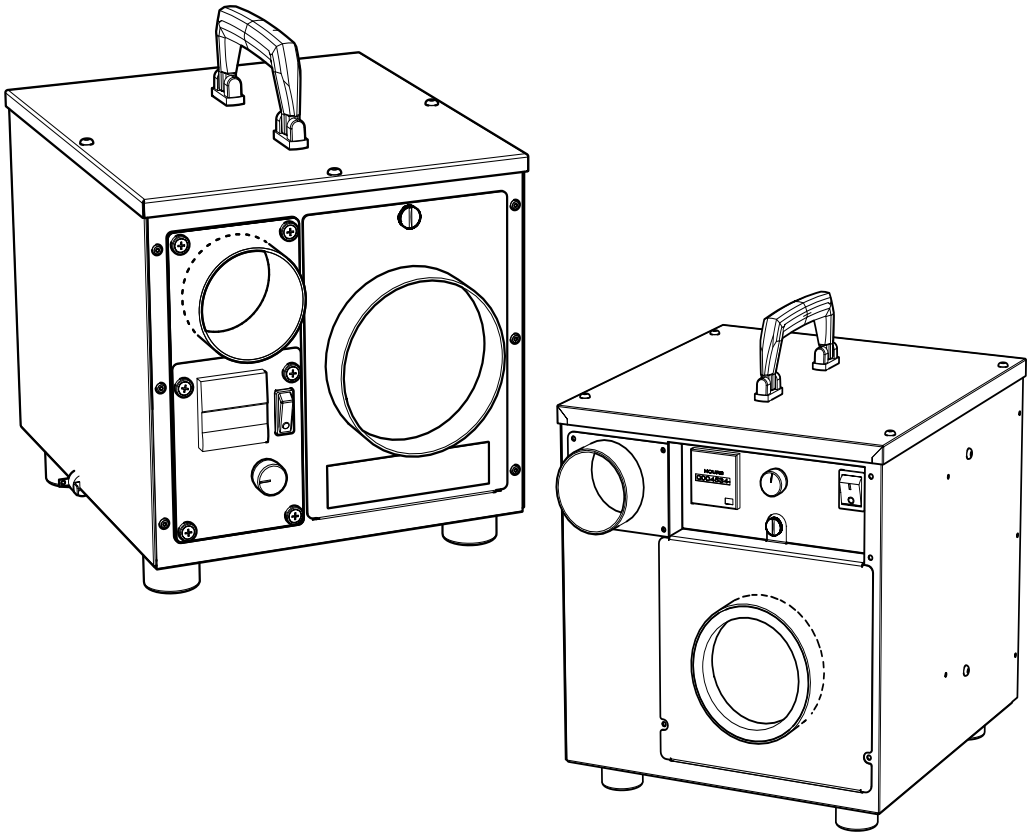
Dantherm®

IOM MANUAL

AD 200-300



Notes on this instruction manual

Table of contents

Table of contents This service manual covers the following main topics:

Notes on this instruction manual 3
Table of contents 3
Overview 4
Product description 5
Overall description 5
System operation strategy 7
Installation 8
Safety 8
Location, transport and installation 9
Installation 11
User's manual 13
Operation and operator control 13
Service Guide 15
Maintenance and service 15
Troubleshooting 17
Specifications 18
Spare parts 19
Enclosure dimensions 20
Schematics 22
EU Declaration of Conformity 23

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Overview

Introduction

This is the service manual for the Dantherm product AD 200 / 300.
Please see the table of content on page 3 for further information about the sections.

Target group

This instruction manual addresses all technicians who install and maintain the AD 200 / 300 as well as all end users. These persons must have read and understood the instruction manual. The physical and psychological preconditions for proper and safety-conscious handling of the devices must always be guaranteed.

Warranty claims

Using a device outside the specified conditions and contrary to its designated use will lead to the forfeiture of all warranty claims.

Reservation

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

Copyright

Copying of this service manual, or part of it, is forbidden without prior written permission from Dantherm.

Conventions

In this instruction manual you will find notes preceding the operating steps described to warn you of possible hazards.

Type and source of hazard
This symbol in connection with the word "Danger" warns of a high risk of 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.

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Product description

Overall description

Introduction

This section contains an overall description regarding the usage of the Dantherm adsorption dryer and optional components.

Designated use

The adsorption dryers manufactured by Dantherm are designed exclusively for dehumidifying air at atmospheric pressure in indoor rooms.
The AD 200 / 300 adsorption dryers can be operated in combination with a side channel compressor or a noise box.
Operating the dehumidifiers within the limits of designated use also involves observing the specified operating conditions (refer to page 9).
Any use of the adsorption dryer not in conformity with or going beyond the designated use is considered contrary to its designated use.

Scope of delivery

- Adsorption Dryer
- One instruction manual

Product presentation AD 200

Front- and back view of the adsorption dryers AD 200:

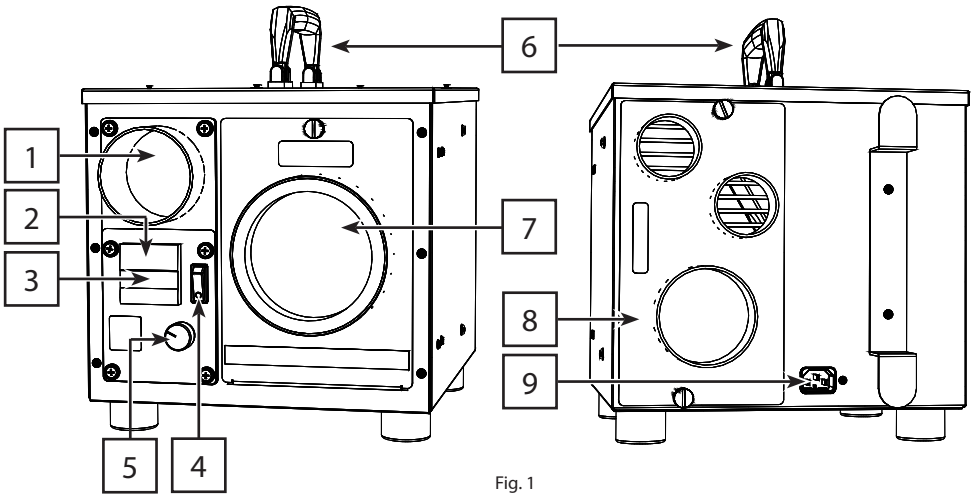


Fig. 1

Product presentation AD 300

Front- and back view of the adsorption dryers AD 300:

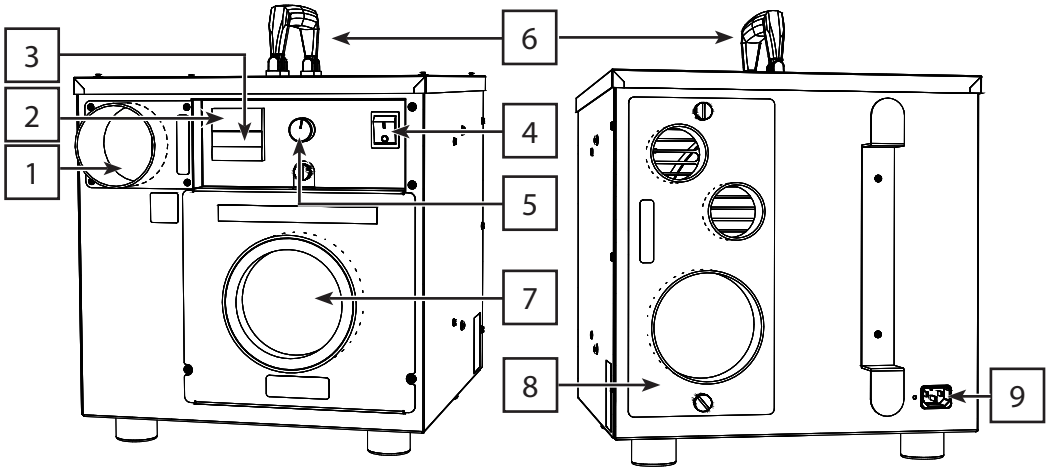


Fig. 2

Overall description, continued

Device description

The following table lists the different parts of the adsorption dryer according to the illustration Fig. 1 and Fig. 2 .

Pos.	Description	Pos.	Description
1	Regeneration air outlet	6	Carrying handle
2	Hour meter	7	Process air intake
3	Performance counter in kWh for accounting the energy consumption	8	Connecting plate for dry air outlet
4	On / Off switch	9	Connecting socket for power cable
5	Hygrostat		

Connecting plate and dry air outlet

This illustration shows, where on the unit the dry air outlet is placed:

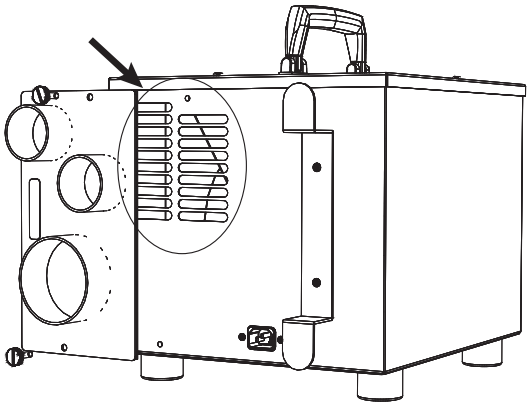
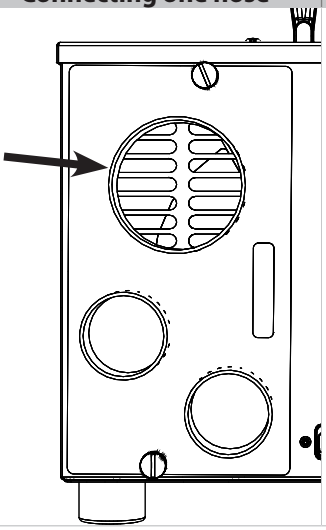
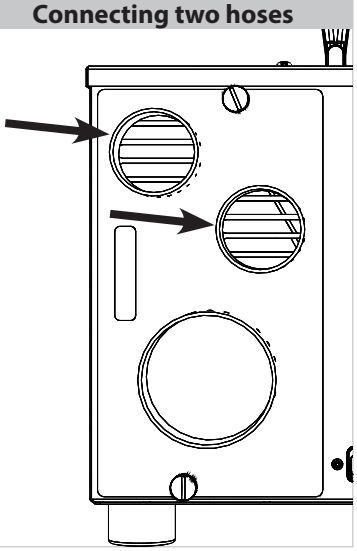


Fig. 3

The dry air is blown into the room through the connecting plate, either with or without connected hoses as desired. Depending on the position of the connecting plate one or two hoses can be connected.

Connecting one hose	Connecting two hoses
	

System operation strategy

Introduction

This section describes the operation strategy of the adsorption dryer.

Method of operation

The following diagram illustrates the method of operation of the adsorption dryer:

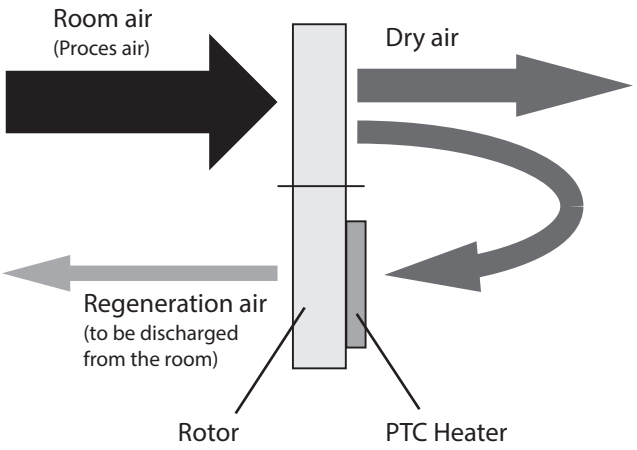


Fig. 4

Adsorption rotor

The room air (= process air) taken in is fed through the turning adsorption rotor. The adsorption rotor is a high-performance rotor. By its metal silicate coating it has been optimised for maximum water adsorption under different intake conditions. The slow rotation of the rotor results in an automatic, continuous drying/regeneration process.
Due to its honeycomb structure the rotor features a very large surface. The mechanical strength of the surface is extremely high. The rotor is non-combustible, maintenance-free and washable.

Regeneration air

The moisture taken up by the rotor is fed back out of the rotor by a heated air current (= regeneration air) flowing in the opposite direction.
The regeneration air is heated by a dynamic, safe and self-regulating PTC heating element.

Regeneration air outlet

The moist air current is discharged at the regeneration outlet (see Fig. 1 and Fig. 2) and must be removed from the room via a hose or air duct (see page 12).

Installation

Safety

Introduction

This section describes the safety regulations which have to be followed when installing and maintaining the adsorption dryer.

Safety devices

All persons involved in the installation, commissioning, operation and maintenance of the devices must

- be properly qualified,
- closely observe the instructions set out in this manual.

Work on the internal components may only be carried out by the manufacturer or personnel authorised by the manufacturer. This work involves danger of electric shock, burns, crushing, entanglement and cutting.

Authorized operator

Operation of or other work on the adsorption dryer incl. electrical equipment may only be carried out by persons commissioned and instructed by the user. In the working area the operator is responsible to third parties.
Responsibilities for the various activities on the device must be clearly defined and observed. Unclear competencies are a safety risk. The user must:

- make the instruction manual accessible to the operator and
- make sure that the operator has read and understood the instruction manual.

Risk of misuse

The series AD 200 / 300 adsorption dryers were subjected to thorough safety testing.
Improper operation or misuse will cause danger to:

- the operator,
- the machine and other material property of the user,
- efficient operation of the machine.

Hazards from accessories

Hoses and air filters must be properly installed and must not disable the protection devices of the adsorption dryers. The operating elements must always be accessible.
Original spare parts or spare parts approved by the manufacturer shall exclusively be used.

Location, transport and installation

Introduction

This section contains important information about the necessary operating conditions, transport and installation of the adsorption dryers.

Areas of application

Series AD adsorption dryers are suited for mobile or stationary use on building sites, in storage rooms, cellars, garages, on boats and in caravans. AD adsorption dryers work without problems in the temperature range from -10 °C to +35 °C and in the humidity range from 10 % to 95 % relative humidity.

Choosing the right location

In case of connection and operation in accordance with its designated use the device generates a negative pressure in the operating room. As a result air, particles, smoke or gases can be drawn in from outside or neighbouring rooms with potentially unexpected hazards due to the effects on fireplaces and stoves or other equipment or due to any substances or materials present there.
Assess this situation before using the adsorption dryer, and take appropriate preventive measures, for example disconnection of devices or sealing-off of endangered rooms.

Inadequate locations

The devices must **not** be used under the following conditions:

- in rooms with potentially explosive atmospheres.
- in rooms with aggressive atmospheres, e.g. ammonia, wood acids, etc.
- in rooms with water with a pH value outside the range from 7.0 to 7.4.
  - In case of lower pH values there is risk of corrosion for all metals and risk of damage to mortar-containing materials (joints). Higher pH values cause skin and mucous membrane irritations and increased lime deposits.
- in rooms with salt or liquids with a salt content > 1% (incl. brine baths).
- in rooms with ozone-treated air.
- in rooms with high solvent concentration.
- in rooms with extreme dust load.

Transport

Step	Action
1	Report any obvious damage to the carrier, parcel service, postal service etc. immediately on delivery and note down the damage on the shipping document or carrier's document.
2	Remove the packaging material completely and dispose of according to the local regulations.
3	Should any transport damage be detected after unpacking of the device, or should the delivery be incomplete, contact your salesman in charge or specialised dealer without delay.
4	Use the carrying handle to transport the adsorption dryer to the place of installation.

WARNING

Crushing hazard!
The adsorption dryer is heavy.

- Use only the handle to carry the adsorption dryer.
- Do not reach into the openings.

CAUTION

Material damage
Pulling the power cable may damage the cable.

- Always disconnect the mains plug from the socket outlet before transport of the device.
- Always use the carrying handle to lift the device.

Location, transport and installation, continued

Installation

During installation of the adsorption dryers the following points must be observed:

- The adsorption dryer must be installed on a horizontal, firm ground.
- Avoid rough handling to prevent damage to the casing.
- The adsorption dryer must be installed in such a way that free air circulation through the device is guaranteed. The air filter must not be blocked.
- Switch off the device via the on/off switch and disconnect the power plug from the socket outlet before moving the device.
- The adsorption dryer is equipped with a carrying handle for easy carrying.

In case of doubts about the operating conditions your technical advisor can help you.

CAUTION

Damage to appliance due to improper operating conditions

- Put the device gently down.
- Place the device on firm ground only.
- Always use the carrying handle to lift the device.
- Free air circulation must be guaranteed and the filter must not be covered.

Installation

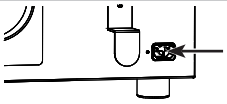
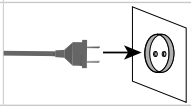
Introduction

This section describes how to install the electrical connection of the series AD 200 / 300 adsorption dryers correctly

Electrical connection

The following items must be checked prior to electrical connection of the adsorption dryer:

- Is the mains voltage in conformity with the voltage of the device?
- Are socket and supply system sufficiently fused?
- Has an RCCB been installed?
- Is the appliance coupler suitable for the building socket outlet?
- Is the socket outlet used grounded properly?

Step	Action	Illustration
1	Connect the appliance coupler of the power cable included in the delivery to the socket on the adsorption dryer.	
2	Connect the power cable of the adsorption dryer to a suitable power outlet.	

DANGER

Danger to life due to electric shock

- Prior to commissioning the technical data of the adsorption dryer must be compared with the conditions prevailing in the room of installation!
- Use exclusively the original power cable! In case of loss or damage original power cables are available from your adsorption dryer supplier.

User's manual

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Operation and operator control

Introduction

This section describes the operating elements and setting options of the adsorption dryers.

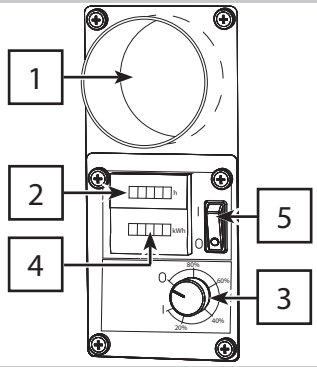
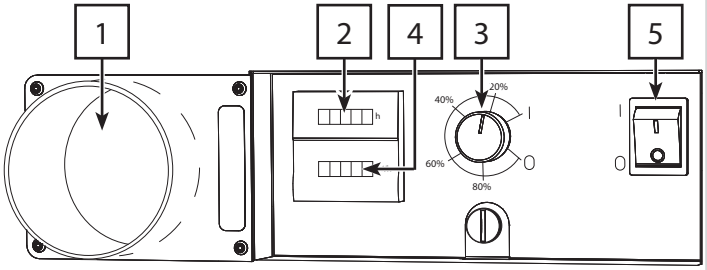
CAUTION

Danger of injury and damage to appliance
Inadmissible ambient conditions or improper operation of the device may constitute a risk.

- Read the instruction manual before commissioning the adsorption dryer.

Operating elements AD 200/ 300

The following illustrations show the operating panel of the AD 200 and AD 300.

AD 200	AD 300
	

Description of the operating elements:

Pos.	Description
1	Regeneration air outlet
2	Hour meter
3	Hygrostat
4	Performance counter in kWh for accounting the energy consumption
5	On / Off switch

TIP

The Hour meter may **not** be used for the accounting of energy consumption. The performance counter in kWh is calibrated and MID approved and thus can be used for the accounting of energy consumption.

Operation and operator control, continued

Hygrostat control

This illustration shows the hygrostat controller of the AD 200 and AD 300.

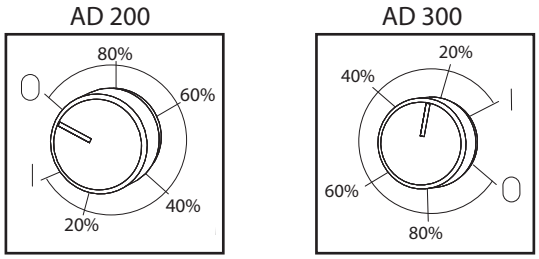


Fig. 5

Adjusting the hygrostat controller

The hygrostat controller of the device can be used to set the desired humidity value. The hygrostat is arranged clearly visible in the operating panel.
Continuous adjustment of the hygrostat allows for easy humidity control.

Hygrostat position	Significance, device response
Position 0	Device ready for operation
Position I	Device running in continuous mode
Position 80%	The adsorption dryer will switch off at a relative room humidity of about 80% and switch on again when a humidity of 80% is exceeded.
Position 60%	The adsorption dryer will switch off at a relative room humidity of about 60% and switch on again when a humidity of 60% is exceeded.
Position 40%	The adsorption dryer will switch off at a relative room humidity of about 40% and switch on again when a humidity of 40% is exceeded.
Position 20%	The adsorption dryer will switch off at a relative room humidity of about 20% and switch on again when a humidity of 20% is exceeded.

TIP

If very precise setting values are required, use a hygrometer with a precise humidity display to set the hygrostat.

TIP

For quick building drying the hygrostat is set to continuous operation (item I).
For drying and keeping rooms with wood furnishing (e. g. parquet flooring) or paintings, antiques etc. dry, a minimum moisture of 55 – 60% must be observed.
In case of doubt please contact your technical advisor.

CAUTION

Damage to the device

- When the adsorption dryer is used in combination with a side channel compressor / noise box: always set the hygrostat to position I.

Activating / deactivating the drying process

Select the desired humidity on the hygrostat (Fig. 5) and switch the adsorption dryer on via the On / Off switch (Fig. 1 and Fig. 2). The On / Off switch lights when the device is switched on. When the drying process has been finished switch the device off via the On / Off switch.

Service Guide

Maintenance and service

Introduction

This section describes the process of maintaining the adsorption dryers including the overall safety precautions which have to be taken during maintenance work.

Cleaning and inspection

The cleaning intervals depend largely on the operating conditions. Therefore check your adsorption dryer after every drying process.
If required, the inside of the device can be carefully cleaned with compressed air. Wear protective goggles and ensure that all internal components are cleaned.

- Rotor, rotor drive, drive belt, fan, heater and hygrostat (if any) must be checked at regular intervals.

Opening the device

The device casing can be opened and inspected after removal of the screws and taking off the lid.

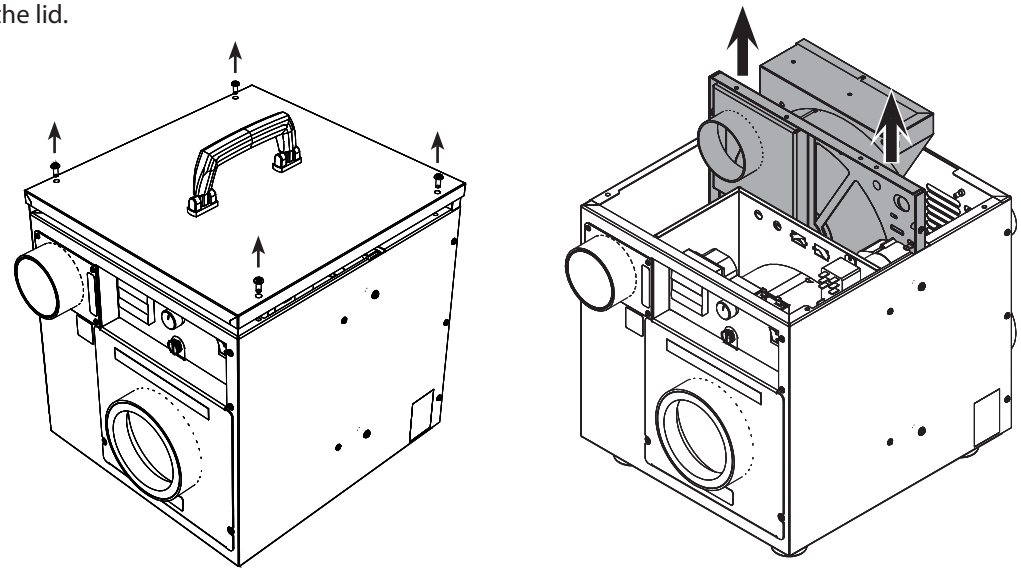


Fig. 6

Checking / changing the air filter

In order to guarantee trouble-free functioning of the adsorption dryer the device must be cleaned and checked (in particular the air filter) at regular intervals.

- If the adsorption dryer is used as building dryer it is recommended to change the filter every three days to ensure efficient drying.

Follow these steps when changing the filter:

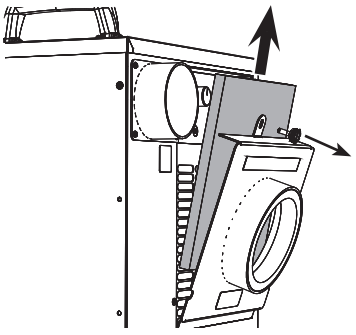
Step	Action	Illustration
1	Remove the process air intake by loosening the thumbscrew.	
2	Remove the filter as shown and replace it by a new one.	
3	Remount the process air intake and close the device casing.	

Fig. 7

Maintenance and service, continued

Danger of injury by electric shock and risk of material damage

- Always observe the general safety instructions when performing any maintenance and service work!
- Switch the device off and pull the power plug before cleaning and inspection.
- Inspection and any work inside the device may only be carried out by trained expert staff.

Danger of injury due to dirt whirled up and compressed air

- Wear protective goggles during cleaning with compressed air!

Danger of cutting when reaching into inlet or outlet openings.
Danger of cut injuries at air inlet and outlet.

- Do not reach into the openings; carry the device exclusively by the handle.

Dust hazard
During cleaning with compressed air dust is released into the atmosphere.

- Clean air filter from outside and inside with a vacuum cleaner, if necessary wash and dry it.
- Clean device with compressed air only in an open environment; wear protective mask and protective goggles.

Damage to the device
Cleaning agents can cause damage to surfaces.

- Use only mild detergents.
- Never operate the adsorption dryer without filter or when the filter is soiled.

Troubleshooting

Introduction

This section helps you identifying the cause of an occurred problem and gives advices of how to solve it.

Identifying the problem

If problems arise with the adsorption dryer please check the following points. Should the fault not be located please contact your technical advisor.

Problem	Possible cause	Remedy
Adsorption dryer does not work / no air current can be felt at dry air outlet and at regeneration air outlet / no air noise can be heard	Adsorption dryer switched off	Switch adsorption dryer on using the On / Off switch
	Power supply interrupted	Check power supply, power cable, power outlet and device fuse
	The humidity set on the hygrostat has been reached.	The adsorption dryer will automatically re-start when the set humidity is exceeded.
	Air filter clogged	Change the air filter (see page 15)
	Rotor drive defective / drive belt torn	Entrust a specialised company with the repair of the adsorption dryer
The desired humidity is not achieved / the device does not automatically switch off although the hygrostat is connected	The device is not sufficiently dimensioned	Ask your specialised dealer to calculate the capacity required for your application.
	There is very much humidity in the masonry or in the floor	The adsorption dryer will need some time to remove the water and achieve an acceptable value in the room.
The regeneration air has the same temperature as the dry air / the desired humidity is not achieved.	Heater defective	Entrust a specialised company with the repair of the adsorption dryer.

TIP

The drying performance of the adsorption dryer largely depends on the operating conditions. Part of the air taken in by the adsorption dryer from the room is discharged from the room with the regeneration air. As a result, negative pressure builds up in the room which causes the corresponding amount of outside air to flow in.
The adsorption dryer can achieve very low humidity values in the dry air outlet (at intake 20 °C / 60% r.h. for example about 30 °C / 20% r.h.), but due to the outside air flowing in the humidity in the complete room will never reach the low value of the dry air.

WARNING

Danger of injury by electric shock and risk of material damage

- The device may only be repaired by trained specialised staff. Within the warranty period, any work on the dehumidifier shall only be carried out by the manufacturer or persons commissioned by the manufacturer. Any work carried out by unauthorised persons shall lead to the forfeiture of all warranty claims!

CAUTION

Danger of cutting when reaching into inlet or outlet openings.
Danger of cut injuries at air inlet and outlet.

- Do not reach into the openings; carry the device exclusively by the handle.

Specifications

Overview

	AD 200	AD 300
Power supply	230 V / 50 Hz	
Protection class	IP 23	
Dry air rate	210 cbm/h	300 cbm/h
Regulation air volume	110 cbm/h	
Dehumidifying performance at 20 °C / 60 % relative humidity	18,75 kg/day	25,7 kg/Tag
Dehumidifying performance in litres per kWh	1,13 l/kWh	1,05 l/kWh
Dehumidifying performance in kWh per litre	0,89 kWh/l	0,97 kWh/l
Power supply max.	690 W	1100 W
Rotor dimensions (Ø in mm / depth in mm)	200 / 60	260 / 50
Rotor speed	30 r/h	
External pressure reg. air	50 pa	
External pressure dry air	150 pa	
Weight	14 kg	18 kg

TIP

Many different components installed in an adsorption dryer decide on its dehumidifying performance.
Since these components can never be completely identical the actual performance according to DIN EN 810 may deviate by up to 5% from the specified performance.

Spare parts

Introduction

Spare parts for the AD 200/ 300 unit shown in this section, are available via Dantherm dealers.

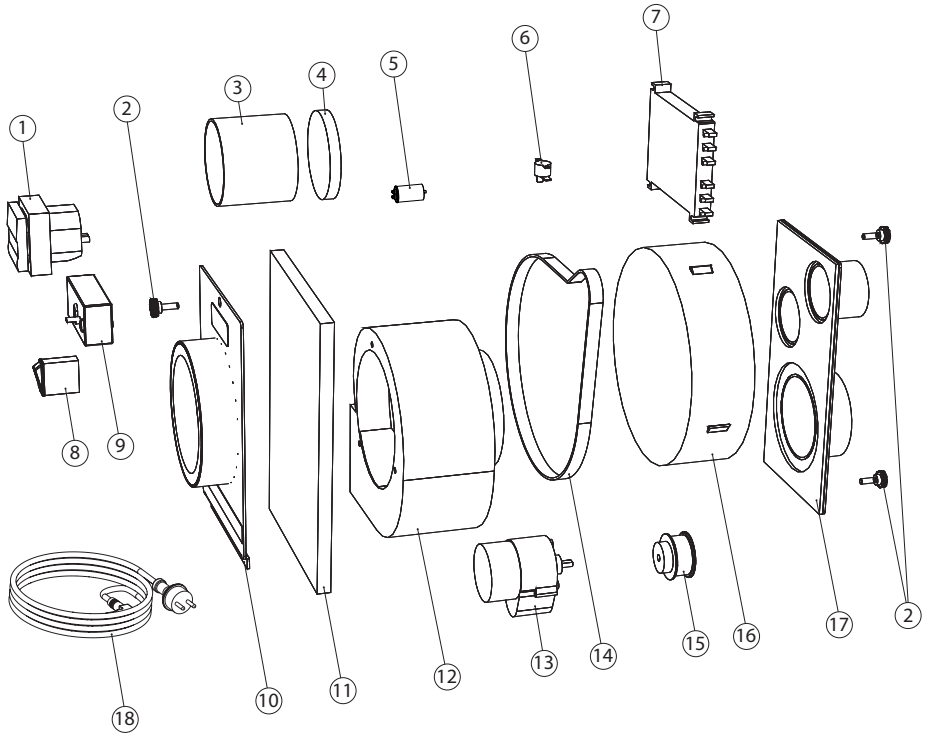


Fig. 8

This table shows all available spare parts with order numbers, according to Fig. 8.

Pos.	Part name	AD 200 (order no.)	AD 300 (order no.)
1	Hour meter and energy counter	099289	
2	Thumbscrew M5x15	099290	
3	Hose 80 mm	099291	
4	Clip for hose	099292	
5	Capacitor 2 µF	099293	099294
6	OT-thermo switch 150°	099295	
7	Heating coil - PTC	099298	
8	Switch	099299	099300
9	Hygrostat	099301	
10	Air inlet	099302	099303
11	Air filter	099304	099305
12	Radial fan	099306	099307
13	Gear motor	099308	
14	V-belt 285 mm	099309	099310
15	V-belt Pulley	099311	
16	Rotor	099312	099313
17	Dry air outlet	099314	099315
18	Power cord	099316	

Enclosure dimensions

Dimension illustration AD 200

This illustrates the dimensions of the AD 200 unit:

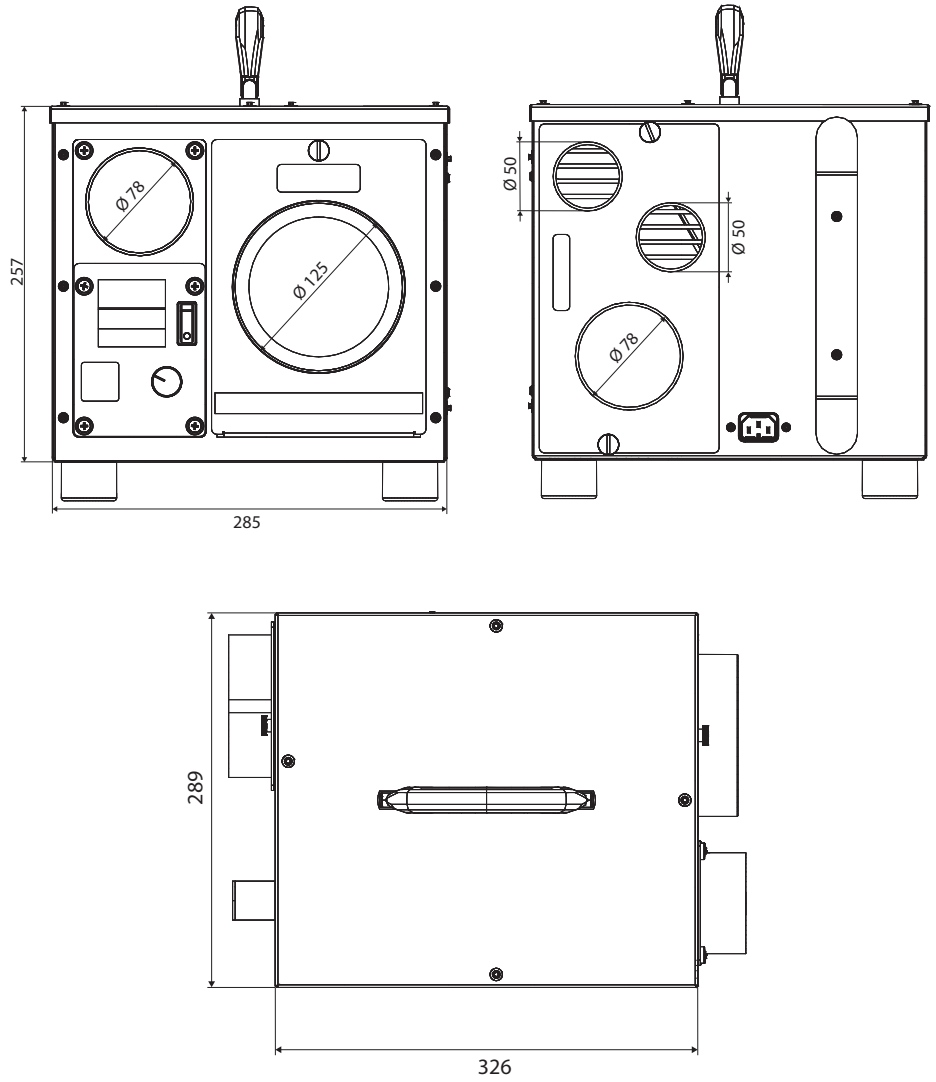


Fig. 9

Enclosure dimensions, continued

Dimension illustration AD 300

This illustrates the dimensions of the AD 300 unit:

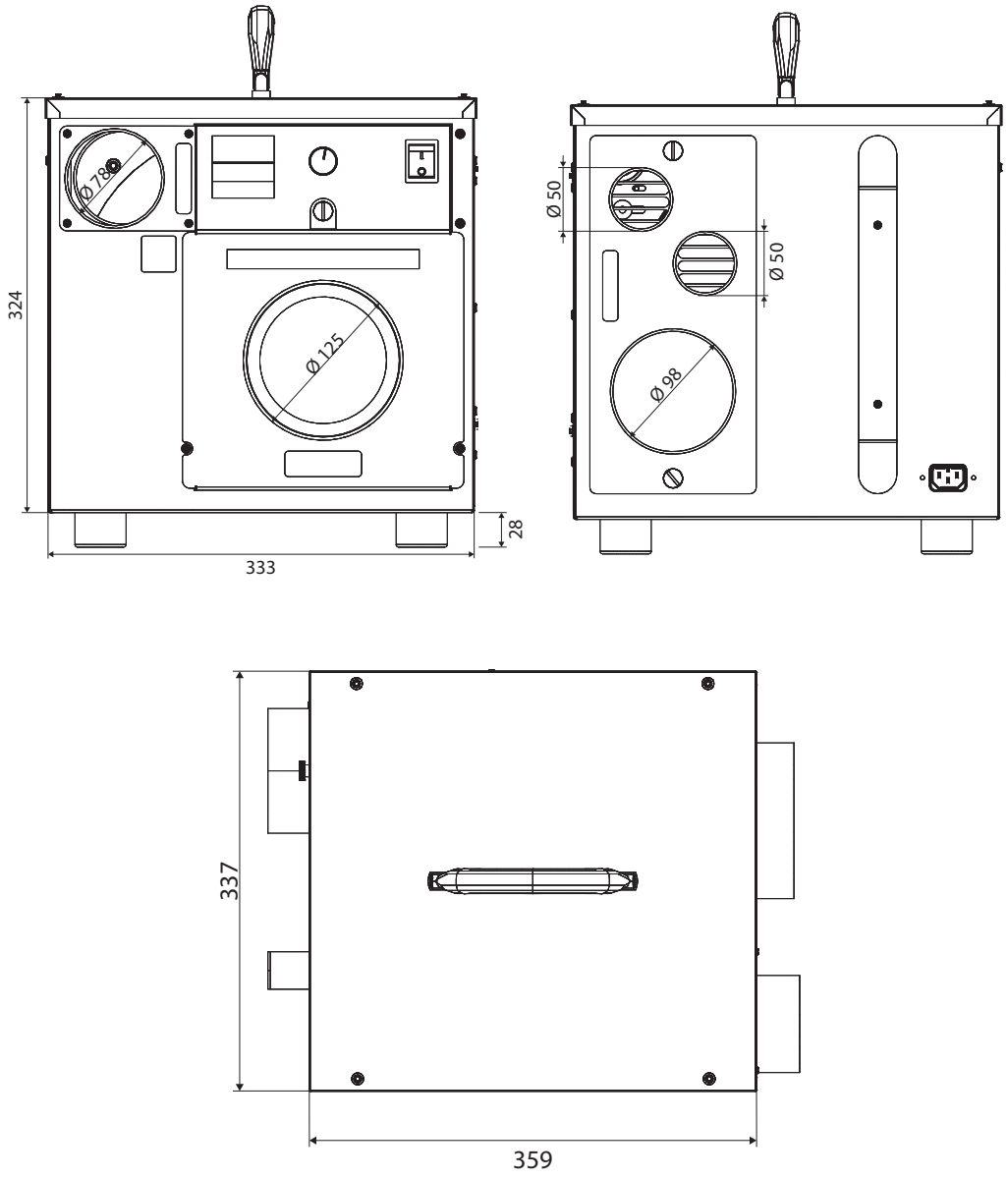
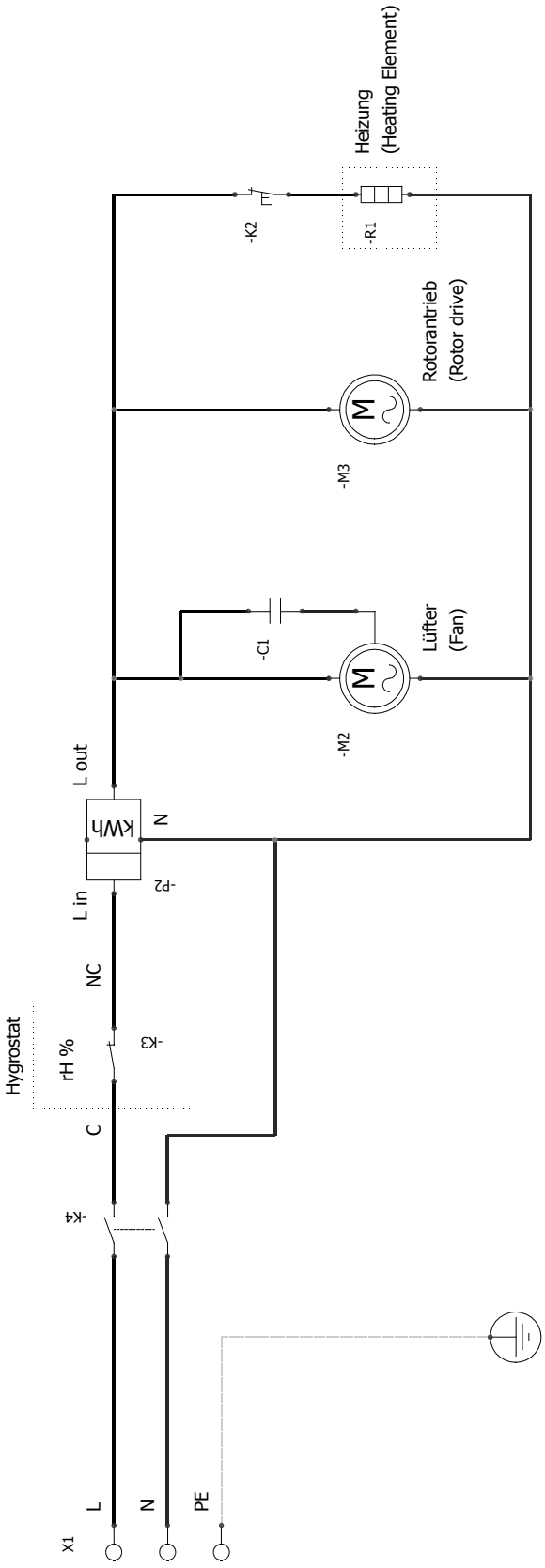


Fig. 10

Schematics

Illustration of the wiring diagram

This illustration shows the wiring diagram of the unit:



EU Declaration of Conformity

Dantherm hereby, declares that the unit mentioned below:
No.: 351066 / 351067 Type: AD 200 / 300

- complies with the following directives:

2006/42/EG	Machinery Directive
2014/35/EU	Low Voltage Directive
2014/30/EU	Electromagnetic Compatibility
2011/65/EU	RoHS Directive (Restriction of hazardous substances)

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

EN ISO 12100:2010-11	Safety of machinery - General principles for design Risk assessment and risk reduction
EN 60 204-1:2006/A1:2009	Safety of machinery - Electrical equipment of machines.
EN 60204-1:2006-06	Safety of machinery - Electrical equipment of machines
EN 60204-1:2006/AC:2010	Safety of machinery - Electrical equipment of machines
EN 60335-2-40:2003-03	Household and similar electrical appliances - Safety
EN 60335-2-40/A11:2004-07	Household and similar electrical appliances - Safety
EN 60335-2-40/A12:2005-02	Household and similar electrical appliances - Safety
EN 60335-2-40/A1:2006-04	Household and similar electrical appliances - Safety
EN 60335-2-40:2003/A2:2009	Household and similar electrical appliances - Safety
EN 60335-2-40:2003/AC:2006	Household and similar electrical appliances - Safety
EN 60335-2-40:2003/A13:2012	Household and similar electrical appliances - Safety
EN 60335-2-40:2003/A13:2012/AC:2013	Household and similar electrical appliances - Safety
EN 55011:2016-04	Industrial, Scientific And Medical Equipment - Radio-Frequency Disturbance Characteristics - Limits And Methods Of Measurement

- and is manufactured in compliance with further technical standards and specifications.

EN 55011/A1:2017-04	Industrial, Scientific And Medical Equipment - Radio-Frequency Disturbance Characteristics - Limits And Methods Of Measurement
EN 61000-3-2:2014-08	Electromagnetic compatibility (EMC)
EN 61000-3-3:2013-08	Electromagnetic compatibility (EMC)

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