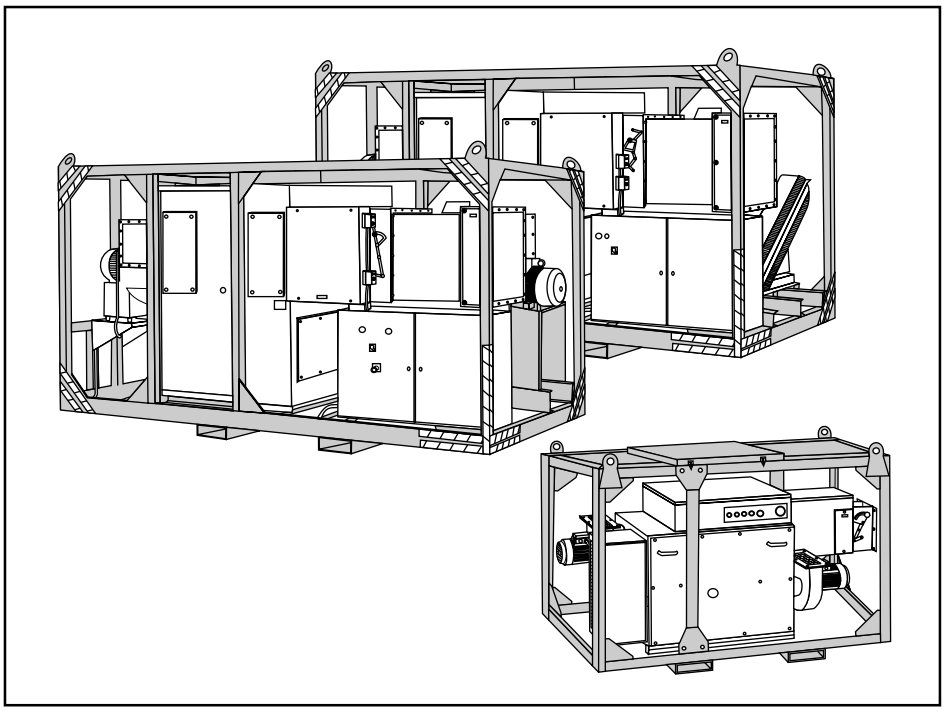
User's manual

MA-C



Desiccant Dehumidifier
MA-C Series

Effective from serial no. 1000

190TGB-1022

Munters

CONTENTS

1 SUPPLIER INFORMATION

1.1 INTRODUCTION

Munters dehumidifiers provide an effective and efficient method of humidity control. MA-C series dehumidifiers are designed for process airflows of 2 500 to 15 000m^3/h.

1.2 WARRANTY

The warranty period is 12 months from the date of equipment commissioning.

The warranty is limited to free replacement and shipping of any faulty part, or sub-assembly which has failed due to poor quality or manufacturing errors. All claims must be supported by evidence that the failure has occurred within the warranty period, and that the unit has been operated within the designed parameters specified.

All warranty claims must specify the unit/type number and the serial number. These details are printed on the unit identification plate.

1.3 SAFETY

Standards for Safety

MA-C series dehumidifiers are designed and built within an EN ISO 9001 accredited design and manufacturing organisation. The units comply with the specifications of the European Machinery Directive (98/37/EEC).

The following standards are applicable to product design:

- EN 60204-1, EN 1050, EN 292-1, EN292-2 EN 292-2/A1, EN50081-1, EN 50082-2,

Responsibility for Safety

Every care has been taken in the design and manufacture of MA-C Series dehumidifiers to ensure that they meet the safety requirements listed in Paragraph 1.3. However, the individual operating or working on any machinery is primarily responsible for:

- Personal safety, safety of other personnel, and the machinery
- Correct utilisation of the machinery in accordance with relevant procedures

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 above stated individual responsibility and/or local safety regulations.

1.4 MISUSE OF EQUIPMENT

Any use of the equipment other than its intended use, or operation of the equipment contrary to the relevant procedures, could cause injury to the operator, or damage to the equipment.

1.5 SAFETY SYMBOLS

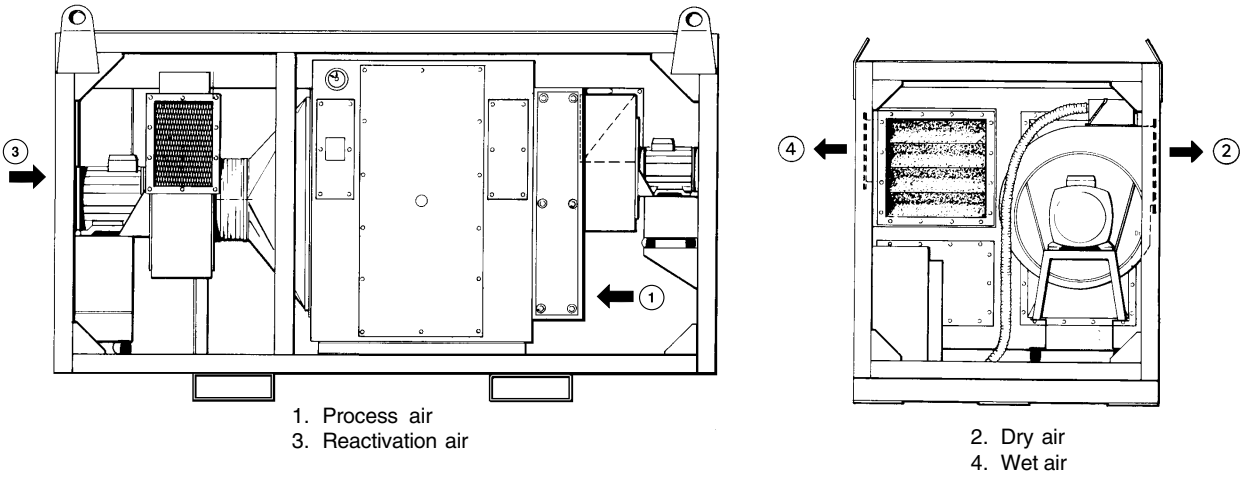
The following symbols are used in this document to alert the reader to areas of potential hazard.

*A **WARNING** is given in this document to identify a hazard which could lead to personal injury. Usually an instruction will be given, together with a brief explanation and the possible result of ignoring the instruction.*

*A **CAUTION** identifies a hazard which could lead to damage to the machine, damage to other equipment and/or environmental pollution. Usually an instruction will be given, together with a brief explanation and the possible result of ignoring the instruction.*

*A **NOTE** is used to highlight additional information which may be helpful to you but where there are no special safety implications.*

2 PRINCIPLE OF OPERATION



1. Process air
3. Reactivation air

2. Dry air
4. Wet air

Airflow Diagram (MA 3000-C, MA 10000-C) - Figure 1

2.1 PRODUCT DESCRIPTION

MA-C SERIES dehumidifiers are designed for dry airflows between 2 500 and 15 000m³/h.

The whole assembled unit is housed in a rugged protective frame work with a roof.

2.2 GENERAL

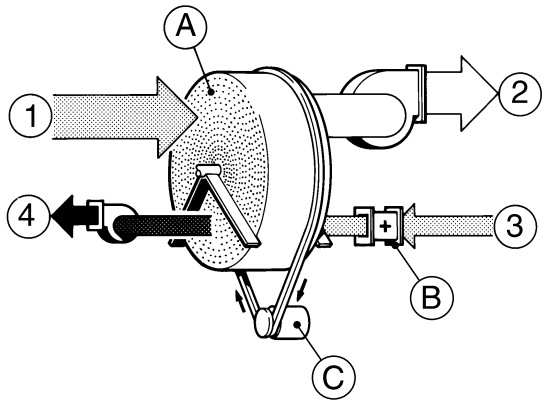
The rotor is divided into two sectors comprising the process sector and the reactivation sector. The air to be dehumidified (process air) is blown through the process sector of the rotor, whose structure forms narrow air flutes. The walls of the rotor are impregnated with High Performance Silica Gel (HPS) which absorbs the moisture from the air, and the resulting dry air is delivered at the dry air outlet.

Simultaneously, a separate airflow (reactivation air) is heated and blown 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.

Whilst this sequence is occurring, the rotor is slowly rotating (approximately 10 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.

2.3 DESICCANT ROTOR

The desiccant rotor is the moisture absorbing part of the dehumidifier, and consists of a special composite matrix of heat resistant material which houses the desiccant. This design produces a compact structure which has an immense surface area for moisture absorption.



A. Desiccant rotor
B. Heater
C. Drive motor

1. Process air
2. Dry air
3. Reactivation air
4. Wet air

Principal of Opetation Example, Desiccant Rotor - Figure 2

3. PRODUCT DESCRIPTION

MA-C SERIES dehumidifiers are designed for dry airflows between 2 500 and 15 000m³/h.

The whole assembled unit is housed in a rugged protective frame work with a roof

3.1 CONSTRUCTION

The main components of the dehumidifier are:

- The rotor unit, consisting of the rotor and its driving device.
- For process air:
  - G3 (EU3) filter
  - Centrifugal fan - MA 2500-C directly driven
    MA 3000-C directly driven
    MA 10000-C belt driven
- For reactivation air:
  - G3 (EU3) filter
  - Directly driven centrifugal fan on all models
  - Manually operated louvred damper
  - Electric reactivation heater

The rotor and filters are accessible for both inspection and servicing via removable inspection covers.

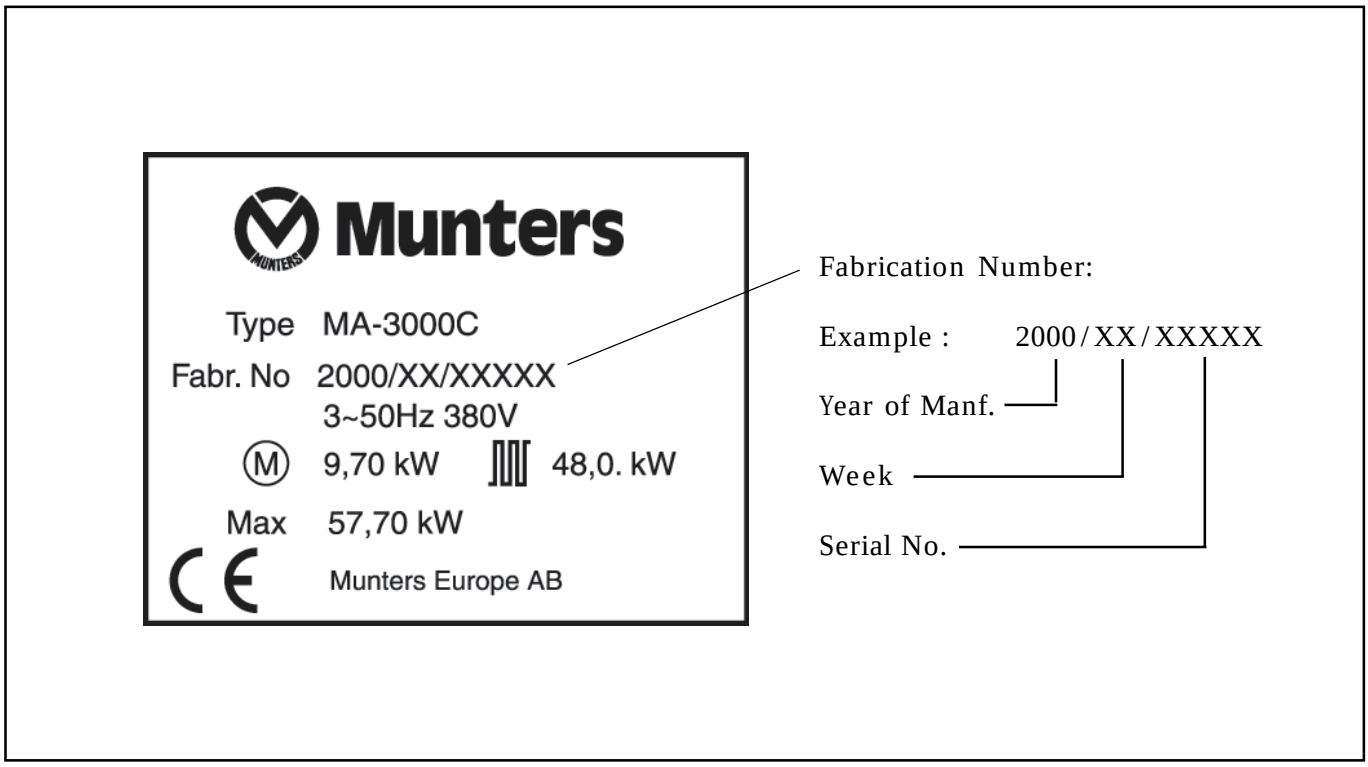
- Electrical control panel:
  - The electrical controls and components for the MA 2500-C unit are housed in a metal box mounted on top of the main casing.
  - The MA 3000-C and MA 10000-C electrical controls are contained in a metal case mounted within the protective framework.

3.2 STANDARD EQUIPMENT

- Connections to ductwork according to ISO 7807 standards.
- Process and reactivation air inlets are fitted with replaceable filters that can be easily changed via the inspection covers.

3.3 MA 2500-C, MA 3000-C, MA 10000-C

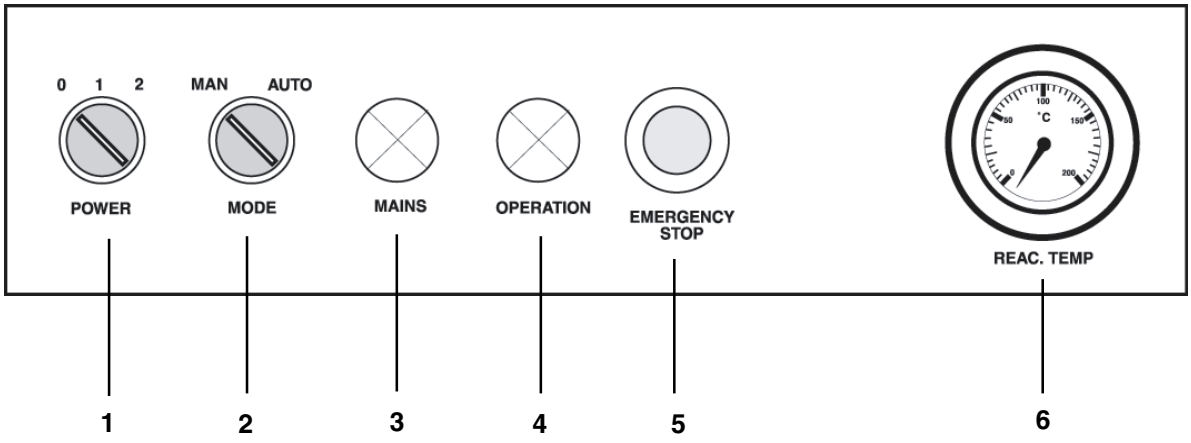
- All models require a three phase electrical supply.
- All of the models are fitted with multi stage electric reactivation heaters.



Identification Plate - Figure 3

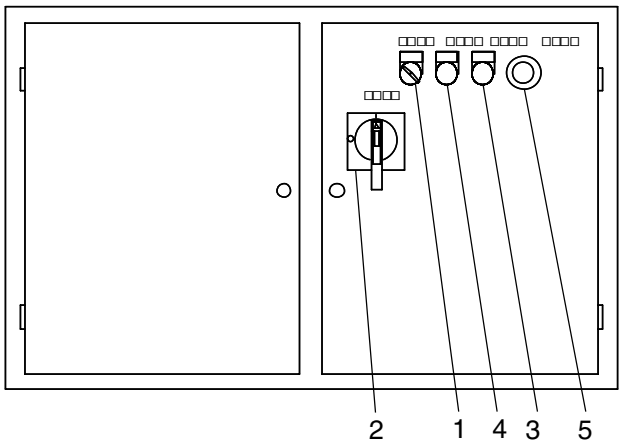
3.4 ELECTRICAL EQUIPMENT

3.4.1 MA 2500-C Control Panel



Item	Switch/Indicator	Function	
1	Power Switch (SA32)	**Pos. 1**	When the switch is in this position, the electric reactivation heater operates at 2/3 capacity.
		Pos. 2	When the switch is in this position, the electric reactivation heater operates at full capacity.
2	Mode Switch (SA33)	**MAN**	The unit is normally operated in the MAN mode.
		AUTO	It can be used in the AUTO mode if a humidistat is used to control the dehumidifier.
3	Power Connected Lamp - MAINS (HL38)		Indicates that mains power has been connected to the dehumidifier
4	Unit Running lamp - OPERATION (HL37)		Indicates that the unit is running, or is ready to start on a signal from the humidisat (AUTO mode)
5	Emergency Stop Button (SB30)		Operation of this button stops the unit but the Power Connected Lamp remains lit.
6	Temperature Gauge		Indicates the reactivation temperature.
7	Isolator Switch (QS10) (Item not illustrated)	**Pos. 0**	To be used to isolate the mains supply from the unit when any form of maintenance or servicing is being carried out on the unit.
		Pos. 1	

3.4.2 MA 3000-C Control Panel



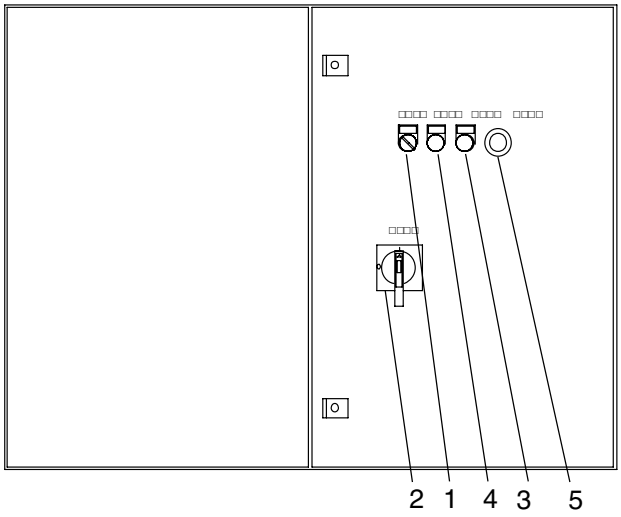
Item	Switch/ indicator	Function
1	SA31 Control switch	Used to start and stop the dehumidifier. When the unit is switched OFF, a timer is activated, and the fans continue to run for approximately 3 mins so as to disperse the residual heat from the reactivation heater. **Pos. 0** Reactivation power = 0kW **Pos. 1** Reactivation power = 52kW **Pos. 2** Reactivation power = 104kW
2	QS10 Isolator Switch	To be used to isolate the mains supply from the unit when any form of maintenance or servicing is being carried out on the unit. **Pos. 0** Switchboard disconnected from the mains. **Pos. 1** Switchboard connected to the mains.
3	HL38	Power Connected Indicator: Indicates that mains power is connected to the dehumidifier
4	HL37	Unit Running Indicator: Indicates that the unit is running
5	SB30 Emergency Stop	Use to stop the dehumidifier in the case of an emergency. Pressing this button disconnects all of the electrical components from the mains.

CAUTION

The emergency stop must not be used to start and stop the dehumidifier during normal operation.

During operation, air from the dry air fan is fed, via a filter on the side of the fan and a hose, to the cabinet in order to maintain a positive pressure in the cabinet.

3.4.3 MA 10000-C Control Panel



Item	Switch/ indicator	Function
1	SA31 Control switch	Used to start and stop the dehumidifier. When the unit is switched OFF, a timer is activated, and the fans continue to run for approximately 3 mins so as to disperse the residual heat from the reactivation heater. **Pos. 0** Reactivation power = 0kW **Pos. 1** Reactivation power = 52kW **Pos. 2** Reactivation power = 104kW **Pos. 3** Reactivation power = 156kW
2	QS10 Isolator Switch	To be used to isolate the mains supply from the unit when any form of maintenance or servicing is being carried out on the unit. **Pos. 0** Switchboard disconnected from the mains. **Pos. 1** Switchboard connected to the mains.
3	HL38	Power Connected Indicator: Indicates that mains power is connected to the dehumidifier
4	HL37	Unit Running Indicator: Indicates that the unit is running
5	SB30 Emergency Stop	Use to stop the dehumidifier in the case of an emergency. Pressing this button disconnects all of the electrical components from the mains.

CAUTION

The doors of the cabinet must be kept closed

3.4.4 Humidistat MA2500-C only (OPTION)

MA2500-C units are pre-wired so that when the units are in AUTOmatic mode they can be controlled by an externally mounted humidistat.

3.4.5 Combistat (MA 3000-C and MA 10000-C)

The “combistat” is a combined two step thermostat and thermometer with an indicator dial placed on the side of the casing. The indicator has three different coloured dials:

Black: Indicates the current reactivation temperature after the air heater

Green: This thermostat limits the reactiviation air temperature to 140°C by switching off the last step/steps of the reactivation power.

Red: This thermostat limits the reactiviation air temperature to 150°C by switching off all of the reactivation power.

3.4.6 High Temperature Cut-Outs (HTCO)

The units are fitted with two independent high temperature cut-outs (HTCO) which will stop the dehumidifier if the temperature exceeds the units design specification. These cut-outs can be manually reset by pressing the appropriate buttons located inside the control panel for the MA2500-C and on the side of the heater for both the MA3000 and 10000-C units.

4 INSTALLATION

4.1 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.

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.

4.2 MOVING THE DEHUMIDIFIER

Heavy load, the dehumidifier weighs in excess of 450kg. To prevent injury, or damage to the dehumidifier, always use approved equipment when attempting to move the dehumidifier.

In order to facilitate the movement and transportation of the dehumidifier, it is housed within a framework that is fitted with lifiting eyes. In addition the frame also has built in lifting points for fork trucks to use.

4.3 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 Technical Specification.

4.4 PROCESS & DRY AIR CONNECTIONS

The process and reactivation air ducts are sized in accordance with ISO 7807 recommendations. The duct connections contain tapped inserts for M8 bolt fixings.

When installing ductwork the following recommendations should be observed

The dehumidifier has been designed to operate at specific process airflows (corresponding to the fan sizes installed) and must not be directly connected to air-conditioning systems.

- The length of ductwork should be kept as short as possible to minimise static air pressure losses.
- 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 installed at low points in the ductwork.
- Ducts mounted directly onto the dehumidifier should be adequately supported to minimise the load and stress due to the duct weight and movement.
- Ensure that access for operation and servicing is not restricted when designing and installing ducting.
- To reduce noise and/or vibration being transmitted along rigid ductwork, good quality, airtight flexible connections should be fitted.
- Dampers for balancing the airflows must be installed in the dry air outlet. The correct airflow is essential for maintaining the operating efficiency of the unit.

If the dehumidifier is to be connected to a duct system, the procedure should be as follows.

4.4.1 Duct for process air

If the dew-point of the process air is higher than the ambient temperature of the dehumidifier, there is a risk of condensation in the duct. Ducts can be installed in two ways:

1. The duct is mounted sloping down and away from the dehumidifier so that any condensate formed can drain away.
2. If any duct does slope upwards, it should be provided with drainage holes (Ø 10 mm) at the lowest point so as to prevent any condensate entering the dehumidifier and damaging the rotor.

There is a Ø 10 mm drainage hole in the bottom of the filter unit to prevent any condensate accumulating in the filter unit.

4.4.2 Duct for Reactivation Air

If the dew-point of the reactivation air is higher than the ambient temperature of the dehumidifier, then the process air procedure should be used for the reactiviation air.

4.4.3 Duct System for Wet Air Outlet

Wet air ductwork should be manufactured in corrosion resistant material and should be capable of withstanding temperatures of up to 100°C.

Due to the high moisture content of the air in the wet air outlet ducting, condensation will readily form on the duct walls. Horizontal duct-runs should therefore be installed sloping downwards (away from the dehumidifier) to allow for condensate drainage. In addition, Ø 10 mm drain holes should be drilled at the low points in the duct to prevent water accumulating in the duct.

If this is impossible, a rising wet air duct may be used under the following circumstances:

- The duct is insulated (25 mm mineral wool or equivalent)
- The ducts are drained at their lowest points via Ø 10 mm drainage holes

The ducting must always be insulated, using 25mm of mineral wool or equivalent if there is a risk of freezing.

4.5 ELECTRICAL CONNECTIONS

4.5.1 Connection to the Mains

WARNING: THIS APPLIANCE MUST BE EARTHED

Electrical connections should be made by qualified persons only and in accordance with local electricity regulations.

MA-C dehumidifiers are supplied complete with all the internal wiring installed and configured in accordance with the specified voltage and frequency as detailed on the identification plate.

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

All of the units are designed for 3-phase AC operation:

380V 3~ 50Hz
400V 3~ 50Hz
440V 3~ 60Hz

Refer to the wiring diagrams, that are despatched with the unit, and connect the supply to the terminals L1, L2 and L3, which are located in the control panel.

Before connecting the unit to the mains supply, the three phases of the power supply should be checked to ensure that the supply voltage does not vary by more than 10% of the specified operating voltage. This is particularly important where large loads (caused by switching of ancillary equipment) could cause voltage fluctuations.

The unit must be adequately earthed and equipped with a fused isolator to enable isolation of the electrical power for inspection and servicing.

The isolator should be installed within easy reach of the dehumidifier control panel.

The current rating of the fused isolator must be in accordance with the type and model of dehumidifier being installed. For details refer to Technical Specification.

*All screws in the control panel must be re-tightened, **BEFORE** connecting the unit to the mains for the first time.*

The power supply cables must be of the correct size and current rating for the dehumidifier being installed. For details refer to Technical Specification.

4.5.2 Humidistat - MA2500-C only (option)

MA2500-C units are pre-wired so that when the units are in AUTOmatic mode they can be controlled by an externally mounted humidistat. The humidistat is connected to the terminal block on the switchboard as shown on the circuit diagrams. On delivery these terminal are shortcircuited.

Location requirements

When an external humidistat is installed, it should be sited in accordance with the following guidelines:

- The humidistat should be located at least 1 to 1,5m above the floor level so that it can sense a representative level of relative humidity in the room to be controlled.
- The humidistat should be mounted in a position where it will not be directly subjected to the influence of either dry or moist air (avoid draughts from opening doorways etc).
- The humidistat should not be located close to heat-producing equipment, or exposed to direct sunlight, since changes in temperature will have a direct effect on the relative humidity.

Electrical Specification

- The humidistat connecting cable should have a conductor cross-sectional area of not less than 0,75mm² and must have an insulation resistance rating in excess of 500V ac.
- The humidistat must be designed so that the contacts close on a rising RH set-point to complete the control circuit and start the dehumidifier.

5 OPERATION

5.1 PRE-START CHECKS

Before starting the dehumidifier ensure that the mains power supply is isolated from the dehumidifier and carry out the following checks:

1. Make sure that the all of the air inlets and outlets are not blocked.
2. Carry-out a visual check on all ductwork, and duct insulation, for correct connection and for signs of damage.
3. Check that the incoming power supply cables have been correctly installed.
4. If a humidistat has been installed, check that it has been correctly positioned and has been correctly connected to the unit. For details refer to the Installation (Paragraph 4.5.2) and the circuit diagrams supplied with the unit.

5.2 CHECK THE DIRECTION OF FAN ROTATION (MA 3000-C, MA 10000-C)

	MA 3000-C	MA 10000-C
1. Turn the main switch to position 1	QS10	QS10
2. Start the unit by turning the control switch to position 1	SA31	SA31
3. Wait a few seconds and then set the control switch to position 0	SA31	SA31
4. Immediately stop the unit by setting the main switch to position 0	QS10	QS10
5. Check that the fans are rotating in the direction of the arrow on the fan casing	-	-
6. If the fans are rotating in the wrong direction, wait until the fans have stopped completely and then change the rotation by switching cables L1 & L2 around.		

5.3 RUNNING CHECKS

If the dehumidifier fails any of the following checks refer to Fault Isolation (Paragraph 7.1) for actions required to identify the probable cause of the fault, and the corrective action required to return the unit to service.

To prevent damage to the fans, the unit must not be run for longer than 10 minutes prior to setting up the process and reactivation airflows. For details refer to Paragraphs 5.3.1 and 5.3.2

5.3.1 MA 2500-C

1. Set the reactivation air adjustment damper to the fully open position.
2. Set the process air adjustment damper, if fitted, half open. (A damper, if fitted, should be installed in the dry air duct)
3. Set the mode switch to the **MAN** position.
4. Start the dehumidifier by turning the **POWER** switch to position 2.
5. Ensure that the rotor is rotating smoothly, at approximately 8 r.p.h, in the direction of the red arrow (upwards as viewed through the inspection hole located on the front panel)

MA 2500-C Air flow adjustment

To achieve the design performance, the air flow dampers must be correctly adjusted in accordance with the rated airflow detailed in the Technical Specification (Paragraph 8)

Failure to correctly adjust the process and reactivation air flows could cause the unit to malfunction.

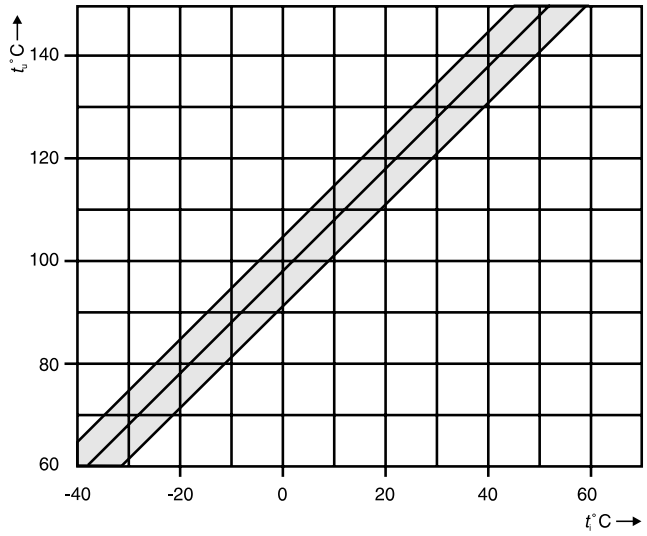
1. Using the dampers installed, adjust the process and reactivation airflows to the corrected rated flow.
2. Allow the unit to run for a few minutes to ensure that the operating conditions have stabilised.
3. Ensure that the indication on the reactivation temperature gauge falls within the parameters shown in the diagram on page 13.
   If the temperature is too low, close the reactivation damper in small stages (allowing the temperature indication to stabilise each time) until the temperature indication lies within the specification.

5.3.2 MA 3000-C, MA 10000-C

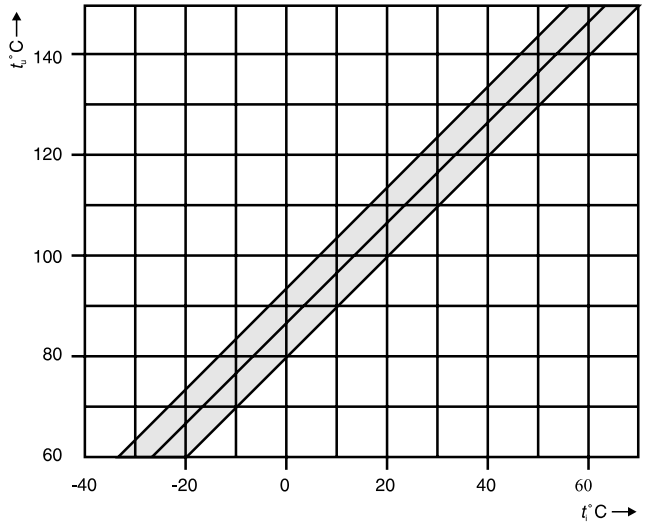
	MA 3000-C	MA 10000-C
1. Set the main switch to position 1.	QS10	QS10
2. Set the control switch to 1 and allow 5 secs. for the fans to reach their operating speed.	SA31	SA31
3. Set the control switch to position 2	SA31	SA31
4. **MA 10000-C:** Set control switch to position 3	_	SA31

5. Carry out the airflow adjustment

MA 2500-C Reactivation Temperature



MA 3000-C Reactivation Temperature



MA 3000-C, MA10000-C Air flow adjustment

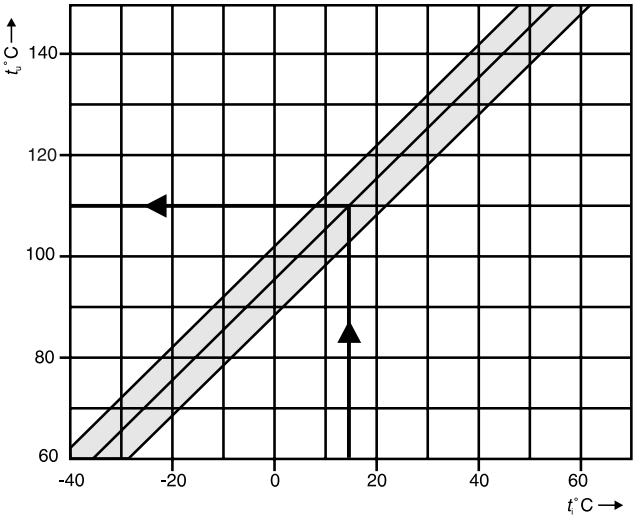
To achieve the design performance, the air flow dampers must be correctly adjusted in accordance with the rated airflow detailed in the Technical Specification (Paragraph 8)

Failure to correctly adjust the process and reactivation air flows could cause the unit to malfunction.

1. Using the damper installed in the reactiviation air inlet duct (and dry air outlet if fitted), adjust the airflows to the corrected rated flow.
2. Allow the unit to run for a few minutes to ensure that the operating conditions have stabilised.
3. Ensure that the indication on the reactivation temperature gauge (black dial) falls within the parameters shown in the diagram below.

   If the temperature is too low, close the reactivation damper in small stages (allowing the temperature indication to stabilise each time) until the temperature indication lies within the specification.

MA 10000-C Reactivation Temperature



Symbols:

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

Example for MA10000-C:

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

Automatic mode (MA2500-C only)

For the unit to operate in the AUTOMATIC mode a humidistat must be installed correctly to the unit. For details refer to paragraph 4.5.2.

1. Set the mode switch SA33 to the **AUTO** position.
2. Adjust the humidistat set point for the minimum relative humidity (RH) value.
   Apply power to the unit as detailed in paragraph 5.3.1 operations 1, 2,3, 4 and 5 for the MA 2500-C and 5.3.2 for the MA 3000-C and 10000-C.
   Ensure that the unit is operating.
3. Slowly increase the humidistat set point and check that the unit switches Off when the set point matches the RH in the area where the humidisat is located.
4. Slowly decrease the humidistat set point and check that the unit switches on when the set point falls below the RH in the area where the humidistat is located.
5. Switch off the power to the unit.
6. Calibrate the humidistat in accordance with the manufacturer's recommendations.
7. Reset the humidisat to the desired set point.

5.4 STOPPING THE UNIT

To turn the units off under normal operating conditions:

MA 2500-C: Set the power switch SA32 to **0**

MA 3000-C: Set the control switch SA31 to **0**

MA 10000-C: Set the control switch SA31 to **0**

Ensure that after apprximately 3 minutes the fans have stopped.

In order to dissipate any residual heat, the reactivation air fan, process fan and drive motor will continue to run (after the unit has been switched off).

In an emergency situation
Use the EMERGENCY STOP!

6 MAINTENANCE

The dehumidifier contains lethal voltages. Ensure that the unit is isolated from the mains supply before attempting to carry out any maintenance work.

The dehumidifier contains areas of high temperature. The unit and the surrounding ductwork must be allowed to cool down prior to maintenance work being carried out.

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.

6.1 MAINTENANCE PROCEDURES

MA-C dehumidifiers are designed to run for long periods with the minimum of attention and will normally require very little maintenance.

The frequency of maintenance will be determined by the operating conditions and the quality of the environment where the unit is being used. If the process air has a high dust-loading the scheduled maintenance should be carried out at at more frequent intervals. This can best be determined by your local Munters Service Engineer.

However, in order to maintain reliable peformance and prolong the service life of vital components, regular scheduled maintenance is recommended.

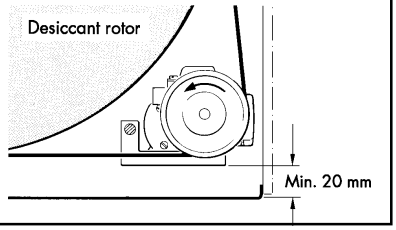
Recommendations for perodic maintenance are given on pages 15 and 16 of this manual.

MA 2500-C PERIODIC MAINTENANCE

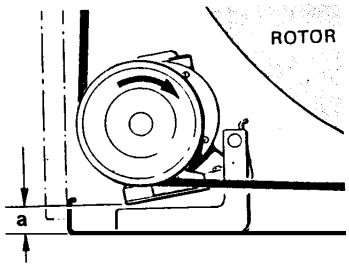
Component	Inspection/Maintenance Procedure	
	3-6 Months	12 Months
Process and reactivation air filters[1]	Clean the filter housing and change the filter if dirty. If the operating conditions and/or the condition of the process air has, for example, a high dust loading, then the filter may require changing more frequently.	Clean the filter housing and change the filter if dirty. If the operating conditions and/or the condition of the process air has, for example, a high dust loading, then the filter may require changing more frequently.
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 casings as required.	All dust and dirt in the motor cooling slots must be removed. Check the electrical connections to the motors to ensure that they are not loose. Check for signs of dammage and overheating.
Rotor drive assembly	Check the drive belt for signs of damage and ensure the tension is correct. (see diagram below) If the belt needs adjusting, remove the belt connector, shorten the belt and re-connect.	Check the electrical connections to the motors to ensure that they are not loose. Check for signs of dammage and overheating. Check the drive belt for signs of damage and ensure the tension is correct. (see diagram below) If the belt needs adjusting, remove the belt connector, shorten the belt and re-connect.
Electrical control panel and wiring	Inspect the components and wiring in the electrical control panel for signs of dammage and overheating. Check that none of the electrical connections have worked loose.	Inspect the components and wiring in the electrical control panel for signs of dammage and overheating. Check that none of the electrical connections have worked loose.
Reactivation heater	Check that none of the electrical connections have worked loose	Remove any scale deposits or dirt from the bottom of the heater compartment. Check that none of the electrical connections have worked loose.
Seals	Check the location and wear of the seals and replace any worn or ill fitting ones. Ensure that the seal just touches the rotor face and that the rotor rotates smoothly.	Check the location and wear of the seals and replace any worn or ill fitting ones. Ensure that the seal just touches the rotor face and that the rotor rotates smoothly.
Humidistat (if fitted)	Check the calibration and adjust if necessary.	Check the calibration and adjust if necessary.
All components	Check all of the functions of the unit. Replace any defective or worn components if necessary.	Check all of the functions of the unit. Replace any defective or worn components if necessary. In order to maintain efficient dehumidification, a full capacity check should be carried out by a Munters Service Engineer.

[1] In order to prevent dust and/or pigment particles accumulating in the rotor, which will damage the rotor, the dehumidifier must NEVER be operated without all of the filters being fitted.

Rotor Drive Belt Tension
This diagram shows that the rotor drive motor belt tension must equal to or greater than 20 mm in order to comply with the required specification.



MA 3000-C AND MA 10000-C PERIODIC MAINTENANCE

Interval/Steps to be taken	Description
Every day	
Cleaning of filters[1]	Take out the filter cells and remove the dust from the filter material by shaking/beating it lightly.
Checking the rotation of the rotor	Remove one of the plastic plugs in the rotor casing and check, whilst the unit is operating, that the rotor is rotating correctly.
Every week	
Filter replacement	Clean the filter housing and change the filter. If the operating conditions and the condition of the air being processed has for example a high dust loading, then the filter may require changing more frequently. Make sure that the white side of the filter faces towards the dehumidifier.
Every 3 months	
Check the rotor drive belt tension	Remove the inspection cover from the rotor casing and check the belt tension of the rotor drive. The tension is correct if dimension "a" is greater than 2-3 cm. If the belt needs adjusting, remove the belt connector, shorten the belt and re-connect. 
MA 10000-C	
Check the dry air fan belt tension	If the belt needs adjusting, remove the belt connector, shorten the belt and re-connect.
Every 6 months	
Replace the switchboard filter	Remove the hose and filter housing from the dry air fan, remove the old filter cartridge, clean the filter housing and fit a new filter.
MA 10000-C	
Dry air fan and motor	Lubricate
Every 12 months	
Rotor belt tensioner	Remove the inspection cover in the rotor casing and lubricate all of the joints in the belt tensioner.

[1] In order to prevent dust and/or pigment particles accumulating in the rotor, which will damage the rotor, the dehumidifier must NEVER be operated without all of the filters being fitted.

7 FAULT ISOLATION

The purpose of this section is to assist the operator in recognising and rectifying faults in the unit.

The dehumidifier contains lethal voltages. Ensure that the unit is isolated from the mains supply before attempting to carry out any maintenance work.

The dehumidifier contains areas of high temperature. The unit and the surrounding ductwork must be allowed to cool down prior to maintenance work being carried out.

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.

7.1 FAULT ISOLATION PROCEDURES

When a fault occurs the following fault isolation checklist should be carried out before calling a service technician. This will assist in identifying faults that can be easily rectified by the operator.

Fault Isolation checklist for MA2500-C, MA3000-C, MA10000-C

Fault Symptom	Probable Fault	Corrective Action
Unit stopped. (All indicators are off)	Power supply failure. Mains fuse has ruptured.	Check the power supply to the unit. Replace the fuse.
Unit stopped (Power connected indicator on, unit running indicator on)	Manual mode: Unit inadvertently switched into AUTOmatic mode without a humidistat being connected. Automatic mode (MA2500-C only): Humidistat fault (AUTOmatic mode).	 Switch the dehumidifier into MANual mode and check that the unit starts. Check the operation and calibration of the humidistat inaccordance with the manufacturer's recommendations.
Unit stopped. (Power connected indicator on, unit running indicator off)	The high temperature cut-out (HTCO) has tripped. One of the motor overload circuit breakers has trripped.	Check the filters, fan impellers, air inlet and air outlet ducts are free from obstructions and are not clogged with dirt. Reset the cut-out when the unit has cooled down. Investigate the cause of the fault and rectify. Reset the breaker.
Loss of performance. (The dehumidifier appears to be operating correctly - but is not controlling the humidity)	Heating capacity is too low. Reactivation and process airflows are not in accordance with the design specification. Rotor drive failure. Humidistat not functioning correctly. (AUTOmatic mode)	Check the operation of the heater. Measure and adjust the reactivation airflows. For details refer to Operation (paragraphs 5.3.1 and 5.3.2. Check the rotor drive belt and drive motor. Check the operation and calibration of the humidistat inaccordance with the manufacturer's recommendations.

8 TECHNICAL DATA

Model	MA 2500 C	MA 3000 C	MA 10000 C
PROCESS AIR [1]			
Rated Airflow (m³/s)	0,69	1,39	4,17
Rated Airflow (m³/h)	2 500	5 000	15 000
Total Pressure Available (Pa)	300	880	590
Pressure drop (Pa)[2]	50	40	30
Fan Motor Power (kW)	3,0	7,5	18,5
REACTIVATION AIR [1]			
Rated Airflow (m³/s)	0,23	0,46	1,39
Rated Airflow (m³/h)	830	1670	5000
Total Pressure Available (Pa)	800	390	540
Pressure drop over a clean filter (Pa)	40	35	35
Fan Motor Power (kW)	1,5	2,2	7,5
ELECTRICAL POWER AND RATED CURRENT			
Total Power (kW)	31,5	57,7	183,5
Rated Current 3 ~ 50Hz 380V	51,0	92,0	287,0
Rated Current 3 ~ 50Hz 400V	48,5	87,5	272,5
Rated Current 3 ~ 60Hz 440V	43,9	82,4	257,4
REACTIVATION HEATER			
Reactivation Heater Power (kW)	27,0	48,0	157,5
MISCELLANEOUS DATA			
Drive Motor Power (W)	18	35	35
Air Filtration (Standard)	G3 (EU3)	G3 (EU3)	G3 (EU3)
Dust and Water Resistance (Main Case)	IP44	IP44	IP44

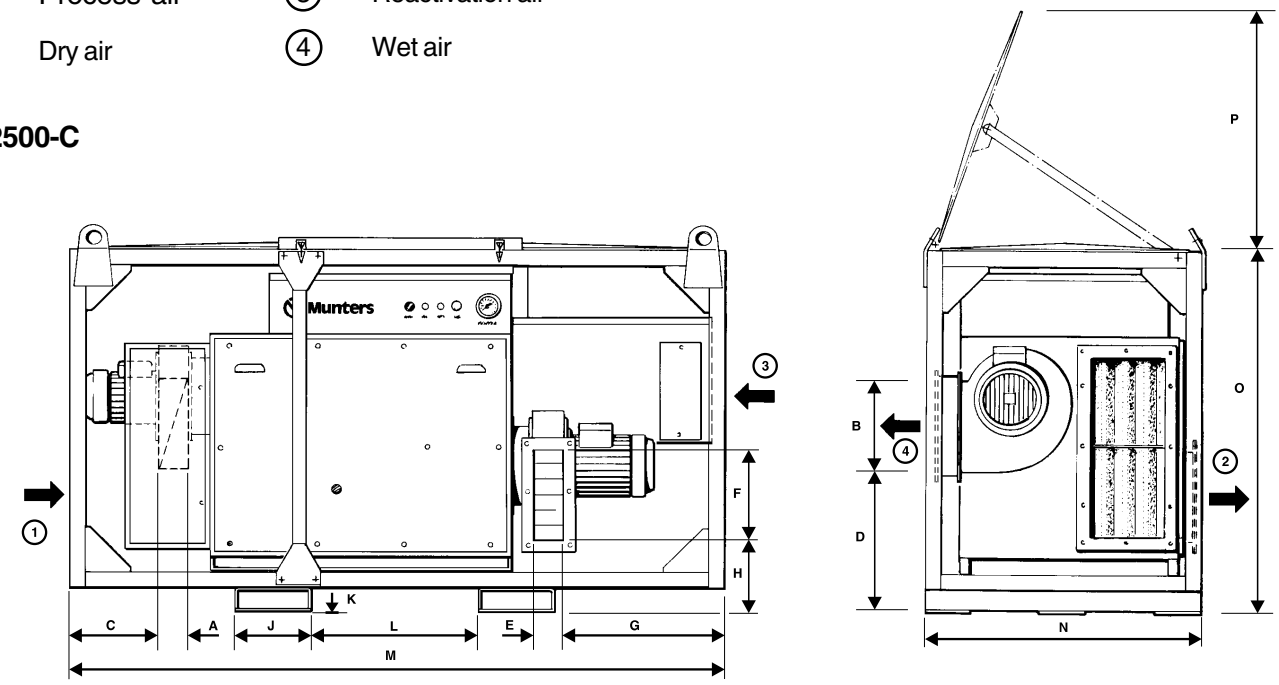
[1] Figures quoted are nominal, based on fan air inlet temperature of 20°C, and an air density of 1.2kg/m³

8.1 DIMENSIONS AND WEIGHT

① Process air ③ Reactivation air

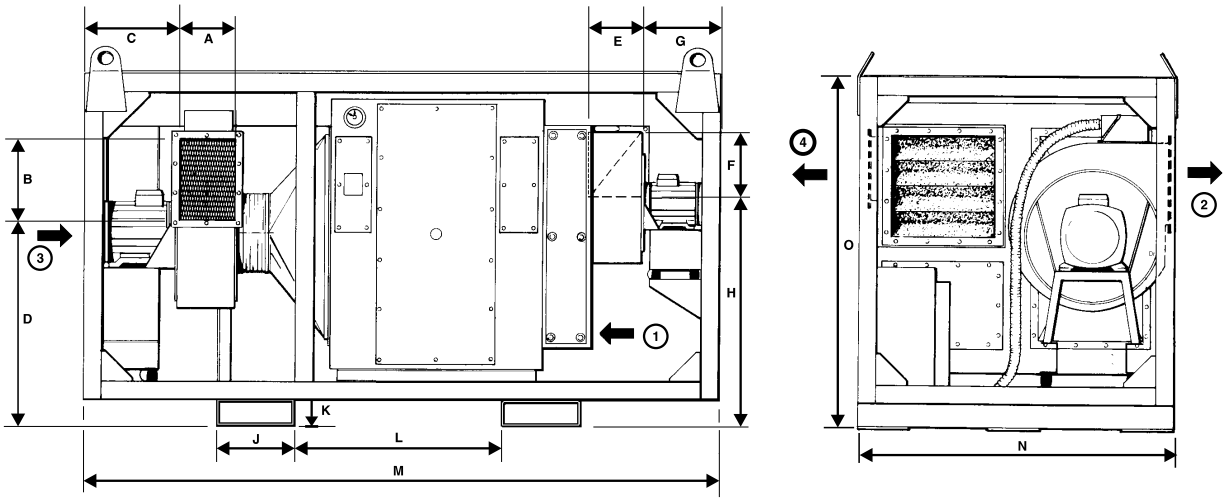
② Dry air ④ Wet air

MA 2500-C



MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	WEIGHT (kg)
MA 2500-C	100	300	290	470	100	300	520	240	250	80	550	2350	900	1200	800	450

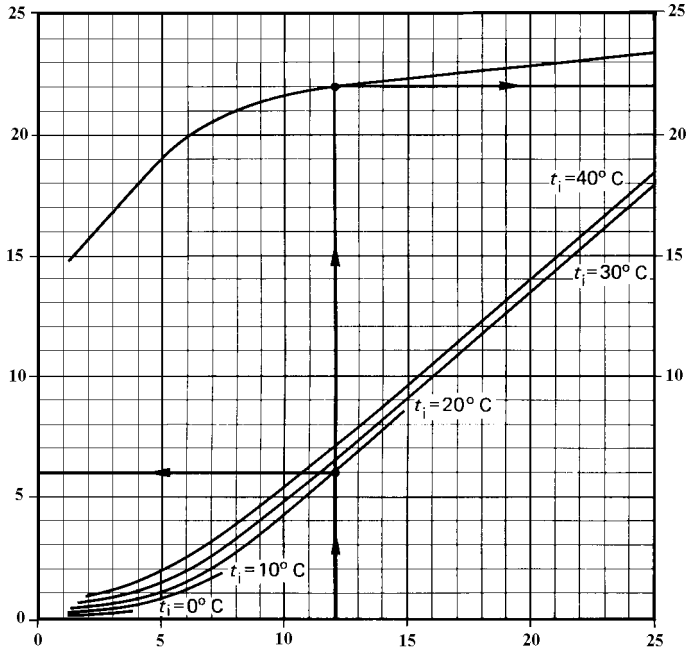
MA 3000-C, MA 10000-C



MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	O	WEIGHT (kg)
MA 3000-C	250	315	410	800	200	250	305	910	300	106	800	2450	1215	1370	890
MA 10000-C	400	500	690	1160	250	315	470	1460	300	106	900	3750	1830	2060	2070

8.2 CAPACITY DIAGRAM

If dry air conditions below 1 g/kg are required, please consult Munters.



SYMBOLS

x_i	= Moisture content of process air	g/kg
t_i	= Process air temperature	°C
x_u	= Moisture content of Dry air	g/kg
Δt	= Dry air temperature rise	°C

Sample Calculation for dehumidifier type MA:

Process air moisture content x_i	=	12.0g/kg
Process air temperature t_i	=	20°C
Dry air moisture content x_u	=	6.0g/kg
Dry air temperature rise Δt	=	22°C
Total Dry Air Temperature t_u	**=**	**20 + 22 = 42°C**

8.3 FAN DIAGRAM

The fan diagrams are for inlet conditions of 20°C, density 1,2kg/m²

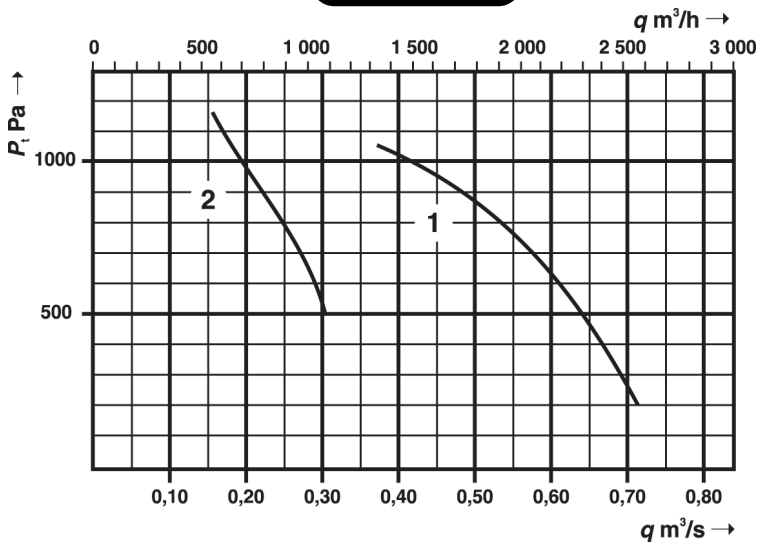
① PROCESS AIR

② REACTIVATION AIR

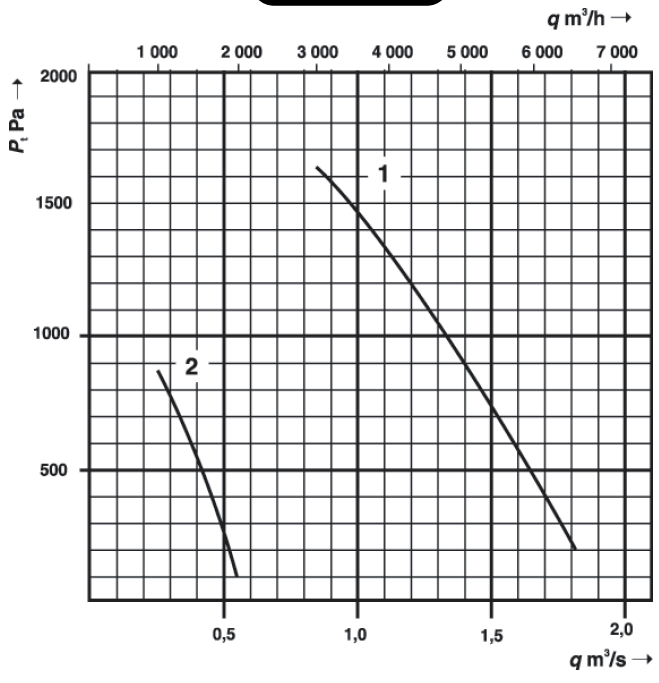
q = Airflow m³/s (m³/h)

P_t = Total pressure available Pa

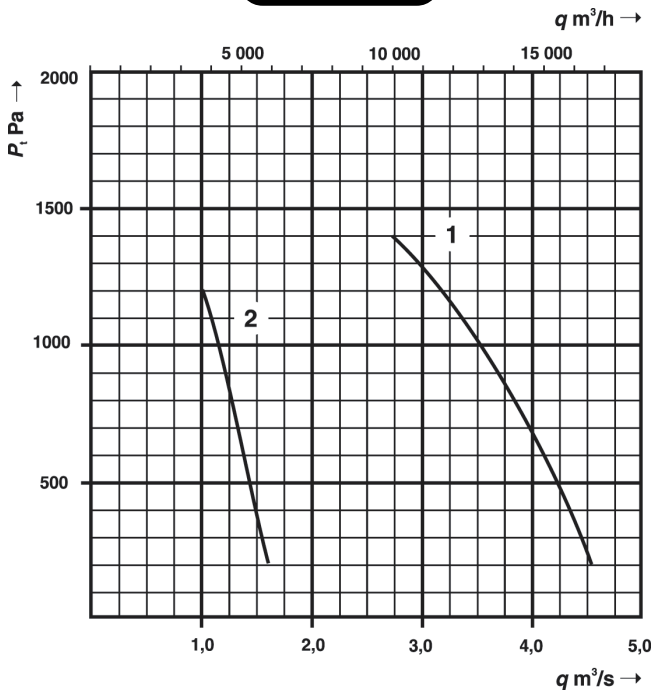
MA 2500-C



MA 3000-C

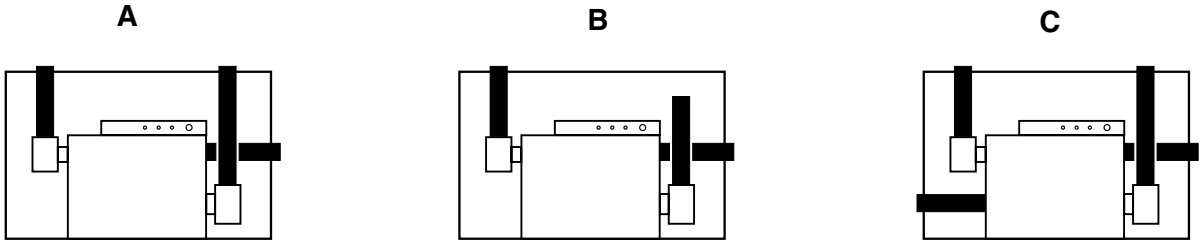


MA 10000-C



8.4 SOUND DATA

MODEL	NOISE PATH	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
MA 2500-C	A	96	-33	-22	-10	-6	-6	-5	-12	-27
	B	97	-27	-16	-9	-6	-6	-5	-13	-17
	C	88	-19	-9	-3	-9	-9	-11	-16	-19
MA 3000-C	A	103	-6	-6	-6	-7	-14	-21	-27	-35
	B	104	-6	-6	-6	-9	-13	-17	-22	-30
	C	93	-7	-9	-5	-6	-14	-17	-22	-29
MA 10000-C	A	107	-8	-5	-5	-8	-14	-20	-27	-33
	B	108	-6	-6	-6	-9	-13	-17	-22	-30
	C	97	-7	-9	-5	-6	-14	-17	-22	-29



NOISE PATHS TO SURROUNDINGS:

A = Noise path to duct system.

B = Noise path to the surroundings, dry air duct length 1 m.

C = Noise path to the surroundings, duct connected.

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 the calculation of L_w
$L_w = L_{wt} + K_{ok}$

9. GENERAL ASSEMBLY

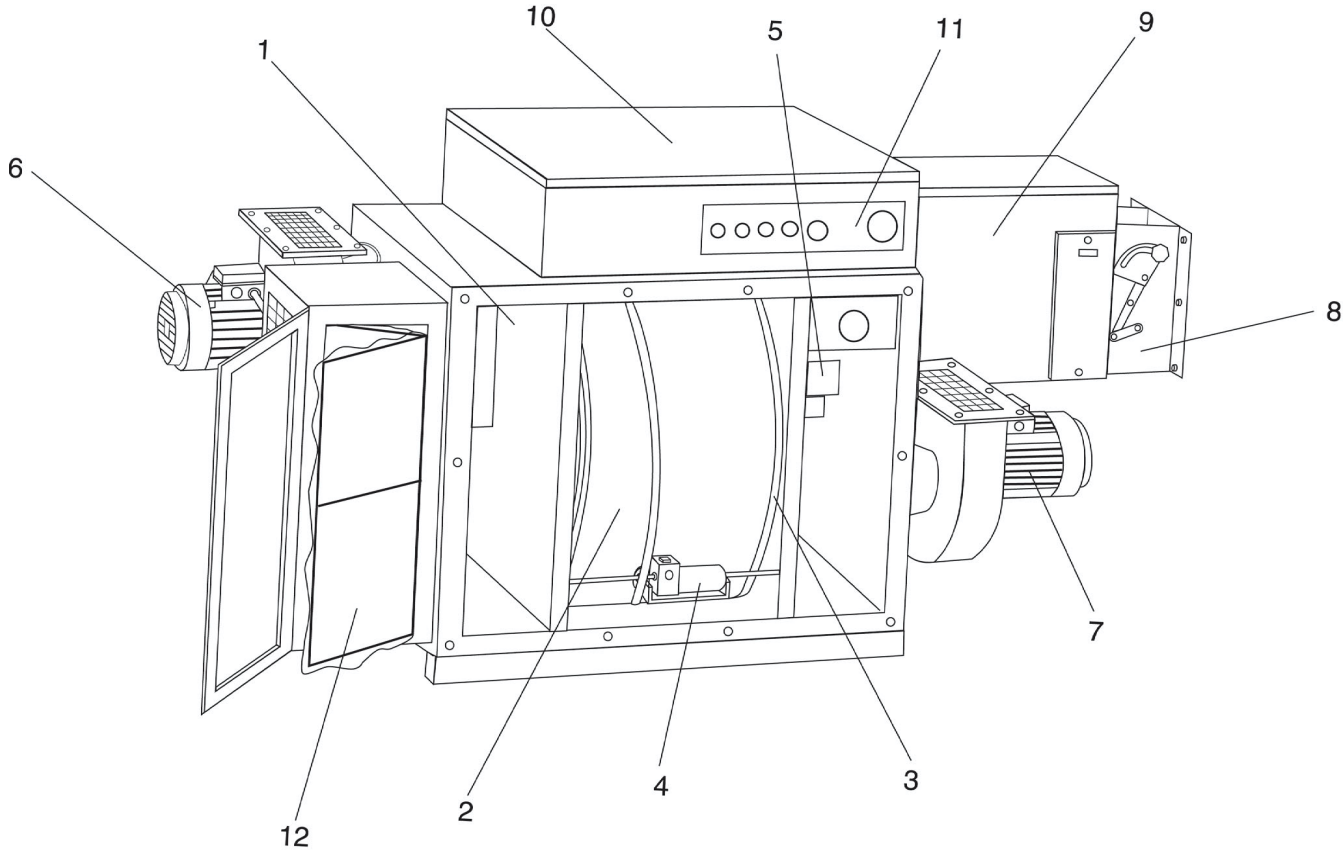
Spare and replacement parts should be ordered from your local sales company. For addresses and telephone numbers refer to the back page. When ordering spare parts always supply the following details:

- Type (refer to identification plate on unit)
- Fabrication number (refer to identification plate on unit)
- Electrical specification (refer to identification plate on unit)
- Description of spare part required
- Quantity required

ORDER EXAMPLE:

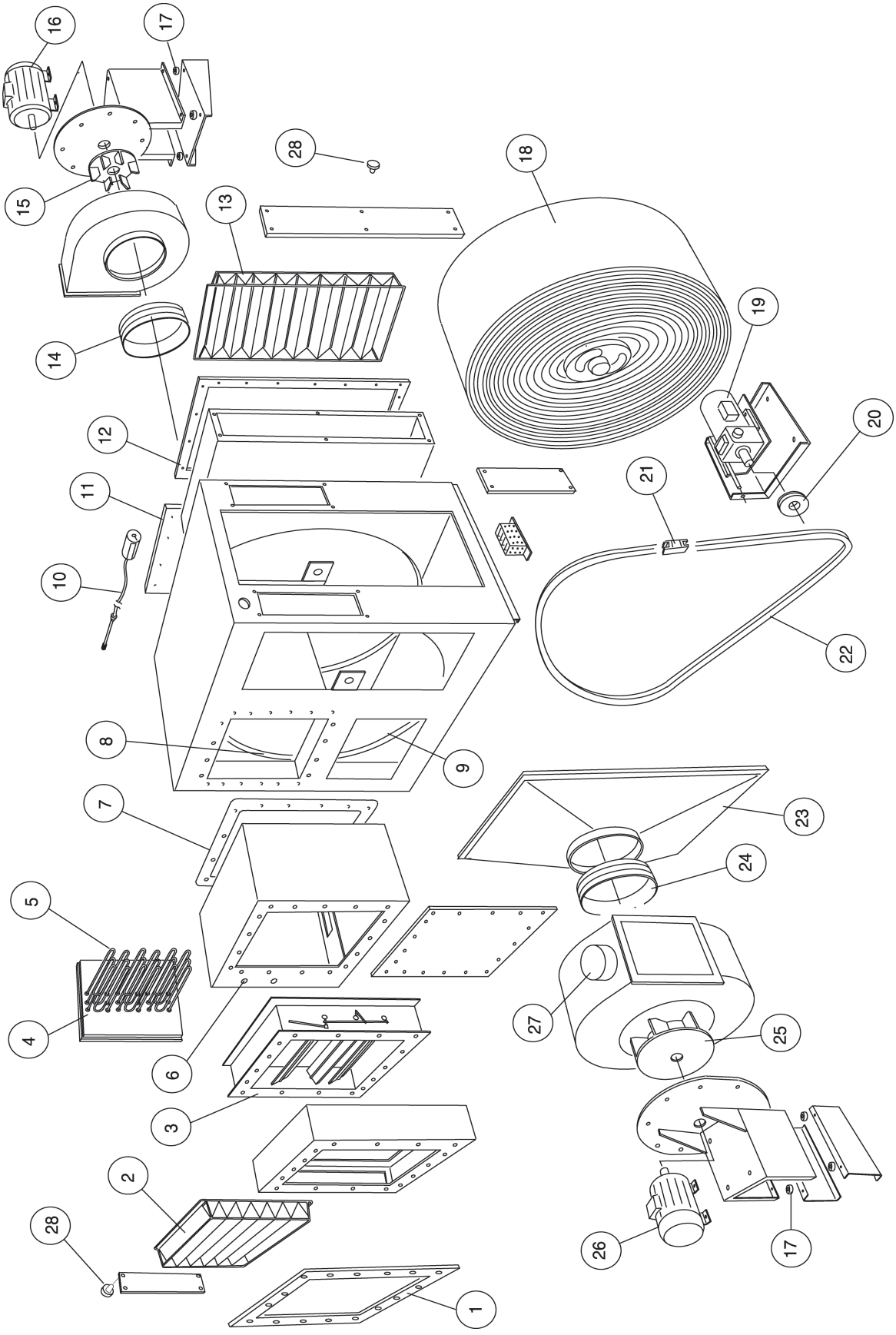
Type ..... MA 3000-C
Fabrication Number 96/X/30/1411
Electrical Specification ..... 3 ~ 380V 50Hz
Description ..... Process Fan Motor
Quantity Required 1

9.1 MA 2500-C GENERAL ASSEMBLY



Item	Description	Item	Description
1	Casing	7	Process Fan Assembly
2	Rotor	8	Damper
3	Seal Assembly	9	Heater
4	Drive Assembly	10	Control Panel
5	Thermostat Bulb	11	Thermometer
6	Reactivation Fan Assembly	12	Process Filter

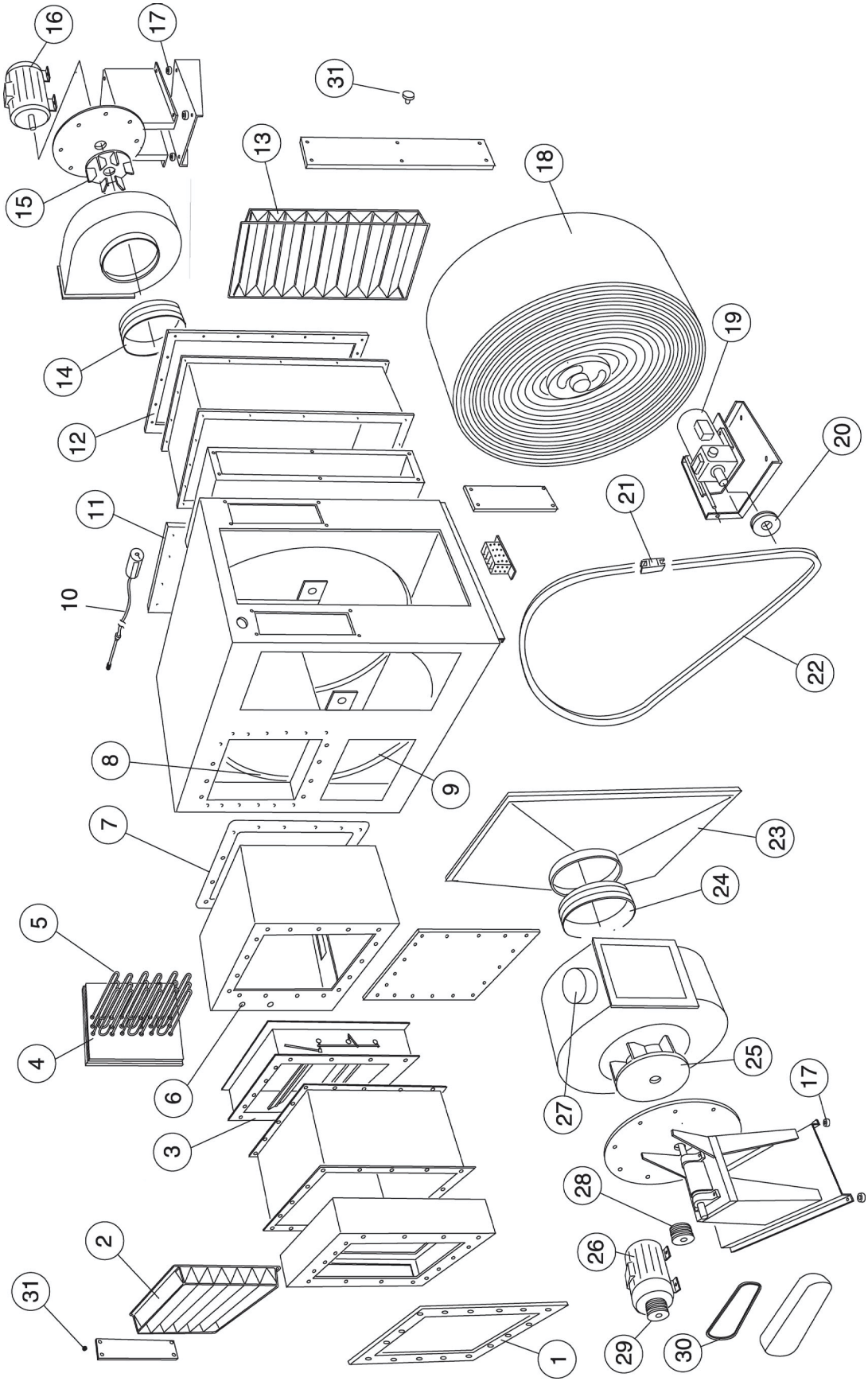
9.2 MA 3000-C GENERAL ASSEMBLY



MA 3000-C GENERAL ASSEMBLY

Item	Description	Item	Description
1	Flange - Reactivation	**ROTOR ASSEMBLY**	
2	Reactivation Filter	18	Rotor
3	Damper	19	Drive Motor
4	Electric Heater	20	Pulley
5	Heating Elements	21	Drive Belt Connector
6	Thermostat ATHF	22	Drive Belt
7	Silicon Seal		
8	Reactivation Seal	23	Process Air Connecting Piece
9	Process Seal	24	Process Air Connecting Piece
10	Combistat	**PROCESS FAN ASSEMBLY**	
11	Reactivation Connecting Duct	25	Impeller
12	Flange - Process	26	Fan motor
13	Process Filter	27	Filter
14	Connecting Piece	28	Fixing knob
REACTIVATION FAN ASSEMBLY			
15	Impeller		
16	Fan motor		
17	Anti vibration dampers		

9.3 MA 10000-C GENERAL ASSEMBLY



MA 10000-C GENERAL ASSEMBLY

Item	Description	Item	Description
1	Flange - Reactivation	**ROTOR ASSEMBLY**	
2	Reactivation Filter	18	Rotor
3	Damper	19	Drive Motor
4	Electric Heater	20	Pulley
5	Heating Elements	21	Drive Belt Connector
6	Thermostat ATHF	22	Drive Belt
7	Silicon Seal		
8	Reactivation Seal	23	Process Air Connecting Piece
9	Process Seal	24	Process Air Connecting Piece
10	Combistat	**PROCESS FAN ASSEMBLY**	
11	Reactivation Connecting Duct	25	Impeller
12	Flange - Process	26	Fan motor
13	Process Filter	27	Filter
14	Connecting Piece	28	Fan Pulley
REACTIVATION FAN ASSEMBLY		29	Motor Pulley
15	Impeller	30	Drive Belt
16	Fan motor	31	Fixing knob
17	Anti vibration dampers		

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