# TTR 800 / TTR 1400

EN

**OPERATING MANUAL**
DESICCANT DEHUMIDIFIER

TROTEC

TRT-BA-TTR800-1400-TC-006-EN

## Table of contents



## Notes regarding the operating manual

### Symbols

**Hazardous electric current!**
Warns about hazards from electric current which can lead to injuries or even death.

**Danger!**
Warns of a hazard which can lead to personal injury.

**Caution!**
Warns of a hazard which can lead to property damage.

The current version of the operating manual can be found at:

**TTR 800**

http://download.trotec.com/?sku=1110000150&id=1

**TTR 1400**

## Legal notice



## Warranty and liability

Warranty and liability claims in case of personal injury and material damage are excluded if they are the result of one or more of the following causes:

- improper handling of the dehumidifier
- start-up by unauthorised persons
- misuse by uninstructed persons
- improper assembly, start-up, operation and maintenance of the dehumidifier
- operation despite defective safety devices or inadequately fitted or non-functioning safety and protective devices
- non-observance of the instructions in the operating manual regarding transportation, storage, assembly, start-up, operation and maintenance of the dehumidifier
- unauthorised structural changes
- unauthorised technical modifications
- insufficient checking of components subjected to wear
- inadequately carried out repair work
- emergency situations due to foreign objects and force majeure

The device complies with the fundamental health and safety requirements of the applicable EU regulations and was tested at the factory for perfect functionality multiple times. However, if faults in the functionality occur and cannot be remedied with the measures in the chapter Errors and faults, please get in touch with your dealer or distributor.

When making a warranty claim, supply the device number (see the rear of the device). When manufacturer's instructions or legal regulations have not been followed, or after unauthorised changes to the device are made, the manufacturer is not responsible for the resulting damages.

Changes to the device or unauthorised replacement of individual parts can drastically impact the safety of this product and will result in the loss of the warranty.

## Safety

**Read this manual carefully before starting or using the device. Always store the manual in the immediate vicinity of the device or its site of use!**

- Do not use the device in potentially explosive rooms.
- Do not use the device in aggressive atmosphere.
- Set the device up in an upright and stable position.
- Let the device dry out after a wet clean. Do not operate it when wet.
- Ensure that the air inlet and outlet are not obstructed.
- Ensure that the side of the device where the air inlet is found is kept free of dirt and loose objects.
- Never reach or put objects into the device.
- Never insert any objects or limbs into the device.
- Do not cover or transport the device during operation.
- Ensure that all electric cables outside of the device are protected from damage (e.g. caused by animals). Never use the device if electric cables or the power connection are damaged!
- Observe the device's power input, cable length and intended use when selecting extensions to the power cable. Completely unroll extension cables. Avoid electrical overload.
- Switch the device off and disconnect the power cable from the mains socket when the device is not in use.
- If you do not use the device for extended periods of time, switch the device off and disconnect it from the mains.
- Before maintenance, care or repair work disconnect the device from the mains. Before starting any work on the device, discharge the EMC filters.
- Do not under any circumstances use the device if you detect damages on the mains plug or power cable. Defective power cables pose a serious health risk.
- Insert the mains plug into a properly secured mains socket.

### Informal safety measures

- The operating manual must always be available at the operating site of the dehumidifier.
- Besides the operating manual, generally known and local regulations as to accident prevention and environmental protection have to be made available and observed.
- Keep all safety instructions and hazard warnings at the dehumidifier in a clearly legible condition.

### Intended use

The devices TTR 800 / TTR 1400 are only to be used for dehumidifying atmospheric air. Any other use possibly exceeding the intended purpose is considered to be improper use.

Intended use comprises:

- observing all the instructions in the operating manual
- adherence to the inspection and maintenance tasks
- observing the permissible operating and surrounding conditions according to the technical data (see technical annex)

The following minimum requirements must be met:

- air inlet temperature process air: max. +40 °C
- air inlet temperature regeneration air: min. -15 °C
- permissible ambient temperature: -20 °C to +40 °C
- relative humidity: max. 95 % RH non-condensing

After consultation with Trotec other operating conditions are possible with respectively modified versions.

### Improper use

Dehumidifiers are not suited for the installation on or the intake of fluids, e.g. from filled tanks or tubs, flooded installation areas.

If supplying the system with contaminated air, the **"harmful influences on rotors"** must be observed!

## Personnel qualifications

People who use this device must:

- be aware of the dangers that occur when working with desiccant dehumidifiers of this performance class.
- have read and understood the operating manual, especially the Safety chapter.

## Personnel training

- Only trained and instructed personnel may work at or with the dehumidifier – observe the personnel qualifications.
- The responsibilities of the personnel for the following tasks must be clearly defined:
  - set-up and assembly
  - installation
  - start-up and operation
  - maintenance and repair
- The control unit may only be operated by instructed personnel.
  - **Electrically skilled personnel**
    Electrically skilled personnel must be able to read and understand electric circuit diagrams, to put electrical systems into service and to maintain them, to wire control cabinets, to ensure the functionality of electrical components and to identify possible hazards from electrical and electronic systems.
  - **Instructed persons**
    Instructed persons have been informed of the tasks they were entrusted with as well as of potential hazards resulting from inappropriate behaviour. They are allowed to operate and transport the device and perform simple maintenance activities (changing the filter, opening the control box). The device is to be maintained and looked after by instructed personnel.

## Residual risks

**Hazardous electric current!**
Work on the electrical components must only be carried out by an electrically skilled person or an authorised specialist company.

**Danger!**
Dangers can occur at the device when it is used by untrained people in an unprofessional or improper way! Observe the personnel qualifications!

**Danger!**
For maintenance work inside the device wear protective gloves.

**Caution!**
Do not operate the device without an inserted air filter! Without air filter the inside of the device will be heavily contaminated, this could reduce the dehumidification performance and result in damage to the device.

**Caution!**
Dirt accumulating inside the rotor can substantially reduce the dehumidification performance or damage the rotor beyond repair!
Supplying the system with contaminated air might damage the rotor! Observe the information regarding "harmful influences on rotors".

**Caution!**
Only use residual current devices sensitive to all types of current (type B or B+). The integrated EMC filters can lead to instantaneously tripped RCDs. Use residual current devices with a minimum triggering level of > 300 mA and delayed tripping (type K).

## Behaviour in the event of an emergency

1. Immediately switch the device off via the main emergency stop switch or the emergency stop at the upstream distributor.
2. Remove persons from the danger area.
3. Disconnect the device from the electric circuit.
4. Do not reconnect a defective device to the mains.

## Information about the device

### General description

Dehumidifiers operating on the desiccant principle are used to tackle drying tasks in the field of process engineering, air-conditioning, on construction sites and for the dehumidification of production and storage facilities, where a particularly low humidity level is required over a broad temperature range.

The desiccation technique enables the safe and economic operation even at low operating temperatures.

### Functional principle

#### Design

The basic device consists of the following components:

- fans for air transport
- air filters behind every air inlet
- separate sectors for process air (to be dehumidified) and regeneration air (humid exhaust air)
- purging sector for heat recovery
- rotor desiccant wheel for the dehumidification with silica gel
- drive unit with gear motor, toothed belt pulley and toothed belt
- heater battery for heating regeneration air
- Depending on the selected options further components are possible (see technical annex).

During dehumidification the desiccant wheel turns continuously at a low speed (depending on the configuration 2 to 40 rotations per hour).

Via the sectors the desiccant wheel is simultaneously charged with the process and regeneration air so it can constantly absorb and release moisture.

#### Process air

The air to be dehumidified is sucked in by means of a fan. The process air (4) flows through the desiccant wheel's dehumidification sector (1).

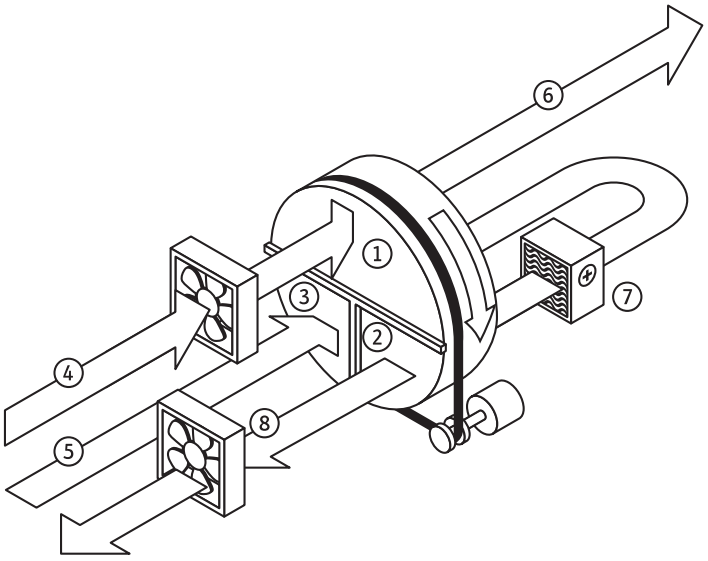
In doing so, the contained moisture is withdrawn by the sorbent (silica gel) and retained (desiccation). Due to physical processes the temperature of the dry air (6) increases. Later the dried air flows towards the dry air outlet.

#### Regeneration air

The regeneration air (5) is also sucked in with its own fan and guided through the purging sector (3). During dehumidification the desiccant wheel warms up as a result of the released desiccation heat and the regeneration heat. The purging sector (3) serves the purpose of heat recovery and for cooling the desiccant wheel, leading to a reduced energy input and improvement of the dehumidification performance – especially at lower dew points. Whilst flowing through the heater battery (7) the air is heated to approx. 100 °C to 140 °C (depending on the intake temperature) and at the same time the relative humidity is extremely reduced.

In passing through the regeneration sector (2), the thusly prepared air now again absorbs the moisture retained by the silica gel (desorption). Then the extremely humid regeneration air (8) is discharged to the outside via the moist air outlet.

### Schematic diagram




| No. | Designation |
|---|---|
| 1 | Dehumidification sector |
| 2 | Regeneration sector |
| 3 | Purging sector |
| 4 | Process air inlet |
| 5 | Regeneration air inlet |
| 6 | Dry air outlet |
| 7 | Heater battery |
| 8 | Humid air outlet (regeneration air) |

## Design configuration and components

### Rotor

The desiccant dehumidifier works with a desiccant wheel (rotor A) which is composed of layers of smooth and corrugated non-woven fabric with chemically bonded silica gel. Thus created is a honeycomb structure with a large number of axial air ducts with a large surface and direct connection to the inner pore structure of the silica gel.

On account of the desiccant wheel's good mechanical and physical properties no silica gel is discharged. It may be supplied with saturated air with a relative humidity of up to 100 % but not with water drops. The rotor is incombustible.

### Rotor drive

The rotor is driven by an electric gear motor.

The power is transmitted by means of synchronized pulley and timing belt.

### Rotor rotation control

The device is equipped with a rotation control for an early recognition of a possible rotor standstill.

### Rotor bearing

The rotor is mounted on a stainless steel axle with maintenance-free plain bearing bushes.

### Rotor sealing

An automatically clearance-compensating gasket system seals the rotor and the individual air sectors against one another.

### Filter

Air filters are located in each individual air inlet – depending on the field of application designed either as coarse or fine filter for removing the dust in the air currents.

### Fans

Used are radial fans or mixed-flow fans with energy-saving EC motors. For an easy adjustment of the volumetric flow rates a potentiometer is located behind the front cover. Therefore, the fan speed for process air and regeneration air can be adjusted according to the specifications. Hence, additional throttle valves in the ventilation system are rendered redundant.

### Regeneration air heater

Heating the regeneration air is effected by means of electric heater batteries consisting of individual resistance heating elements. Depending on the dehumidifier model and size of the heater these can be designed as single- or multi-stage versions. The regeneration temperature is regulated by a thermostatic two-step control.

Safety temperature monitors (STW) measure both the regeneration exhaust air temperature (RAL) and the regeneration air temperature heating (RHZ). Primarily the regulation is geared to a preferably constant RHZ. With a decreasing moisture load however RAL might positively rocket, so that the heating is down-regulated before reaching the RHZ. Achieved in this way is an optimum performance adjustment of the regeneration energy to the operating point.

### Safety components

In order to protect the basic device from inadmissible temperatures, it comes equipped with the following safety components:

- a differential pressure switch (ΔP switch) to monitor the air flow direction and the flow rate of the regeneration air
- a safety temperature limiter (STB RHZ) to monitor the max. permissible temperature after heating (thermostat maximum)
- a safety temperature limiter (STB RAL) as rotation control for the rotor; it is situated in the exhaust air flow and tripped by an inadmissible temperature rise resulting from rotor standstill
- Depending on the selected options further components are possible (see technical annex).

**Caution!**

If a safety component is tripped, the device will be switched off (STOP), but the overrun will remain active.

### Electrical system

The entire switching and control technology is located in the integrated electrical control box on the dryer housing. The electrical control box is designed for a high safety standard with protection type IP 42. Accommodated here are safety temperature monitors and pressure controllers as well as the control voltage source.

The terminals for remote monitoring and control can be accessed via the front cover or the cover of the control box. This is also the place to access the reset buttons of the safety temperature monitors and the potentiometers for fan regulation. The mains feed-in takes place at the side of the device via the corresponding cable gland.

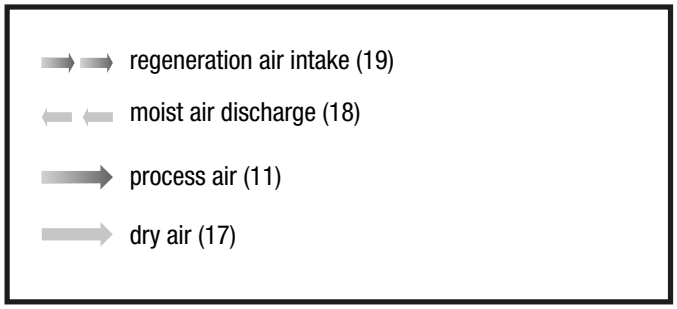
The terminals for permanent connection can be found under the lid of the electrical control box.

### Housing

Depending on the model the housing of the dehumidifier is made of galvanized sheet steel or stainless steel sheet.

## Types of application

Key for exemplary types of application:

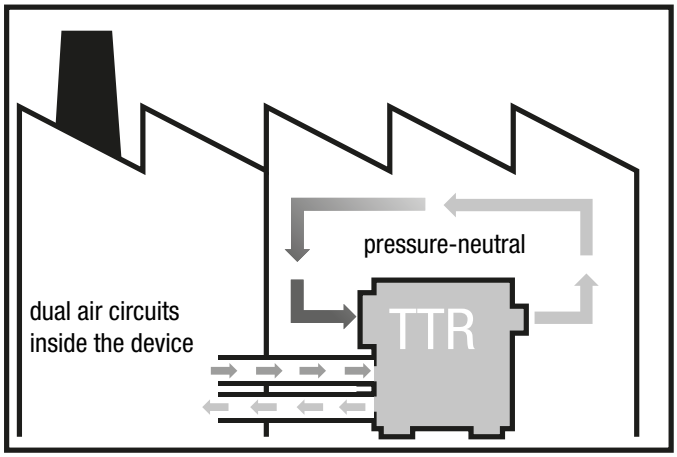



### Circulating air drying for indoor installation

The device is positioned in the room to be dehumidified.

- The device operates in recirculation mode.
- The air transport line for the regeneration air inlet (19) is to be led outside.
- The air transport line for the humid air outlet (regeneration air (18)) is to be led outside.

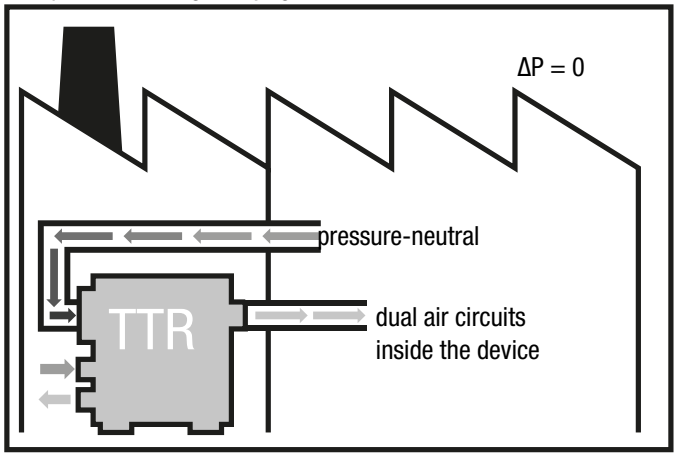
Example 1: Circulating air drying for indoor installation




### Circulating air drying outdoor installation

- The air transport line for the process air inlet (17) is led into the room to be dried in order to take in the humid air from the room.
- The air transport line for the dry air outlet (11) is led into the room in order to feed dry air into it.

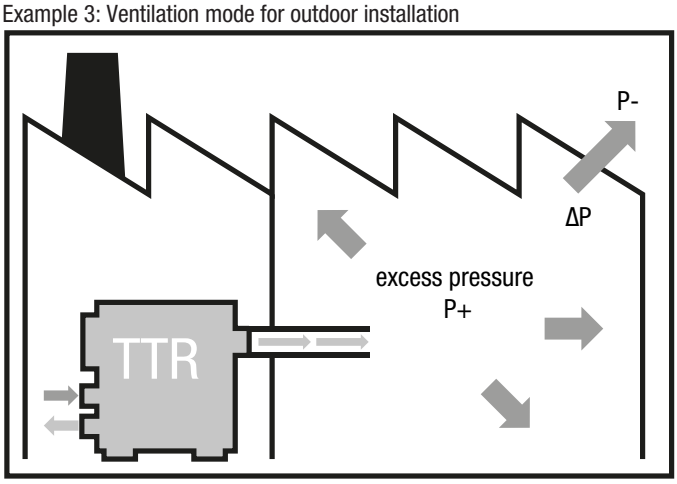
Example 2: Circulating air drying for outdoor installation



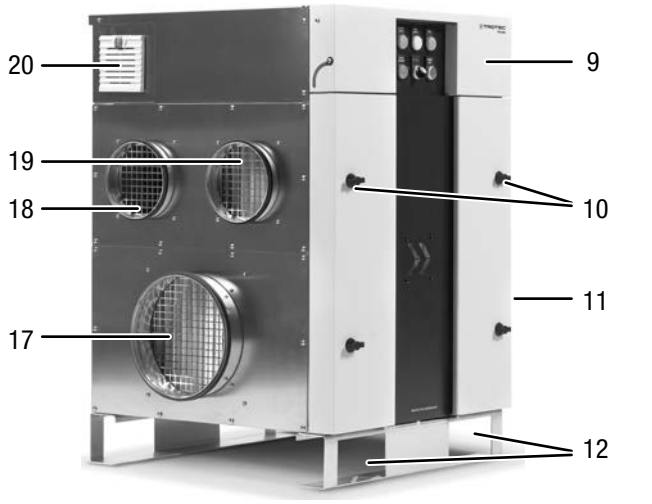

### Ventilation mode for outdoor installation

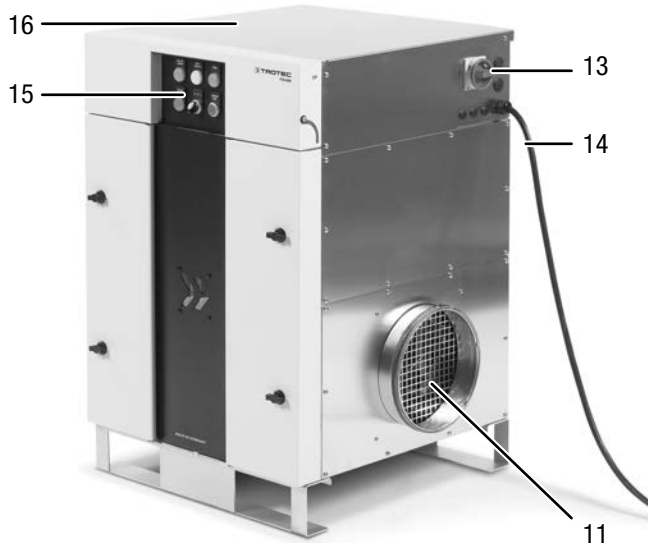
- The air transport line for the dry air outlet (11) is led into the room to be dehumidified in order to feed dry air into it.

Example 3: Ventilation mode for outdoor installation



## Device depiction




| No. | Designation |
|---|---|
| 9 | Front cover (hinged) |
| 10 | Air filter access and maintenance doors |
| 11 | Dry air outlet with connection for an air transport line |
| 12 | Forklift pockets |
| 13 | Main switch with emergency stop function |
| 14 | Mains cable |
| 15 | Control panel |
| 16 | Cover of the electrical control box incl. cable inlet for mains connection and control lines |
| 17 | Process air inlet with connection for an air transport line |
| 18 | Humid air outlet (regeneration air) with connection for an air transport line |
| 19 | Regeneration air inlet with connection for an air transport line |
| 20 | Control box ventilation system incl. air filter(s) |

## Transport and installation

**Danger!**
The device may only be lifted by use of the forklift pockets or lifting straps. Pipe sockets or other attachment parts must not be used as lifting points!

The device may only be lifted by use of the forklift pockets or lifting straps. Pipe sockets or other attachment parts must not be used as lifting points! The carrying capacity of the lifting gear must be suitable for the weight of the device (see technical data).

Optionally the device is delivered with a transport frame incl. crane lifting lugs with holes for crane eyes or similar (see technical annex).

The following should be observed before transporting the device using lifting gear:

**Danger!**
Risk of injury from suspended loads.
Make sure that nobody is situated in the immediate proximity.

- Only instructed persons are allowed to perform the transport by use of lifting gear.
- Consider the centre of gravity when transporting the load.

### Inserting the air filter

**Caution!**
To avoid damages to the device, do not operate the device without inserted air filters!

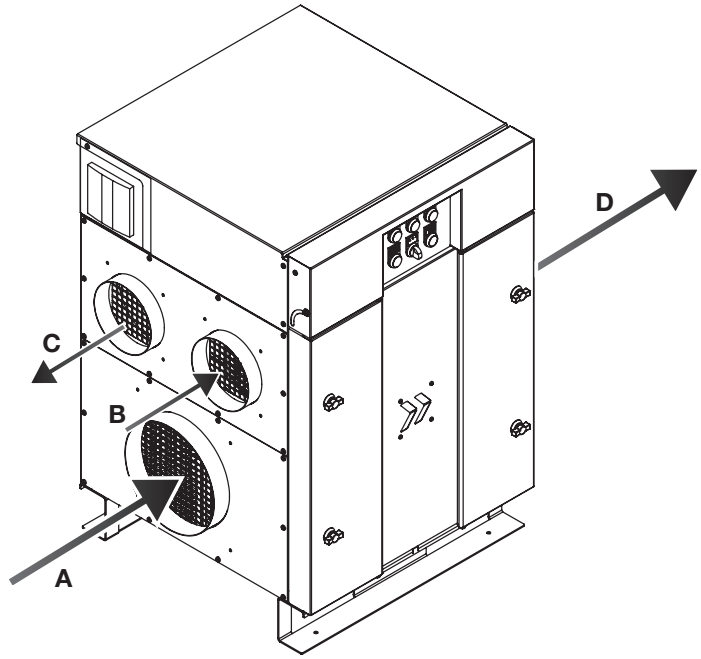
- Prior to installation and switching the device on, check whether all air filters are inserted.

Information regarding the air filter installation and filter change can be found in the Maintenance chapter.

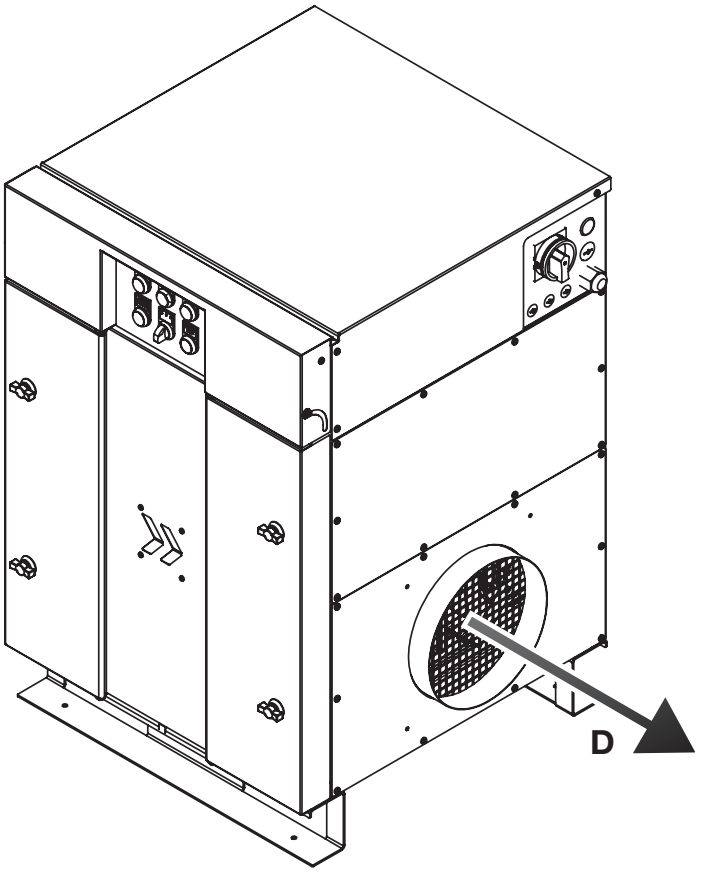
## Installing the device

- Position the device on firm, dry and level ground. Depending on the floor load capacity a panel for weight distribution is to be provided. A proper foundation is not necessary.
  - Avoid slippery and oscillating ground.
  - Position the device allowing a sufficient distance for air inlet and outlet and for connecting the air transport lines.
  - Make sure there is enough space to operate and maintain the device (see technical annex).
- Only place the device under a roof. On request devices with a higher type of protection are available for outdoor installation. Make sure that no water can reach the device interior via the air inlet and outlet openings. If required, connect an air transport line to minimize the risk.
- Ensure a sufficient distance between humid air outlet and air inlet. In case of direct-intake devices the distance between humid air outlet and the suction nozzles should amount to at least 2 m to prevent the moist exhaust air from being sucked right back in.
- The air transport lines must be designed for the available static compression of the fans (see technical annex).
- The regeneration exhaust air line (C) must be laid with a slight decline (min. 1.5 %) so that possibly accumulating condensate cannot flow back into the device or obstruct the air flow. If an incline cannot be avoided, it is necessary to deliberately create a nadir (lowest point) for draining (e.g. using a syphon).

## Schematic diagram




Optionally, a mirror-inverted assembly is also possible.

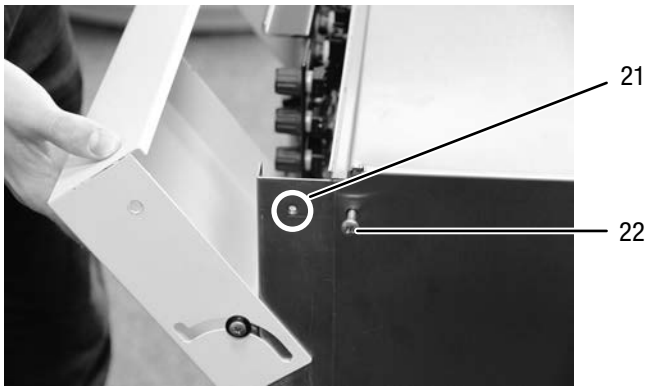



| No. | Designation |
|---|---|
| A | Process air / dry air inlet |
| B | Regeneration air inlet |
| C | Humid air outlet (regeneration air) |
| D | Dry air outlet |

## Installation

### Mains connection

1. Loosen the two screws (21) of the front cover.




2. Slightly lift the front cover and open it.
3. Loosen the screws (22) of the electrical control box cover.
4. Remove the electrical control box cover either by pulling it forwards or by lifting it.

5. Guide your mains cable through the cable gland at the device and connect it to the power supply terminals. To connect the device please observe the wiring diagram in the technical annex. The phase sequence can be chosen freely.

6. Fix the cable, screw down the cable gland and observe the strain relief.

### Connecting the control lines

#### Remote ON/OFF

If you want to operate the device optionally via remote mode, e.g. from a remote control centre or factory master control system, connect the external switching contact (N/O contact) to the respective terminals. (For detailed information please refer to the wiring diagrams in the technical annex.)

#### Control via external hygrostat (% RH)

You can control the device via an external hygrostat (option). The control voltage is 24 V DC.

The external hygrostat is to be connected to the terminal strip in accordance with the wiring diagram (see technical annex).



#### Ventilation mode process air

Select the operating mode Ventilation mode process air if constant air movement is also required at times without the need for drying. If so, replug the respective jumper (blue) of the corresponding terminals (for detailed information please refer to the wiring diagrams in the technical annex).

The process air fan keeps running even if the hygrostat switches off and the external contact of the hygrostat is opened.

Hygrostat and fan operation are only switches off when switching of the device (STOP), the fan will be switched off at the end of the rundown period.

You can always change back to the normal dehumidification operating mode by replugging the jumper.

Ventilation mode process air can be activated both when in on-site or remote mode.

**Remote signalling contacts**

Remote signalling is effected by means of potential-free changeover contacts that can be tapped directly at the corresponding relays.

1. BETRIEB/OPERATION
2. STÖRUNG/FAULT
3. FILTER

These remote signalling contacts correlate with the lamps on the control panel (see description in chapter operation).

For the correct assignment observe the wiring diagrams in the technical annex.

## Start-up

**Requirements**

- Check whether all air filters have been inserted properly.
- Check whether all doors, flaps and covers are closed or screwed in place.
- Check whether all air transport lines have been connected and screwed down properly and whether they are secured by means of tension belts.
- Check whether all air transport routes are clear and free from foreign objects or obstacles.
- Check the permissible operating conditions according to the technical data!

**Initial start-up**

For an ideal operation of the device the regeneration air flow must be adjusted according to the technical data.

The potentiometers can be accessed via the front cover:
R4 – target value fan process air and
R6 – target value fan regeneration air for adjusting the air volume via the fan speed.

For adjustment work, measurements or the like, which have to be carried out during operation, one must on principle switch over to manual operation (ON-SITE)!

1. Connect the device to the properly fused feed-in.
2. Turn the selection switch to position I.
3. Open the front cover (9).
   ⇨ The two potentiometers are located behind the front cover on the right-hand side:
   R4 – target value fan process air and
   R6 – target value fan regeneration air for fan speed regulation.

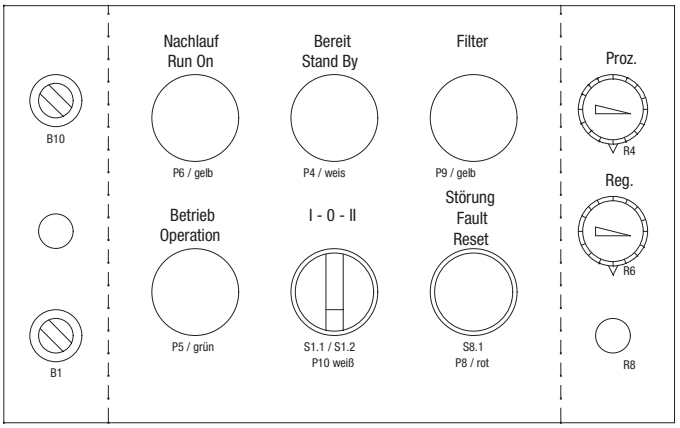
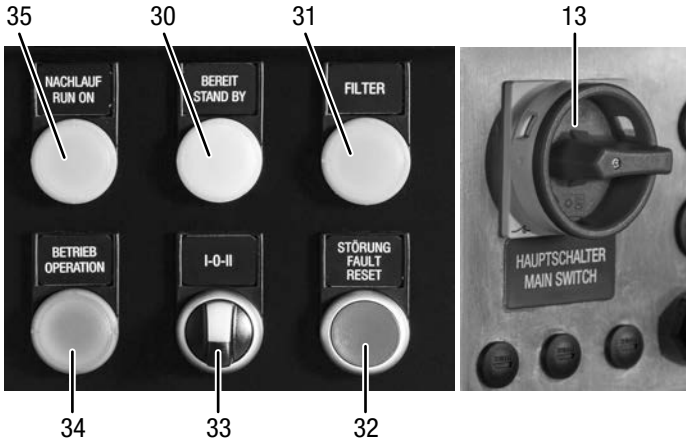



*Fig. 1:* Control panel overview

4. Adjust the regeneration air volume in ON-SITE mode. This also allows an adjustment to the on-site air transport lines for optimum operation.
5. The proceed as with the normal start-up.

## Operation




| No. | Designation |
|---|---|
| 13 | **Main switch with emergency stop function**<br>0: The device is switched off.<br>I: The device is switched on. |
| 30 | **BEREIT / STAND BY lamp**<br>indicates operational readiness for REMOTE operation:<br>- mains voltage present<br>- selection switch in position II – REMOTE OPERATION<br>- REMOTE-ON not yet activated |
| 31 | **FILTER lamp**<br>indicates the insufficient air flow rate of one or more air filters. The differential pressure controllers monitor the air flow rate of the filters and so report a dirty filter at an early stage.<br>Replace a dirty filter in due time to prevent an impairment of the device functions. |
| 32 | **STÖRUNG / FAULT lamp and RESET button**<br>collective fault message with device switch-off (STOP) tripped by<br>- a safety temperature limiter (STB RHZ) to monitor the max. permissible temperature after heating (thermostat maximum)<br>- a safety temperature limiter (STB RAL) as rotation control for the rotor; it is situated in the exhaust air flow and tripped by an inadmissible temperature rise resulting from rotor standstill<br>- a differential pressure switch (ΔP switch) to monitor the air flow direction and the flow rate of the regeneration air<br>- possibly collective fault messages of additional options (see technical annex) |
| 33 | **BETRIEB / OPERATION lamp**<br>indicates the start-up of the device after switching it on via<br>- selection switch to position I<br>or - selection switch to position II and remote-ON contact closed |
| 34 | **Selection switch ON-SITE/REMOTE OPERATION I – 0 – II**<br>I: ON-SITE OPERATION<br>II: REMOTE OPERATION<br>0: Control OFF (STOP) |
| 35 | **NACHLAUF / RUN ON lamp**<br>indicates the rundown operation of the device at operating temperature after switching off the control voltage. |

**Note:**
The main switch serves for switch-on and may only be used as emergency stop switch for disconnection from the mains **in case of an emergency**.

**Caution!**

**In order to prevent a defect of the heater battery due to heat accumulation or an unnecessary tripping of the safety temperature limiter STB when switching off the unit, the regeneration air blower is provided with a temperature-controlled rundown period of approx. 5 minutes.**

For normal switch-off (STOP) please use the selection switch ON-SITE/REMOTE OPERATION **I – 0 – II**, which initiates the rundown function (NACHLAUF-RUN ON lamp illuminated). Only disconnect the device from the mains for transport or storage via the main switch **at the end of the rundown period**.

### Switching the device on

✓ The device is connected to the properly fused feed-in.

1. Turn the main switch (13) to position I.
2. Select the desired operating mode via the selection switch I – 0 – II:
   - ⇨ A) on-site operation I
     Turn the selection switch to position I: – the BETRIEB / OPERATION lamp is illuminated – the device starts up.
   - ⇨ B) remote operation II
     Turn the selection switch to position II: – the BEREIT / STAND BY lamp is illuminated until the REMOTE-ON contact is activated – as soon as the REMOTE-ON contact has been activated, the BETRIEB / OPERATION lamp will be illuminated – the device starts up.

**Caution!**

**In order to attain the full dehumidification performance and to prevent damages due to an insufficient regeneration air flow, the minimum air volumes specified in the technical annex must be observed. Dirty air filters reduce the volumetric flow rate and must be replaced in due time!**

**Switching the device off (STOP)**

1. Turn the selection switch to position 0 or open the REMOTE-ON contact.
   ⇨ The BETRIEB / OPERATION lamp goes out.
   ⇨ The NACHLAUF / RUN ON lamp is illuminated.
   ⇨ The device switches over to rundown operation.

**Rundown operation**

In order to discharge the trapped heat from the heater, the regeneration air blower will continue to operate for approx. 5 min (temperature-controlled). The control unit remains active. During rundown the device may be restarted at any time.

The fans start up smoothly, delayed by approx. 20 s the device switches into normal operation.

Upon expiry of the rundown period the regeneration air blower stops, the indicator lights go out.

**Shutdown**

For a complete switch-off, e.g. for transport or maintenance activities, switch the emergency stop main switch to position **0 at the end of the rundown period**.

**Storage**

- Store the cleaned device in a dry location and protect it against dust.
- Before restarting the device, check the condition of the power cable. If you are doubting its perfect condition, have the cable repaired or call the customer service.
- Have the device checked once a year by an electrically skilled person at any rate.

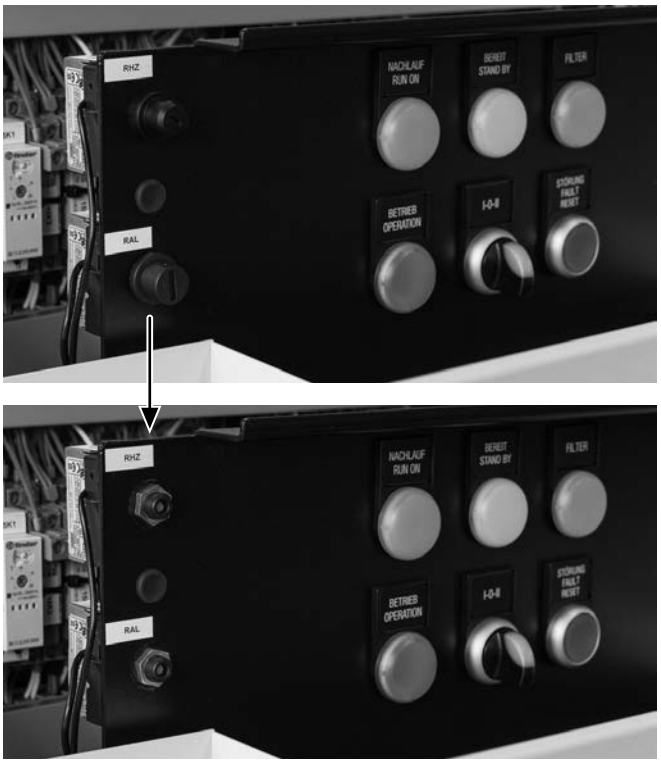
## Errors and faults

The fault recognition switches the device off (STOP), only the rundown operation remains active.

After having eliminated the cause of the fault, the fault message of the STB or rather the STB is to be set back via the corresponding reset button.

1. STB RHZ = heating
2. STB RAL = rotor
3. - possibly reset button for additional options (see technical annex)

1. Open the front cover and remove the respective cover of the reset buttons.




2. Press the corresponding reset button and reattach the cover.


3. Then press the STÖRUNG / FAULT – RESET button (32) to acknowledge the STB faults or the ΔP fault message.

## Maintenance

**Danger!**

**Before starting any work on the device switch the main switch to position 0. For disassembly a cool-down period of at least 30 minutes should be observed. Prior to any intervention, check that all motors and fans are at a standstill.**

**Activities required before starting maintenance**

- For adjustment work, measurements or the like, which have to be carried out during operation, one must on principle switch over to manual operation (ON-SITE).
- If the dehumidifier was previously operated, one is to wait for the end of the rundown period before switching the device off and for the end of the cool-down period of at least 30 minutes before disassembly.
- Secure all plant sections and operating media (such as vapour) up- and downstream the dehumidifier against inadvertent start-up.
- For all maintenance, inspection and repair work, de-energize the dehumidifier and secure the main switch against inadvertent restart.
- Attach a danger sign warning against restart.

**Notes on maintenance and repair activities**

- Perform the stipulated adjustment, maintenance and inspection work in due time.
- Inform the operating personnel before starting any maintenance and repair work.
- Upon completion of the maintenance work check all loosened screwed connections for tight fit.
- Upon completion of the maintenance work check all safety devices for proper functioning.

## Air filter change

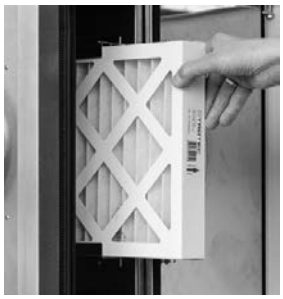
The filter change intervals depend on the degree of air pollution and the filter quality. Dirty filters impair the performance ability of the dehumidifier.

A filter change is required at the latest when the filter change indicator *FILTER* on the control panel lights up.

**Air filters for air inlet, dry air and regeneration air**

1. Open the door for accessing the air filter behind the air inlets. In case of a standard version this means the left door of the cabinet; if mirror-inverted, use the right door.

2. Pull the filters for the individual air inlet openings out towards the front.



3. Change the filters as needed.

4. Then close the cabinet door again.

**Air filter of the electrical control box**

Check the air filter of the electrical control box once a month and replace the filter mat as needed.

1. To do so, open the filter flap at the electrical control box.

2. If it is dirty, replace the filter. Then close the flap again until it snaps into place.

## Harmful influences on rotors

Some of the substances and compounds listed below are typical examples for substances dissolving the honeycombed silica gel rotors or else negatively affecting the dehumidification performance.

The sorption rotor should not be charged with air which is contaminated with the following or similar substances. Even minor concentrations in the air can have lasting harmful effects on the rotor material and the sorption capacity. The listed substances remain in the rotor material or the rotor elements and can bring about the following effects:

- Reduced performance owing to the clogging of the silica gel's pores
- Reduced performance owing to the chemical reaction with the silica gel
- Reduced performance owing to the chemical reaction with the silica gel

### A) Inorganic substances (for example)

| No. | Substances | Chemical formula | Effects |
|---|---|---|---|
| 1 | lithium chloride | LiCl | reduced productivity of the silica gel[1] |
| 2 | sodium hydroxide | NaOH | destruction of the silica gel structure |
| 3 | potassium hydroxide | KOH | destruction of the silica gel structure |
| 4 | sodium chloride | NaCl | reduced productivity of the silica gel[1] |
| 5 | potassium chloride | KCl | reduced productivity of the silica gel[1] |
| 6 | calcium chloride | $CaCl_2$ | reduced productivity of the silica gel[1] |
| 7 | magnesium chloride | $MgCl_2$ | reduced productivity of the silica gel[1] |
| 8 | ammonia | $NH_3$ | destruction of the silica gel structure |
| 9 | hydrofluoric acid | HF | destruction of the mechanical strength of the rotor material |
| 10 | aluminium chloride | $AlCl_3$ | reduced productivity of the silica gel[1] |
| 11 | sea water | | reduced productivity of the silica gel[1] |
| 12 | steam with a high temperature | | destruction of the silica gel structure |
| 13 | softener | | clogs the silica gel pores |
| 14 | strong acids | pH ≤ 2...3 | destruction of the mechanical strength of the rotor material |
| 15 | bases | pH ≥ 7...8 | destruction of the sorption capacity of the silica gel |
| 16 | amines | R-$NH_2$ | reduced productivity of the silica gel[1] |

[1] Reduces the internal pore surface of the silica gel leading to a loss of performance.

### B) Organic substances (for example)

The solvents or volatiles listed below have a high boiling point and a low vapour pressure. Provided these substances are adsorbed by silica gel, they remain in the material on a permanent basis.

| No. | Substances | Chemical formula | Effects |
|---|---|---|---|
| 1 | oil mist | | clogs the silica gel pores |
| 2 | cyclohexanone | $C_6H_{10}O$ | reduced productivity of the silica gel[1] |
| 3 | isopropyl alcohol | $CH_3H_8O$ | reduced productivity of the silica gel[1] |
| 4 | o-xylene | $C_8H_{10}$ | reduced productivity of the silica gel[1] |
| 5 | m-xylene | $C_8H_{10}$ | reduced productivity of the silica gel[1] |
| 6 | p-xylene | $C_8H_{10}$ | reduced productivity of the silica gel[1] |
| 7 | phenol | $C_6H_5OH$ | reduced productivity of the silica gel[1] |
| 8 | o-dichlorobenzenes | $C_6H_4Cl_2$ | reduced productivity of the silica gel[1] |
| 9 | methyl bromide | $CH_3Br$ | reduced productivity of the silica gel[1] |
| 10 | glycerin | $C_3H_8O_3$ | reduced productivity of the silica gel[1] |

[1] Reduces the internal pore surface of the silica gel leading to a loss of performance.

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