



DEHUMIDIFIER

DehuTech 210

Technical Manual

Valid from serial no: 369 11 06



EC-declaration of conformity

Fuktkontroll AB
Mätslingan 22
187 66 TÄBY
Sweden

declare under own responsibility that the product:

Dehumidifier DehuTech 210 (type DA-210 in Swedish market) from unit no 369 11 06.

which is detailed in this declaration complies to the following harmonised European standards and technical specifications:

SS-EN 60335-1/A13	Electrical domestic appliances - general requirements
SS-EN 60335-2-40 issue 4.2	Specified requirements for electrical heat pumps, air conditioning units and dehumidifiers.
SS-EN 60335-2-40 C1	Specified requirements for electrical heat pumps, air conditioning units and dehumidifiers.

amendments **SS-EN 60335-1 T1, T2, T3, T4, T5**

according to conditions in directive:

2006/95/EC; Low Voltage Directive

2004//108/EC; EMC Directive

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Ulf Rahle, Managing Director



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General safety information

- Anyone operating the DehuTech 210 should have access to this manual, and should be aware of the safety information.
- Only personnel with adequate knowledge of the dehumidifier should be allowed to operate and service it.
- Only personnel with authorisation for electrical installations are allowed to make repair of electrical components.
- Repair of electrical components should be carried out by suitable qualified personnel.
- The dehumidifier must not be installed in areas where explosion proof equipment is required.
- Disconnect the dehumidifier from the mains prior to opening any service panel.
- Prior to servicing the dehumidifier must be left to cool down for at least 15 minutes after operation.
- The service panels should remain closed except when servicing is carried out.
- The dehumidifier can only be used for dehumidification of air at atmospheric pressure.
- Never use the dehumidifier without the filters as the desiccant rotor can become contaminated and lose capacity.
- Signs and instructions on the dehumidifier should not be removed or altered.
- This manual should always be accessible and kept close to the dehumidifier.
- All maintenance and control of the dehumidifier should be as per the specified schedule.
- Use only genuine spare parts.
- Written permission must be obtained from DehuTech AB prior to making any alteration or modifications.

Applications

Dehumidifier DehuTech 210 is of the solid desiccant wheel type designed to dry air of atmospheric pressure. The dehumidifier can be used for drying air of up to 100 % relative humidity (RH) with temperatures from -30 °C to +40 °C.

The applications are numerous and wide spread. Below are some examples:

- Controlling humidity levels in production processes.
- Drying of temperature sensitive products.
- Maintaining correct humidity in storage areas.
- Protection of equipment sensitive to corrosion.
- Controlling humidity levels in museums and archives.
- Drying after water damage and drying of buildings during construction.
- Climatic improvements in damp areas.

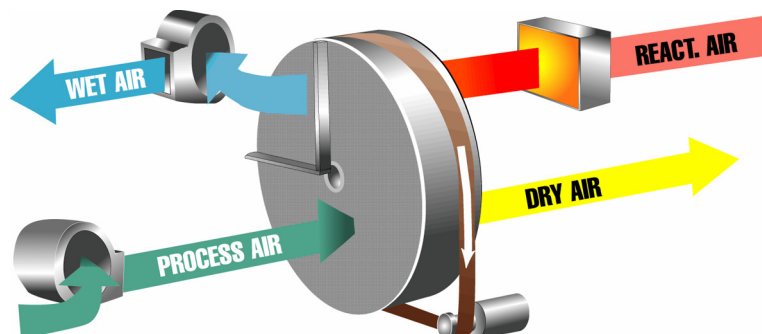
Method of operation

The dehumidifier operates with two air streams. A larger air stream to be dehumidified, and a smaller air stream to exhaust the moisture out of the desiccant rotor.

Two fans inside the dehumidifier create air streams which travel through the desiccant rotor in opposite directions.

The larger air volume, the process air, passes through the slowly rotating silica gel rotor. Silica gel is a hygroscopic material adsorbing water vapour direct from the air. When passing through the rotor the humidity of the air is reduced, whilst the moisture content of the rotor material increases. On exiting the rotor the dried air is introduced into the area, or the process to be dehumidified. The adsorption process works in temperatures from -30 °C to +40 °C.

The smaller air volume, the reactivation air, adsorbs the moisture from the silica gel rotor. This reactivation air is heated by an internal heater to a temperature of approximately +100°C. As the reactivation air passes through the rotor, in an opposite direction to the dry air, it will decrease the moisture content of the rotor material. The reactivation air will leave the dehumidifier as warm, wet air, which is then exhausted out from the building.



Product description

The dehumidifier is designed to meet the requirements of IEC protective class IP 44:

Casing

The casing is fabricated from stainless steel 2333. The top of the dehumidifier has a top panel that can be removed for service access to electrical and mechanical components. All duct connections to the dehumidifier are designed for connections to standard size spiral ducts.

Rotor

The dehumidifier has a drying rotor fabricated from a desiccant material. The rotor has a matrix of corrugated and flat heat resistant sheets which houses the Silica Gel desiccant agent. This matrix creates a large number of axial flutes through the rotor, which together builds up an immense surface area for moisture adsorption in a small volume. The rotor is manufactured and processed to be able to withstand moisture saturated air without being damaged. This means that the rotor can be used in conjunction with a pre-cooling coil. Furthermore the rotor will not be damaged even if the fan or the heater for reactivation should fail during operation. The rotor is incombustible and non flammable.

The slow rotation of the rotor is achieved by an electrical gear motor and a belt drive. The belt sits on the outer rim of the rotor and is driven by a pulley on the drive motor. An adjustable belt tension device keeps the belt in place and maintains tension to prevent belt slip. Correct operation of the drive system, and direction of rotation can be checked by opening the top panel.

The centre hub of the rotor is equipped with ball bearings. The rotor shaft is made from stainless steel. The complete rotor part can easily be removed and lifted as one piece out from the casing.

Filter

The dehumidifier has two separate filters. One in the process air inlet, and one in the reactivation air inlet.

Fans for process- and reactivation air

The fans are direct driven radial fans with single phase standard motors class IP 54, ISO F. The complete fan assembly is easily removed and lifted out from the casing.

Heater for reactivation air

The reactivation heater is of the PTC-type (Positive Temperature Control), which can not be overheated, and gives the possibility of a stepless control for 30 - 100 % of the dehumidification capacity. This is achieved by controlling the reactivation air volume.

Electrical panel

The electrical components is located inside the dehumidifier and is accessible through the top panel. Switches and indications for operation are mounted at the front of the electrical panel.

Operation options

Using the operation switch on the front side of the dehumidifier, different running options can be selected:

0	Dehumidifier not in operation.
1	Dehumidifier in operation mode.
MAN	Dehumidifier in continuous operation.
AUTO	Automatic operation by remote humidistat, or other external on/off signal.

Installation

Installation and service access

Dehumidifier DehuTech 210 is designed for indoor installation. The dehumidifier should be installed horizontally.

All components in the dehumidifier are accessible from the top of the unit. For inspection and service, a space of 400 mm must be left free above the dehumidifier to accommodate for servicing of filters, fans and rotor.

When using a mounting plate, the dehumidifier must be put so that the rotorshaft still is horizontal and the wet air outlet is placed low.

Duct connection for permanent installation

The dehumidifier can be installed in the room that should be dehumidified or in a separate plant room.

To obtain the best performance the outlets from the fans should be equipped with diffusors.

Wet air duct out from dehumidifier

The wet air from the dehumidifier should be exhausted to the outside. The duct should be as short as possible to minimise the chance of condensation of the wet air. This duct should slope down slightly to stop any condensed water from flowing back into the dehumidifier.

If the wet air duct is extremely long, or must be installed sloping upwards from the dehumidifier, it should be insulated and have a drainage point (2 mm) drilled at its lowest position.

A damper should be installed in the wet air duct to enable correct setting of the reactivation air volume during commissioning.

The exhaust opening should have a coarse wire net.

Reactivation air into the dehumidifier

The reactivation air duct into the dehumidifier should be as short as possible. The intake opening of the duct should have a coarse wire net, to stop foreign objects from entering the dehumidifier. No insulation is needed and the duct can slope up- or downwards. In some installations, as an alternative, the reactivation air can be taken from the installation room, for this alternative no duct connection is needed.

Process and dry air with the dehumidifier installed in the dehumidified room

When the dehumidifier is installed in the dehumidified room it would normally take the process air directly from the room without any duct system, with only a protection net for the inlet required. The dry air outlet would normally have a duct system designed for distribution of the dry air in the building.

Process and dry air with the dehumidifier installed outside the dehumidified room

When the dehumidifier is installed in a separate plant room all inlet and outlet openings are usually ducted.

The dehumidifier takes the process air as ambient air, or as pre-treated air (cooled/heated), or alternatively as return air from the dehumidified room. The dry air from the dehumidifier can be connected for post treatment or ducted back to the dehumidified room.

A damper should be installed in the dry air duct, enabling correct commissioning of the dry air volume.

Duct connection for basement installation

If the dehumidifier should be installed in the basement it is sometimes desirable to achieve a slight negative pressure in the space to prevent odours from penetrating up into the building. In these circumstances the reactivation air is taken directly from the basement and the wet air is exhausted out from the basement. This method of installation will create a small negative pressure. The ducts should be installed according to "Duct connections for permanent installation".

Temporary installation

With temporary installations for water damage or building drying, flexible plastic ducts would normally be used instead of the spiral duct type. The drying method differs depending on situation and construction to be dried. The complete room could be dehumidified, or just the damaged part. For the later option plastic sheet is used to cover the damaged area, and the dry air is supplied under the sheet. For both options the wet air must be exhausted out from the building via flexible duct, or alternatively connected to the general exhaust ventilation system for the building.

Electrical installation

See the electrical wiring diagram on page 16.

Commissioning

On initial start up, the following steps should be taken in this order:

1. Ensure that the external isolation switch is isolating the unit from the mains, or that the power plug is disconnected.
2. Select the OFF position on the main switch (orange) at the front of the dehumidifier.
3. Open the service panel on the top of the dehumidifier and ensure no foreign objects are left inside the unit or in the electrical compartment
4. Check air filters are installed.
5. Rotate the fan impellers by hand and make sure they can move freely.
6. Ensure that the dry and wet air dampers are open, and that ducts are clean and free of blockages.
7. Ensure that the mains supply fuse is suitably rated and that the fuse is of a slow kind.
9. Connect the dehumidifier to the main electrical supply by turning the isolation switch to ON, or alternatively connect the power plug to the socket.
10. Select the MAN position on the operation switch (black) of the dehumidifier. Switch the main switch (orange) to the ON position for 3-4 seconds. Check that the rotor is slowly rotating, the fans are starting, and that the orange lamp in the main switch lights up. Turn OFF the dehumidifier.
11. Mount the service panel and ensure it seals properly to the casing.
12. The dehumidifier is now ready for operation.
13. Start the dehumidifier and check that the unit is operating at the correct air volumes. An indication of correct operation is if the optional amperemeter on the front of the dehumidifier indicates approximately 4-5 A.
14. From the factory the dehumidifier is electrically wired in such a way that when operating in AUTO mode, the controls operate the complete unit to start or stop. By shifting one terminal connection in the electrical panel the operation mode can be altered to operate the fan continuously. The controls will then only operate the heater on /off, depending on the signal from the humidistat or other external signal.

See the electrical wiring diagram on page 16.

Maintenance

NOTE ! *With all maintenance and service of the dehumidifier:*

- *Switch off the dehumidifier approximately 15 minutes prior to opening any service panel, allowing the heater to cool down.*
- *Disconnect the dehumidifier from main electrical supply by turning the external switch to the off position or by pulling out the power plug.*

The maintenance intervals for the dehumidifier depend on the surrounding environment and installation site. Recommended maintenance intervals could therefore differ from one installation to another. Incorrect maintenance and service may result in reduced dehumidification capacity.

Filter

The dehumidifier is equipped with two separate filters, one for the process air and the other for the reactivation air. The filters are positioned at the respective inlets and will clean the air prior to entering the dehumidifier.

Intervals for cleaning or replacement of the filters will be determined by the amount of dust and particles in the air at the installation site.

We recommend that the filter is checked at least once a month, at least for the first year of a new installation.

Never operate the dehumidifier without the filters, as the rotor can be damaged by dust.

Rotor

The rotor is maintenance free. However should it be necessary to clean the rotor careful use of compressed air should be the first choice. With severe contamination the rotor can be washed with water.

Cleaning with water is no routine matter, please contact DehuTech AB or a local distributor prior to this procedure.

Check the rotor bearing and the rotor surface once a year.

Electrical motors

The electrical motors are equipped with ball bearings. The bearings are designed to last the life of the motor and therefore no maintenance is required.

Check the motors once a year for any abnormal sound.

Heater

The reactivation electric heater does not need maintenance, but should be checked twice a year for any dust or mechanical damage to the heating rods. Clean with a soft brush, or vacuum clean with dust. Gentle use of compressed air is another alternative.

Rotor drive belt

Check the belt tensioning at regular intervals. Adjust when needed by moving the tensioning support wheel closer to the desiccant rotor.

General summary of maintenance intervals

	Filter	Rotor Bearing	Motors	Rotor drive	Heater	Sealings
On demand	√					√
Every 6 th month				√	√	
Every 12 th month		√	√			

Transportation

Observe the following for transport or handling of the dehumidifier:

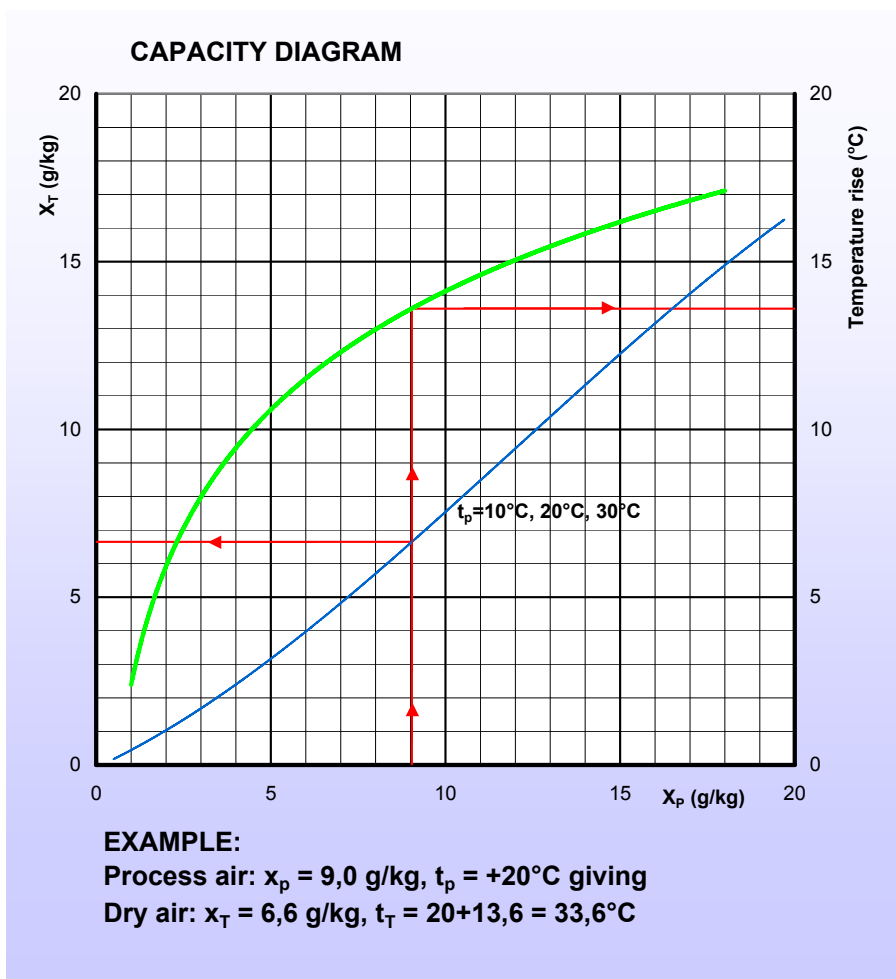
- Check the dehumidifier on delivery for any transport damage.
- The dehumidifier should be protected from rain and snow.
- The dehumidifier should always stand upright on its feet.
- Never put other goods on top of the dehumidifier.
- Transport and lift the dehumidifier by the two handles on each side of the transportation box.

Fault finding

Malfunction	Possible cause of trouble	Corrective action
None, or reduced dehumidification capacity	<ul style="list-style-type: none"> Filter clogged Electrical heater faulty Airflow reduced No rotation of rotor Internal leakage in unit Altered air volumes Altered reactivation temperature Air leakage 	<ul style="list-style-type: none"> Clean or replace filters Check fuses Check openings and dampers Check belt tensioning Check springs Measure and check air volumes Check reactivation heater Check panel and casing
Main fuse faulty	<ul style="list-style-type: none"> Fan faulty Too large air volume Rotor does not rotate Reactivation heater No power supply 	<ul style="list-style-type: none"> Check fans and motors Check air volumes and dampers Check drive motor Check reactivation heater Check main fuse
Dehumidifier does not start	<ul style="list-style-type: none"> No control circuit Faulty control circuit Fuse for controls faulty 	<ul style="list-style-type: none"> Check control fuses Check external start/stop signal Check electrical components
Rotor does not rotate	<ul style="list-style-type: none"> Drive belt is slipping Drive belt broken or worn Rotor jammed Drive motor faulty 	<ul style="list-style-type: none"> Check belt tensioning Replace drive belt Check centre shaft, rim of rotor Replace complete gear motor
No dry- or wet air volume	<ul style="list-style-type: none"> Filter clogged Fan faulty Ducts blocked 	<ul style="list-style-type: none"> Clean or replace filters Check fan, motor and impeller Check dampers and ducts

Technical data

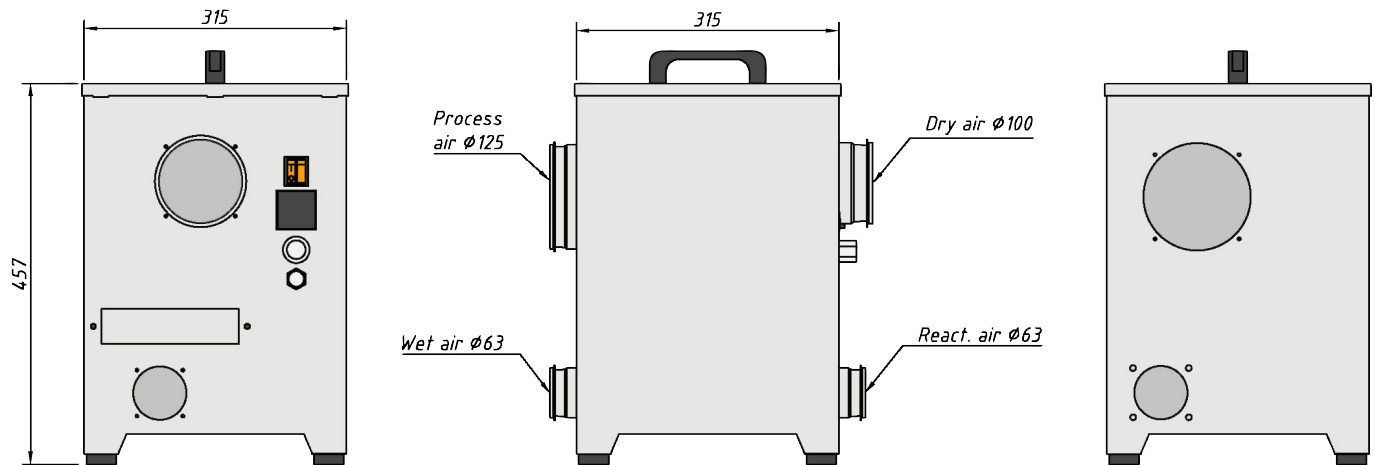
Performance chart & dry air flow diagram



DA 210 Torrluftsflöde/Tillgängligt tryck / DT 210 Dry air flow/Available pressure



Dimensions



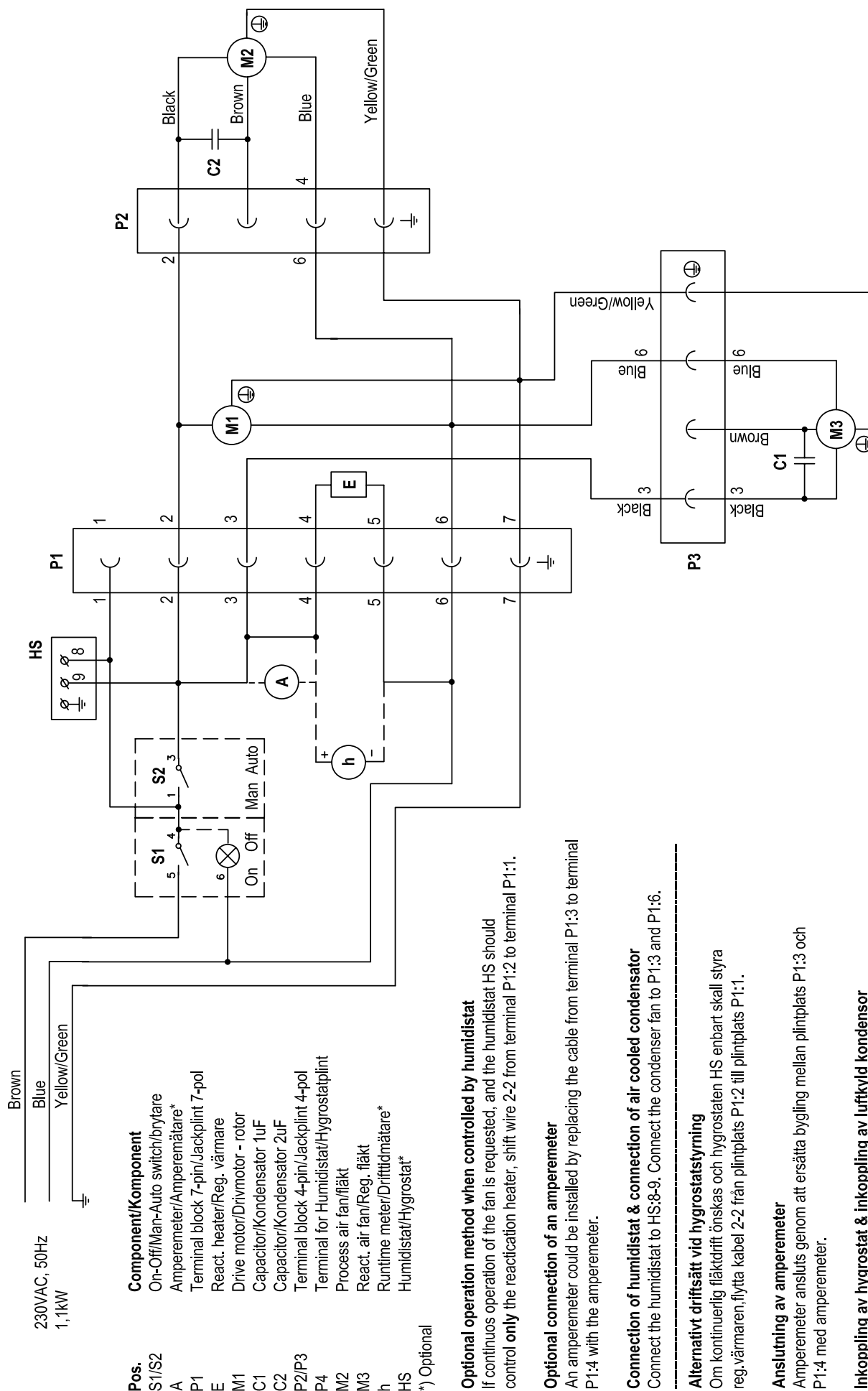
Technical data

Dehumidification capacity (at +20 °C and 60 % RH. See performance chart for other data)	0,6 kg/h
Dry air flow (freeblowing)	210 m ³ /h
Wet air flow (freeblowing)	40 m ³ /h
Power supply (1 x 230 V, 50 Hz)	1,1 kW
Current (connection fuse: 10 A)	4,8 A
Weight	16,5 kg
Noise level	53,3 dB(A)

Spare parts list

Part	Technical specification	No installed	No of recommended spare parts	Comment
Drive motor	Gearmotor 230-240 V 50 Hz 3 rpm low temp grease	1	1	
Belt pulley	5G 37	1		
Drive belt	Round 5G 790	1		
Process air fan	G2E 140-AE77-B9	1		
Capacitor for process air fan	2 μ F 400 V	1		
Wet air fan	G2E-085-AAD1-05	1		
Capacitor for wet air fan	1 μ F 400 V	1		
Heater PTC	HF213U44D1 - 230V	1	1	
Wet air duct	Heat resistant flexcord \varnothing 63	1		
Rotor	PPS 210	1		
Belt tensioning		1		
Process air filter	AAF R29 EN779:G3 210 x 250 mm	1	3	
React. air filter	AAF R29 EN779:G3 150 x 160 mm	1	3	
Toggle switch	2x1 pol. electric switch	1		
Cord	H07RNF/3 x 1,5	1		
Process air duct connection		0		optional

Electrical wiring



230VAC, 50Hz
1,1kW

Component/Komponent

- S1/S2 On-Off/Man-Auto switch/brytare
- A Amperemeter/Amperemätare*
- P1 Terminal block 7-pin/Jackplint 7-pol
- E React. heater/Reg. värmare
- M1 Drive motor/Drivmotor - rotor
- C1 Capacitor/Kondensator 1uF
- C2 Capacitor/Kondensator 2uF
- P2/P3 Terminal block 4-pin/Jackplint 4-pol
- P4 Terminal for Humidistat/Hygrosstatplint
- M2 Process air fan/fläkt
- M3 React. air fan/Reg. fläkt
- h Runtime meter/Drifttidmätare*
- HS Humidistat/Hygrosstat

*) Optional

Optional operation method when controlled by humidistat

If continuous operation of the fan is requested, and the humidistat HS should control **only** the reactivation heater, shift wire 2-2 from terminal P1:2 to terminal P1:1.

Optional connection of an amperemeter

An amperemeter could be installed by replacing the cable from terminal P1:3 to terminal P1:4 with the amperemeter.

Connection of humidistat & connection of air cooled condensor

Connect the humidistat to HS:8-9. Connect the condenser fan to P1:3 and P1:6.

Alternativt driftsätt vid hygrosstatstyrning

Om kontinuerlig fläkt drift önskas och hygrosstaten HS enbart skall styra reg.värmaren, flytta kabel 2-2 från plintplats P1:2 till plintplats P1:1.

Anslutning av amperemeter

Amperemeter ansluts genom att ersätta bygling mellan plintplats P1:3 och P1:4 med amperemeter.

Inkoppling av hygrosstat & inkoppling av luftkyld kondensator

Hygrosstat kopplas in på plint HS:8-9. Kondensatorfläkt kopplas in på plintar P1:3 och P1:6.

Electrical components

No	Part	Mark	Type	Quantity	Manufacturer
1	Gear motor 230 V, 50 Hz, 3 rpm	M1	823055BJ	1	Crouzet AB
2	Radial fan, G2E 140-AE77-B9	M2	46701140	1	ZIEHL-ebm AB
3	Capacitor, 2 µF 400 V	C		1	ZIEHL-ebm AB
4	Radial fan, G2E-085-AA01-05	M3		1	ZIEHL-ebm AB
5	Capacitor, 1 µF 400 V	-		1	ZIEHL-ebm AB
6	Toggle switch 2x1-pol. bl/or	S1/S2	255036	1	Orbitus Ind.komp.
7	Amperemeter	A		*	Tälje mätinstrum.
8	Heater, 230 V	E	HF213U44D1	1	Victon Ltd.
9	Terminal male 7-pin	P1	sls 5.08/7B sn or	1	Weidmüller AB
10	Terminal, female 7-pin	P1	blz 5.08/7 sn or	1	Weidmüller AB
11	Terminal male 4-pin	P2/P3	sls 5.08/4B sn or	2	Weidmüller AB
12	Terminal female 4-pin	P2/P3	sls 5.08/4 sn or	2	Weidmüller AB
13	Blind panel, 48 x 48	-	11110	1	Tälje mätinstrum.
14	Blind plug, 22,0-25,5 mm	-	P208/4	1	OEM Component
15	Cord, H07RNF/3G1.5/3,5m	-	2440032	1	OEM Component
16	Runtime meter	h		*	
17	Humidistat plug connection	HS		*	

*) Option

Miscellaneous / Notes

DehuTech AB

Mätslingan 22
S-187 66 TÄBY
Sweden

Tel: +46 (0) 8 792 04 08
Fax: +46 (0) 8 792 55 59
E-mail: info@dehutech.com
Website: www.dehutech.com