



## INSTALLATION & OPERATING INSTRUCTIONS



**3 & 4 INCH  
SUBMERSIBLE MOTORS**

**V3/MCIP 100.5/MCIP 101/PREMIUM 100  
PREMIUM 100.5/PREMIUM 100.7/PREMIUM 101**



May/2019-20/19/00000 VC : 700277 SAP NO. 2900000713

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## EC DECLARATION OF CONFORMITY

### IN ACCORDANCE WITH LV & RoHS MACHINERY DIRECTIVES UNDER SELF DECLARATION

Product Designation : Submersible Motors / Solar Submersible Motors  
Model Reference : V3, Premium, MCIP, SML, MTSF, Solar (0.50 HP to 252.0 HP)  
Intended End Use : For Submersible Motors / Solar Submersible Motors to be used for Clean water lifting application.

Conforming to the requirement of the following European Directive :

- a) Low Voltage Directive - 2006 / 95 / EC
- b) RoHS Directive - 2011 / 65 / EU

Applicable harmonised standards used :  
EN 60034-1-2010

We hereby declare that Submersible Motors / Solar Submersible Motors is intended to be incorporated into OR assembled with other machinery to constitute relevant machinery to comply with the Essential Health and Safety requirement of the above-mentioned directives.

This machinery, its components and sub-assemblies shall not be put in to service until the machinery into which it is to be incorporated has been declared in conformity with the provision of the applicable directives.

The criteria for selection, safety requirement of other associated equipment and installation guidelines are detailed in the instruction manual.

- Date of Manufacturer & First CE marking : 10-Dec-2007.
- Date of Review : 5-Nov-2015
- Place of Manufacturer : Shakti Pumps India Ltd, Pithampur.

Issued at : SHAKTI PUMPS (I) LTD.  
Pithampur

Marking : **CE**

The above Motor must not be put into service/usage for other than specified in the instruction Manual on Date : 10-Dec-2007.

  
Deo Kumar Thakur  
(Manager-QA)

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## INSTALLATION AND OPERATING INSTRUCTIONS

### 1. GUIDELINES

The submersible motors are a machine component in accordance with the "machines" EC guideline. You must not commission the motor unless the met the safety requirements stipulated in the applicable EC guidelines and confirmed this by a certificate of conformity.

### 2. SAFETY

The 3-4 Inch submersible motor must only be operated in observance of the following safety regulations :

- Operate the motor only under water (fig. 1/ fig. 2, See Pg 9)
- Take into account the implementation limits of motor and units
- Check the electrical system and fusing before switching-on (fig. 3, See Pg 9)
- Protect electrical and mechanical danger spots against access
- Vent rising pipe before commissioning in order to avoid water hammers when starting up
- Provide a check valve in the pump or rising pipe (max. 7m away from pump) (fig. 4, See Pg 9)
- Water temperature with original motor below not below -3° C, with water filling not below 0° C (fig. 5, See Pg 9)
- Maximum water temperature +30° C. Higher temperatures only with derated motors (fig. 5, See Pg 9)

**With generator operation always unload the generator first, i.e.**

- Start : First the generator, then the motor
- Switch-off : First the motor, then the generator

**After powering the system check :**

- Operating current of the motor at each phase
- Mains voltage with the motor running
- Level of the medium to be pumped

**Switch off the motor immediately if :**

- Name plate current is exceeded
- Voltage tolerances of more than -15% / +6% compared to the rated voltage on the motor are measured (fig. 6, See Pg 9)
- Dry run is imminent

### 3. APPLICATIONS

Submersible Motors are specifically designed for submerged operation as drivers of variable torque loads such as pumps i.e.

- Drinking water supply
- Wells in domestic houses, waterworks and agriculture
- Dewatering, pressure boosting, irrigation systems
- Supply of process water
- Ground water heating systems

Maximum 20 starts per hour, allow 60 seconds between successive starts.

The maximum submergence depth is 150 meters. Up to 1000 meters after consulting us, Motors in SS are available for operation in aggressive environments. The responsibility for correct material choosing lies with the customer.

Improper use of Submersible Motors, like pumping of air or explosive media is strictly prohibited.

## INSTALLATION AND OPERATING INSTRUCTIONS



### 4. TRANSPORT AND STORAGE



#### ATTENTION

The motor may be commissioned by trained and instructed personnel only. Electrical connections have only to be carried out by qualified personnel.

- Store motor in original packaging until assembly
- Under no circumstances may the motor be stored at temperatures above 50° C since this can lead to filling liquid leakage and premature motor failure (fig. 7, See Pg 9)
- Storage temperature with original motor filling up to -40° C, with water filling frost free (fig. 8, See Pg 9)
- Determine the age of motor by checking the name plate. (See fig. below)

MOTOR PREMIUM/MCIP/V3- ...HP kW-1φ ...V ...Hz  
 SERIAL NO: ..... Date of Mfg: .....

75/100mm SUBMERSIBLE MOTOR  
 ....V/..... Hz.....A..... RPM, COSφ .....

AXIAL THRUST LOAD .....lbf (.....N)  
 CATEGORY - ..... CONNECTION - .....

CAPACITOR- .....  
 TYPE OF DUTY- .....

THERMALLY PROTECTED  
 DEGREE OF PROTECTION - IP-68  
 NET WT:.....Kg GROSS WT:.....Kg  
 MATERIAL: .....

MADE IN INDIA Mfg. by: Shakti Pumps (I) Ltd.

Fig. Name Plate

MOTOR PREMIUM- ...HP...kW 1φ ...V ...Hz  
 SERIAL NO: ..... Date of Mfg: .....

100mm SUBMERSIBLE MOTOR  
 ....V/..... Hz.....A..... RPM, COSφ .....

AXIAL THRUST LOAD .....lbf (.....N)  
 CATEGORY - ..... CONNECTION - .....

CAPACITOR- .....  
 TYPE OF DUTY- .....

THERMALLY PROTECTED  
 DEGREE OF PROTECTION - IP-68  
 NET WT:.....Kg GROSS WT:.....Kg  
 MATERIAL: .....

MADE IN INDIA Mfg. by: Shakti Pumps (I) Ltd.

Fig. Name Plate

MOTOR MCIP/.....HP/.....kW 3φ ...V...Hz  
 SERIAL NO: ..... Date of mfg: .....

100mm SUBMERSIBLE MOTOR

380V/50Hz .....A..... RPM, COSφ .....

400V/50Hz .....A..... RPM, COSφ .....

415V/50Hz .....A..... RPM, COSφ .....

480V/60Hz .....A..... RPM, COSφ .....

AXIAL THRUST LOAD .....lbf (.....N)  
 CATEGORY - ..... CONNECTION - .....

TYPES OF DUTY - .....

DEGREE OF PROTECTION - IP - 68  
 NET WT:.....Kg GROSS WT:.....Kg  
 Material: .....

MADE IN INDIA Mfg. by: Shakti Pumps (I) Ltd.

Fig. Name Plate

## INSTALLATION AND OPERATING INSTRUCTIONS

### 5. CONNECTING THE MOTOR CABLE

#### GENERAL

- The electrical connection should be done by an authentic mechanic as per local regulation.
- The electrical connection should be done in accordance with Voltage
- Rated Current and Power Factor given in motor instruction manual.
- Voltage tolerance in motor could be upto (-15%/+6%).
- For use of capacitor for 1 phase motor, refer motor name plate.



#### ATTENTION

The maximum tightening torque of the plug is 20-27 Nm. If the jam nut is tightened too much, the plug will become leaky in PREMIUM route the motor leads along the pump and use the cable guard to protect it from damage.

#### Fusing and Motor Protection

Provide an external mains switch (1) enabling the voltage to be removed from the system Provide fuses (2) for every single phase on site Provide a motor starting & protection switch (3) (see connection alternatives) Provide an emergency stop system, if required for your specific application Ground the motor (4) (exterior grounding possible with all motors)

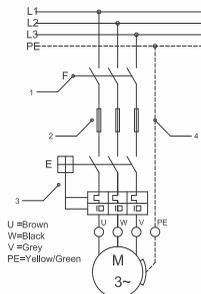


Figure 5-10: Fusing & Motor Protection

#### Overload Protector

Integrate an overload protector in accordance with IEC 60099 in the power supply (lightning safety) (5).

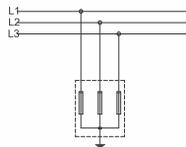


Figure 5-12: Overload protector

#### Connection Alternatives

The motors can be used for clockwise and anti clockwise rotation. When using 8 Inch/10 Inch motors with anticlockwise rotation, please first consult Shakti Pumps.

The connection example shows the usual circuit with a right-hand field and an anticlockwise direction of rotation:

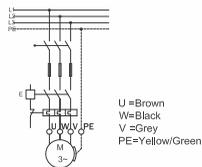


Figure 5-13: Direct starting

## INSTALLATION AND OPERATING INSTRUCTIONS



### 6 ASSEMBLING THE MOTOR & PUMP

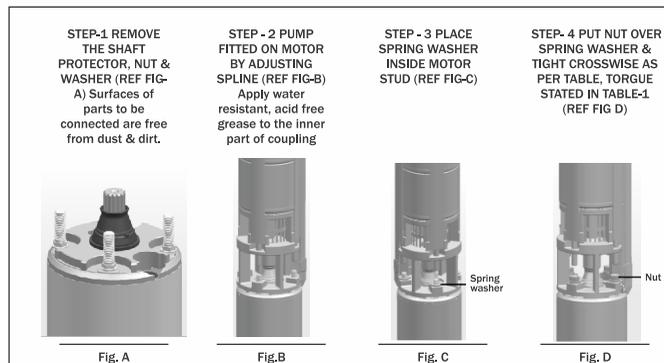
#### NOTE

These assembly & operating instructions only describe action steps related to the motor. You should also observe the pump unit manufacturer's instructions in all events.

#### 6.1 Pre operational check

- Check the fluid level in motor prior to installation
- Check insulation resistance prior to the installation

#### HOW TO COUPLE MOTOR WITH PUMP



#### NOTE

Only use fixing screws of the relevant grade & dimensions approved by the pump unit manufacturer

When Assembling the motor and pump, the nuts must be tightened diagonally to the torques stated in the following table:

TABLE 1

PUMP/MOTOR STAY BOLT SIZE	TORQUE [Nm]
M8	18
M12	100

## INSTALLATION AND OPERATING INSTRUCTIONS

### 7. EXTENDING THE MOTOR CABLE

The cable provided can be extended by the customer, by one of the following means:

1. Dimension of submersible drop cable should be according to the max Current mentioned over motor,
2. Cross selection of the cable should be capable of bearing maximum voltage drop new line use cable with maximum cross section as given table 1& 2

**Note:** The plumbers themselves are responsible for the correct selection and dimensioning of the drop cable.

#### SUBMERSIBLE CABLE SELECTION CHART

For 415 V, 50Hz AC power supply

CABLE DIMENSIONS AT 3X415 VOLT 50 Hz

VOLTAGE DROP - 3%											
HP	Kw	I	CABLE SIZE SQUARE MILLIMETERS								
			1.5	2.5	4	6	10	16	25	35	50
LENGTH IN METERS											
0.5	0.37	1.2	589	978	1557						
0.75	0.55	1.7	395	657	1046						
1.0	0.75	2.2	344	570	907						
1.5	1.1	3.1	240	399	635	946					
2.0	1.5	4.1	182	302	480	715			2786		
3.0	2.2	6.3	123	205	326	485	795		1877	2534	
4.0	3	8.2	93	155	247	367	603	943	1425	1926	2614
5.0	3.7	9.4	77	128	204	304	500	783			
5.5	4	10.3	71	119	189	281	462	723			
7.50 DOL	5.5	14.2	51	84	135	201	331	518			
7.50 S/D	5.5	14.2	88	147	234	348	572	897			
10.0 S/D	7.5	17.4	66	111	177	264	434	684			
15.0 S/D	11	20		96	154	229	378	595	906		
17.5 S/D	13	29.7			106	158	261	409	623	848	
20.0 S/D	15	33			92	137	226	357	544	742	
25.0 S/D	18.5	42.5			71	107	176	277	422	576	
30.0 S/D	22	49.6				95	158	248	377	513	702
35.0 S/D	26	57.3					132	208	316	431	592
40.0 S/D	30	67.5					116	182	277	377	516

For 220 V, 50Hz AC power supply

CABLE DIMENSIONS AT 1X220 VOLT 50 Hz

VOLTAGE DROP - 6%											
HP	kW	I	CABLE SIZE SQUARE MILLIMETERS								
			1.5	2.5	4	6	10	16	25	35	50
LENGTH IN METERS											
0.5	0.37	3.2	244	405	644	959					
0.75	0.55	4.2	196	326	518	771					
1.0	0.75	5.8	131	217	346	516	848				
1.5	1.1	8.4	85	141	224	335	552	868			
2.0	1.5	10.6	61	102	162	242	401	633			
3.0	2.2	16		67	107	161	265	419	644	883	
5.0	3.7	28			55	83	138	220	341	473	669
MAX. CURRENT FOR CABLE (A)			18.5	25	34	43	60	80	101	126	153

## INSTALLATION AND OPERATING INSTRUCTIONS



**NOTE:-** Table Showing maximum allowable length of submersible cable for the given full load current where site voltage in nominal (i.e)415V.

Calculated length = (415/Actual Voltage) X actual length 7.5 HP and above are SD Motors.

For these motors, the actual current is  $1/\sqrt{3}$  times the FL Current.

The Cable size and maximum allowable length are arrived at accordingly.

These instructions refer to the Pump set only. Please strictly observe the assembly instructions of the pump manufacturer.

1. Place motor and pump horizontally and level (fig.10, See Pg 10).
2. Turn motor shaft by hand before assembly. It must turn freely after overcoming the adhesive friction.
3. Apply acid-free, waterproof grease to the coupling internal toothing.
4. Remove hexagon nuts and washes from the studs of the motor.
5. Align the pump so that its cable guard is in line with the lead exit of the motor and guide pump and motor together.
6. Place spring washer on the studs and tighten the nuts crosswise. Strictly observe the tightening torques of the unit manufacturer.

#### **!** ATTENTION

Check radial and axial clearance of the motor & Pump shaft. There must be no rigid connection since otherwise motor and pump will be damaged during commissioning.

7. Protect coupling spot against contact.

### 8. ELECTRICAL CONNECTION

Please observe the specifications on both the nameplate and the enclosed data sheet. The following connection examples refer only to the motor itself. They are no recommendation regarding the control elements connected upstream.

#### 8.1 FUSING AND MOTOR PROTECTION

1. Allow for an external mains switch 1 (fig.9, See Pg 9) in order to be able to switch the system dead at any time.
2. Allow for fuses for each individual phase (fig.11, See Pg 10)
3. Allow for a motor overload protection in the switch box (fig. 12., See Pg 10)
  - Warranty is void without thermal protection
  - Motor protection according to EN 60947-4-1
  - Trip time at 500% IN < 10 sec.(cold bi metal)
  - Overload setting at operation current (max.IN)
4. Allow for an emergency stop and follow the assembly instructions of the pump manufacturer.

## INSTALLATION AND OPERATING INSTRUCTIONS

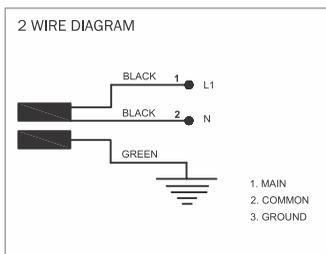
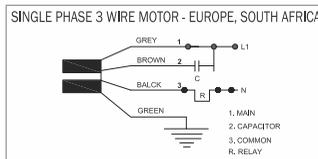
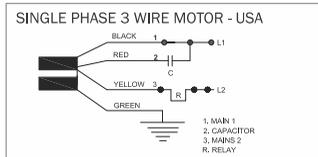
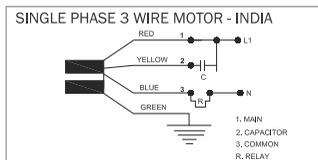
### 8.2 EARTHING

Consider motor power rating when dimensioning the earth connection in accordance with EN 60034-1.

- Motor has to be earthen
- Provide good contact of the protective conductor terminal

### 8.3 CONNECTING EXAMPLES

**1.Phase connection** Connect motor so that its direction of rotation corresponds to that of the unit. The connection features the usual circuit with a clockwise rotating field and an counter clockwise rotation for the motor shaft.



### 8.4 OPERATION WITH A SOFT STARTING DEVICE

- Adjust soft starter to 55% of the rated voltage
- Adjust acceleration and deceleration time to max. 3 seconds.
- Soft starting device has to be bridged after acceleration with a contractor.
- Please strictly observe the manufacturer's operating instructions.

## 9. WORK ON THE MOTOR

### ATTENTION

De-energize system to the beginning of the work and protect it against unintended re-energizing (fig.14, See Pg 10).

Regarding the trouble shooting and rectification on the entire system please strictly observe the appropriate instructions of the motor and unit manufacturer.

- Never open the motor since it can only be shut and adjusted with special tools.
- Do not carry out any modifications or conversions to the motor or its electrical connections.
- After completion of the work apply all safety and protective devices completely and check for their function

## INSTALLATION AND OPERATING INSTRUCTIONS

### 9.1 CHECKING/REPLENISHING THE MOTOR FILLING

Submersible motors are a water lubricated design. In Premium/V3 & MCIP100/101 motors are factory pre filled with a mixture of water and non toxic antifreeze. No re-filling prior to installation is required.

Loss of a few drops of liquid will not damage the motor as the filter check valve will allow lost liquid to be replaced by filtered well water upon installation.

If there is reason to believe there has been a considerable amount of leakage, please consult our Service center for checking procedures.

Do not attempt to open the motor since it can only be shut and adjusted with special tools.

### 9.2 MEASURING THE INSULATION RESISTANCE

This measurement is to be carried out using an Insulation measuring unit (500 VDC) before and while submersing the fully assembled unit at the place of use.

\* Before submersing the unit, connect a measuring cable to the ground conductor

\* Make sure that the contact points are clean

\* Connect the other measuring cable to every core of the connected motor cable in succession. The Insulation resistance is shown on the Insulation measuring unit.

Minimum insulation resistance

(ambient temp. 20 °C) with extension cable

- For a new motor > 4 M.Ω
- For a used motor > 1 M.Ω

### FOR YOUR INFORMATION

Minimum insulation resistance without extension cable:

- For a new motor > 400 M.Ω
- For a used motor > 20 M.Ω

### 9.3 FUSING & MOTOR PROTECTION

- Allow for an external mains switch 1 (Fig. 9) in order to be able to switch the system dead at any time
- Allow for fuses for each individual face (Fig. 11).
- Allow for a motor overload protection in the switch box (Fig. 12)
  1. Warranty is void without thermal protection,
  2. Motor protection according to EN 60947-4-1.
  3. Trip time at 500% I<sub>n</sub> < 10 sec (cold bi-metal).
  4. Overload setting at operation current (Max. I<sub>N</sub>)
- Allow for an emergency stop

### 9.4 LIGHTNING PROTECTION

Various models already feature a over-voltage protection ex-works

## INSTALLATION AND OPERATING INSTRUCTIONS

### 10. HANDLING & INSTALLATION FIGURES

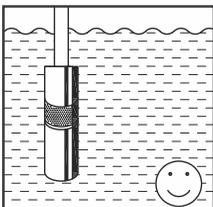


Fig.: 1

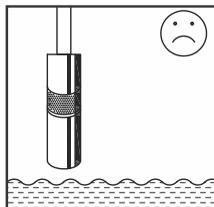


Fig.: 2

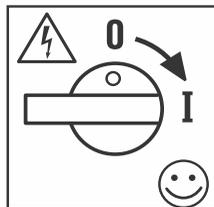


Fig.: 3

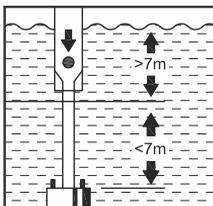


Fig.: 4

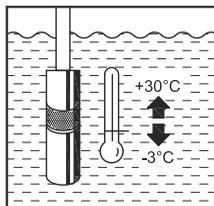


Fig.: 5

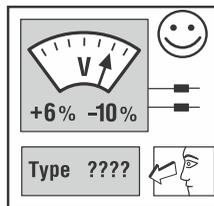


Fig.: 6

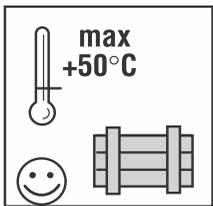


Fig.: 7

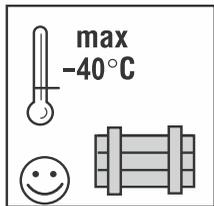


Fig.: 8

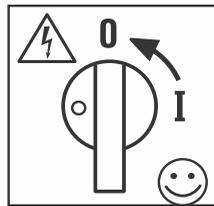


Fig.: 9

## INSTALLATION AND OPERATING INSTRUCTIONS

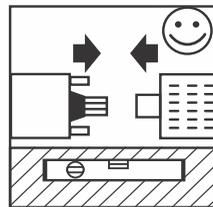


Fig.: 10

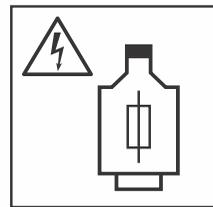


Fig.: 11

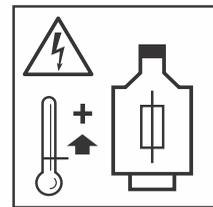


Fig.: 12

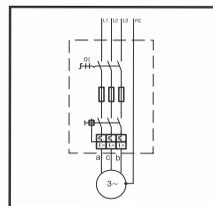


Fig.: 13

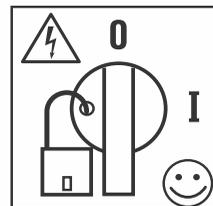


Fig.: 14

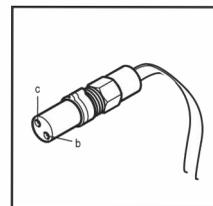


Fig.: 15

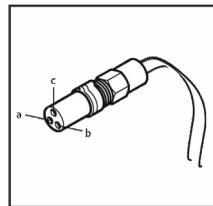


Fig.: 16

## INSTALLATION AND OPERATING INSTRUCTIONS

### WARRANTY CERTIFICATE

Dear Customer,  
Congratulation, for purchasing our product.

Pump and Motor are warranted against defects in workmanship and material under normal use, service & specified duty conditions. We provide one time warranty service for twelve months from the date of purchase by the first user.

Shakti Pumps (I) Ltd warrants this product to be free from damage/ defects in material and workmanship under normal use and service for Twelve Months from the date of purchase by the first user. The user shall produce valid and original copy of invoice for availing warranty. The user shall carry defective pump set to nearest authorized service center

This warranty does not cover any loss or damage/ defect of any nature resulting from wrong product selection/ improper installation or installation by unauthorized/ untrained person/ sandy condition/ dry running and improper use of the pump sets.

The warranty also does not cover consequential losses/ damages arising due to failure of pump/ motor.

Our obligation is limited t to recycling or repairing or replacing product/ parts ex-factory. Equipment for repairs should be returned free of cost to us.

The forgoing is subject to the provision that the user does not open the unit and make any change or repair without prior approval of authorized service center during the warranty period.

This warranty excludes every condition whether statutory or otherwise, whatsoever not herein expressly set out.

Customer name: .....Customer's phone:.....

Customer Address: .....

Invoice number: .....Invoice date:.....

Model Name: ..... Model Serial Number:.....

Dealer's Name: .....Dealer's phone:.....

Dealer's Address:.....

APPROVED BY:

DATE OF ISSUE



## INSTALLATION AND OPERATING INSTRUCTIONS

### INSTALLATION REPORT

Customer's Name: - \_\_\_\_\_

Customer's Address: - \_\_\_\_\_

Customer's Ph. No.: \_\_\_\_\_

Dealer's Name: - \_\_\_\_\_

Dealer's Address: \_\_\_\_\_

Dealer's Ph. No. \_\_\_\_\_

Pump Model:- \_\_\_\_\_ S.L.No: \_\_\_\_\_

Project/Application: \_\_\_\_\_

Pressure In Kg:- \_\_\_\_\_ Flow in m<sup>3</sup>/hr: \_\_\_\_\_

Liquid:- \_\_\_\_\_ Temp.: \_\_\_\_\_

Voltage:- \_\_\_\_\_ Current: \_\_\_\_\_

Packing Condition:- \_\_\_\_\_

Remarks: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date:- \_\_\_\_\_

Customer's Signature

**BOOK-POST**

To,  
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