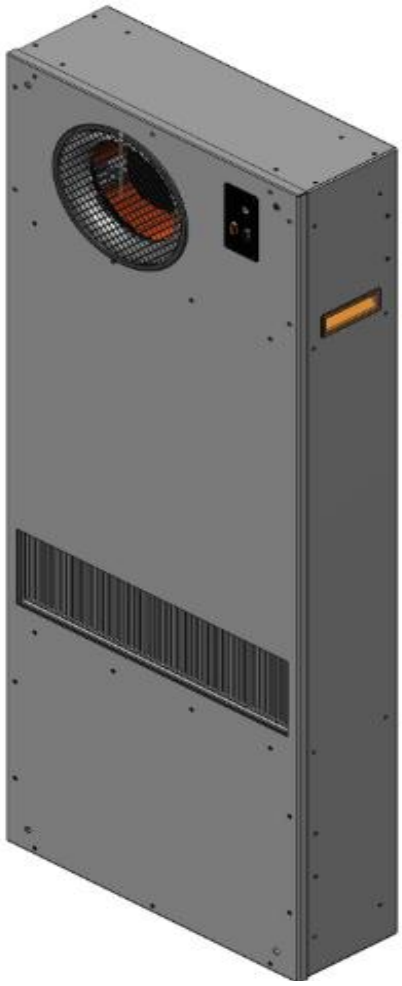
HEX 70/90/120

Service manual

EN

No. 067333 • rev. 1.0 • 29.06.2011



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Dantherm can accept no responsibility for possible errors and changes
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Introduction

Overview

Introduction

This is the service manual for the heat exchangers HEX 70/90/120.

The table of content below gives you an overview of the main sections. Please see the complete table of content for further information about the sections.

Serial number

This manual covers units with serial numbers equal or higher than:

1105010000000

Table of contents

This service manual covers the following main topics:

Table of content

Introduction

This is the complete table of content covering all sections in this service manual.

Each main section will begin with an introduction including a separate table of content covering the exact section.

Table of content

This service manual covers the following topics:

General information

Introduction

This section gives you the general information about this service manual and about the unit.

Manual, part no.

Part number of this service manual is 067333.

Target group

The target group for this service manual are the technicians who install and maintain the HEX 70/90/120 unit as well as the users of the unit.

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Reservations

Dantherm Air Handling reserves the right to make changes and improvements to the product and the service manual at any time without prior notice or obligation.

EC-Declaration of Conformity

CE

Dantherm Air Handling A/S, Marienlystvej 65, DK-7800 Skive hereby declare that the units mentioned below **with the corresponding part numbers**

HEX 70/90/120: 352915/352916/352917

are in conformity with the following directives:

2006/42/EF	*Directive on the safety of machines*
2006/95EC	*Low Voltage Directive*
2004/108/EF	*EMC Directive*

- and are manufactured in conformity with the following standards:

EN 60 950-1: 2006
EN 60 950-1/A11: 2009

EN 61 000 6-2 Immunity : 2005
EN 61 000 6-3 Emission : 2007

Skive, 29.06.2011

Recycling

The unit is designed to last for many years. When the time comes for the unit to be recycled, the unit should be recycled according to national rules and procedures to protect the environment.

Product description

Overview

Introduction

This section will give you a description of the HEX 70/90/120 and its functionality.

Content

This section covers the following topics:

Functional description of HEX 70/90/120 and parts

Introduction

This section describes how the internal and the external fans of HEX 70/90/120 operate.

Usage of HEX 70/90/120

HEX 70/90/120 is designed to control the internal temperature of an outdoor enclosure with respect to climate, moist and air.

HEX 70/90/120 removes excess heat from electronic equipment and is especially suited to maintain equipment within defined temperature limits to achieve optimum performance and to maximize lifetime of the components in the installation.

Important

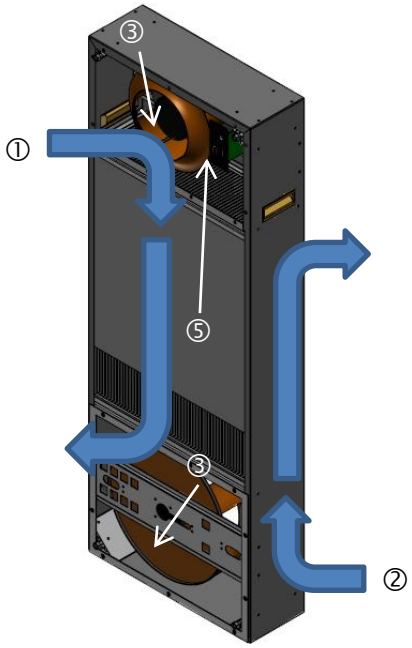
Dantherm Air Handling recommends that the cooling system should be running continuously!

Two separate air flows

The illustration and table below show the airflows of HEX 70/90/120.

The two air flows (internal/external) operate separately. External air is only used to cool down internal air via the heat exchanger. *The air flows are not mixed*.

Part	Function
①	External airflow
②	Internal airflow
③	Internal fan
④	External fan
⑤	Control board



Internal air flow

Warm, internal air is sucked from the enclosure into the internal fan at the top of HEX 70/90/120 and let through the heat exchanger, where it is cooled down. After cooling in the heat exchanger, the air is let back into the enclosure.

External air flow

Cold, external air is sucked into the external fan at the bottom of HEX 70/90/120 and let through the heat exchanger, where it cools down the internal air. After passing through the heat exchanger, the air is let back to the external environment at the top of the unit.

Continued overleaf

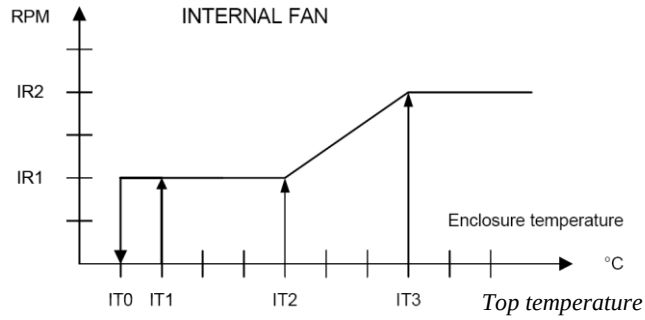
Functional description of HEX 70/90/120 and parts, *continued*

Control strategy

The control board controls fans according to the air temperature in the cabinet of the top. Higher temperatures equal higher fan speed.

Internal fan strategy

This illustration and the tables below show the speed of the **internal** fan according to different temperatures.



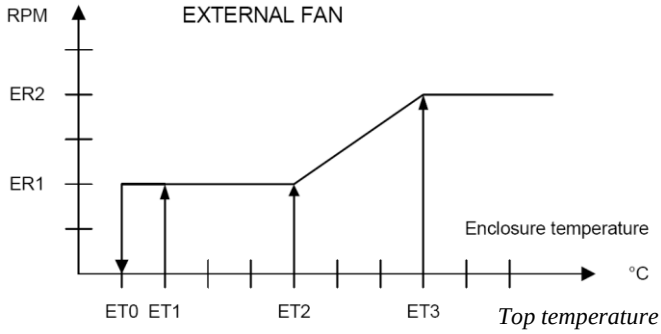
Top temperature inside the cabinet

Internal temp.	HEX 70	HEX 90/120
IT 0	18°c	16°c
IT 1	20°c	20°c
IT 2	30°c	30°c
IT 3	50°c	50°c

Rotation speed	HEX 70	HEX 90/120
IR 1	1100 RPM	1400 RPM
IR 2	1920 RPM	2250 RPM

External fan strategy

This illustration and the tables below the speed of the **external** fan according to different temperatures.



Top temperature inside the cabinet

Internal temp.	HEX 70	HEX 90/120
IT 0	28°c	26°c
IT 1	30°c	30°c
IT 2	35°c	35°c
IT 3	50°c	55°c

Rotation speed	HEX 70	HEX 90/120
IR 1	1100 RPM	950 RPM
IR 2	1850 RPM	1400 RPM

Control board

Introduction

This section describes key features of the control board and how it operates.

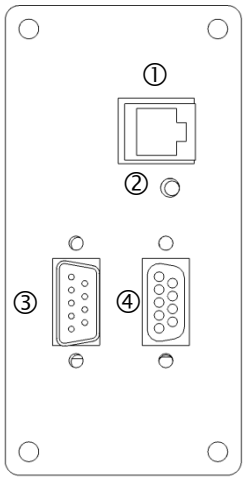
Control system

The illustration on the right and the table below describe the control board.

HEX 70/90/120 is controlled via a controller that controls the speed of the fans.

The key features of the controller are:

- Onboard temperature sensor (NTC type)
- Microprocessor based control in accordance with preselected strategy
- Shared alarm output
- Polarity protection
- Input voltage ÷ 40 V DC to -60 V DC
- Alarm output is “Normally closed” (NC)
- Sensor failure alarm (LED)
- Fan and high temperature failure alarm (LED)



Part	Function
① RS 232	For factory testing and further information from the controller
② Alarm LED	Alarm signals: • Flashing: sensor failure • Constant = fan failure or high temperature Alarms can be monitored (potential free contact) on the power/alarm plug. See more about fault finding in the section “Preventive maintenance”, page 12.
③ 9 pin, sub-D, male	Power and alarm plug Pin designation: 1 N/C (not connected) 2 + 48 V DC 3 + 48 V DC 4 NC 5 Alarm + 6 0 V DC 7 0 V DC 8 NC 9 Alarm ÷
④ 9 pin, sub-D, female	When this plug is removed, testing the fans can be done. Fans will run at maximum speed when the plug is removed. NB: The plug should always be mounted during normal operation

Mounting and installation

Introduction

This section guides you through mounting and installation of HEX 70/90/120.

Caution!

- Only trained and certified technicians are allowed to mount and install the unit.
- Switch off DC supply before working on the unit
- Make sure all work has been performed before switching on the power again

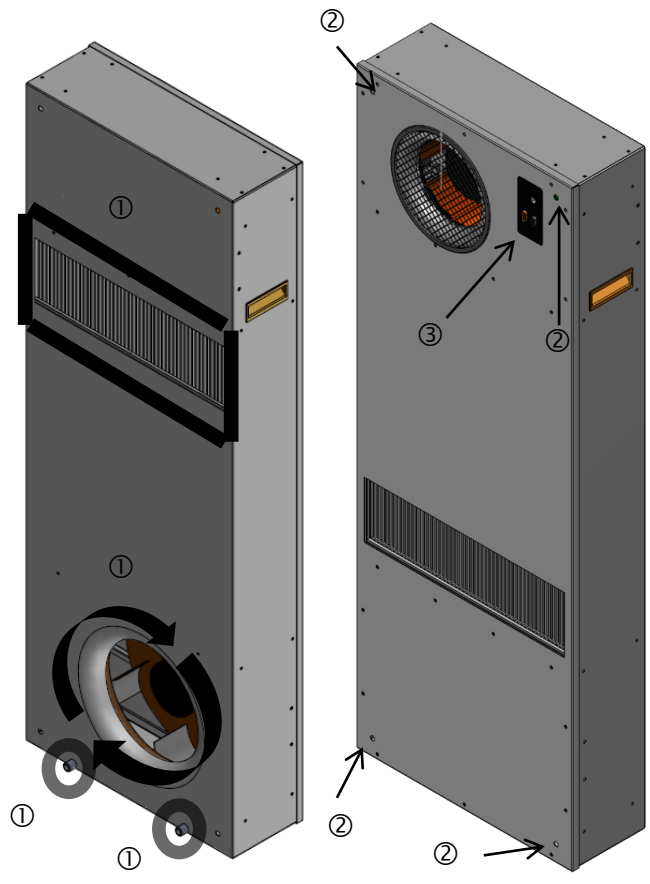
Before you start

Make sure you have the following available before you begin installing the unit:

- Mounting kit (sub-D plug, plus four M8 x 170 mm mounting screws with washers)
- Power/alarm cable (9 pin sub-D, female)

Mounting

Follow this procedure to mount the unit on the inside of the door to the enclosure:

Step	Action	
1	Mount four gaskets between HEX 70/90/120 and the door. This is the IP barrier against the outdoor environment	
2	Place HEX 70/90/120 on the door and fasten the four M8 x 170 mm with washers	
3	Connect power (48 V DC) to the unit. The unit performs a self-test. If no alarm starts, the unit operates as expected	

Service guide

Overview

Introduction

This section gives all relevant information about servicing, spare parts and trouble shooting.

Serial numbers

Product model and serial numbers are found on the nameplate.

Please have product model and serial numbers handy if you are contacting After Sales Support.

Contents

This section covers the following topics:

Preventive maintenance

Introduction

Preventive maintenance has to be carried out to keep the heat exchanger fit to meet specifications. The unit also needs preventive maintenance with specific intervals to avoid breakdown or inefficient operation and to maximize the unit's lifetime.

It is important to notice that intervals between maintenance can vary depending on the specific environment of the unit.

Parts which need preventive maintenance:

- Heat exchanger
- Fans

Caution

- Switch off DC supply before working on the unit
- Make sure that all work has been performed correctly before switching power back on

Cleaning/-inspection

The unit must be cleaned according to the recommended preventive maintenance intervals of six months.

Remove front cover to access to the internal and the external fans. The core can be internally cleaned as well.

Trouble shooting

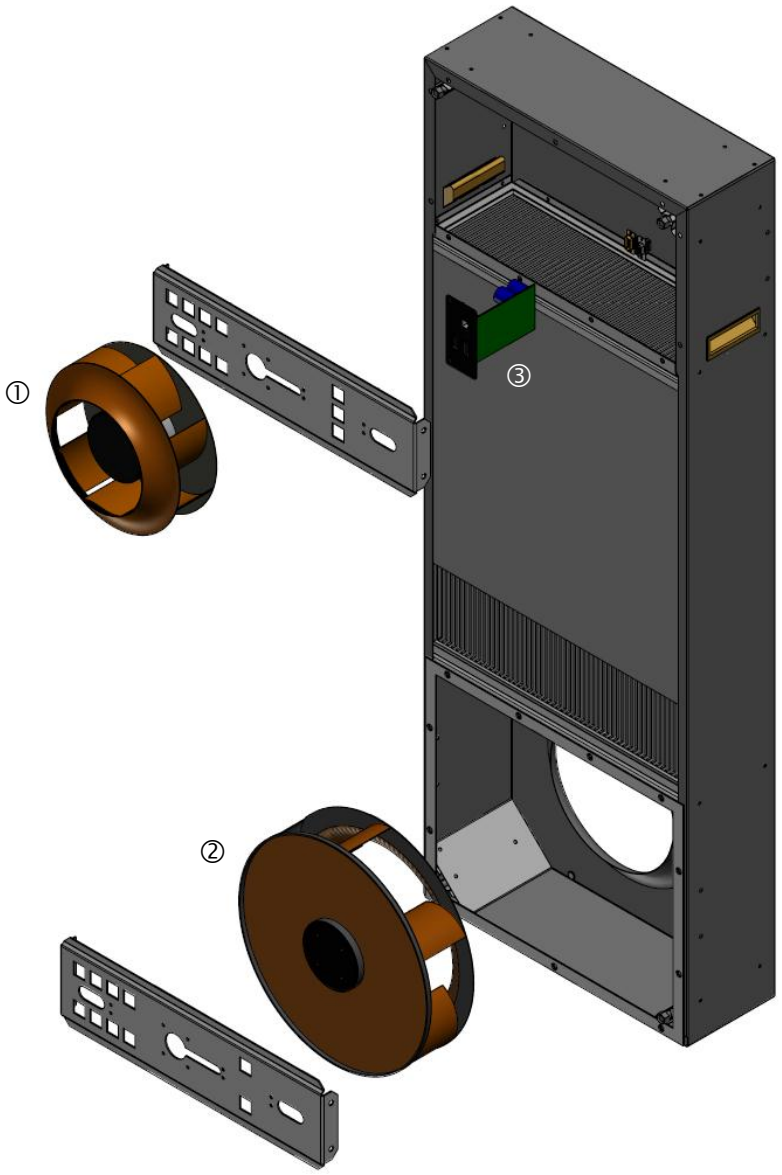
Operating errors may occur. Follow the columns from left to right to trouble shoot the problem at hand.

Problem	Cause	Solution
The red LED illuminates constantly	Too high temperature in the enclosure, above 70 °C or fan failure	See if airways are free and clean. See "Cleaning" above. Replace fan if necessary
The red LED is flashing	Onboard sensor has been disconnected/shorted	See if test plug is in place. Replace controller if necessary
The internal fan runs at low speed	Temperature in the enclosure below 20 °C	This is due to the control strategy
The external fan runs at low speed	Temperature in the enclosure below 30 °C	This is due to the control strategy

Spare part list

Illustration

Available spare parts for HEX 70/90/120:



List

List of spare parts including spare part numbers for HEX 70/90/120:

Pos.	Description	Part no. HEX 70	Part no. HEX 90	Part no. HEX 120
1	Internal fan	067738	067738	067738
2	External fan	067738	067739	067739
3	Control board	067740	067741	067741

How to replace the internal fan

When to replace

Only replace the internal when faulty or when replacement is due, e.g. after approximately five years.

Tools

Make sure you have the following tools available before you start:

- Torx 20 screw driver

Note: Reuse all screws if nothing else is stated

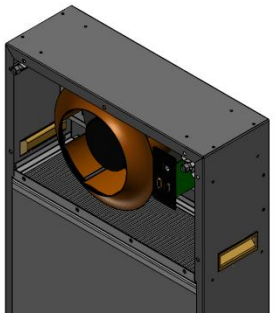
Caution!

- Only trained and certified technicians are allowed to replace parts
- Switch of the DC supply before working on the unit
- Make sure that all work has been performed correctly before switching the power back on

Illustration

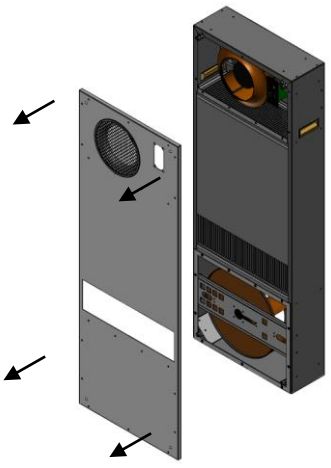
This illustration shows where the internal fan is placed in the unit:

Internal fan



Procedure

Follow these steps to replace the internal fan:

Step	Action	
1	Disconnect all power to the unit by removing the plug from the front	
2	Remove all torx 20 screws on the front cover plate and remove the front cover plate	

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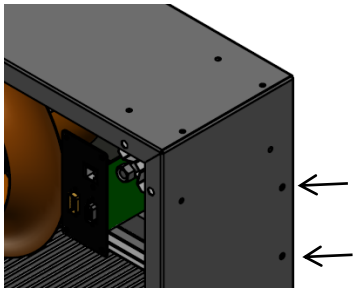
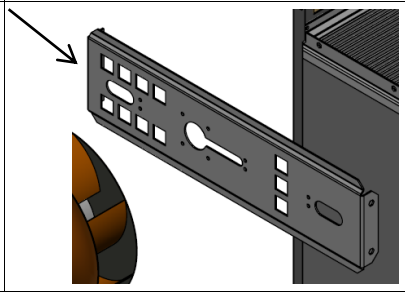
How to replace the internal fan, *continued*

Procedure, ***continued***

Step	Action	
3	Unscrew the four torx 20 screws (two on each side of the unit) that hold the fan suspension	
4	Lift out the left side of the fan suspension, then the right side	
5	Disconnect the four-way multi plug from the fan	
6	Mount a new internal fan by following step 2 to 5 reversed and in opposite order	
7	Connect power The test program runs through all functions. Make sure the unit does not come out with an alarm signal. In case of an alarm signal, please see please see “Preventive maintenance” on page 12.	

How to replace the external fan

When to replace

Only replace the internal when faulty or when replacement is due, e.g. after approximately five years.

Tools

Make sure you have the following tools available before you start:

- Torx 20 screwdriver

Note: Reuse all screws if nothing else is stated

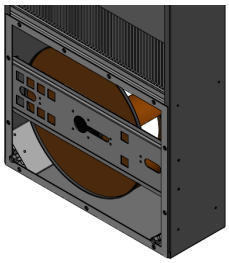
Caution!

- Only trained and certified technicians are allowed to replace parts
- Switch of the DC supply before working on the unit
- Make sure that all work has been performed correctly before switching the power back on

Illustration

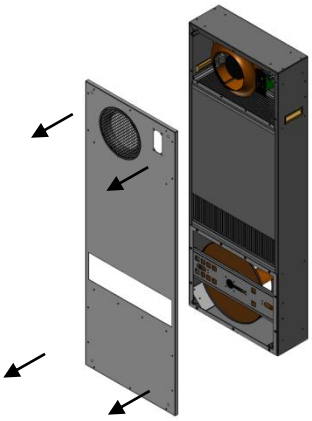
This drawing illustrates the external fan and where the fan is placed in the unit:

External fan



Procedure

Follow these steps to replace the external fan:

Step	Action	
1	Switch of all the power to the unit	
2	Dismount the controller by unscrewing the four torx 20 screws and disconnect the two fan plugs	
3	Remove all torx 20 screws on the front cover plate and remove the front cover plate	

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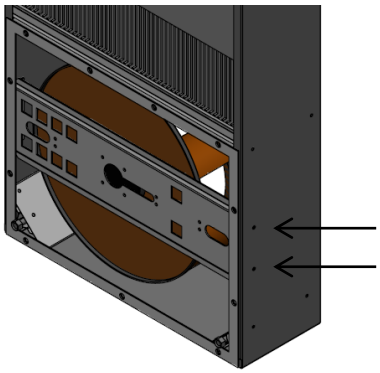
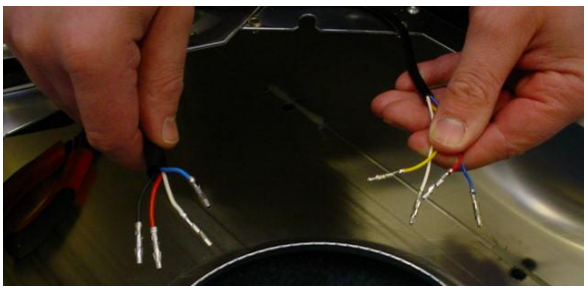
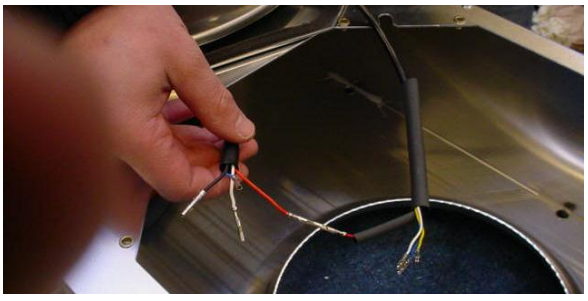
How to replace the external fan, *continued*

Procedure, ***continued***

Step	Action	
4	Cut the fan cable 20-30 cm from the fan	
5	Unscrew the four torx 20 screws (two on each side of the unit) that hold the fan suspension	
6	Slide the fan suspension a side and wiggle out the faulty fan	
7	Place two new rubber nuts at each end of the fan suspension	
8	Cut the new fan cable in appropriate length (according to the cut in step 4)	
9	Lead the cable up through the fan suspension	
10	Place the fan below the fan suspension	
11	Mount the new fan on the fan suspension with the four torx 20 (from step 5)	
12	Remove the cable insulation, 5 cm on each cable end	
13	Put crimp bushings on all eight wires	
14	Place shrinkage tubes on all four wires from the fan	
15	Connect crimped wires, place shrinkage tubes, heat tubes	
16	Insulate the cable assembly with vinyl electrical insulation tape and the cable work is done	

Continued overleaf

How to replace the external fan, *continued*

Procedure, continued, ***continued***

Step	Action
17	Fasten the cable with a cable binder
18	Fasten the fan suspension with four new screws with glue. Important: Fasten with 1.5 Nm
19	Remount the two plugs for the controller
20	Remount the front cover
21	Remount the controller
22	Connect power The test program runs through all functions. Make sure the unit does not come out with an alarm signal. In case of an alarm signal, please see please see “Preventive maintenance” on page 12.

How to replace the control board

Introduction

This section shows you how to replace the control panel.

When to replace

Only replace the control board when faulty.

Tools

Make sure you have the following tools available before you start:

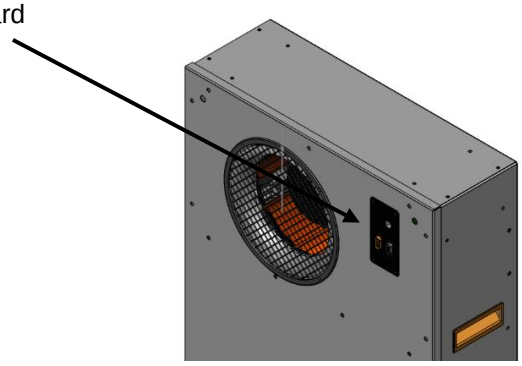
- Torx 20 screw driver
- Straight slot screw driver for power plug

Caution!

- Only trained and certified technicians are allowed to replace parts
- Switch of the DC supply before working on the unit
- Make sure that all work has been performed correctly before switching the power back on

Illustration

This illustration shows the control board and where it is placed in the unit:



Procedure

Follow these steps to replace the control board:

Step	Action
1	Switch of all the power to the unit
2	Loosen the two straight slot screws on the power plug and remove the power plug from the controller
3	Remove the four torx 20 screws that hold the controller
4	Take out the controller by turning it to the left
5	Remove the two four-way multi plugs from the controller
6	Mount a new controller by following step 2 to 5 reversed and in opposite order
7	Connect power The test program runs through all functions. Make sure the unit does not come out with an alarm signal. In case of an alarm signal, please see please see “Preventive maintenance” on page 12.

Service agreement

Introduction

The unit includes mechanical and electrical parts and the unit is often placed in a rough environment where the components are exposed to different climate conditions. Therefore the unit needs preventative maintenance on a regular basis.

Hotline

Dantherm Air Handling A/S 's After Sales Support Department is ready to help you in case of a problem.

To help you in the best way possible, please have the following information ready when contacting Dantherm Air Handling A/S:

- Name
- Company
- Country
- Phone no.
- Email
- Type (unit)
- Site/location (unit)
- Serial no/order no.
- Description of the problem

Contact Dantherm Air Handling A/S, ask for After Sales Support, and help will be provided as soon as possible:

Phone: +45 96 14 37 00
Fax: +45 96 14 38 00
Email: service@dantherm.com

Preventive maintenance

Dantherm Air Handling A/S offers to do the preventive maintenance on the units so that they at all times will operate according to factory standards.

Corrective and emergency repair

In case of malfunctions of the product Dantherm Air Handling A/S offers to do emergency repair on the climate units. Agreements will be made with the customer on response time and price.

Setup

Dantherm Air Handling A/S has established a network of service partners to do the preventative maintenance. The partner is trained and certified on the actual climate units. The partner will also carry an adequate number of spare parts – so that any repairs can be made during the same visit.

The agreement will be made with Dantherm Air Handling A/S – and the overall responsibility for the agreement belongs to Dantherm Air Handling A/S.

Further information

For further information about a service agreement in your country or region, please contact:

Henrik Hersted
After Sales Support Manager

Dantherm Air Handling A/S

Phone: +45 9614 4767
Mobile: +45 2399 4066
Email: heh@dantherm.com

Technical data and dimensions

Introduction

This section covers technical data and dimensions for HEX 70/90/120. See “Dimensions” further below.

Technical data, HEX 70

This table shows the technical data for HEX 70:

Specification	Unit	Value
Supply voltage nominal	VDC	48
Cabinet part dimensions (height x width x depth)	mm	1148x446x152
Cabinet part with drain dimensions (height x width x depth)	mm	1148x446x167
Weight	kg	21
Cooling capacity	W/K	70
Internal airflow, free blowing measurement	m^3/h	400
External airflow, free blowing measurement	m^3/h	400
Operating (ambient) temperature range	ºC	-33 - +55
Relative humidity	%	0-99
Noise level	dB(A)	64
Environmental protection	-	IP 55 from external to internal air path according to EN 60529
Material	-	0,8 – 2 mm aluzinc coated steel plate
Note: Only HEX 70 has a plug on the external circuit fan	-	-

Continued overleaf

Technical data and dimensions, *continued*

Technical data, HEX 90

This table shows the technical data for HEX 90:

Specification	Unit	Value
Supply voltage nominal	VDC	48
Cabinet part dimensions (height x width x depth)	mm	1227x447x167
Cabinet part with drain dimensions (height x width x depth)	mm	1227x447x173
Weight	kg	26
Cooling capacity	W/K	90
Internal airflow, free blowing measurement	m3/h	585
External airflow, free blowing measurement	m3/h	585
Operating (ambient) temperature range	ºC	-33 - +55
Relative humidity	%	0-99
Noise level	dB(A)	64
Environmental protection		IP 55 from external to internal air path according to EN 60529
Material		0,8 – 2,0 mm aluzinc coated steel plate

Technical data, HEX 120

This table shows the technical data for HEX 120:

Specification	Unit	Value
Supply voltage nominal	VDC	48
Cabinet part dimensions (height x width x depth)	mm	1227x598x152
Cabinet part with drain dimensions (height x width x depth)	mm	1227x598x167
Weight	kg	32
Cooling capacity	W/K	120
Internal airflow, free blowing measurement	m3/h	620
External airflow, free blowing measurement	m3/h	620
Operating (ambient) temperature range	ºC	-33 - +55
Relative humidity	%	0-99
Noise level	dB(A)	64
Environmental protection		IP 55 from external to internal air path according to EN 60529
Material		0,8- 2,0 mm aluzinc coated steel plate

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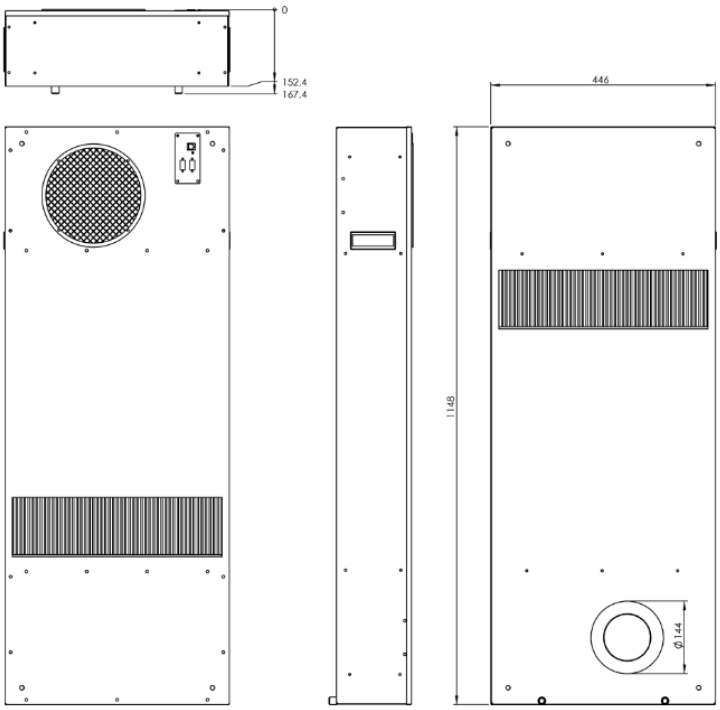
Technical data and dimensions, *continued*

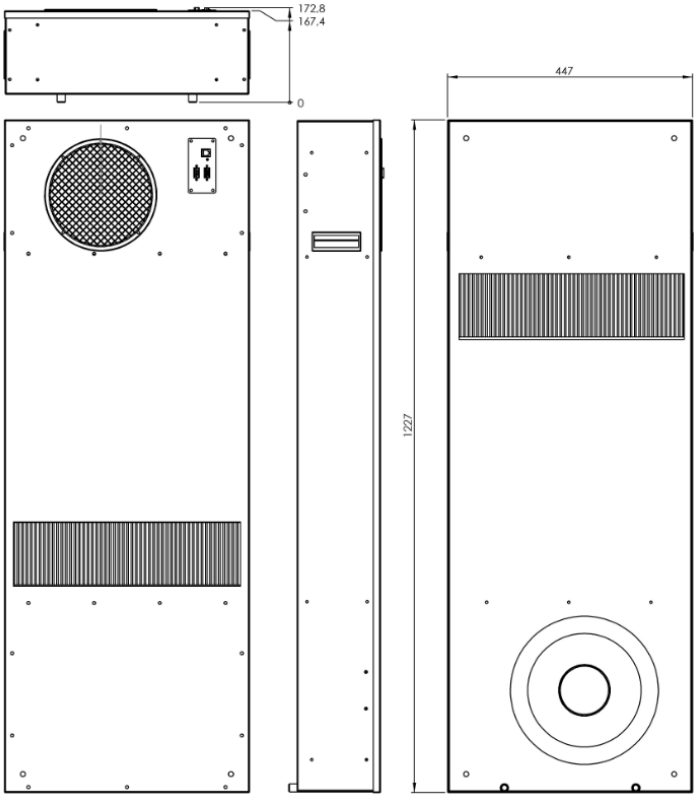
Introduction

This section shows the dimensions for HEX 70/90/120. Measurements are in mm.

Dimensions, HEX 70



Dimensions, HEX 90



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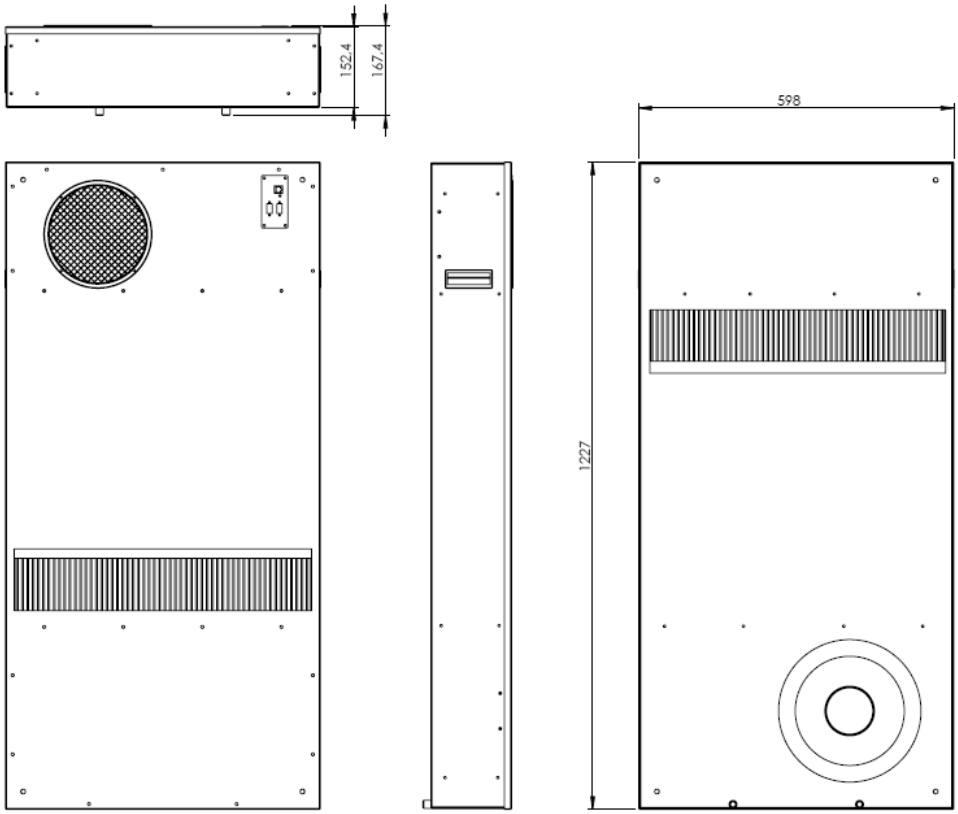
Technical data and dimensions, *continued*

Dimensions, HEX 120

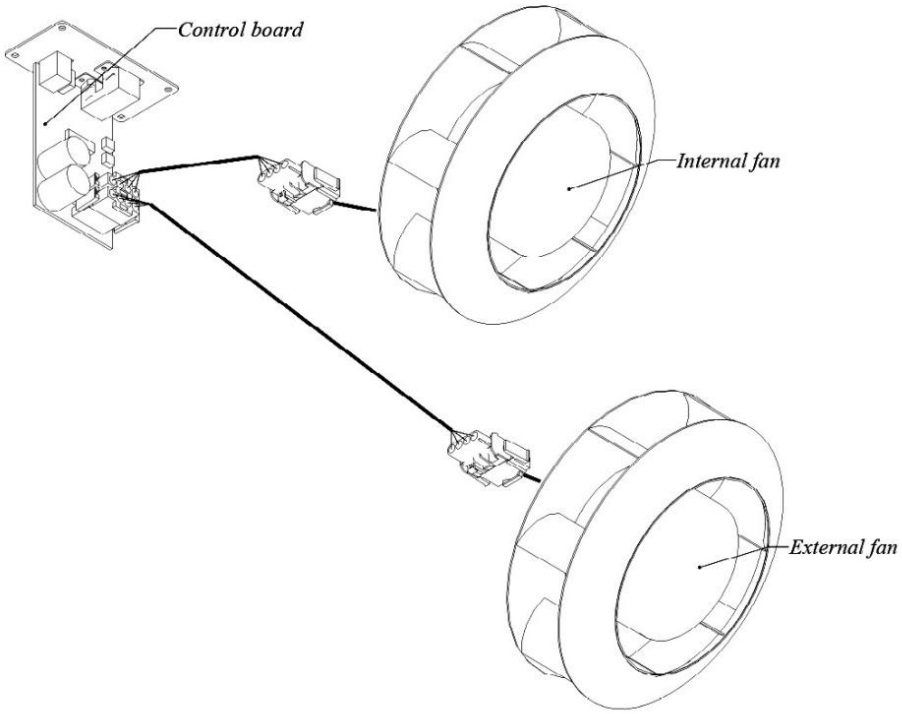


Wiring diagram

Diagram

This is the wiring diagram for the HEX 70/90/120 :

Note: Only HEX 70 has a plug on the external circuit fan



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