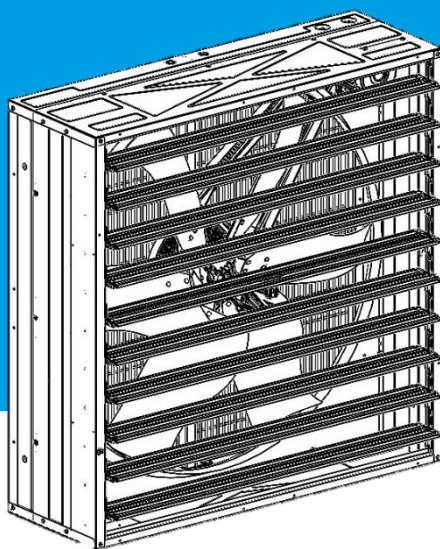


Air extraction fan

EM50



rev. 202404
P/N 2200136

Use and maintenance manual

GENERAL INFORMATION

This manual for use and maintenance is an integral part of the apparatus together with the attached technical documentation and has been produced with reference to Directive 2006/42/EC, paragraph A, Annex II, and to ErP Directive 2009/125/CE Commission Regulation 327/2011.

This document is destined for the user of the apparatus: it may not be reproduced in whole or in part, committed to computer memory as a file or delivered to third parties without the prior authorisation of the assembler of the system. Munters Italy S.p.A. reserves the right to effect modifications to the apparatus in accordance with technical and legal developments and to make alterations to specifications, quantities, etc., for production or other reasons, subsequent to publication.

Warranty:



For Warranty information please refers to "General terms and condition of sale" available on https://www.munters.com/globalassets/termsandpolicies/condizioni_generali_vendita.pdf

Conditions and Limitations

- Products and Systems involved in a warranty claim under the "General terms and condition of sale" shall have been properly installed, maintained and operated under competent supervision, according to the instructions provided by Munters;
- Malfunction or failure resulting from misuse, abuse, negligence, alteration, accident or lack of proper installation or maintenance shall not be considered a defect under the Warranty.

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1. EU DECLARATION

EU DECLARATION OF CONFORMITY

(complies with Subparagraph A Annex II Directive 2006/42/EC)

Munters Italy S.p.A.

with registered offices in strada Piani 12 – 18027 Chiusavecchia (IM) – Italy
(Company registration nr. 00081050080)

DECLARES ON ITS OWN RESPONSIBILITY THAT THE APPARATUS

Designation	Fan designed for moving air to control temperature and humidity in greenhouses or rearing sheds.
Model	EM50

CONFORMS WITH THE ESSENTIAL SAFETY REQUIREMENTS STATED
BY APPARATUS DIRECTIVE 2006/42/EC AND PERFORMANCE REQUIREMENTS
COMPLY WITH THE ERP DIRECTIVE 2009/125/CE,
WITH PARTICULAR REFERENCE TO THE FOLLOWING PROVISIONS:

UNI EN 953:2009, UNI EN ISO 12100:2010, UNI EN ISO 12499:2009,
UNI EN ISO 13857:2008, CEI EN 60204-1:2006 (CEI 44-5), UNI EN ISO 5801:2009

Chiusavecchia, 2024/07/15
Daniela Giglioli



(legal representative)

1.1 Disclaimer

Munters reserves the right to make alternations to specifications, quantities, dimensions etc. for production or other reasons, subsequent to publication. The information contained herein has been prepared by qualified experts within Munters. While we believe the information is accurate and complete, we make no warranty or representation for any particular purposes. The information is offered in good faith and with the understanding that any use of the units or accessories in breach of the directions and warnings in this document is at the sole discretion and risk of the user.

1.2 Introduction

Congratulations on your excellent choice of purchasing an Munters fan!

In order to realize the full benefit from this product it is important that it is installed, commissioned and operated correctly. Before installation or using the fan, this manual should be studied carefully. It is also recommended that it is kept safely for future reference. The manual is intended as a reference for installation, commissioning and day-to-day operation of the Munters fans.

1.3 Notes

Date of release: 2024.

Munters cannot guarantee to inform users about the changes or to distribute new manuals to them.

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Munters. The contents of this manual are subject to change without notice.

1.4 Data for Fan Eco Design Directive

Table 1

Product information requirements* (according to ANNEX I - 3.2 of regulation)	1	2	3	4	optional	5	6a	6b	6c	7	8
Fan description*	overall efficiency $\eta\%$	measurement category	efficiency category	efficiency grade	target efficiency grade 2013 (2015)	VDS must be installed with the fan	motor power input at optimum energy efficiency [W]	flow rate at optimum energy efficiency [m ³ /h]	pressure at optimum energy efficiency [Pa]	RPM at optimum energy efficiency	specific ratio
EM50 1.5hp 3ph 50Hz OS	35.4	A	static	40.3	40	no	1669	30519	69.6	429	1
EM50 1.0hp 3ph 50Hz OS	33.9	A	static	40.1	40	no	1074	26474	49.5	364	1
EM50 1.5hp 3ph 50Hz MS	34.7	A	static	40.2	40	no	1377	28817	59.7	403	1
EM50 1.2hp 3ph 50Hz MS	33.6	A	static	40.1	40	no	948	23037	49.8	345	1
EM50 1.5hp 1ph 50Hz OS	35.1	A	static	40.2	40	no	1570	28197	70.4	435	1
EM50 2.5hp 3ph 50Hz E-Line	40.3	A	static	45.4	40	yes	1569	29623	71.5	432	1

1.5 Attached technical documentation

The listed documentation is to be considered an integral part of this manual:

- technical sheet/electric motor instruction booklet.

1.6 Disposal

Do not dispose of this product with general household waste. This product must be disposed according to the laws governing Waste Electrical and Electronic Equipment. If required, contact your local authorities for information regarding the available disposal facilities.

2. SAFETY ASPECTS



WARNING Failure to respect safety or behavioural rules can produce hazardous situations for users as well as damage to the machine and the place where it is installed.

The fan must only be used if it is in perfect operating condition, by personnel who are perfectly aware of the safety measures and possible hazards, and in strict compliance with the instructions given in this manual.

2.1 Personnel requirements

The fan is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

Equipment may only be used by personnel who know and apply the

specific requirements given in the user and maintenance manual and the more general instructions contained in various regulations for accident prevention and applicable legislation regarding safety in the workplace, as well as other European Community directives incorporated by the member states into their national legislation.

Knowledge and understanding of the manual and of the attached documents constitute an indispensable tool for reducing hazards and promoting the safety and health of workers.

Personnel training

All operators engaged in the use of the fan must have received adequate information from the employer relating to:

- risks to health and safety at work connected with the use of the machine;
- first aid procedures, fire precautions and evacuation of workplaces;
- devices provided for the safety of operators, and residual risks generated by the machine.

In particular, the employer has the following duties:

- when assigning tasks to operators, to take into account their capabilities in the interests of safeguarding their health and safety;
- to provide adequate means of protection;
- to require compliance by individual operators with the company rules and provisions regarding safety and the use of the collective and individual protective measures at their disposal;
- to ensure that normal and special maintenance operations, or in any event operations necessary for machine safety, are regularly

performed.

All operators must take care of their own safety and health as well as that of other people in the workplace who may be affected by their actions or omissions, in accordance with their personal skills, and the instructions and means provided to them by the employer.



WARNING Unauthorized tampering-replacement of one or more parts of the machine, or the use of accessories, tools or materials other than those recommended by the manufacturer, are prohibited and release the manufacturer from all liability.



WARNING Operators must be trained to deal with the occurrence of possible faults, malfunctions or dangerous conditions to themselves or others, and in such an event must:

- stop the fan immediately by operating the emergency stop device (mushroom- shaped pushbutton/main switch mounted on the electrical panel);
- not carry out operations which are beyond their duties and/or technical knowledge.

2.2 General safety instructions



WARNING

- Safety devices must not be removed or rendered ineffective; the fan must not be started with guards removed;
- any adjustment or maintenance operation must be performed with the electrical isolating device activated and locked in position with a padlock;
- any operation is prohibited which may cause arcing or sparks or other situations which could start a fire;

- in the event of alarm signals resulting in the intervention of safety devices, the operator must ask for immediate action by qualified technicians responsible for maintenance;
- user must ensure that the environmental and electricity supply conditions in which the fan operates are always within the limits specified in this user manual;
- do not for any reason modify parts of the fan in order to fit additional devices.

2.3 Safety devices

In the process of designing and building the fan, the manufacturer adopted the necessary technical solutions to ensure compliance with fundamental safety requirements: the object of the risk reduction process was to ensure that the operator can use the fan in safety. The machine is provided with protection devices of fixed type and is fitted with an actuator for the emergency stop function.

Fixed guards

The fixed guards are solidly fixed to the structure of the machine and cannot easily be eluded: the guards are fixed with systems which require the use of tools for dismantling.



WARNING Do not start the fan with fixed guards removed: the guards can only be removed with special tools, by specialized and trained personnel and with the system stationary (emergency system activated and electricity and hydraulic fluid isolated). At the end of maintenance operations, the guards which were removed must be replaced correctly.

Table 2

Position of guard	Type of guard	Notes
	Guard of fixed type made of metal mesh.	Dimensions and positioning in accordance with the instructions in the standard UNI EN 13857. Removable only by means of special tool.

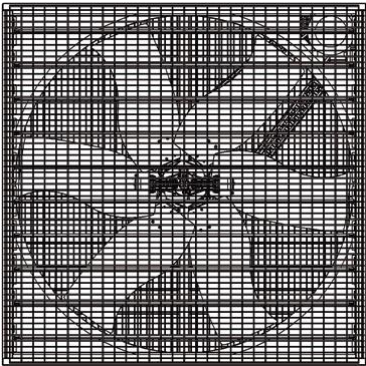


fig. 1

Outlet side of fan	Guard of fixed type made of metal mesh.	Dimensions and positioning in accordance with the instructions in the standard UNI EN 13857. Removable only by means of special tool
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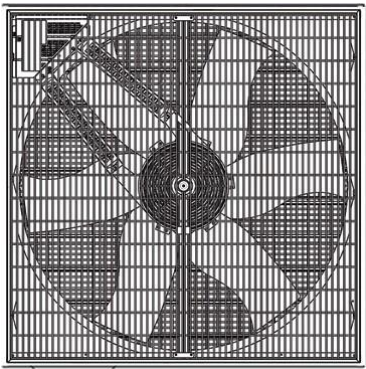


fig. 2

Emergency stop function



fig. 3

The machine must be equipped at the installation stage with an electrical panel, on which must be installed an actuator for the emergency stop function, which when operated brings dangerous movements to a halt by isolation of the power supply: the button must be mushroom-shaped and colored red, provided with mechanical restraint and released by turning.

2.4 Residual risks

Table 3



Mechanical hazards		
Part of machine/stage of use	Description	Plates/provisions/PPE
Installation of machine	Hazard arising from failure to observe ergonomic principles, caused by excessive strain, i.e. generic mechanical hazard during the moving and installing stages of the machine.	<div></div> <div>fig. 4</div>
Electrical hazards		
System area	Description	Plates/provisions/PPE
Panels, covers and electrical apparatus	The safety signs must be fixed in an extremely visible position on the door of the electrical panel and on covers containing electrical apparatus, to highlight the risks to which an operator could be exposed in the event of opening the electrical panel (danger resulting from the presence of live parts), the level of voltage present, the prohibition of tampering by unauthorized personnel and the prohibition on the use of liquids on electrical apparatus in the event of fire.	<div></div> <div>fig. 5</div>

Table 4

Hazards generated by noise (measured at 4m distance)	
Fan model	Sound pressure level Lp [dB(A)]
EM50 - 1.0hp	67.6
EM50 - 1.5hp	70.4
EM50 2.5hp – E-Line	70.3

Measurements performed according to standard EN ISO 3744:2010



WARNING The user and the employer must comply with current national law in terms of protection against daily personal exposure of operators to noise, by providing

the use of personal protective equipment (earmuffs, earplugs, etc.) if necessary, depending on the overall level of sound pressure in the installation area, and the daily personal exposure of the employees. In areas where the overall sound level reaches excessive values, personal protective equipment must be used.



WARNING The fan must only be used if it is in perfect operating condition, by personnel, aged more than 14 years who are perfectly aware of the safety measures and possible

hazards, and in strict compliance with the instructions given in this manual.

3. BEFORE USING

3.1 Delivery check

Upon receipt, inspect the fan for external damage and if found, inform the forwarding agent without delay. Check the data on all the rating plates, especially voltage and frequency. Turn propeller by hand to check free rotation. Check the opening of the shutter by hand.

3.2 Packaging and transport of assembled fans

The fan has a self-supporting structure in galvanised steel and it is usually delivered without packaging. Upon request fans can be delivered packed in cardboard boxes.

Fans should not be permanently stocked one upon the other, regardless if they are delivered with or without packaging. Handling of the fans should not be done manually as the fans have no handles or grips. Consequently one of the following alternatives should be used:

- trolley: when loading the fan on the trolley make sure fan shutter is positioned outwards;
- forklift: before loading, make sure the forks are opened as much as possible to avoid bending of the fan bottom panel and damaging the shutter;
- crane: fix two bolts in the M8 bushes situated on the sides of the fan housing and hook the lifting cable over the bolts.



WARNING Make sure a steel cable or rope of adequate size is being used when the fan is lifted by crane. Fan weights are shown in the technical specification table (see section 7.1).

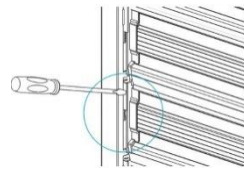


fig. 6

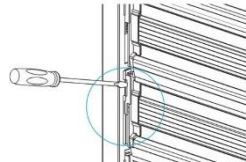


fig. 7

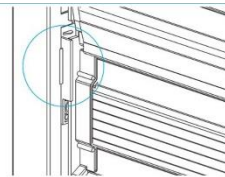


fig. 8

Once unpacked check the opening of the shutter manually by rotating the central shutter blade, verify that during transportation the plastic shutter bearings did not fall off from their operation condition. If yes restore them by mean of a screw-driver and re-check the opening of the shutter.

Follow the steps shown in the pictures.

3.3 Structure

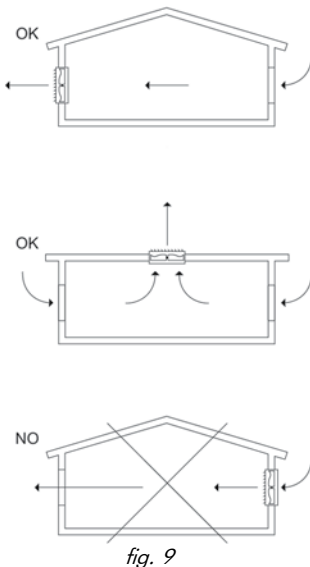
The fans consist of the following components:

- fan housing in Munters Protect coated steel without welding spots;
- fan shutter in Munters Protect coated steel, which pivots on UV protected plastic bushes and pins;
- propeller with six blades in stainless or Munters Protect coated steel; blades are fixed to the propeller by high-strength pop rivets;
- asynchronous three-phases or single-phase motor; 50 or 60 Hz; B3 form; F class winding insulation, IP55 protection class; single-speed or multi-speed;
- centrifugal operated shutter opening device.

4. OPERATING CONDITIONS

4.1 Intended conditions of use

Fans are machines designed for moving air to control temperature and humidity in greenhouses or rearing sheds by extraction, not under pressure. They can even be installed horizontally, without altering or modifying their characteristics.



The fan has been designed and built to operate in safety for the user, if used according to the conditions intended by the manufacturer and stated in this user and maintenance manual.

NOTE For further information, please refer to the technical documentation attached to this manual.

4.2 Non-permitted conditions of use

Total or partial failure to observe the instructions given in this manual could cause damage to the fan and/or people. The following uses are to be considered not permitted and improper:

- use in the event of faults and/or tampering with the installed safety devices;
- use by personnel not specifically trained;
- installation of the fan for extraction or circulation under pressure;
- use contrary to existing regulations;
- incorrect installation differing from instructions given in this manual;
- supply from an electrical network with characteristics different from that specified in the wiring diagram;
- total or partial failure to observe instructions;
- insufficient maintenance;
- use of non-original spare parts;
- use of lubricants with characteristics different from those specified in the technical documentation attached to the manual;
- use by minors;
- use under the influence of drugs, alcohol, etc.



WARNING Use of the fan other than as described in the user manual or outside the operational limits laid down by the manufacturer is considered **IMPROPER USE**. In the event of **IMPROPER USE** the manufacturer declines all liability in relation to any damage that may be caused to persons or property, and any kind of warranty will be considered invalidated.



WARNING If unusual oscillating movement is observed, immediately stop using the fan and contact the manufacturer, its service agent or suitably qualified persons.

Use of non-original spare parts

Original spare parts ensure the reliability and safety of the operation of the fan: in the event of maintenance/ replacement, consult the spare parts list, the list of parts and components used and the relevant technical documentation attached to this manual.



WARNING In the event of replacement of safety devices, it is essential to maintain the safety and operational characteristics of the original device, preferring replacement with an identical component.

The replacement of parts of the safety suspension system device shall be performed by the manufacturer, its service agent or suitably qualified persons.

Insufficient maintenance

A correct normal maintenance is one that maintains the original integrity or restores the fan's efficiency, while at the same time limiting normal deterioration resulting from use.

Special maintenance work can also prolong the usable life of the machine and/or, secondarily, can improve its efficiency, reliability, productivity and ease of maintenance and inspection.

Unauthorized modifications or tampering

No operation is permitted which is aimed at making modifications to the fan and the safety devices fitted to it; similarly, it is not possible to alter its operational and performance characteristics.



WARNING Interference with the command and control circuits is prohibited: such operations could cause damage to the equipment and serious danger to the operator.

NOTE Modifications made to the fan which do not come into the categories of normal and special maintenance, or which alter its operational and performance characteristics, invalidate the machine's compliance with the requirements of the applicable directives, as attested by the manufacturer with the EC declaration of conformity: it is up to the person responsible for the modification to resubmit the machine to the assessment conformity procedures specified in the applicable directives.

Use in a potentially explosive atmosphere

The fan has been designed and built to operate in environments where the presence of a potentially explosive atmosphere is not expected, in other words it is not intended to handle materials which release explosive dust. Emission into the atmosphere of harmful particles or gases must be contained within the limits established by current regulations.



WARNING The fan has been designed and built in such a way that it CANNOT operate in a classified area, according to directive 1999/92/EC.



WARNING The metal sheets used for constructing the fan housing and shutter blades have a surface coating made of an alloy of Zinc, Aluminum and Magnesium ('Munters Protect'), classified as ZM120 (equivalent to 9 µm of coating thickness on each side of the panels) which corresponds to a corrosion resistance in salty mist of 1800 hours.

Whenever it is intended to use the fans in ambients characterized by the presence of particularly aggressive agents (ammonia, clavulanic acid, etc.) the user, before installing the fan at the installation site must verify that the environmental conditions are compatible with the intended use of the materials that compose the fan.

5. INSTALLATION

After fan has been delivered but before fitting and installation, check condition of the consignment: in the event of discrepancy or damage to the machine, the manufacturer or carrier must be informed immediately.



WARNING Fitting and installation of the fan must be performed by specialized personnel, in order to prevent damage to the equipment or hazards to people as a result of faulty fitting.

Fitting the fan must be carried out according to the following stages:

- positioning and anchoring the fan;
- connection to the mains electricity supply;
- operational testing and putting into operation.

5.1 Choise of site and cecking installation requirements

The user is responsible for preparing an area suitable for installation of the equipment and complying with the requirements laid down by European directives and national law governing safety at places of work. Environmental conditions for operating the equipment are as follows:

Table 5

Ambient temperature during operation	Ambient humidity during operation
- 15°C / + 40 °C	< 90%

For operation of fan installation, a manoeuvring area must be made available that is suitable for the fan dimensions and the chosen lifting equipment: electrical points must be provided in the installation area for fan connection to the mains electricity supply.



WARNING The fans must be installed at a height of not less than 2.7 m from the ground. If they are installed at a lower height, the fans must be fitted with the optional pyramidal safety mesh by the manufacturer, to protect the internal rotor.

Failure to install the safety mesh releases the manufacturer from all liability and shall be considered an improper use of the machine.

Irrespective of the place of installation, suitable indelible warning signs are attached to the fan, warning of danger and giving instructions to remain at a safe distance not to place hands inside the shutter and not to run in proximity of the fan.

The warning signs are yellow, self-adhesive and indelible. They are fitted to the front and rear of the fan, and marked with the numbers A-1997 and B-1997 (see fig.10).

The area adjacent to the fan in the premises from which air is being extracted must be kept clear to allow the air to exit freely. It is also prohibited for anyone to remain in this area, because of the presence of organic gases and dust which may be present in the airflow.

WARNING There must be no obstacle neither in front or behind the fans. The outgoing airflow must be kept free at least of 3-times fan diameter and the ingoing airflow must be kept free at least in a radius of 1.5 m distance in front of the fan.

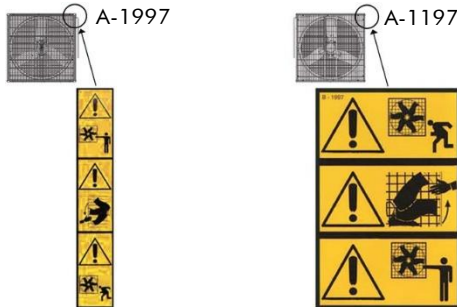


fig. 10

WARNING The fans must be installed to carry out extraction of the air present in the area, and must not operate under positive pressure. It is also permissible to install the fan in a horizontal position.

5.2 Installing Series EM fans

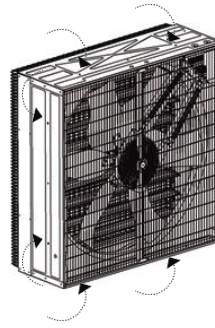


fig. 11

If the fan is fixed directly to a metal structure, M8 bolts type 8.8 must be used, screwing them into the threaded inserts provided for the purpose on the bodywork (two per side).

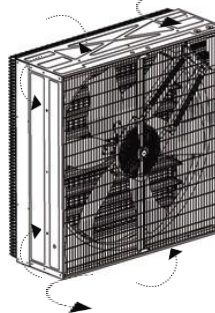


fig. 12

If the fan is installed in a masonry structure, an iron outer frame must be constructed (not supplied with the fan), with a 60 mm L-shaped profile at least 5 mm thick, with suitably-sized clamps.

When the outer frame is properly built-in, i.e. perfectly level and upright, insert the fan, screwing four M8 bolts type 8.8 (not supplied with the fan) into the threaded inserts provided on the sides of the bodywork, two per side.

5.3 Connection to the electrical system

The fan is supplied without a command and control circuit, but with all the internal electrical connections already made.

At the fitting stage, the installer must set up a control panel in compliance with the requirements of standard IEC EN 60439-1, and arrange the wiring of the fan in accordance with the instructions in standards IEC EN 60204-1 and IEC 60364.

The electrical panel of the fan must generally be equipped with the following devices (bearing EC marking as per directive 2006/95/EC):



fig. 13

Lockable isolating switch.



fig. 14

Magnetothermal switch (chosen to suit the power of the motor).

The need to fit a switch of differential type depends on the configuration of the electrical system supplying the fan: it is the installer's responsibility to make this assessment in accordance with the instructions in standard IEC 60364.



fig. 15

Red emergency stop button, mushroom type, provided with mechanical locking and release by turning (in compliance with UNI

EN ISO 13850). Operating the button must bring about the electromechanical isolation of the power supply to the electric motor (category 0/1 according to IEC EN 60204-1)



fig. 16

Start/stop selector switch (with characteristics compatible with the nominal current of the motor), or main panel for managing the equipment, with control

devices which act on the electrical supply to the fan.



WARNING Do not supply power to the fan during installation stage.

Installer must issue a declaration of correct installation in accordance with applicable legislation in the country of use.

Wiring diagram

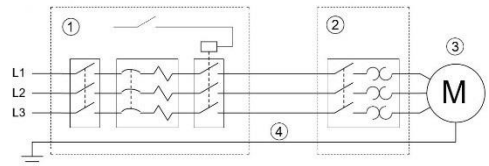


fig. 17 - wiring diagram for three-phase models

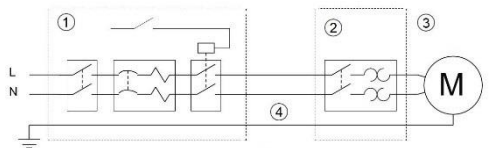


fig. 18 - wiring diagram for single-phase models

- 1 Overload and short circuit protection of the supply line.
- 2 Breaking switch
- 3 Fan motor
- 4 Grounding



WARNING The rating plate data of the electric motor and the instructions given in the attached technical documentation must be used for sizing the power supply cable.

In the event of installations that do not comply with the directions given in this chapter, the manufacturer's liability ceases, along with the validity of the CE Declaration of Conformity.

The electrical lines must be laid in accordance with requirements of the laws applying in the place of installation, and in any event:

- they must be laid with cables of adequate section for the power of the fan and the length of the line itself;
- they must make an effective earth connection;
- they must have isolating devices and automatic protection against overload and short circuits.

Before activating the electrical supply to the machine by turning the isolator switch to position On, a series of checks must be made:

- check that the voltage and frequency of the power source correspond to those indicated in the equipment technical data and electrical diagram;
- check that the connections in the control and power circuits and the cable glands are tightened correctly, also in order to preserve the IP protection rating;
- check that the connections in the control and power circuits are properly tight;

- check that the intensity of the short-circuit expected at the connection terminals is compatible with the breaking power of the protection switch upstream of the electrical panel;
- check that the protection devices (fuses, magnetothermic switches) are correctly sized, and that the phases are connected in the correct order: check that the fan rotates in the direction of the arrow shown on the driven pulley (*see fig. 19*).

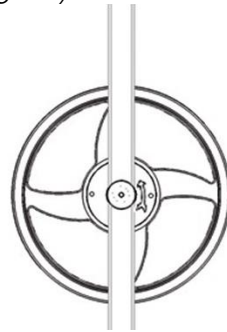


fig. 19

Equipotential earthing wiring safeguard

To create effective protection against the risk of electrocution, the outer protection conductor must be connected to terminal PE inside an electrical panel.

For correct sizing of the protection conductors, see following requirements as indicated in standard IEC EN 60204-1:

- phase conductor up to 16 mm²: section of the protection conductor equal to the section of the supply conductor;
- phase conductor between 16 and 35 mm²: section of protection conductor equal to 16 mm²;
- phase conductor over 35 mm²: section of protection conductor equal to at least half the section of the supply conductor.



WARNING When connecting all the metal masses to the earth system, check that there are no insulating elements between the various conductive masses (metal parts). The system must not be put into operation unless the equipotentiality of the masses and the connection to the earth system have previously been checked.

Protection against contact voltages

The choice of device to protect the electrical system must be made in such a way as to ensure the safe intervention of the main automatic switches and any differential devices linked to them. For an appropriate choice of the type of protection for the machine’s supply line, taking into account whether the distribution system is TT or TN, it is advisable to consult an electrical systems designer, in order to ensure compliance with the requirements of standard IEC 64-8 or the equivalent provisions in the country where the machine is being installed.

5.4 Inverter (only for E-Line version)

This section illustrates the main characteristics of the inverter that equips some versions of the fans.

Table 6

Voltage	Phases	Frequency
208 - 230Vac (-15% / +10%)	Single phase or 3-phases	50 or 60Hz
400 - 480Vac (-15% / +10%)	3-phases	50 or 60Hz

STAR: TN, TT and IT. DELTA corner grounded

Table 7

Ambient working temperature	-20°C ÷ 50°C
RH%	0 ÷ 95%

The Motor and Inverter are IP66

Pinout

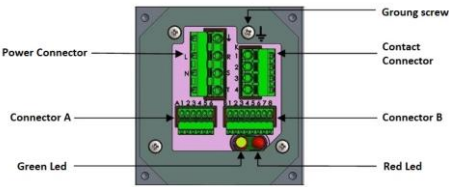


Table 8

Power Connector	
	Power Supply Ground (earth)
R/L	3-Phases Supply (400-480Vac, 208-230Vac): R Phase Single Phase Supply (208-230Vac): Line
S/N	3-Phases Supply (400-480Vac, 208-230Vac): S Phase Single Phase Supply (208-230Vac): Neutral
T	3-Phases Supply (400-480Vac, 208-230Vac): T Phase Single Phase Supply (208-230Vac): Not used

SELV Signal Connector A	
1	GND Modbus 485 Out
2	Modbus 485 Out B/-
3	Modbus 485 Out A/+
4	GND Modbus 485 In
5	Modbus 485 In B/-
6	Modbus 485 In A/+

SELV Signal Connector B		
1	GND 0-10V	0-10V input for motor speed control
2	Input(+) 0-10V 20KOhm 0,5mA @10V	
3	GND Potentiometer 10,5V	External potentiometer power supply output
4	Output 10,5V Potentiometer max 10mA	
5	GND Input End of Line Shutter	Input End of Line Shutter (if present) Admissible Range: 0-24V
6	Input End of Line Shutter 1,2mA	
7	GND Input Enable o Run	Enable/disable the motor control through the 0-10V input. Close contact means Run.
8	Input Enable o Run	

SELV Contacts 24Vdc 230Vac (MIN 100mA, MAX 1A)		
1	Pin 1 Alarm contact	Normal closed contact (NC)
2	Pin 2 Alarm contact	Closed contact means no active Alarms Open contact: active Alarm present
3	Pin 1 Shutter command (if present)	Closed contact: open Shutter
4	Pin 2 Shutter command (if present)	Open contact: close Shutter

Leds

The inverter is equipped with two LEDs, one green and one red, which are used to show different states of the motor as shown in the following table.

Table 9

Green Led	Red Led	Description
Off	Off	Motor Off (without supply)
On	Off	Motor On (working properly)
Off	Flashing	Motor on Alarm
Flashing	Flashing	Inverter firmware update in progress

Connection scheme

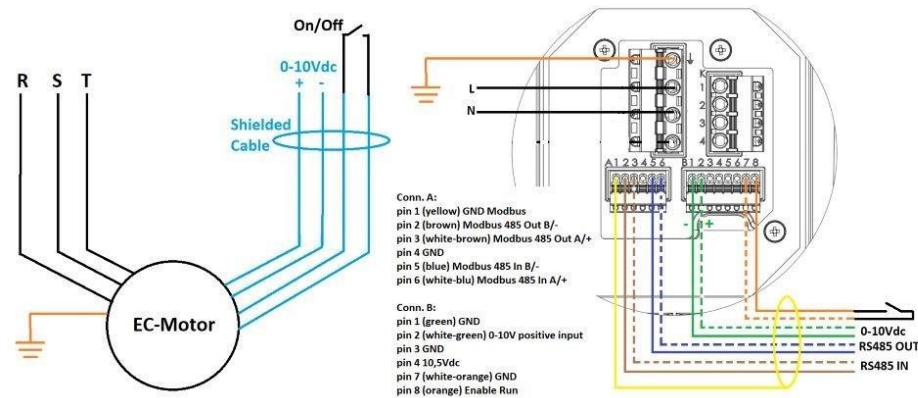


fig. 20 - wiring diagram for three-phase models

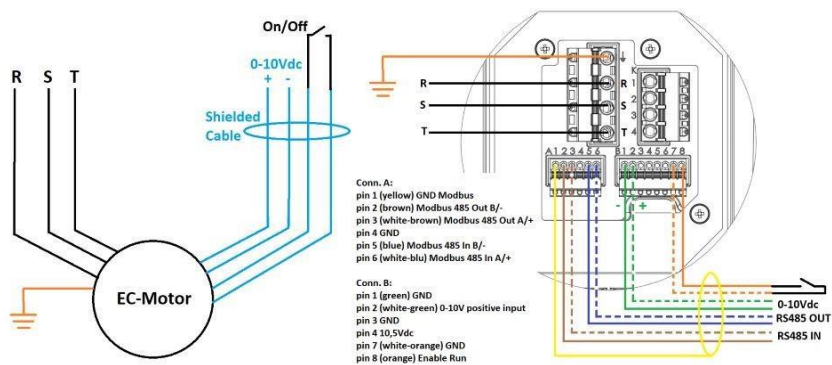


fig. 21 - wiring diagram for single-phase models

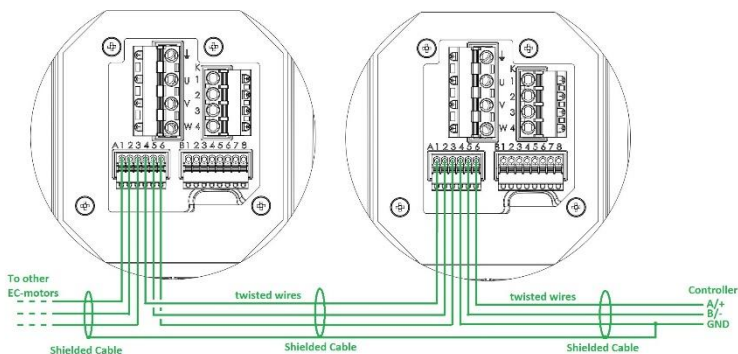
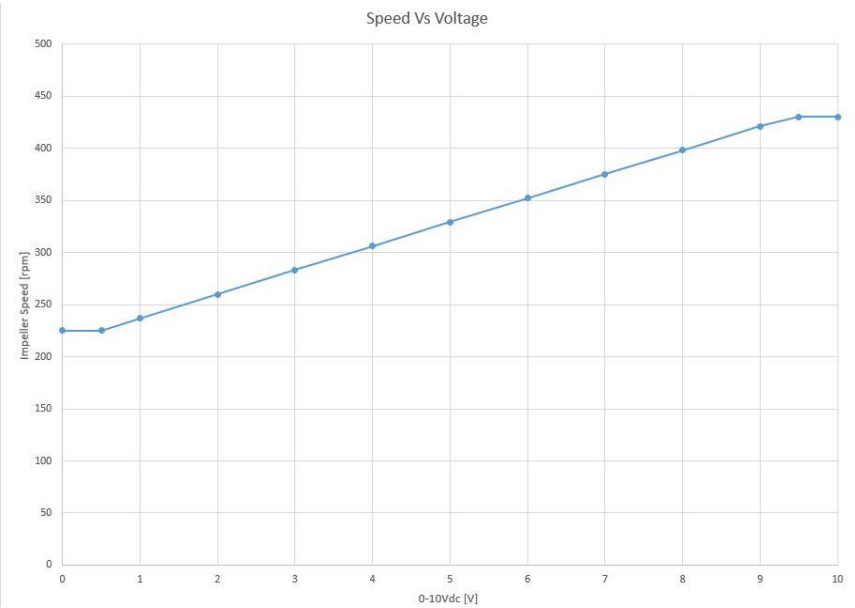


fig. 22 – modbus diagram

NOTE The shield of the signal cables (On/Off and 0-10Vdc or Modbus) must be connected to the “signal gnd” on the control unit side and not to “power gnd” (earth). It is possible to control the motor with 2 wires (0-10Vdc) only, so without the other 2 On/Off wires and this can be done via the App and by connecting pins 7 and 8 together; in fact, it will be sufficient to set the “Enable under stop” register to 0 (Address 1010): if the 0-10Vdc voltage is less than the minimum voltage (for example: 0.5V for Saturn 5, EM50, Saturn Breeze), then the motor will stop, obviously in the opposite case (voltage 0-10Vdc greater than the minimum voltage) the impeller will start to rotate. In order to control the fan with just 2 wires, in addition to the setting on the App (Enable under stop = 0), it is also necessary to connect pins 7 and 8 together.



With Munters control units, it is also possible to obtain opposite control: at 0V higher speed and 10V lower speed.

Alarms

The following table shows the identification codes of the possible alarms that the device can generate.

Table 10

Alarm code	Description
1	Over Voltage: the supply voltage is too high
2	Under Voltage: the supply voltage is too low
3	Over Temperature
4	Over Current (lock)
5	Loss of synchronism (lock)
6	Over Current
7	Loss of synchronism
8	Loss of internal communication
9	Breaking resistance: too high wasted energy
10	Broken fuse or loss of phase

Showing Alarm

The presence of an active alarm is highlighted by the flashing of a red LED; the number of flashes of the LED corresponds to the identification code of the alarm that occurred (for example, in the event of a Over Temperature alarm the red LED will flash three times).

The code of the active alarm can be read from the Modbus register or on the App at address 4; in the absence of alarms the register has a value of 0, while in the event of an alarm it takes on the value corresponding to the identification code.

The alarms detected by the device are stored in an internal ROM memory. The device can store up to 10 alarms before the oldest alarm is deleted to make space for the most recent one. When an alarm occurs, the following information is saved in ROM memory.

Alaram code

- Timestamp hour
- Timestamp minute
- Timestamp second
- Vbus value when the alarm rise on
- Id value when the alarm rise on
- Iq value when the alarm rise on
- IGBT Module temperature when the alarm rise on
- NTC temperature (inside the inverter) when the alarm rise on
- Speed value when the alarm rise on

The information stored for each individual alarm can be retrieved by reading the Modbus registers as shown in the following table

Table 11

Alarm	Registers
0 ⁽¹⁾	7000 – 7010
1	7011 – 7021
2	7022 – 7032
3	7033 – 7043
4	7044 – 7054
5	7055 – 7065
6	7066 – 7076
7	7077 – 7087
8	7088 – 7098
9 ⁽²⁾	7099 – 7109

(1) Most recent alarm (2) Older alarm

Reset

In order to reset the alarms it is possible to write 0 in Modbus register 1008.

Troubleshooting

In the following list there are the actions that can be performed when a specific alarm occurs.

Table 12

Failure	Solution
Over Voltage	Check that the input voltage is within the range allowed by the device or that voltage spikes do not occur.
Under Voltage	Check that the input voltage is within the range allowed by the device or that there are no voltage drops. Note: <i>when the device is turned off, an under voltage alarm can occur and it is to be considered normal</i>
Over Temperature	Check that the ambient temperature at which the device operates is within the correct operating range of the equipment. Check that the fan nets are clean and that the motor dissipation heat sink are clean to allow correct dissipation of internal heat by the inverter. Wait for the device temperature to drop (below 80°C for the IGBT module and below 105°C for the electronic board) before requesting a new impeller movement (switch on the fan).
Over Current (lock)	The inverter detected an over current, so it reduced the speed and re-tried to go to the required rpm three consecutive times. Check that the fan is able to rotate without impediment (for safety reasons, before carrying out the checks, make sure that the fan is switched off). Check for any bearing problems by checking that there is no loose on the fan rotation axis (for safety reasons, before carrying out the checks, make sure that the fan is switched off). Check that the input voltage is within the correct operating range of the equipment and that the section of the cables in use is suitable. Reset the alarm and try the movement again or turn the device off and on again after waiting at least one minute for the internal capacitors to completely discharge. Check with Munters if the acceleration at the start is not too high (boost).
Loss of synchronism (lock)	Reset the alarm and trying the movement again or turning the device off and on again after waiting at least one minute. Check with Munters that the minimum speed is not too low (from FF to FOC) or that the acceleration at the start is not too high (boost).
Over Current	No action required, the device automatically retries the movement up to a maximum of three consecutive times. The time interval between one attempt and the next increases: after the first alarm the device waits for a time equal to 1 second before repeating the movement, if a second alarm rise on, the time for the a new attempt movement is equal to 10 seconds while on the occasion of the third alarm the last movement attempt is delayed by 20 seconds. If all three restarts attempt fail, the device generates the alarm.
Loss of synchronism	No action required, the device automatically retries the movement up to a maximum of three consecutive times. The time interval between one attempt and the next increases: after the first alarm the device waits for a time equal to 1 second before repeating the movement, if a second alarm rise on, the time for a new attempt movement is equal to 10 seconds while on the occasion of the third alarm the last movement attempt is delayed by 20 seconds. If all three restarts attempt fail, the device generates the alarm <i>Loss of synchronism (lock)</i> .
Loss of internal communication	No action required, the device restarts automatically.
Braking resistance: too high wasted energy	The fan can reduce its speed in heavy conditions; in this case, turn off the fan, check that the damper or butterfly close correctly and make sure that the fan does not rotate by itself also without any command (windmill effect). In case of rotation caused by a discordant air flow, check the correct closing of the damper or butterfly (this operation must be done safely: switch off the fan and wait until the fan stops rotating); in case decrease the deceleration time. In case of rotation caused by a concordant air flow, check the correct closing of the damper or butterfly (this operation must be done safely: switch off the fan and wait until the fan stops rotating); in case increase the rotation speed. Note: <i>in case of air flow consistent with the direction of rotation, pay attention to the required speed set point: if this is lower than the speed imposed by the wind on the blades, the braking resistors will always be active, increasing their temperature up to the maximum allowed. In this case it is necessary to increase the speed set point.</i> If the problem persists, contact Munters customer service to evaluate a possible reduction in the deceleration time.

Failure	Solution
Broken fuse or loss of phase	This alarm shows that at least one of the power phases is not connected to the motor correctly. Check with the help of an electrical technician that there are no interruptions along the line and that all the phases reach the motor correctly with the voltage values in the indicated range. If even after these checks the alarm persists and the green LED remains off, then the fuses inside the inverter may have blown or the inverter itself may have been damaged. If necessary, contact Munters customer service.
Both Leds Off	If both motor LEDs are off, check that the motor protector and the safety switch on the fan side are both switched on, then with the help of an electrical technician, check that the power supply actually reaches the motor. If the power supply reaches the motor correctly, but the LEDs are both off and the fan does not rotate, the internal fuses may have blown or the inverter may have been damaged; in both cases contact Munters customer service.
The impeller speed change alone: decrease and then increase with constant speed setpoint	If the fan decreases its speed automatically (even if the set point is kept constant by the control unit), it means that the internal protection is working for some reason. The protections that can cause a temporary decrease in speed are over temperature or an increase on the deflux current (Id) or a Vbus too low (low input Voltage Supply). In both situations, the fan temporarily decreases the speed and then starts increasing it again (in accordance with the set point) as soon as the cause that triggered the limitation disappears (temperature decreases or deflux current falls below the threshold or input power supply increase). Check the NTC and IGBT temperatures, wait for the motor to cool down; with the fan off, clean the motor dissipation heat sink in order to allow better dissipation of internal heat. Check that the Id [A] (deflux current) is not too high and check with the help of an electrician that the Voltage supply is into the working range. Switch the supply of and check also that the fan can rotate easily and that there are not any obstacles. In case contact Munters customer service.

5.6 Mobile device APP

When you open the app it start scan for nearby inverter devices, displaying a list of all the devices found.

To connect a device in the list, simply click on its address/name.

When connecting, the app may require you to enter the inverter pairing code which is the following: 123456.

The inverter maintains a list of devices coupled to it; in the event that the device (smartphone, tablet, etc.) with which the connection is made is not present in the list, the app will request the insertion of the pairing code while otherwise it will not require the insertion of any code.

Dashboard

This tab of the application displays a whole series of information that allows monitoring of the device.

The information displayed is shown in the following table.

Table 13

Parameter	Description
HW	Hardware type (400Vac or 230Vac)
FW MAIN	Firmware version (motor microcontroller)
FW INTERFACE	Firmware version (interface microcontroller)
FW BLE	Firmware version (BLE module)
Inverter status	State of the inverter (standby, run or alarm)
Alarm Code	Alarm code
IGBT Module Temperature	Temperature IGBT power module [°C]
NTC Sensor Temperature	Temperature NTC sensor inside the inverter [°C]
Measured Speed	Measured rotation speed [rpm]
VBUS DC	Measured internal DC Bus Voltage [V]
Vd	Inverter Direct Voltage [V]
Vq	Inverter Orthogonal Voltage [V]
Vtot	Inverter Total Voltage [V]
Id	Inverter Direct Current [A]
Iq	Inverter Orthogonal Current[A]
Itot	Inverter Total Current [A]
Frequency Set	Frequency of the magnetic field [Hz]
Motor Speed	Setpoint: rotation speed [rpm]
Motor Direction	Motor direction if 1 means clockwise, if 0 means counter-clockwise
Absorbed Power	Motor absorbed power [watt]

Setup parameters

This tab allows to modify the operating parameters of the motor.

To view the contents of this tab you must enter the password 123456. The editable parameters are shown in the following table.



WARNING Changing the configuration parameters can compromise optimal functioning of the fan. We recommend, before making any changes to contact Munters customer service in order to avoid any issues.



WARNING the settings must be made with the motor supplied but stopped (rpm = 0).

Table 14

Parameter	Description
Modbus Address	Modbus Address Allow Value: [1;247] Default: 1
Enable 485	485 bus termination resistance enable Allow Value: [0; 1] 0 termination resistance disable 1 termination resistance enable Default: 0
Alarm Reset	Alarm reset Allow Value: 0
Enable under stop	Enable the rotation at minimum speed when the control voltage is lower than the minimum value. Allow value: [0; 1] The fan does not rotate if the driving voltage (0-10Vdc) is lower than the minimum voltage The fan rotates at the minimum speed if the driving voltage (0-10Vdc) is lower than the minimum voltage Default: 0
Acceleration	Motor acceleration [rpm/s] Allow value: [10; max Acc.] Default: Max Acc.
Deceleration	Motor deceleration [rpm/s] Allow value: [10; max Dec.] Default: Max Dec.
Slope swap	This Switch reverses the slope of the relationship between 0-10V voltage and rpm. Allows you to reverse operation from: Low voltage, low Speed and high voltage, high speed → Low voltage, high speed and high voltage, low speed
Boost/Reverse Configuration	Enable the boost and/or reverse features Boost: when turned on, the fan will go quickly to maximum speed and then reach the rotation speed set by the controller. Should be used in fans with Butterfly. Reverse: when turned off, the fan decelerates until it stops, once stopped it will begin to rotate with the opposite direction of rotation to the standard one so to "attract" the butterfly and help to close the shutter. Can be used in fans with Butterfly. Allow value: [0; 3] 0: Boost e Reverse disable 1: Boost enable, Reverse disable 2: Boost disable, Reverse enable 3: Boost and Reverse both enable Default: 0 NOTE with these parameters, once received the command to "Off", the fan will start to automatically rotate in opposite direction for a time predetermined.

Parameter	Description
Reverse time	Fan rotation time in the opposite direction after receive a stop command [s] Allow value: [0; 32767] Default: 25 second
Reverse speed factor	Fan rotation speed setpoint during the Reverse rotation; expressed as a percentage of the maximum rotation speed [%] Allow value: [1; 100] Default: 60
Boost ramp time	Acceleration time to reach the maximum speed during the boost phase [s] Allow value: [2; 32767] Default: 10
Boost maintain time	Fan rotation time after reaching the maximum speed during the boost phase [s] Allow value: [0; 32767] Default: 5
Start delay	Delay in turning on the fan from the moment it receives the command from the control unit [s/10] Allow value: [0; 100] it means from 0 up to 10 sec Default: 0
Fallback speed	Rotation speed in case of Modbus communication loss Activate only if "Enable Live Command (Reg.1009) = 1" If the Reg. Enable Live Command is = 0 and the modbus connection is lost, the fan will continue to turn at the last operating speed before the loss of communication [rpm] Allow value: 0, [rpm min; rpm_max] Default: 0

App screens

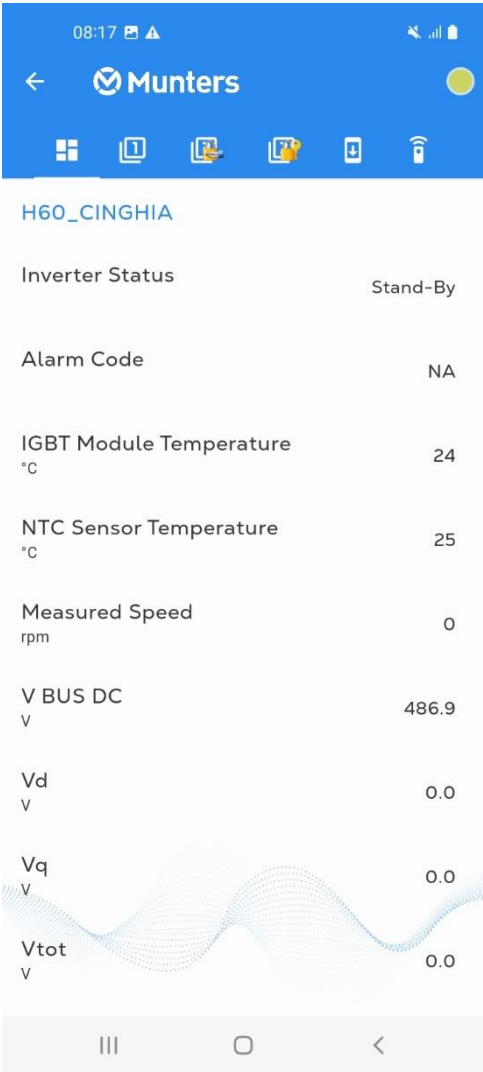


fig. 23 - Tab. 0 Dashboard Readings

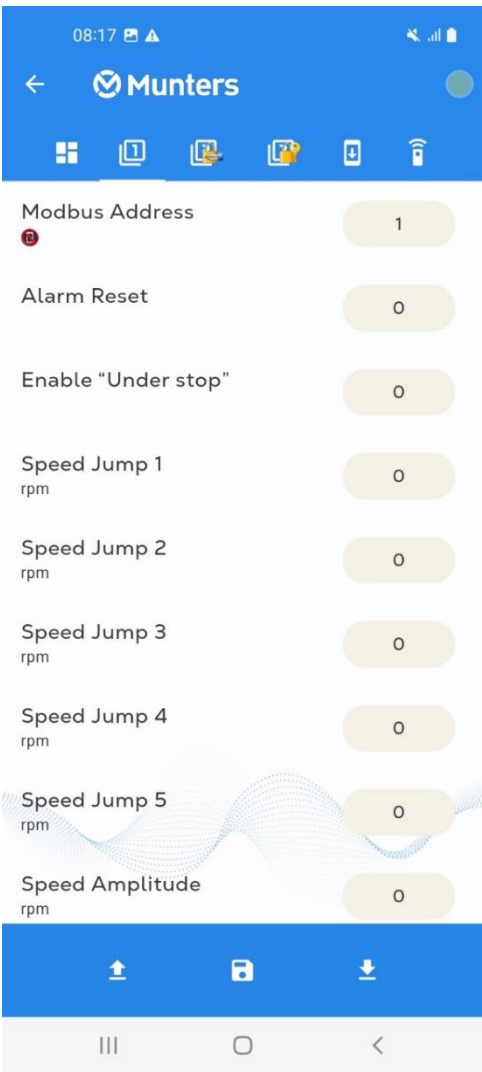


fig. 24 - Tab. 1 Settings

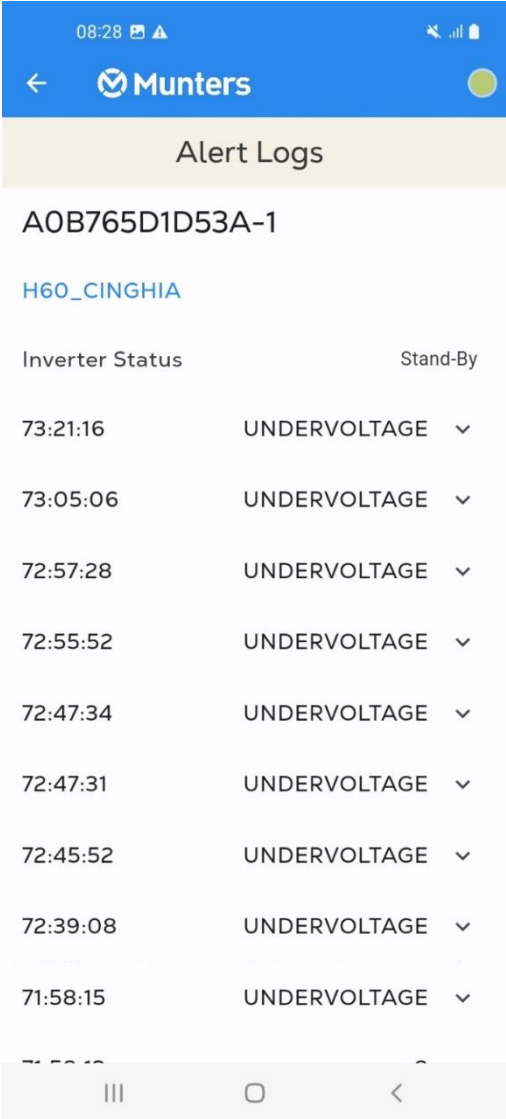


fig. 25 - Traffic Light: Alarm Log

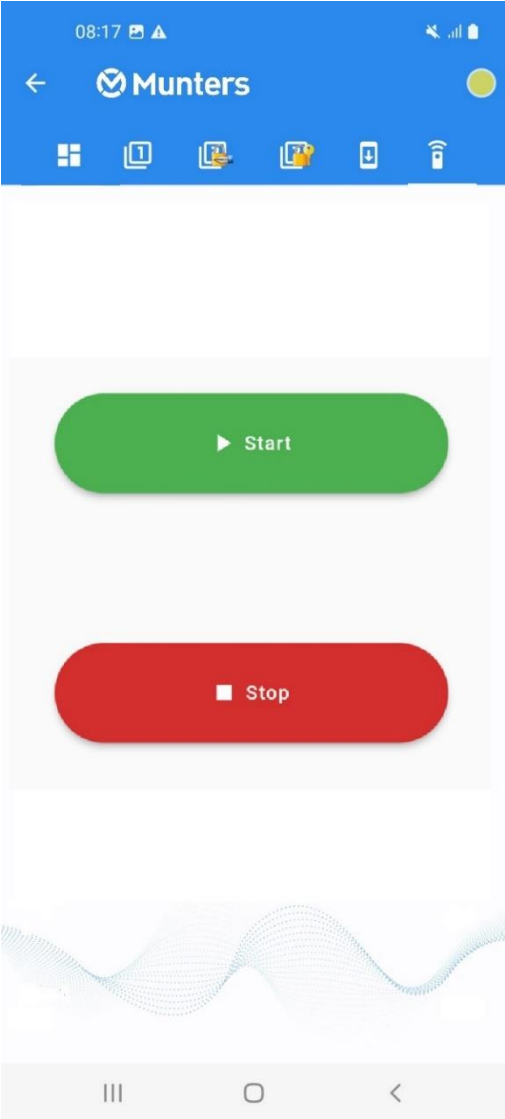


fig. 26 - Start / Stop Fan

Firmware update

Using this tab, after entering the password (123456), it is possible to update the firmware of both microcontrollers inside the inverter if new features or bug fixings are available.

Before to go ahead remember to save your current settings.

The update procedure consists of four different phases: the verification of the communication protocol to be used for communication with the inverter, the transfer of the firmware update file, the safety stop of the fan rotation and finally the writing of the new firmware in the flash memory of the inverter.

The conclusion of the various phases is denoted by a green tick. Select the update file (*.upd), press the start procedure button and wait for the outcome.

At the end of the update don't forgot to download your saved settings.

Terms of use



WARNING In order to reduce the average lifetime and/or possible problems with the electrical components, it is recommended not to keep the inverter unpowered for long periods, we recommend therefore keep it powered (it does not need to work, it's enough that the supply voltage is applied to the inverter: green led On) for at least 24 hours once/twice per year.

6. COMISSIONING



WARNING The fan must not be used without first reading and understanding the user manual and becoming completely familiar with the controls.



WARNING Make sure the fan is disconnected from the mains before removing the safety devices.

6.1 Control devices

This chapter gives instructions on the control devices with which the electrical control panel must be fitted, which shall be done at the installation stage.

At the fitting stage, the installer must set up a control panel complying with the requirements of standard IEC EN 60439-1 and arrange the wiring of the fan in accordance with the instructions in standards IEC EN 60204-1 and IEC 60364.

The electrical circuit of the fan must generally be fitted with the devices indicated in section 5.3.

6.2 Instructions for machine use

Switching on and starting up

Before starting the machine:

- check that all the guards for the hazardous areas are in their correct positions;
- check that all the electrical safety components are in place and check their effectiveness by activating them;
- check the presence of the electricity supply.

To start the fan, go through the following procedure:

- turn the isolator switch to position On;
- press the fan starter button.

Normal stopping

In the event of necessity the fan can be stopped by operating the relative control device (stop), which shall be installed on the electrical panel.

Activating this control must cause the fan blade to stop rotating, but does not cause isolation of the power supply: the fan can be started again by pressing the start button.

In the event that the fan does not need to be used for an extended period of time, the following stop procedure must be used:

- operate the stop button
- operate the emergency stop button;
- open the main isolator switch (position "0") on the electrical panel and attach a padlock to the actuator.



WARNING Interrupting the electricity supply, equivalent to isolating by the operator with the main switch, causes complete fan shutdown: restoring the electricity supply will not cause any movement in the machine.



WARNING Interrupting the electricity unusual oscillating movement is observed, immediately stop using the fan and contact the manufacturer, its service agent or suitably qualified persons.

Emergency stop

Operating the main emergency stop button causes the fan to stop moving.

The function is controlled by a red mushroom type button on a yellow background, provided with mechanical locking and release by turning. Operating it causes the instantaneous interruption of the power supply to the electric motor which makes the rotor turn (uncontrolled shutdown category 0 according to IEC EN 60204-1).

Resetting after stopping

1. Resetting after normal stopping

After normal stopping the operating cycle must be reset by following the procedure described in section 6.2.

2. Resetting after emergency stop

After an emergency stop, the operating cycle must be reset by following the procedure described below:

- reset the actuator by which the emergency stop command was given (by turning the relative mushroom button);
- for an exact reset sequence, refer to the instructions given in section 6.2.

7. TECHNICAL DATA

7.1 Dimensions

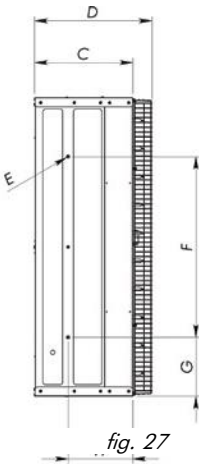
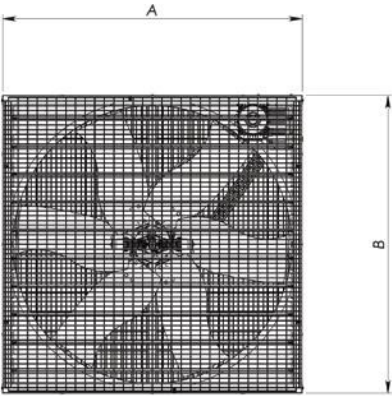


fig. 27

Table 15

A	B	C	D	E	F	G	H
1,380	1,380	450	540	M8	830	270	295

7.2 Technical specifications

Table 16

Technical specifications			
	1 and 1.2hp	1.5 hp	2.5 hp E-Line
Number of blades	6		
Number of shutter blades	10		
Propeller diameter mm [inch]	1270 [50]		
Weight of fully equipped fan* [kg]	84	86	87
Airflow at 0 Pa m3/h [cfm]	37000 [21800]	42400 [25000]	40000 [23600]
Airflow at 25 Pa m3/h [cfm]	32500 [19200]	38400 [22600]	36400 [21400]
Airflow at 50 Pa m3/h [cfm]	26200 [15400]	33800 [19900]	31500 [18500]
Specific performance at 0 Pa m3/h /W [cfm /W]	33.9 [20]	27.0 [15.9]	27.9 [16.4]
Max. operating temperature °C [°F]	40 [104]		
Max. operating pressure [Pa]	50		
Nominal propeller speed [rpm]	380	435	435
IEC protective class of electric motor	IP55		
Electric motor winding insulation grade	F		

7.3 Motor specifications

Table 17

Cod.	Nominal Power [W] [Hp]		Phases	Speed	Frequency [Hz]	Voltage [V]	Current [A]	Rpm
a	735	1.0	1	single	50	208/230	5.2	1350
b	735	1.0	1	multi*	50	208/230	5.2	1350
c	735	1.0	1	single	60	208/230	4.6	1670
d	735	1.0	3	single	50	230/400	3.5/2	1400
e	735	1.0	3	single	60	230/400	3.5/2	1700
f	880	1.2	3	multi*	50	230/400	4.3/2.5	1360

Cod.	Nominal Power [W] [Hp]		Phases	Speed	Frequency [Hz]	Voltage [V]	Current [A]	Rpm
g	880	1.2	3	multi*	60	230/400	3.8/2.2	1640
h	1100	1.5	1	single	50	230	7.2	1384
i	1100	1.5	1	single	60	220-240	7.3	1660
k	1100	1.5	3	single	50	230/400	5.2/3	1400
l	1100	1.5	3	multi*	50	230/400	4.8/2.8	1370
m	1100	1.5	3	single	60	230/400	5.2/3	1700
n	1100	1.5	3	multi*	60	230/400	4.3/2.5	1650
e-line	1800	2.5	3	VDS	50/60	230/400	3.4	1400

8.1 Introduction


Maintenance must only be carried out by qualified personnel only using suitable

tools and working methods. Before any maintenance steps are taken, make sure the power switch is in the off position and locked by a padlock. Make sure the propeller is at a complete standstill.


Fans do not contain parts needing periodic lubrication, as moving parts are either manufactured from self lubricating materials, or are sealed with lifetime lubrication.

8.2 Cleaning

Inspect the fan at regular intervals and keep it clean. It is advised to perform periodic cleaning of safety mesh guards. Dust on the safety mesh guards causes extra power consumption; severe dust on the motor can cause overheating and subsequent motor failure.



WARNING Keep motor body clean. Dust deposit on motor body will lead to overheating and failure of bearings and motor itself. Do not use water for motor cleaning. Use compressed air only. Water spraying will cause rust inside the bearings and lead to their failure.




WARNING All the components and spare parts **MUST** be stored in dry and clean environment.

8.3 Belt tensioning check up



Check V-belt tension at regular intervals, the correct tension is obtained when maximum deflection (half-way from motor and central pulley) is about 15 mm, when pushed in by thumb.

8. MAINTENANCE



WARNING Make sure the fan is disconnected from the mains before removing the safety devices.

Table 18

Task	Frequency
Visual inspection to check for defects	Daily
Check belt tension	3 days after first starting and then monthly
Clear dust	Every second month
	<div>WARNING No high pressure water to be sprayed on motor and bearings.</div>
	<div>WARNING Clean carefully the heatsink of the inverter (only for EC motor version)</div>



WARNING Tighten fan belt after the fan has been running for 3 days. Without adjusting the tension, transmission components can wear out early.

To reset the correct tension:

1. with the propeller at a complete standstill, open the safety mesh guard on the pulley/motor side; loosen motor slide fixing screws;
2. tighten the V-belt by pushing the motor sideways; tighten the fixing screws adequately;
3. fix the safety meshes guard to the fan housing.

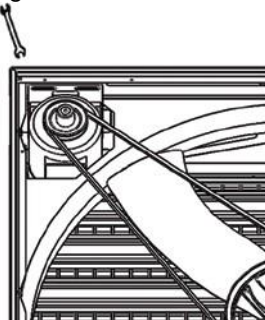


fig. 29



WARNING Do not operate the fan with the safety protections removed: safety meshes can be removed only with specific tools by qualified technicians when the fan reaches a complete standstill.

The fixing systems of the safety protections are not interchangeable with other devices.

Therefore, if for maintenance reasons the user damages or loses any component, this must be definitely ordered from the manufacturer as spare parts and it cannot just be replaced with other components, even similar, not supplied by the constructor itself.

In this particular event the manufacturer refuses all responsibility on consequent damages caused to things and people and considers any kind of warranty lost.

8.4 Replacement of propeller

If propeller damaging occurs, it is necessary to substitute the whole propeller because of the difficulty to balance it, in the field.

1. Open shutter by hand and take away the pin, which connects central shutter blade to centrifugal system;

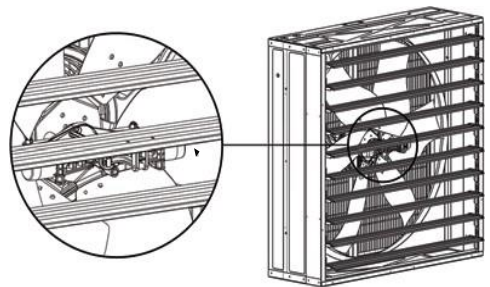


fig. 28

2. Loosen motor to propeller V-belt from pulleys throat;
3. unscrew the fixing nut.

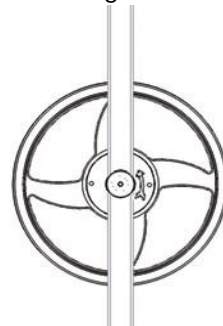


fig. 30

4. Take out the pulley-propeller-centrifugal system assembly from fan frame.

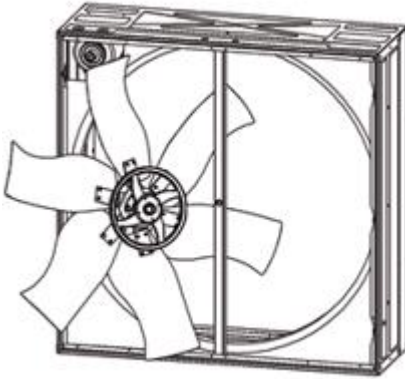


fig. 31

5. Remove centrifugal system by unscrewing central allen screws (M8) fixing it to propeller;
6. disassemble the propeller from central pulley unscrewing the 4 hub fixing screws;
7. assemble the new propeller following the reverse procedure.

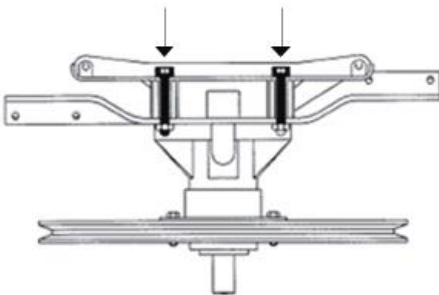


fig. 32

8.5 Replacement of central pulley

To replace the central pulley follow the same procedure of the propeller replacement (see section 8.4).

8.6 Replacement of shutter bearing assembly

1. open shutter by hand and take away the pin, which connects central shutter blade to centrifugal system;

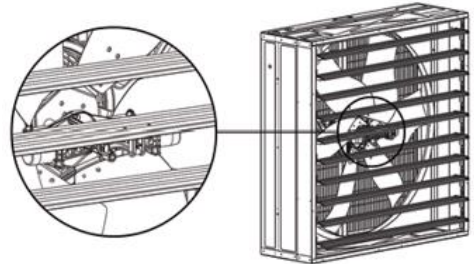


fig. 34

2. remove the side cover plates (see n.1);
3. unthread two tie-rod with holes (see n.8) and unscrew M6 bolts (see n.2) and nuts (see n.3) which fix shutter closing spring;
4. pull off the shutter blades (see n.7) from their slot and unhook the damage shutter bearing assembly (see n.4,5,6);
5. insert the new shutter bearing assembly;
6. put back the shutter blades and fix the closing springs in their position;
7. fit the cover side plates back (see n.1).

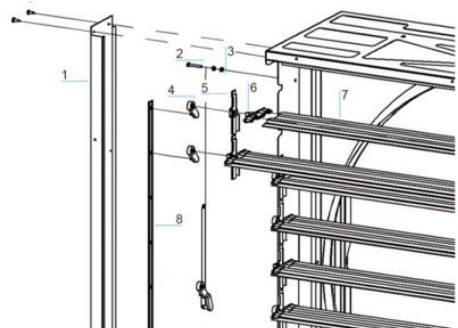


fig. 33

8.7 Fan bearing lubrication

Bearings are properly sized, with double sealed protection (2RS) and lubricated for life, therefore they do not require any additional lubrication.

8.8 Replacement of shutter opening device (centrifugal system)

1. open shutter by hand and take away the pin, which connects central shutter blade to centrifugal system;

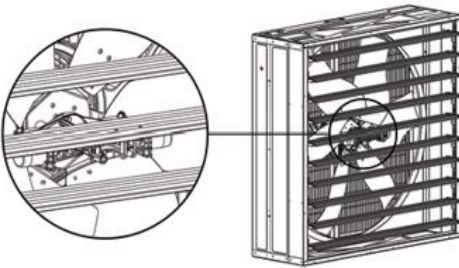


fig. 35

2. unscrew the two M8 hexagonal socket head cap screws and pull out the whole centrifugal system through the shutter blades.
3. do the reverse procedure to replace the shutter opening device and put back the pin, which connects central shutter blade to centrifugal system.

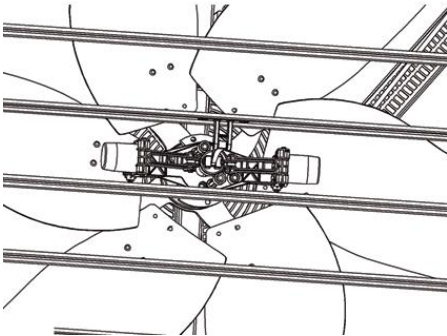
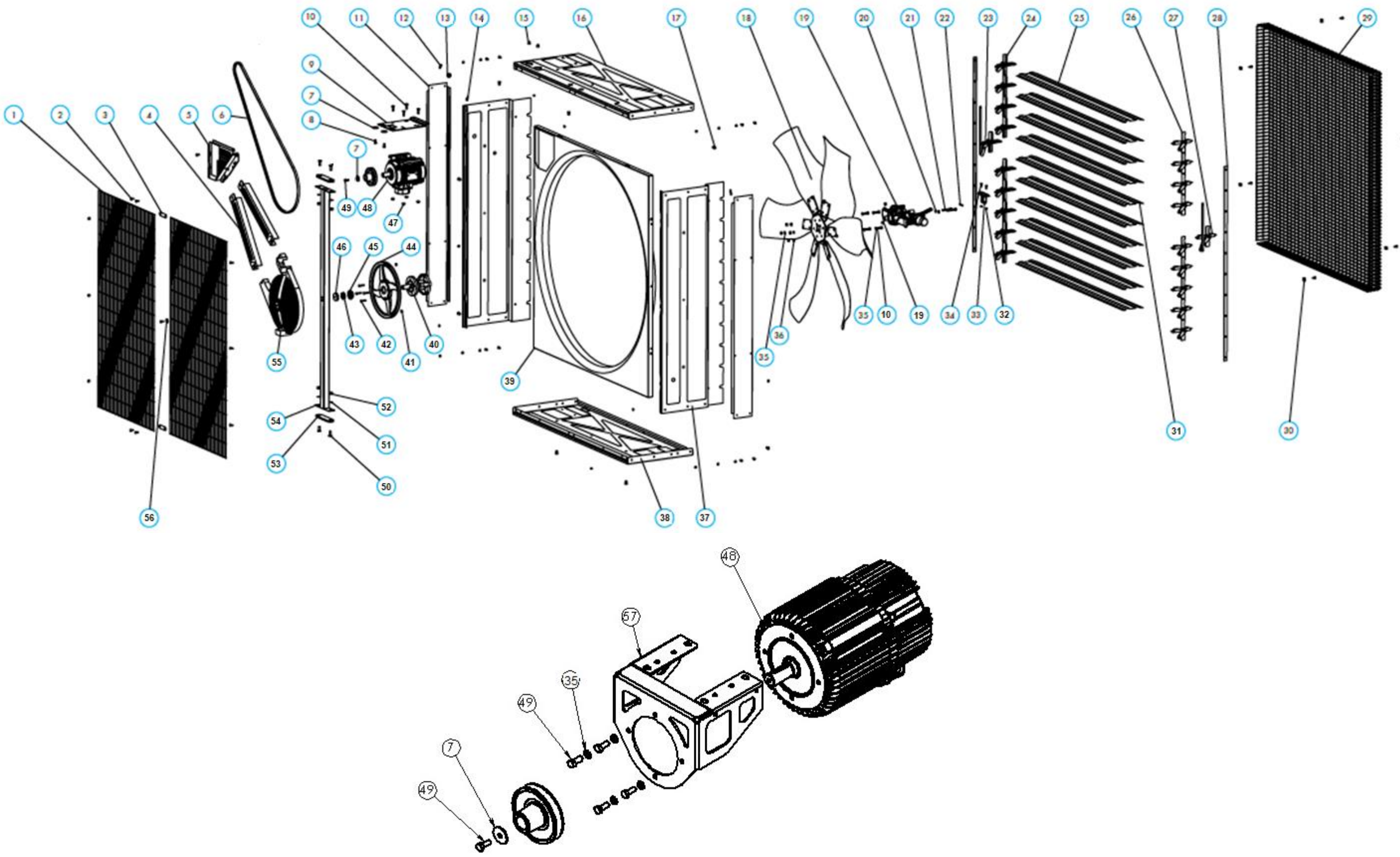


fig. 36

9. SPARE PARTS

EM50



DETAIL for E-line version

Table 19

REF.	DESCRIPTION	QUANTITY
1	REAR SAFETY MESH	2
2	Ø6,3×19 SELF-TAPPING SCREW	26
3	METAL CLIP FOR REAR MESSES	2
4	SAFETY PROTECTION FOR V-BELT	2
5	SAFETY PROTECTION FOR MOTOR	1
6	V-BELT	1
7	Ø8X32 WASHER	3
8	HEX SCREW M8X16	2
9	MOTOR PLATE	1
10	M8×25 HEX SCREW	8
11	COVER PLATE	2
12	Ø6.4X8 POP UP RIVET	20
13	RUBBER FOR CABLE	1
14	HOOK FOR SPRING	2
15	THREADED BUSH M8X12.5	2
16	TOP PANEL	1
17	M8×17.5 THREADED BUSH	8
18	PROPELLER	1
19	CENTRIFUGAL SYSTEM	1
20	Ø8X16 WASHER	2
21	M8×55 HEX SCREW	2
22	BRASS PIN	1
23	CENTRAL RIGHT BEARING W/SPRING	1
24	RIGHT BEARING	9
25	SHUTTER BLADE	9
26	LEFT BEARING	9
27	CENTRAL LEFT BEARING W/SPRING	1

REF.	DESCRIPTION	QUANTITY
28	PLASTIC TIE ROD	2
29	PYRAMIDAL SAFETY MESH	1
30	METAL CLIP FOR PYRAMIDAL MESH	6
31	CENTRAL SHUTTER BLADE	1
32	M6 THIN HEX NUT	2
33	PLASTIC FORK FOR CENTRIFUGAL SYSTEM	1
34	M6X16 HEX SCREW	2
35	Ø8 EXT THOOTED WASHER	6 (*)
36	M8 HEX NUT	6
37	SIDE PANEL	2
38	BOTTOM PANEL	1
39	CONVEYOR	1
40	CENTRAL ALUMINIUM HUB W/AXLE	1
41	HEX NUT M6 WITH FLANGE	4
42	M6×30 HEX SCREW	4
43	M25 HEX NUT	1
44	CENTRAL PULLEY	1
45	WATERPROOF DISTANCE PIECE	1
46	CUP COVER NUT	1
47	M8 HEX NUT W/FLANGE	4
48	MOTOR AND PULLEY	1
49	M8×20 HEX SCREW SELF-LOCKING	1 (**)
50	M10×30 SCREW	4
51	EXT TOOTHED WASHER D10,5X18	4
52	M10 HEX NUT	4
53	PLASTIC OVAL PLATE	2
54	CENTRAL SUPPORT	1
55	SAFETY PROTECTION FOR CENTRAL PULLEY	1
56	Ø6×24 WASHER	1
57	FLANGE FOR E-LINE MOTOR	1

(*) qty 10 for E-Line version

(**) qty 5 for E-Line version

MOTOR PULLEY PITCH DIAMETER AND HOLE	
1.5HP - 3 PHASE - SINGLE SPEED	
50HZ	60HZ
100/24	80/24
1.5HP - 3 PHASE - MULTI SPEED	
50HZ	60HZ
100/24	80/24
1.5HP - 1 PHASE - SINGLE SPEED	
50HZ	60HZ
95/24	80/24
1HP - 3 PHASE - SINGLE SPEED	
50HZ	60HZ
85/19	70/19
1.2HP - 3 PHASE - MULTI SPEED	
50HZ	60HZ
80/19	65/19
1HP - 1 PHASE - SINGLE SPEED	
50HZ	60HZ
80/19	65/19
1HP - 1 PHASE - MULTI SPEED	
50HZ	60HZ
80/19	NA
2.5 HP - 3 PHASE – E-LINE	
50HZ	60HZ
100/24	100/24

Requests for technical assistance and spare parts must be made directly to the manufacturer, at the following address:

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18027 Chiusavecchia (IM), Italy
Tel: +39 0183 52 11
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