PM Technology

4OME SOLAR

4” SOLAR-POWERED SUBMERSIBLE MOTORS WITH INVERTER ON-BOARD

Made in Italy

4OME SOLAR

TECHNICAL SPECIFICATIONS

MOTORS ENDOWED WITH ELECTRONIC INVERTER INTEGRATED ON-BOARD

4" OIL FILLED SUBMERSIBLE MOTORS

MOTOR/PUMP FLANGE
4" NEMA STANDARD

POWERS
From 0,75 to 1,5 Hp

VOLTAGE
Power supply from panels
Three-phase motor

THRUST LOAD
3000 N

CONSTRUCTION FEATURES

EXTERNAL SLEEVE made in AISI 304L (Low Carbon) stainless steel.

UPPER BRACKET made in cast iron with cataphoresis treatment.

MECHANICAL SEAL made in graphite/ceramic in the standard version; SIC/SIC version available upon request.

BALL BEARING duly oversized to ensure a long lasting motor.

SHAFT PROJECTION made in DUPLEX stainless steel.

REMOVABLE POWER CABLE-CONNECTOR to ensure a perfect sealing, also in the most critical conditions, and to aid maintenance operations. Homologated cable KTW, ACS, WRAS.

INVERTER placed under the motor and inside the same tube, fully resinate.

INTERFACE SOLAR MESSENGER. Control panel, acting as the user interface.

100% TESTED, all motors are tested at the end of the line. Seal and electrical checks are carried out on all motors.

PATENTED MOTOR

Patent N. 0001397548
Patent N. US 9,353,766 B2

ACCESSORIES

Sacrificial anode
Different cable lengths

OPERATING LIMITS

DEGREE OF PROTECTION
Motor: IP 68
SOLAR MESSENGER: IP 55

INSULATION CLASS
F

VOLTAGE TOLERANCE
-10% / +10%

PUMPED LIQUID TEMPERATURE
0°C – 35°C

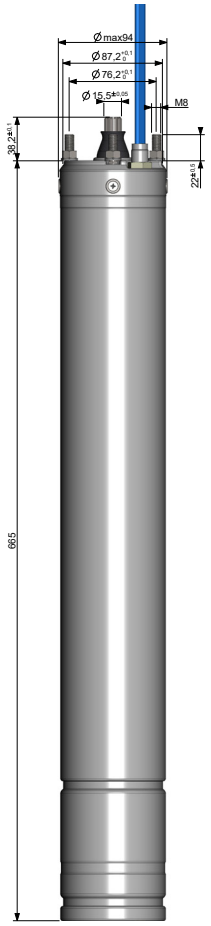
MIN. COOLING FLOW
0,1 m/s

MAX. STARTS / HOUR
30

MOUNTING
Vertical and/or horizontal

MAX. IMMERSION DEPTH
200m

DIMENSIONS



4OME SOLAR

WORKING PRINCIPLE

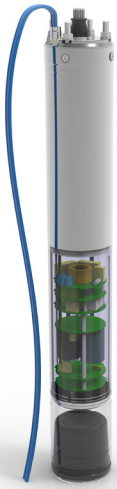
The motor is directly powered by solar energy which is captured by PV modules converting solar radiation into electric power.

The heart of electronics' power, the inverter, is located inside the submersible motors. It manages the entire operation through **MPPT** algorithm, *Maximum Power Point Tracker*. This is a special algorithm to maximize electric power from solar irradiation on photovoltaic panels. This system ensures maximum power available in a certain moment by adjusting the revs of the motor. In fact, as solar irradiation varies, the device change the rotating speed of the motor, increasing or decreasing the flow rate or the hydraulic head of the electropump, thus ensuring the maximum values possible at any time. Therefore the electropump will continue to supply water as long as solar irradiation is sufficient to ensure its operation.

SOLAR MESSENGER electrical panel acts as an interface with the user above ground, self-managing the communication of the whole system.

4OME SOLAR respects NEMA standards and it can be therefore coupled with any kind of pump on the market having equal or inferior power to the maximum power of the moto

HOW THE PRODUCT IS COMPOSED:

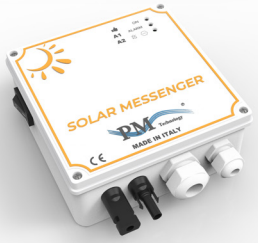


4OME SOLAR SUBMERSIBLE MOTOR

The submersible motor is three-phase oil filled with rotor made in copper, specifically designed in order to guarantee high efficiency and electric elasticity. The motor is combined with the inverter integrated on-board.

SOLAR MESSENGER: CONTROL AND MANAGEMENT DEVICE

SOLAR MESSENGER is a panel composed of plastic box containing an electronic card, used in surface to control pump by the operator. Through this device, user can switch on and off the system, in addition to display and manage any alarms.
SOLAR MESSENGER panel, in addition to being connected to photovoltaic panels and motor, gives the opportunity to connect also a floating level.



MOTOR'S PROTECTIONS

- Protection against dry running and automatic reset of protection after 10-20-40-80-(120x10 times) minutes
- Electric protection against motor overload
- Phase failure protection
- Overvoltage protection
- Motor temperature protection

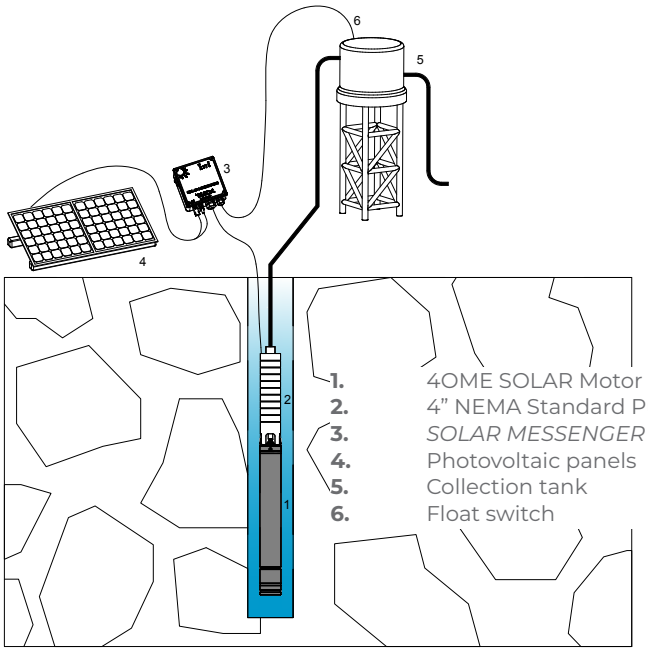
ADVANTAGES

Inverter integrated on-board electric drive allows:

- to change the engine RPM always ensuring the highest level of water;
- to start and stop the motor softly, avoiding water hammers and electrical absorption peaks;
- not to install expensive filters or shielded cables to prevent motor damage, being the inverter integrated.

CONNECTION DIAGRAM

As you can see in the connection diagram, you just need to install the motor with the desired pump and connect it with the *SOLAR MESSENGER* panel on the surface. *SOLAR MESSENGER* panel, in turn, will be connected with photovoltaic panels.



ELECTRICAL DATA 4OME SOLAR

MOTOR DATA													PANELS POWER SUPPLY		
Type	P_2 [Hp]	P_2 [kW]	Motor Voltage [V_{AC}]	Ph	I_{max} [A]	$P_{1\,max}$ [W]	rpm	Thrust Load [N]	Length A [mm]	Weight [kg]	Cable Length [m]	Cable Section [mm²]	Voltage * [V_{DC}]	Minimum Output [W_p]	Minimum Current [A]
4OME SOLAR-075	0,75	0,55	100	3	6,5	850	2850	3000	665	14,1	1,5	1,5	140-220	>900	>7
4OME SOLAR-100	1	0,75	100	3	8,5	1150	2850	3000	665	14,1	1,5	1,5	140-220	>1300	>9
4OME SOLAR-150	1,5	1,1	100	3	11,5	1700	2850	3000	665	14,1	1,5	1,5	140-220	>1800	>12

** The incoming voltage from solar panels must never exceed the specified maximum voltage of 220 V_{DC}. Otherwise, the motor could be damaged irreparably. Unlike, a voltage lower than the one indicated (140 V_{DC}), doesn't guarantee the full RPM of the motor.*

EXAMPLE

INSTALLATION OF 4OME SOLAR-150 MOTOR

SIZING OF PHOTOVOLTAIC PANELS

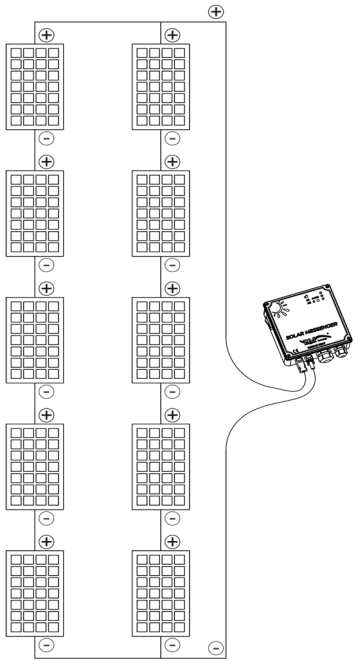
Example of panels:

W_p 240 W (power supplied by the single panel)

V_p 30 V_{DC} (maximum voltage supplied by the single panel)

V_{OC} 37 V_{DC} (open-circuit voltage of the single panel)

I_p 8 A (minimum current supplied by the single panel)



How many panels are needed and how should they be connected?

Based on the electrical data showed in the above chart, 4OME SOLAR-150 model requires, to operate the system at full capacity, of:

- 1800 W_p. This means that **1800/240 = 7,5 → 8 panels** are needed
- minimum 140 V_{DC}. So, **140/30 = 4,6 → 5 panels serially connected together** must be installed
- current not less than 12 A. Each panels in this example generates 8 A so, in order to guarantee 12 A, **12/8 = 1,5 → 2 panels in parallel** must be installed, obtaining 16 A in case of maximum irradiation.

In this case, the ideal photovoltaic system consists of 10 panels in total. Two strings from 5 panels (in series) each and connected in parallel together, as from the connection diagram in figure.

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