

## INSTALLATION AND OPERATING INSTRUCTIONS

### 1. GENERAL INFORMATION

Before using the product carefully read the information contained in this instruction manual, the manual should be kept for future reference.

Please refer to the sales contract for the features of variants and special versions. Always specify the exact type of motor and code when requesting our Sales and Service Department for technical information or spare parts.

Improper use may cause personal injury and/or damage to property, and invalidate the warranty.

#### 1.1. SYMBOLS

To improve the understanding of the manual, below are indicated the symbols used with the related meaning.



#### DANGER

Failure to observe this warning may cause personal injury and/or damage to property.



#### ELECTRIC SHOCK

Failure to observe this warning may result in electric shock



#### WARNING

Failure to observe this warning may cause damage to property (pump, system, panel,...) or the environment.

#### 1.2. MANUFACTURER NAME AND ADDRESS

PD Water Systems  
3000 W. 16 Ave. Miami, FL 33012  
Tel: (954) 4749090 | Fax: (954) 8890413  
info@pdwatersystems.com | www.pdwatersystems.com

#### 1.3. AUTHORIZED OPERATORS

The product is intended for use by expert operators divided into end users and specialized technicians. (see the symbols above).

It's forbidden, for the end user, carry out operations which must be done only by specialized technicians. The manufacturer declines any liability for damage related to the non-compliance of this warning. Provide enough clearance around the unit for motor ventilation and for filling and draining the pump.

#### 1.4. WARRANTY

For the product warranty refer to the general terms and conditions of sale.

The warranty covers only the replacement and the repair of the defective parts of the goods (recognized by the manufacturer).

The Warranty will not be considered in the following cases:

- Whenever the use of the device does not conform to the instructions and information described in this manual.
- In case of changes or variations made without authorization of the manufacturer.



- In case of technical interventions executed by a nonauthorized personnel.
- In case of failing to carry out adequate maintenance.

#### 1.5. TECHNICAL ASSISTANCE

Any further information about the documentation, technical assistance and spare parts, shall be requested to the manufacturer.

### 2. PRODUCT DESCRIPTION

The 4MOP range comprises a number of 4" submersible motors with stator and rotor immersed in oil, designed to be coupled to 4" and 6" submersible pumps with NEMA-compliant flange and coupling sizes.

All the metal parts in contact with the water are either made from stainless steel or cast iron.

Each motor includes a cable with removable connector and angular ball bearing.

### 3. APPLICATIONS

All the motors in the 4MOP range can be used to drive submersible pumps in the conditions established at the supply voltage/frequency specified on the rating plate and in:

- For the T series: EN 60034-1 (IEC 60034-1)
- For the S series: EN61000-6-4, EN60034-1

The shaft extension and flange size of these motors comply with:

- For the T series: NEMA MG1:2006 Rev. 1-2007.
- For the S series: NEMA MG1-1B.388



The power of the pumps coupled to these motors must be less than or equal to that of the motors.

### 3.1 WORKING LIMITS

#### 3.1.1 LIQUIDS IN WHICH THE MOTOR CAN OPERATE

This motor can be used in cold water.



Do not use this motor with corrosive or explosive liquids, or particularly dirty or hard water (impurities may deposit on the outer casing).

#### 3.1.2 WATER TEMPERATURE



Minimum water temperature is + 0°C (32°F). Maximum water temperature is + 35°C (95°F), as long as the flowrate of the water around the motor does not fall below 0.15 m/s (0.45 Ft/s). For temperatures above + 35°C (95°F), motor output must be reduced to ensure correct cooling.

For further information, please contact our Sales and Service Department.

#### 3.1.3 COOLING THE MOTOR

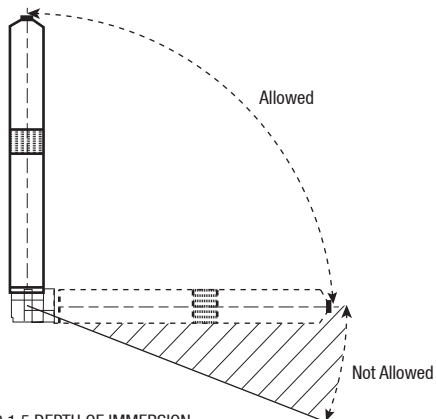


To ensure the motor is correctly cooled, make sure the flowrate of the water around the outer casing is at least 0.15 m/s (0.45 Ft/s), when positioning the motor in wells or tanks. At water speeds lower than 0.15 m/s (0.45 Ft/s), mount a cooling jacket.

For further information, please contact our Sales and Service Department.

#### 3.1.4 INSTALLATION POSITION

All the motors in the range can be installed vertically and horizontally. For special requirements, please contact our Sales and Service Department.



#### 3.1.5 DEPTH OF IMMERSION

The maximum depth of immersion for all motors is 650 Ft. (200 m)

### 3.1.6 POWER SUPPLY REQUIREMENTS



Make sure the supply voltage and frequency match those indicated on the rating plate of the motor. For further information, please contact our Sales and Service Department.

The motors can generally work at the following supply voltage tolerances:

f Hz	~	UN	
		V	%
60	1	220-230	-10%
60	3	220/380	-10%

#### 3.1.7 NUMBER OF STARTS PER HOUR

The maximum number of starts per hour is 20 for direct starting and 10 for impedance starting.

#### 3.1.8 COMPATIBLE PUMPS



Make sure the motor is compatible with the pump. Incompatible combinations may cause problems. In particular, before coupling the motor to the pump check that:

- The power of the pump to couple to the motor is less than or equal to that of the motor.
- The supply voltage and frequency match those indicated on the rating plate of the motor
- The motor and pump shafts turn freely

For further information, please contact our Sales and Service Department.

#### 3.1.9 MOTOR POWERED BY A FREQUENCY CONVERTER



The motors can be powered with a frequency converter (30 Hz – 50/60 Hz).

For further information, please contact our Sales and Service Department.



If the motor is combined with a frequency converter, downgrade power by 10% and make sure you never exceed the rated input frequency of the motor. To ensure the motor is properly cooled, the minimum water flowrate at the minimum frequency of use must equal the minimum flowrate indicated in the previous points.

For further information, please contact our Sales and Service Department.

#### 3.1.10 MOTOR POWERED BY A GENERATING SET

For information, please contact our Sales and Service Department.

#### 3.1.11 SPECIAL APPLICATIONS



For situations other than those described for the nature of the liquid and/or installation, please contact our Sales and Service Department.

### 3.1.12 IMPROPER USE



Improper use of the motor may create dangerous conditions and cause personal injury and/or damage to property.

Improper use includes:

- Working with liquids other than water
- Working at water temperatures higher than 35 °C without downgrading the motor
- Working with a cooling water flowrate of less than 0.15 m/s
- Exceeding the maximum number of starts per hour

### 3.2 TECHNICAL SPECIFICATIONS

For performance data, please refer to the rating plate attached to the motor.

For any requirements, please contact our Sales and Service Department.

### 3.3 WARRANTY

Please refer to the sales contract for further information.

### 4. TRANSPORT AND STORAGE

Store packed products at an ambient temperature ranging from -5° to +40°C.



Packed products must be transported, handled and stored horizontally.

**WARNING** Protect products from humidity, heat and physical damage, like knocks, falls, etc.

Do not place heavy objects on boxes.



Lift and handle products carefully, using suitable lifting equipment. Observe accident prevention regulations.

Do not lift or carry motors by their power cord.

On receipt of the motor, check the box for signs of damage. If the product is damaged, inform our dealer within 8 days of delivery. If you cannot reuse the box, dispose of it according to local by-laws governing sorted waste disposal.

Harness the product safely before lifting and handling it.

For further information, check section 3.1.

### 5. INSTALLATION



Before installing the motor, read this instructions manual and the one supplied with the pump or electric pump to which the motor will be coupled. Keep both manuals with care.

If the product shows clear signs of damage, do not proceed with installation, but contact the Technical Service Centre.



This product may only be installed by qualified and experienced personnel.

Use suitable equipment and protective devices. Observe all accident prevention regulations.

Carefully read the working limits specified in section 3.1.

Always refer to current local and/or national regulations, legislation and bylaws governing installation and water and power connections.

#### 5.1 SELECTING THE ELECTRICAL PANEL

Motors must be suitably protected against overloads and short circuits.

The following starting systems can be used: direct, impedance, autotransformer, soft-start.



Make sure the panel power ratings match those of the pump. Incompatible combinations may cause faults and fail to fully protect the motor.

Check the working limits specified in section 3.1.



Before installing, carefully read the instructions supplied with the electrical panel.

For further information, please contact our Sales and Service Department.

#### 5.2 PUMP CONNECTIONS



Before connecting the motor to the pump, read this instructions manual and the one supplied with the pump or electric pump to which the motor will be coupled. Keep both manuals with care.

For further information, please contact our Sales and Service Department.

#### 5.3 INSTALLING THE MOTOR IN A WELL OR TANK



Follow the instructions in the pump or electric pump manual.

When installing the electric pump vertically, make sure the motor does not rest on the bottom of the well or tank.

When installing the electric pump horizontally, make sure the motor does not rest on the bottom of the tank.

For further information, please contact our Sales and Service Department.

### 6. START-UP



Follow the instructions in the pump or electric pump manual.

#### 6.1 ELECTRICAL CONNECTIONS TO THE ELECTRIC PUMP



Electrical connections may only be performed by a qualified installer in compliance with current regulations.



Make sure that the supply voltage and frequency are compatible with the electrical panel. The relative information is shown on the motor rating plate and in the documents supplied with the panel. Provide suitable short circuit protection on the supply line.



Before proceeding, make sure that all the connections (even if they are potential-free) are voltage-free.

Unless otherwise specified in local bylaws, the supply line must be fitted with:

- A short circuit protection device
  - A high sensitivity residual current circuit breaker (30mA) for additional protection from electrocution in case of inefficient grounding.
  - A general switch with a contact aperture of at least 3 millimetres (0.1 in).
- Ground the system in compliance with current regulations.

#### • SINGLE-PHASE VERSION

Connect the electric pump to a supply line via a suitable electrical control panel containing the overload protection and the capacitor.



Refer to the wiring diagram on the outer casing of the motor and in figure 1 and the documentation supplied with the electrical panel.



Refer to the motor rating plate for the capacity of the capacitor.

Install the electrical panel in a sheltered area.

#### • THREE-PHASE VERSION

Connect the electric pump to a supply line via a suitable electrical control panel .



Install the electrical panel in a sheltered area.  
Refer to the documentation supplied with the electrical panel.

For connections to any external control devices (e.g.: pressure switch, float) follow the instructions supplied with these devices.

Verify the correct execution of the junction, measuring the insulation resistance. For a new motor the correct measurement has to be at least 200 Mohm

## 7. MAINTENANCE, SERVICE, SPARE PARTS



Before proceeding, always make sure the motor is disconnected from the supply line.



Maintenance operations may only be performed by expert and qualified people. Use suitable equipment and protective devices. Observe all accident prevention regulations.

Do not attempt to disconnect the connector from the motor head cable.

This may only be done by authorised personnel.



Only use original spare parts to replace faulty components.

The motor does not require any scheduled routine maintenance. Users wishing to prepare a maintenance schedule should bear in mind that maintenance frequencies depend on the conditions of use.

For any requirements, please contact our Sales and Service Department.

### 7.1 SPARE PARTS



Always specify the exact type of motor and code when requesting our Sales and Assistance Service for technical information or spare parts.



Only use spare parts to replace faulty components. Unsuitable spare parts may cause the product to work incorrectly and cause hazards for people and property.

For further information, please contact our Sales and Service Department.

### SINGLE PHASE 2 WIRE MOTOR WINDING RESISTANCES

#### ELECTRICAL DATA 2 WIRE

##### 4MOP 2W SINGLE PHASE MOTORS

P2		VOLT. [V]	MAIN RESISTANCE	START RESISTANCE
[hp]	[kW]			
0.5	0.37	115	1.30	3.05
		230	4.977	11.54
0.75	0.5	230	4.52	8.39
1.0	0.75	230	3.81	8.40
1.5	1.1	230	2.63	5.30

### SINGLE PHASE 3 WIRE MOTOR WINDING RESISTANCES

#### ELECTRICAL DATA 3 WIRE

##### 4MOP 3W SINGLE PHASE MOTORS

P2		VOLT. [V]	MAIN RESISTANCE	START RESISTANCE
[hp]	[kW]			
0.5	0.37	115	1.30	3.05
		230	4.977	11.54
0.75	0.5	230	4.52	8.39
1.0	0.75	230	3.81	8.40
1.5	1.1	230	2.63	5.30
2	1.5	230	1.69	3.74
3	2.2	230	1.36	3.09
5	3.0	230	0.87	1.95

### THREE PHASE MOTOR WINDING RESISTANCES

#### ELECTRICAL DATA 60 HZ

##### 4MOP THREE PHASE MOTORS

P2		V [V]	WINDING RESISTANCE
[hp]	[kW]		
0.5	0.37	230	9.024
		460	31.627
0.75	0.5	230	6.508
		460	28.849
1.0	0.75	230	5.209
		460	26.257
1.5	1.1	230	3.869
		460	16.093
2	1.5	230	2.593
		460	12.396
3	2.2	230	2.069
		460	8.203
5	3.0	230	1.071
		460	4.008
7.5	5.0	230	0.862
		460	2.734
10	7.5	230	0.561
		460	2.072