

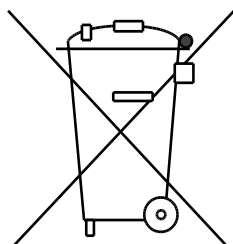
AD 290B

Service manual

Rev. 1.1

en

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CONTROL YOUR CLIMATE



Der tages forbehold for trykfejl og ændringer
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Irrtümer und Änderungen vorbehalten
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Introduction

Overview

Introduction

This is the service manual for the dehumidifier AD 290 B from Dantherm.
The table of contents below provides an overview of all sections in the manual.

Warning

It is the responsibility of the operator to read and understand this service manual and other information and to employ the correct operational and maintenance procedures.
Read the whole manual before the appliance is started for the first time. It is important to be familiar with the correct operational procedures for the appliance and all precautionary safety measures in order to avoid damage to materials and/or personal injury.

Contents

The service manual includes the following topics:

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General information

Introduction	This section provides general information about the appliance and the service manual.																
The manual's product number	The product number of the service manual is 045786.																
Target group	The target group of the service manual is the technicians who install the appliance and carry out preventive maintenance and replace defective parts.																
Copyright	Copying this service manual or parts thereof is not permitted without prior written permission from Dantherm A/S.																
Reservations	Dantherm A/S reserves the right at any time to carry out changes or improvements to the product and service manual without prior notification or obligation.																
EU declaration of conformity 	Dantherm A/S, Marienlystvej 65, DK-7800 Skive declares at its own liability that the following product: Dehumidifier, type AD 290 B, product number 351032: covered by this declaration complies with the following directives: <table> <tr> <td>98/37/EEC</td><td>Machinery Directive</td></tr> <tr> <td>73/23/EEC</td><td>Low Voltage Directive</td></tr> <tr> <td>89/336/EEC</td><td>The EMC Directive</td></tr> </table> – and is manufactured in compliance with the following harmonised standards: <table> <tr> <td>EN 12100-1</td><td>Safety of Machinery</td></tr> <tr> <td>EN 12100-2</td><td>Safety of Machinery</td></tr> <tr> <td>EN 60204-1</td><td>Safety of Machinery</td></tr> <tr> <td>EN 61000-6-3:01</td><td>Generic standard</td></tr> <tr> <td>EN 61000-6-2:01</td><td>Generic standard</td></tr> </table> Skive, 14.11.2007	98/37/EEC	Machinery Directive	73/23/EEC	Low Voltage Directive	89/336/EEC	The EMC Directive	EN 12100-1	Safety of Machinery	EN 12100-2	Safety of Machinery	EN 60204-1	Safety of Machinery	EN 61000-6-3:01	Generic standard	EN 61000-6-2:01	Generic standard
98/37/EEC	Machinery Directive																
73/23/EEC	Low Voltage Directive																
89/336/EEC	The EMC Directive																
EN 12100-1	Safety of Machinery																
EN 12100-2	Safety of Machinery																
EN 60204-1	Safety of Machinery																
EN 61000-6-3:01	Generic standard																
EN 61000-6-2:01	Generic standard																
Other declarations	 Russia: АЯ46																
Disposal	The appliance is designed to function for many years. When the appliance requires disposal, such disposal must be carried out in compliance with national legislation and procedures to protect the environment.																

Product and functional description

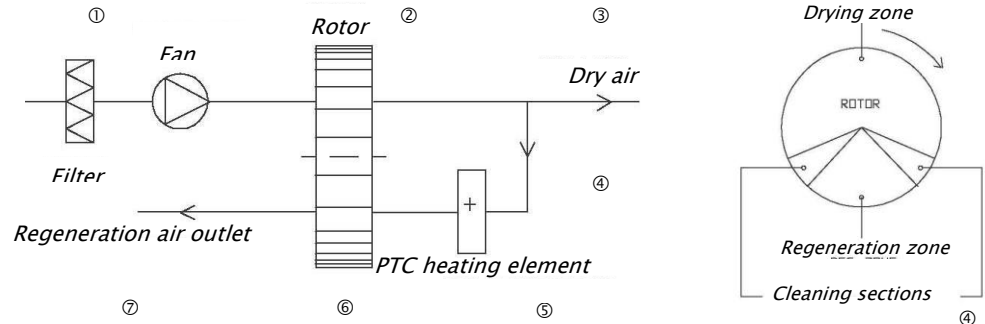
Introduction	This chapter provides a product and functionality description of AD 290 B:
Use	The dehumidifier AD 290 B removes water from the air passing through it and the removed water is led away from the dehumidifier with the regeneration air. The water absorption itself and the giving off of water take place through adsorption in a water-resistant silica gel rotor (tolerates water).
IMPORTANT!	The air to be dried must be free of contamination by solid particles, chemical substances, solvents and explosive fumes/gasses. The same applies to the regeneration air used. Likewise the dehumidifier must not be set up in locations where explosive fumes/gasses, oil fumes, exhaust fumes from diesel engines, etc. may occur. Do not expose the appliance to loads of 20 kg or above as this may damage the dehumidifier.
Air	The limit value for the intake air for air temperature is 45°C and the limit value for max/min air pressure is atmospheric $\pm$ 300 Pa. Varying air pressure occurs most often when the dehumidifier is connected to other air conditioning systems. Pressure in the main system will then be transmitted to the dehumidifier. Because excessive pressure variations may reduce the capacity of the dehumidifier, you should contact the supplier from whom you purchased the dehumidifier for advice in these cases.
PTC heating element	The heating element consumes energy depending on the value of the air passing through, i.e. no air = no energy consumption. No operational or safety thermostats are therefore mounted as their function would be to ensure a given temperature for a varying air flow. The mounted heating element ensures this in itself. Warning: Do not touch the heating element when it is powered on as fins/ribs are live.
Installation	AD 290 B is designed for indoor, stationary installation. It should not be installed where water may come into contact with the cabinet. See section "Unpacking and installation" page 26.

Continued overleaf

Product and functional description, *continued*

Illustration

The following illustrates the air's passage through the dehumidifier:



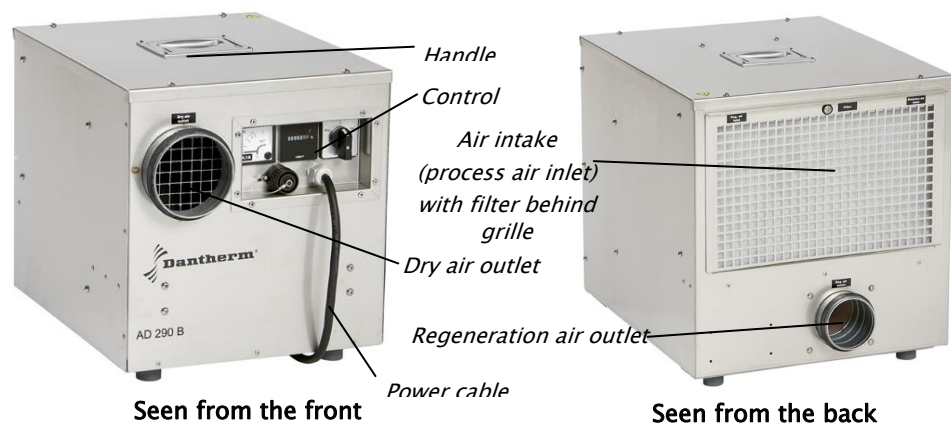
How the dehumidifier works – The following describes the air's passage through the dehumidifier:

Phase	Description
1	The fan draws in humid air through the filter in the dehumidifier
2	The rotor absorbs the humidity from the humid air
3	The dry air leaves the dehumidifier
4	The regeneration air is taken from the two 30-degree sections of the rotor located on each side of the regeneration section
5	The PTC heating element warms up the regeneration air to approx. 110 °C (at 20 °C intake)
6	The regeneration air absorbs the humidity from the rotor
7	The humid regeneration air leaves the dehumidifier

The two air passages are fixed and the rotor turns and an automatic and continuous drying/regeneration process is thus achieved.

Illustration

This illustrates the dehumidifier:

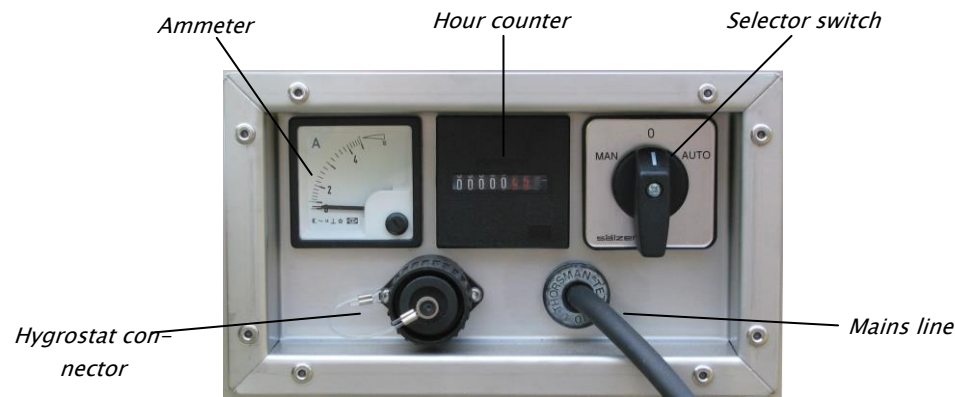


Continued overleaf

Product and functional description, *continued*

Illustration,
control

This illustrates the control:



Part/function
control

The following describes the function of the different parts of the control:

Part	Function
Ammeter	Display where current is shown
Hour counter	Counter showing the number of operational hours
Selector switch	Switch where required position is set: • MAN: Continuous operation • 0: Disconnected • AUTO: Hygrostat-controlled (accessory)
Mains line	Supplies power to the appliance
Hygrostat connector	The appliance can be controlled by hygrostat control and/or dew point control (accessory). See section "Accessories" page 33.

Get ready for use

Overview

Contents

This section covers the following topics:

Topic	See page
Unpacking and installation	26
Start-up and adjustment	28

Unpacking and installation

Introduction This section will guide you through the unpacking and installation of AD 290 B.

Important Only trained and certified technicians are permitted to install the appliance!

Before you start Ensure that you have the following at hand before you start the installation:

- Ducts/pipes
- Clips

Use ducts/pipes of the same size as the mounted connections.

Connected output, output consumption and air flow The heating element will be able to use 1800 W which is why the installation must be prepared for this. The output use in the heating element depends on the air passing through (the regeneration air flow). This is determined by the dehumidifier's internal pressure conditions which are primarily determined by current process air flow.

Packaging AD 290 B is packed in a cardboard box.

Procedure Follow this procedure to unpack the dehumidifier and install it:

Step	Action
1	Open the cardboard packing at the top and pull the appliance out of the box using the handles on the top of the appliance
2	Place the appliance indoors on a horizontal surface resting on the four rubber foot supports
3	Connect the regeneration air outlet on the back of the appliance with a duct/pipe ø80 draining away from the appliance. The duct must be as short as possible. NOTE: If the duct rises away from the dehumidifier, drainage must be ensured e.g. with a drain hole, min. ø4 at the lowest position

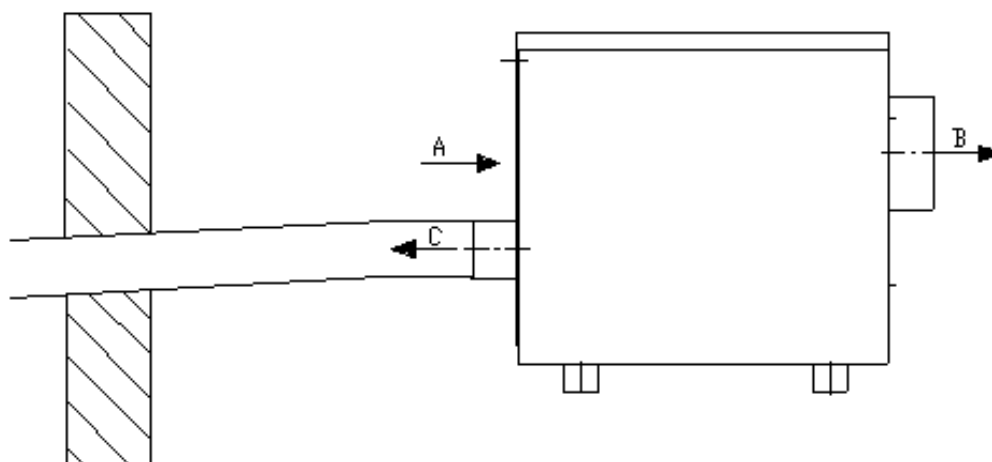
Follow this procedure for the installation of the remaining ducts/pipes if required for the dehumidifying process:

Step	Action
4	Provide the dry air outlet with a duct/pipe ø100 and damper, if required, for regulation of air flow
5	Replace the net for the air inlet with a plate to reduce process air inlet and re-generation air inlet (accessories). See section "Accessories" page 33.

Continued overleaf

Unpacking and installation, *continued*

Illustration
duct connections



	DA	EN	DE	FR
A	Procesluft tilgang	Process air intake	Prozesslufteintritt	Entrée d'air process
B	Tørluft afgang	Dry air outlet	Trockenluftaustritt	Sortie d'air sec
C	Regenereringsluft afgang	Regeneration air outlet	Regenerationsluft-austritt	Sortie d'air ré-génération

Start-up and adjustment

Introduction	This section will guide you through the start-up and adjustment of AD 290 B.
Electric connection	The dehumidifier is supplied with a 2-metre connection cable with a connector for 230 V + PE. The connected output is 1.64 kW, fuse 10A.
Optimum process	The optimum process is always at the nominal data, i.e. 6.0 A for the energy consumption of the heating element = 65 m³/h. This can be adjusted with a grille on the regeneration air. Nominal energy consumption is therefore 1.64 kW at 230 V. Note The capacity of the dehumidifier does not increase if a value greater than 6 A is set on the ammeter. If it is set to less than 6 A, the heating element and rotor may be damaged. The heating element has a starting power of up to 15 A which is why the ammeter during start-up will show results of more than 10 A.

Procedure Follow this procedure for start-up and adjustment of the appliance:

Step	Action
1	Check that all ducts/pipes are correctly connected and the clips are tightened
2	Check that the filter is in place
3	Connect the plug to 230 V AC
4	Set the selector switch to the required position: • MAN = Continuous operation • 0 = Disconnected • AUTO = Hygrostat-controlled (accessory) 
5	The regeneration air flow should be adjusted using a damper (not included) until the ammeter shows 6.0 A (the greater the back pressure for the dry air, the greater the regeneration air flow, the more amps)

The dehumidifier is now set to a nominal capacity and is ready for use.

Continued overleaf

Start-up and adjustment, *continued*

Constant fan operation for hygrostat-controlled dehumidifier This operation mode is only used when a hygrostat is connected! When the dehumidifier is controlled by a hygrostat it may in some cases be desirable to let the fan run no matter whether the dehumidifier is running or not. In such cases fan and rotor are in operation continuously. The hygrostat switches the heating element on and off in accordance with the set value. When the heating element is switched off there is no dehumidification.

In order to obtain this operation mode, the wiring has to be changed as follows, please see the section "Power circuit", page 76:

Step	Action
1	Dismantle the top cover
2	Change the connection between terminal 5 and 6 at the top of the multiple plug, thus creating a connection between terminal 4 and 6. (see numbering at the inside of the top cover)
3	Disconnect the connection between SA1 terminal 2 and the hour meter by moving the conductor in the two-pole terminal block to the empty adjacent terminal

Service guide

Overview

NOTE

Parts are shown from page 79.

Important

The mains connector must always be disconnected before the dehumidifier is serviced!

Contents

This section covers the following topics:

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Preventive maintenance

Introduction The dehumidifier consists of few moveable parts and otherwise of components of high quality and long life.
Preventive maintenance in the form of cleaning and regular service should be carried out to ensure continued operation and to maximise durability. It is important to note that the intervals between services may vary depending on the environment in which the appliance is installed.

Service contract Dantherm A/S offers a service contract that includes preventive and/or corrective maintenance – see more about this in section "Service agreement", page 35.

Tools No special tools are required.

IMPORTANT! The mains connector must always be disconnected before preventive maintenance is commenced!
If the dehumidifier has been operational, the heating element should be left to cool for 15 minutes before the dehumidifier is dismantled.

Changing the filter If the appliance is used as a construction dehumidifier, the air filter should be replaced every third day. Otherwise the filter should be replaced as required depending on the environment in which the appliance is used.
Carry out the following to replace the filter:

Step	Action
1	Ensure that power to the appliance is disconnected
2	Dismantle the net on the air inlet on the back of the appliance
3	Take out the filter and clean it with compressed air/vacuum cleaner or replace, if required
5	Reinsert the filter
6	Mount the net on the air inlet and reconnect the power

Continued overleaf

Preventive maintenance, *continued*

Service/cleaning Carry out the following to service and clean the appliance:

Step	Action
1	Ensure that power to the appliance is disconnected
2	Dismantle top cover
3	Separate the wire connection to the fan at the multiple connector on the supply line to the fan
4	Pull the fan and the plate on which it is mounted up and move it to the upper position and backwards out of the cabinet
5	Pull the pipe for regeneration air off the pipe stubs in the cabinet and at the rotor sector and remove it from cabinet
6	Separate the wire connections to the rotor section in the multiple connector
7	Remove the two lock steels holding the rotor section in place by moving them inwards towards the middle (lock steel is located at the top of the cabinet in the two slots)
8	Lift the rotor section up the possible 4 mm until it hits the cabinet's flange edges – pull it backwards until it is level with the wide slots in the cabinet and pull it out of the cabinet
9	Clean the cabinet with compressed air, vacuum cleaner or water/soap
10	Clean the rotor with compressed air (limited pressure)
11	Clean the duct stubs with compressed air
12	Check the motor and driving belt for rotor
13	Check the fan
14	Check the heating element
15	Check the strips
16	Check the electrical equipment and wires
17	Adjust external humidity control (optional extra)
18	Remount the dismantled parts in reverse order
19	Connect power to the appliance
20	Carry out a function test of the appliance (check heat and air and whether the rotor is turning) NOTE Check with your hand that the dry air temperature is warmer than the process air temperature (+ 10–15°C). Check that the regeneration air temperature is warmer than the process air temperature (40–50°C).

Rotor wash

The rotor can be washed with water and a little detergent. Washing the rotor must however not be carried out unless it is very dirty and is thus not part of the standard maintenance routine. Contact Dantherm your supplier to obtain a guide to rotor wash.

Warranty conditions

The factory warranty is only valid with documented preventive maintenance. Maintenance must have been carried out at intervals of a minimum of six months. The documentation must be in the form of a written log/journal.

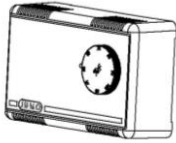
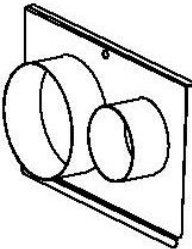
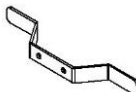
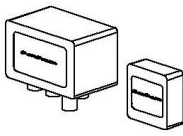
Accessories

Introduction

Further information about individual accessories can be obtained from Dantherm A/S.

List

The complete list of accessories for AD 290 B with drawing, description and product number is shown below:

Accessory	Illustration	Description	Product number
Hygostat		The dehumidifier is designed for connection to an external hygostat which is used when the maintenance of a certain RF value is required. The hygostat can be set from 30–100% relative humidity. The cable from the hygostat must be provided with a male connector that fits into the dehumidifier's hygostat connector on the front of the cabinet.	351036
Back plate		For standard operations minor low pressure may occur in the room where the dehumidifier is located, because the regeneration air is led from the room via duct. This may in some cases not be desirable and in such cases the back plate with two stubs for process air, in and regeneration air, in may be used.	351034
Electrical wire holder		Used if mounting of electrical wires is required.	351035
Dew point control DH24		Combines an electronic hygostat and dew point control in one and the same product. DH 24 consists of a connection box with humidity and temperature sensor and a separate control panel.	351037

Fault finding guide

Fault finding

Use this table to locate and remedy a problem or a fault:

Problem	Cause	Action
The dehumidifier does not start	The mains connector has not been connected or the group fuse has blown	Check that the power supply to the dehumidifier is in order. Is the plug connected? If the plug is connected, check the group fuse Check also that the selector switch on the dehumidifier is in the required position
The dehumidifier is not operational	If a hygrostat is installed as an optional extra, it may have disconnected the dehumidifier	Check this by setting the hygrostat down to e.g. 20% RF. The dehumidifier will then start.
The dry air is colder than the inlet air and the regeneration air is warmer than normal	The rotor is not running	Check rotor, engine and belt
The required regeneration and dry air are not there	The fan is not working	Check the fan
The regeneration air is cold	Error on heating element	Check that the ammeter shows 6,0 – 6,2

Note

If the dehumidifier is not functioning as it should, it must be disconnected immediately!

Further help

If the dehumidifier does not restart, contact Dantherm your supplier.

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 will need preventative maintenance on a regular basis.
Hotline	The After Sales Support Department of Dantherm A/S is ready to help you in case of a problem. To be able to offer quick and efficient help, please have the following information ready when contacting Dantherm A/S: • Name • Phone no. • Site/location (unit) • Company • Email • Serial no/order no. • Country • Type (unit) • Description of the problem Contact Dantherm A/S, ask for the After Sales Support department 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 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 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 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 A/S – and the overall responsibility for the agreement will be Dantherm A/S's.
Further information	For further information about a service agreement in your country or region, please contact: Henrik Hersted After Sales Support Manager Dantherm A/S Phone: +45 9614 4767 Mobile: +45 2399 4066 Email: heh@dantherm.com

Technical data

Data

The table below shows the dehumidifier's technical data:

Specification	Unit	Value
Dry air flow, free-blowing	m ³ /h	310
Dry air flow, nominal	m ³ /h	290
Regeneration air flow	m ³ /h	65
External pressure, process air	Pa	60
External pressure, regeneration air	Pa	80
Capacity at 20°C 60%RF	kg/h	0,08
Specific capacity at 20°C 60%RF	g/kg	3,1
PTC heating element, max.	W	1800
PTC heating element, nominal	W	1380
PTC heating element, nominal	A	7,1
PTC heating element, nominal	V	230
Fan	W	300
Motor for gear	W	5
Connected output, nominal	W	1680
Current	V	220-230
Current	Hz	50
Rotor		Silica gel ø260/67
Rotor revolutions	o/h	18
Driving belt		Ø6/880
LxWxH, cabinet	mm	370 x 330 x 345
LxWxH, total	mm	450 x 335 x 345
Weight	kg	17
Sound pressure level (1 m from cabinet middle and 1.6 m above ground)	dB(A)	60

Teknisk information/Technical information/Technische Hinweise/Renseignements techniques

DA

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EN

Topic	See page
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DE

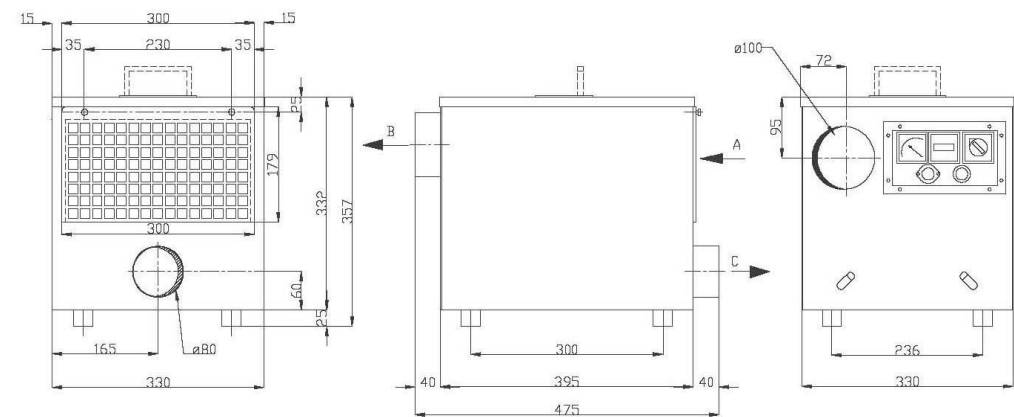
Thema	Siehe Seite
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FR

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Dimensioner/Dimensions/Abmessungen/Dimensions

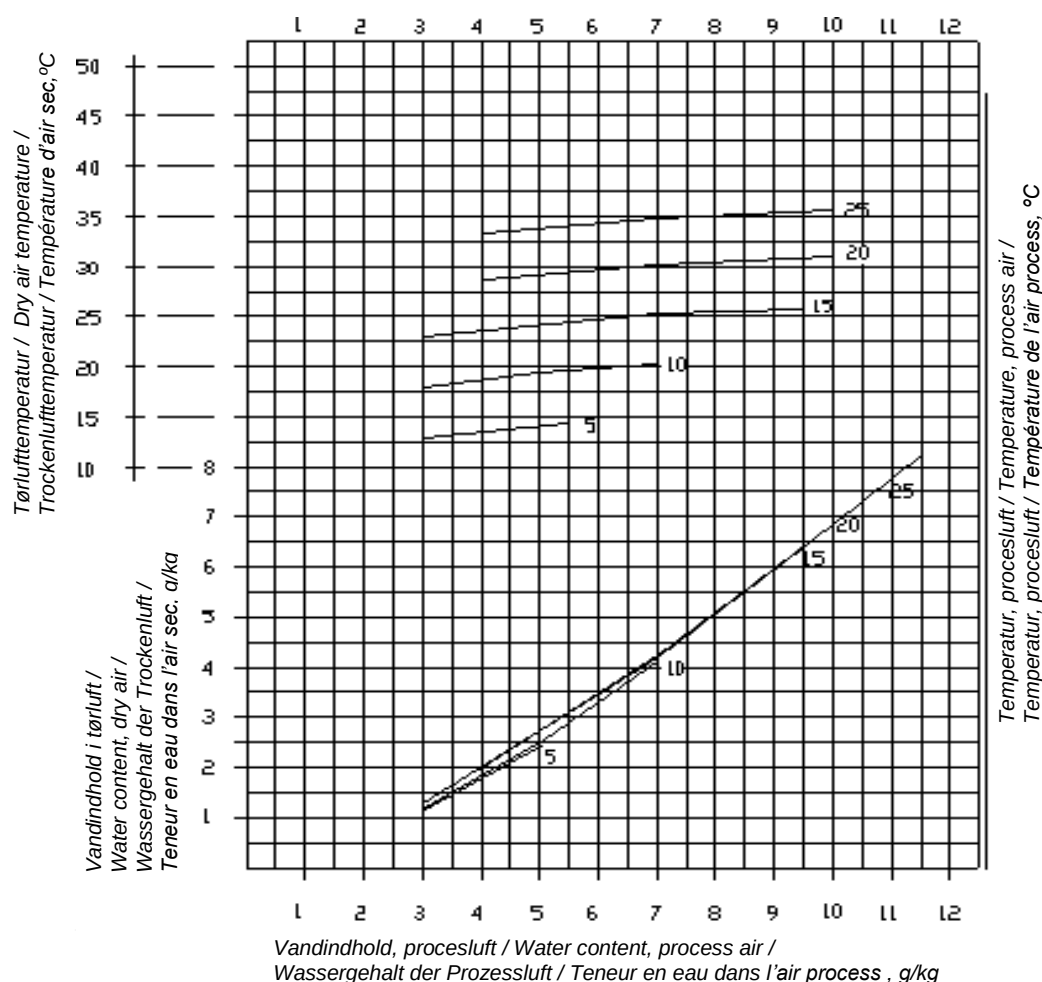
Illustration
Abbildung



	DA	EN	DE	FR
A	Procesluft tilgang	Process air intake	Prozesslufteintritt	Entrée d'air process
B	Tørluft afgang	Dry air outlet	Trockenluftaustritt	Sortie d'air sec
C	Regenereringsluft afgang	Regeneration air outlet	Regenerationsluft-austritt	Sortie d'air ré-génération

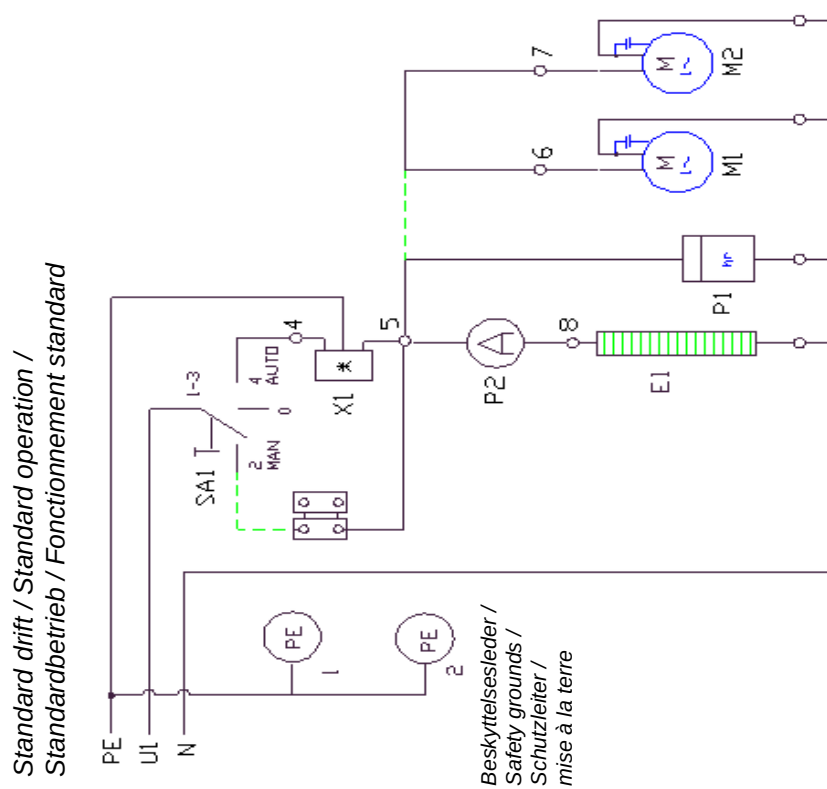
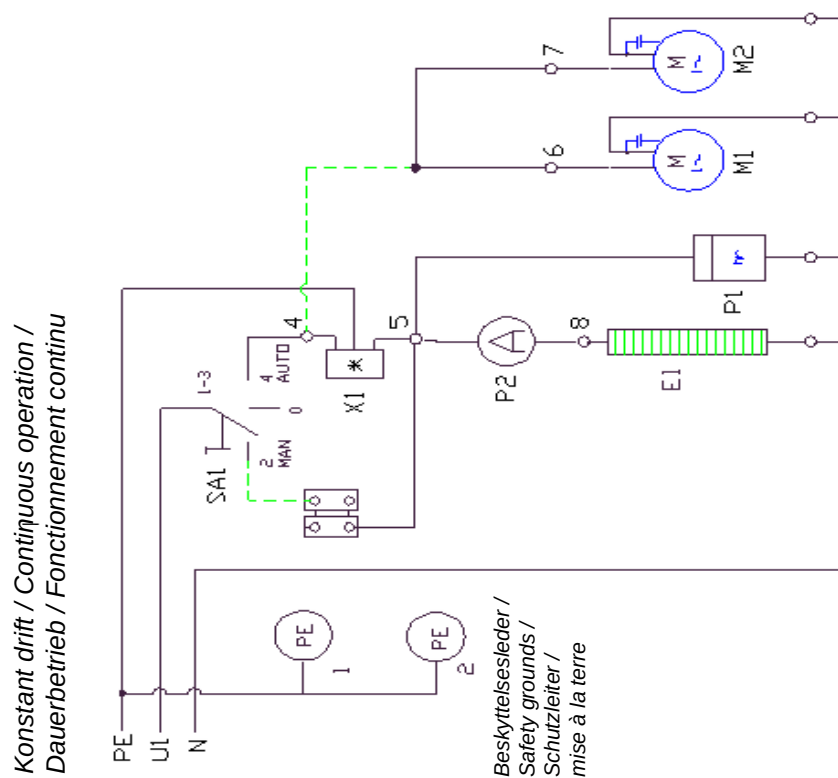
Kapacitetsdiagram/Capacity diagram/ Kapazitätsdiagramm/ Diagramme de capacité

Diagram
Diagramm
Schéma



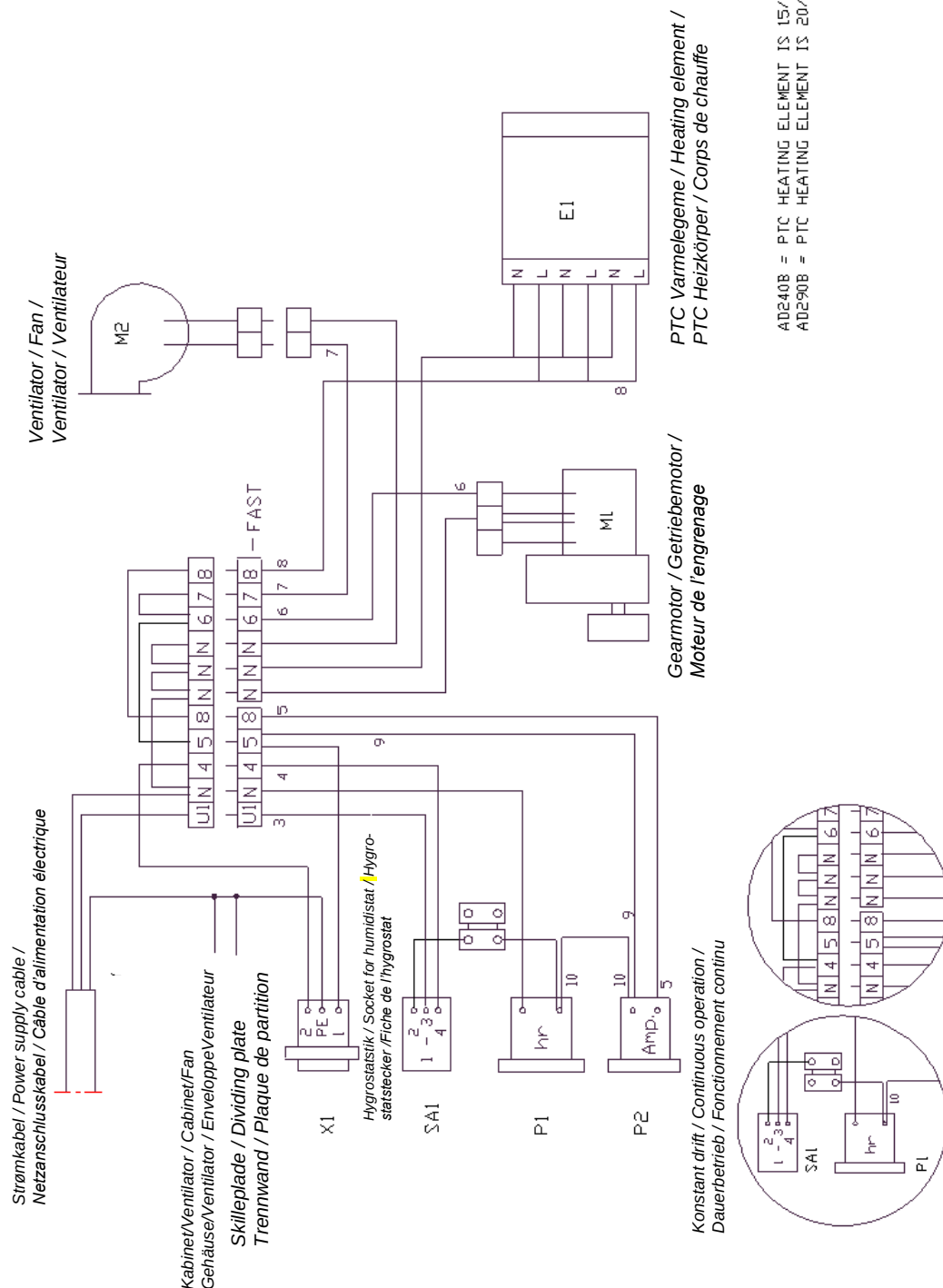
Nøglediagram/Power circuit/Stromkreis/Circuit à courant

Diagram
Diagramm
Schéma



Ledningstræk/Wiring diagram/Schaltplan/Schéma électrique

Diagram
Diagramm
Schéma



Continued overleaf

Ledningstræk/Wiring diagram/Schaltplan/Schéma électrique, *continued*

Ordforklaring/ Legend

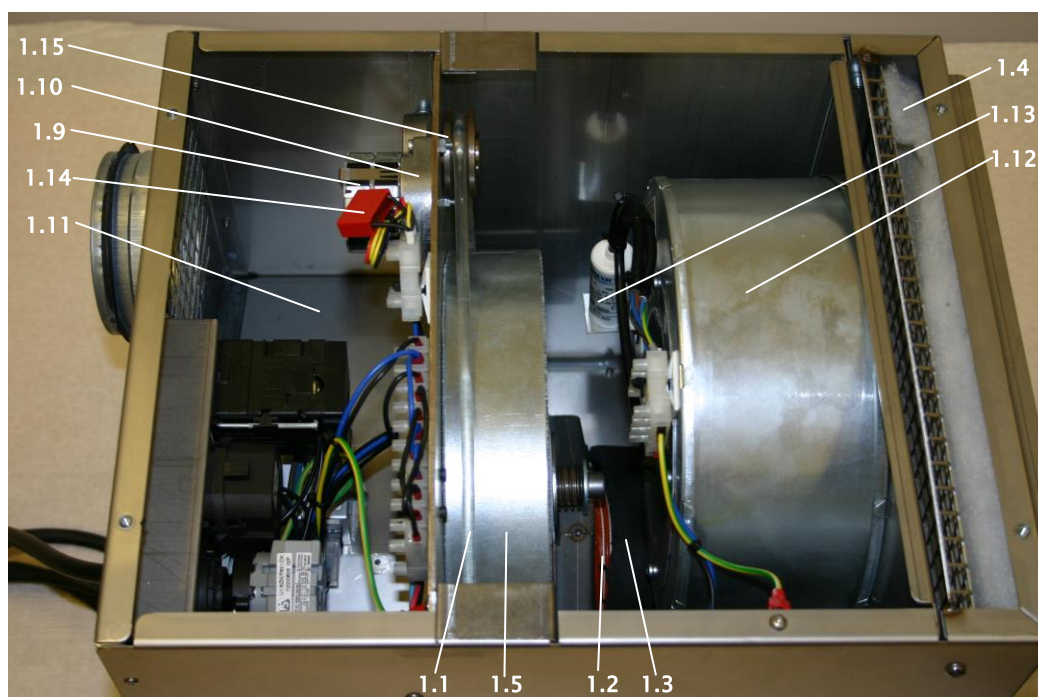
Position	DA	EN
	Beskrivelse	Designation
SA1	Drejeomskifter	Selector switch
P2	Amperemeter	Ammeter
P1	Timetæller	Hourcounter
M1	Motor for drivgear	Motor for gear
M1	Kondensator	Capacitor
M1	Gear	Gear
M2	Ventilator	Fan
M2	Kondensator	Capacitor
E1	Varmelegeme	Heating element
X1	Hygrostatstik på affugter	Connector on cabinet for hygrostat
X1	Hygrostatstik på kabeltilslutning	Connector for hygrostat cable
X1	Blændkappe	Cover for connector
PE1	Tilslutning af beskyttelsesleder på skilleplade	Connection of protective conductor between PE and dividing plate
PE2	Tilslutning af beskyttelsesleder på ventilator	Connection of protective conductor between fan and cabinet

Legende/ Légende

Position	DE	FR
	Beschreibung	Désignation
SA1	Dreheschalter	Commutateur rotatif
P2	Amperemeter	Ampèremètre
P1	Betriebsstundenzähler	Compteur horaire
M1	Motor für Antriebsgetriebe	Moteur pour l'entraînement
M1	Kondensator	Condenseur
M1	Getriebe	Vitesse
M2	Ventilator	Ventilateur
M2	Kondensator	Condenseur
E1	Heizelement	Corps de chauffe
X1	Hygrostatanschluss am Entfeuchter	Fiche de l'hygrostat sur le déshumidificateur
X1	Hygrostatanschluss	Fiche de l'hygrostat
X1	Abdeckkappe	Capot
PE1	Anschluss des Schutzleiters an Trennplatte	Raccordement à la terre sur la plaque séparatrice
PE2	Anschluss des Schutzleiters am Ventilator	Raccordement à la terre sur le ventilateur

Reservedele/Spare parts/Ersatzteile/Pièces détachées

Illustration
Abbildung



Continued overleaf

Reservedele/Spare parts/Ersatzteile/Pièces détachées, *continued*

Reservedele/
spare parts

Pos.	Dantherm Air Handling Nr./No.	DA Beskrivelse	EN Description
1.1	040802	Kilerem Dn 6/880	Drive belt Dn 6/880
1.2	040803	Rød slange Dn80, 20 cm	Red hose Dn80, 20 cm
1.3	040804	Isolering, sort DN89	Insulation, black DN89
1.4	040805	Filter 210x330	Filter 210x330
1.5	040812	Rotor Dn 260/67	Rotor Dn 260/67
1.6	040807	Drejeomskifter M/0/A	Selector switch M/0/A
1.7	040794	Timetæller	Hour Counter
1.8	040813	Amperemeter 10A, 48x48	Ammeter 10A, 48x48
1.9	040795	Saia Motor UFR12.230	Saia Motor UFR12.230
1.10	040796	Saia Gear B30S	Saia Gear B30S
1.11	040814	Varmelegeme HRKK 20/22	Heating element HRKK 20/22
1.12	040815	Ventilator GE160-2b	Fan GE160-2b
1.13	040816	Kondensator for ventilator 6 µf	Capacitor for fan 6 µf
1.14	040797	Kondensator for gearmotor 0,12 µf	Capacitor for gearmotor 0,12 µf
1.15	046381	Remskive R995	Pulley R995

Ersatzteile/
Pièces détachées

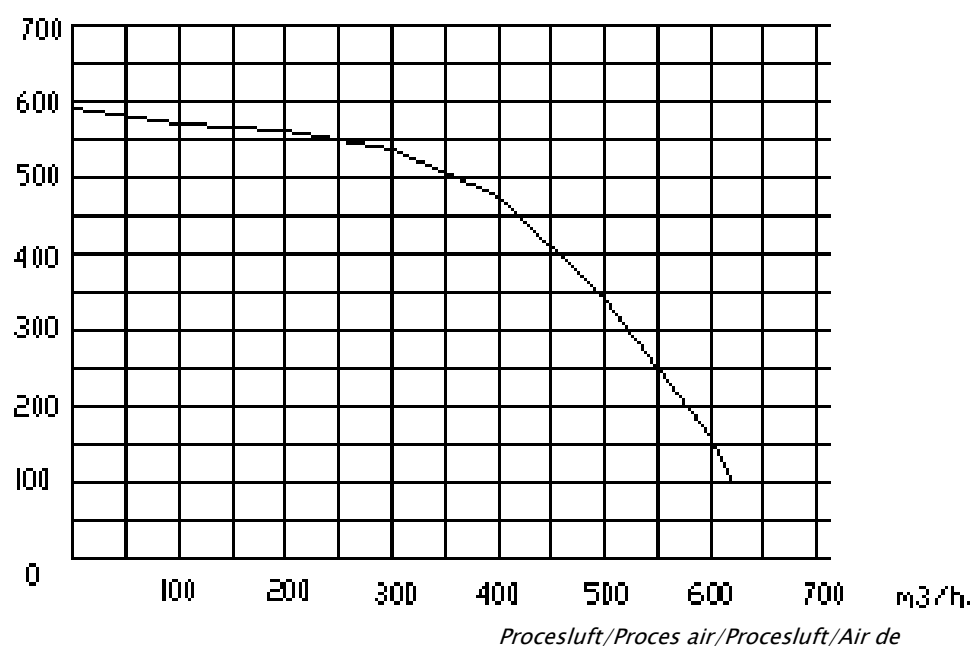
Pos.	Dantherm Air Handling Nr./No.	DE Beschreibung	FR Désignation
1.1	040802	Keilriemen Dn 6/880	Courroie Dn 6/880
1.2	040803	Schlauch Dn80, 20 cm	Tuyaux Dn80, 20 cm
1.3	040804	Isolierung, schwarz DN89	Isolation, noir DN89
1.4	040805	Filter 210x330	Filtre 210x330
1.5	040812	Rotor Dn 260/67	Rotor Dn 260/67
1.6	040807	Drehschalter M/0/A	Commutateur rotatif M/0/A
1.7	040794	Betriebsstundenzähler	Compteur horaire
1.8	040813	Amperemeter 10A, 48x48	Ampèremètre 10A, 48x48
1.9	040795	Saia Motor UFR12.230	Saia Moteur UFR12.230
1.10	040796	Saia Getriebe B30S	Saia Vitesse B30S
1.11	040814	Heizelement HRKK 20/22	Corps de chauffe HRKK 20/22
1.12	040815	Ventilator GE160-2b	Ventilateur GE160-2b
1.13	040816	Kondensator für Ventilator 6 µf	Condensateur p. ventilateur 6 µf
1.14	040797	Kondensator für Motor 0,12 µf	Condensateur p. moteur 0,12 µf
1.15	046381	Riemenscheibe R955	Poulie R995

Appendiks A – Eksternt tryk/Appendix A – External pressure/ Anhang A – Externer Druck/Appendice A – Pression externe

Eksternt tryk
External pressure
Externer Druck
Pression externe

Eksternt tryk/External pressure/Externer Druck/Pression externe

P_d .



Contact Dantherm

Dantherm Air Handling A/S
Marienlystvej 65
7800 Skive
Denmark

Phone +45 96 14 37 00
Fax +45 96 14 38 00

infodk@dantherm.com
www.dantherm.com

Dantherm AS
Postboks 4
3101 Tønsberg
Norway
Besøksadresse: Løkkeåsvn. 26
3138 Skallestad
Phone +47 33 35 16 00
Fax +47 33 38 51 91

dantherm.no@dantherm.com
www.dantherm.no

Dantherm Air Handling AB
Virkesgatan 5
614 31 Söderköping
Sweden

Phone +(0) 121 130 40
Fax +(0) 121 133 70

infose@dantherm.com
www.dantherm.se

Dantherm Air Handling (Suzhou) Ltd.
Bldg#9, No.855 Zhu Jiang Rd.,
Suzhou New District, Jiangsu
215219 Suzhou
China

Phone +86 512 6667 8500
Fax +86 512 6667 8500

dantherm.cn@dantherm.com
www.dantherm-air-handling.com.cn

Dantherm Limited
12 Windmill Business Park
Windmill Road, Clevedon
North Somerset, BS21 6SR
England

Phone +44 (0)1275 87 68 51
Fax +44 (0)1275 34 30 86

infouk@dantherm.com
www.dantherm.co.uk

Dantherm Air Handling Inc.
110 Corporate Drive, Suite K
Spartanburg, SC 29303
USA

Phone +1 (864) 595 9800
Fax +1 (864) 595 9810

infous@dantherm.com
www.dantherm.com



Dantherm Air Handling A/S

Marienlystvej 65

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