

Solar Submersible Pump

Installation and operating instructions



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1. Pre-installation Checks and Caution during installation



The borewell must be flushed well so that it is free from sand, silt and cuttings. The inside diameter of well casing should be checked to ensure that it is not smaller than the size of the pump.

Caution

The submersible pumps are designed for pumping clean, Thin, non-aggressive, non-explosive clear cold water or edible oil (Food grade) without abrasives, solid particles or fibres and free of air and gases.



The pump must not be run dry or at zero discharge for more than one minutes. If run, it might cause extensive damage to various parts of the pump and motor.

Note

Do not pull the cable to lift the Pumpset.



The motor is fitted with a soft material thrust bearing hence it should not be hammered at the time of coupling.



A check should be made to ensure that the installation depth of the pump will always be at least 15 feet (4.57m) below the maximum draw down water level of the bore well. The bottom of the motor should never be installed lower than the water entry.



The drop cable used between the submersible motor and controller should be an approved one for submersible application and adequately sized.



The Pumpset must always be given proper earthing. In the case of G.I. pipes, the earth line be connected to the pipe itself, in all other types of pipes separate earth leads of the proper size must be connected to the pump sets.

1.1 Packed Pumpset



a. Unpack the solar submersible Pump



b. Unpack solar submersible DC motor.



c. Unpacked solar submersible motor and pump for pre-installation preparation.

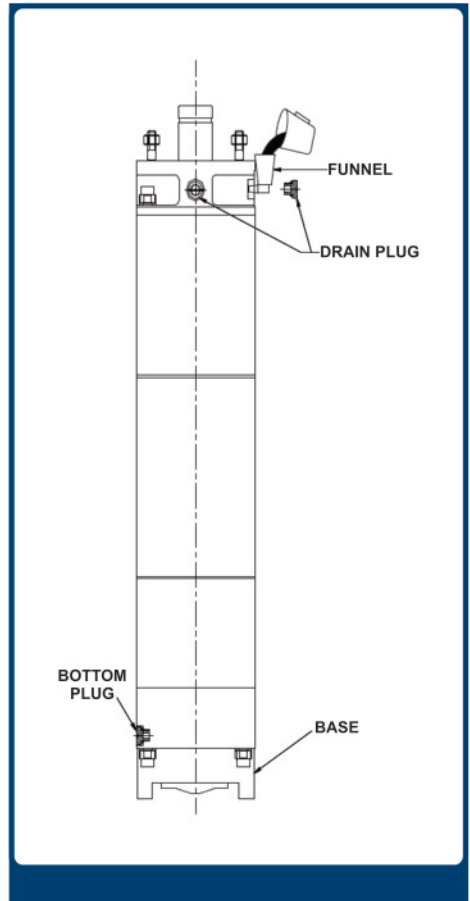
d. Remove the hex nut from motor stud.



2. Motor filling.

a. Motor filling with water or 25% Anti-corrosive liquid with 75% water mix.

- Preparation of liquid mixture.
- Open water filling and air vent plugs situated at top of the motor.
- Now fill the water with a funnel through plug holes and let the air bubbles come out, then unscrew the drain plug provided at the bottom and flush the motor.
- Then replace the drain plug at the bottom and fill the motor with pure water with funnel through any of the plugholes at top, till the water overflows through another plug hole.
- Leave the motor as such 10 minutes, then move the motor gently to and for with two plug holes kept open to accelerate the escape of air bubbles trapped in the winding.
- Then replace the two top plugs, ensuring that no water loss occur.



3. Insulation resistance test and No-load test.



Check the insulation resistance test of the winding wire using the meggar (voltage as 500v) to make sure that the cable and splice are good. Insulation resistance should be at least 40M Ω . Motor should not be operating if the measurement is less than 40 M Ω .

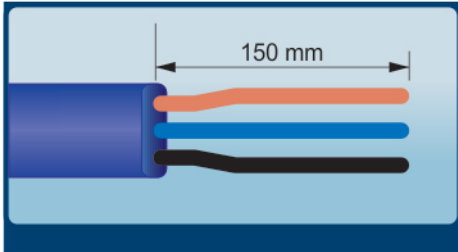


Check the no load vibration free running of motor and direction of rotation as marked on the pump.

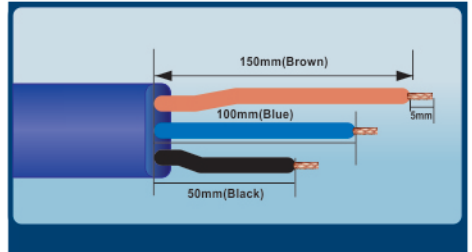
Now motor is ready for coupling with the pump for installation.

4. Cable splicing procedure

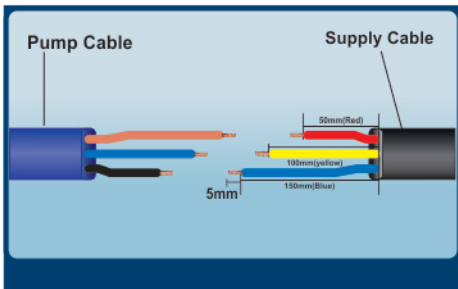
- a. Remove the sheath from the EPDM cable. Make sure that sheath is removed in 150mm in length.



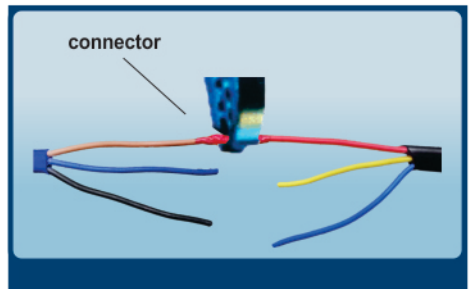
- b. Pump Cable: Leave Brown wire Length as it is. Cut Blue wire length by 50mm and Black wire length by 100mm. Remove each wire insulation by 5mm.



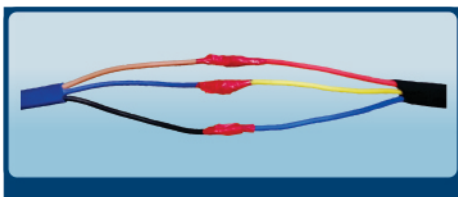
- c. Supply cable: Cut red wire length by 50mm. Cut Yellow wire length by 100mm and leave Blue wire as it is. Remove each wire insulated by 5mm.



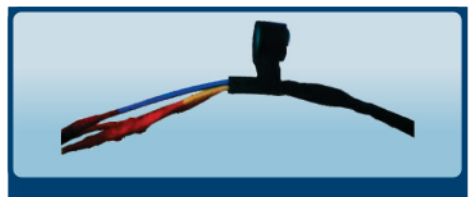
- d. Join each pair of wire with tin plated copper connector and crimp the copper connector.



- e. Insulate individual joint by cushion rubber tape followed by insulation tape.



- f. Wrap the cushion rubber tape on entire length of joints. Make sure that cushion tape cushion covers at least 25mm length of both sheath end.



- g. Wrap the insulation tape on the cushion rubber tape.



5. Coupling of Pumpset.

a. Remove the cable guard from the pump.



c. Fix the cable guard and Coupled Pumpset for installation and operation.

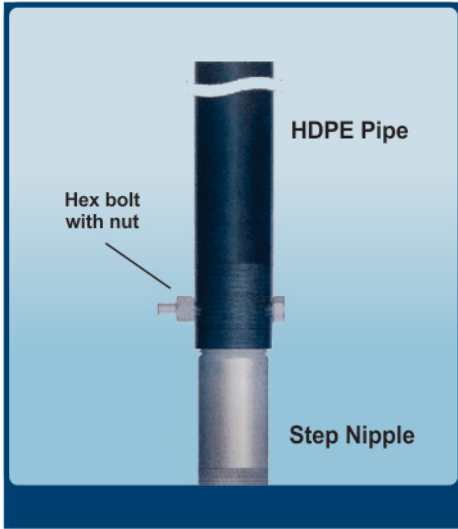


b. Fit the pump with motor and fix hex nut by ring spanner only.

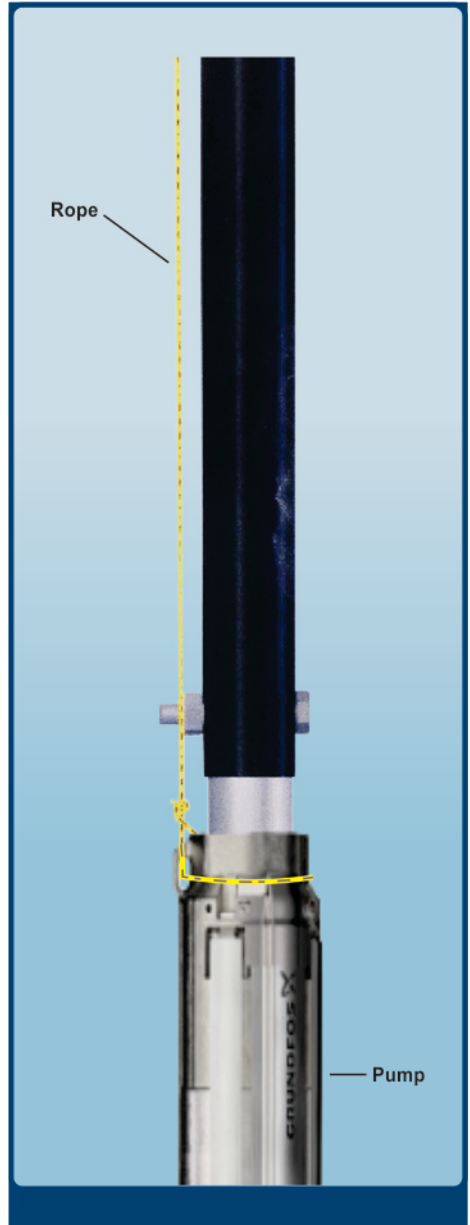


6. Installation of Pumpset in borewell (Erection).

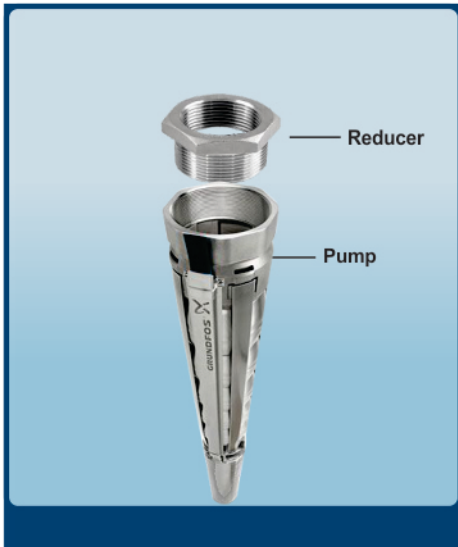
a. Fix HDPE pipe into Step Nipple.



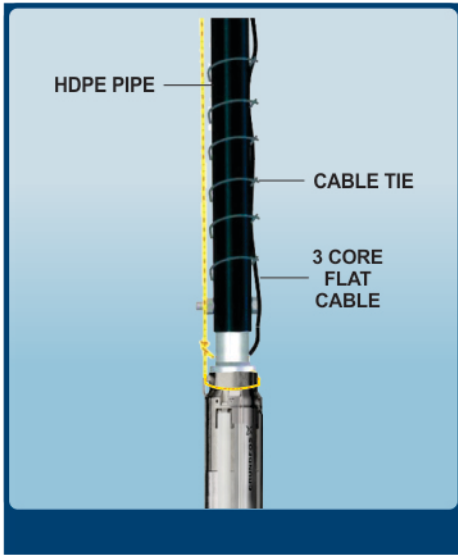
c. Rope fixing with Pumpset.



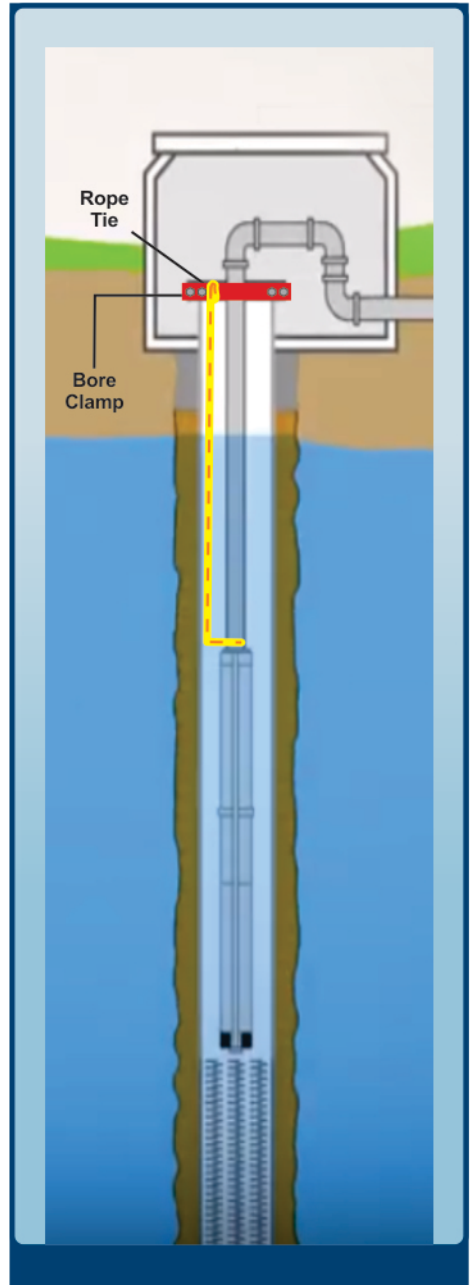
b. Fix the Reducer or Expander if needed.



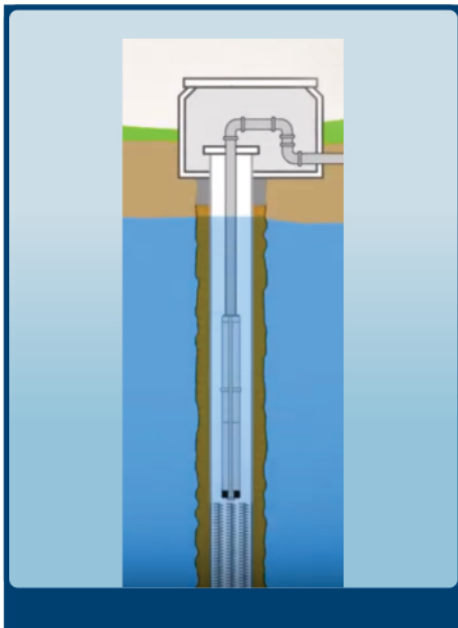
d. Fixing the cable tie with HDPE Pipe.



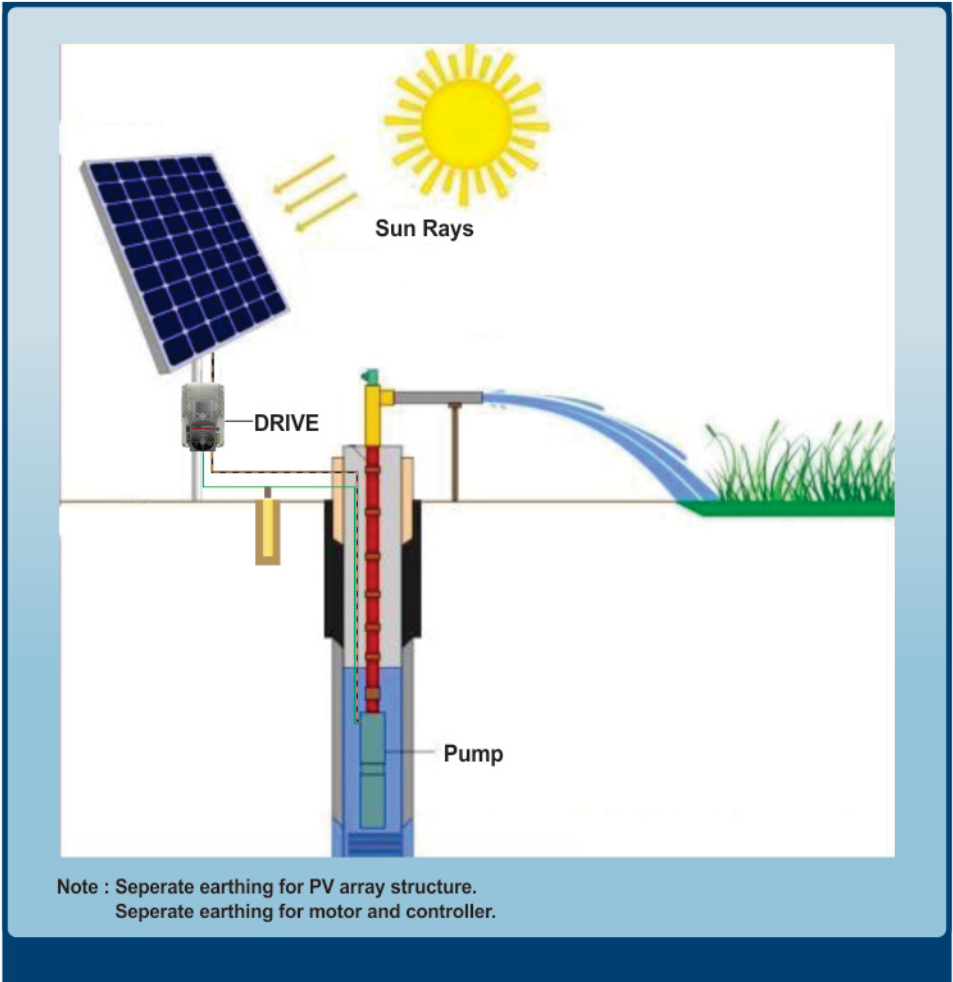
f. Fixing the bore clamp & rope tie.



e. Lower the pump in bore.

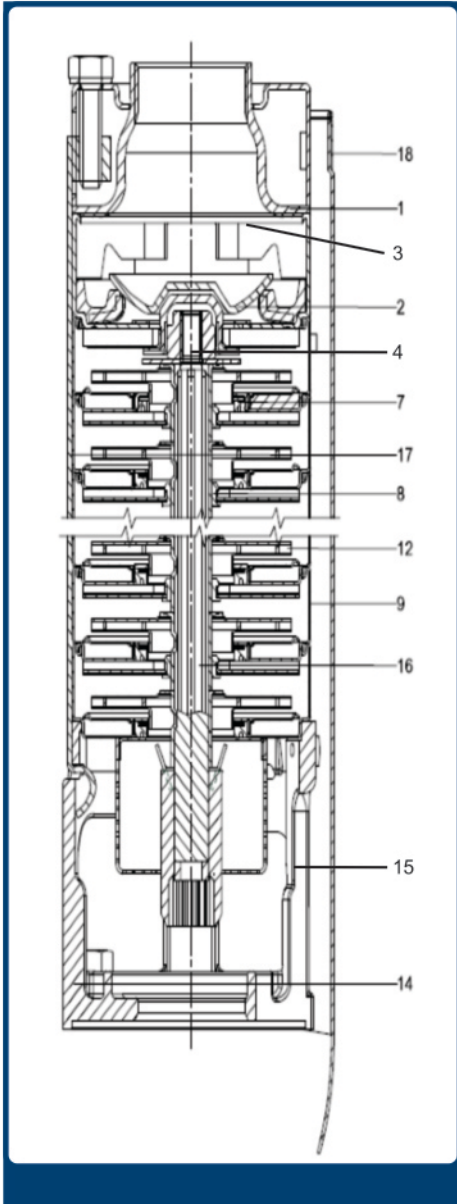


7. Typical Installation for Submersible Pump.



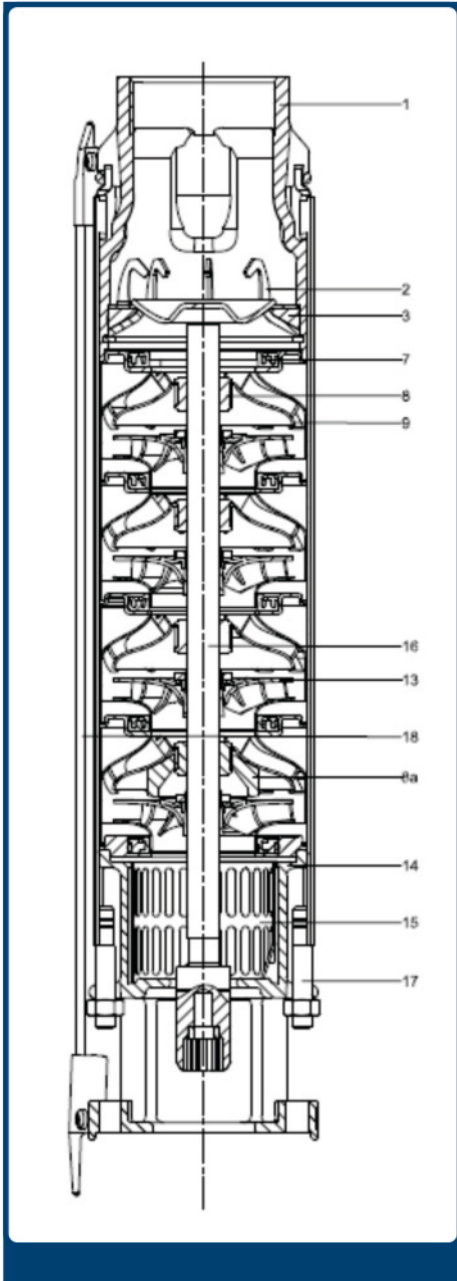
8. Cross sectional view of Pumps

Material specification (SP 1A - SP 5A)



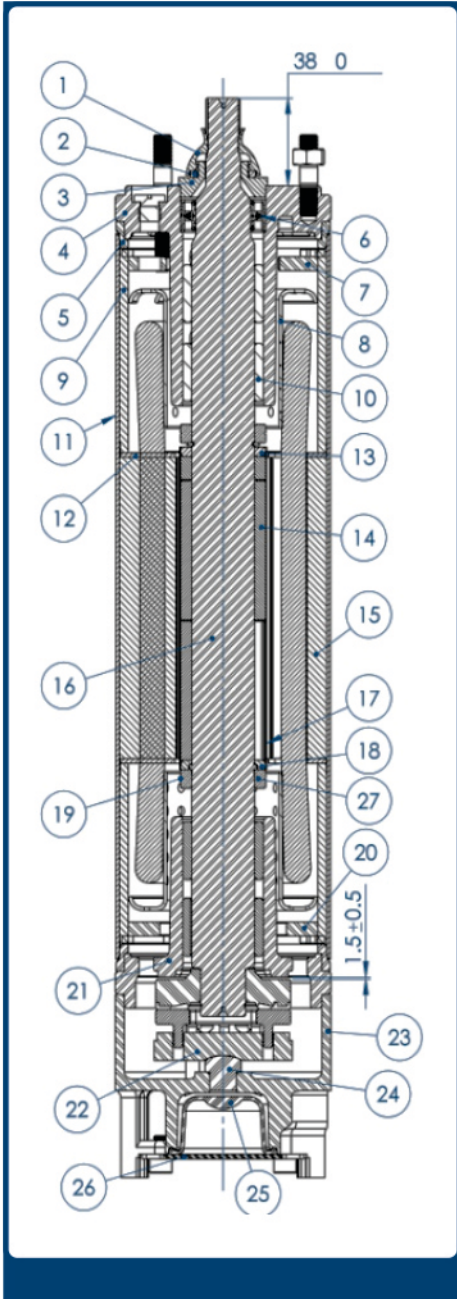
Pos.	Component	Material
1	Valve casing	Stainless steel
2	Valve cup	Stainless steel
3	Valve seat	Rubber type
7	Neck ring	Rubber type
8	Bearing	Rubber type
4	Washer for stop ring	Carbon
9	Chamber	Stainless steel
12	Impeller	Stainless steel
14	Suction interconnector	Cast stainless steel
15	Strainer	Stainless steel
16	Shaft complete	Stainless steel
17	Strap	Stainless steel
18	Cable guard	Stainless steel

Material specification (SP 7 - SP 14)



Pos.	Component	Material
1	Valve casing	Cast stainless steel
2	Valve cup	Cast stainless steel
3	Valve seat	NBR-FKM
7	Neck ring	TPU/PPS-FKM
8	Bearing	LSR/FKM
8a	Washer for stop ring	Carbon
9	Chamber	Carbon/graphite HY22 in PTFE
13	Impeller	Stainless steel
14	Suction interconnector	Cast stainless steel
15	Strainer	Stainless steel
16	Shaft complete	Stainless steel
17	Strap	Stainless steel
18	Cable guard	Stainless steel

Cross sectional view of 4" motor.



Pos.	Component	Material
1	SAND SLINGER	NITRILE RUBBER
2	SAND WASHER	TEFLON
3	SAND COVER	SS 304
4	ADAPTOR	SS 304
5	STATOR RING	SS 304
6	OIL SEAL	NBR+SS
7	UPPER FLANGE	MS
8	UPPER WINDING CAP	HDPE
9	STATOR END UPPER	MS
10	CARBON BUSH	CARBON KH24R
11	STATOR TUBE 3.0HP	SS 304
12	END LAMINATION	MS
13	ROTOR WASHER TOP	SS 316
14	MAGNET 60 mm	NdFeB PERMANENT TYPE N42SH
15	STAMPING	CRNO M47
16	SHAFT EXTENSIONS 3.0HP	SS 304 + SS 410
17	ROTOR TUBE	SS 304
18	ROTOR WASHER BOTTOM	SS 316
19	BOTTOM WINDING CAP	HDPE
20	LOWER FLANGE	MS
21	LOWER HOUSING	SS 304
22	THRUST BEARING	CARBON + MILD STEEL, SS 420
23	MOTOR BASE	SS 304
24	ROCKER SUPPORT	SS 410
25	DIAPHRAGM	NITRILE RUBBER
26	MOTOR BASE PLATE	SS 304
27	BALANCE RING	BRASS, GRADE - 1; IS 319

9. Trouble shooting Chart.

Operational Problems	Probable Cause	Precautions & Solutions
<p>a. Less Discharge</p>	<ul style="list-style-type: none"> • Changes in actual static head. • Inadequate water in the borewell • Foreign particles lodged in impellers • Discharge pipe's inner passage coated with deposition from water • Wearing down of pump components such as impellers bowl owing to high sand content / prolonged use/abrasive wear of pump bushes • Less voltage • Incorrect direction of rotation • Gate valve in the delivery line is closed • Non-return valve in the pump is not opening properly • Lesser speed due to low voltage and low frequency • The delivery pipe is of smaller size than 	<ul style="list-style-type: none"> • Check the static head • Lower the Pumpset • Check the impeller & remove foreign particles • Clean the pipe & remove Deposition • Replace the worn-out parts • Check all connections, if a voltage is found to be consistently low fit a booster • Interchange the supply connection • Ensure that the gate valve is open • Open the non-return valve • Recheck the voltage and frequency • Use suitable delivery pipe
<p>b. The pump refuses to deliver water</p>	<ul style="list-style-type: none"> • Power is not available • One defective fuse (in single phase Pump) • Owing to the not use of pump for long period, the rotor has seized (as a result of corrosion & oxidation at the impeller sealing gaps and in the pump bushes • Low voltage of supply, resulting in lesser speed • The req. head is higher than pump • Pump motor coupling is damaged • Defective motor winding cable and Starter 	<ul style="list-style-type: none"> • Check the line • Check line fuses • Send pump for repair, pump should be operating at least once in every 3 days • Install a booster for improve voltage • Select the right pump • Take out the Pumpset and repair damaged coupling • Check all parameters

<p>c. Excessive consumption of Current.</p>	<ul style="list-style-type: none"> • Defective fuse • Voltage too low • Defective rotor • Abrasive wear of pump bearing following prolonged operations, or due to operating water in high sand content • Change in actual static head • High frequency of supply resulting in High motor speed • Winding insulation inadequate • Loose connection at supply • Wrong selection of pump set 	<ul style="list-style-type: none"> • Check the fuses • Check the voltage • Change the rotor • Change the bearing • Check the actual static head and if necessary throttle the pump • Check the frequency • Change the winding • Check the connection input • Consult with dealer / Distributor
<p>d. Pumps runs roughly or noisy or Vibrates too much</p>	<ul style="list-style-type: none"> • Abrasive wear of pump bearing following prolonged operations, or due to operating water in high sand content • Inadequate water level in the borewell • Improper alignment • Defective thrust bearing of and wrong alignment in coupling • Bend in the shaft due to mishandling Foreign particles lodge in impeller • Delivery pipelines are vibrating 	<ul style="list-style-type: none"> • Change the worn-out parts • Use a low discharge pump • Do the alignment properly • Change defective parts • Handle carefully • Remove foreign particles • Check the pipe line

10. Disposal.

This product or parts of it must be disposed of in an environmentally sound way:

- Use the public or private waste collection service.
- If this is not possible, contact the nearest Grundfos company or service workshop.
- We, as manufacturers of solar pumps set systems try to use materials of reusable and recyclable types as far as possible so that environmental burden on planet Earth is controlled.
- At “end of life” these products could be either given to state certified agencies or sent to us for proper disposal. At our place we organize to reuse whatever could be by repairing or follow current governmental guidelines and dispose them off accordingly.

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