

INSTRUCTION MANUAL



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Dehumidifier **CONSORB DC-31** T10/16



CE

The product picture may differ from the actual product

DST
Seibu Giken 

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1 SAFETY

1.1 AIM OF THIS DOCUMENTATION

This document is included at delivery and is therefore an integral part of the equipment. It describes the machine's design and configuration at the time of delivery.

In the interest of safety, please study this documentation before installing or operating the equipment.

Instructions relating to safety, handling, operation and maintenance are to be followed.

Non-compliance can result in serious personal injury or damage to the machinery and may invalidate manufacturers' liabilities and warranties.

This documentation includes guidance for:

- Installers
- Operators
- Maintenance staff

Please retain this documentation throughout the lifetime of the equipment.

1.2 ACCENTUATIONS IN THE TEXT



Attention! This is advice on safety! Identifies potential hazards that may cause injury to personnel.



Actions which must be taken to reduce risk of injury are marked like this.



Additional useful information is labelled like this.

1.3 INSPECTION OF GOODS

The equipment was factory tested and inspected before delivery.



Attention! Check for transportation damage!



Continue the use of this product only if you assess it as being undamaged and faultless. Any damage must be recorded by the forwarder at time of delivery and reported to the supplier of the equipment at the earliest opportunity.



Please check condition of the equipment carefully for damage upon receipt and after removal of all packaging.

1.4 SAFETY

1.4.1 GENERAL ADVICE

This equipment conforms to the appropriate European regulations and directives and is designed and manufactured to be safe and reliable in operation.

Continued safety and reliability is entirely dependent on correct handling, installation, operation and maintenance of the equipment supplied.

1.5 INTENDED USE

This equipment is specifically designed for atmospheric air drying. It is unsuitable for any other use. For further advice please contact your DST representative.

Unless specifically stated in this manual, the following applications are prohibited:

- Conditioning of gases (other than air).
- Conditioning of air contaminated with chemicals or aggressive elements.
- Conditioning of air containing flammable or explosive elements.
- On rooms or air systems having a potentially explosive atmosphere (Ex-Zones).
- Conditioning of air at elevated pressures.
- Unless the air that enter the unit is properly filtered with at least G4 class.

1.5.1 SAFETY ADVICE - MECHANICAL



Attention! Mechanical hazards!



Installation, testing, commissioning preventative and corrective maintenance must be carried out by a qualified person or under supervision of a qualified person. Wherever possible, all mechanical work must be carried out with the electric supply switched off.

A qualified person (mechanical) is defined in this manual as:

- A mechanical technician or engineer qualified to service and maintain air conditioning plant and associated systems.
- Has completed the appropriate health and safety training.
- Has read and is familiar with the contents of this manual.
- Is professionally competent to commission and service this type of equipment.



For your own safety, wear the appropriate personal protective equipment (PPE).

1.5.2 SAFETY ADVICE - ELECTRICAL



Attention! This equipment will contain high voltage electrical components!





Wherever possible, all electrical work must be carried out with the electric supply switched off. It is recommended that electrical isolators are locked in the off position. All electrical work must be carried out by a qualified person or under supervision of a qualified person.


A qualified person (electrical) is defined in this manual as:


- An electrical technician or engineer qualified to service and maintain air conditioning plant.


- Has completed the appropriate health and safety training.
- Has read and is familiar with the contents of this manual.


 **Attention!** If the unit control panel isolation switch is off, the incoming cable terminals may still be live! Always disconnect the cable from the electric grid.


 If working on the unit's isolation switch, ensure that electrical power is switched off and unplugged to prevent accidental resetting.

 **Attention!** Permitted Voltage!


 Check incoming electrical voltage and operating frequency conform to the electrical wiring diagram and the manufacturer's type plate attached to the unit.

 Electrical connection are to be made in accordance with local regulations.


 **Attention!** Safety functions!


 The operation of all electric safety devices are to be checked at commissioning and during service/maintenance. Under no circumstances are these devices to be deactivated (e.g. adjustment or bridging).


 **Attention!** Defective electrical components!


 Defective electrical components and defective wiring must be replaced immediately. The equipment must not be operated until the defect has been repaired and the unit has been retested.


1.5.3 UNIT RELATED SAFETY ADVICE


 **Attention!** Danger from incorrect installation!


 The air dryer is designed for internal installation. For external use it will require a weatherproof enclosure.


 Do not rinse the unit with water.


 Use of the air dryer in areas having a potentially explosive atmosphere (Ex-area) or treatment of air with potential explosive/flammable components is prohibited.


 The air dryer requires installing on a horizontal plane.


 The air ducts shall be connected load and vibration free.


 **Attention!** As standard, the air dryer is equipped with electrical resistive heater elements (regeneration air heater).


 **Attention!** Automatic restart after power failure!


 Ensure that the main isolator switch is off and power cable unplugged before servicing internal components.

 **Attention!** Condensate in wet air outlet duct.

 Due to concentrated water content in the wet air outlet duct, incidental condensate may flow back into the machine and damage the equipment. To prevent this, install the wet air outlet duct at a slight gradient. If the duct needs to be installed at high level, fix a condensate drain at the lowest point of the duct.

 Wet air ductwork must be insulated to prevent condensate.

 Ensure that the condensate drain does not create an ice hazard in winter.

 Pay attention to accessibility requirements for maintenance and service purposes.

1.5.4 HAZARDOUS OPERATING CONDITIONS

Operation of the system is deemed to be hazardous, if:

- Is not operated inside or is not protected within a weatherproof enclosure.
- Is not operated within the permitted operating parameters (see technical specifications).
- Is operated outside the scope of 'normal' use (see intended use).

1.5.5 RESPONSIBILITIES OF THE OPERATOR

It is the responsibility of the operator of the system to ensure that all personnel engaged with installation, operation, maintenance and service of the equipment have read and understand the relevant sections of this manual.

1.5.6 MINIMISING HAZARDS


To ensure risk to personnel is minimised:

- Ensure that all activities relating to this equipment are carried out by qualified and authorised staff only.
- Identify and prevent potential safety hazards in the environment.

Failure-free Operation

- To ensure a failure-free operation, please make the following arrangements:
- Keep this manual ready to hand with the unit.
- Use the machine as intended only.
- Only use the machine if it is fully functional.
- Check the condition of the machine before using.
- Check the machine on operational efficiency at regular intervals.
- Carry out maintenance and testing at the prescribed intervals.

1.6 DISPOSAL/RECYCLING

 When unit is no longer in use and taking out of service - dismantle the unit and recycle the components according to the local regulations. Contact your DST representative for any questions.

2 PRINCIPLE OF OPERATION

2.1 APPLICATIONS

DST desiccant type dehumidifiers are normally used where dry air is essential to the various manufacturing processes used in chemical, pharmaceutical, food or confectionery industries, or where a dry environment is required for storing and handling of moisture sensitive products and raw materials.

The well proven air drying technology using the adsorption principle provides great flexibility in solving humidity problems. It offers the user independent humidity control, down to dewpoints far lower than the effective operating range of refrigeration dehumidifiers.

2.2 DESIGN

The standard dehumidifiers are made as complete units including rotor, fans, rotor motor and rotor drive transmission, heater for the regeneration, controls and electrical equipment.

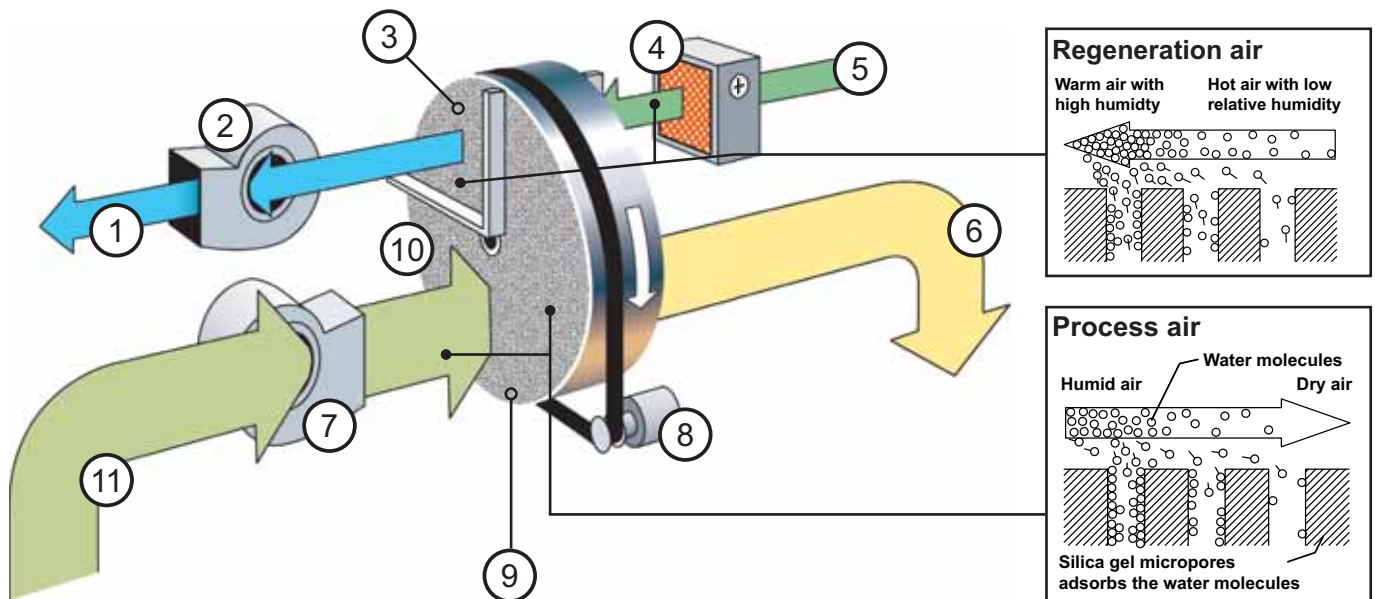
The water vapour is effectively adsorbed from the treated air in the SSCR silica gel rotor.

The regeneration heater is normally electric, but steam and hot water-heater are available as option.

2.3 PRINCIPLE OF OPERATION

It works on a continuous process with two air streams of different flow rates, normally having a flow ratio of approximately 4:1. The greater flow, *process air*, is dried as it passes through the dehumidifier, while the smaller flow, *regeneration air*, is used to heat the rotor material to evaporate the adsorbed moisture vapour from the desiccant. The moisture which is removed from the process air, is transferred over to the other sector as the SSCR rotor turns slowly.

FIGURE 1: Principle of operation & rotor



1. Wet air outlet
2. Regeneration air fan
3. Regeneration sector (25%)
4. Regeneration heater
5. Regeneration air in
6. Dry air outlet
7. Process air fan
8. Rotor motor
9. Process sector (75%)
10. Rotor
11. Process air inlet

CONSORB is a continuous dehumidifier able to reach very low dew points. The rotor is divided by seals into two separate air sectors, process and regeneration. The process air is dried by adsorption in the process sector, which is 75% of the rotor. The regeneration air is first heated by the regeneration heater before it flows into the regeneration sector where it evaporates the adsorbed moisture vapour and drives it out of the rotor.

3 PRODUCT DESCRIPTION

3.1 PRODUCT OVERVIEW

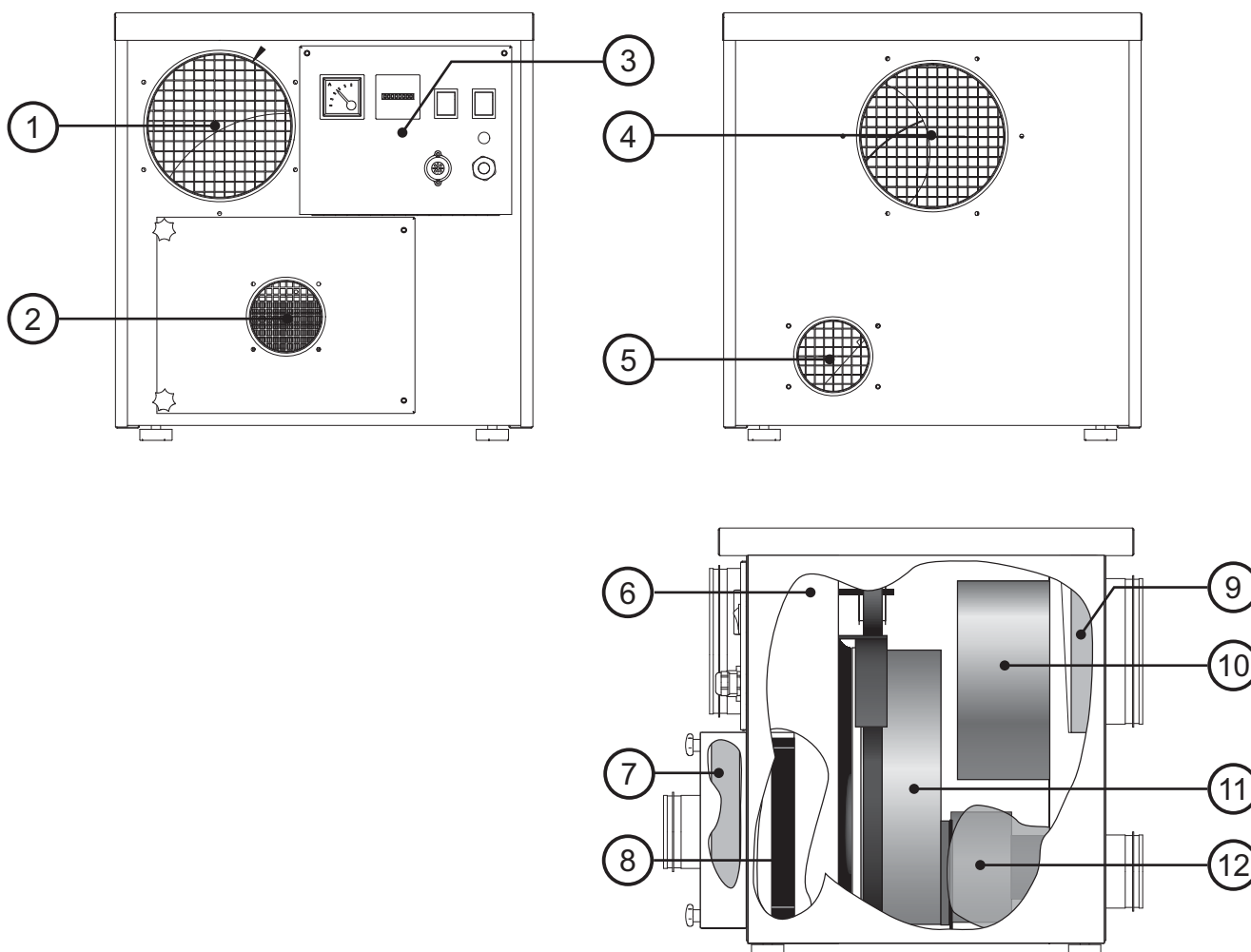


FIGURE 2: Product description

The product picture may differ from the actual product

1. Dry air out
2. Regeneration air in
3. Electrical cabinet & control panel
4. Process air in
5. Wet air out
6. Rotor motor (hidden)
7. Regeneration filter
8. Regeneration heater
9. Process filter
10. Process fan
11. Rotor
12. Regeneration fan

The dehumidifier CONSORB DC-31 - T10/T16 has a housing of 2333 stainless steel where all the different components are contained.

The unit consists of rotor, filter, fan, heater for the regeneration, controls and electrical equipment.

3.2 DISMANTLING

When dismantling, the unit must be electrically disconnected. If the unit has been in operation it should be left to cool off, for at least 15 minutes, before dismantling

The lid and two of the panels can easily be removed when inspection or service is needed. The lid is fastened by four screws which can be removed without using any tools. The two side panels can be unhooked when the lid is removed.

3.3 COMPONENT DESCRIPTION

3.3.1 ROTOR

The heart of a DST dehumidifier is the very efficient patented Super SSCR silica gel rotor. This rotor matrix is manufactured from alternate layers of flat and corrugated sheets of silica gel and metal silicates, chemically bonded into a tissue of inorganic fibres. It is made to form a vast number of axial air channels running parallel through the structure. The large internal surface area combined with the special micro structure of the SSCR silica gel material, ensures maximum contact area to give the rotor an extremely high capacity for adsorbing water vapour. It has a galvanized sheet metal lining, spokes, and a hub of steel and two bronze bearings on which it rotates around a fixed steel shaft. The rotor is driven by a single phase rotor motor with a timing belt transmission.

*Section of a dehumidifier rotor from Seibu Giken.
The high number of channels means that moisture is adsorbed with extra efficiency!*

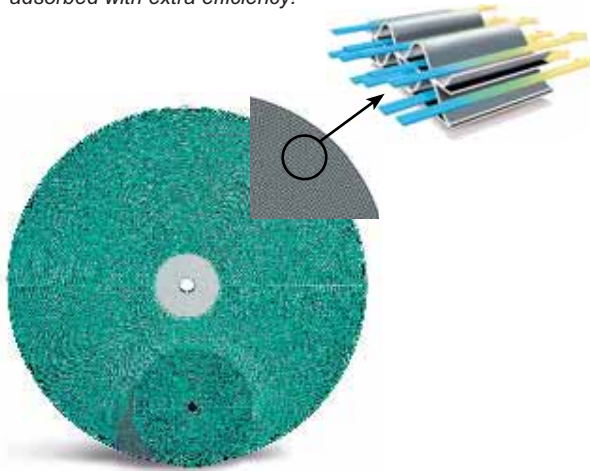


FIGURE 3: Rotor

3.3.2 FILTERS

The air filters are made as a rectangular flat sheet, cut from standard filter gauze. The process filter is reached by taking off the lid, the regeneration filter by removing the small panel on the side of the regeneration inlet. Both covers are removable without the use of any tools as they are fixed with hand wheels.

3.3.3 FANS

Both fans are of medium pressure radial type, directly driven by a single-phase AC motor.

3.3.4 PTC-HEATER

The heater is built around the PTC thermistor, which is a temperature dependent semiconductor resistor. Its resistance value rises sharply with increasing temperature after a defined temperature, the Curie point, has been exceeded. The very high positive temperature coefficient has given the PTC thermistor its name. From a practical standpoint, this resistance characteristic causes the thermistor temperature to remain essentially constant over a wide range of operational conditions. Variations in ambient temperature, applied voltage and air flow have but a small effect on thermistor temperature.

The automatic temperature limiting effect of the PTC heater prevents the formation of excessively high temperatures and thus also of fire hazard even in the event of an air flow failure. The detrimental

combustion of dust is definitely avoided. Even if the regeneration air flow is totally stopped the temperature of the heater will never exceed 230°C The material near the heater is chosen to withstand such a temperature.

If the maximum drying capacity of the dehumidifier is not needed then simply reduce the regeneration air flow. The PTC heater will then immediately respond with a higher resistance to maintain the temperature of its surface. The current is therefore reduced, which can be monitored on the ammeter. In other words; the less regeneration air flow the less heating output.

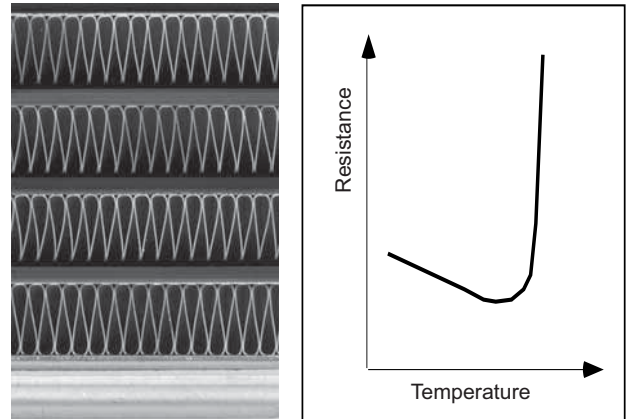


FIGURE 4: PTC-heater

4 INSTALLATION

4.1 UNIT INSTALLATION

Follow the direction regarding installation of heavy and medium heavy dehumidifiers.

Note: Use the installation guidelines as a reference only.

4.1.1 POSITIONING

Position the machine with adequate working space around the unit to allow inspection and service. Size of unit and the position of the access panels/doors varies depending on the series. Follow the below recommendation to avoid misplacement.

- Adequate space must be left clear in front and/or rear of the unit to allow access doors/panels to be opened and removal of rotor.
- The free floor area in front of the inspection doors should be as wide as the unit.
- See dimension for measurement, working space and foot bolt-hole dimensions.

4.2 INSTALLATION

Installation remark when installing the dehumidifier onto the wall

- The arrows point out the direction of the incoming and outgoing air flow, and what direction the duct channels should be installed. Do not deviate from the illustration below (!)
- See installation remark on general duct installation “4.4.5 Wet air out”, “4.4.6 Regeneration air in & wet air out” and “4.4.7 Process air in & dry air out”.
- Wet air out must “ALWAYS” face downwards. See “4.4.5 Wet air out”.

Note: Wall brackets for each model are sold separately.

Note: Wall mounting is only applicable for DR-10/20/30 and DC-10 series.

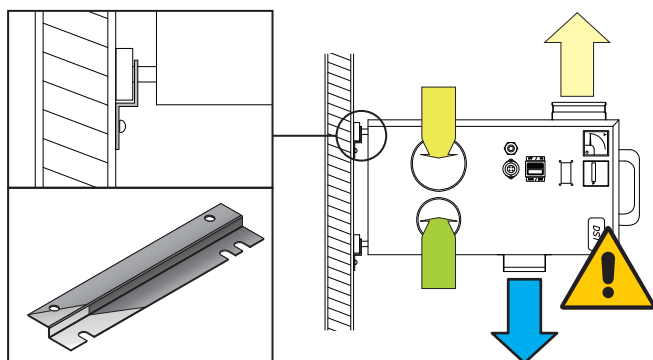


FIGURE 5: Wall mounting of dehumidifier

4.3 THROTTLE

At delivery (only for T16) comes with a throttle installed on regeneration air in. The throttle will prevent the regeneration fan from overloading during free blowing operation. The damper also reduces the dehumidifying capacity and energy consumption.

Note: Install an throttle on regeneration air in if the inlet is not connected to a duct. The throttle must be adjust to create a sufficient underpressure to maintain below 10A and 16A on T10 and T16 respectively. Failure to do so, may result in damage to the unit due to overheating.

Note: Only use the throttle during free blowing operation. Remove the throttle if regeneration air inlet is connected to a duct.

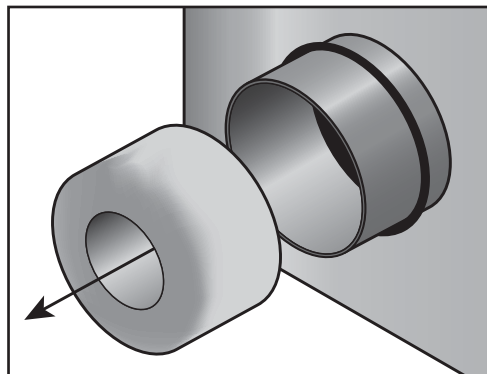


FIGURE 6: Remove throttle when connecting to a duct

4.4 GENERAL DUCT WORK INSTALLATION

The intended area to be dehumidified may vary significantly in terms of size of the facility, the amount infiltration and other conditions. Use the recommendations below as a general guideline only. Consult your DST representative or local mechanical installation company for more information.

The guidelines are to assist the installers and operators to adjust the duct/dehumidifier installation and to maximize performance. Please follow the recommendations in order achieve maximum performance.

- To avoid recirculation, direct wet air out (3) away from the regeneration air in (4) of the unit. Same goes for process air in (1) and the dry air out (7).
- Check if the dry air (7) is well distributed in the dehumidified area.
- Adjust any dampers on process air in (1 & 2) and/or regeneration air in (4) according to the desired airflows and dehumidification need.
- Process air in (1 & 2) is taken from indoor area or ambient depending on the amount of infiltration. Installing an intersection piece with damper (8) will enable the unit to use air, simultaneous or separately, from indoor and ambient.
- The regeneration air in (4) and wet air out (3) has to be connected to outside.
- The position of the dampers (5, 8 & 6) may differ on-site.
- Use the installation principle as reference only. The position of the fan and in/outlets may vary.

4.4.1 INSTALLATION SETUP INSIDE A ROOM

When the unit is installed in the same room as the intended dehumidification area, use damper (5) to adjust the capacity.

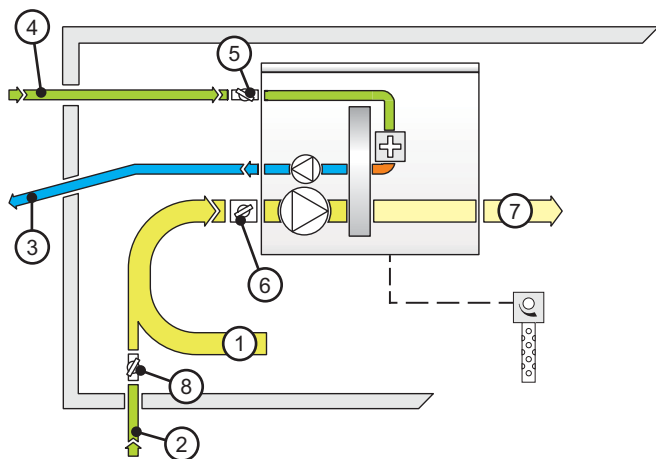


FIGURE 7: Dehumidifier placed inside a room*

4.4.2 INSTALLATION SETUP OUTSIDE A ROOM

If installed outside of the dehumidified room (in a separate room, e.g. plant room), the dehumidifier must be connected to the room via ducts with the process air in (1) and the dry air out (7).

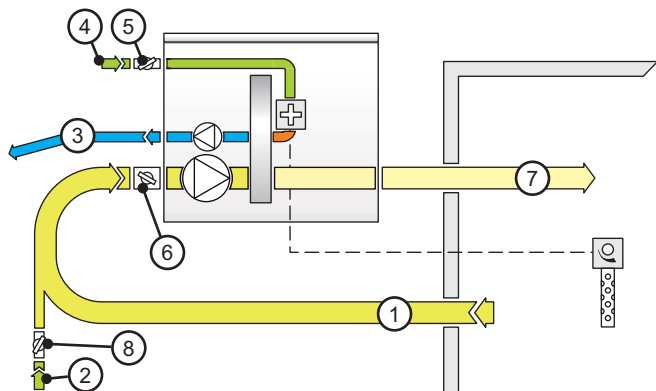


FIGURE 8: Dehumidifier placed outside the room*

4.4.3 INFILTRATION

If necessary, use the damper on process air in (2) to create a overpressure in order to counteract the infiltration.

- An area with no or very little infiltration, does not require an additional ambient air. Doing so may cause an unnecessary overpressure and decreased performance.
- The area needs to be properly sealed in order to the minimize moisture load inside the dehumidified space.
- A room with high infiltration rate should have some ambient air into the room. Depending on the amount of infiltration, adjust the damper (8) on the process air in to create a sufficient mixture.

1. Process air in (indoor)		Fan (blowing left)
2. Process air in (ambient)		Fan (blowing right)
3. Wet air out		Humidity sensor / humidistat
4. Regeneration air in		Heater
5. Regeneration air damper		Damper
6. Dry air damper		
7. Dry air out		
8. Process air damper		

*Note: The position of the fan may vary depending on model.

4.4.4 FRESH AIR DEHUMIDIFICATION

It is recommended to take the process air intake (1) and regeneration air in (4) from outside if:

- 1) The intended dehumidification area is polluted with harmful substances and other particles
- 2) It is not possible to use the return air from indoor by any other reasons.

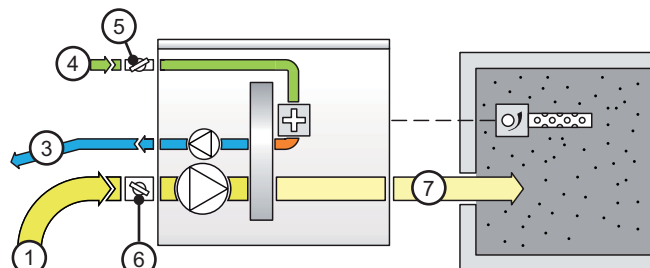


FIGURE 9: Return air taken from outside*

4.4.5 WET AIR OUT

Additional installation remark regarding wet air out (3):

- Wet air out can be left free blowing.
- It is recommended to insulate the wet air duct and have it installed at a sloping outwards angle, due to risk of condensation inside the ductwork. The setup will also prevent the condensate to flow back into the dehumidifier.
- If the duct must be installed higher than the outlet, a small drain hole is to be made for discharge of condensate at the lowest point in the ductwork.

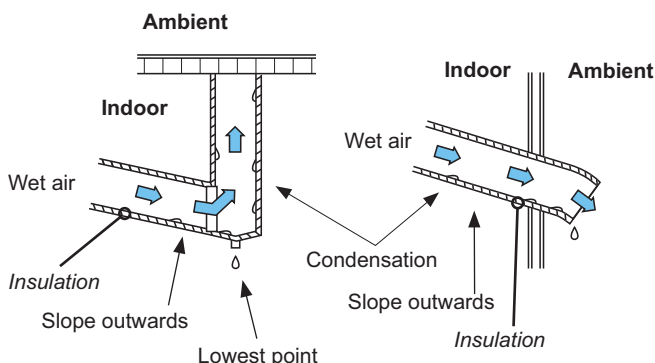


FIGURE 10: Installation of wet air out duct

4.4.6 REGENERATION AIR IN & WET AIR OUT

Installation remarks regarding regeneration air in (4):.

- Avoid recirculation together with wet air out (3).
- The intake of regeneration air in (4) should be placed lower than the wet air out (3).
- Allow the wet air to disperse freely when exiting the duct.
- Avoid to forward the wet air against the back pressure of another air fan inside a duct. Chances are, the wet air will be rerouted to somewhere else than ambient.
- To increase the lifetime of the filter, it is recommended to intake regeneration air (4) from higher level where dust and other particles are kept at minimum.

4.4.7 PROCESS AIR IN & DRY AIR OUT

Installation remarks regarding process air in (1):

- Avoid recirculation together with regeneration air in (4).
- Install dry air out (7) duct/channel on a high level.
- To increase the lifetime of the filter, it is recommended to intake air from higher level where dust and other particles are kept at minimum.
- For potential infiltration, use the process air damper (8) to create a sufficient overpressure inside the room.
- If a certain dew point is desired, use dry air damper (6) to adjust the dry air flow.
- To maximize an absolute drying capacity of the system (in H₂O kg/hour), the amount of the dry air has to be brought on the maximum value (free dry air outlet without reduction).

4.5 HUMIDISTAT/HUMIDITY SENSOR INSTALLATION

Do not install the humidistat/humidity sensor too close to the dry air flow. It might pick up false readings from the dry air flow and thus shut down the dehumidifier prematurely.

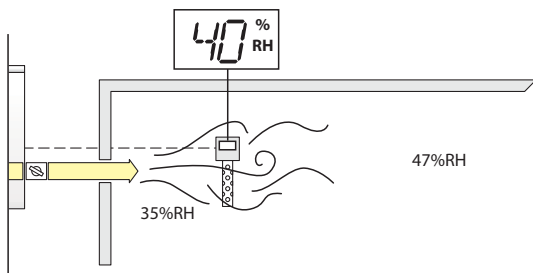


FIGURE 11: Humidistat positioning

4.6 ELECTRICAL CONNECTION

4.6.1 POWER SUPPLY

The incoming single-phase cable are to be directly connected to the power grid with earthing capability.

The electrical feed must be provided on-site in accordance with the electrical diagram and local requirements.

See electrical diagram for a detailed layout and description.

4.6.2 HUMIDISTAT CONNECTIONS

The dehumidifier has a connection for a 1-step or 2-step humidistat.

See electrical diagram for connections.

5 STARTING UP

5.1 PRE-OPERATION CHECK



The operator of the system has to assure, that all people, which are involved with installation, operation and maintenance or reparation of the machine, read the "1 Safety" parts of the manual.

1. Inspect and clean the inside of the unit from foreign objects such as rags, tools, particles of metal, and such, that may pose damage to the inside of the unit.
2. If any, ensure that both air balance dampers are open and check that the air paths of the ductwork are not obstructed in any way.
3. Check that the filters are securely in place.
4. Check that the rating of the electrical supply fuses is correct, see wiring diagram.

5.2 START

1. Switch MAN/AUTO [4] to "MAN" (AUTO-mode can only be used if an humidistat is connected).
2. Switch ON/OFF [5] to "I" (The unit starts running).
3. Adjust the airflows by trimming the dampers in the duct systems for dry air and wet air respectively.

5.3 STOP

1. Switch ON/OFF [5] to "0".

MAN or AUTO-mode (Auto/Vent or Auto/Off)

The unit has a auto-venting mode (only useful when a humidistat/external regulator is connected) and a manual mode.

Note: The unit is wired for ON/VENT. To change to ON/OFF, rewire the terminal link. See electrical diagram for more information.

In **ON/VENT**-mode, the humidistat stops the dehumidification process by turning off the heater and the regeneration fan. Process fan and rotor motor will continue to be in operation continuously.

In **ON/OFF**-mode, the humidistat stops the dehumidification process and shuts down the unit completely.

In **MAN**-mode, the unit will dehumidify on a continuous process until the operator shuts it down manually. Connected humidistat/electronic controller will not disrupt the dehumidification process.

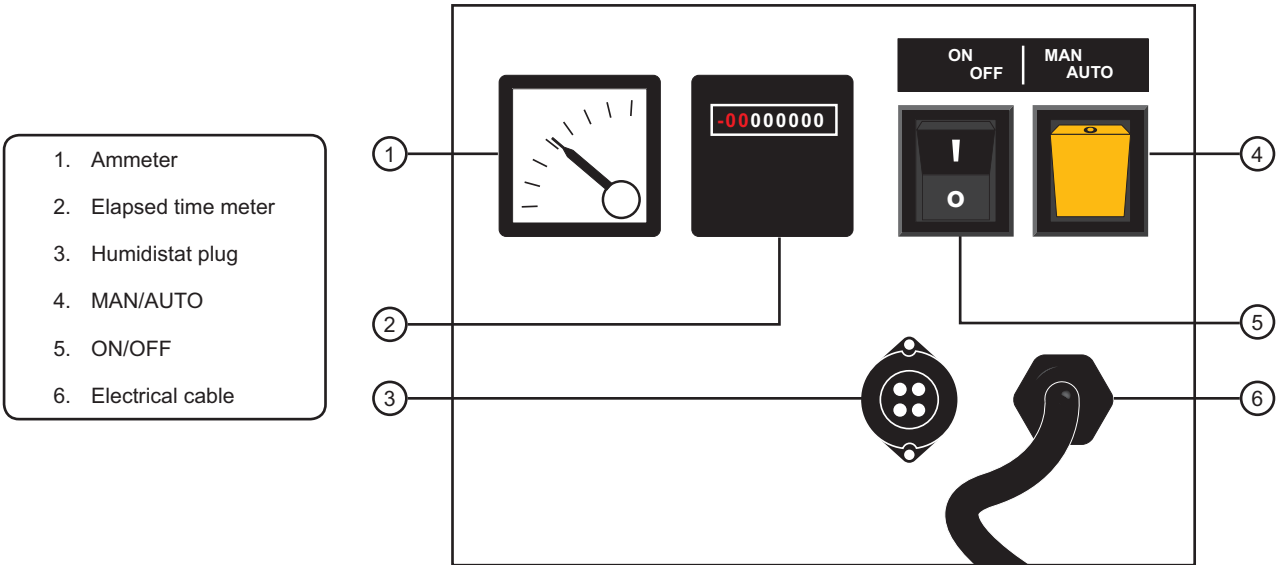


FIGURE 12: Control panel

6 MAINTENANCE

Before dismantling the unit, for inspection or service, the following precautions should be noted:



When dismantling, the electrical must be disconnected from the electrical grid.

If the unit has been in operation it should be left to cool off, for at least 30 minutes, before dismantling.

The wet air duct can be very hot if it is not insulated.

DST dehumidifiers are designed to run for long periods with little maintenance requirements. The items listed below shall however be noted;

6.1 EXCHANGING FILTERS

The filters should be inspected at regular intervals, the frequency of which can best be judged by experience. In storage applications where clean air conditions normally exist, the filter will typically require changing only every six months. In process work and dusty environments, the filter may need to be changed more often.

A dirty filter will in time affect the drying performance of the dehumidifier.



On no account should the unit be operated without the correct air filters installed!

6.2 GENERAL MAINTENANCE

Every two years an inspection of all internal components of the dehumidifier should be carried out, the following items being blown with compressed air and cleaned with a vacuum cleaner.

1. Gear motor and belt transmission.
2. Fans
3. Regeneration heater
4. Access panels and rotor seals.
5. Electric equipment.

Depending on how dirty the dehumidifier was at the first general maintenance, the interval of inspection may be increased or decreased

6.3 WASHING THE ROTOR

The SSCR rotor contained in DST dehumidifiers has a distinct advantage over other types of desiccant rotors in that dust can be washed out of the material without any need for reimpregnation after the treatment.

Before dismantling the unit, for inspection or service, the following precautions should be noted:

DST dehumidifiers are designed to run for long periods with little maintenance requirements. The items listed below shall however be noted;

1. Let the dehumidifier be shut-off for at least an hour.
2. Carefully remove the rotor from the unit.
3. Wet the rotor with water and a mild acid based detergent or with industrial alcohol and allow to soak for 30 minutes.
4. Rinse carefully with fresh water, pumped at low pressure through an ordinary hose.
5. Allow the liquid to drain from the rotor structure and blow the channels free with air. Do not to hold the air nozzle too close to the rotor surface.
6. Carefully refit the rotor and its transmission belt into the unit.
7. Ensure that all peripheral and radial seals are placed correctly.
8. Start the dehumidifier again and let it operate, with process fan and rotor motor only, for one hour without heater before the capacity is checked. Repeat the washing with a stronger (Non-alkaline) detergent if the performance has not recovered satisfactorily. Take action when the reactivation or process air in that enter the unit is not lower then 7°C.



Never use a strong alkaline based detergent, as this may destroy the rotor!

7 TROUBLESHOOTING

6.4 CAPACITY TROUBLESHOOTING

The dehumidifier performance can be checked simply by checking the temperature of the uninsulated ductwork near the unit.

Normally with the unit working at nominal conditions (with process air at room temperature), the dry air duct should be warm (25-40°C) and the wet air duct should be warm or hot (30-60°C).

If the unit does not maintain the required humidity look for the following causes:

PROBLEM	CAUSE	SOLUTION
The unit does not maintain the desired %RH humidity despite operating at full capacity.	Dehumidification capacity is insufficient although both dry and wet air ducts are warm.	Check the real moisture load and compare to design data. Check the airflow volumes, filter and adjustment of dampers. Check the rotor for correct position and sealing alignment, and ensure that there is no infiltration.
	Both air ducts are cold.	Is the unit switched on? Check that the wet air damper is not closed. Check the regeneration filter. Check operation of the regeneration fan.
	Dry air duct is cold and wet air duct is very hot.	Check rotation of the rotor. Check process air fan. Check that the dry air damper is not closed. Check the process air filter.

FIGURE 13: Capacity troubleshooting and solution table

6.5 CAPACITY TEST

If no fault can be found after checking as troubleshooting table, a performance test should be carried out on the dehumidifier, proceeding as follows.

- The different moisture contents x (g/kg), in the four airflows, can be determined by using wet and dry thermometers or calibrated instruments for temp and humidity. To receive the moisture contents the measured temperatures shall be plotted in a psychometric chart.

Process air in: x_{PI}

Process air out: x_{PO}

Regeneration air in: x_{RI}

Wet air out: x_{RO}

- Calculate from the actual temperatures the density of the two outlet airflows D_{PO} (kg/m³) and D_{RO} .
- Measure the airflow rate in each duct, e.g using a Prandtl tube. The airflow rate is the dynamic pressure, Δp (Pa), which is measured by the difference between the total pressure and static pressure in the duct.

Measurements shall be done in a straight part of the ductwork. In order to avoid faulty measurements caused by turbulent flows, measurements should not be done close after a bend or a fan.

The flow rate in each duct can be calculated as:

$$w = (2 * \Delta p / D)^{1/2} \text{ (m/s)}$$

Where D is the density according to item 2.

Then calculate the volume air flows, V_{PO} (m³/h) for the dry air and V_{RO} for the wet air:

$$V = w * A * 3600 \text{ (m}^3\text{/h)}$$

Where A is the cross section area of each duct.

- Now determine the de-humidification capacity, Q (kg/h), by the following equation.

$$Q = (Q_P + Q_R) / 2 \text{ (kg/h)}$$

where

$$Q_P = V_{PO} * D_{PO} * (x_{PI} - x_{PO}) / 1000$$

and

$$Q_R = V_{RO} * D_{RO} * (x_{RO} - x_{RI}) / 1000$$

Compare this measured capacity to the capacity which can be calculated from the data sheet.

8 TECHNICAL DATA

Model	DC-31 T10	DC-31 T16
Capacity		
Capacity [kg/h] 1)	1.4	2.1
Nominal dry air flow [m3/h] 2)	300	490
External static pressure dry air [Pa] 3)	-	-
Nominal wet air flow [m3/h] 4)	120	120
External static pressure wet air [Pa] 3)	-	-
Total power - Electrical		
Heater current [A] 5)	8	13
Heater power [kW] 5)	-	-
Total motor power [kW]	-	0.3
Total power [kW]	2.1	3.4
Total amperage [A]	10	16
Other electrical information		
Supply fuse 1x230V/ 50Hz [A]	10	16
Electric compartment protection class	IP54	IP54
Humidistat connection	230V	230V
Humidistat supply current [A]	10	< 1
Temperature setpoint settings		
Overheat protection TH1 [C]	-	-
Thermostat TH2 [C]	-	-
Overheat protection TH3 [C]	-	-
Rotor data		
Speed of rotor rotation [rph]	24	24
Rotor type	SSCR-U	SSCR-U
Other technical data		
Air filter class (regeneration/process)	G4/G4	G4/G4
Weight [kg]	30	32

- 1) Valid for inlet conditions 20°C/ 60%RH. For other inlet conditions the capacity can be calculated by the correction factor from below diagram.
- 2) Volume flow for density 1,20 kg/m³.
- 3) If no data is stated here the volume flow above is given at free blowing airflow.
- 4) Free blowing airflow.
- 5) Thanks to the PTC thermistor heater the power can be steplessly varied, by control of the wet air flow.

The content of this document may be subject to change without prior notice.

For questions and comments regarding the content of this document, please send it to
 Seibu Giken DST AB, ATT: Documentation, Avestagatan 33, 163 53 SPÅNGA, SWEDEN.

Correction diagram

The dehumidifying capacity is estimated as the nominal capacity from above, multiplied by factor (K) from the correction diagram.

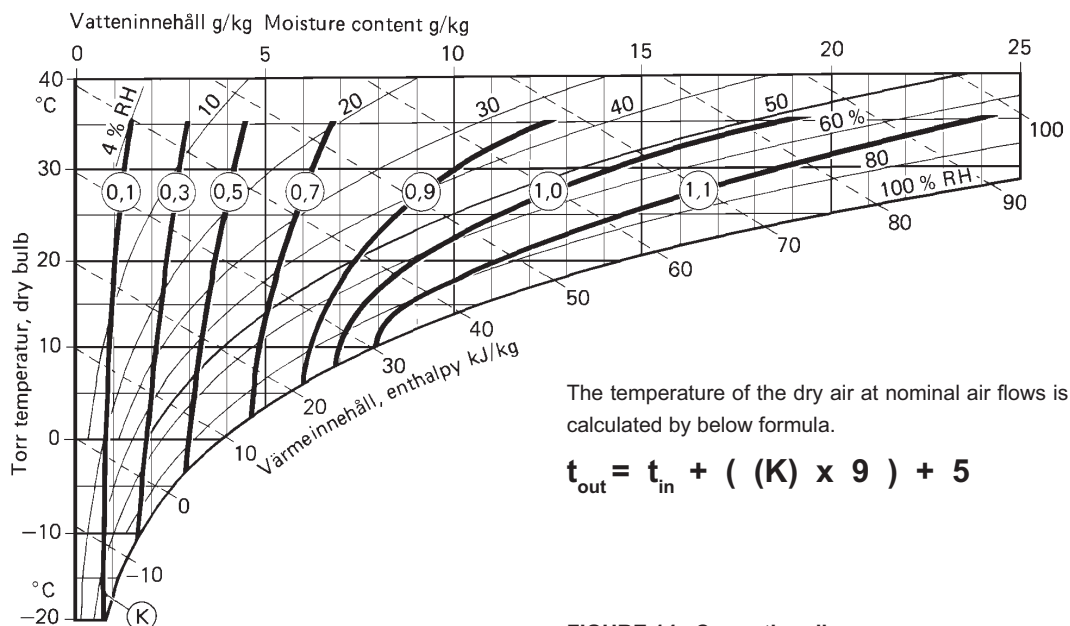


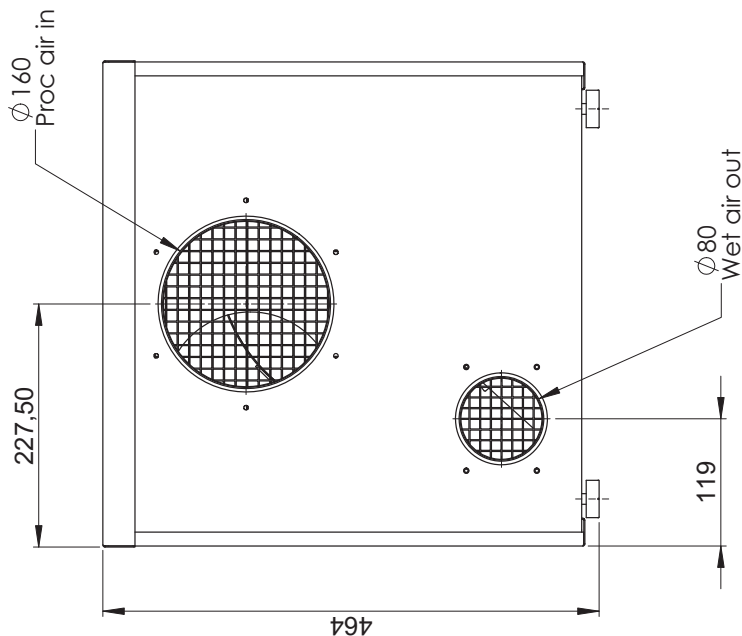
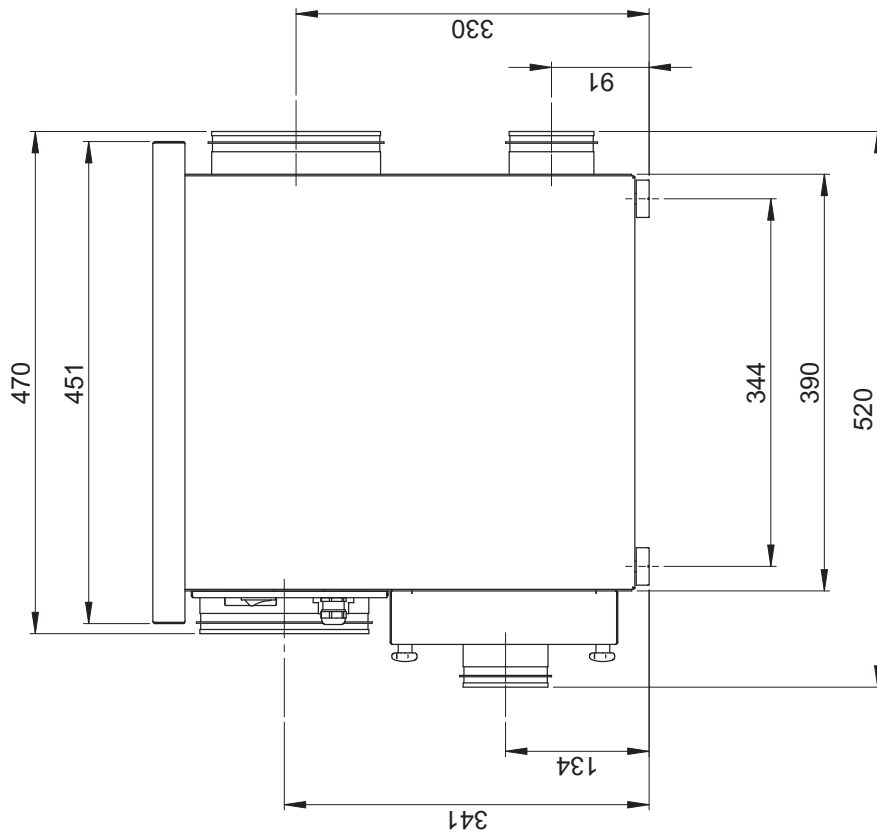
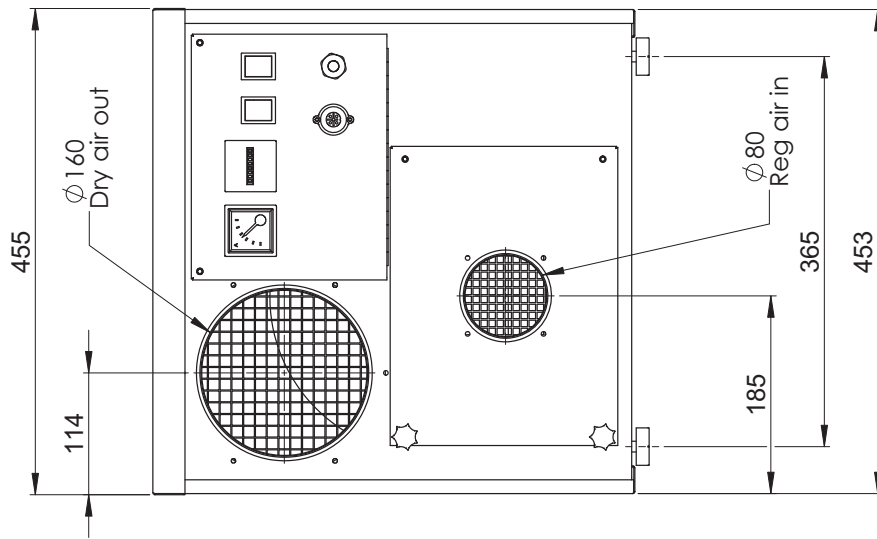
FIGURE 14: Correction diagram

Komponentlista / Component list DC-31 T10

AntalQty	Benämning	Description	Typ, ritn nr o dyl No etc	Type, Drwg	Art. Nr Art No	Tillverkare / Leverantör Manufact. / Supplier
<i>Huvudkomponenter / Main components</i>						
1	Aggregathus	Housing			106086	
1	Rotor	Rotor	SSCR-U 300H10		105414	Seibu Giken /
1,0m	Periferitättning	Peripheral sealing	Felt 25x2mm		100239	
0,9m	Radialtättning	Radialsealing	Silicone, profile DST-2, 15mm		100217	
1	Rotormotor	Rotor motor	SGSD.K0495.01 230V 50/60Hz		106184	
1	Drivrem	Drive belt	480 L050		100211	
1	Remskiva	Belt pulley	16 L 050-6F		100212	
1	Process Fläkt	Proc Fan	G2E 160-AY47-10S, 250W 1,1A		104786	
1	Kondensator	Capacitor	6µF (incl. in fan)			
1	Reg Fläkt	Reg Fan	GMV2C-312/025 K37CW-120H; 70W; 0,3A		104522	
1	Kondensator	Capacitor	2µF (incl. in fan)			
1	Värmeelement	Reg. heater	HRKK06 30/22 230V		107658	
1	Filtermatta	Filter media (Proc)	G4 430x245x15 mm		105320	
1	Filtermatta	Filter media (Reg)	G4 275x200x15 mm		105321	
1	Sladdställ	Flexible cord	3x1,5mm ²		100022	
1	ON/OFF switch	ON/OFF switch	Orange with lamp		100597	
1	MAN/AUTO switch	MAN/AUTO switch	Black		100892	
1	Amperemeter	Ammeter	99T1, 0-10A		106265	
1	Driftidsmätare	Elapsed time meter	HM-1, 230V 50Hz		106264	
1	Hygrostatplug	Chassi contact for remote control			100392	
1	Anslutningsplint	Terminal block			106213	

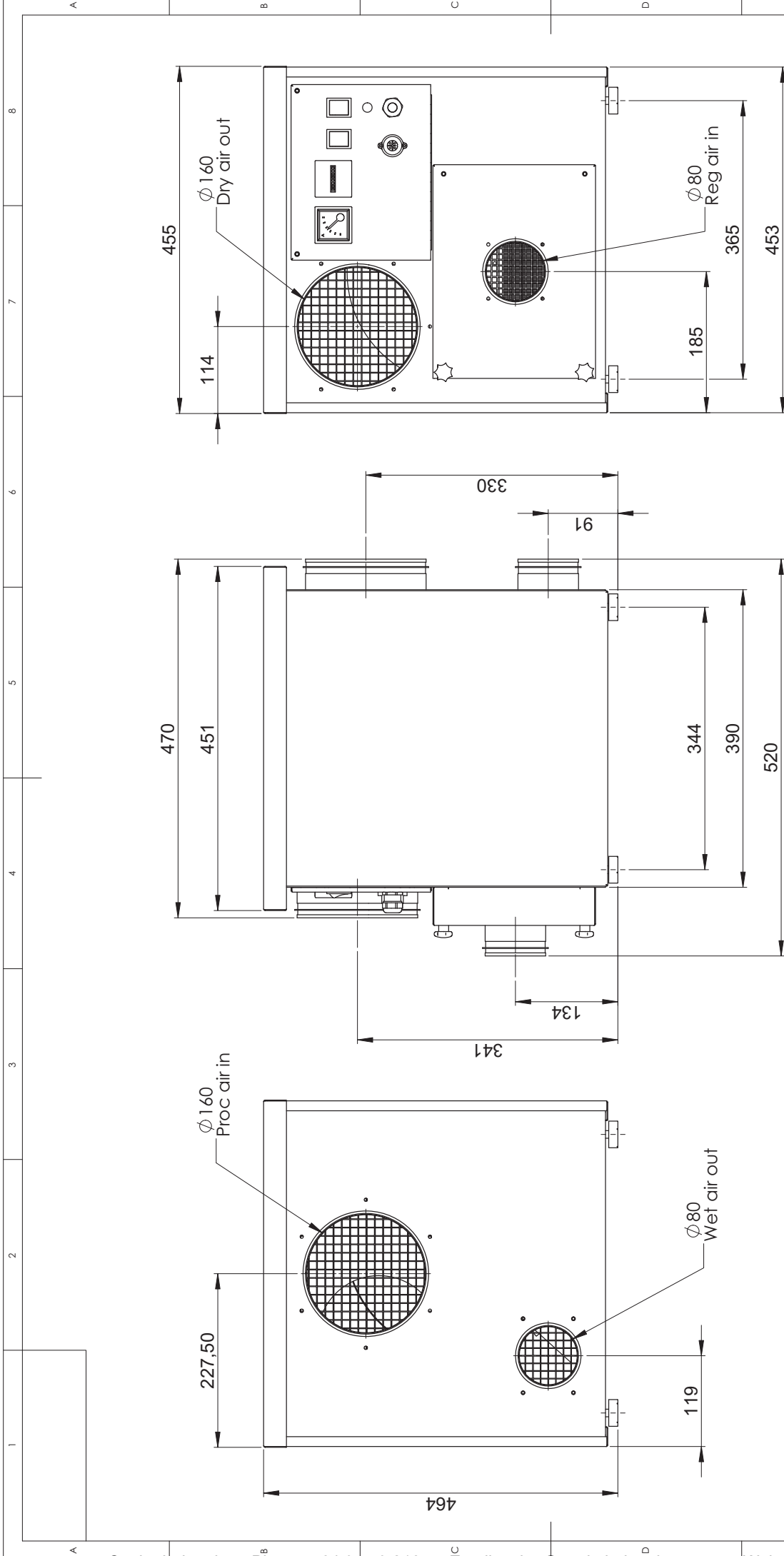
Komponentlista / Component list DC-31 T16

AntalQty	Benämning	Description	Type, Drwg	Art. Nr	Tillverkare / Leverantör	Anmärkning
				Art No	Manufact. / Supplier	Notes
	<i>Huvudkomponenter / Main components</i>					
1	Aggregathus	Housing		106087		
1	Rotor	Rotor	SSCR-U 300H10	105414	Seibu Giken /	
1,0m	Periferitätning	Peripheral sealing	Felt 25x2mm	100239		
0,9m	Radialtätning	Radialsealing	Silicone, profile DST-2, 15mm	100217		
1	Rotormotor	Rotor motor	SGSD.K0495.01 230V 50/60Hz	106184		
1	Drivrem	Drive belt	480 L050	100211		
1	Remskiva	Belt pulley	16 L 050-6F	100212		
1	Process Fläkt	Proc Fan	G2E 180-AA03-05z, 315W 1,38A;	102134		
1	Kondensator	Capacitor	8µF (incl. in fan)			
1	Reg Fläkt	Reg Fan	GMV2C-312/025 K37CW-120H; 70W; 0,3A	104522		
1	Kondensator	Capacitor	2µF (incl. in fan)			
2	Värmelement	Reg. heater	HRKK04 50/22 230V	107418		
1	Filtermatta	Filter media (Proc)	G4 430x245x15 mm	105320		
1	Filtermatta	Filter media (Reg)	G4 275x200x15 mm	105321		
1	Sladdställ	Flexible cord	3x2,5mm ²	103193		
1	Kablage	Cable Package		106137		
1	ON/OFF switch	ON/OFF switch	Orange with lamp	100597		
1	MAN/AUTO switch	MAN/AUTO switch	Black	100892		
1	Amperemeter	Ammeter	RQ 48E, 0-25A	100065		
1	Driftidsmätare	Elapsed time meter	HM-1	106264		
1	Hygrostatplug	Chassi contact for remote control		100392		
1	Säkringshållare	Fuseholder	5x20 PTF / 70	104214		
1	Säkring	Fuse	F1, 5x20, Glass tube, slow, 1A	104215		
1	Relä	Relay	1-pol, 30A	104216		
1	Anslutningsplint	Terminal block		104912		




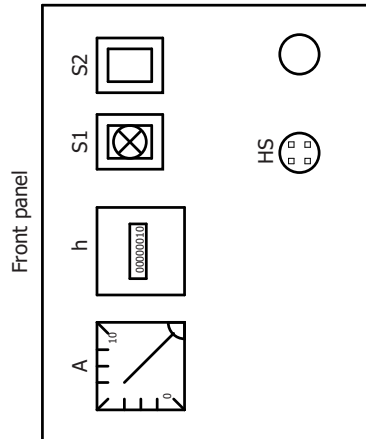
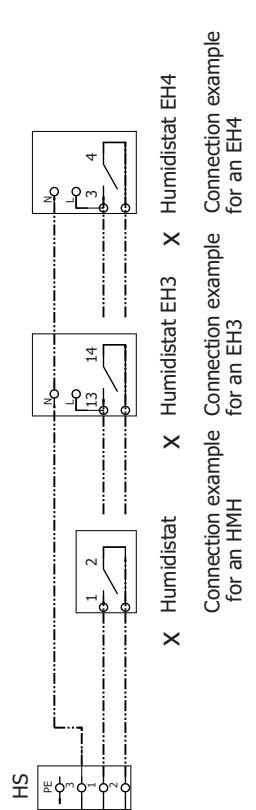
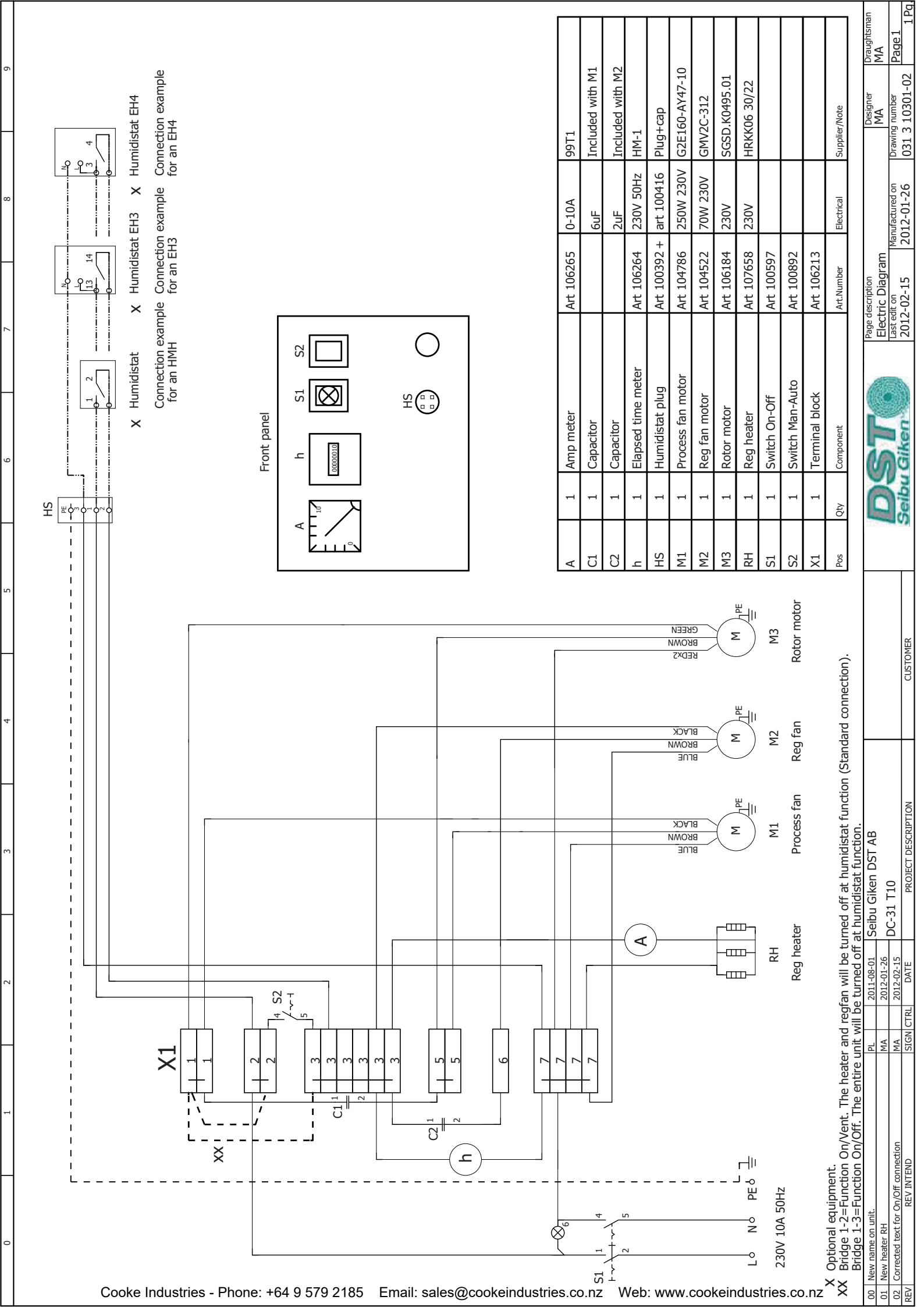
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	Drawn by Stefan O	Date 2011-07-04	Material DC-31 T10		Drawing no DST02465	Rev 00+
Status Construction		Reference ISO 2768-1m	Thickness t=		Sheet/Sheet 1/1	Rev Part 00+
Scale 1:5	Format A3	Sheet/Sheet 1/1	Rev Part 00+	Width/Width 27.305	Material DC-31 T10	
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		Drawn by Stefan O	Date 2011-02-07	Title/Description Dimensionsritning Dimension drawing	Drawing no DST02427	Rev 00+
		Checked by Stefan O	Date 2011-02-07	Model DC-31 T16	Status Construction	Drawing no DST02427
		Scale 1:5	Format A3	Sheet/Sheet 1/1	Total Sheet 1/1	Model/Part 00+ 29.785
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Pos	Qty	Component	Art.Number	Electrical	Supplier/Note
A	1	Amp meter	Art 106265	0-10A	99T1
C1	1	Capacitor		6uF	Included with M1
C2	1	Capacitor		2uF	Included with M2
h	1	Elapsed time meter	Art 106264	230V 50Hz	HM-1
HS	1	Humidistat plug	Art 100392 +	art 100416	Plug+cap
M1	1	Process fan motor	Art 104786	250W 230V	G2E160-AY47-10
M2	1	Reg fan motor	Art 104522	70W 230V	GMV2C-312
M3	1	Rotor motor	Art 106184	230V	SGSD.K0495.01
RH	1	Reg heater	Art 107658	230V	HRKK06 30/22
S1	1	Switch On-Off	Art 100597		
S2	1	Switch Man-Auto	Art 100892		
X1	1	Terminal block	Art 106213		

X Optional equipment. The heater and regfan will be turned off at humidistat function (Standard connection).
 XX Bridge 1-2=Function On/Vent. The heater and regfan will be turned off at humidistat function (Standard connection).
 Bridge 1-3=Function On/Off. The entire unit will be turned off at humidistat function.

Page description
Electric Diagram
Last edit on
2012-02-15

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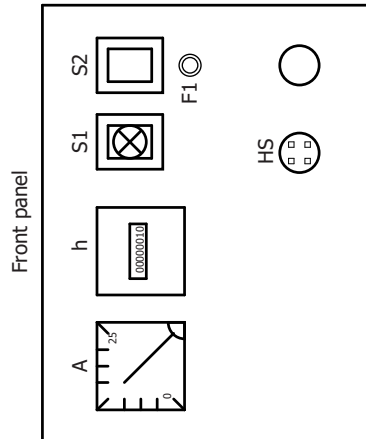
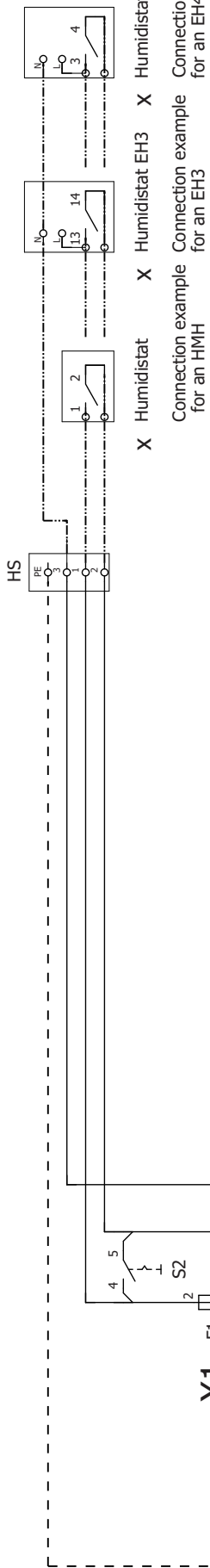
REV	REV INTEND	DATE	PROJECT DESCRIPTION	CUSTOMER
00	New name on unit.	2011-08-01	Seibu Giken DST AB	
01	New heater RH	2012-01-26	DC-31 T10	
02	Corrected text for On/Off connection	2012-02-15		

Designer
MA

Drawing number
031 3 10301-02

Draughtsman
MA

Page 1 of 1



Pos	Qty	Component	Art.Number	Electrical	Supplier/Note
A	1	Amp meter	Art 100065	0-25A	RQ48E
C1	1	Capacitor		8uF	Included with M1
C2	1	Capacitor		2uF	Included with M2
F1	1	Fuse	Art 104215	1A	
h	1	Elapsed time meter	Art 106264	230V 50Hz	HM-1
HS	1	Humidistat plug	Art 100392 +	art 100416	Plug+cap
K1	1	Relay	Art 104216	230V 1-pole	
M1	1	Process fan motor	Art 102134	315W 230V	G2E180-AA03-05Z
M2	1	Reg fan motor	Art 104522	70W 230V	GMV2C-312
M3	1	Rotor motor	Art 106184	230V	SGSD.K0495.01
RH	2	Reg heater	Art 107418	230V	HRKK04 50/22
S1	1	Switch On-Off	Art 100597		
S2	1	Switch Man-Auto	Art 100892		
X1	1	Terminal block	Art 104912		

X Optional equipment. The heater and regfan will be turned off at humidistat function (Standard connection).
 XX Bridge 1-2=Function On/Vent. The heater and regfan will be turned off at humidistat function (Standard connection).
 Bridge 2-3=Function On/Off. The entire unit will be turned off at humidistat function.

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REV	REV INTEND	SIGN	CTRL	DATE	PROJECT DESCRIPTION	CUSTOMER
00	New name on unit.	PL		2011-08-01	Seibu Giken DST AB	
01	Text Bridge 1-3 changed to Bridge 2-3=Function On/Off	MA		2012-01-09	DC-31 T16	

Page description
Electric Diagram

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2012-01-09

Manufactured on
2011-08-01

Drawing number
031 3 10302-01

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Page 1 of 1

EC declaration of conformity

Manufacturer:

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Hereby confirms that:

Machinery type DC-31 T10/T16

- a) is manufactured in compliance with DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast)
- b) is manufactured in compliance with the Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC
- c) is manufactured in compliance with European Standards EN 60204-1:2006, EN ISO 12100-1, EN 12100-2, EN ISO 13857, EN 61000-6-3, and EN 61000-6-1
- d) is manufactured in compliance with European Directive 2002/95/EC for Restriction of Hazardous Substance (RoHS).



Anders Kristoferson, Managing Director

Spånga

21/07/11

21/07/11

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