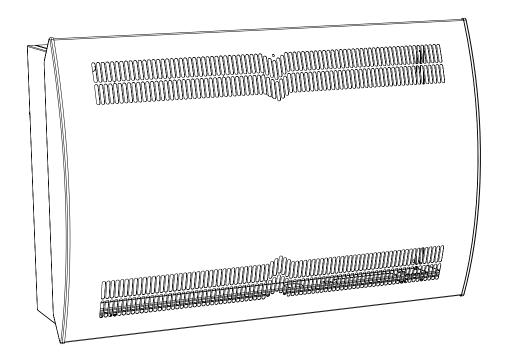


SERVICE MANUAL

CDF 40-50-70



Rev. 1.1 • 2020-W33-5



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

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.

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.

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

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.



Type and source of hazard

This symbol in connection with the word "Danger" warns of a high risk or severe injury or acute danger to life.

 Measures to avert danger or immediate measures if the risk occurs are described in this way



Type and source of hazard

This symbol in connection with the word "Warning" warns of a risk involving severe injury.

 Measures to avert danger or immediate measures if the risk occurs are described in this way



Type and source of hazard

This symbol in connection with the word "Caution" warns of a risk of minor or moderate injury and material damage.

 Measures to avert danger or immediate measures if the risk occurs are described in this way



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 2014/35/EU Low Voltage Directive

2014/30/EU EMC Directive 2014/53/EU R&TTE Directive

97/23/EC Pressure Equipment Directive 2009/105/EC Simple Pressure Vessels Directive

2011/65/EU RoHS Directive

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

DS/EN ISO 12100-1:2011 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

DS/EN 61000-3-2:2014 Electromagnetic compatibility (EMC) - Part 3
DS/EN 61000-3-3:2013 Electromagnetic compatibility (EMC) - Part 3
DS/EN 61000-6-2:2005 Electromagnetic compatibility (EMC) - Part 6
DS/EN 61000-6-3:2007 Electromagnetic compatibility (EMC) - Part 6

DS/EN 60730-1:2012 Automatic electrical controls for household and similar use -

Part 1

DS/EN 55014-1:2007 Electromagnetic compatibility - Requirements for household

appliances - Part 1

DS/EN 55014-2:2015 Electromagnetic compatibility - Requirements for household

appliances - Part 2

DS/EN 301489-1 ElectroMagnetic Compatibility (EMC) standard for radio

equipment and services; Part 1

DS/EN 301489-3 ElectroMagnetic Compatibility (EMC) standard for radio

equipment and services; Part 3

Skive, 24.10.2018

Product manager

/Jesper Holm Thorstensen Managing director

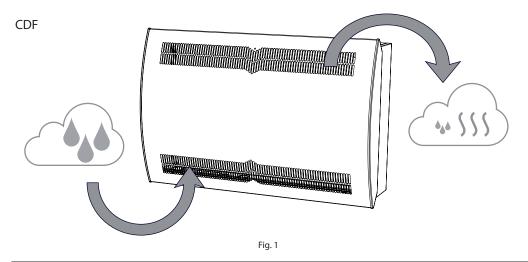


Product description

Overall description

Air flow direction

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



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.

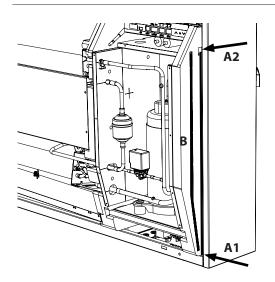
When the evaporator has the right temperature again the magnet valve will close and the dehumidification will continue.

Safety circuit

If the temperature in the dehumidifier increases to a temperature of more than 55 $^{\circ}$ C (in case of fan failure or room air temperature higher than 36 $^{\circ}$ 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 seperate groove to avoid interference.

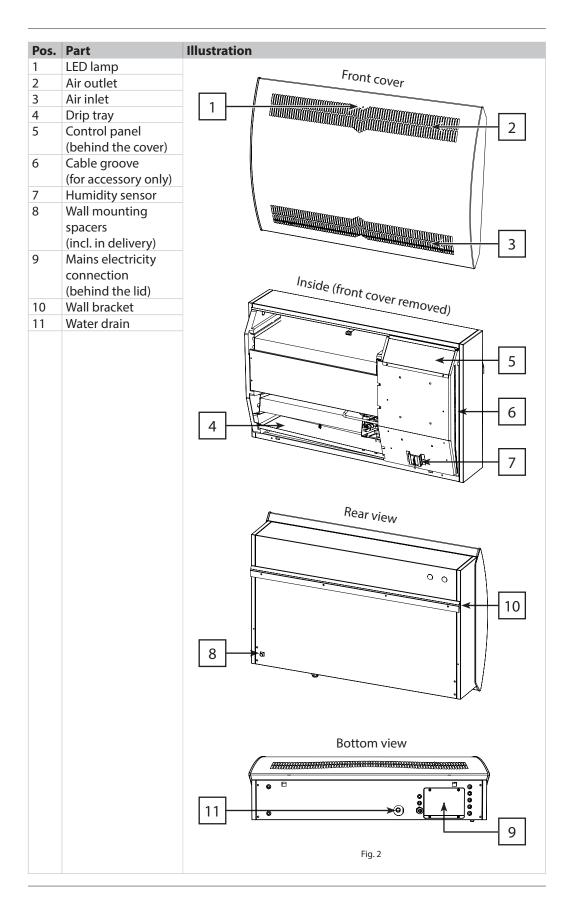
All other accessory cables are to be placed in groove A1-A2.

LED

Colour	Description	LED location
Blue	Power connected, standby mode	
Green	Compressor ON, deicing	
Yellow	Remote pairing mode	
Red	Errors	



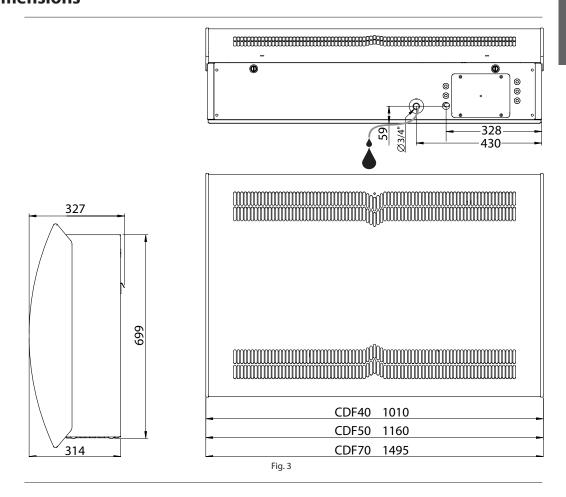
CDF Presentation





Enclosure dimensions

CDF 40-50-70





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	m³/h	400	680	900
Capacity at 20°C - RH 60	I/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	0,78	1,08	1,50
Max Ampere consumption	А	3,4	4,7	6,5
Refrigerant	-	R407C		
Quantity of refrigerant kg 0.7 0.9		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		IP)	< 4	



Installation

Wall mounting

Optimal conditions



- 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.



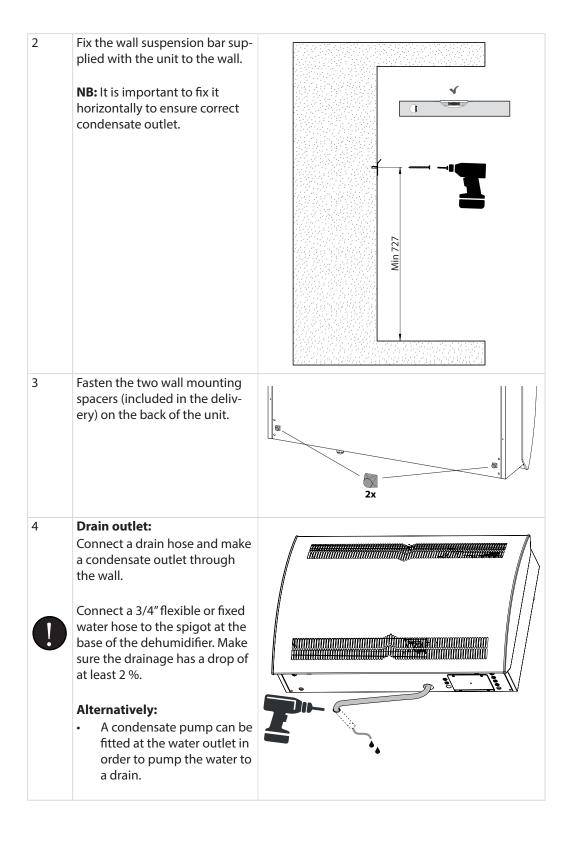


Mounting CDF 40-50-70

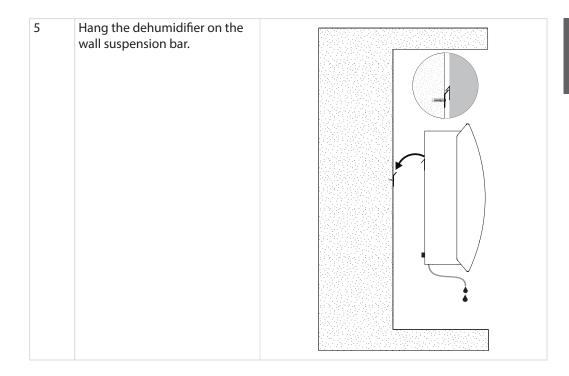
Please follow this procedure to mount the CDF 40-50-70:

Step	Description	Illustration
1	Find the right spot for the CDF dehumidifier and measure where the wall suspension bar has to be mounted. Recommended distance from dehumidifier to: • Ceiling: min 225 mm • Floor: min 225 mm	Min. 727 Min. 225 Min. 225





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).

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 27.	2,5 mm ² Min Ø9 Max Ø18
4	Close the lid and fix it with screws	again.



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.

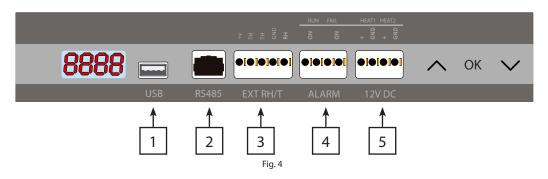




It is the responsibility of the installer to ensure the conformity towards national regulations of all, not supplied cables.

Control panel interfaces

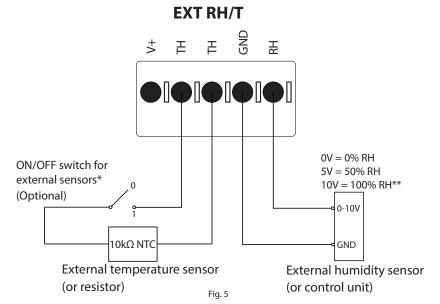
The interfaces and terminals on the control panel make it possible to communicate with the dehumidifier and connect accessory such as a RH/T sensor, an alarm and a heating coil. The figure and table below describe the different functions of the interface.



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.



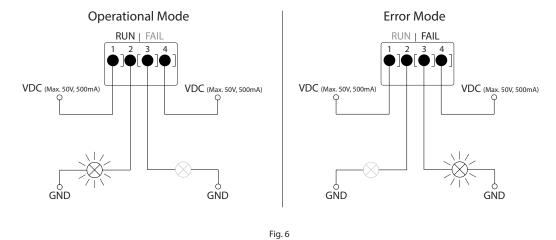
- *Switch in position: 0 = Internal sensors in use, 1 = External sensors in use
- **Note, operational range is within 40-99% RH, if out of range the dehumidifier will be in stand by mode



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 26).

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



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.

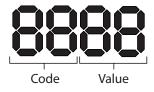
Accessing the control panel

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

Step	Description	Illustration
1	Open the dehumidifier:	○ b
	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.	a
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.



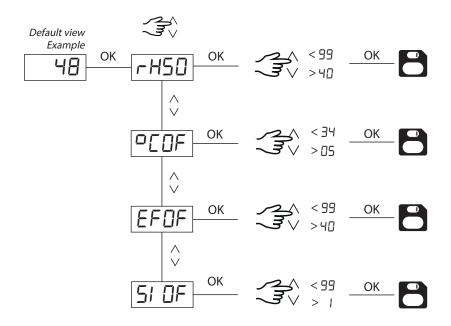
Default view

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 $5E_r$, when it is time for service.

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.



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:

Action
Remove the front from the dehumidifier
Inspect the inside of the dehumidifier
Vacuum clean the dehumidifier to remove any dust or debris
Important: Vacuum clean the condenser thoroughly
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></dd:mm:hh:ss>	Time for log since last compressor start sequence	
T_amb	<-40100>	Temperature of ambient air (-40 = Not conn.)	
T_amb_int	<-40100>	Temperature from internal RH/T sensor (-40 = Not conn	
T_amb_ext	<-40100>	Temperature from external RH/T sensor (-40 = Not cor	
T_aux	<-40100>	Auxiliary temperature (input) (-40 = Not conn.)	
T_cond	<-40100>	Temperature from condenser (-40 = Not conn.)	
T_evap1	<-40100>	Temperature from evaporator 1 (-40 = Not conn.)	
T_evap2	<-40100>	Temperature from evaporator 2 (-40 = Not conn.)	
T_set	<534>	Setpoint value of desired temperature (Default OFF)	
RH_amb	<0100>	Humidity of ambient air (0 = Not conn.)	
RH_amb_int	<0100>	Humidity from internal RH/T sensor ($0 = Not conn.$)	
RH_amb_ext	<0100>	Humidity from external RH/T sensor ($0 = Not conn.$)	
RH_set	<4099>	Humidity set point (Default 60)	
ExtFanSet	<4099>	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	
	"AMBRH"	Ambient humidity fail mode	
Error	"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	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. 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
5	update procedure again. 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	Type: format /FS:FAT32 X: - press enter. $X = \text{letter of the USB drive}$			
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
Abrh	The relative humidity is out of range.
	The display will automatically return to standard view when the relative humidity is within range again.
Abb	The ambient temperature is out of range.
	• The display will automatically return to standard view when the temperature is within range again.
1.055	The connection to the Remote Panel is lost.
	• When the connection is reestablished the error message can be cleared by pressing OK.
5Er	It is time for service inspection.
	When a new service interval is set, the display will return to standard view.
PAI r	The unit tries to connect to a remote control.
	The display will automatically return to standard view after some seconds.

Error messages

Display	Description				
SEn5	This message indicates a sensor fault and will cause the unit to stop.				
		Press either faulty sen	Press either Up or Down to determine which sensor is faulty. The faulty sensor can be:		
		[Ond	Condensor sensor (displayed COnd)		
		EUAP Evaporator sensor (displayed EVAP)			
		rhºE	Humidity sensor (displayed rh°t)		
	If no button i	s pressed fo	or 10 seconds it will return to SEnS.		
LP	If the Code LP (Low Pressure detection) is shown, the fault must be found and rectified. (See also "Fault finding" on page 23)				
HP	If the Code HP (High Pressure detection) is shown, the fault must be found and rectified. (See also "Fault finding" 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

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	(F)	U∩L ロ (unlock function) is displayed
2	€ OK	EE5E (test function) is displayed
3	€ OK	test is activated. The test will detect if the error is fixed. CCC indicates that the error has been fixed and the unit is unlocked successfully.
		FRI L indicates that the error is NOT fixed yet and the unit will still be locked.



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

Fault finding

Use this table to localize and solve a possible problem or fault:

Led	Audible alarm	Problem	Possible cause(s)	Solution	
OFF	-		Power outlet in wall is disconnected	Restore the power (Electrical)	
	-		Fuse F1 on main PCB are blown	Replace the fuse	
	-	230V connected but no function	Defective power supply on main PCB	Replace main PCB	
	-		Disconnected/loose 230V connection inside the unit	Check 230V connections according to wiring diagram	
	3 sec. Initiating beep	HP fault - Can't turn on /shuts down	Defective fan	Replace fan	
RED			Dirty filter	Clean the filter	
			Dirty condenser coil	Clean coil	
		LP fault - Can't turn on /shuts down	Leaking refrigerant	Find leak and repair leak + refill refrigerant	
	Double beep every 1 min.		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	

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

Introduction

Spare parts for the CDF unit shown in this section, are available via Dantherm dealers.

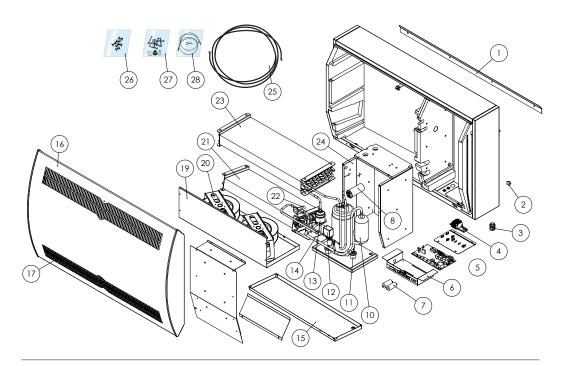


Fig. 7

Pos.	Description	CDF 40	CDF 50	CDF 70
1	Wall bracket	094696	094827	094828
2	Wall mounting spacers		094811	
3	Cable gland M25		094812	
4	Terminal blocks on DIN rail		094666	
5	Control board		094685	
6	Interface panel with holder		094687	
7	Fan capacitor		094975	
8	Motor capacitor, Compressor	094822	094821	094688
10	Compressor	094693	094825	094826
11	Compressor accessories	094691	094823	094824
12	Magnet valve		094973	
13	Dry filter		094665	
14	Coper tubes kit	094694	094833	094834
15	Drip tray	094683	094817	094818
16	Front CDF	094664	094807	094808
17	PPI filter (one size)		094686	
19	Fan assembly	094671	094815	094816
20	Fan		094669	
21	Evaporator coil cpl.	094670	094813	094814
22	Thermo valve	094684	094819	094820
23	Condenser coil	094667	094809	094810
24	Insulation for compressor		094697	
25	Harness cpl.		094690	
26	Plastic rivets, fastening		094681	
27	Screw and lock	094695		
28	Temperature, RH sensor and light diode		094689	



Schematics

Cooling circuit

Illustration

This illustration shows the cooling circuit of the CDF range.

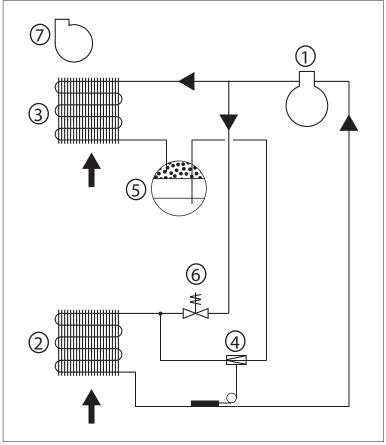


Fig. 8

Description

This table lists the different parts of the cooling circuit according to Fig. 8.

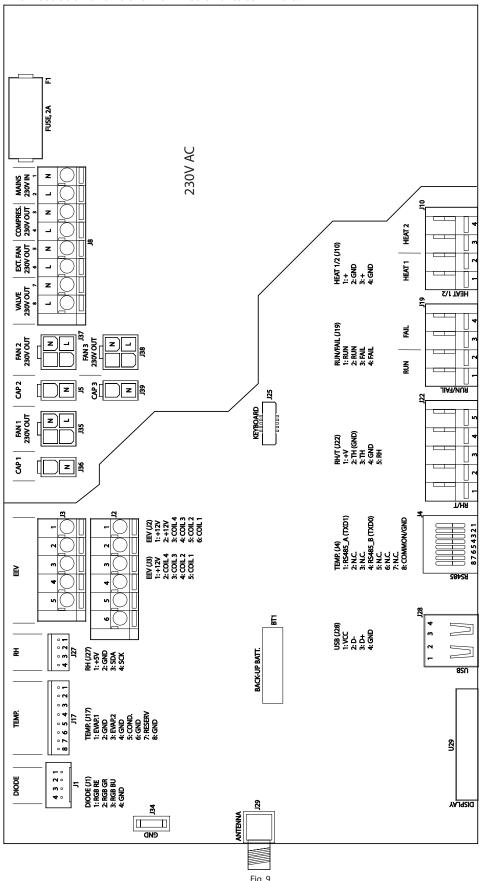
Pos.	Description
1	Compressor
2	Evaporator
3	Air-cooled condenser
4	Thermostatic expansion valve
5	Receiver/liquid line drier
6	Solenoid valve for pressure equalization
7	Fan



Main PCB

Illustration

This illustration shows the main PCB and its terminals.





Wiring diagram

Illustration

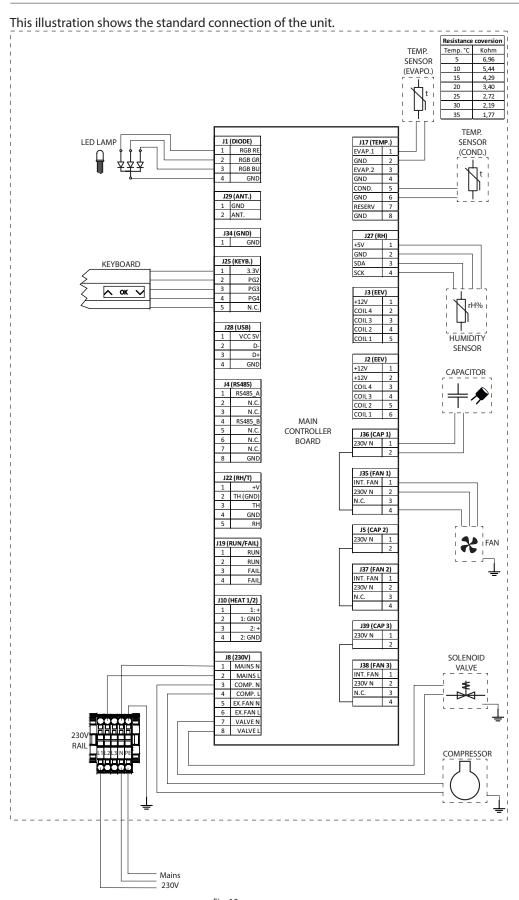


Fig. 10



Dantherm A/SMarienlystvej 65 7800 Skive Denmark

support.dantherm.com

