Однофазные и трехфазные погружные двигатели серии МС 4

Инструкция по эксплуатации

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- 10 Technical data, dimensions and weights Ref. Caprari and dealer and/or assistance service



1. GENERAL INFORMATION

1.1 Description of the symbols used



The instructions in the documentation concerning safety indications are marked by this symbol. Failure to comply with them could expose the personnel to health risks.



The instructions in the documentation concerning electrical safety are marked by this symbol. Failure to comply with them could expose the personnel to risks from electricity.

WARNING

The instructions in the documentation highlighted by this word contain the main recommendations about how to correctly install, operate, service and dispose of the motor. Nevertheless, all the instructions in the documentation must be complied with if the motor is to operate safely and reliably throughout its life cycle.



Read the use and maintenance instructions.

1.2 General information:

Make sure that the materials indicated in the delivery note correspond to the items actually received and that they are not damaged. Before you begin to use the motor you have purchased, please consult all the instructions in the documentation supplied.

The manual and all the documentation supplied, including the copy of the rating plates, are an integral part of the motor. They must be kept with care and be available for consultation throughout the entire life cycle of the motor itself. For example, the additional rating plates can be affixed to the panel containing the power feeding equipment. No part of this documentation may be duplicated in any form whatsoever without the manufacturer's explicit written authorization.

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1.3 Example of a submersible motor data plate

TYPE	Complete motor code	Code date	Date Code
U [V]	Nominal powering voltage rating	~	Alternating current
I [A]	Rated current consumption	f [Hz]	Frequency
P ₂ [kW] [HP]	Output power rating	n [min -1]	Revolutions per minute
cos φ	Power factor	S.F.	Service factor
Supply (1 or 3)	Single-phase or three-phase	IP68	Motor protection class IEC 529
C [μF]	Capacitor capacitance	Vdb	Rated voltage of capacitor during continuous service
I. CI.	Insulation class		
min. cooling s	beed Minimum speed of cooling water outside motor		

[Kg]	Motor weight	Thrust Load	Axial load [N]
S1	Continuous service	Max ambient	Max ambient temperature

1.4 Exemplification of submersible motor abbreviation

MCXRDS415ML/S-312345678910101) Motor series: MC = standard series, oil-cooled motors MW = standard series, a bagno d'acqua5) Special voltage: S = 60 Hz10) Derived motor: S = special2) X = Inox AISI316 version6) Motor diameter: $4 = 4"$ -0 = special voltage $1 = 50$ Hz 220/230V $15 = 1,5$ CV11) Connection voltage: $- 2 = 50$ Hz 230/240V $- 3 = 60$ Hz 220/230V $- 6 = 50$ Hz 230/240V $- 6 = 50$ Hz 230V; 60 Hz 2 $- 6 = 50$ Hz 230V; 60 Hz 2 $- 6 = 50$ Hz 230V; 60 Hz 3 $- 01 = 60$ Hz 220/230V $- 6 = 60$ Hz 380V4) Version type:9) Casing polishing:			
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1) Motor series: MC = standard series, oil-cooled motors MW = standard series, a bagno d'acqua5) Special voltage: $S = 60 \text{ Hz}$ 10) Derived motor: $S = special$ 2) X = Inox AlSI316 version6) Motor diameter: $4 = 4"$ -0 = special voltage $-1 = 50 \text{ Hz} = 220/230V$ $-2 = 50 \text{ Hz} = 230/240V$ 3) Axial load: $H = 2500 \text{ N}$ $K = 4000 \text{ N}$ $R = 5000 \text{ N}$ 7) Nominal power: $15 = 1,5 \text{ CV}$ -2 = 50 \text{ Hz} 230/240V $-3 = 60 \text{ Hz} = 230/240V$ $-3 = 60 \text{ Hz} 220/230V$ $-6 = 50 \text{ Hz} 230V; 60 \text{ Hz} 380V$ 4) Version type:9) Casing polishing:		0 0	
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6) Motor diameter: $4 = 4"$ 11) Connection voltage: $-0 = special voltage$ $-1 = 50 Hz 220/230V$ $-2 = 50 Hz 230/240V$ 3) Axial load: $H = 2500 N$ $K = 4000 N$ $R = 5000 N$ 7) Nominal power: $15 = 1,5 CV$ $-2 = 50 Hz 230/240V$ $-6 = 50 Hz 230V; 60 Hz 2-6 = 50 Hz 230V; 60 Hz 2-01 = 60 Hz 220/230V-8 = 50 Hz 400V; 60 Hz 3-01 = 60 Hz 320V4) Version type:9) Casing polishing:$	MC = standard series, oil-cooled motors MW = standard series, a bagno d'acqua	S = 60 Hz	S = special
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7) Nominal power: $-2 = 50 Hz 230/240V$ 3) Axial load: $15 = 1,5 CV$ $-3 = 60 Hz 220/230V$ H = 2500 N $-6 = 50 Hz 230V; 60 Hz 2$ K = 4000 N8) Supply: $-8 = 50 Hz 400V; 60 Hz 3$ R = 5000 N \boxed{M} = single-phase $-01 = 60 Hz 220/230V$ 4) Version type:9) Casing polishing:	2) X = Inox AISI316 version	4 = 4"	- 0 = special voltage - 1 = 50 Hz 220/230V
3) Axial load: H = 2500 N K = 4000 N R = 5000 N 15 = $1,5 \text{ CV}$ $-3 = 60 \text{ Hz } 220/230 \text{ V}$ $-6 = 50 \text{ Hz } 230 \text{ V}; 60 \text{ Hz } 2$ $8) Supply:\blacksquare = \text{single-phase}= \text{three-phase}-3 = 60 \text{ Hz } 220/230 \text{ V}-6 = 50 \text{ Hz } 400 \text{ V}; 60 \text{ Hz } 3= 01 = 60 \text{ Hz } 220/230 \text{ V}-04 = 60 \text{ Hz } 380 \text{ V}4) Version type:9) Casing polishing:$	_,	7) Nominal power:	-2 = 50 Hz 230/240V
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$\Box = \text{three-phase} \qquad -04 = 60 \text{ Hz } 380 \text{V}$ 4) Version type: 9) Casing polishing:	R = 5000 N	M = single-phase	-01 = 60 Hz 220/230V
4) Version type: 9) Casing polishing:		= three-phase	-04 = 60 Hz 380V
	4) Version type:	9) Casing polishing:	
D = customer's version L = AISI304 polished casing	D = customer's version	L = AISI304 polished casing	

1.5 Recommendations:

Carefully read the documentation supplied with the product. It will allow you to work in complete safety and obtain the best performance the product is able to offer.

The following instructions refer to the standard version of the motor operating in normal conditions. Special versions, which can be identified by their product code, may not fully correspond to the information given (supplementary information will be supplied with the manual when necessary). In accordance with our policy to continually improve the products, the data in the documentation and the product itself may be liable to modification without the manufacturer being obliged to give prior notice.

Failure to comply with all the indications in this documentation, improper use or unauthorized modifications to the motor will void all forms of warranty and relieve the manufacturer from all liability for any damage to persons, animals or things.

WARNING Never operate the motor unless it is submerged.



SAFETY:

Before working with the product in any way, make sure that the electrical parts of the installation in which the work is to be carried out have been disconnected from the electricity source.

The motor must be handled, installed, operated, serviced, repaired and disposed of by specialized persons possessing appropriate qualifications and using the proper tools. In addition, these persons must have studied and understood the contents of this manual and any other documentation supplied with the product.

Comply with all the safety, accident-prevention and anti-pollution instructions in the documentation when performing each individual operation, as well as any more restrictive, local regulations. For safety reasons, and to comply with the warranty terms, the purchaser is forbidden to use the motor if it operates in a faulty way or if there are sudden changes in the performance it provides.

Installation must be performed in such a way as to prevent accidental contacts that could represent a danger hazard for persons, animals or things. Alarm systems, inspection and maintenance procedures must be provided to prevent any form of risk caused by faulty operation of the motor. Consult chapter 4 'Storage and handling' for instructions about how to safely handle and store the product.

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3 3.1 DESCRIPTION OF THE PRODUCT AND USE: Technical and operating characteristics:

MC/MW series includes 4" submersible motors. Type MC are filled with oil (for lubrication and cooling) approved by the Food and Drug Administration (U.S.A.) Submersible motors type MW are supplied filled with a mixture of 70% clean fresh water and 30% Propylene Glycol, classifiable as non-hazardous according to the criteria established by the EEC.

WARNING When the motor is installed in compliance with the instructions in this manual and the indications given in the diagrams, the acoustic pressure level issued by the machine within the envisaged operating range will never reach 70 dB (A).

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3.2 Fields of use:

MC / MW series motors are suitable to drive submersible pumps, according with EN 60034-1 (IEC 60034-1) requirements and with supply voltage / frequency specified on the rating plate. Motor shaft protrusion and flange dimensions comply NEMA MG1:2006 (NEMA 4").

3.3 Improper uses: WARNING

The motors are not designed for:

- non-submersible operation;
- installation in a slanting position;
- continuous service when the speed of the water outside the motor jacket is less than the values in Tab. "Technical data, dimensions and weights". - excessively intermittent operation (consult the 'Motor table' in the chapter entitled 'Dimensions, weights and technical data');
- liquid at a temperature above 25 to 30°C (77 to 86°F) (consult the 'Motor table' in chapter 10 'Dimensions, weights and technical data');
- operation at a depth exceeding 150 m; pumping inflammable liquids;

operation in places where there is a classified risk of explosion.

- installation in the horizontal position (consult the specific technical documentation);

- storage at very low temperatures (consult chapter 4 'Handling and storage').
- installation in boosters.



Also make sure that the product conforms to any pertinent local restrictions.

STORAGE AND HANDLING: 4

Store the product in a dry, dust-free place.

Make sure that the motor and all the other components forming the installation are positioned correctly and are completely stable.



WARNING The motor must be handled with care and circumspection using suitable lifting means and harness that comply with the safety standards



The weights of each motor are given in the chapter on 'Dimensions, weights and technical data'. Never use the electric power cables to move the motor.



When the motor is positioned vertically, take care to ensure that the cables are not sharply bent (the minimum radius of curvature must be more than 5 times the diameter of the cable). The free ends of the cables must never be immersed or wetted in any way.

5 ASSEMBLY AND INSTALLATION:

Do not discard the packaging materials in the environment. Comply with the local laws governing disposal and pollution abatement.



fasten the motor in the vertical position and make sure that it is stable. Wrap something around the end of the drive shaft to prevent it from being damaged then, using a pair of pliers, make sure that the rotor turns smoothly.

5.1 Preliminary inspectionsWARNING

Deep well

Make sure that the motor remains at least 2-3 meters above the bottom of the well. To ensure correct cooling, the well's drawing filters must always be below the position occupied by the motor.

Check whether there are variations to the dynamic level in the well due to seasonal falling of groundwater levels or if the pump rating is too high for the dynamic characteristics of the actual well.

Tank

Correct installation of the unit will include a pressure accumulator.

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5.2 Mechanical connections:

Proceed as described below if the motor must be assembled on the pump:

- 1) thoroughly clean the mating surfaces.
- fix the motor in the vertical position and make sure that it is stable;
- a) if installed, remove the strainer and filter from the suction casing of the pump;
 b) if installed, remove the strainer and filter from the suction casing of the pump;
 c) lift the pump vertically and, after positioning it on the same axis as the motor and setting it in the correct angular position, slowly lower it, inserting a screwdriver through the hole in the filter housing and into the milled part so as to mesh- the splined shaft and coupling more easily. In the absence of a hole in the filter housing, turn the coupling with a tool in the shape of a drive shaft or using a screwdriver on the first impeller, taking care not to chip it:
- 5) tighten the nuts evenly using the plate, when present, to close the cable routing zone and fit the filter back in place if used; 6) lock the Defender in place with the O-Rings, when present. If the motor has a second cable outlet at 90°, replace one of the Defenders with a 6) second plate to close the cable routing zone, when present;
- 7) fit the strainer back in place;
- 8) arrange the power cables under the protecting cable guard/s.

Pump power coupled to the motor must be less than or equal to motor power.

5.3

Electrical connections and relative information:



The electrical connections must be made by qualified personnel in strict compliance with all the installation regulations in force in the country of use (standard CEI 64-8 in Italy) and as shown in the circuit diagrams in the manual and attached to the control panels. All the yellow-green earth conductors must be connected to the earthing circuit of the installation before the other conductors are connected, while they must be the last to be removed when the motor is electrically disconnected. The free ends of the cables must never be immersed in water or wetted in any other way.

Insulation resistance measuring procedure:

Make sure that the motor cables are not connected to the electricity main;

Check the conditions of the cables:

If the environment is damp, clean the end of the power cable at the point in which it will be connected to the clamp of the test instrument; If the motor has an output with 3 power cables, connect one of the terminals of the instrument (Megger) to the ends of one of the motor's power cables and the second to the motor casing. If the motor has an output with 6 power cables, connect one of the terminals of the instrument to the beginning and to the end of the same phase (e.g. : V1-V2) and the second to the motor casing;

Measure the insulation considering the following parameters: Max. test time 30 sec., Test voltage 500V DC (a longer testing time at high voltage could damage the insulation of the motor winding wire). If the value measured tends to be infinite during the test (full scale of the instrument), the motor winding can be considered to be electrically insulated and the test can be interrupted even before the 30 sec have elapsed; After measuring, the phases must be briefly connected to earth so as to reset their potential.

Cable connection.

Connect the supply and earth cables as described in detail in Caprari's specific technical instructions and then measure the insulation resistance of the connection: minimum value with 500 V D.C. test voltage: 5M Ω , in air; 2M Ω in water.

If low insulation values persist in the presence of junctions between motor cables and power cables (risers), cut the junctions and repeat the tests directly on the three motor cables as indicated above.



Cables in addition to the standard one supplied with the electric pump must not possess inferior characteristics (contact Caprari S.p.A. or check the type of standard cable in the sales catalogue).

The connection must withstand the maximum pressure to which it will be subjected, (e.g. the pressure exercised by the static level of the water in the well) and the alternating temperatures caused by the work phases.

WARNING Poorly made connections can easily damage the motor and/or the supply cable.

Electrical equipment.

Make sure that the electric control panel complies with the laws in force in the country of use. Particularly make sure that its protection class suits the place of installation.

It is advisable to install electrical equipment in a dry, well ventilated place where the temperatures are not extreme

- (e.g. -20 to +40°C). Failing this, use special versions of the equipment.
- WARNING The contacts of undersized or poor quality electrical equipment are liable to deteriorate quickly. This leads to unbalanced power being supplied to the motor, which could be damaged as a consequence.

Unless correctly researched and installed, use of Inverters and Soft-starters could impair the safety of the pumping unit. Ask the Caprari Technical Office for assistance if the relative difficulties are not known.

Power supply voltage.

Permitted variations on supply voltage:

single-phase motors: 230V ±10% [50Hz]; 220V ±10% [60Hz] three-phase motors: 400V ±10% [50Hz]; 460V ±10% [60Hz] For other voltage/frequency values: ±5%

Tolerances on operating features: in compliance with IEC 34-1 International Standards.

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WARNING



Make sure that the voltage and frequency values with which the motor is supplied correspond to the data on the motor rating plate. Ask for a special version of the motor if the supply voltage fails to comply with the admissible variations. To prevent voltage dips of more than 2.5-3% the rated value, make sure that the power supply cable has been sized in relation to its length, the power consumption of the unit and the air temperature (consult the technical annex of Caprari's Submersible Electric Pumps catalogue for details about how to size the cable correctly). The voltage must be sinusoidal, while the system must be three-phase with symmetrical supply.

In accordance with standard CEI 2.3 (IEC 38), the supply voltage in an alternating current motor is considered to be practically sinusoidal if, when the motor functions at rated load, the waveform is such that the difference between its every instantaneous value and the corresponding instantaneous value of the fundamental component does not exceed 5% of the amplitude of this latter. During the temperature-rise test, this difference in amplitude must not exceed 2.5%. The three-phase voltage system is considered to be symmetric when the negative sequence component does not exceed 1% of the positive sequence component of the voltage system during a long period of time, or 1.5% for a short period of no more than a few minutes, or if the homopolar component of the voltage system does not exceed 1% of the positive sequence component.

Direction of rotation.

WARNING The wrong direction of rotation can damage the motor since the power input and axial thrust of the pump is generally sensibly higher than forecast.

Find the correct direction of rotation (anti-clockwise for the pump viewed from the discharge side) by means of the following operations: 1) fill the pipe and measure the pressure developed by the electric pump with the slide valve closed;

2) disconnect the mains power supply and invert two of the three phases;

3) repeat the operation from point 1. Maximum pressure shows that the direction of rotation is correct.

If the pump is installed at great depth, the pressure developed during operation in the wrong direction of rotation will not even be sufficient to overcome the static level.

Phase imbalance.



Check the power input of each phase. Imbalance must not exceed 5%. If higher values are found (which could be caused by the motor but also by the electricity main), check the power inputs of the other two motor-mains connection combinations, taking care to avoid reversing the direction of rotation. The best connection will be the one with the least power input difference among the phases. Note that if the highest power input is always detected on the same phase of the line, the main cause of imbalance will be due to the mains supply.



The correct direction is anti-clockwise, viewed from the motor overhang side

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6 USE AND OPERATION

6.1 Starting:

In single-phase motors, we strongly recommend using a start capacitor with electronic circuit breaker to allow the correct motor starting torque. The capacitor is only **mandatory** for 3 kW and 4 kW motors. Refer to the table entitled **Capacitance of run and start capacitor** included in the "Technical data" section.

If the motor is unable to start, avoid repeated attempts to start as this would only

damage it. Find out why it fails to start and eliminate the cause.

If an indirect starting system is used, the starting transient must be brief and must never last more than a few seconds.

When the motor is running, check to make sure that current draw does not exceed the value given on the rating plate of the motor and that the machine functions correctly.

The thermal relay must be calibrated to suit the power consumption of the unit, as described below:

1) operate the electric pump in the maximum consumption conditions (which usually correspond to maximum flow rate conditions) with the relay set at the ampere rating of the motor;

2) gradually lower the setting level until the relay trips (if the relay's trip position cannot be reached even by arriving at the minimum

ampere rating value, replace the relay, because it is either defective or oversized with respect to the power consumption, then repeat the entire sequence);

3) now position the relay's range setting pointer to the non-trip minimum ampere rating.

REFERENCE PARAMETERS PER TYPE OF STARTING SYSTEM											
Motor		Impedance or autotransformer	Inverter								
Motor	P2	Max. time with Vs> 0.65 Vn	Max. acceleration time								
	[kW]	[s]	[s]								
M405÷410	0,37÷7,5	1	1,5								

P2 = motor power rating / Vs = starting voltage / Vn = rated voltage / Is = starting current / In = rated current

General instructions for use of an INVERTER

- the minimum frequency must not be less than 70% of the rated value during the starting phase and/or use, with the

- voltage/frequency ratio maintained at a constant level;
- max. acceleration ramp time: see table
- Maximum deceleration time equivalent to twice the maximum acceleration time.
- Maximum inverter switching frequency ≤5kHz

A filter that ensures compliance with the following conditions must be installed between the inverter and motor:

The voltage gradient for oil-bath motors (4") is
$$\frac{dV}{dt} \le 750 \left[\frac{V}{\mu s}\right]$$
. e Vp-p ≤ 2100 V

Conditions to be complied with regardless of the length of the power cables.

In the event of a malfunction of an installation that has an inverter startup check, if possible, check the operation of the pump unit by connecting it directly to the mains (or other device).

6.2 Operation and inspections:

The maximum number of motor starts is given in the 'Motor table' in chapter 10.

WARNING

Once installed, the electric pump will not need any particular maintenance. However, to ensure that it continues to function correctly over time, it should be frequently inspected at least every 3 months or after every 1000-1500 hours service, during which time the parameters indicated in the 'Operation report' should be checked. In addition, the efficiency of all the electrical equipment should be checked every 6-12 months.

If operation is faulty, find the causes and proceed as a consequence, as described in this manual.

Maintenance:

The motor must only be serviced and repaired by specialized personnel possessing adequate qualifications and using suitable tools. Moreover, these persons must have studied and understood the contents of this manual and any other documentation supplied with the motor.

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Removal.

Before any operation involving the motor is performed, it must be disconnected from the installation's power supply source. Work through the instructions given in the 'Electrical connections and relative information' section if the motor must be disassembled from the installation. Also make sure: that the various components remain stable once they have been set in the vertical position.

Only use Caprari original spare parts if repairs are required otherwise all forms of warranty will become void. Moreover, failure to do so will relieve the Manufacturer from all liability.

Give the following information when ordering spare parts from Caprari S.p.A. or one of its Authorized Assistance Centers:

1 - complete code of the product;

2 - date code and/or serial number and/or job order when present;

3 - name and reference number of the required part, as indicated in the spare parts catalogue (available from authorized assistance centers);

4 - number of parts required.

Idle periods:

If the electric pump unit must remain submerged during long idle periods, it is advisable to start it up every 20 to 30 days to prevent the rotor from blocking.

Consult the 'Storage and handling' chapter for further instructions.

7 REMOVAL FROM SERVICE AND DISMANTLING:

If the motor must be dismantled, the operator must perform all the decommissioning and dismantling operations in strict compliance with all the pertinent local disposal laws and regulations.

End-of-life product disposal.

INFORMATION TO USERS pursuant to Article 14 of the DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on waste electrical and electronic equipment (WEEE)



The crossed-out wheeled bin symbol on the electrical and/or electronic equipment (EEE) or on its package indicates that the product must be collected separately at the end of its service life and not disposed of with other mixed municipal waste. DOMESTIC EEE

Please contact your municipality, or local authority, for all the information regarding the locally available separate collection systems. The retailer of the new equipment has the obligation to take back the old one upon the purchase of an equipment of equivalent type, in order to start the correct recycling/disposal cycle. In Italy, domestic EEE are electric pumps with single-phase motor. This classification must be verified in the other European nations.

PROFESSIONAL EEE

The separate collection of this equipment after its useful life is organised and managed by the manufacturer. Therefore, any user that may want to dispose of this equipment can either contact the manufacturer and follow the system implemented to separately collect the equipment at the end of its useful life, or autonomously select an authorised waste management chain. In any case, the user must respect the take-back conditions laid down by the Directive 2012/19/EU.

Illegal disposal of the product by the user shall be subject to the application of the sanctions provided for by law.

8 WARRANTY

The general terms of sale of all products manufactured by Caprari S.p.A. also apply to this motor.

Remember that one of the essential warranty conditions is compliance with all the individual regulations given in the attached documentation as well as with the best hydraulic, mechanical and electrotechnical regulations, which are of fundamental importance if the electric pump unit is to function in a regular way.

Faults caused by wear and/or corrosion are not covered by the warranty.

For the warranty to be recognized it is also necessary to have the motor examined beforehand by our technicians or by the technicians from one of our authorized assistance centers.

Failure to comply with the instructions in the literature supplied with the motor will void all forms of warranty and liability.



NOTE - NOTES

(1) =	numero massimo di avviamenti / ora equamente ripartiti	(1) =
(2) =	temperatura massima del liquido pompato	(2) =
(3) =	Velocità dell'acqua all'esterno della camicia del motore	(3) = (4) =
(4) =	senso di rotazione S = sinistro	(5) =
(5) =	Carico Assiale	S =
S =	Sporgenza albero	

(1) =	maximum number of evenly spaced starts/ hour
(2) =	maximum temperature of pumped liquid
(3) =	Speed of water outside motor casing
(4) =	direction of rotation S = left
(5) =	Axial load
S =	Shaft overhang

(GB)

	Motore	Lunghezza Length	ØE	(1)	T(2)	VH2O (3)	Peso Weight	(4)	S	(5)
	Motor	[mn	ן]	[N°/h]	[°C]	[m/s]	[kg]	.,	[mm] 	[N]
	MC405M	311		20			6,5			1500
ш	MC4075M	331					7,2			1500
=AS	MC41M	356					8,5			1500
NOI ILE P	MCH415M	396	96		30	0,08	10,2	S	38	2500
	МСК42М	450					12			4000
2	МСН43М	492					14,9			2500
	MCK43M	505					15,1			4000
	MC405	311		20			6,5			1500
	MC4075	331					7,2			1500
	MC41	356					8,5			1500
	MCH415	371					9,4	S		2500
	MCH42	410					10,5			2500
SE HASE	MCK42	410		20			10,5			4000
IFA EE PI	MCH43	436	96		30	0,08	11,7		38	2500
TR	MCK43	450					11,9			4000
	MCK44	450					12,1			4000
	MCR44	450					12,1			5000
	MCR455	505					15,1			5000
	MCR475	700		15			24,7			5000
	MCR410	800					29			5000

10 Dati tecnici, dimensioni e pesi Technical data, dimensions and weights

Ingombri e pesi indicativi Indicative dimensions and weights

	Motore	Lunghezza Length	ØE	(1)	Т(2)	VH2O (3)	Peso Weight	(4)	s	(5)
	Motor	[mn	ı]	[N°/h]	[°C]	[m/s]	[kg]	(1)	[mm]	[N]
	MCS405M	331			30		7,2			1500
	MCS4075M	331					7,2			1500
SE SE	MCS41M	356	96	20			8,5			1500
A H C	MCKS415M	410				0.00	10,5	c	20	4000
	МСКS42М	450				0,08	12	3	30	4000
A SIN	МСКS43М	505		15			15,1			4000
	MCRS44M	700					24,2			5000
	MCRS455M	800					29			5000
	MCS405	331					7,2			1500
	MCS4075	331					7,2			1500
	MCS41	356					8,5			1500
Ш Ш	MCKS415	385		20			9,9			4000
PHA	MCKS42	410	00		20	0.09	10,5		20	4000
'RIF Iree	MCKS43	450	96		30	0,08	11,9	5	38	4000
μŦ	MCRS44	450					12,1			5000
	MCRS455	505					15,1			5000
	MCRS475	700		15			24,7			5000
	MCRS410	800					29			5000

	Motore	Lunghezza Length	ØE	(1)	T(2)	VH2O (3)	Peso Weight	(4)	S	(5)
	Motor	[mm	ן	[N°/h]	[°C]	[m/s]	[kg]	.,	[mm]	[N]
	MW405M/1-1	237		20			6,8			2000
ш	MW4075M/1-1	257					7,9			2000
EASI HASE	MW41M/1-1	272			30		9,1			2000
	MW415M/1-1	297	96			0,08	11,2	S	38	2000
	MW42M/1-1	332					13,4			3000
2 **	MW43M/1-1	387		15			14,2			3000
	MW45M/1-1	634					27,8			6500
	MW405/1-8	212					5,8			2000
	MW4075/1-8	237					6,8			2000
	MW41/1-8	257					7,9			2000
8	MW415/1-8	272		20			9,1			2000
ASI PHA	MW42/1-8	297	00		20	0.00	11,2			3000
RIF Ree	MW43/1-8	332	96		30	0,08	13,4	3	38	3000
는 표	MW44/1-8	469					19,8	-		6500
	MW455/1-8	574					23,4			6500
	MW475/1-8	634		15			27,8			6500
	MW410/1-8	734					31,4			6500

P2	P2	Condensatore di marcia Start capacitor	Condensatore di avviamento Run capacitor
[HP]	[kW]	[uF]	[uF]
0,5	0,37	20	30
0,75	0,55	25	30
1	0,75	35	40
1,5	1,1	40	40
2	1,5	60	60
3	2,2	80	60
4	3	90	250÷300
5,5	4	120	250÷300

P2 = Potenza nominale motore - motor power rating

Lunghezza MAX [m] – cavi di alimentazione Tripolare EPDM/EPR o PVC / MAX length [m] - Three-pole supply cable in EPDM/EPR or PVC

Avviamento diretto o statorico – Motore con uscita 3 cavi – 1 cavo di sezione (S) 3 x ... / Direct or statoric impedance starting - Motor with 3 cable output - 1 cable with section (s) 3 x ...

Frequenza 50 Hz / Frequency 50 Hz

			Мс	onofase /	Single-pha	ase		Trifase / Three-phase					
				Cavo	di Sezior	ne 3 (4) x.	[mm2] /	Cable with	n section	3 (4) x	[mm2]		
		1,5	2,5	4	6	10	16	1,5	2,5	4	6	10	16
I [A]	U [V]		Lunghezza MAX [m] / MAX lenght [m]										
1	230	310	514					358	593				
	400		0.40	5.10									
1,5	230	206	343	549				238	396				
	230	155	257	412				179	297	476			
2	400	100	201					311	516				
	230	124	206	330	491			143	237	381	567		
2,5	400							249	413				
2	230	103	171	275	409			119	198	317	473		
	400							207	344	552			
4	230	77	128	206	307	523		89	148	238	354		
	400							155	258	414			
5	230	62	103	165	246	418		72	119	190	284	483	
	400	50	00	107	005	240	544	124	206	331	493	402	
6	230	52	86	137	205	349	541	104	99	159	236	403	
	230	11	72	119	175	200	463	51	95	136	203	345	525
7	400	44	15	110	175	233	403	89	147	236	352	545	555
	230	39	64	103	153	261	405	45	74	119	177	302	468
8	400							78	129	207	308	525	
•	230	34	57	92	136	232	360	40	66	106	158	268	416
9	400							69	115	184	274	467	
10	230	31	51	82	123	209	324	36	59	95	142	242	374
	400							62	103	165	247	420	
11	230	28	47	75	112	190	295	33	54	86	129	220	340
	400							57	94	150	224	382	592
12	230	26	43	69	102	174	270	30	49	79	118	201	312
	400	24	40	62	04	101	240	52	86	138	205	350	543
13	230	24	40	63	94	161	249	28	46	107	109	186	288
	230	22	37	59	88	149	232	26	42	68	101	173	267
14	400	~~~	07	00	00	145	202	44	74	118	176	300	465
4-	230	21	34	55	82	139	216	24	40	63	95	161	250
15	400							41	69	110	164	280	434
16	230	19	32	51	77	131	203	22	37	59	89	151	234
0	400							39	65	103	154	263	407
17	230	18	30	48	72	123	191	21	35	56	83	142	220
	400							37	61	97	145	247	383
18	230	17	29	46	68	116	180	20	33	53	79	134	208
	400		07	40		440	474	35	57	92	137	233	362
19	230	16	27	43	65	110	1/1	19	31	50	/5	127	197
	400	15	26	11	61	105	160	10	20	٥/ ٨٥	71	121	197
20	400	15	20	41		105	102	31	52	40 83	123	210	326
									J 32	00	120	210	020

			Мс	onofase /	Single-pha	ase		Trifase / Three-phase					
				Cavo	di Sezior	ne 3 (4) x.	[mm2] /	Cable with	n section	3 (4) x	[mm2]		
		1,5	2,5	4	6	10	16	1,5	2,5	4	6	10	16
I [A]	U [V]	[V] Lunghezza MAX [m] / MAX lenght [m]											
1	220	296	490					342	566				
	460	107	207	504				220	270				
1,5	220	197	321	524				228 476	378				
	220	148	245	393	584			171	283	453			
2	460		2.10					357	592				
2.5	220	118	196	314	468			137	227	363	540		
2,5	460							286	474				
3	220	99	163	262	390			114	189	302	450		
	460							238	395				
4	220	74	123	196	292	496		85	142	227	337	573	
-	460							179	296	474			
5	220	59	98	157	234	397		68	113	181	270	459	
	460	40	00	101	105	224	E 1 1	143	237	379	564	202	501
6	220	49	82	131	195	331	511	5/	94	151	225	382	591
	400	12	70	112	167	294	120	119	197 01	120	470	200	506
7	460	42	70	112	107	204	430	49	160	271	193	320	500
	220	37	61	98	1/6	248	38/	102	71	113	169	287	113
8	460	57		30	140	240	004	89	148	237	353	599	440
	220	33	54	87	130	221	341	38	63	101	150	255	394
9	460			01	100			79	132	211	314	533	001
	220	30	49	79	117	199	307	34	57	91	135	229	354
10	460							71	118	190	282	479	
44	220	27	45	71	106	181	279	31	51	82	123	208	322
11	460							65	108	172	257	436	
12	220	25	41	65	97	165	256	28	47	76	112	191	295
12	460							60	99	158	235	400	
13	220	23	38	60	90	153	236	26	44	70	104	176	273
	460							55	91	146	217	369	570
14	220	21	35	56	83	142	219	24	40	65	96	164	253
	460	00		50	70	400	005	51	85	135	202	342	529
15	220	20	33	52	/8	132	205	23	38	126	90	220	230
	220	18	31	19	73	124	192	40 21	35	57	84	1/13	221
16	460	10		75	75	124	152	45	74	119	176	300	463
<u> </u>	220	17	29	46	69	117	181	20	33	53	79	135	208
17	460							42	70	112	166	282	436
40	220	16	27	44	65	110	170	19	31	50	75	127	197
18	460							40	66	105	157	266	412
10	220	16	26	41	62	105	162	18	30	48	71	121	187
19	460							38	62	100	149	252	390
20	220	15	25	39	58	99	153	17	28	45	67	115	177
20	460							36	59	95	141	240	370

Le lunghezze contrassegnate in grassetto sono riferite solo ai cavi in EPDM/EPR.

Assicurarsi che la corrente considerata sia effettivamente quella assorbita dal motore nelle condizioni reali d'esercizio. Le lunghezze dei cavi sono riferite ad una temperatura ambiente di 30° C; installazione in aria; cos ϕ = 0,8 e caduta di tensione ammessa = 3%.

Assicurarsi che la sezione selezionata per il cavo di risalita sia maggiore o uguale alla sezione del cavo d'uscita motore.

Lengths given in boldface type refer solely to cables in EPDM/EPR.

Make sure that the current considered is effectively that absorbed by the motor in the real operating conditions. The cable lengths refer to 30°C ambient temperature; installation in air; $\cos\varphi = 0.8$ and 3% admissible voltage dip. Make sure that the section of the riser cable is the same as the section of the motor output cable, or larger.

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