

INSTALLATION & OPERATING INSTRUCTIONS



SAP NO. 2900000560



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4" SUBMERSIBLE MOTORS

MCIP 100/MCIP 100.5/MCIP 100.7/MCIP 101
PREMIUM 100/PREMIUM 100.5/PREMIUM 100.7/PREMIUM 101

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1 GUIDELINES

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

2 SAFETY

The 4" 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 7)
- Take into account the implementation limits of motor and units
- Check the electrical system and fusing before switching-on (fig. 3, See Pg 7)
- 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 7)
- Water temperature with original motor filling not below -3°C, with water filling not below 0°C (fig. 5, See Pg 7)
- Maximum water temperature +30°C. Higher temperatures only with derated motors (fig. 5, See Pg 7)

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 +6% / -10% compared to the rated voltage on the motor are measured (fig. 6, See Pg 7)
- Dry run is imminent

3 APPLICATION

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 13 starts per hour, allow 60 seconds between successive starts.
- The maximum submergence depth is 160 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.

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 7)
- Storage temperature with original motor filling up to -40°C, with water filling frost free (fig. 8, See Pg 7)

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 (-10%/+6%).

For use capacitor for 1 phase see below table.

50Hz Model

S. No.	HP/Kw	CAPACITOR		OVERLOAD REALAY	RESET
		START	RUN		
1	0.5/0.37	N/A	15MFD, 440VAC	6	MANUAL
2	0.75/0.55	N/A	20 MFD, 440VAC	6	MANUAL
3	1.0/0.75	N/A	36 MFD, 440VAC	8	MANUAL
4	1.5/1.1	N/A	36 MFD, 440VAC	10	MANUAL
5	2.0/1.5	189-227MFD, 220VAC	50 MFD, 440VAC	16	MANUAL
6	3.0/2.2	189-227MFD *2 NOS 220VAC	70 MFD, 440VAC	25	MANUAL
7	4.0/3.0	189-227MFD *2 NOS 220VAC	80 MFD, 440VAC	30	MANUAL
8	5.0/3.7	189-227MFD *2 NOS 220VAC	80 MFD, 440VAC	30	MANUAL

60Hz H Model

S. No.	HP/Kw	CAPACITOR		OVERLOAD REALAY	RESET
		START	RUN		
1	0.5/0.37	43-52MFD, 330VAC	15MFD, 440VAC	6	MANUAL
2	0.75/0.55	64-77MFD, 330VAC	20MFD, 440VAC	8	MANUAL
3	1.0/0.75	88-106MFD, 330VAC	20MFD, 440VAC	10	MANUAL
4	1.5/1.1	100-120MFD, 275VAC	15MFD, 440VAC	12	MANUAL
5	2.0/1.5	189-227MFD, 220VAC	20MFD, 440VAC	16	MANUAL
6	3.0/2.2	250-300MFD, 275VAC	50MFD, 440VAC	25	MANUAL
7	5.0/3.7	189-227MFD, *2 NOS, 220VAC	40MFD, 440VAC	30	MANUAL

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 PREM

6. Route the motor leads along the pump and use the cable guard to protect it from damage.

6 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%												
MOTOR	HP	kW	I	CABLE SIZE SQUARE MILLIMETERS								
				1.5	2.5	4	6	10	16	25	35	50
LENGTH IN METERS												
4"	0.5	0.37	3.2	244	405	644	959					
4"	0.75	0.55	4.2	196	326	518	771					
4"	1.0	0.75	5.8	131	217	346	516	848				
4"	1.5	1.1	8.4	85	141	224	335	552	868			
4"	2.0	1.5	10.6	61	102	162	242	401	633			
4"	3.0	2.2	16		67	107	161	265	419	644	883	
4"	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

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.9, See Pg 7).
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.

7 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.

7.1 Fusing and motor protection

1. Allow for an external mains switch (fig.10, See Pg 7) in order to be able to switch the system dead at anytime.
2. Allow for fuses for each individual phase (fig.11, See Pg 7)
3. Allow for a motor overload protection in the switch box (fig. 12,, See Pg 7)
 - 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!

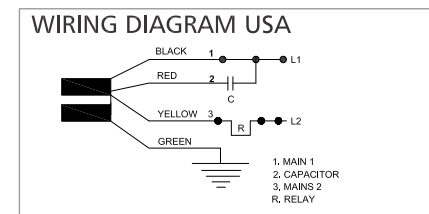
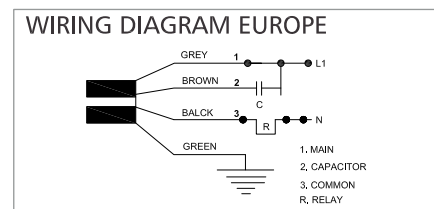
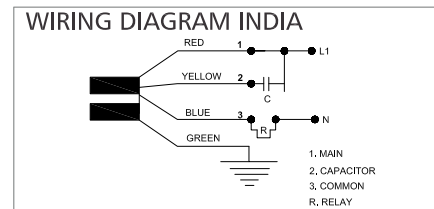
7.2 Earthing

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

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

7.3 Connecting examples

1. 1-phase connection (fig. 13, See Pg 8) 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.



7.4 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.

8 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 8).

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

8.1 Checking/Replenishing the motor filling

Submersible motors are a water lubricated design. In PRE & MCIP 100/101 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.

8.2 Measuring the insulation resistance

Perform this measurement before and while the assembled unit is lowered to the place of application.

The motor is ok if the insulation resistance at 20°C is at least:

Minimum insulation resistance with extension cable:

- For a new motor > 4 MΩ
- For a used motor > 1 MΩ

Minimum insulation resistance without extension cable:

- For a new motor > 400 MΩ
- For a used motor > 20 MΩ

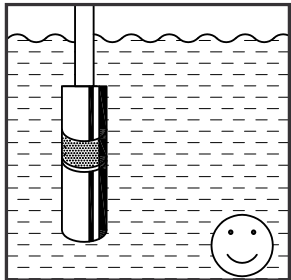


Fig.: 1

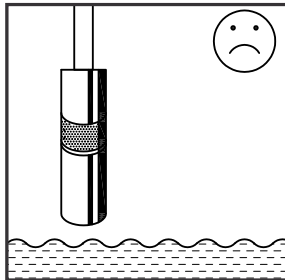


Fig.: 2

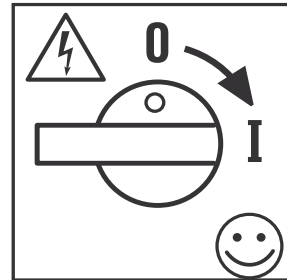


Fig.: 3

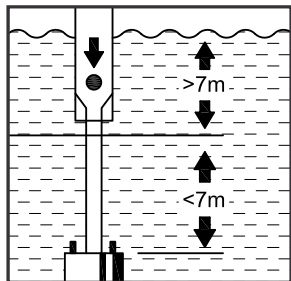


Fig.: 4

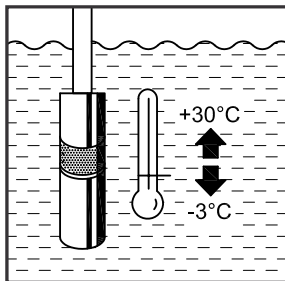


Fig.: 5

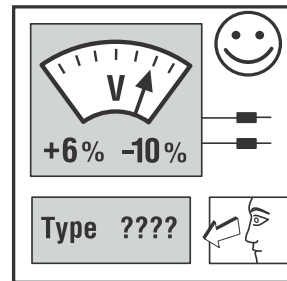


Fig.: 6

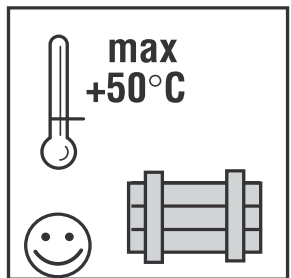


Fig.: 7

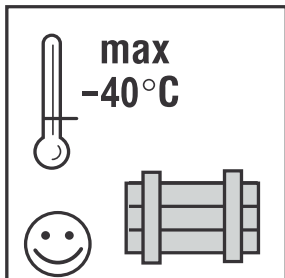


Fig.: 8

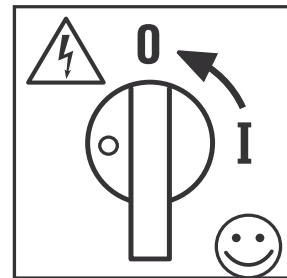


Fig.: 9

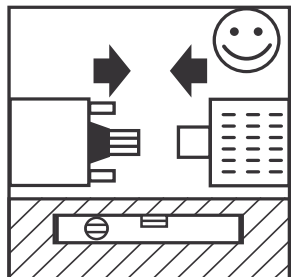


Fig.: 10

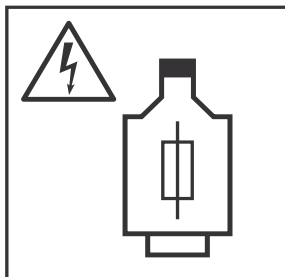


Fig.: 11

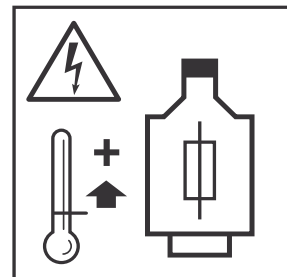


Fig.: 12

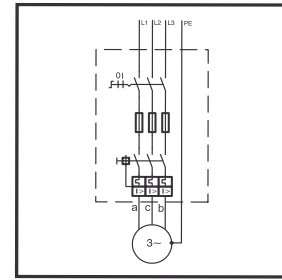


Fig.: 13

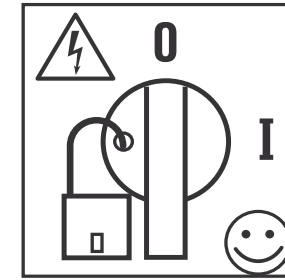


Fig.: 14