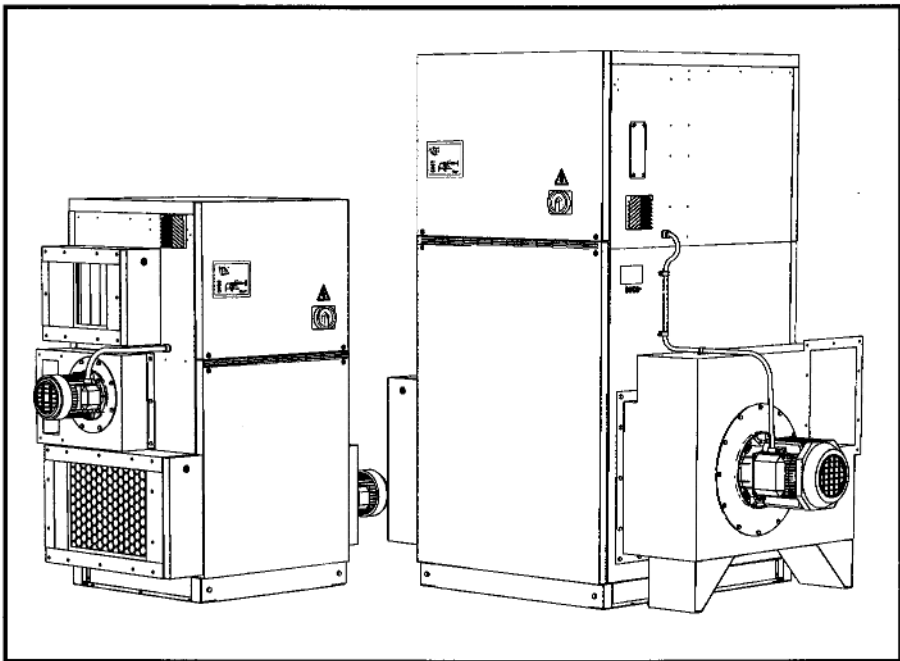


User's manual

MX/MXT

Dehumidifiers



Desiccant Dehumidifier

MX-series & MXT-series

(B) Base Control System

Effective for units manufactured from
Munters MNL FPSO failure safe dtw

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Important user information

Intended use of equipment

Munters dehumidifiers are intended to be used for the dehumidification of air. All other uses of the equipment, or use which is contrary to the instructions given in this manual, can cause personal injury and/or machine damage.

Warranty and obligations

The warranty period is 12 months from the date the equipment left our factory unless otherwise advised in writing. The warranty is limited to a free exchange complete with free freight, of faulty units or components which have failed as a result of faulty quality or defects in manufacture.

Munters guarantees that the delivered unit has undergone rigid testing to ensure that the specifications stated here are fulfilled. All claims on warranty must verify that the fault has occurred within the guarantee period, plus that the unit has been used within its operating range as stated in the specification. All claims must include the unit type and manufacturing number. This data is to be found stamped on the unit identification plate, see Section *Markings* for location.

Note

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Safety

In this publication hazardous activities are indicated and preceded by the common hazard symbol.



WARNING! is used in this publication to indicate a possible danger that could lead to personal injury. An instruction is normally given, followed by a short explanation plus the possible effect if the instruction is not followed.



CAUTION! is used in this publication to indicate a possible danger that could lead to damage to the machine or other equipment and/or cause environmental damage. An instruction is normally given, followed by a short explanation plus the possible environmental effect if the instruction is not followed.

NOTE!

Used to accentuate supplementary information that is required for problem-free use or optimal use of the unit.

Conformity with directives and standards

Munters dehumidifiers are designed and manufactured by an EN-ISO 9001 accredited development and manufacturing organization. The unit conforms with the specifications in the Machinery Directive 98/37/EEC, the Low Voltage Directive 73/23/EEC as amended by Directive 93/68/EEC and the EMC Directive 89/336/EEC as amended by Directives 92/31/EEC and 93/68/EEC. The standards applied are listed in the EC Declaration of Conformity.

1 Introduction

1.1 General

Munters MX(B)-series and MXT(B)-series are two ranges of dehumidifiers, all described in this manual. MX(B) and MXT(B) units described are designed as stand alone units.

Munters product range for dehumidification includes units designed for different applications. Contact nearest Munters dealer regarding any questions for specific installations.

1.2 Manual composition

The goal of this manual is to provide necessary information to the user - the operator - to be able to understand the unit design and function. This manual is also a guideline during installation, operation and maintenance. General troubleshooting is also provided, before Munters Product Service must be involved.

The manual composition is based on numbered chapters, including main activities and functions normally included in a standard unit. Numbered chapters are followed by Appendices, including more detailed information.

Each individual application/configuration adds a number of functions and components to the base unit. This is specified through the "MX Dehumidifier Configuration" sheet, which can be found in front of this manual. This sheet also includes references to Appendices, where more information about configuration functions and components can be found.

For wiring details (including control options), refer to the *Electrical Wiring Diagram Supplement*.

For steam reactivation heater details, refer to the *Steam Heater Supplement*.

1.3 Product range and applications

The MX(B)¹ range of dehumidifiers are designed for process airflows between 1500 and 7600 m³/h and are ideally suited for environments where simple 1- or 2-step humidistat control is required.

The MXT(B) range covers process airflows between 2100 and 9000 m³/h, and are specifically designed for dehumidification control in storage environments, ice rinks, swimming pools and other applications requiring high moisture removal combined with good energy efficiency.

1. (B)= "Base Control System"

1.4 Principle of operation

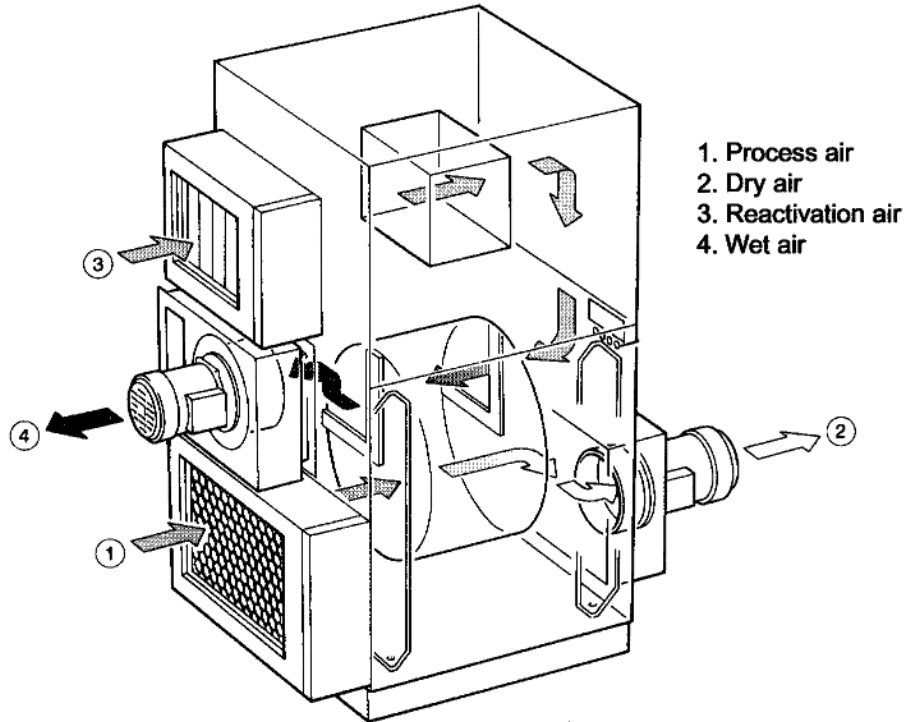


Figure 1-1. Airflow overview

1.4.1 Dehumidification

The desiccant rotor is the moisture absorbing part of the dehumidifier. The rotor is divided into two sectors comprising the Process Sector (270°) and the Reactivation Sector (90°). The air to be dehumidified (Process Air) is drawn through the process sector of the rotor, whose structure forms narrow air flutes. The walls of the rotor include High Performance Silica Gel (S) or Lithium Chloride (L) which absorbs the moisture from the air, and the resulting dry air is delivered at the dry air outlet. Refer to *figure 1-1*.

1.4.2 Reactivation

A separate airflow (Reactivation Air) is heated and drawn through the reactivation sector of the rotor. This heated air evaporates the moisture from the reactivation sector of the rotor. The moisture laden air (Wet Air) is then vented outside the humidity controlled atmosphere. Refer to *figure 1-1*.

Whilst this sequence is occurring, the rotor is slowly rotating (approximately 8 revolutions per hour). This rotation ensures that a new section of the rotor requiring reactivation is continuously presented to the heated reactivation sector. At the same time a new section of reactivated rotor is presented to the process air, ready to absorb moisture. The dehumidification process is therefore repeated continuously.

1.5 Construction

The dehumidifiers are designed to meet the requirements of IEC protective class IP 44.

All the functional components are enclosed in a corrosion resistant Aluzink® case (standard) or stainless steel case (option) which ensures ease of installation and access for maintenance. See *figure 1-2*.

The unit is constructed on a steel base frame which allows the use of a fork-lift truck during transportation and installation.

The seals dividing the process and reactivation airflows are designed to very high standards, and their low frictional properties guarantee long and continuous service life.

The control system provides a "simple" display to show the operating status of the unit and the reactivation air temperature.

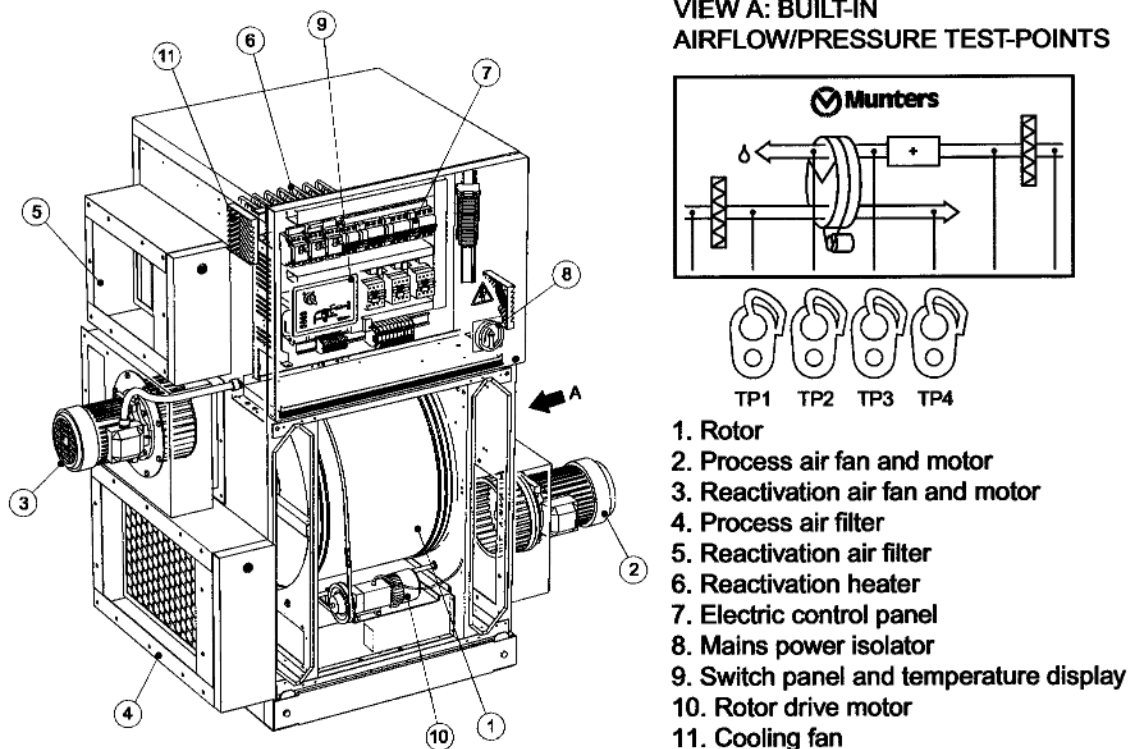


Figure 1-2. General arrangements

1.6 Configuration

An MX/MXT unit can be configured to fit a large number of applications in terms of capacity and functionality. Maximum capacity and most functions are specified at the ordering procedure, but some functions can be set and altered at start-up. Refer to *section 2.11. Pre-Start settings*.

Each individual unit is specified through the “MX Dehumidifier Configuration” sheet, which can be found in front of this manual. For more information about configuration functions and components, refer to *appendix 1. General configurations* and *appendix 2. Control configurations*.

1.7 Markings

Identification and information markings are positioned on the unit as follows:

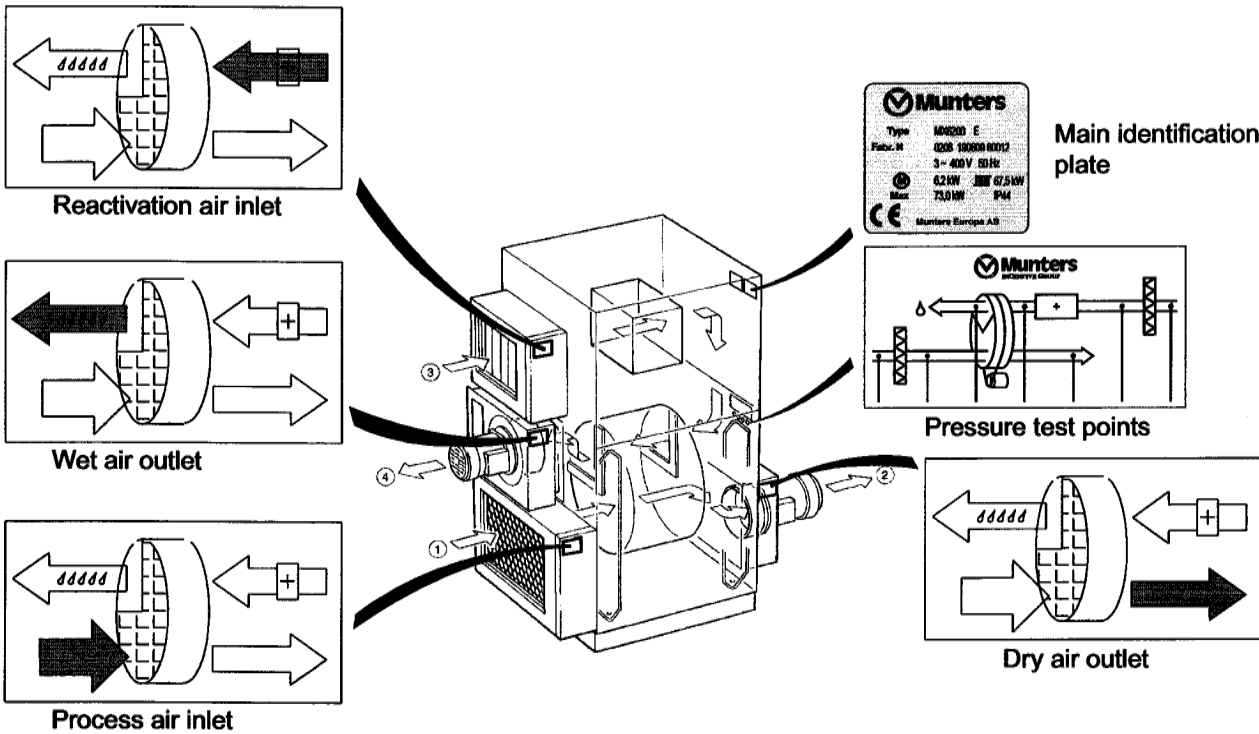


Figure 1-3. Marking overview

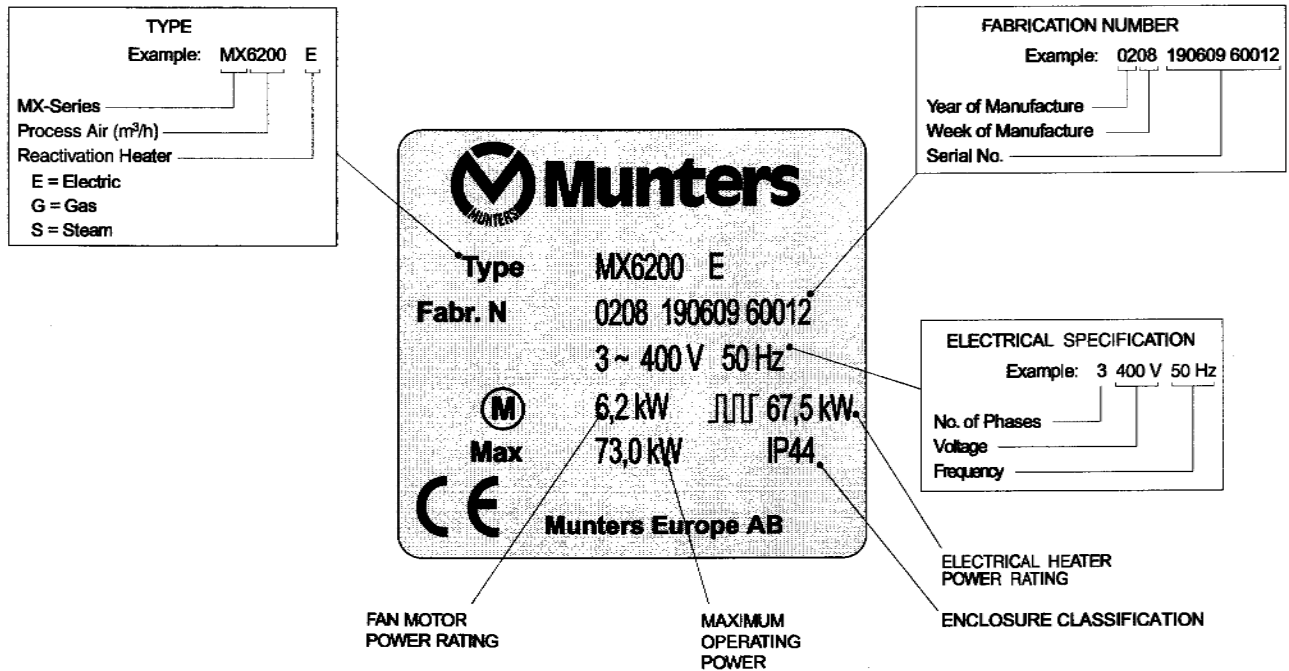


Figure 1-4. Example of identification plate content

1.8 Safety and Cautions

The contents of this manual include suggested best working practices and procedures. These are issued for guidance only, they do not take precedence over the individual responsibility and/or local safety regulations. During installation and operation of this equipment it is always each individual person's responsibility to consider:

- Their own and others' personal safety
- The safety of the unit through correct use of the equipment in accordance with the descriptions and instructions given in this manual.

Every care has been taken in design and manufacture of MX(B) / MXT(B)-Series dehumidifiers to ensure that they meet the safety requirements of the directives and standards listed in the EC Declaration of Conformity.

It is recommended to be informed about the use of safety symbols in this manual by reading the *Important user information* in front of this chapter. The relevant safety information for this manual will be found listed early in each manual section.

2 Installation

2.1 Safety



WARNING! *Heavy load, the dehumidifier weighs in excess of 350 kg. To prevent injury, or damage to the dehumidifier, always use approved equipment.*



WARNING! *Electrical connections must be carried out in accordance with local electricity regulations by qualified personnel.*



WARNING! *The dehumidifier must never be operated on a voltage or frequency other than that for which it was manufactured.*



WARNING! *Connection of steam pipes must be carried out in accordance with local regulations by qualified personnel.*



WARNING! *Rotating hazard - to prevent access to the fan impellers the dehumidifier must only be run with the wet and dry air ducts connected.*



CAUTION! *Failure to correctly adjust the process and reactivation airflows could cause the unit to malfunction.*

2.2 Delivery and storage

To ensure consistent quality and maximum reliability, each dehumidifier is inspected before leaving the factory. If the dehumidifier is to be put into storage, prior to installation, the following precautions should be observed:

- The dehumidifier must be protected from physical damage.
- The dehumidifier must be stored under cover and protected from dust, frost and rain.

2.3 Inspection

Remove the transit packing and inspect the unit to ensure that no damage has occurred during transit. Any visible damage must be reported to Munters prior to installation.

If the connecting services and ductwork have been pre-installed, they should be checked to ensure that they are suitable. If the environmental or installation conditions are unsatisfactory, Munters Technical Support should be contacted for further advice.

2.4 Moving the dehumidifier



WARNING! *Heavy load, the dehumidifier weighs in excess of 350 kg. To prevent injury, or damage to the dehumidifier, always use approved equipment.*

The dehumidifier must always be handled with care. It can be moved using either an overhead crane or a fork-lift truck. If an overhead crane is used, it is necessary to take the precaution of using a suitable sling which will keep clear of, and prevent damage to, the motors, control panel and exposed pipework.

To gain access to the fork-lift positions, remove the kick plate (for details refer to *figure 2-1*). When the unit has been lifted into position, the kick plate should be replaced.

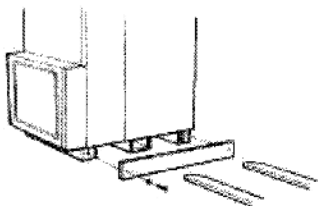


Figure 2-1. Fork lift positions

For skid mounted version do not use fork-lift positions. Only use hoisting lugs (for details refer to *figure 2-1-1*).

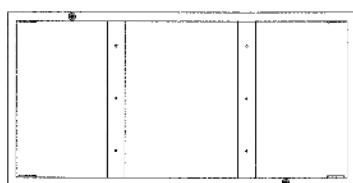


Figure 2-1-1. Hoisting lug positions

2.5 Location requirements

To achieve optimum performance and trouble-free service, it is essential that the proposed installation site meets with the location and space requirements for the model being installed. For dimensions, weight and space requirements, including service access details, refer to *section 6.2. Dimensions and space requirements*.

NOTE! *It is important to ensure that the minimum service access space is maintained for cleaning and maintenance purposes.*

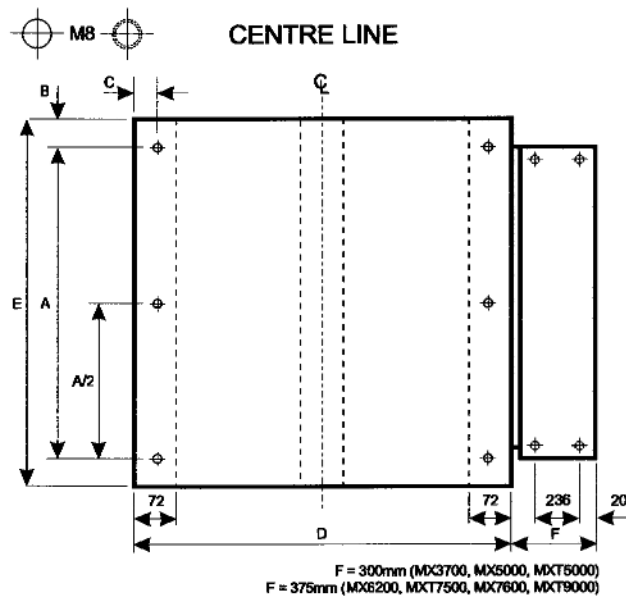
To prevent condensation forming inside the dehumidifier, it must not be exposed to ambient air temperatures less than the dewpoint of the process air. In addition, if the dehumidifier is installed outdoors, it must be properly sheltered from snow, frost and rain.

2.6 Foundations

The dehumidifier must be installed on a level floor, or platform, which has been designed with a floor loading capacity capable of supporting the machine's weight. If the maximum floor loading weight is not exceeded, special foundations are not required.

When the dehumidifier has been installed, it should be checked 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 or to a skid. For drilling details refer to *figure 2-2*.



ITEM	MX1500-MX2700 MXT2100-MXT2500	MX3700-MX7600 MXT5000-MXT9000
	DIMENSION (mm)	DIMENSION (mm)
A	600	900
B	92	92
C	25	35
D	800	1 000
E	785.5	1 190

Figure 2-2. Plinth drilling pattern

2.7 Ducting principles

2.7.1 General recommendations

The connections for process and reactivation air are designed in accordance with the recommendations in ISO 7807. The duct connections contain tapped inserts for M8 bolt fixings. For connection details refer to *figure 2-5*.

NOTE!

Where angle-flanged duct connections are installed, the fixing bolt length must not exceed 20mm.

When installing ductwork between the dehumidifier and the inlet and outlet connections, the following recommendations should be observed:

- The length of ductwork should be kept as short as possible to minimise static air pressure losses.
- To maintain performance, all rigid ductwork joints must be air and vapour tight.

- The process air ductwork should be insulated to prevent condensation from developing on the outside of the duct whenever the temperature of the air within the duct falls below the dewpoint of the ambient air through which the ductwork is routed.
- The ducting must always be insulated when there is a risk of freezing.
- The wet air leaving the dehumidifier will, due to high moisture content, condense on the inside duct walls. This must be avoided by insulating the ducting.
- Horizontal (reactivation) duct-runs should be installed sloping downwards (away from the dehumidifier) to allow for condensate drainage. On the wet air outlet ducting, suitable condensate drains should be appropriately installed at low points in the ductwork. Refer to *figure 2-3*.
- Ensure that access for operation and service is not restricted when designing and installing ducting. For details refer to *section 6.2. Dimensions and space requirements*.
- To reduce noise and/or vibration being transmitted along rigid ductwork, high quality, airtight flexible connections should be fitted.
- Ducts mounted directly onto the dehumidifier should be adequately supported to minimise the load and stress due to the duct weight and movement.
- Dampers for balancing the airflows must be installed in the dry air outlet and the reactivation air inlet ducts. The correct airflows are essential for maintaining the operating efficiency of the unit. For air flow adjustment details, see *section 2.12.2. Airflow adjustment*.
- The total resistance in the process and reactivation ductwork must not exceed the performance rating of the fans fitted in the dehumidifier. For details of available static pressures refer to *section 6.1. Main data*.
- The wet air ducting should be manufactured in corrosion resistant material, e.g. stainless steel, aluminium or plastic, and should be capable of withstanding temperatures of up to 100° C.

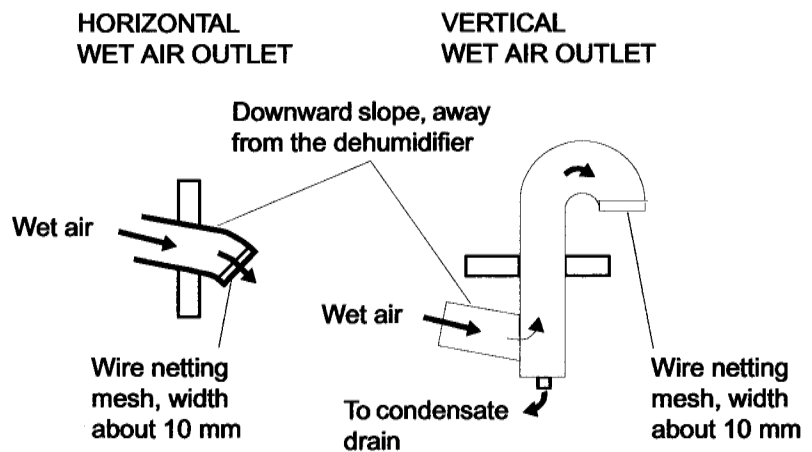


Figure 2-3. Wet air outlet design

When bringing outside air into the dehumidifier, the opening to the inlet duct should be sufficiently located above ground level to prevent the pick-up of dust and debris. The air inlet must be located away from possible contaminants such as engine exhaust gasses, steam and harmful vapours.

To prevent the wet (outlet) air humidifying the reactivation or process (inlet) air, the outdoor air inlet must be located at least 2 meters from the wet air outlet. In addition, the ducting should be designed to prevent rain and snow from being drawn into the dehumidifier. Refer to *figure 2-4*.

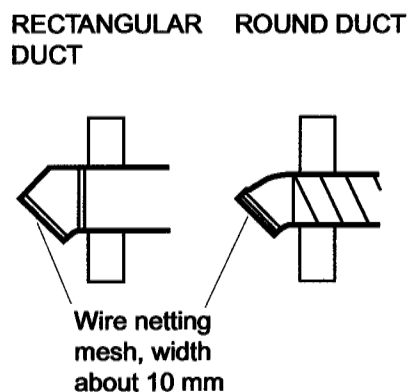


Figure 2-4. Outdoor air inlet design

2.7.2 Precaution for units using LI desiccant rotor

To prevent a lithium chloride (LI) desiccant rotor from becoming overloaded when the dehumidifier has been switched off, air with a relative humidity exceeding 80% must not pass through the rotor! It is recommended to install motorized and air tight shut-off dampers in the inlet process and reactivation air openings to the dehumidifier. This to prevent air with very high relative humidity from inadvertently being drawn through the rotor by a chimney effect created by ancillary equipment. This is particularly important when the process air is drawn from outdoors, or the system has been fitted with a pre-cooler. Failure to observe these precautions could result in a serious loss of performance and may cause permanent damage to the rotor.

2.7.3 Duct connections

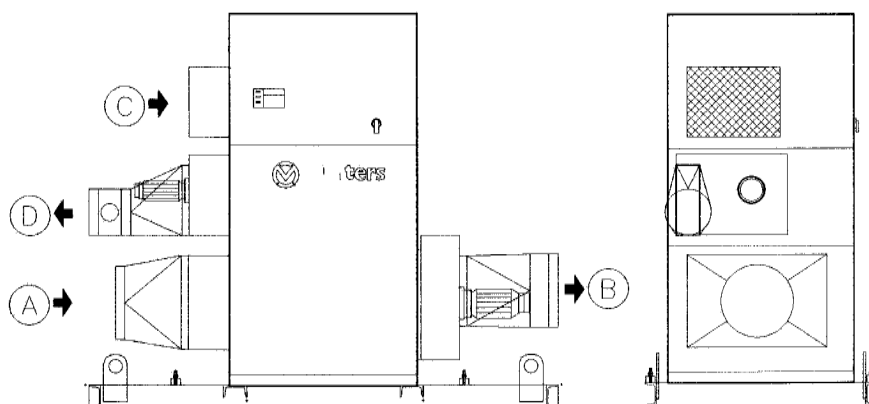


Figure 2-5. Duct connection details

Model	Process Air Inlet (Ø mm) A	Dry Air outlet (Ø mm) B	Reactivation Air Inlet (Ø mm) C	Wet Air Outlet (Ø mm) D
MX1500	248	248	Wire netting/158	158
MX2100			Wire netting/???	
MX2700	313	313	Wire netting/198	198
MX3700			Wire netting/???	
MX5000	398	398	Wire netting/248	248
MX6200			Wire netting/???	
MX7600			Wire netting/???	

Table 2-1. Duct connection dimensions, MX-series

2.8 Electrical connection



WARNING! *Electrical connections must be carried out in accordance with local electricity regulations by qualified personnel.*

The unit is designed for 3-phase AC operation. Each unit is supplied complete with all the internal wiring installed and configured in accordance with the specified voltage and frequency specified on the identification plate (*figure 1-4*).



WARNING! *The dehumidifier must never be operated on a voltage or frequency other than that for which it was manufactured.*

The main power supply is connected directly on the switch disconnecter/main circuit breaker on the unit. The supply cable, and main fuses if the unit is equipped with a switch disconnecter, must be sized in accordance with the unit being installed.

On units equipped with main circuit breaker it is not necessary to install main fuses in the supply (also refer to local regulations).

For connection details refer to the identification plate and the Electrical Wiring Diagram Supplement.

2.9 Wet air Temperature controller

The MX(B) and MXT(B)-Series dehumidifiers are equipped with a wet air temperature controller. The wet-air temperature is limited to 50 °C.

- ☞ Electrical reactivation by two-step heater control.
- ☞ Steam reactivation by modulating steam valve.

2.9.1 Location of controller

- ☞ The controller is located on the electrical panel . All parameters are presetted at time of delivery.
- ☞ Parameter list as in Appendix.
- ☞ Location of wet-air temperature sensor, in wet-air compartment. Behind frontpanel on left-side.

2.10 Steam heater connection



WARNING! *Connection of steam pipes must be carried out in accordance with local regulations by qualified personnel.*

For details on installation, commissioning and maintenance of steam heaters refer to the *MX/MXT-Series Steam Heater Supplement* (supplied with the dehumidifier).

2.11 Pre-Start settings

All MX(B)/MXT(B) units are equipped with a number of standard features requiring a few selections and settings before the unit is put in operation for the first time.

Some features require connection of external equipment. For wiring details refer to the *Electrical wiring diagram Supplement*.

Further pre-start settings of configuration features can be required. Each individual unit is specified through the *MX Dehumidifier Configuration* sheet, which can be found in front of this manual. For more information about configuration functions and components, refer to *appendix 1. General configurations*.

2.11.1 Continuous process air fan operation

Default setting is that the process fan is automatically operated only when dehumidification is needed. However, continuous process airflow may be desirable even when there is no demand for dehumidification. Continuous process fan operation can be set in accordance with the *Electrical wiring diagram Supplement*.

2.11.2 Remote fault indication

A signal from voltage-free contacts on the display PCB can be used to provide a remote general indication of the following faults on the dehumidifier:

- ⚡ Process air fan
- ⚡ Reactivation air fan
- ⚡ Drive motor
- ⚡ Heaters 1, 2 or 3 (Electric reactivation heater models only)
- ⚡ Rotor stopped (if option fitted)

External signal voltage maximum 50 V. Refer to the *Electrical Wiring Diagram Supplement*.

2.11.4 Remote fault indication

A signal from voltage-free contacts on the display PCB can be used to provide a remote general indication of the following faults on the dehumidifier:

- ✍ Process air fan
- ✍ Reactivation air fan
- ✍ Drive motor
- ✍ Heaters 1, 2 or 3 (Electric reactivation heater models only)
- ✍ Rotor stopped (if option fitted)

External signal voltage maximum 50 V. Refer to the *Electrical Wiring Diagram Supplement*.

2.12 Pre-start checks

2.12.1 Installation

Before starting the dehumidifier for the first time, carry-out the following checks:

1. Ensure that all transit packaging and blanking plates (if fitted) have been removed.
2. Carry-out a visual check on all ductwork, and duct insulation, for correct connection and for general signs of damage. Check the steam connections (if applicable) to ensure that all pipes are correctly installed and secured.
3. Check that the incoming power supply cables have been correctly installed and that a fused isolator, fitted with the correct rated fuses, has been fitted within easy reach of the dehumidifier. Check that none of the main circuit breakers and current sensing devices in the electrical control panel have been tripped. For details refer to the Electrical Wiring Diagram Supplement.

2.12.2 Airflow adjustment

To obtain the design performance, the dry air and reactivation airflow dampers must be correctly adjusted in accordance with the rated airflow, *see table 2-2 and 2-3*.

If required contact Munters Product Service to receive help with commissioning the dehumidifier installation, *see addresses on the back cover of this manual for your local Munters representative*.



WARNING! *Rotating hazard - to prevent access to the fan impellers the dehumidifier must only be run with the wet and dry air ducts connected.*



CAUTION! *Failure to correctly adjust the process and reactivation airflows could cause the unit to malfunction.*

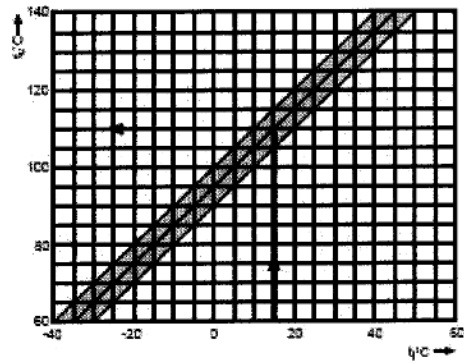
1. Using the dampers installed in the dry air outlet and reactivation air outlet ducts, adjust the process and reactivation airflows to the correct rated airflow.
2. Start the dehumidifier and let it run on full power for approximately 5 minutes to allow the reactivation heater to reach its normal operating temperature. Refer to **Chapter 3, Operation**.
3. Check that the temperature differential between the reactivation supply air and the reactivation air (indicated on the temperature display) is 95°C (tolerance $\pm 5^\circ\text{C}$).
4. If the temperature differential is out of tolerance limit by 5%, adjust the reactivation air damper in small stages allowing the temperature display to stabilise after each adjustment) until reactivation temperature reading is within the specified tolerances.

Symbols:

- t_i = Inlet air temperature (°C)
- t_u = Reactivation air temperature (°C)

Example:

- Inlet air temperature (t_i) = 15°C
- Reactivation air temperature = 110°C
- Temperature increase = 95°C



5. Connect a manometer between test points TP1 and TP4 and measure the differential pressure. Adjust the process air damper until the pressure reading corresponds with the relevant data in the following table. When the differential pressure is correct, lock the damper in position.
6. Measure rated current of fan motors.
Check rated current on identification plate fan motor. If measured current is too high, adjust airflow on maximum fan motor current.

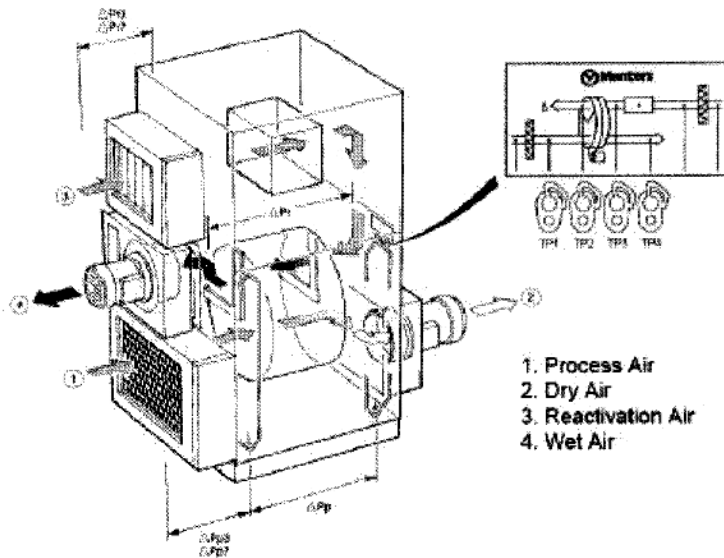


Figure 2-6. Air pressure test points

The pressure drop data in the following table is subject to a tolerance of $\pm 10\%$ and should be used for basic installation work. Where very accurate installation is required, airflows must be measured external to the dehumidifier using properly calibrated test equipment. Changes to air temperature must be taken into consideration.

MODEL	PROCESS AIR ⁽¹⁾		
	RATED AIRFLOW (m ³ /s)	RATED AIRFLOW (m ³ /h)	DIFFERENTIAL PRESSURE (Pa) TP1 to TP4 ⁽²⁾
MX1500	0.42	1 500	270
MX2100	0.58	2 100	405
MXT2100	0.58	2 100	405
MX2700	0.75	2 700	545
MXT2800	0.77	2 800	570
MX3700	1.03	3 700	345
MX5000	1.39	5 000	495
MXT5000	1.39	5 000	495
MX6200	1.72	6 200	405
MXT7500	2.08	7 500	805
MX7600	2.11	7 600	515
MXT9000	2.5	9000	630

Table 2-2. Process airflows and pressure drops

- (1) Process air temperature = 20° C. Process air density = 1.20 kg/m³
 (2) Refer to *figure 2-6*.

MODEL	REACTIVATION AIR ⁽¹⁾		
	RATED AIRFLOW (m ³ /s)	RATED AIRFLOW (m ³ /h)	DIFFERENTIAL PRESSURE (Pa) TP2 to TP3 ⁽²⁾
MX1500	0.14	500	390
MX2100	0.19	680	565
MXT2100	0.14	500	390
MX2700	0.25	900	740
MXT2800	0.19	680	565
MX3700	0.34	1 220	480
MX5000	0.46	1 660	665
MXT5000	0.34	1 220	480
MX6200	0.57	2 050	545
MXT7500	0.46	1 660	665
MX7600	0.70	2 520	685
MXT9000	0.57	2 050	545

Table 2-3. Reactivation airflows and pressure drops

- (1) Reactivation air temperature = 20° C. Reactivation air density = 1.20 kg/m³.
 Reactivation air temperature (after the heater) = 120° C.
 (2) Refer to *figure 2-6*.

3 Operation

NOTE! For specific details relating to steam heater models, refer to the *MX/MXT-Series Steam Heater Supplement* (supplied with the dehumidifier).

NOTE! Following sections include general information, valid for all MX/MXT units. An individual unit is configured according to the *MX Dehumidifier Configuration sheet*. Added functions and components affecting the operation are described in **appendix 1. General configurations** and **appendix 2. Control configurations**.

3.1 Safety



CAUTION! To prevent damage to the fans, the unit must not be run for longer than a few minutes prior to setting-up the process and reactivation airflows.

3.2 Emergency stop



To make the entire unit immediately voltage-free, use the main switch.

CAUTION! The external main switch must not be used under other circumstances to stop the unit. Since the reactivation fan will also stop, considerable heat can develop in the reactivation heater causing possible damage to components close to the heater.

3.3 Pre-Start checks

Before starting the dehumidifier for the first time, carry out checks according to **section 2.12. Pre-start checks**.

3.4 Running checks

If the dehumidifier fails any of the following checks, refer to **chapter 5. Fault isolation** for actions required to identify the probable cause of the fault, and the corrective action required to return the unit to service.



CAUTION! To prevent damage to the fans, the unit must not be run for longer than a few minutes prior to setting-up the process and reactivation airflows.

3.4.1 Normal mode

1. Operate the mains isolator to the ON position (I). Check that the power connected indicator is on.
2. Push the mode switch to the I position and check that the following indicators are on:
 - Power connected indicator
 - Unit running indicator
 - Both reactivation heater indicators (electrical reactivation heater models only)
 - Process and reactivation air fan indicators
 - Drive motor indicator

3. Check that the reactivation and process air fans are rotating in the correct direction. The correct direction can be determined by checking the rotation against the arrows marked on the fan casing.

NOTE! *The fan motors are pre-wired during manufacture for the correct rotation. If the fan rotation for both fans is incorrect this indicates that two of the main power supply phases to the dehumidifier have been incorrectly connected.*

4. Remove the process air filter and check that the rotor is turning anticlockwise. Replace the process air filter after completion of the check.

5. Allow the unit to run for approximately 10 minutes to ensure that the operating conditions have stabilised and check that the reactivation heater is operating (temperature indicator displays reactivation air temperature).

6. Push the mode switch to the "O" position and check that both reactivation heater indicators go out.

NOTE! *In order to dissipate any residual heat, the reactivation air fan, process air fan and the drive motor will continue to run (after the unit has been switched off) until the temperature has fallen below 50° C.*

7. Check that when the reactivation air temperature falls below 50° C, the unit running, process air fan, reactivation air fan and drive motor indicators go out and that the power connected indicator remains on.

3.5 Fault mode

When a fault is detected, the dehumidifier will automatically shutdown. The fault warning indicator on the control panel will flash and one or more of the indicators on the control panel will also flash to identify the cause of the fault. For further details refer to *chapter 5. Fault isolation*.

Once the fault has been rectified, operation of the mains isolator to the OFF position (0) and then to the ON position (I) will clear the fault warning.

For details of switch functions and fault displays refer to the following figure:

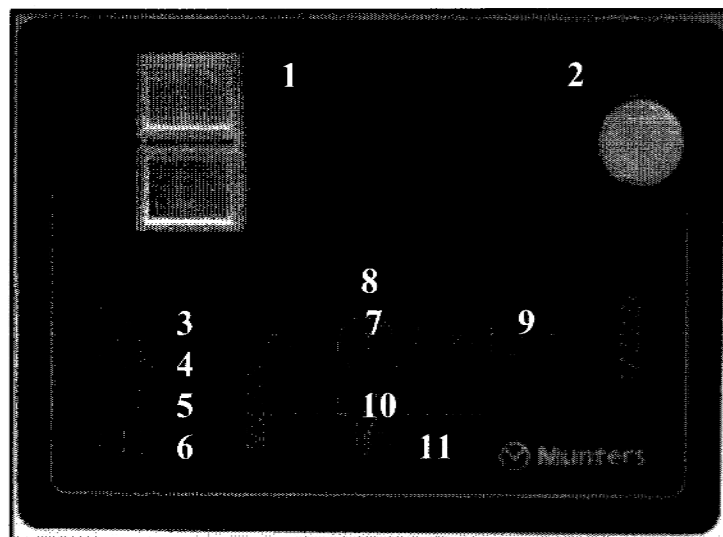


Fig. 3—1 control Panel

- | | |
|-----|----------------------------------------|
| 1. | Mode Switch |
| 2. | Dirty Filter Warning |
| 3. | Power Connected Indicator |
| 4. | Unit Running Indicator |
| 5. | Fault Warning Indicator |
| 6. | No Function |
| 7. | Reactivation Air Fan Indicator |
| 8. | Reactivation Air Temperature Indicator |
| 9. | Reactivation Heater Indicator |
| 10. | Process Air Fan Indicator |
| 11. | Drive Motor Indicator |

SWITCH/INDICATOR DESCRIPTION	FUNCTION
Mode Switch	Position I (green) start unit, Position 0 (red) stop unit. Failure safe start/stop, unit will not start automatically after power up.
Power Connected Indicator	Indicates when power has been connected, and the Mains Isolator is in the on position (I).
Unit Running Indicator	Indicates that the unit is in the run mode. The dehumidifier may be running or, if the unit is in the AUT mode, it may be waiting to receive a start signal from the humidistat/RH98 ⁽¹⁾ .
Fault Warning Indicator	<p>When the Fault Warning indicator is flashing, it indicates that the unit has shut-down due to one of the following faults being detected:</p> <ul style="list-style-type: none"> - Process air fan fault - Reactivation air fan fault - Drive motor fault - Reactivation Heater (stage 1) fault (Electrical reactivation heater models only) - Reactivation Heater (stage 2) fault (Electrical reactivation heater models only) - Rotor stopped fault⁽¹⁾ <p>To assist with fault diagnosis, the corresponding indicator will be flashing. In addition the remote fault output relay will be activated. For further details refer to <i>chapter 5. Fault isolation</i>.</p>
Blocked Indicator ⁽¹⁾	When the process air filter indicator is lit it indicates that the filter is blocked. A blocked filter does not shut-down the unit.
Blocked Indicator ⁽¹⁾	When the reactivation air filter indicator is lit it indicates that the filter is blocked. A blocked filter does not shut-down the unit.
Drive Motor Indicator	The drive motor indicator is on when the rotor drive motor is operating. The indicator will flash to indicate either a drive motor fault (or a stopped rotor ¹).
Process Air Fan Indicator	The process air fan indicator is on when the fan is running. The indicator will flash to indicate a fan fault.
Reactivation Air Fan Indicator	The reactivation air fan indicator is on when the fan is running. The indicator will flash to indicate a fan fault.
Reactivation Heater (Stage 1) Indicator	The Indicator is on when the relevant heater stage is switched on. The Indicator will flash to indicate a heater (stage 1) fault.
Reactivation Heater (Stage 2) Indicator	The Indicator is on when the relevant heater stage is switched on. The Indicator will flash to indicate a heater (stage 2) fault.

Table 3-1. Control panel functions

(1) Optional component

4 Maintenance

4.1 General

The MX(B)/MXT(B)-Series dehumidifiers are designed to run for long periods with minimum attention and will normally require little maintenance in service.

The frequency of maintenance will be determined by the operating conditions and the quality of the environment where the unit is installed. If the process air has a high dust-loading, the scheduled maintenance should be carried-out at more frequent intervals.

4.2 Safety



WARNING! *Adjustments, maintenance and repairs should only be carried-out by qualified personnel who are aware of the hazards of maintaining equipment containing high voltages and temperatures.*



WARNING! *Rotating hazard - to prevent access to the fan impellers the dehumidifier must only be run with the wet and dry air ducts connected.*

4.3 Maintenance procedures

Refer to *figure 4-1* for component identification.

COMPONENT	INSPECTION / MAINTENANCE PROCEDURE	
	3-6 MONTHS	12 MONTHS
Process and reactivation air filters	Clean the filter housing and change the filter if dirty.	Clean the filter housing and change the filter.
General assembly/housing	Check for signs of physical damage and clean the inside and outside of the unit as required.	Check for signs of physical damage and clean the inside and outside of the unit as required.
Process and reactivation air fans	Check for signs of physical damage and clean the motor casing as required.	All dust and dirt in the motor cooling slots must be removed. Check the electrical connections to the motor to ensure that they have not worked loose. Check for signs of damage and overheating. Treat any corrosion immediately. Check airflows and adjust damper settings as required. For details refer to <i>section 2.12.2. Airflow adjustment.</i>
Rotor drive motor assembly	Check the belt tension and adjust as required.	Check the electrical connections to the motor to ensure that they have not worked loose. Check for signs of damage and overheating.
Electrical control panel and wiring	Inspect the components and wiring on the electrical control panel for signs of damage and overheating.	Inspect the components and wiring on the electrical control panel for signs of damage and overheating. Remove cooling fan filter and clean in warm soapy water.
Reactivation heater	Remove any scale deposits or dirt from the bottom of the heater compartment.	Check the security of all pipework, cables and control components. Remove any scale deposits or dirt from the bottom of the heater compartment.

Continued

Table 4-1. Maintenance overview

COMPONENT	INSPECTION / MAINTENANCE PROCEDURE	
	3-6 MONTHS	12 MONTHS
Desiccant rotor	Check for signs of overheating and blockages. Clean any dust from the rotor face as required.	Check for signs of overheating and blockages. Clean any dust from the rotor face as required. Check pressure drop across the rotor. For details refer to <i>section 6.3. Airflow performance data.</i>
Seals	Check for signs of damage and incorrect fitting.	Check for signs of damage and incorrect fitting. Replace seals if worn or damaged.
Duct connections	Check for air leaks and for correct fitting to the unit.	Check for air leaks and for correct fitting to the unit. Check internal chambers for dirt and signs of physical damage.
Humidity/dewpoint controls	Check the operation of all external sensors and calibrate as required.	Check the operation of all external sensors and calibrate as required.

Table 4-1. Maintenance overview

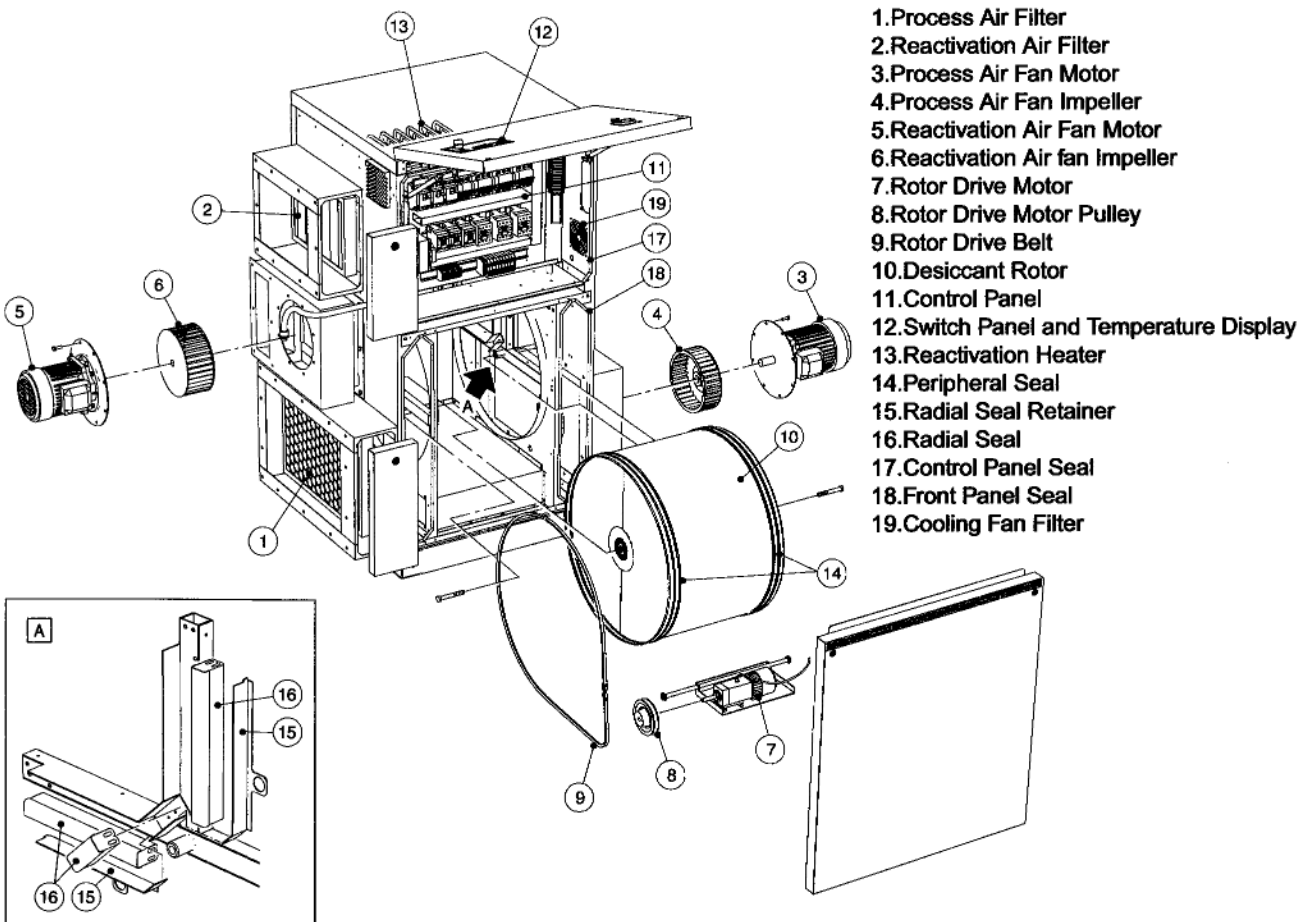


Figure 4-1. Component locations

5 Fault isolation

5.1 General

The purpose of this section is to assist the user in recognising and rectifying faults in the unit and ancillary components. To assist with fault isolation, control panel layout diagrams and wiring diagrams have been provided in the Electrical Wiring Diagram Supplement. For specific information relating to gas and steam heaters, refer to the MX/MXT-Series Gas and Steam Heater Supplements (supplied with the dehumidifier).

5.2 Fault isolation procedures

The primary source of fault isolation, when the unit has automatically shutdown, is the fault warning indicator and associated flashing indicators on the control panel. When a fault occurs the fault isolation checklist given in the following table should be carried out before calling a service technician. This will assist in identifying faults that can be easily rectified by the user.



WARNING! *Rotating hazard - to prevent access to the fan impellers the dehumidifier must only be run with the wet and dry air ducts connected.*

FAULT SYMPTOM	PROBABLE FAULT	CORRECTIVE ACTION
GENERAL		
Unit stopped. All indicators are off.	Mains isolator inadvertently switched off. Power supply failure. Resettable fuses tripped due to a wiring fault. Mains transformer failure. Printed circuit board failure.	Set the mains isolator to the ON position (I) and check that the power connected indicator is on. Check the supply from the wall mounted isolator. Reset the fuses. If the fault re-occurs call a service technician. Call a service technician. Replace the fuse on the pcb. If the fault re-occurs call a service technician.
Unit stopped (fault warning indicator not flashing)	Unit inadvertently switched into Automatic mode without a humidistat being connected.	Switch the dehumidifier into Manual mode and check that the unit starts. If the unit starts, the fault will probably be with the humidistat or associated wiring.
Heater over temperature thermostat keep tripping (electrical heater models).	Airflow obstructed. Reactivation airflow set too low.	Check the air inlet, air outlet ducts and filters are free from obstructions and are not clogged with dirt. Adjust the reactivation airflow. For details refer to <i>section 2.12.2. Airflow adjustment.</i>

Continued

Table 5-1. Fault isolation overview

FAULT SYMPTOM	PROBABLE FAULT	CORRECTIVE ACTION
AUTOMATIC SHUTDOWN		
Unit has stopped, the fault warning indicator is flashing and one (or more) of the following indicators are flashing:		
Reactivation Heater Indicators	<p>Electrical Heater Models:</p> <p>If both indicators are flashing it indicates that one (or both) of the over temperature thermostats have tripped due to an obstruction in the reactivation airflow, or the airflow has been set too low.</p>	<p>Allow the unit to cool down. Open the control panel and reset the fuses as required.</p> <p>Check the air inlet, outlet ducts and filters are free from obstructions and are not clogged with dirt. Check and adjust the reactivation airflow. For details refer to <i>section 2.12.2. Airflow adjustment.</i></p> <p>Operate the mains isolator to reset the fault warning. If the fault re-occurs call a service technician.</p>
Reactivation Heater Stage 1 or Stage 2 Indicators	Safety device has tripped due to a component or wiring fault.	<p>Open the control panel and reset as required.</p> <p>Operate the mains isolator to reset the fault warning. If the fault re-occurs call a service technician.</p>
Reactivation Air Fan Indicator	<p>Safety device has tripped due to one of the following:</p> <ul style="list-style-type: none"> - Incorrect airflow adjustment - Circuit breaker setting too low - Fan motor fault - Wiring fault 	<p>Open the control panel and reset as required.</p> <p>Check the reactivation airflow and adjust as required. For details refer to <i>section 2.12.2. Airflow adjustment.</i></p> <p>Check and adjust Circuit breaker setting. For details refer to the Electrical wiring diagram Supplement.</p> <p>Operate the mains isolator to reset the fault warning. If the fault re-occurs call a service technician.</p>
Process Air Fan Indicator	<p>Safety device has tripped due to one of the following:</p> <ul style="list-style-type: none"> - Incorrect airflow adjustment - Circuit breaker setting too low - Fan motor fault - Wiring fault 	<p>Open the control panel and reset as required.</p> <p>Check the process airflow and adjust as required. For details refer to <i>section 2.12.2. Airflow adjustment.</i></p> <p>Check and adjust Circuit breaker setting. For details refer to the Electrical wiring diagram Supplement.</p> <p>Operate the mains isolator to reset the fault warning. If the fault re-occurs call a service technician.</p>
Drive Motor Indicator	<p>Safety device has tripped due to one of the following:</p> <ul style="list-style-type: none"> - Drive motor fault - Circuit breaker setting too low - Rotor stopped warning (option) - Wiring fault 	<p>Open the control panel and reset as required.</p> <p>Check and adjust Circuit breaker setting. For details refer to the Electrical Wiring diagram Supplement.</p> <p>Investigate the cause of the rotor stopped warning (broken drive belt etc.) and rectify the fault.</p> <p>Operate the mains isolator to reset the fault warning. If the fault re-occurs call a service technician.</p> <p style="text-align: right;"><i>Continued</i></p>

Table 5-1. Fault isolation overview

FAULT SYMPTOM	PROBABLE FAULT	CORRECTIVE ACTION
<p>PERFORMANCE FAULTS</p> <p>Unit is operating but does not appear to be controlling humidity.</p>	<p>Reactivation temperature too low (heater not operating correctly).</p> <p>Rotor drive failure.</p> <p>Process and reactivation airflows are not in accordance with the design specification.</p>	<p>Check the operation of the heater.</p> <p>Check that the rotor is turning at approx. 8 revolutions per hour. Check the drive belt tensioning.</p> <p>Check the airflows and adjust as required. For details refer to <i>section 2.12.2. Airflow adjustment.</i></p>

Table 5-1. Fault isolation overview

6 Technical specification

6.1 Main data

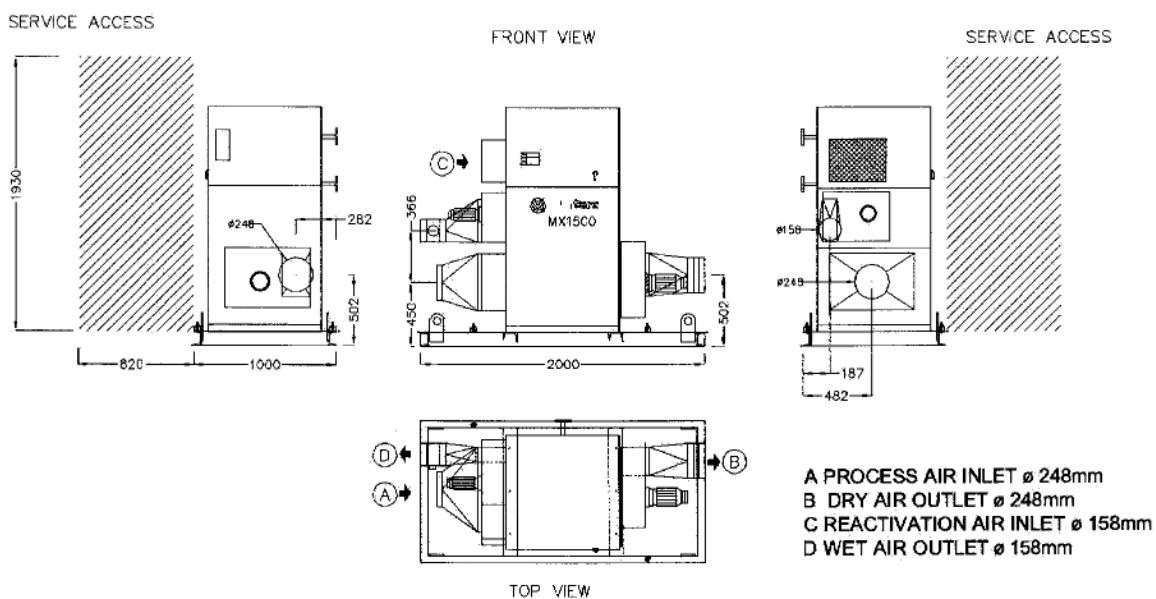
MODEL	MX 1500	MX 2100	MXT 2100	MX 2700	MXT 2800	MX 3700	MX 5000	MXT 5000	MX 6200	MXT 7500	MX 7600	MXT 9000
PROCESS AIR⁽¹⁾												
Rated Air Flow (m ³ /s)	0,42	0,58	0,58	0,75	0,77	1,03	1,39	1,39	1,72	2,08	2,11	2,50
Rated Air Flow (m ³ /h)	1 500	2 100	2 100	2 700	2 800	3 700	5 000	5 000	6 200	7 500	7 600	9 000
Minimum Available Static Pressure (Pa)	300	300	150	300	150	300	300	150	300	150	300	150
Fan Motor Power (kW) (at 220-240/380-420 V, 50 Hz) ⁽²⁾	1,5	2,2	2,2	3,0	3,0	3,0	4,0	4,0	4,0	7,5	7,5	7,5
REACTIVATION AIR⁽¹⁾												
Rated Air Flow (m ³ /s)	0,14	0,19	0,14	0,25	0,19	0,34	0,46	0,34	0,57	0,46	0,70	0,57
Rated Air Flow (m ³ /h)	500	680	500	900	680	1 220	1 660	1 220	2 050	1 660	2 520	2 050
Minimum Available Static Pressure (Pa)	300	300	300	300	300	300	300	300	300	300	300	300
Fan Motor Power (kW) (at 220-240/380-420 V, 50 Hz) ⁽²⁾	1,1	1,5	1,1	1,5	1,5	1,5	2,2	1,5	2,2	2,2	3,0	2,2
DRIVE MOTOR												
Drive Motor Power (kW)	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
ELECTRICAL POWER (for electrical reactivation heater models)												
Maximum Electrical Power (kW)	18,1	26,4	18,8	35,3	27,2	42,5	59,5	43,5	73,9	63,0	93,6	77,4
ELECTRICAL POWER (for gas and steam react. heater models)												
Maximum Electrical Power (kW)	2,8	3,9	3,5	4,7	4,7	4,7	6,4	5,7	6,4	9,9	10,7	9,9
ELECTRICAL REACTIVATION HEATER												
Temperature Increase (°C)	91,80	96,43	91,80	102,0	96,43	91,97	95,62	91,97	98,02	95,62	98,07	98,02
Reactivation Heater Power (kW)	15,3	22,5	15,3	30,6	22,5	37,8	53,1	37,8	67,5	53,1	82,9	67,5
STEAM REACTIVATION HEATER												
Steam Consumption ⁽³⁾ (g/s)	7,2	10,66	7,2	14,51	10,66	17,92	25,18	17,92	32,01	25,18	39,27	32,01
Max. Steam Working Pressure (kPa)	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2	6,2
Contactor coil voltage	24V AC											

Table 6-1. Main MX/MXT-series data

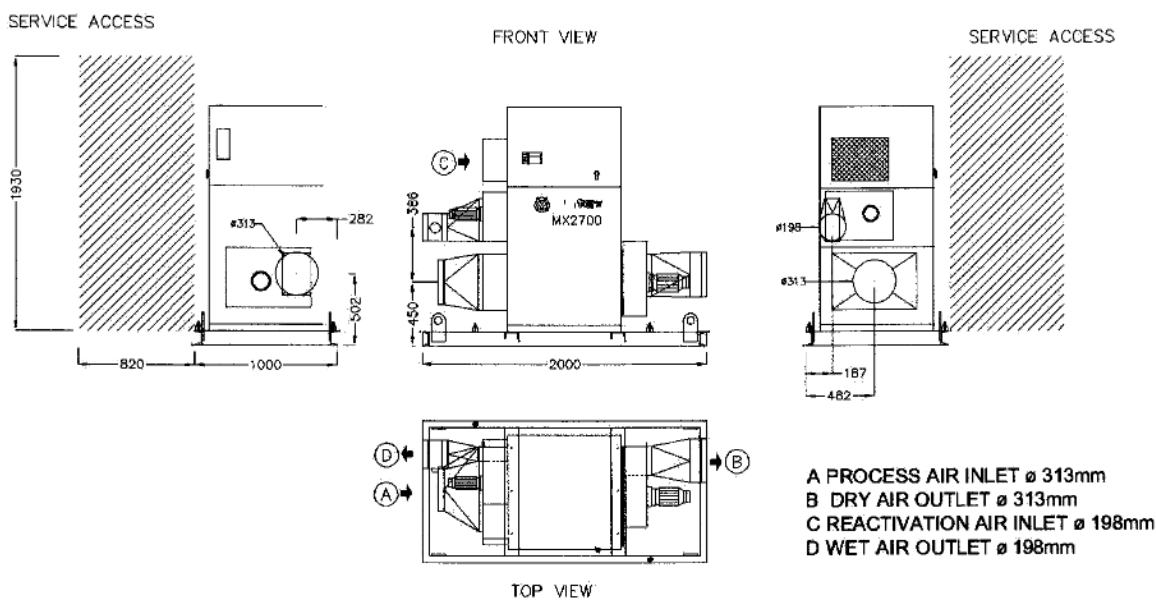
- (1) Figures quoted are nominal, based on fan air inlet temperature of 20°C, and an air density of 1,2 kg/m³.
 (2) For other voltages or frequencies refer to ID-plates on the motors.
 (3) Steam consumption calculated at 2 106,6 kJ/kg at 500 kPa.

6.2 Dimensions and space requirements

MX1500



MX2700



6.3 Airflow performance data

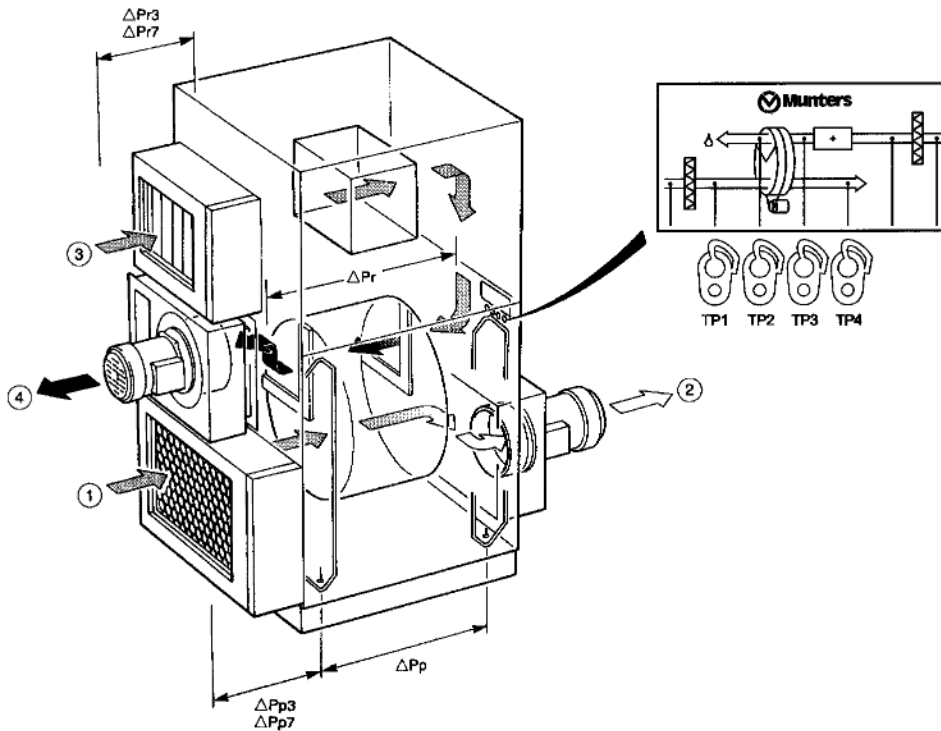


Figure 6-3. Airflow diagram

The pressure drop data in the following table is subject to a tolerance of ±10% and should be used for basic installation work or for simple performance checks. Where very accurate installation or performance checks are required, airflows must be measured external to the dehumidifier using properly calibrated test equipment. Changes to air temperature must be taken into consideration.

MODEL	RATED AIRFLOW (m³/h)	PROCESS AIR ⁽¹⁾					ROTOR (Δ P) (TP1-TP4)
		PRESSURE DROP (Pa)					
		G3 (EU3) FILTER (Δ Pp3)		F7 (EU7) FILTER (Δ Pp7)			
Clean	Dirty	Clean	Dirty				
MX1500	0.42	76	250	130	300	270	
MX2100	0.58	76	250	130	300	405	
MXT2100	0.58	91	250	130	300	405	
MX2700	0.75	91	250	130	300	545	
MXT2800	0.77	91	250	130	300	570	
MX3700	1.03	76	250	130	300	345	
MX5000	1.39	76	250	130	300	495	
MXT5000	1.39	76	250	130	300	495	
MX6200	1.72	91	250	130	300	405	
MXT7500	2.08	76	250	130	300	805	
MX7600	2.11	91	250	130	300	515	
MXT9000	2.5	91	250	130	300	630	

MODEL	RATED AIRFLOW (m³/h)	REACTIVATION AIR ⁽²⁾					ROTOR (Δ P) (TP2-TP3)
		PRESSURE DROP (Pa)					
		G3 (EU3) FILTER (Δ Pp3)		F7 (EU7) FILTER (Δ Pp7)			
Clean	Dirty	Clean	Dirty				
MX1500	0.14	76	250	130	300	390	
MX2100	0.19	76	250	130	300	565	
MXT2100	0.14	76	250	130	300	390	
MX2700	0.25	76	250	130	300	740	
MXT2800	0.19	76	250	130	300	565	
MX3700	0.34	76	250	130	300	480	
MX5000	0.46	76	250	130	300	665	
MXT5000	0.34	76	250	130	300	480	
MX6200	0.57	76	250	130	300	545	
MXT7500	0.46	76	250	130	300	665	
MX7600	0.70	91	250	130	300	685	
MXT9000	0.57	76	250	130	300	545	

Table 6-4. Airflow and pressure drop data

- (1) Process air temperature = 20° C. Process air density = 1,20 kg/ m³.
- (2) Reactivation air temp. = 20° C. Reactivation air density = 1,20 kg/ m³. Reactivation air temp. (after the heater) = 120° C.

6.4 Capacity diagrams

Approximate capacity in kg/h. For detailed information, please contact your nearest Munters office or refer to Munters DryCap program.

NOTE!

The below figures are based on a nominal (1/1) airflow.

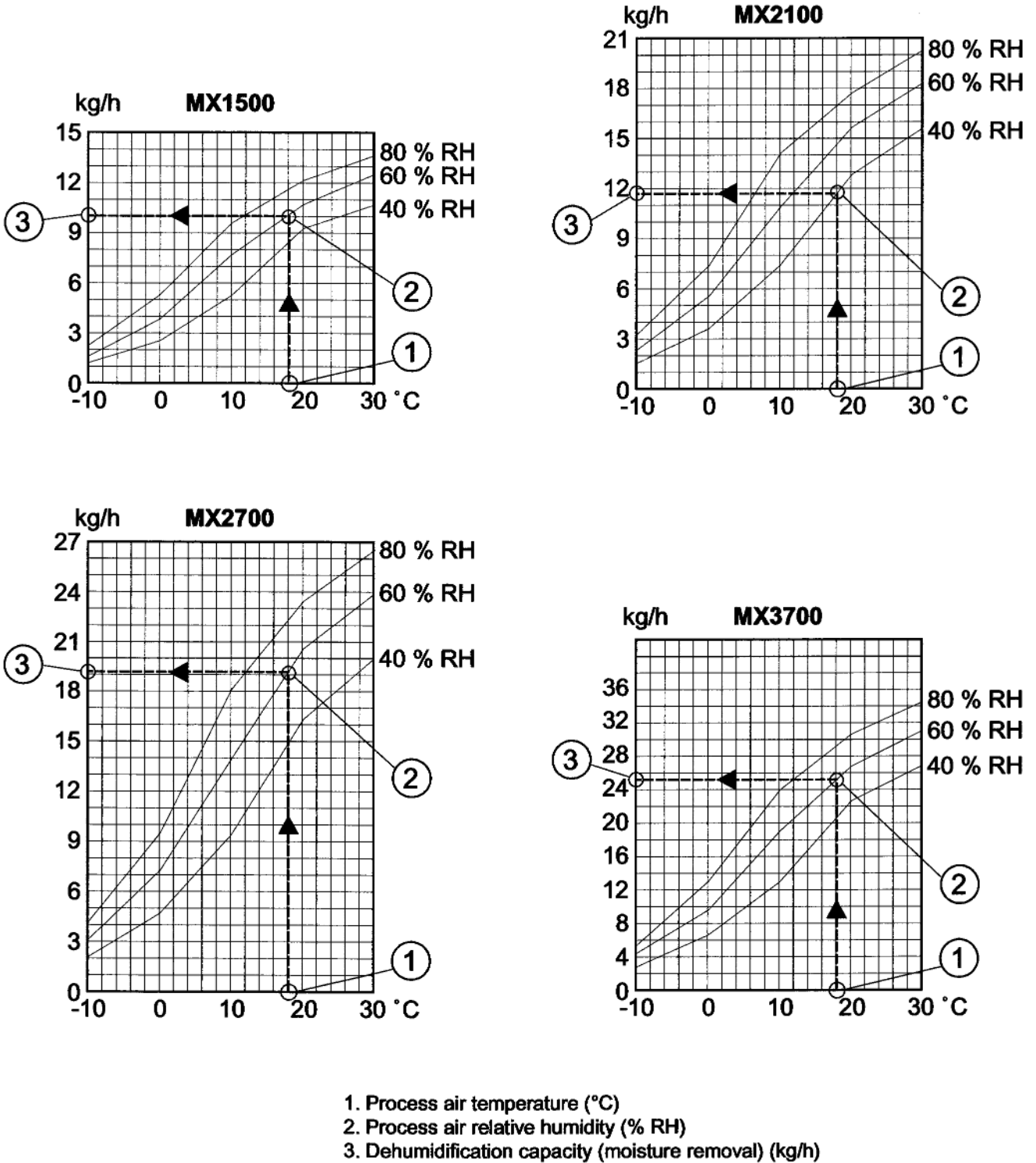
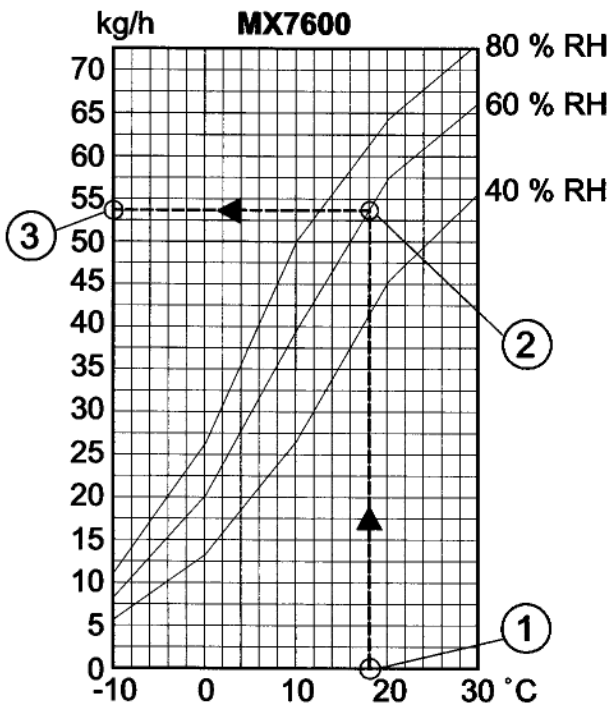
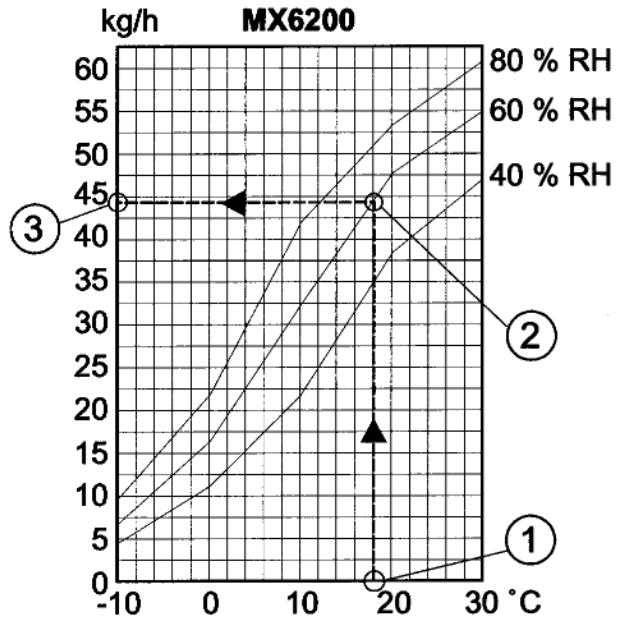
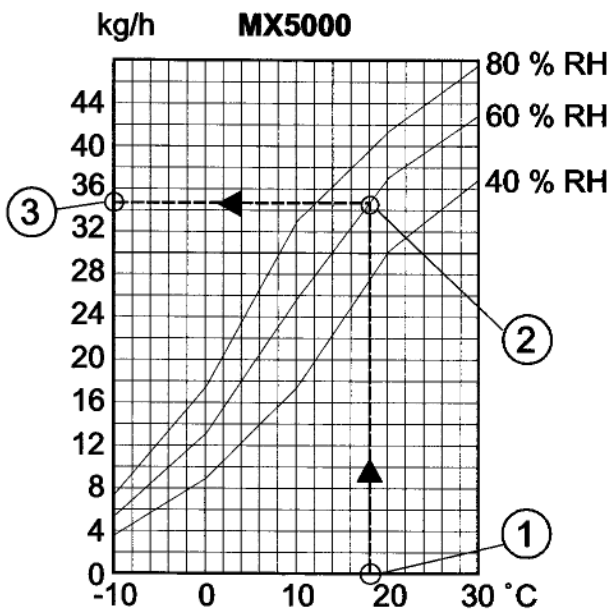


Figure 6-4. Capacity diagrams, MX1500 - MX3700



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

Figure 6-5. Capacity diagrams, MX5000 - MX7600

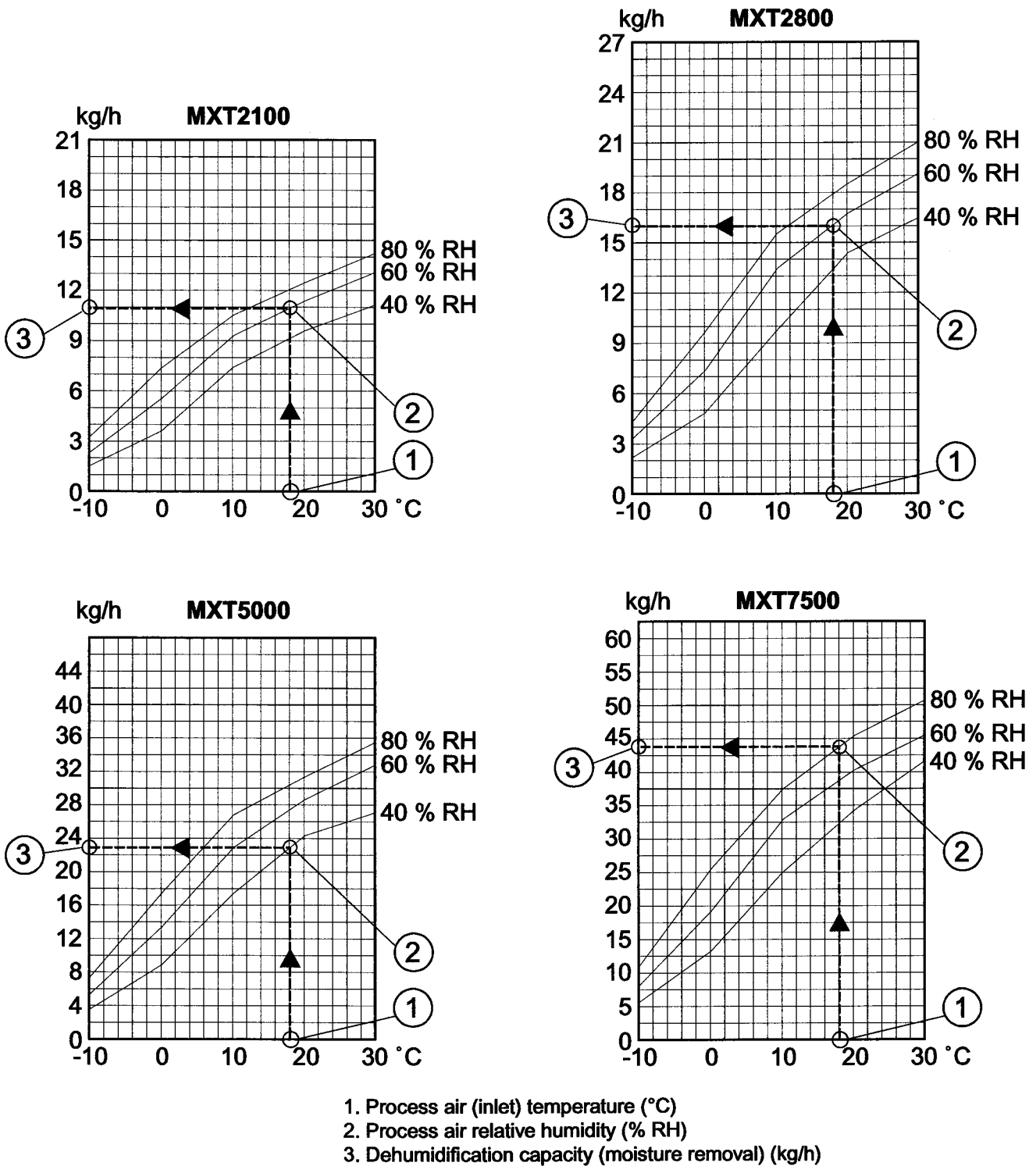


Figure 6-6. Capacity diagrams, MXT2100 - MXT7500

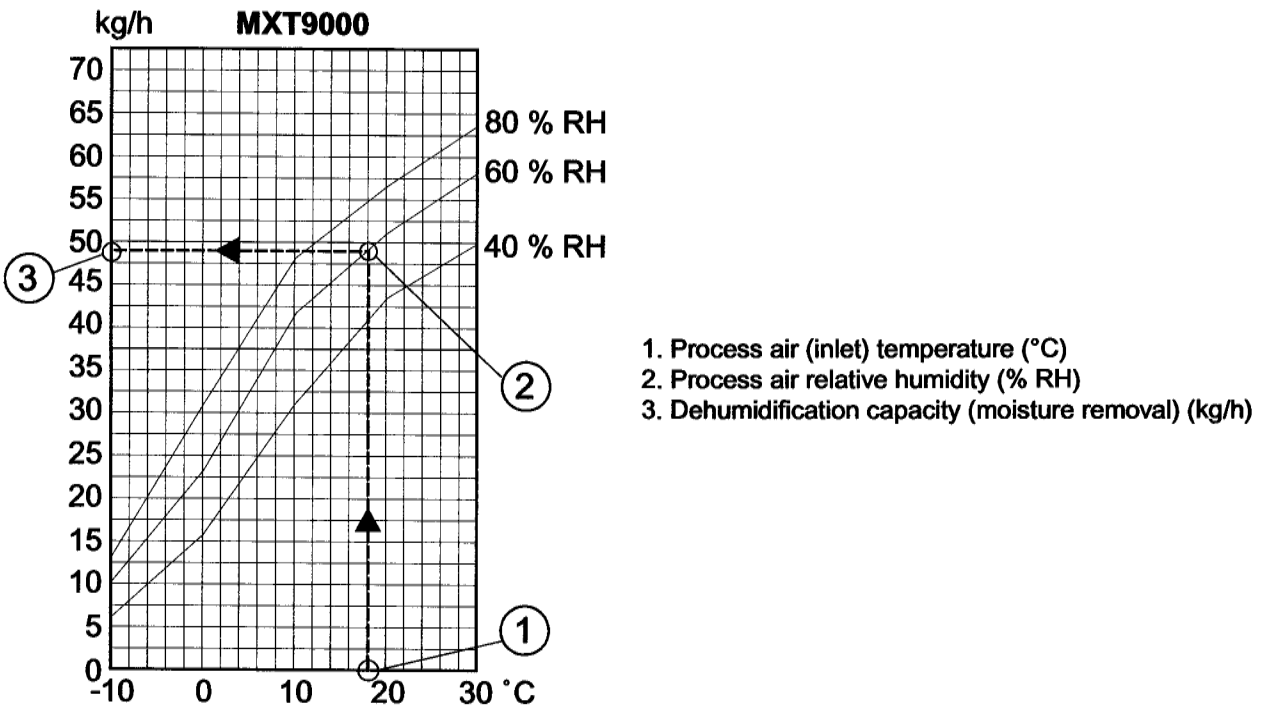
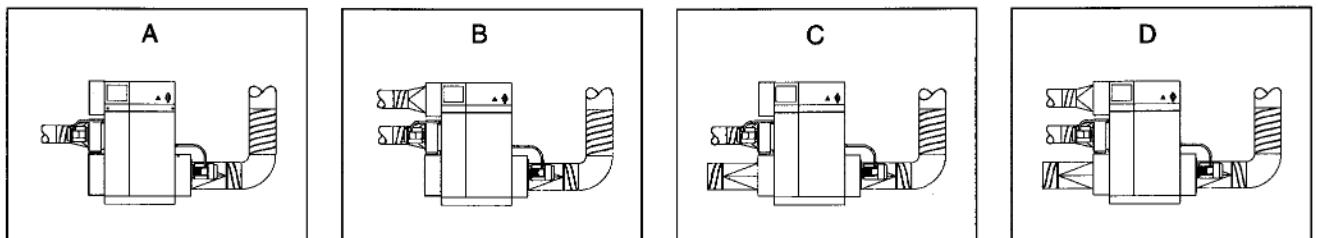


Figure 6-7. Capacity diagram, MXT9000

6.5 Sound data

NOISE PATH	MODEL	L_{wt} dB	CORRECTION OF K_{ok} dB AT ISO-BAND No./CENTRE FREQUENCY (Hz)							
			1/63	2/125	3/250	4/500	5/1000	6/2000	7/4000	8/8000
A	MX1500	75,2	-2,4	-6,4	-7,0	-9,9	-11,5	-12,1	-15,5	-20,4
	MX2100	75,8	-2,5	-6,5	-7,1	-10,0	-11,6	-12,2	-15,6	-20,6
	MX2700	77,6	-2,5	-6,6	-7,3	-10,2	-11,8	-12,5	-16,0	-21,1
	MX3700	88,2	-4,3	-7,0	-7,0	-6,7	-14,0	-15,0	-22,6	-31,5
	MX5000	90,4	-4,4	-7,2	-7,2	-6,9	-14,3	-16,3	-23,2	-32,3
	MX6200	95,8	-4,6	-7,6	-7,6	-7,3	-15,2	-17,3	-24,6	-34,2
	MX7600	98,2	-4,7	-7,8	-7,8	-7,5	-15,6	-17,7	-25,2	-35,1
B	MX1500	75,0	-4,0	-7,1	-7,3	-10,1	-11,6	-12,0	-15,6	-20,5
	MX2100	75,2	-4,0	-7,1	-7,4	-10,1	-11,6	-12,0	-15,7	-20,6
	MX2700	77,6	-4,1	-7,3	-7,6	-10,4	-12,0	-12,4	-16,2	-21,2
	MX3700	87,4	-5,0	-6,7	-7,2	-6,9	-13,9	-15,8	-22,6	-31,3
	MX5000	90,3	-5,2	-6,9	-7,5	-7,1	-14,4	-16,4	-23,3	-32,3
	MX6200	95,6	-5,5	-7,3	-7,9	-7,5	-15,2	-17,3	-24,7	-34,2
	MX7600	97,4	-5,6	-7,4	-8,0	-7,6	-15,5	-17,7	-25,1	-34,8
C	MX1500	74,8	-3,0	-6,1	-7,1	-9,5	-11,8	-12,6	-15,3	-20,0
	MX2100	74,9	-3,0	-6,1	-7,1	-9,6	-11,8	-12,6	-15,3	-20,1
	MX2700	76,9	-3,1	-6,3	-7,3	-9,8	-12,1	-12,9	-15,7	-20,6
	MX3700	87,1	-5,0	-6,1	-6,8	-6,5	-13,9	-15,4	-22,1	-31,1
	MX5000	89,9	-5,1	-6,3	-7,0	-6,7	-14,3	-15,9	-22,8	-32,1
	MX6200	94,5	-5,4	-6,6	-7,3	-7,1	-15,1	-16,7	-24,0	-33,7
	MX7600	96,4	-5,5	-6,7	-7,5	-7,2	-15,4	-17,0	-24,5	-34,4
D	MX1500	74,4	-5,9	-5,0	-7,0	-8,9	-11,0	-11,6	-14,5	-19,4
	MX2100	74,6	-6,0	-5,1	-7,2	-9,1	-11,3	-11,8	-14,8	-19,9
	MX2700	76,0	-6,0	-5,1	-7,2	-9,1	-11,3	-11,8	-14,8	-19,9
	MX3700	86,3	-4,4	-5,9	-6,7	-5,9	-13,7	-15,2	-21,9	-30,7
	MX5000	89,8	-4,5	-6,2	-7,0	-6,1	-14,2	-15,8	-22,8	-32,0
	MX6200	94,1	-4,8	-6,5	-7,3	-6,4	-14,9	-16,5	-23,9	-33,5
	MX7600	95,2	-4,8	-6,6	-7,4	-6,5	-15,1	-16,7	-24,2	-33,9



NOISE PATHS TO SURROUNDINGS:

- A = Process and Reactivation Inlets Open
- B = Process Inlet Open
- C = Reactivation Inlet Open
- D = Fully Ducted

SYMBOLS:

L_{wt} = Total Noise Level dB (Rel. $10^{-12}W$)

L_w = Noise Power Level in Octave Band dB (Rel. $10^{-12}W$)

K_{ok} = Correction for Calculation of L_w ($L_w = L_{wt} + K_{ok}$)

Figure 6-8. Sound data

Appendix 1 - General configurations

1.1 General

The MX(B)/MXT(B)-Series dehumidifiers have been designed to ensure that options can be incorporated with the minimum external physical alteration.

For wiring details refer to the *Electrical wiring diagram Supplement*.

NOTE!

Voltage drops may be experienced when using excessively long cables. At operation the voltage must be 24 V measured at the connection point (dehumidifier) for all external humidistat and remote switch connections. If the measured voltage is less than 20 V, a separate relay controlled by the humidistat must be used.

1.2 Configuration features

This appendix includes information about all configuration functions and components that can be added when ordering a MX(B)/MXT(B) dehumidifier. An individual unit is configured according to the *MX Dehumidifier Configuration sheet* positioned in front of the User's Manual, and can be used to find relevant information/sections below.

1.2.1 Rotor stop alarm

An optional reed switch closes momentarily once per revolution of the rotor i.e. once every 8 minutes. The switch is activated by a magnet mounted on the rotor to produce a 0 V DC pulse.

If the pulse does not occur within 10 minutes, the Drive Motor and Fault Warning Indicators flash to indicate a fault and the unit is automatically shut-down.

1.2.2 Blocked filter alarms

Differential pressure switches can be fitted to the process and reactivation air filters. When the pressure difference across a filter exceeds the set limit, the switch contacts close sending a low (filter blocked) signal to the blocked filter indicator.

Filter Blocked Indicators is lit to indicate a blocked filter.

1.2.3 Insulated process air inlet

All dehumidifier units supplied with pre-cooled process air have insulated process air inlet. The process air sector in front of the rotor has an internal lining of isolation to prevent condensation on the unit.

The isolation material is an elastomeric foam based on synthetic rubber.

1.2.4 Low dewpoint (purge)

Purge airflow increases the dehumidification capacity and is used to enable extra low dewpoints. A minor part (approximately 10%) of the process airflow is forced through a smaller sector of the rotor which according to the rotor rotation direction is positioned directly after the reactivation sector. The result is that a part of the process air is taken off (purge air) and the rotor material is cooled down before it is exposed to the dry air outlet sector.

The warm purge airflow is drawn from this smaller sector of the rotor, passing an adjustable damper, and entering the reactivation air just before the reactivation heater.

The purge airflow duct including the damper unit is installed on the back of the unit according to *figure 1-1*.

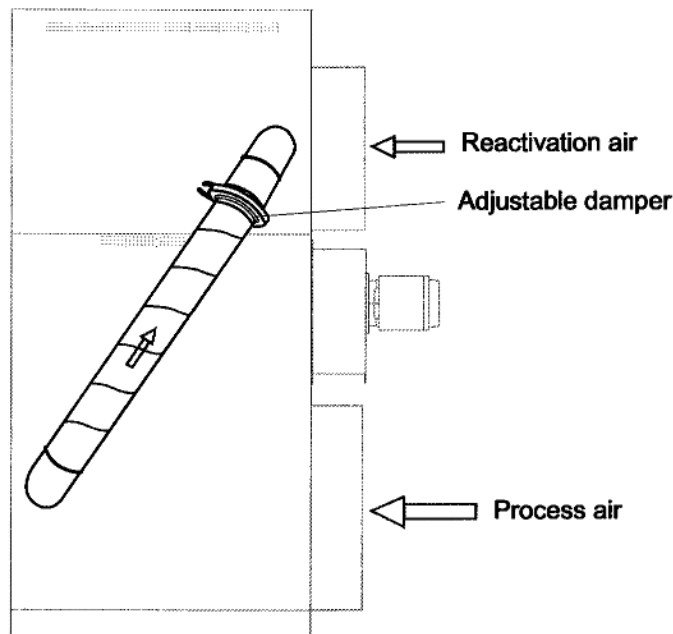


Figure 1-1. Purge airflow duct and damper installation



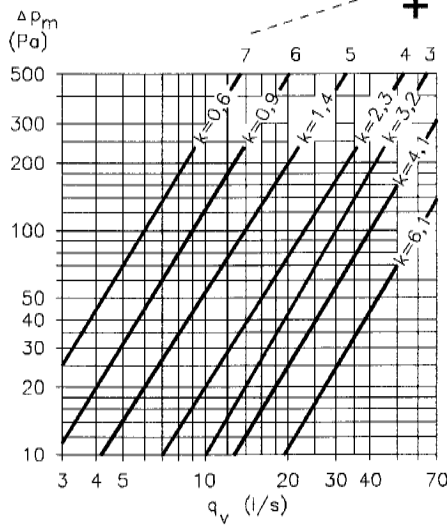
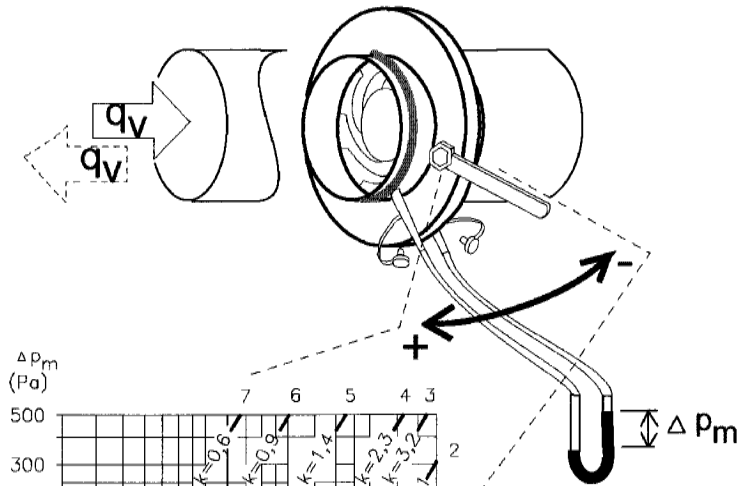
CAUTION! *Never start or run the unit with fully closed purge damper. It is recommended to have the damper fully opened when the process fan is started for the first time.*

The required purge airflow can be calculated using a diagram. This involves measuring the pressure drop over the purge damper by connecting a U-gauge to the pressure test points. Refer to *figure 1-2*.

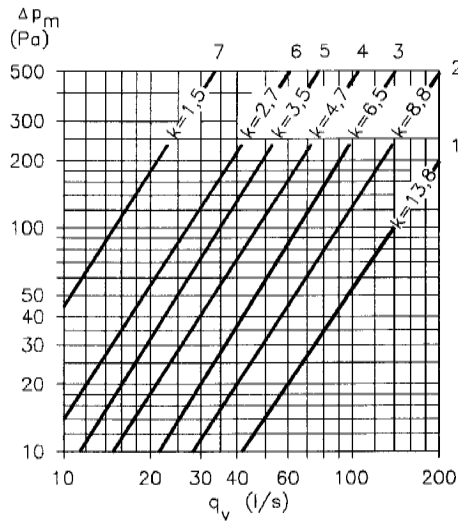
The purge airflow setting is application dependent and should be adjusted by a qualified engineer during the commissioning to obtain the desired dry air dew point. A general recommendation is that the purge airflow represents 10% of the total process airflow.

NOTE!

Dehumidifiers equipped with purge sector do not include a standard “pulling” process fan. A “pushing” fan, installed in a separate box enclosure, must be added in front of the standard MX unit (for example a MX Plus unit).



MX 1500-2700



MX 3700-7600

Figure 1-2. Purge damper flow control

Appendix 2 - Control configurations

2.1 General

The MX(B) / MXT(B)-Series dehumidifiers have been designed to ensure that options can be incorporated with the minimum external physical alteration.

For wiring details refer to the *Electrical Wiring Diagram Supplement*.

NOTE!

Voltage drops may be experienced when using excessively long cables. At operation the voltage must be 24 V measured at the connection point (dehumidifier) for all external humidistat and remote switch connections. If the measured voltage is less than 20 V, a separate relay controlled by the humidistat must be used.

2.2 Configuration alternatives

This appendix includes information about all MX(B) / MXT(B) dehumidifier control configurations. An individual unit is configured according to the *MX Dehumidifier Configuration sheet* positioned in front of the User's Manual, and can be used to find relevant information/section below.

2.2.1 Configuration 91-0

MX Base Control and Humidity control system RH98 with humidity control & wall sensor.

RH98 panel installed on the MX/MXT unit. Humidity control sensor included but must be installed and connected on site. Also refer to the *RH98 Supplement, section 2.6*.

The unit can run in both MAN and AUTO mode.

2.2.2 Configuration 92-0

MX Base Control and Humidity control system RH98 with humidity control, alarm & wall sensor.

RH98 panel including humidity deviation alarm installed on the MX/MXT unit. Humidity control sensor included but must be installed and connected on site. Also refer to the *RH98 Supplement, section 2.6*.

The unit can run in both MAN and AUTO mode.

2.2.3 Configuration 93-0

MX Base Control and Humidity control system RH98 with humidity control & duct sensor.

RH98 panel installed on the MX/MXT unit. Humidity control sensor included but must be installed and connected on site. Also refer to the *RH98 Supplement, section 2.6*.

The unit can run in both MAN and AUTO mode.

2.2.4 Configuration 94-0

MX Base Control and Humidity control system RH98 with humidity control, alarm & duct sensor.

RH98 panel including humidity deviation alarm installed on the MX/MXT unit. Humidity control sensor included but must be installed and connected on site. Also refer to the *RH98 Supplement, section 2.6*.

The unit can run in both MAN and AUTO mode.

2.2.5 Configuration 99-0

MX Base Control only.

No humidity control included. The unit can only run at continuous, maximum capacity.

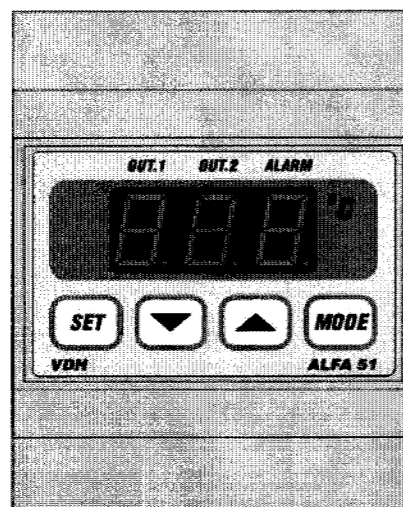
External humidistat can be added. Refer to the *Electrical Wiring Diagram Supplement*.

User manual

ALFA 51 0-100°C

Two-stage Thermostat

Electric Reactivation



* Installation.

On the top side of the **ALFA 71** is shown how the sensors, power supply and relays are to be connected.

After connecting the **ALFA 71** to the power supply, a self test function is started. As this test is finished the measured temperature appears in the display. Normally this is the temperature of sensor-1, unless sensor-2 is active as control sensor (P05=1) in that case the average temperature of both sensors is displayed and used for control.

* Control.

The **ALFA 71** thermostat can be controlled by four pushbuttons on the front. These keys are:

SET - view / change the setpoint.

UP - increase the setpoint.

DOWN - decrease the setpoint.

° C - hidden push button above the **SET** key and behind ° C symbol.

* Viewing setpoint.

By pushing the **SET** key the setpoint appears in the display. The decimal point of the last display starts blinking. A few seconds after releasing the **SET** key the setpoint disappears and the measured temperature is shown again in the display.

* Changing setpoint.

Push the **SET** key and the setpoint appears in the display. Release the **SET** key. Now push the **SET** key again together with the **UP** or **DOWN** keys to change the setpoint. A few seconds after releasing the keys the measured temperature shows again in the display.

* Viewing the individual sensors.

By pressing the **UP** and **DOWN** key together, the individual sensors can be show in the display. After releasing the keys, the measured temperature of sensor-1 can be shown by pushing the **UP** key or the measured temperature of sensor-2 can be shown by pushing the **DOWN** key. A few seconds after releasing the keys the (average) temperature shows again in the display.

* Status of the Relays.

By pushing the hidden ° C key the display shows the status of the relays. Each display segment shows the status of the relay output, showing 0=off and 1=on. The code 110 means relay 1 and 2 are on and relay 3 is off.

* Setting internal parameters.

Next to the adjustment of the setpoint, internal settings can be made like differential, sensor offset, setpoint range and the functions of the thermostat.

Push the **DOWN** key more than 10 seconds, to enter the 'Internal Programming Menu'. In the left display the upper and lower segment are blinking. Over the **UP** and **DOWN** keys the required parameter can be selected (see table for the parameters).

If the required parameter is selected, the value can be read-out by pushing the **SET** key. Pushing the **UP** or **DOWN** key to change the value of this parameter.

If after 20 seconds no key is pushed, the **ALFA 71** changes to the normal operation mode.

* Adjustment sensors.

Sensor-1 can be adjusted by using the Sensor Offset parameter 06 and Sensor-2 can be adjusted by using the Sensor Offset parameter 07. Indicates a Sensor e.g. 2°C to much, the according Sensor Offset has to be decreased with 2° C.

* Error messages.

In the display of the **ALFA 71** the following error messages can appear:

LO	- Minimum alarm.	Solution E1,E2:
HI	- Maximum alarm.	- Check if the sensor is connected correctly.
E1	- Sensor-1 failure.	- Check sensor (1000? ? at 25° C).
E2	- Sensor-2 failure.	- Replace sensor.
EEE	- Settings are lost.	Solution EEE:
		- Reprogram the settings.

-L- - In case of sensor short-circuit the display alternates between error-code **E..** and **-L-**, as indication for a short-circuit sensor.

-H- - In case of open-circuit sensor the display alternates between error-code **E..** and **-H-**, as indication for a open circuit sensor.

Reset Alarm. When a error-messages appears it can be resetted by pushing the **SET** key. The function of this key depends on parameter P37.

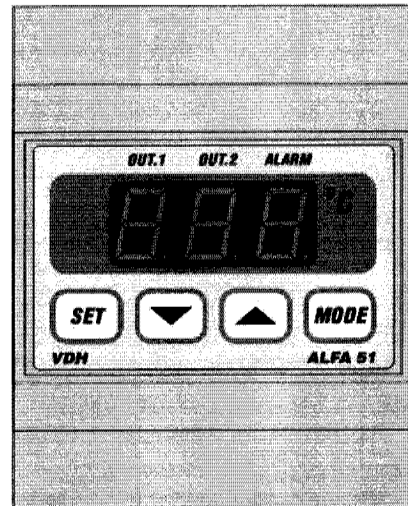
* Technical details.

Type	: ALFA 71 Thermostat	
Range	: 0/+100,0° C	
Supply	: 24Vac 50/60Hz (-5/+10%)	
Display	: 3-digit 7-segment display	
Relays	: Ry1= SPST(NO) 250V/8A (cosF =1) of 250V/5A (cosF =0.4) Ry2= SPST(NO) 250V/8A (cosF =1) of 250V/5A (cosF =0.4) Ry3= SPDT(NO/NC) 250V/8A (cosF =1) of 250V/5A (cosF =0.4) Relays have one common (C).	
Control	: By push buttons on front.	
Front	: Polycarbonate IP65	
Sensors	: SM 811/2m (PTC 1000 Ohm /25° C).	
Dimensions	: 90 x 71 x 58mm (HWD)	
Accuracy	: ± 0,5% of the range.	

- Provided with memory protection during power failure.
- Equipped with sensor failure detection.

Parameter	Description Parameter	Range	Setting
01	Function Relay 1	1=Cool 2=Heat 3=Alarm	2
02	Function Relay 2	1=Cool 2=Heat 3=Alarm	2
03	Function Relay 3	1=Cool 2=Heat 3=Alarm	3
05	Function sensor-2	0=Not 1=Control 2=Alarm	0
06	Offset temperature sensor-1	-15.0..+15.0°C	0.0
07	Offset temperature sensor-2	-15.0..+15.0°C	0.0
10	Switch on relay 2 by	0=Temperature 1=Time	0
11	Switch on relay 3 by	0=Temperature 1=Time	0
12	Switch on delay relay 2	0..99 Minutes	0
13	Switch on delay relay 3	0..99 Minutes	0
14	Switching differential relay 1	0.1..15.0	3.0
15	Setpoint offset relay 1	-15..+15	0.0
16	Switching differential relay 2	0.1..15.0	3.0
17	Setpoint offset relay 2	-15..+15	10.0
18	Switching differential relay 3	0.1..15.0	0.5
19	Setpoint offset relay 3	-15..+15	0.0
20	Switch on delay cooling	0..99	0
21	Switch off delay cooling	0..99	0
22	Parameter 20/21 in Sec. or Min.	0=Seconds 1=Minutes	0
23	Minimum on-time cooling	0..99 Minutes	0
24	Minimum off-time cooling	0..99 Minutes	0
25	Minimum setpoint	0..100°C	0
26	Maximum setpoint	0..100°C	100
27	Read-out above -10°C per 1°C	0= No 1= Yes	1
30	Alarm type (to setpoint)	0= None 1= Absolute 2= Relatief	1
31	Minimum alarm setpoint	0.0..+100.0°C	0
32	Maximum alarm setpoint	0.0..+100.0°C	100
33	Time delay minimum alarm	0..99 min.	0
34	Time delay maximum alarm	0..99 min.	0
35	Relay function alarm relay	0= Watch 1= Control	0
36	Reset alarm relay after recovering alarm	0= No 1= Yes	0
37	Reset alarm relay after manual reset	0= No 1= Yes	0
40	Start up delay after power failure	0..99 Minutes	0
41	Forced relay function at sensor failure	0= None 1= Cool 2= Heat	0
95	Software version	0..255	0
96	Production year	00..99	0
97	Production week	1..52	1
98	Serial number (x1000)	0..255	0
99	Serial number (units)	0..999	0

User manual ALFA 51 PI 0-100°C Modulating Thermostat Steam Reactivation



* Installation.

On the top side of the **ALFA 71** is shown how the sensors, power supply and relays are to be connected.

After connecting the **ALFA 71** to the power supply, a self test function is started. As this test is finished the measured temperature appears in the display.

* Control.

The **ALFA 71** thermostat can be controlled by four pushbuttons on the front. These keys are:

SET - view / change the setpoint.

UP - increase the setpoint.

DOWN - decrease the setpoint.

° C - hidden push button above the **SET** key and behind **° C** symbol.

* Viewing setpoint.

By pushing the **SET** key the setpoint appears in the display. The decimal point of the last display starts blinking. A few seconds after releasing the **SET** key the setpoint disappears and the measured temperature is shown again in the display.

* Changing setpoint.

Push the **SET** key and the setpoint appears in the display. Release the **SET** key. Now push the **SET** key again together with the **UP** or **DOWN** keys to change the setpoint. A few seconds after releasing the keys the measured temperature shows again in the display.

* Viewing the individual sensors.

By pressing the **UP** and **DOWN** key together, the individual sensors can be show in the display.

After releasing the keys, the measured temperature of sensor-1 can be shown by pushing the **UP** key or the measured temperature of sensor-2 can be shown by pushing the **DOWN** key. A few seconds after releasing the keys the (average) temperature shows again in the display.

* Status of the Relays.

By pushing the hidden ° C key the display shows the status of the relays. Each display segment shows the status of the relay output, showing 0=off and 1=on. The code 110 means relay 1 and 2 are on and relay 3 is off.

* Setting internal parameters.

Next to the adjustment of the setpoint, internal settings can be made like differential, sensor offset, setpoint range and the functions of the thermostat.

Push the **DOWN** key more than 10 seconds, to enter the 'Internal Programming Menu'. In the left display the upper and lower segment are blinking. Over the **UP** and **DOWN** keys the required parameter can be selected (see table for the parameters).

If the required parameter is selected, the value can be read-out by pushing the **SET** key. Pushing the **UP** or **DOWN** key to change the value of this parameter.

If after 20 seconds no key is pushed, the **ALFA 71** changes to the normal operation mode.

* Adjustment sensors.

Sensor-1 can be adjusted by using the Sensor Offset parameter 06 and Sensor-2 can be adjusted by using the Sensor Offset parameter 07. Indicates a Sensor e.g. 2°C too much, the according Sensor Offset has to be decreased with 2° C.

* Error messages.

In the display of the **ALFA 71** the following error messages can appear:

LO	- Minimum alarm.	Solution E1,E2:
HI	- Maximum alarm.	- Check if the sensor is connected correctly.
E1	- Sensor-1 failure.	- Check sensor (1000?? at 25° C).
E2	- Sensor-2 failure.	- Replace sensor.
EEE	- Settings are lost.	Solution EEE:
		- Reprogram the settings.

-L- - In case of sensor short-circuit the display alternates between error-code **E..** and **-L-**, as indication for a short-circuit sensor.

-H- - In case of open-circuit sensor the display alternates between error-code **E..** and **-H-**, as indication for an open circuit sensor.

Reset Alarm. When an error-message appears it can be reset by pushing the **SET** key. The function of this key depends on parameter P37.

* Technical details.

Type	: ALFA 71 Thermostat	
Range	: 0/+100,0° C	
Supply	: 24Vac 50/60Hz (-5/+10%)	
Display	: 3-digit 7-segment display	
Relays	: Ry1= SPST(NO) 250V/8A (cosF =1) of 250V/5A (cosF =0.4) Ry2= SPST(NO) 250V/8A (cosF =1) of 250V/5A (cosF =0.4) Ry3= SPDT(NO/NC) 250V/8A (cosF =1) of 250V/5A (cosF =0.4) Relays have one common (C).	
Control	: By push buttons on front.	
Front	: Polycarbonate IP65	
Sensors	: SM 811/2m	(PTC 1000 Ohm /25° C).
Analog output	: 0...10Vdc PI-output	(Rload>10KOhm)
Dimensions	: 90 x 71 x 58mm	(HWD)
Accuracy	: ± 0,5% of the range.	

- Provided with memory protection during power failure.
- Equipped with sensor failure detection.

Parameter	Description Parameter	Range	Setting
01	Function Relay 1	1=Cool 2=Heat 3=Alarm	2
02	Function Relay 2	1=Cool 2=Heat 3=Alarm	2
03	Function Relay 3	1=Cool 2=Heat 3=Alarm	2
05	Offset temperature sensor-1	-15.0..+15.0°C	0.0
06	Offset PI	-15.0..+15.0°C	0.0
07	Proportional band.	0.0..20.0°C	5.0
08	Integral time constant.	0..99 Minutes	0(off)
10	Switch on relay 2 by	0=Temperature 1=Time	0
11	Switch on relay 3 by	0=Temperature 1=Time	0
12	Switch on delay relay 2	0..99 Minutes	0
13	Switch on delay relay 3	0..99 Minutes	0
14	Switching differential relay 1	0.1..15.0	3.0
15	Setpoint offset relay 1	-15..+15	0.0
16	Switching differential relay 2	0.1..15.0	3.0
17	Setpoint offset relay 2	-15..+15	10.0
18	Switching differential relay 3	0.1..15.0	0.5
19	Setpoint offset relay 3	-15..+15	0.0
20	Switch on delay cooling	0..99	0
21	Switch off delay cooling	0..99	0
22	Parameter 20/21 in Sec. or Min.	0=Seconds 1=Minutes	0
23	Minimum on-time cooling	0..99 Minutes	0
24	Minimum off-time cooling	0..99 Minutes	0
25	Minimum setpoint	0..100°C	0
26	Maximum setpoint	0..100°C	100
27	Read-out above -10°C per 1°C	0= No 1= Yes	1
30	Alarm type (to setpoint)	0= None 1= Absolute 2= Relatief	1
31	Minimum alarm setpoint	0.0..+100.0°C	0
32	Maximum alarm setpoint	0.0..+100.0°C	100
33	Time delay minimum alarm	0..99 min.	0
34	Time delay maximum alarm	0..99 min.	0
35	Relay function alarm relay	0= Watch 1= Control	0
36	Reset alarm relay after recovering alarm	0= No 1= Yes	0
37	Reset alarm relay after manual reset	0= No 1= Yes	0
40	Start up delay after power failure	0..99 Minutes	0
41	Forced relay function at sensor failure	0= None 1= Cool 2= Heat	0
95	Software version	0..255	0
96	Production year	00..99	0
97	Production week	1..52	1
98	Serial number (x1000)	0..255	0
99	Serial number (units)	0..999	0



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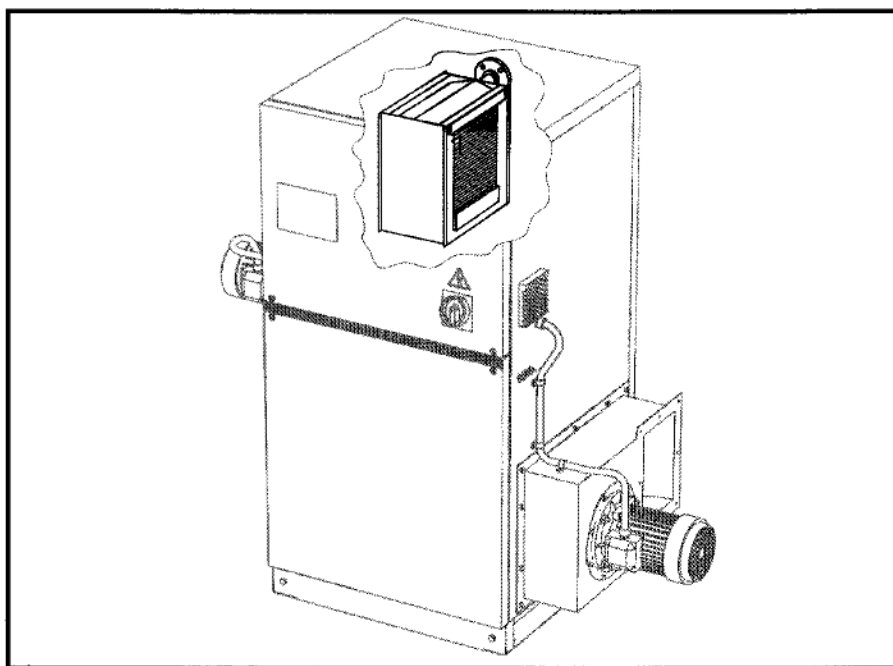
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Supplement

MX/MXT



Sorption dehumidifier Steam heater for reactivation of MX/MXT dehumidifier

This supplement is intended for use by qualified service technicians who are specially trained in working with steam heating apparatus. It must be used together with the instructions manual for MX/MXT dehumidifiers 190TSE-1017 and/or 190TSE-1018.

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1 Introduction

1.1 General

This supplement provides technical information for qualified technicians and for third-party fitters on installing, commissioning and maintaining steam reactivation heaters in Munters MX/MXT dehumidifiers.

The supplement is to be used together with the User's manual supplied with the dehumidifier.

1.2 Construction

The heater consists of stainless steel pipes with aluminium fins. These are encapsulated in a stainless steel cover. Mounting flanges (for connecting steam feed/return) are fitted to the inlet and outlet pipes.

NOTE!

At the time the unit is delivered, the flanges are only tightened by hand. Before the steam supply is connected, these must be properly sealed and tightened.

1.3 Steam supply

It is important that there is access to a good quality steam supply at the right temperature and pressure in order for the steam reactivation heater to work properly. Overlooking this can result in the steam heater not working as well and finally stopping altogether.

The water quality is decisive for the quality of the steam produced.

1.3.1 Factors that affect the steam quality

Common impurities occurring in the feed water are:

- Solid matter that has been dissolved - these can result in deposits forming in the unit. The most commonly occurring substances are carbonates and sulfates of calcium and magnesium.
- Suspended solid substances - these can result in the formation of sludge in the boiler. These are usually solid minerals or organic particles that have become suspended in the water.
- Dissolved gases - these can cause corrosion in the equipment. The dissolved gasses are oxygen and carbon dioxide.
- Frothing substances - these can give rise to contaminants and corrosion in the equipment. The foam is formed by foaming and usually contains soda in the form of carbonates, chlorides or sulfates.
- If the contaminants in the water are not dealt with properly, the water in the boiler can overflow into the steam system. Water treatment is required.

2 Installation and commissioning

2.1 General

This section is intended to help the technician ensure that the installation and commissioning of the MX-series steam reactivation heater is carried out in accordance with approved installation procedures.

2.2 Safety measures

The following safety measures must be taken during installation and commissioning:

- 1 Check that stop valves are fitted and shut before the steam reactivation heater is connected to the steam supply. See Figure 2.1. *Installing a steam heater*
- 2 Ensure that the flanges are sealed and tightened before connecting the steam reactivation heater to the steam supply.



WARNING!

Steam pipes must be connected by qualified personnel and in accordance with local regulations.



CAUTION!

The system must be designed so that the steam condensate is drained by gravity into an open condensate tank and it must be fitted with a vacuum breaker. This is very important for the working life of the steam heater. Any condensate remaining in the heater once the unit has been switched off will inevitably damage the steam heater the next time it is started up.

2.3 Recommended installation

The following components **must** be installed as part of the steam supply circuit in order to ensure trouble-free operation. See Figure 2.1. *Installing a steam heater*

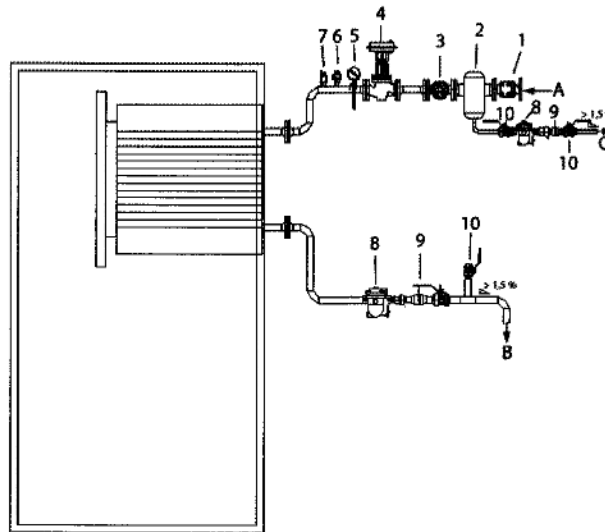
- A separator for removing contaminants and fluids from incoming steam. The separator removes fluids that could have a detrimental effect on the heat transfer surface and also cause erosion damage.
- A steam control valve is used to adjust the steam flow through the heater. For all types of control valve, it is important that they open slowly in order to reduce the risk of hydraulic shock, thermal strains and erosion that can damage the heat exchanger. We recommend the use of a logarithmic steam control valve in order to obtain a slow opening action. The valve actuator should have an opening time of no less than 120 seconds.
- If a modulating steam control valve is used, remember that the pressure drop across the valve affects the steam pressure to the steam heater, and

therefore the temperature that can be achieved. Bear this in mind when designing a control valve.

- A vacuum breaker must be installed on the steam inlet to allow condensate to be drained at shut-down and when operating at low power.
- The steam trap must be a float drain type, preferably with an integral thermic deaerator and dirt filter. (Thermostatic drains may not be used).
- A nonreturn valve must be fitted in the condensate return line in order to prevent condensate from getting into the heater, and to prevent any hammering in the condensate system. This is the case if the condensate return line has condensate from more than one drain when there may be different pressures, and temperatures and/or in order to protect against a return flow when condensate is "lifted" to the condensate tank.
- There must be expansion bends in both the inlet and outlet pipes in order to compensate for thermal expansion. All pipes must be decompressed individually near to the dehumidifier in order to reduce the load on the steam heater.
- If there is a risk of freezing, a thermostat must be installed immediately after the heater in the direction of the airflow. If its temperature falls below +7° C, there is considered to be a risk of freezing and the thermostat should then shut off the dehumidifier unit so that the reactivation airflow is stopped and an alarm is given.

In addition to the above, it is also recommended that the following components are installed in order to facilitate operation and maintenance

- A deaerator in order to vent oxygen and other gasses from the steam supply.
- Stop valves.
- A manometer for measuring the steam pressure in the heater.
- A pressure-resistant thermometer for showing the steam temperature.
- A filter for preventing contaminants.

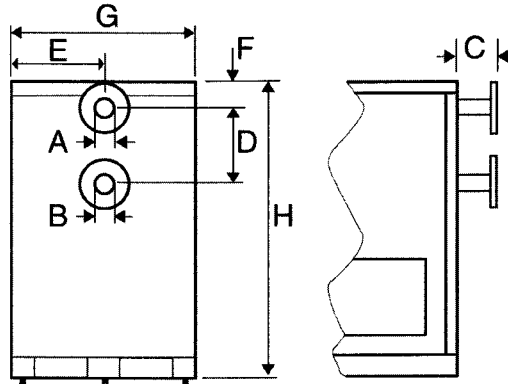


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|-----------------------------------|----------------------------------|--------------------------------------|
| A. Steam supply | 1. Steam filter | 6. Thermic de-aerator |
| B. Condensate return dehumidifier | 2. Separator | 7. Vacuum breaker |
| C. Condensate return drainage | 3. Mushroom valve | 8. Steam trap (floating body) |
| | 4. Modulating steam valve | 9. Non-return Valve |
| | 5. Manometer | 10 Ball valve (shut-down) |

Figure 2.1 Installing a steam heater

NOTE!

Components in bold as in figure 2.1 must always be installed



	MX1500-MX2700 MXT2100-MXT2800	MX3700 MXT5000	MX5000-MX7600 MXT7500-MXT9000
	DIMENSIONS (mm)	DIMENSIONS (mm)	DIMENSIONS (mm)
A	1" (BSP)	1" (BSP)	1 1/2" (BSP)
B	3/4" (BSP)	3/4" (BSP)	1" (BSP)
C	100 + - 10	100 + - 10	100 + - 10
D	329	406	406
E	400	500	500
F	214	213	213
G	800	1000	1000
H	1585	2172	2172

NOTES:

Headers: Stainless steel 304L

Flanges: Carbon steel to PN16 code 113

Test pressure: 15 bar (g)

Rated working pressure 5 bar (g)

Maximum allowed working pressure 10 bar (g)

All pipework must be supported to ensure minimal strain on the connections.

Figure 2.2 Connecting a steam supply

NOTE!

It is very important that the control valve does not open too quickly, even during "On-Off" control, as this will inevitably result in wear and tear to the steam heater and other components.

NOTE!

It is extremely important that the pressure drop in the condensate return line is not too great and that it is installed with a fall from the steam heater's outlet all the way to an unpressurised (open) condensate tank, so that condensate can be drained easily. . If this is not possible due to external factors, the risk of what is known as stalling must be monitored, for example by installing a condensate pump.

2.4 Connection information

The following recommendations apply when connecting a steam supply to the dehumidifier. See figure 2.1.

- If a manometer is fitted to the steam pipe, its measuring range may be no less than the max pressure at the point where it is fitted.
- It is recommended that an extra cut-off valve is installed after a condensate drain on the outlet from the heat exchanger to facilitate installation of a manometer for quickly indicating any counter-pressure that may occur in the condensate system in case of any functional deviations during operation.

2.5 Setting up and testing

- 1 Check that the cut-off valves are shut.
- 2 Connect the reactivation heater to the steam supply.
- 3 Open the cut-off valves.
- 4 Check that the correct pressure is shown on the manometer.
- 5 Check that there are no leaks in the heater or the pipes connected to it.
- 6 Check that the thermometer shows a temperature that is in accordance with the pressure in the pipe.

3 Maintenance

3.1 General

Periodic maintenance ensures that the pressure control components work without any defects.

The maintenance interval is determined by the operating conditions and the quality of the steam supply where the unit is installed.

3.2 Maintenance work

Adjustment, maintenance and repairs should only be carried-out by qualified personnel who are aware of the hazards of operating and maintaining equipment containing high steam temperatures and pressures.

The reactivation heater must be left to cool down before starting any inspection or maintenance work on the heater section.

Before re-starting the dehumidifier, carry-out the following checks:

- 1 Carry-out a visual check of all ductwork and duct insulation for correct connection and for general signs of damage or leaks.
- 2 Check the steam pipes' connections to ensure that all pipes are correctly installed and secured.

INTERVAL	ACTION
Daily	Check that the correct pressure is shown on the manometer.
	Check to see if there are any leaks around the connections.
Monthly	Check that there are no steam leaks in the equipment.
	Check for signs of corrosion or deposits on the heater. All signs of corrosion must be treated immediately. All deposits and accumulations of dirt at the bottom of the heater must be removed.
	Check that the electrical connections to the steam control valve are firmly in place.
Six-monthly	Inspect the steam control valve. See the manufacturer's technical documentation.
	Check for signs of corrosion on surfaces with flanges. Repair if necessary.
Yearly	Drain the heater. Check for small magnetic residues in the water.

Table 3.1 Periodic maintenance

4 Fault Finding

4.1 General

This section is intended to help service engineers to identify and take action against faults that can occur in the heater and the equipment that goes with it.

4.2 Fault-finding methods

Before beginning any fault-finding, the following warning should be read and observed.



WARNING!

Adjustments, maintenance and repairs may only be carried out by qualified personnel who are aware of the risks involved in the operation and maintenance of equipment where high steam temperatures and pressures occur.

SYMPTOM	PROBABLE FAULT	ACTION
GENERAL		
Little or no reactivation heat	Incorrect steam pressure.	Check that the pressure indicated on the manometer is within the working limits (<6.2 bar (g) overpressure).
	Wrong steam temperature.	Check that the temperature shown on the thermometer is in accordance with the pressure in the pipe.
	Closed shut-off valve.	Check that the shut-off valves are open.
	The steam control valve is permanently shut (if there is one).	Check the function of the steam control valve.
	Clogged pipe.	Check that none of the pipes is blocked.
	Leaking pipe.	Check that none of the pipes is leaking.
LOSS OF PERFORMANCE		
Unit operating, but not controlling air humidity	Steam reactivation heater.	Check the steam pressure and the temperature in the heater.
		Check that none of the pipes is blocked or is leaking.
	The steam control valve does not open fully	Check the regulator for controlling the steam valve and the control signal to the steam valve

SYMPTOM	PROBABLE FAULT	ACTION
	Blocked filter or steam trap	Clean if required

Table 4.1 Fault Finding