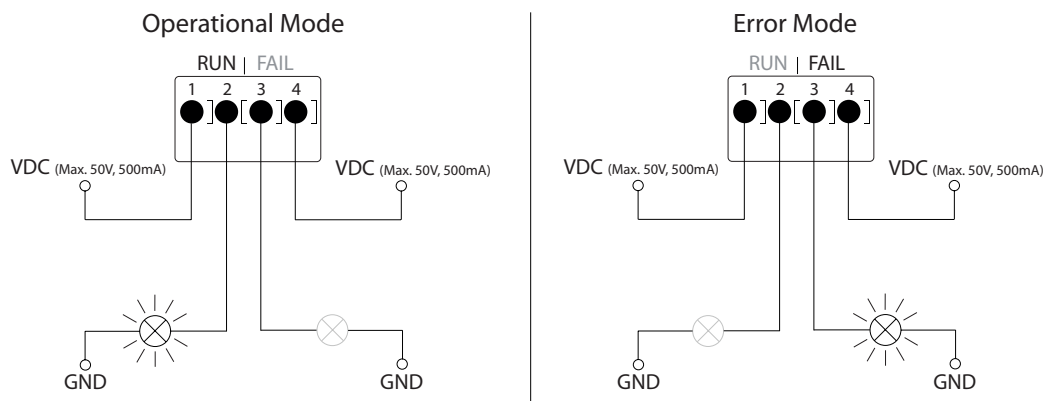


Fig. 6

Operation

Control panel



Risk of electric shock
An electric shock can cause severe burning and in most extreme cases shock to the brain, strain to the heart, injury to other organs or result in death.

- Switch off the power on the main switch, while you open the dehumidifier.
- Remember also to switch off the power, while you close the dehumidifier.

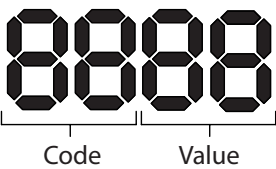
Accessing the control panel

Follow the steps below in order to access the control panel.

Step	Description	Illustration
1	Open the dehumidifier: a) Loosen the two screws at the bottom of the unit. Check that the locks release the front cover. b) Pull upwards and remove the front cover.	
2	Loosen the two screws and remove the upper plate (covering the control panel).	

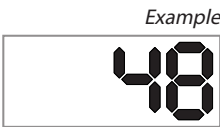
Display

4 digit Display divided into 2 sections: The first 2 digits show the code and the last 2 show the value of the code.

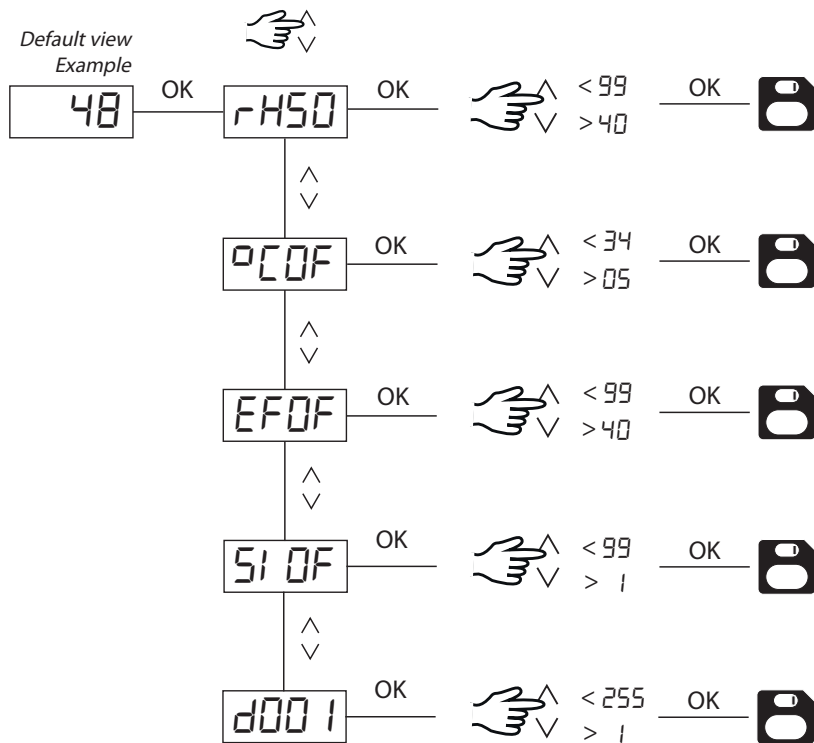


Default view

By default the display will show the relative humidity RH %. This reading can be from the external humidity/temperature sensor when available, if not the RH will be from the internal humidity sensor.



Menu overview



Update to latest software version, if the menu looks different.

Menu description

Code	Function	Default value	Value range	Description
rH	Relative humidity (%)	50	40-99	The unit will start dehumidifying, when the sensor measures a relative humidity higher than the set value. (Note the +/- 2% hysteresis)
°C	°Celcius (accessory only)	OF (OFF)	5-34	The el/water heating coil (accessory) will start to heat, when the temperature is lower than the set value. (Note the +/- 2 °C hysteresis)
EF	Extractor fan (accessory only)	OF (OFF)	40-99	The extractor fan (accessory) will start, when the humidity is higher than the set value, completely independent of the dehumidifier. The value is measured in % relative humidity. (Note the +/- 2% hysteresis)
SI	Service Interval (weeks)	OF (OFF)	1-99	When the Service Interval function is enabled, the unit will display SEr, when it is time for service.
d001	Modbus Slave ID	001	1-255	Connection via modbus is possible. The default modbus slave ID of the unit is 1 and can be changed to a value between 1-255.

Menu buttons



Press and hold OK button for 3 sec to enter menu mode



Toggle Menu Page / change value

Note: If no button is pressed for 10 seconds it will return to Standard view.

Maintenance and care

Preventative maintenance

Introduction

The dehumidifier requires very little attention for trouble free running. All the necessary safety and control functions have been built in. The fan motor(s) and the compressor have permanent lubrication and require no particular maintenance.



CAUTION

Injury - risk of cuts and minor skin burns, when you access the inside of the CDF

Be cautious of sharp edges when opening the unit. Internal parts can be very hot or cold.

- Switch off CDF for half an hour prior to opening it. Avoid touching very hot and cold parts as e.g. the pipes or evaporator.
- Avoid touching sharp edges or wear gloves.

Monthly service

The air inlet filter is to be cleaned once a month. The filter is placed in a stand behind the grill of the air inlet duct. Drip tray and outlet should also be cleaned, so water can run off freely. Please follow this procedure to perform the monthly service:

Step	Action
1	Unlock the two locks underneath the dehumidifier
2	Dismount the front cap by lifting it up and take out the filter. The filter is located on the rear of the front cap
3	Wash the filter in tepid soapy water or vacuum clean thoroughly. If the filter is faulty, replace it.
4	Insert filter in the filter holder, reattach the cap and lock the two locks. (From Step 1)

NB: If the filter (one size PPI filter with order no. 094686) has to be replaced, you can order it through a Dantherm dealer.

Annual service

The dehumidifier should be inspected once a year. Please follow this procedure to perform the annual service:

Step	Action
1	Remove the front from the dehumidifier
2	Inspect the inside of the dehumidifier
3	Vacuum clean the dehumidifier to remove any dust or debris Important: Vacuum clean the condenser thoroughly
4	If necessary wash the lamella evaporator in tepid soapy water if it is badly soiled

Software update and log files

Access data log/ USB

If you wish to read the log file from the unit without updating the software follow these steps.

Step	Action
1	Insert an empty FAT32 USB memory stick (see section "Formatting to FAT32" on page 21).
2	After connecting the USB memory stick all collected records will be stored to file data_log.csv in CSV format. Records won't be deleted from board so it is possible to get data onto several USB memory sticks.
3	When the display has shown the "Log" message and went back to default view, the log records have been stored successfully and the USB memory stick can be removed.

Data log uses 2KB of backup SRAM (under battery) for data records.

Interval for storing records is 3 hours. State change to fail mode also invokes record store.

If whole space is filled by record then new one will replace the oldest.

Data log record content

Excel column	Output text	Description
Timestamp	<dd:mm:hh:ss>	Time for log since last compressor start sequence
T_amb	<-40....100>	Temperature of ambient air (-40 = Not conn.)
T_amb_int	<-40....100>	Temperature from internal RH/T sensor (-40 = Not conn.)
T_amb_ext	<-40....100>	Temperature from external RH/T sensor (-40 = Not conn.)
T_aux	<-40....100>	Auxiliary temperature (input) (-40 = Not conn.)
T_cond	<-40....100>	Temperature from condenser (-40 = Not conn.)
T_evap1	<-40....100>	Temperature from evaporator 1 (-40 = Not conn.)
T_evap2	<-40....100>	Temperature from evaporator 2 (-40 = Not conn.)
T_set	<5....34>	Setpoint value of desired temperature (Default OFF)
RH_amb	<0....100>	Humidity of ambient air (0 = Not conn.)
RH_amb_int	<0....100>	Humidity from internal RH/T sensor (0 = Not conn.)
RH_amb_ext	<0....100>	Humidity from external RH/T sensor (0 = Not conn.)
RH_set	<40....99>	Humidity set point (Default 60)
ExtFanSet	<40....99>	Extractor fan set point (Default OFF)
Service	[Blank]	Service interval disabled
	"ENABLED"	Service interval enabled
Mode	"SB"	Stand-by mode state
	"STARTUP"	Start-up mode state
	"DEH"	Dehumidifying state
	"ICE"	Deicing state
	"LP"	Low-pressure fail mode state
	"HP"	High-pressure fail mode state
	"SENS"	Sensor fail mode state
	"AMBT"	Ambient temperature fail mode
Error	"AMBRH"	Ambient humidity fail mode
	"EVAP"	Evaporator sensor Fail
	"COND"	Condenser sensor Fail
	"AUX"	Auxiliary sensor Fail
	"AMB_INT"	Internal ambient sensor error
	"AMB_EXT"	External sensor error (Always shown when no conn.)
Reason (For log)	"IDLE"	Automatically made every 3 hours
	"ERROR"	If an error occurred
Sensor	"SHT31"	New sensor type
	"ChipCap2"	Old sensor type


Software update

Follow these steps in order to update the software version.

Step	Action
1	Use an empty USB memory stick.
2	Obtain latest software version from Dantherm and copy the file to the USB memory stick.
3	Insert the USB memory stick in the USB port of the control panel of the unit.
4	<p>The unit will now auto detect the new software and install it. The installation process should take no more than 30 seconds. During the process the display shows: "Erasing - Flashing - Done - Log" and a log file is stored on the USB memory stick.</p> <p>Note: If the display only shows the "Log" message, when the USB is inserted and returns back to default view some seconds later, the software has NOT been updated successfully. The reason may be a wrong format of the USB memory stick. Try to format the USB memory stick to FAT32 (see description below) and repeat the software update procedure again.</p>
5	When the display went back to default view the memory stick can be removed.

Formatting to FAT32

Format the USB memory stick to FAT32 file system by following the below steps.
 (Note: All data on the USB memory stick will be erased during the formatting process.)

Step	Action
1	Insert a USB memory stick in the USB port of the computer
2	Press WIN key () + r
3	Type: CMD - press enter
4	<p>Type: format /FS:FAT32 X: - press enter.</p> <p style="margin-left: 150px;">↖ X = letter of the USB drive</p>
5	When you get the following message: Insert new disc for drive X: and press ENTER when ready - press enter.
6	When the disc has been formatted with a 100% - press enter to complete the formatting process.

Trouble shooting


Display messages

The CDF can display a number of Information and Error Messages to help finding a fault. Every single message and associated problems are explained in the following sections.

Information messages

Display	Description
<i>Ab rh</i>	The relative humidity is out of range. <ul style="list-style-type: none"> The display will automatically return to standard view when the relative humidity is within range again.
<i>Ab t</i>	The ambient temperature is out of range. <ul style="list-style-type: none"> The display will automatically return to standard view when the temperature is within range again.
<i>LOSS</i>	The connection to the Remote Panel is lost. <ul style="list-style-type: none"> When the connection is reestablished the error message can be cleared by pressing OK.
<i>SE r</i>	It is time for service inspection. <ul style="list-style-type: none"> When a new service interval is set, the display will return to standard view.
<i>PAI r</i>	The unit tries to connect to a remote control. <ul style="list-style-type: none"> The display will automatically return to standard view after some seconds.
<i>LP Co</i>	Low Pressure preliminary warning <ul style="list-style-type: none"> The unit will reset and returns to standard view, if the problem is solved after restart. If the error persists the display will switch to an LP error (see table "Error messages").

Error messages

Display	Description
<i>SE nS</i>	This message indicates a sensor fault and will cause the unit to stop. <div>  Press either Up or Down to determine which sensor is faulty. The faulty sensor can be: <div> <div><i>COnd</i></div> Condensor sensor (displayed COnd) <div><i>EVAP</i></div> Evaporator sensor (displayed EVAP) <div><i>rh°t</i></div> Humidity sensor (displayed rh°t) </div> </div> <p>If no button is pressed for 10 seconds it will return to SE nS.</p>
<i>LP</i>	If the Code LP (Low Pressure detection) is shown, the fault must be found and rectified. (See also "LED light and troubleshooting" on page 23)
<i>HP</i>	If the Code HP (High Pressure detection) is shown, the fault must be found and rectified. (See also "LED light and troubleshooting" on page 23)

The errors described above automatically lock the unit.



Press OK and access the unlock sequence in order to dismiss the error.

Unlock Sequence

Loc The message indicates that the unit is locked. If no buttons are pressed within 5 seconds the display will return to previous fail state.

Follow the steps below in order to unlock the unit.

Step	Action	Description
1		UnLo (unlock function) is displayed
2		tEst (test function) is displayed
3		test is activated. The test will detect if the error is fixed. CCCC indicates that the error has been fixed and the unit is unlocked successfully. FAi L indicates that the error is NOT fixed yet and the unit will still be locked.



NOTICE

If the dehumidifier is not functioning correctly, shut it down immediately!

LED light and troubleshooting

Use this table to understand the LED lights or localize and solve a possible problem/ fault:

Led colour	Audible alarm	Problem	Possible cause(s)	Solution
OFF	-	230V connected but no function	Power outlet in wall is disconnected	Restore the power (Electrical)
	-		Fuse F1 on main PCB are blown	Replace the fuse
	-		Defective power supply on main PCB	Replace main PCB
	-		Disconnected/loose 230V connection inside the unit	Check 230V connections according to wiring diagram
RED (constant)	3 sec. initiating beep	HP fault - Can't turn on /shuts down	Defective fan	Replace fan
			Dirty filter	Clean the filter
			Dirty condenser coil	Clean coil
RED (flashing)	Double beep every 1 min.	LP fault - Can't turn on /shuts down	Leaking refrigerant	Find leak and repair leak + refill refrigerant
			Malfunction of thermostatic valve	Replace thermostatic valve
			Insufficient refrigerant	Refill refrigerant
	Single short beep every 5 min.	Sensor fail - check display	Defective sensor	Replace sensor
RED/YELLOW (flashing)	Single short beep	Ambient temperature out of range	Ambient temperature too high	Cool down the room
			Ambient temperature too low	Heat up the room

YELLOW (constant)	Single short beep every hour	-	Service interval has expired	Carry out a service inspection of the unit and set a new service interval.
YELLOW (flashing)	Triple beep every 10 min.	No connection to the paired remote control	Remote control is placed too far away	Place remote control within blue-tooth range.
			Remote control ran out of battery	Change the battery of the remote control.
GREEN/ YELLOW (flashing)	-	-	Unit in remote pairing mode	Pair with a remote control. Successful pairing is confirmed with a triple beep.
GREEN (constant)	-	-	Ext. heating coil activated (accessory only)	Part of normal operating condition.
BLUE (constant)	Single short beep every 1 min.	LPCo error	Temp. difference between condenser and evaporator coil too small	Unit resets automatically. If the problem persists the unit will switch to an LP failure.
BLUE (flashing)	One single beep	-	Normal power up sequence	Part of normal operating condition.

If you cannot find the reason for the fault, switch off the unit immediately in order to prevent further damage. Contact a service technician or a Dantherm representative.

Spare parts

Find spare parts

If the need for spare parts occurs, please visit: shop.dantherm.com



Main PCB

Illustration

This illustration shows the main PCB and its terminals.

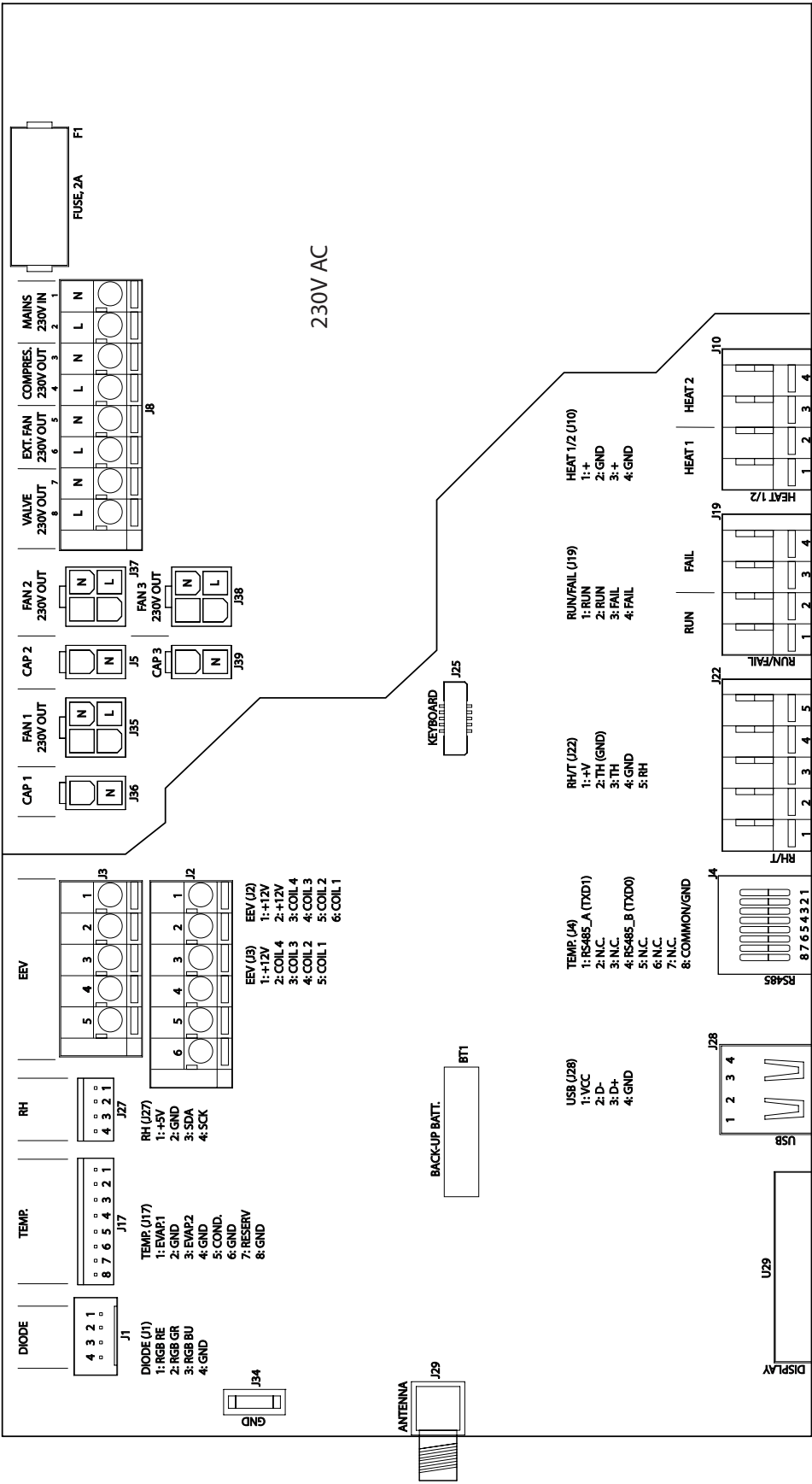


Fig. 8

Wiring diagram

Illustration

This illustration shows the standard connection of the unit.

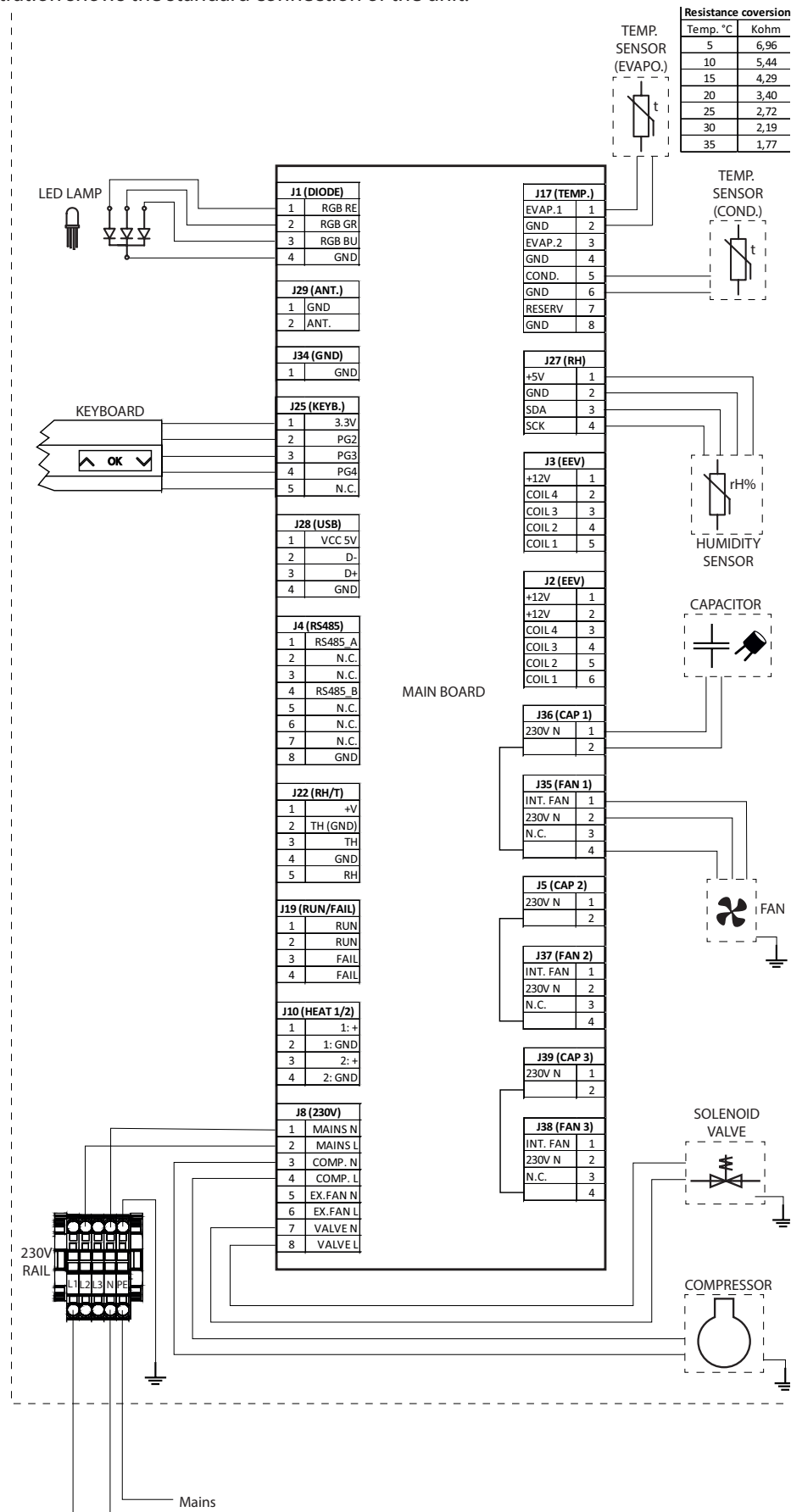


Fig. 9



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Dantherm can accept no responsibility for possible errors and changes (en)

Der tages forbehold for trykfejl og ændringer (da)

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