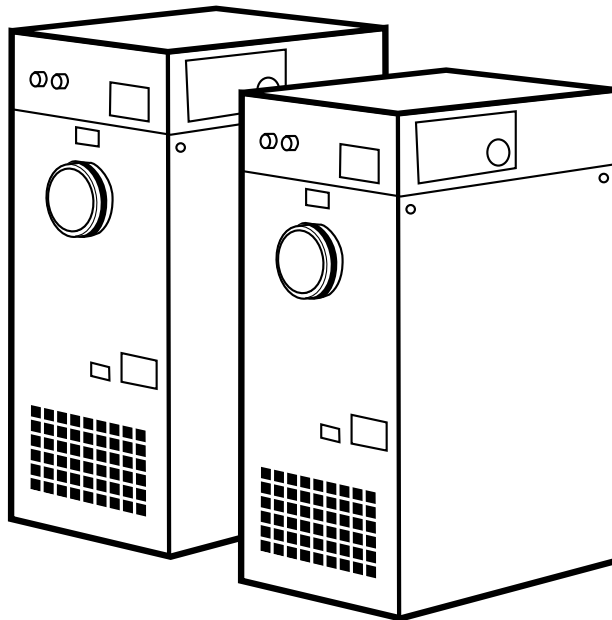


Original instructions

User manual

ML180, ML270, MLT350



Desiccant dehumidifier

190TGB-1034-L1604

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Important user information

Intended use

Munters dehumidifiers are intended to be used for the dehumidification of air. Any other use of the unit, or use which is contrary to the instructions given in this manual, can cause personal injury and damage to the unit and other property.

No modification of the unit is allowed without prior approval by Munters. Attachment or installation of additional devices is only allowed after written agreement by Munters.

Warranty

The warranty period is valid from the date the unit left our factory, unless otherwise stated in writing. The warranty is limited to a free exchange of parts or components which have failed as a result of defects in materials or workmanship.

All warranty claims must include proof that the fault has occurred within the warranty period and that the unit has been used in accordance with the specifications. All claims must specify the unit type and fabrication number. This information is stamped on the identification plate, see section *Marking*.

It is a condition of the warranty that the unit for the full warranty period is serviced and maintained by a qualified Munters engineer or Munters approved engineer. Access to specific and calibrated test equipment is necessary. The service and maintenance must be documented for the warranty to be valid.

Always contact Munters for service or repair. Operating faults can occur if the unit is maintained insufficiently or incorrectly.

Safety

Information about dangers are in this manual indicated by the common hazard symbol:



WARNING!

Indicates a possible danger that can lead to personal injury.



CAUTION!

Indicates a possible danger that can lead to damage to the unit or other property, or cause environmental damage.

NOTE! *Highlights supplementary information for optimal use of the unit.*

Conformity with Directives

The dehumidifier is in conformity with the essential safety requirements of the Machinery Directive 2006/42/EC, and in conformity with the provisions of the Ecodesign Directive (ErP) 2009/125/EC, and of the EMC Directive 2004/108/EC. The dehumidifier is manufactured by an organization certified according to ISO 9001 and ISO 14001.

Copyright

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1 Introduction

1.1 About this manual

This manual is written for the user of the dehumidifier. It contains necessary information for how to install and use the dehumidifier in a safe and efficient way. Read through the manual before the dehumidifier is installed and used.

Contact your nearest Munters office if you have any questions regarding the installation or the use of your dehumidifier.

This manual must be stored in a permanent location close to the dehumidifier.

1.2 Unintended use

- The dehumidifier is not intended for outdoor installation.
- The dehumidifier is not intended for use in classified areas where explosion safety compliant equipment is required.
- The dehumidifier must not be installed near any heat generating devices that can cause damage to the equipment.

1.3 Safety and cautions

Every measure has been taken in the design and manufacture of the dehumidifier to ensure that it meets the safety requirements of the directives and standards listed in the EC Declaration of Conformity.

The information in this manual shall in no way take precedence over individual responsibilities or local regulations.

During operation and other work with a machine it is always the responsibility of the individual to consider the following:

- The safety of all persons concerned.
- The safety of the unit and other property.
- The protection of the environment.

The types of dangers that are indicated in this manual are described in the section *Important user information*.

**WARNING!**

- *The unit must not be splashed with or immersed in water.*

- *The unit must never be connected to a voltage or frequency other than that for which it was designed. Refer to the identification plate. Line voltage that is too high can cause an electrical shock hazard and damage to the unit.*

- *Do not insert fingers or any objects into the air vents.*

- *All electrical installations must be carried out by a qualified electrician and in accordance with local regulations.*

- *The dehumidifier can restart automatically after a power cut. Always set and lock the main power switch in the OFF position before carrying out any service work.*

- *Use only approved lifting equipment to prevent personal injury and damage to the equipment.*

- *Always contact Munters for service or repair.*

1.4 Markings

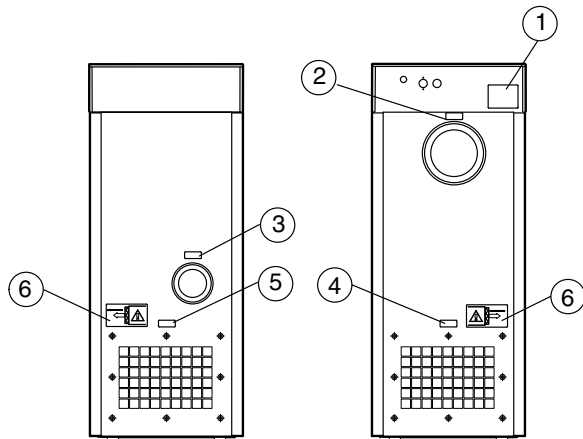


Figure 1.1 Identification plate and markings

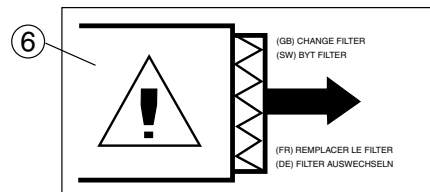


Figure 1.2 Replace filter

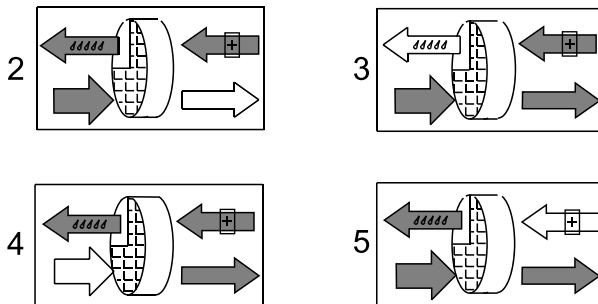


Figure 1.3 Labels for air inlets and outlets

- | | |
|------------------------------|---------------------------|
| 1. Unit identification plate | 4. Process air inlet |
| 2. Dry air outlet | 5. Reactivation air inlet |
| 3. Wet air outlet | 6. Replace filter |

1.5 Supervision of operation

The dehumidifier is controlled and monitored using the operator panel located on the front of the unit.

1.6 Fault indications

Faults are clearly indicated on the operator panel, see section 6.4, *Operator panel*.

Alarms relating to relative air humidity are given in the display of the humidity control system (if installed), see appendix 1.3, *Humidity control system*.

2 Dehumidifier design

2.1 Product description

The desiccant dehumidifiers in the ML series have been developed to effectively dehumidify the air in environments requiring low air humidity.

The dehumidifier is equipped with an encapsulated rotor unit. The rotor casing is constructed of durable thermoset plastic and contains isolated sections that provide a precise balance for the dehumidification, reactivation and heat recovery airflows.

The dehumidifier is manufactured in accordance with uniform European standards and established requirements for CE-marking.

2.2 Function description

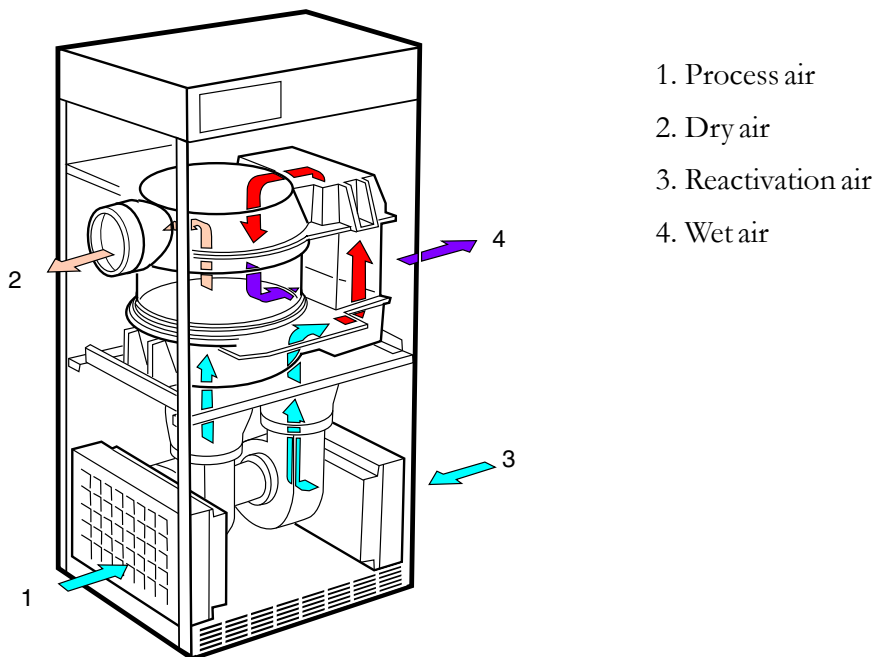


Figure 2.1 Internal airflows

The desiccant rotor is the adsorption dehumidifying component in the unit. The rotor structure is comprised of a large number of small air channels.

The desiccant rotor is made of a composite material that is highly effective in attracting and retaining water vapour. The rotor is divided in two zones. The airflow to be dehumidified, **process air**, passes through the largest zone of the rotor and then leaves the rotor as **dry air**. Since the rotor rotates slowly, the incoming air always meets a dry zone on the rotor, thus creating a continuous dehumidification process.

The airflow that is used to dry the rotor, **reactivation air**, is heated. The reactivation air passes through the rotor in the opposite direction to the process air and leaves the rotor as **wet air** (warm, moist air). This principle enables the dehumidifier to work effectively, even at freezing temperatures.

2.3 Main components

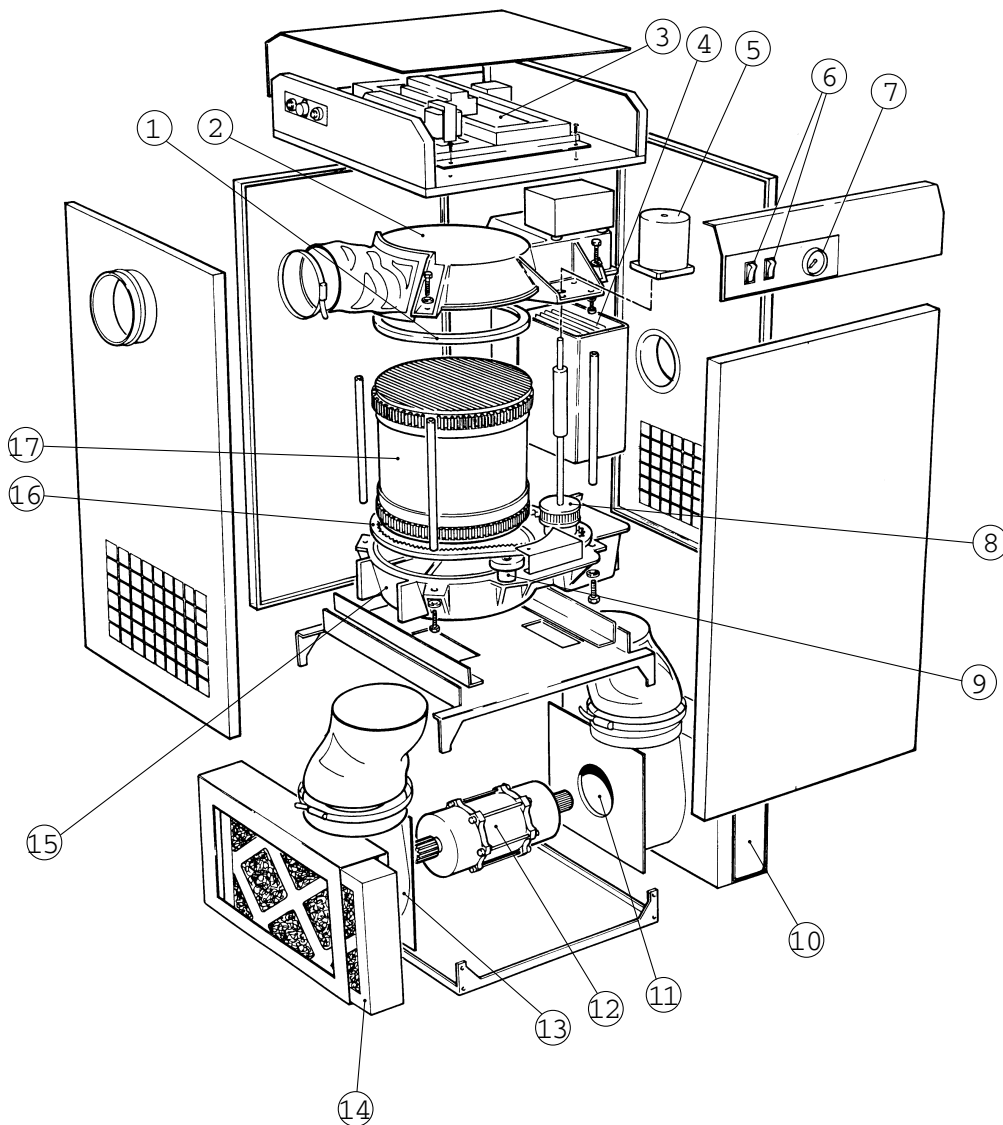


Figure 2.2 Main components

- | | |
|-----------------------------|-------------------------------|
| 1. Sealing ring, rotor | 10. Reactivation air filter |
| 2. Upper rotor cover | 11. Reactivation air impeller |
| 3. Electrical control panel | 12. Fan motor |
| 4. Reactivation heater | 13. Process air impeller |
| 5. Drive motor | 14. Process air filter |
| 6. Switch (rocker, 2-pole) | 15. Lower rotor cover |
| 7. Temperature indicator | 16. Drive belt |
| 8. Pulley, belt drive | 17. Rotor |
| 9. Roller, belt guide | |

3 Transport, inspection and storage

3.1 Transport

The dehumidifier is delivered on a pallet and must be handled carefully. All panel doors on the unit must be closed during transport. Provided that the dehumidifier is still secured to its delivery pallet, it can be moved using a fork-lift truck.



WARNING!

Move the dehumidifier carefully as there is a risk of the dehumidifier tipping over.

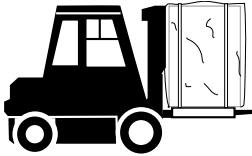


Figure 3.1 Correct length on forklift arms

Weight of the dehumidifier can be found in section 9.1, *Dimensions and service space*.

3.2 Inspection of delivery

- Do an inspection of the delivery and compare with the delivery note, order confirmation or other delivery documentation. Make sure that everything is included and nothing is damaged.
- Contact Munters immediately if the delivery is not complete or damaged in order to avoid installation delays.
- Remove all packaging material from the unit, and make sure that no damage has been made during transportation.
- Any visible damage must be reported in writing to Munters within 3 days and prior to installation of the unit.
- Discard the packaging material according to local regulations.

3.3 Storing the equipment

Follow these instructions if the dehumidifier is to be stored prior to installation:

- Place the dehumidifier in an upright position on a horizontal surface.
- Re-use the packaging material to provide protection for the unit.
- Protect the dehumidifier from physical damage.
- Store the dehumidifier under cover and protect it from dust, frost, rain and aggressive contaminants.

4 Installation

4.1 Safety



WARNING!

- *The unit must not be splashed with or immersed in water.*
- *The unit must never be connected to a voltage or frequency other than that for which it was designed. Refer to the identification plate. Line voltage that is too high can cause an electrical shock hazard and damage to the unit.*
- *Do not insert fingers or any objects into the air vents.*
- *All electrical installations must be carried out by a qualified electrician and in accordance with local regulations.*
- *The dehumidifier can restart automatically after a power cut. Always set and lock the main power switch in the OFF position before carrying out any service work.*
- *Use only approved lifting equipment to prevent personal injury and damage to the equipment.*
- *Always contact Munters for service or repair.*



CAUTION!

The wet air duct must always be insulated when there is a risk of freezing. Condensation builds up easily on the inside of the duct because of the high moisture content of the wet air leaving the dehumidifier.



CAUTION!

The dehumidifier has been designed to operate at specific process airflows corresponding to the fan sizes installed.

4.2 Site requirements

The dehumidifier is only intended for indoor installation. Avoid installing the dehumidifier in a damp environment where there is a risk of water entering the unit or in a very dusty environment. If in doubt, contact Munters. It is important that the intended installation site meets the location and space requirements for the equipment in order to achieve the best possible performance.

For the unit dimensions and service space requirements, see section 9.1, *Dimensions and service space*.

NOTE! *If there is a need for reduction of vibrations from the dehumidifier, contact Munters for instructions.*

4.3 Foundation

The dehumidifier must be installed on a level floor, or on a platform capable of supporting the machine weight. If the maximum floor loading weight is not exceeded, special foundations are not required.

When the dehumidifier has been installed, check that it is level.

If local regulations require that the unit is permanently fixed in position, the fixing holes can be used for bolting the unit to the floor.

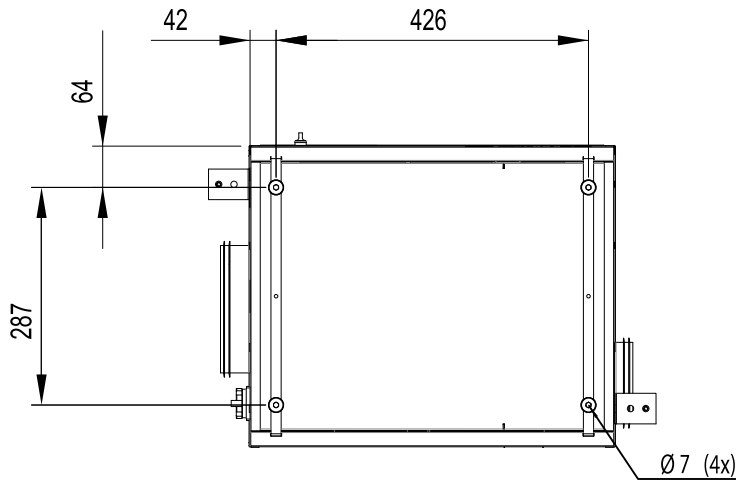


Figure 4.1 Drilling pattern

4.4 Mirror handed duct connections

The front and rear panels are interchangeable, so that the connections for process air and dry air may be situated either on the left or right side of the unit.

The dehumidifiers are delivered with the process and dry air connections on the left side of the unit. If it is required to change the orientation, so that the connections are on the right side of the unit, proceed as follows.



WARNING!

Make sure that the dehumidifier is disconnected from the mains power before changing the positions of the process air and dry air connections.

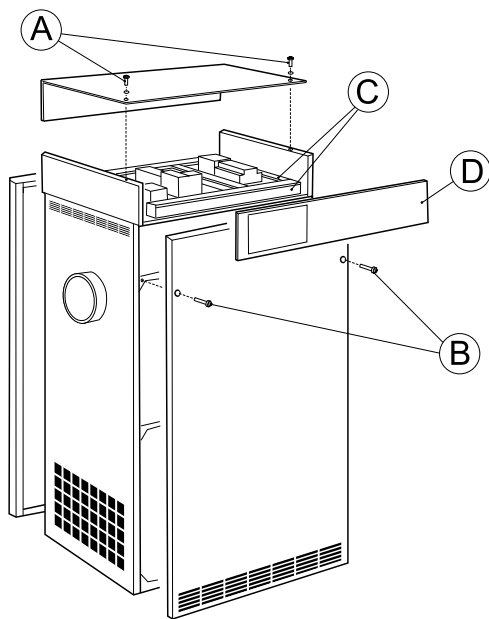


Figure 4.2 Changing panel positions

1. Remove the two bolts (B) securing the front panel and carefully remove the panel.
2. Remove the two bolts securing the rear panel and carefully remove the panel.
3. Remove the two bolts (A) and washers securing the control and top panels, then carefully remove the top panel.
4. Remove the cable duct covers (C), re-route the cables and fit the control panel (D) onto the opposite side of the unit. Refit the cable duct covers.
5. Fit the front, rear and top panels in their new positions.

4.5 Duct installation

4.5.1 General recommendations

The connections for process and reactivation air are designed in accordance with the recommendations in ISO 13351. The rectangular duct connections contain tapped inserts for M8 screws.

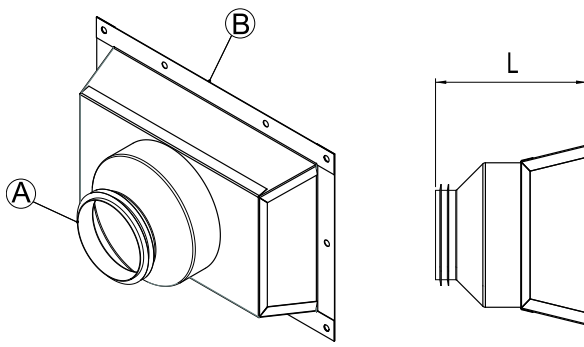


Figure 4.3 Duct connections

Part number	170-013477-001	170-013477-002	170-013477-003	170-013477-004
A	Ø80	Ø100	Ø125	Ø160
B	See 9.1, <i>Dimensions and service space</i> .			
L (mm)	225	225	220	140
ML180	X		X	
ML270		X		X
MLT350	X		X	



CAUTION!

The dehumidifier has been designed to operate at specific process airflows corresponding to the fan sizes installed.

- The process air and dry air ducts should be the same diameter. The same applies to the reactivation air and wet air ducts.
- The length of ductwork must be kept as short as possible to minimise static air pressure losses.
- To maintain performance, all rigid process or reactivation air ductwork joints must be air and vapour tight.
- The process air ductwork must be insulated to prevent condensation developing on the outside of the duct, whenever the temperature of the air within the duct falls below the dewpoint temperature of the ambient air through which the ductwork is routed.
- The ducts must always be insulated when there is a risk of freezing.
- The wet air leaving the dehumidifier will, because of high moisture content, condense on the inside duct walls. By insulating the ducts, the amount of condensate is reduced.
- Horizontal wet air ducts must be installed with a slight decline (away from the dehumidifier) to drain away possible condensation. Suitable condensation drains must be installed at low points in the wet air outlet duct, see *Figure 4.6*.
- Ensure that access for operation and servicing is not restricted when designing and installing ducting. For more information, refer to section 9.1, *Dimensions and service space*.
- To reduce noise and/or vibration being transmitted along rigid ducts, good quality, airtight flexible connections can be fitted.
- Ducts mounted directly onto the unit must be independently supported to minimise the load on the unit.
- Dampers for adjusting the airflows must be installed in the supply air outlet and reactivation air inlet ducts. Correct airflows are essential for the operating efficiency of the unit. For airflow adjustment instructions, see section 5.2, *Airflow check and adjustment*.
- The total pressure drop in the process and reactivation ductwork must not exceed the available pressure of the fans fitted to the dehumidifier. For details of minimum available static pressure, see section 9.3, *Technical data*.

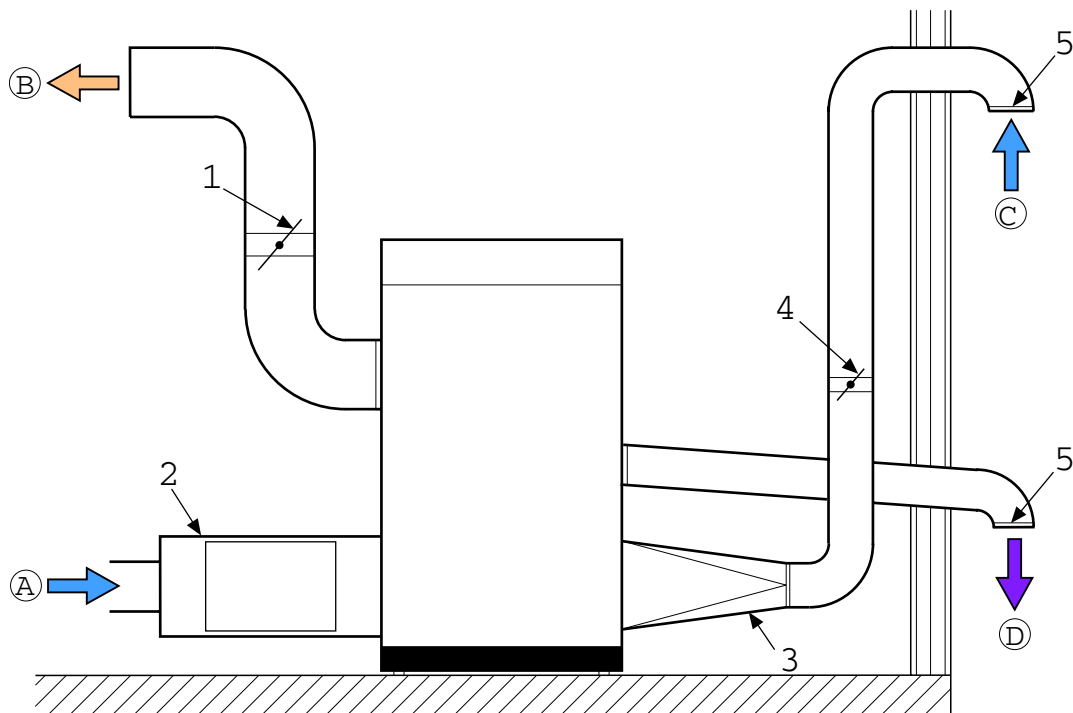


Figure 4.4 Ducts required for installation

- | | |
|---------------------------|-------------------------------------|
| A. Process air inlet | 1. Dry air damper |
| B. Dry air outlet | 2. External filter box (option) |
| C. Reactivation air inlet | 3. Duct transition |
| D. Wet air outlet | 4. Reactivation air damper |
| | 5. Outlet/inlet duct (wire netting) |

4.5.2 Duct for outdoor air inlet

When bringing ambient air from outdoors into the dehumidifier, the inlet duct opening must be located sufficiently high above ground level to prevent dust and debris from entering.

The ducting must be designed to prevent rain and snow from being drawn into the dehumidifier. The air inlet must be located away from possible contaminants such as engine exhaust gases, steam and harmful vapours.

To prevent the wet (outlet) air from humidifying the reactivation (inlet) air, the air inlet for reactivation must be located at least 2 m from the wet air outlet.

Attach a wire net with a mesh width of approximately 10 mm in the outer end of the duct to prevent animals from entering the dehumidifier ducting.

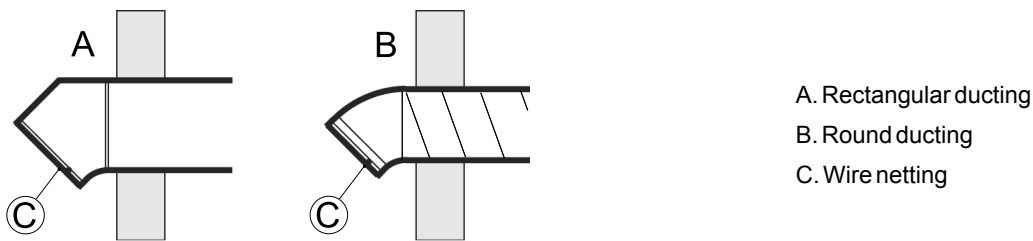


Figure 4.5 Outdoor air inlet design

4.5.3 Duct for wet air outlet

Make sure that the ambient air pressure is the same at the air inlet and at the wet air outlet to prevent the risk of reverse airflow.

The material for the wet air duct must withstand corrosion and temperatures of up to 100 °C. The wet air ducting must always be insulated if there is a risk of condensation. The wet air leaving the dehumidifier will easily cause condensation on the inside of the duct walls due to the high moisture content.

Horizontal ducts must be installed sloping downwards (away from the dehumidifier) to drain away possible condensation. The duct slope must be at least 2 cm/m. In addition, drainage holes (5 mm) should be made at low points in the duct to prevent water accumulation.

Attach a wire net with a mesh width of approximately 10 mm in the outer end of the duct to prevent animals from entering the dehumidifier ducting.

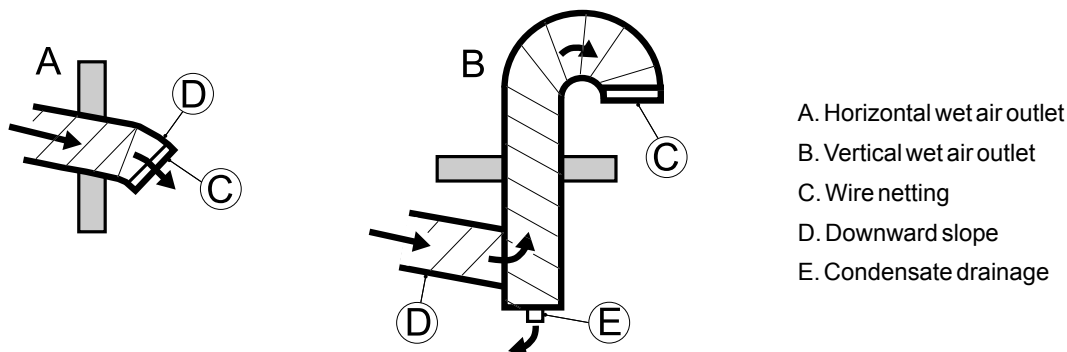


Figure 4.6 Wet air outlet design

4.6 Precautionary measures for units with LI desiccant rotor

The standard delivery is Munters high performance desiccant rotor HPS (High Performance Silica gel). If the dehumidifier is delivered with an LI rotor (lithium chloride) it is important that the rotor does not become loaded with moisture when the dehumidifier is off.

NOTE! *Make sure that no air passing through the rotor has a relative humidity greater than 80%.*

It is recommended to install closing dampers in the process and reactivation air inlets to avoid that air with high relative humidity is drawn through the rotor and into the room.

This is particularly important when the process air is drawn from outdoors, or when the system has been fitted with a pre-cooler.

4.7 Electrical connections



WARNING!

All electrical equipment connections must be carried out in accordance with local regulations and by qualified personnel. Risk of electrical shock.



WARNING!

The unit must never be connected to a voltage or frequency other than that for which it was designed. Refer to the unit identification plate.

Each unit is supplied complete with all the internal wiring installed and configured in accordance with the specified voltage and frequency on the identification plate.

ML180 & MLT350 dehumidifiers are supplied complete with a prewired mains cable. The cable is fitted with a multi-pin plug suitable for connection to a single phase earthed mains socket.

NOTE! *The supply voltage must not differ from the specified operating voltage by more than +/- 10%.*

For connection details, see the identification plate and the wiring diagram or section 9.3, *Technical data*.

4.8 External humidity sensor

ML-series dehumidifiers are wired so that when the unit is set to **AUTO**matic, it can be controlled from an externally mounted humidity sensor.

ML180-MLT350 have been designed with a one-step heater, and therefore control is limited to switching the unit on and off using a one-step humidity sensor.

A low voltage connector (mounted on the side of the unit) is provided for electrical connection of a one-step humidity sensor. For more information, see the wiring diagram.

NOTE! *Where no humidity sensor is connected to the unit, the dehumidifier will be operating at maximum output for as long as the unit is switched on.*

A room humidity sensor is to be mounted 1-1.5 m above the floor. It must be positioned so that it is not directly exposed to dry air from the unit or to humid air flowing in through opening doors. Position it away from heat sources and direct sunlight.

- The humidity sensor connecting cable should have a conductor area of not less than 0,75 mm² and must have an insulation resistance rating in excess of 500 VAC.

- The humidity sensor must be designed so that the contacts close on a rising RH to complete the control circuit and start the dehumidifier.
- Voltage drops can occur when using excessively long cables.

If the voltage across the terminals used for connecting the humidity sensor is less than 20 VAC, a separate relay controlled by the humidity sensor must be used.

5 Commissioning

Prior to starting for the first time, some operating parameters must be set in the control system, see chapter 6.4, *Operator panel*.

Some features require connection of external equipment. For wiring details, see the wiring diagram.

5.1 Pre-start checks



WARNING!

Installation, adjustments, maintenance and repairs must only be carried out by qualified personnel who are aware of the risks involved when working with equipment operating with high electrical voltage and high machine temperatures.

Before starting the dehumidifier for the first time, ensure that the mains power supply is isolated from the dehumidifier and carry-out the following checks:

1. Check that the Mode switch on the dehumidifier is in the “OFF” position, see section 6.4, *Operator panel*.
2. Check the air intake filters for damage and proper fixation and also check that all areas inside the unit are clean.
3. Visually inspect all ducting and duct connections to make sure that all connections have been correctly installed and that there are no signs of damage to the system. Also check that all ducts are free from obstacles blocking the air passage.
4. Remove the top panel and check that none of the main contact breakers in the electrical operator panel have been tripped. For details refer to the wiring diagrams provided with the unit.
5. Check that the incoming power supply voltage is correct and that the cables are correctly connected.
6. The ML270 has a 3 phase fan motor and the rotation direction of the fan impeller must be checked after connection to the power supply. Open the front panel of the dehumidifier and take out the process filter. Start the dehumidifier and check that the fan impeller is rotating. Switch off the dehumidifier and watch the fan impeller just before it stops rotating. Check that it is rotating clockwise.
7. If an external humidity sensor is used, check that the sensor is correctly positioned in the room and is correctly connected to the unit, see section 4.8, *External humidity sensor*.
8. Set the process and reactivation airflow dampers to the fully open position.

5.2 Airflow check and adjustment

To obtain the design performance, the dry air and reactivation airflow dampers must be correctly adjusted in accordance with the rated airflow, see section 9.3, *Technical data*.

If necessary, contact Munters for assistance concerning installation and settings. Munters contact addresses are provided on the back cover of this manual.



CAUTION!

Incorrectly set process and reactivation airflows can cause the unit to malfunction.

Any damage to the unit resulting from incorrect adjustment of the airflows can invalidate the warranty of the unit.

The unit must not be run for more than a few minutes before setting up the correct airflows.

1. Adjust the dampers installed in the dry air outlet and reactivation air inlet ducts to the correct rated airflows.
2. Start the dehumidifier and run at full power for 8 minutes to allow the reactivation heater to reach its normal operating temperature.
3. Verify that the temperature difference between the reactivation inlet air and the reactivation temperature is 95 °C (tolerance limit ± 5 °C). If the temperature difference lies outside of the 5% tolerance limit, the reactivation air damper can be adjusted in small steps until the reactivation temperature is within the specified tolerances. Allow the temperature to stabilise after each adjustment.

Example:

Inlet air temperature = 15 °C

Reactivation air temperature = 110 °C

Temperature increase = 95 °C

6 Operation

6.1 General

ML180-MLT350 dehumidifiers are equipped with an operator panel with a mode selector switch, Run/Stop switch and LED indicators.

The mode selector of the operator panel has two operating positions:

MAN (Manual mode)

The dehumidifier fans, rotor and reactivation heater operate continuously at full capacity.

AUTO (Automatic mode)

The dehumidifier fans, rotor and reactivation heater operate when the relative humidity exceeds the desired value.

6.2 Quick stop

ML180 & MLT350

To start and stop the unit in normal operation the Run/Stop switch is used. In case of an emergency switch the unit off using the main power switch or unplug the unit from the wall outlet.

ML270

To start and stop the unit in normal operation the Run/Stop switch is used. In case of an emergency switch the unit off using the main power switch.



CAUTION!

Only use the main power switch to stop the unit in the case of an emergency. The normal shutdown sequence will not be followed. The fans stop and the heater can be very hot, which can result in damage to the heater and other components close to it.

6.3 Before starting

Follow the instructions in sections 5.1, *Pre-start checks* and 5.2, *Airflow check and adjustment* before initial start-up of the dehumidifier.

6.4 Operator panel

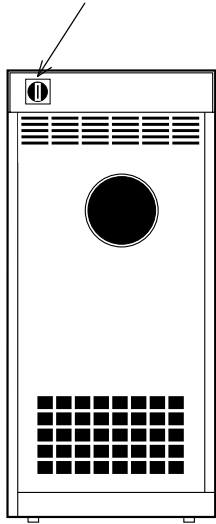


Figure 6.1 Main power switch

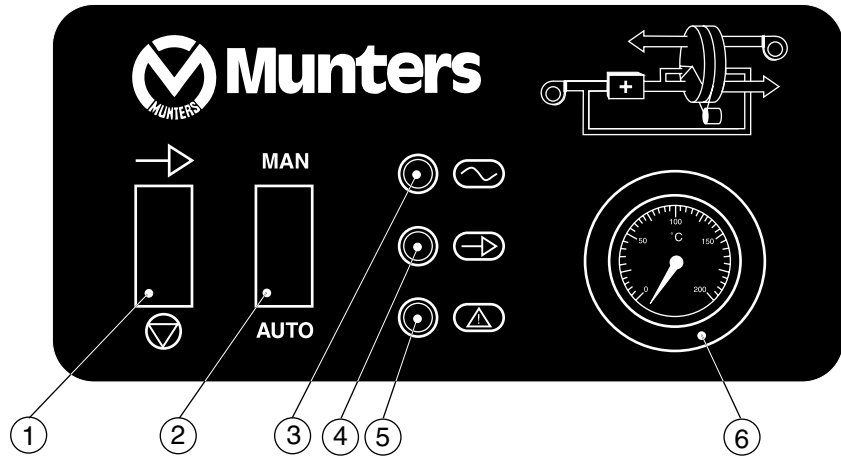


Figure 6.2 Operator panel

Item	Switch/Indicator	Function
1	Run/Stop Switch	When the Run/Stop switch is set to Stop the unit switches off. When the mode switch is set to MAN and the run/stop switch is set to Operation the dehumidifier starts. When the mode switch is set to AUTO and the run/stop switch is set to Operation the dehumidifier can be controlled by an external humidity sensor or RH98.
2	Mode Switch	When the mode switch is set to MAN the dehumidifier runs in manual mode. In this mode the unit will run continuously when the run/stop switch is operated to the position Operation . When the mode switch is set to AUTO the dehumidifier runs in automatic mode. In this mode a humidity sensor or RH98 must be connected to the unit. When the Run/Stop switch is set to Operation the humidity sensor or RH98 determines when the dehumidifier starts and stops.
3	Power Connected Indicator	Indicates that mains power is connected to the dehumidifier.
4	Unit Running Indicator	Indicates that the dehumidifier is running, or is ready to start on a signal from the humidity sensor or RH98 (automatic mode).
5	Fault Warning Indicator	Indicates that the unit has shut-down due to the control circuit detecting that either the high temperature cut-out or the fan motor overload has tripped. For units fitted with an air cooled condenser, the fault warning indicator is activated when there is a condenser fan or heater fault.
6	Temperature Gauge	Indicates the Reactivation Air temperature.
7	Running time meter (optional)	Indicates the number of hours that the dehumidifier has been operating.

Table 6.1 Operator panel functions

6.5 RH98 operator panel

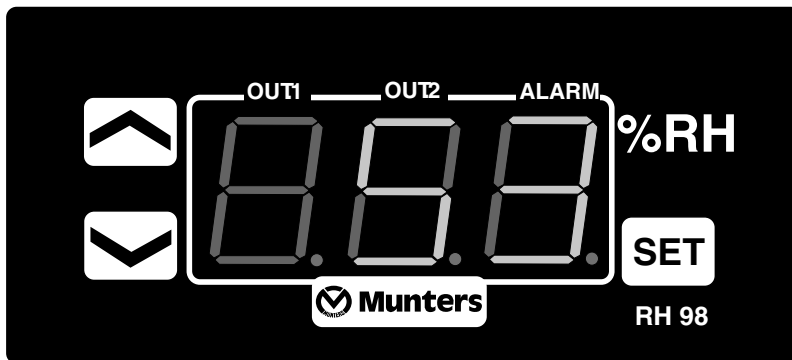


Figure 6.3 RH98 operator panel

Checking and changing set points and control parameters can be made during operation or in stand-by mode.







Button	Function
	Display/change a certain value and reset the alarm
	Increase the value
	Decrease the value
	% RH: Display position of control steps for reactivation heater (0 = off; 1 = on).

Table 6.2 RH98 operator panel functions

During normal operation and in any position of the mode switch the current relative air humidity is displayed.

6.6 Operating the unit



6.6.1 Manual mode

1. Check that the Run/Stop switch is set to  (Stop).
2. Operate the mode switch to position **MAN**.
3. Connect mains power to the unit and ensure that the power connected indicator is illuminated.
4. Operate the run/stop switch to position  (Operation). Ensure that the unit running indicator is lit and the unit is operating.
5. Operate the run/stop switch to position , check that the unit stops and that the unit running indicator goes out.

For details on the operator panel, see section 6.4, *Operator panel*

6.6.2 Automatic mode – humidity sensor connected

To run the unit in **AUTO** mode, there must be a one-step humidity sensor connected. For more details, see section 4.8, *External humidity sensor*.



1. Operate the mode switch to position **AUTO**.
2. Adjust the humidity sensor setpoint for the minimum relative humidity (RH) value. Operate the run/stop switch to position . Ensure that the unit running indicator is lit and the unit is operating.
3. Slowly increase the humidity setpoint and check that the unit switches off when the setpoint matches the RH in the room where the humidity sensor is installed.
4. Check that the unit running indicator remains on.
5. Slowly decrease the humidity setpoint and check that the unit switches on when the setpoint falls below the RH in the room where the humidity sensor is installed.
6. Operate the run/stop switch to position  and check that the unit stops and that the unit running indicator goes out.
7. Adjust the humidity setpoint to the desired RH value.

For details on the operator panel, see section 6.4, *Operator panel*

6.6.3 Automatic mode - RH98

If the unit is fitted with a factory installed RH98 (option) humidity control system, the external humidity sensor must be installed and correctly connected to the unit. The same site requirements apply to the humidity sensor and RH98, see section 4.8, *External humidity sensor*.

For more operational details, see appendix 1.3, *Humidity control system*.

1. Operate the mode switch to position **AUTO**.
2. Adjust the RH98 setpoint to the lowest RH value, see section 6.5, *RH98 operator panel*.
3. Operate the run/stop switch to position . Ensure that the unit running indicator is lit and the unit is operating.
4. Slowly increase the humidity setpoint and check that the unit switches off when the setpoint matches the RH in the room where the humidity sensor is installed.
5. Check that the unit running indicator remains on.
6. Slowly decrease the humidity setpoint and check that the unit switches on when the setpoint falls below the RH in the room where the humidity sensor is installed.
7. Operate the run/stop switch to position  and check that the unit stops and that the unit running indicator goes out.
8. Adjust the humidity setpoint to the desired RH value.

7 Service and maintenance

7.1 Safety



Figure 7.1 Electrical hazard



Figure 7.2 Secure against reconnection



WARNING!

Adjustments, maintenance and repairs must only be carried out by qualified personnel.



WARNING!

Before doing any service or maintenance work on the unit make sure that all electrical equipment is disconnected from the power supply, and secured against reconnection.

7.2 General

Munters dehumidifiers are designed for long-term, continuous usage with a high degree of reliability. As with all machinery, regular service and maintenance is required to keep the dehumidifier in optimal condition so that it works most efficiently.

Service and maintenance interval lengths are primarily determined by operating conditions and the environment in which the unit is installed. For example, if the process air contains a lot of dust, preventative maintenance should be carried out at shorter intervals. The same also applies if the unit works intensively.

7.3 Service options

In addition to commissioning of the unit there are four service options (A - D) as standard.

S. Commissioning/ start-up.

A. Inspection and if necessary change of filter. General function check.

B. In addition to A, safety check and capacity, temperature and humidity regulation measurements.

C. In addition to B, preventive replacement of some components after 3 years of operation.

D. In addition to C, preventive replacement of some components after 6 years of operation.

NOTE! Always contact Munters for service or repair. Operating faults can occur if the unit is maintained insufficiently or incorrectly.

NOTE! Commissioning/Start-up inspection "S" by Munters is mandatory to validate the full warranty.

Munters service engineers have special equipment and rapid spare parts access to handle service on all Munters products. All test equipment used by our personnel to ensure proper system balancing is certified for accuracy.

Munters Service can offer a service plan adapted to suit the conditions of a specific installation. See contact addresses on the back page of this manual.

7.4 Extended warranty

Munters offers an extended warranty to the standard terms when the Customer signs a service agreement with Munters. Details are available on request.

7.5 Cleaning

Use only a pH-neutral soapy water solution and a soft sponge for cleaning of the unit casing.

When cleaning the inside, avoid contact with the rotor and wipe the surfaces dry.

Use a vacuum cleaner with a brush head for the rotor. Contact Munters for instructions if vacuum cleaning is not sufficient.

7.6 Service and maintenance schedule

Service work	Service option	S	A	B	A	B	A	C	A	B	A	B	A	D
	Operating time in hours	0	4000	8000	12000	16000	20000	24000	28000	32000	36000	40000	44000	48000
	Calendar time in months	0	6	12	18	24	30	36	42	48	54	60	66	72
Check and replace filter if necessary, check functions		X	X	X	X	X	X	X	X	X	X	X	X	X
Capacity check, rotor inspection		X		X		X		X		X		X		X
Preventive inspection incl. safety check		X		X		X		X		X		X		X
Replace high temperature cut-out								X						X
Check drive belt and support rollers and replace if necessary								X						X
Replace drive motor														X
Check fans, impellers, motor, bearings														X
Check electrical and control systems, check function		X		X		X		X		X		X		X
Calibrate humidity control equipment and sensors		X		X		X		X		X		X		X
Calibrate temperature control equipment and sensors		X		X		X		X		X		X		X
Check rotor housing, replace rotor gaskets if necessary														X
Replace the rotor only when a capacity check shows that it is necessary.														






Table 7.1 Service and maintenance schedule

NOTE! *Service work should be performed at indicated operating hours or calendar time, whichever is reached first.*

NOTE! *Maintenance schedule restarts again after maintenance type D.*

7.7 Filter change

Replace the filters if necessary every 6 months, see description below.

<p>1. Loosen the two screws on the top of the frontpanel. Use Allen Key No. 5.</p>	
<p>2. Lift the panel and remove it from the unit.</p>	
<p>3. Pull out the filter cartridge.</p>	
<p>4. Clean the filter housing.</p>	
<p>5. Put in a new filter. Follow the arrow to get the correct airflow direction.</p>	
<p>6. Lift the panel in place. Make sure the two bottom hooks fit into the panel.</p>	
<p>7. Tighten the two top screws.</p>	

8 Fault tracing

8.1 General

The purpose of this chapter is to provide guidance in basic fault tracing and provide instructions for corrective actions to remedy any faults. Go through the list in section 8.3, *Fault tracing list* before contacting Munters. The list provides help in identifying types of faults that are easy to remedy without the assistance of specially trained personnel.

8.2 Safety



WARNING!

Installation, adjustments, maintenance and repairs must only be carried out by qualified personnel who are aware of the risks involved when working with equipment operating with high electrical voltage and high machine temperatures.



WARNING!

Before doing any service or maintenance work on the unit make sure that all electrical equipment is disconnected from the power supply, and secured against reconnection.

8.3 Fault tracing list

The control panel LED are the primary source of information for fault tracing when the unit has given an alarm and stopped automatically.

Go through the fault tracing list below before contacting Munters service department. The list contains information for identifying faults that are easy to repair without the help of a technician.

If the unit is equipped with the humidity regulation system RH98, see also appendix

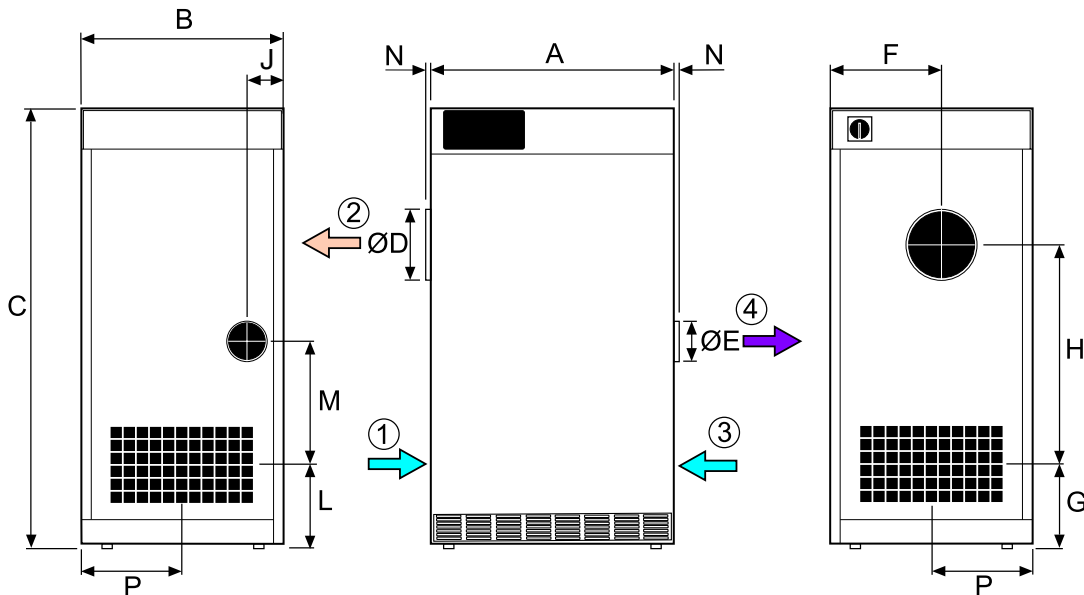
1.3, *Humidity control system*.

Symptom	Indicators	Possible cause	Corrective action
Unit has stopped.	All off.	Power supply failure.	Check the power supply to the unit.
		Transformer TC18 fuse FU18 failure.	Investigate the cause of the fault and rectify. Replace the fuse.
Unit has stopped.	No 3 & 4 are on	Unit switched to AUTOMATIC mode by mistake with no humidity sensor connected.	Set the mode switch to MAN ual, and check that the unit starts.
		Humidistat fault (AUTOMATIC mode)	Set the mode switch to MAN ual, and check that the unit starts. If the unit starts, the humidity sensor is probably at fault.
			Set the mode switch to AUT OMATIC mode, and check the humidity sensor by seeing if the dehumidifier starts when the humidity sensor setpoint is reduced. Reset the humidity sensor setpoint after the check. Calibrate the humidity sensor (in accordance with the manufacturer's recommendations) if necessary or replace
Unit has stopped.	No 5 & 3 are on	High temperature cut-out (BT20) has tripped	Switch off the mains supply and allow the unit to cool down.
			Check that the air inlet, outlet ducts and filters are free from obstructions and are not clogged with dirt
			Reset the cut out when the unit has cooled down.
		Reactivation airflow is set too low.	Reset the cut out
Unit has stopped.	No. 5,3 & 4 are on.	ML180 & MLT350: Circuit Breaker QM12 tripped due to a drive motor, fan fault or reactivation heater fault.	Switch off the mains supply and allow the unit to cool down. Reset circuit breaker QM12. Investigate the cause of the fault and rectify or call Munters.
		ML270: Circuit Breaker QM12 tripped due to a drive motor or fan motor fault. Circuit Breaker QM15 tripped due to a reactivation heater fault.	Switch off the mains supply and allow the unit to cool down. Reset circuit breakers QM12 & QM15. Investigate the cause of the fault and rectify or call Munters.
		Air cooled condensor models: ML180 & MLT350: Circuit Breaker QM12 tripped due to a drive motor, fan fault, condensor fan fault or condensor heater fault.	Investigate the cause of the fault and rectify or call Munters. Reset QM12.
Unit has stopped.	No. 5,3 & 4 are on.	ML270: Circuit Breaker QM12 tripped due to a drive motor, fan fault, condensor fan fault or condensor heater fault. Circuit Breaker QM15 tripped due to a reactivation heater fault.	Investigate the cause of the fault and rectify. Reset QM12 and QM15.
Loss of performance: Dehumidifier appears to be operating correctly, but is not controlling the humidity		Heating capacity is too low.	Check the operation of the heater.
		Reactivation and process airflows are not in accordance with the rated airflow.	Check and adjust the reactivation and process airflows, see section 5.2, <i>Airflow check and adjustment</i> .
		Rotor drive failure.	Check rotor drive belt and drive motor.
		Humidity sensor or RH98 not functioning correctly (AUT OMATIC mode).	Check the operation and calibration of the humidity sensor or RH98 in accordance with the manufacturer's recommendations.

Table 8.1 Fault tracing list

9 Technical specification

9.1 Dimensions and service space



- 1. Process air inlet
- 2. Dry air outlet

- 3. Reactivation air inlet
- 4. Wet air outlet

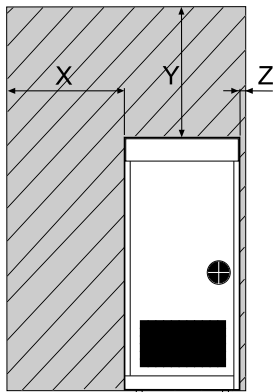


Figure 9.1 Required service space

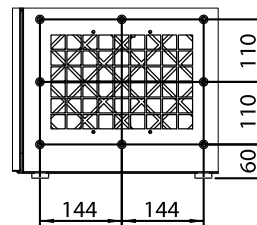


Figure 9.2 Hole pattern for duct connection

Model	Dimensions (mm)																Weight (kg)
	A	B	C	ØD	ØE	F	G	H	J	L	M	N	P	X ⁽¹⁾	Y ⁽¹⁾	Z ⁽¹⁾	
ML180	515	415	910	125	80	222	170	500	138	170	250	45	206	450	400	50	56
MLT350	515	415	910	125	80	222	170	500	138	170	250	45	206	450	400	50	56
ML270	515	415	1010	160	100	217	168	600	138	168	253	45	205	450	400	50	63

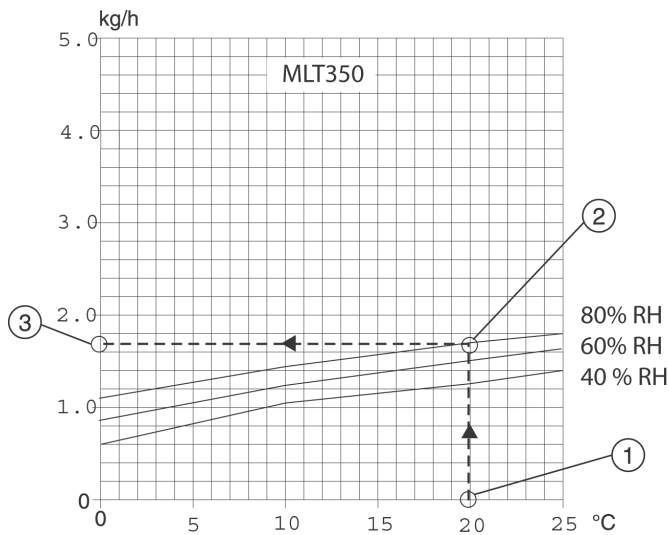
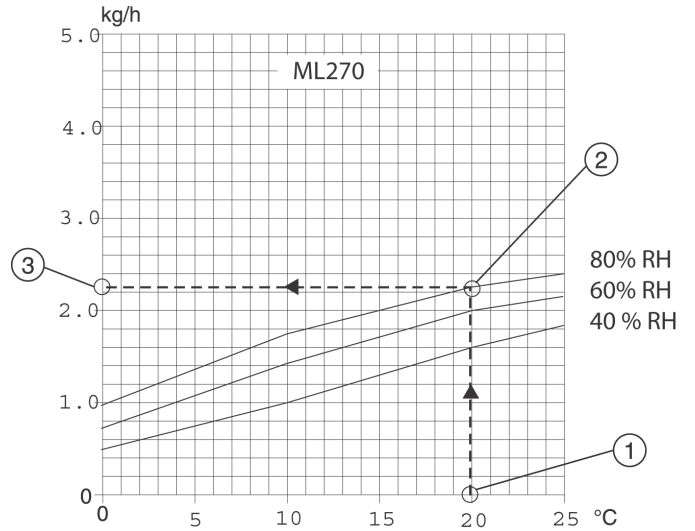
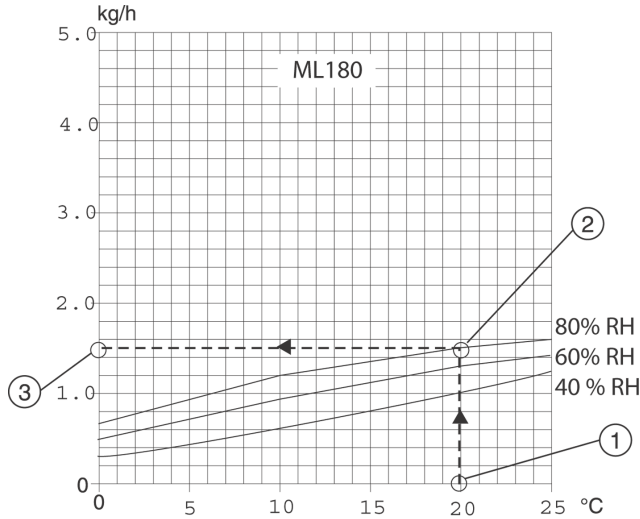
(1) Space for service.

Table 9.1 Dimensions and service space requirements

9.2 Capacity diagrams

Approximate capacity in kg/h. Please contact your nearest Munters office for more detailed information.

NOTE! The below figures are based on a rated airflow.



- 1 Process air temperature (°C)
- 2 Process air relative humidity (% RH)
- 3 Dehumidification capacity (moisture removal per hour) (kg/h)

9.3 Technical data

Model	ML180	ML270	MLT350
Process air⁽¹⁾			
Rated airflow (m ³ /s)	0,05	0,075	0,097
Rated airflow (m ³ /h)	180	270	350
Minimum available static pressure (Pa) ⁽²⁾	200	200	200
Fan motor power (kW) at 50Hz ⁽³⁾	0,25	0,36	0,25
Fan motor power (kW) at 60 Hz ⁽³⁾	0,25	0,36	0,25
Reactivation air⁽¹⁾			
Rated airflow (m ³ /s)	0,019	0,027	0,019
Rated airflow (m ³ /h)	67	99	67
Minimum available static pressure (Pa)	200	200	200
Fan motor power (kW) at 50Hz ⁽³⁾	-	-	-
Fan motor power (kW) at 60 Hz ⁽³⁾	-	-	-
Rated current			
Current (Amps/Phase) 1~ 50 Hz 115 V	17,8	-	17,8
Current (Amps/Phase) 1~ 60 Hz 115 V	17,8	-	-
Current (Amps/Phase) 1~ 50 Hz 220 V	9,9	-	9,9
Current (Amps/Phase) 1~ 60 Hz 220 V	9,9	-	-
Current (Amps/Phase) 1~ 50 Hz 230 V	9,5	-	9,5
Current (Amps/Phase) 1~ 50 Hz 240 V	9,2	-	9,2
Current (Amps/Phase) 3~ 50 Hz 220 V	-	8,5	-
Current (Amps/Phase) 3~ 60 Hz 220 V	-	8,5	-
Current (Amps/Phase) 3~ 50 Hz 230 V	-	8,2	-
Current (Amps/Phase) 3~ 60 Hz 230 V	-	8,1	-
Current (Amps/Phase) 3~ 50 Hz 380 V	-	5	-
Current (Amps/Phase) 3~ 60 Hz 380 V	-	5	-
Current (Amps/Phase) 3~ 50 Hz 400 V	-	4,7	-
Current (Amps/Phase) 3~ 50 Hz 415 V	-	4,6	-
Current (Amps/Phase) 3~ 60 Hz 440 V	-	4,3	-
Current (Amps/Phase) 3~ 60 Hz 460 V	-	4,1	-
Current (Amps/Phase) 3~ 60 Hz 480 V	-	4	-

Reactivation heater			
Temperature increase across heater (°C)	95	95	95
Reactivation heater power (kW)	1,8	2,7	1,8
Miscellaneous data			
Filters	G4		
IEC protection class (unit)	IP33		
IEC protection class (electrical panel)	IP54		
Fan motor winding insulation class	Class F		
Drive motor winding insulation class	Class F		
High temperature cut-out (°C)	160 ± 5		
Contactors coil voltage (V AC)	24		
Corrosion class, outside casing	C4 (painted, AluZink 150, ISO 12944)		
Corrosion class, inside casing	C3 (unpainted, AluZink 150, ISO 12944)		
Environmental conditions			
Operating temperature (°C)	-20... +40		
Maximum installation altitude, above sea level (m)	2000		
Transport and storage temperature (°C)	-20... +70		
(1) Figures quoted are based on fan inlet temperature of 20°C, and an air density of 1,2 kg/m ³ . (2) Without optional F5 or F7 filter boxes. (3) ML180, ML270, MLT350 dehumidifiers have a single motor driving both process and reactivation air fans.			

Table 9.2 Technical data

9.4 Sound data

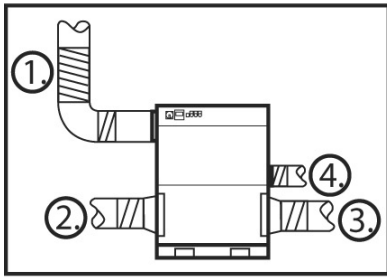


Figure 9.3 Duct connections

1. Ductwork for dry air
2. Ductwork for process air
3. Ductwork for reactivation air
4. Ductwork for wet air

Definitions:

$L_p(A)$ = Sound pressure (free field, Directivity factor $Q=2$, $d=1$ distance from source in meter)

$L_p(A) = L_w(A) + 10\text{Log}(Q/(4\pi d^2))$

$L_w(A)$ = Sound power level dB (A-weighted)

9.4.1 Sound data ML180

Lp(A) at 1 m	Lw(A)	Measure range (Hz)							
		63	125	250	500	1000	2000	4000	8000
dB	dB								
53	61	74	71	63	58	53	48	43	38

Table 9.3 Sound to room, all inlets and outlets ducted

Duct	Lw(A)	Measure range (Hz)							
		63	125	250	500	1000	2000	4000	8000
	dB								
1. Dry air	69	93	76	70	63	57	49	43	33
2. Process air	71	92	81	75	66	55	55	49	41
3. React air	71	91	79	69	70	59	53	50	44
4. Wet air	72	93	81	76	68	58	42	34	27

Table 9.4 Sound in ducts

9.4.2 Sound data ML270

Lp(A) at 1 m	Lw(A)	Measure range (Hz)							
dB	dB	63	125	250	500	1000	2000	4000	8000
56	64	70	71	65	60	56	56	54	49

Table 9.5 Sound to room, all inlets and outlets ducted

Duct	Lw(A)	Measure range (Hz)							
	dB	63	125	250	500	1000	2000	4000	8000
1. Dry air	74	93	82	79	70	63	60	51	40
2. Process air	76	90	85	78	73	67	66	60	55
3. React air	77	95	81	79	75	69	61	59	52
4. Wet air	77	97	85	82	70	57	44	40	28

Table 9.6 Sound in ducts

9.4.3 Sound data MLT350

Lp(A) at 1 m	Lw(A)	Measure range (Hz)							
dB	dB	63	125	250	500	1000	2000	4000	8000
53	61	76	71	65	53	52	51	46	45

Table 9.7 Sound to room, all inlets and outlets ducted

Duct	Lw(A)	Measure range (Hz)							
	dB	63	125	250	500	1000	2000	4000	8000
1. Dry air	73	89	80	77	69	63	61	53	45
2. Process air	74	91	81	78	70	64	62	59	56
3. React air	70	91	79	70	68	61	54	52	45
4. Wet air	74	94	83	78	68	59	40	35	23

Table 9.8 Sound in ducts

10 Scrapping

The unit must be scrapped in accordance with applicable legal requirements and regulations. Contact your local authorities.

If the rotor or filters have been exposed to chemicals that are dangerous to the environment the risk must be assessed. The chemicals can accumulate in the material. Take the necessary precautions to comply with applicable local legal requirements and regulations.

The rotor material is not combustible, and should be deposited like glass fibre materials.



WARNING!

If the rotor is to be cut in pieces, wear a suitable CE marked face mask selected and fitted in accordance with the applicable safety standards to protect from the dust.

Appendix 1 Options

1.1 General

The ML-series dehumidifiers are designed so that optional products can be easily fitted to them.

This appendix contains information about all optional configurations and components that can be added when ordering ML dehumidifiers.

NOTE! *Voltage drops can occur when using excessively long cables. If there is less than 20 V supply at the connection points of the humidity sensor (on the dehumidifier), a separate relay controlled by the humidity sensor must be used.*

1.2 Running time meter

The running time meter records the total number of hours the dehumidifier has run. The last two digits represent a percentage part of an hour. The running time meter cannot be reset.

Example: 0000475 represents four hours and 45 minutes.

1.3 Humidity control system

1.3.1 Introduction

Munters RH98 is a humidity control system intended for use with Munters dehumidifiers. RH98 controls the air humidity by regulating the power to the unit reactivation heater.

The system comprises a humidity transmitter and a control unit. The humidity transmitter is a true two wire transmitter, which is positioned where the air humidity is to be controlled, either in the relevant room or in the air duct.

The control unit sends control signals to the dehumidifier. The power control is performed in one or two steps.

The system has a potential free contact to which an external alarm device can be connected.

1.3.2 Transmitter

The humidity transmitters are available in two different types, wall or duct mounted.

The humidity transmitter sensor emits a signal proportional to the air humidity.

The signal is amplified and sent to the control unit by cable.

The humidity transmitter sensor is sensitive and must be handled with care.

1.3.3 Control unit

The control unit contains a controller, which receives the signal from the humidity transmitter. The controller then sends a control signal to the dehumidifier which determines the reactivation heater output.

There is also an operator panel with a display on the control unit. During normal operation, the display shows the current measured air humidity.

Different parameters can be set using the push buttons on the panel. Examples are settings for air humidity, controller limits and alarm limits.

The control unit constantly receives a signal from the humidity transmitter, and controls the air humidity by regulating the power to the unit reactivation heater in one or two steps. In the event of two heater steps, a basic step 2/3 of the reactivation output is achieved, after which 1/3 of the reactivation output can be controlled as a following step.

The control unit is provided with a potential free contact to which an external alarm device can be connected. The external alarm is activated together with the internal alarm.

1.3.4 Setpoints and control parameters

Checking and changing setpoints and control parameters can be made during operation or in stand-by mode.

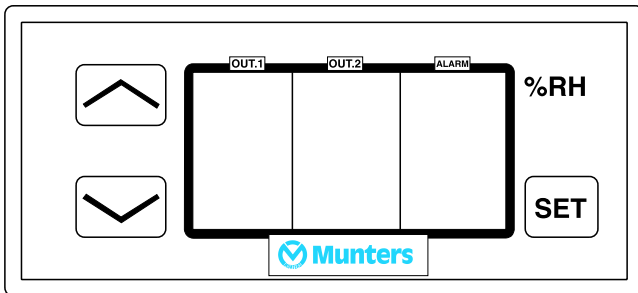


Figure 1.1 Operator panel

Button	Function
	Display/change a certain value and reset the alarm
	Increase the value
	Decrease the value
	% RH: Display position of control steps for reactivation heater (0 = off; 1 = on).







During normal operation and in any position of the mode switch the current relative air humidity is displayed.



CAUTION!










Damage due to incorrect adjustment of the system may invalidate the warranty.

1.3.5 Display/change setpoint for relative humidity

1. Press/release . The value in the lower right corner starts flashing and shows the current setpoint. The display automatically returns to normal after about twenty seconds, i.e. shows current value for relative humidity.
2. Press and hold down  and the current setpoint lights up with a fixed light. When the button is released again, the display flashes before automatically returning to normal.
3. Press and hold down  and at the same time press  or  to set the desired setpoint.
4. Release  and the display starts to flash, indicating the new setting before it automatically returns to normal i.e. shows the current air humidity.

1.3.6 Display/change other parameters

The operator panel setpoints are preset at the factory to 50% RH. Several other internal parameters can be set in addition to the setpoint, e.g. differential, sensor offset and setpoint range, see *Table 1.1*.

1. Press and hold down  for more than ten seconds to show the parameter menu. The characters in the top and bottom segments in the left-hand display start to flash. Parameter 10 is shown. Release .
2. Press  or  to select a parameter.
3. Press and hold  to show the current value for the selected parameter.
4. Press and hold  and press  or  to change the parameter value.
5. Release . The new settings are saved automatically. The display automatically returns to normal after about twenty seconds, i.e. shows current value for relative humidity.

Parameter	Description	Possible parameter selection	Default setting
05	Correction of the humidity transmitter's read-off value	0 % RH	No settings
10	OFF/ON interval, stage1	1-15 % RH	2 % RH ⁽¹⁾
11	Offset stage 1	-15 - +15 % RH	-1 % RH
12	OFF/ON interval, stage 2	1-15 % RH	6 % RH ⁽²⁾
13	Offset stage 2	-15 - +15 % RH	-1 % RH
14	OFF/ON interval alarm output	1-15 % RH	1 % RH
15	Offset from set point, alarm output	-15 - +15 % RH	0 % RH
30	Alarm threshold type:	0 = Not activated; 1 = Absolute; 2 = Relative	2
31	Minimum alarm threshold	-100 - +100 % RH	-50 % RH
32	Maximum alarm threshold	-100 - +100 % RH	10 % RH
33	Delay for minimum alarm	0 - 99 minutes	0 min.
34	Delay for maximum alarm	0 - 99 minutes	0 min.
35	Function of alarm output	0 = monitor alarm 1 = check	1
36	Reset alarm when the cause of the alarm is rectified	0 = No; 1 = Yes	1
37	Alarm resetting when the SET button is pressed (display only)	0 = No; 1 = Yes	1
40	Power delay after power failure	0 - 99 minutes	0 min.
41	Forced relay function at humidity transmitter failure	0 = Off; 1 = Humidification; 2 = Dehumidification	2

(1) Activated when RH exceeds 2% of the setpoint, deactivated when RH falls below 1% of the setpoint.

(2) Activated when RH exceeds 6 % of the setpoint, deactivated when RH falls below 1% of the setpoint.

Table 1.1 Operator panel system parameters – RH98

1.3.7 Process alarms


The operator panel is equipped with an internal alarm that is activated when the alarm thresholds are exceeded. The alarm is indicated in the display on the operator panel.

Alarm messages

The display on the operator panel shows the following messages (steadily lit):

rHI	Upper alarm limit exceeded
rLO	Lower alarm limit exceeded
E1	Faulty humidity transmitter or incorrect connections
EEE	All parameter settings are lost

Acknowledge alarm on RH98

Acknowledge the alarm by pressing  on the operator panel. The display now starts to flash and displays the alarm message and the current relative air humidity alternately. The function for the reset button is dependent on the parameter settings, see *Table 1.1*.

Sensor calibration

The humidity transmitter's read off value can be calibrated using the operator panel sensor offset, see parameter 05, *Table 1.1*.

Example: If 3% RH is too much, the offset should be reduced by 3%.
Contact Munters for calibration of the humidity transmitter.

2 Contact Munters

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