

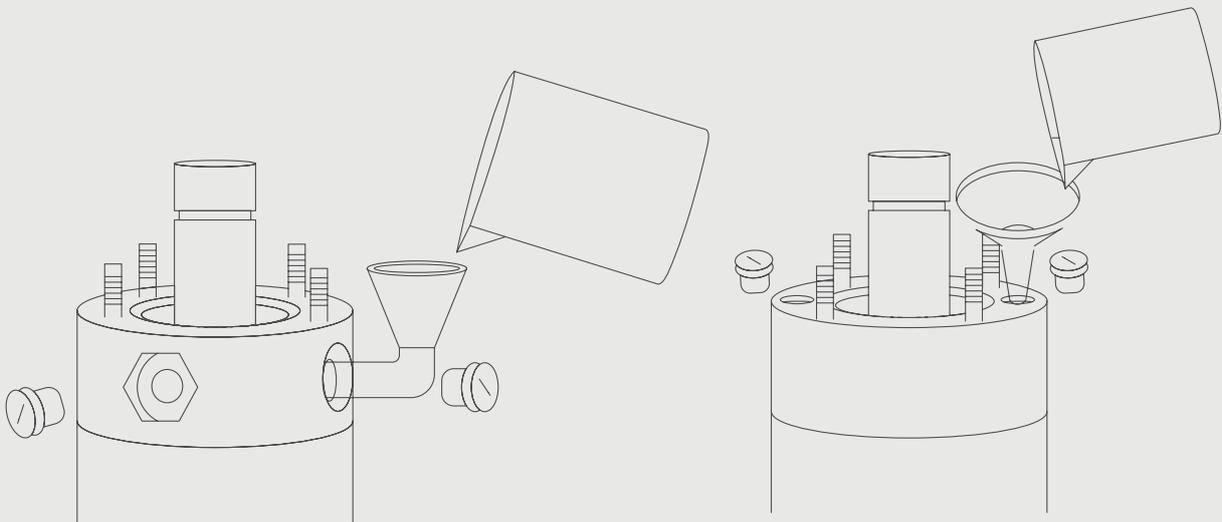
# 6 Inch Borewell Submersible Installation Procedure

## 1. Topping Up The Motor

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The submersible motor is supplied pre-filled with a mixture of clear cold drinking water and anti-corrosive liquid. The following steps are executed prior to installation:

- Position the motor vertically on its base.
- Check if all fasteners are tight. Tighten if required.
- The two threaded plugs provided at the top/circumference of the cable box are removed as shown in Fig. 1 below.
- Check the motor and if required, top up the motor with clear cold drinking water.
- Air bubbles, if any, are removed by gently rocking the motor to and fro.
- Check water level in the motor and if required, top up with cold clear water.
- The two threaded plugs are then re-assembled, ensuring the motor is encapsulated.
- Dry the exterior of the motor and check thoroughly for water leakage.
- If there is no leakage, the motor is now ready for coupling with the pump and then installation.



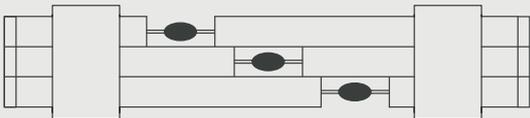
**Fig. 1**  
**Topping up Submersible Motor with Pure Drinking Water**

- Check the motor and if required, top up the motor with clear cold drinking water.
- Air bubbles, if any, are removed by gently rocking the motor to and fro.
- Check water level in the motor and if required, top up with cold clear water.
- The two threaded plugs are then re-assembled, ensuring the motor is encapsulated.
- Dry the exterior of the motor and check thoroughly for water leakage.
- If there is no leakage, the motor is now ready for coupling with the pump and then installation.
- Place the motor key in the motor shaft keyway and then slide the coupling over the motor shaft until it rests on the sand guard as shown in Fig. 3.

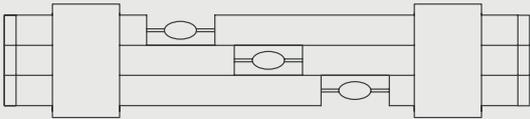
## 2. Waterproofing The Submersible Motor Cable – Supply Cable Joint

- Submersible Motors are supplied with a 3-core PVC insulated flat cable of length 3 meters.
- The free end of the 3-core cable of the motor needs to be connected to supply cable from the control panel.
- As this joint is always nearly submerged in water, the joint needs to be waterproof.
- Refer the sequence shown in Fig. 2 below for insulating the cable joint for underwater application:

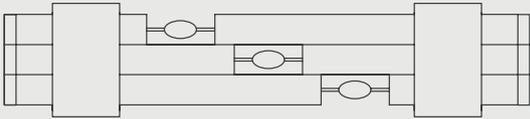
**Step 1:** Soldering the Copper Strands



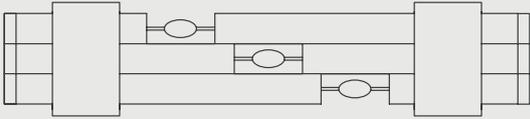
**Step 2:** Layer 1 - 1st layer of virgin rubber insulation



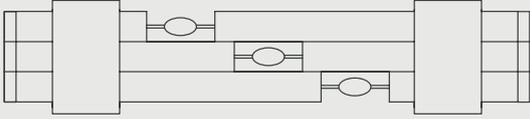
**Step 3:** Layer 2 - 1st layer of PVC Insulation tape



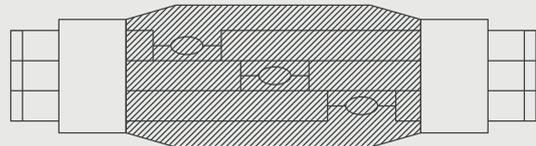
**Step 4:** Layer 3 - 2nd layer of virgin rubber insulation



**Step 5:** Layer 4 - 2nd layer of PVC Insulation tape



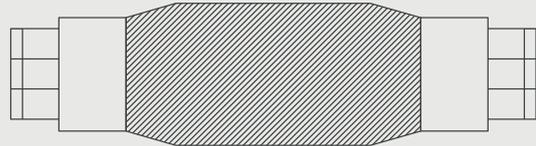
**Step 6:** Layer 1 - 1st layer of virgin rubber insulation



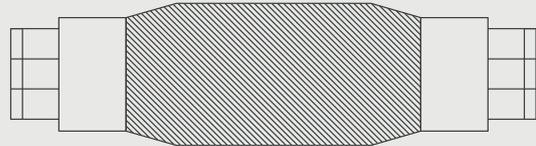
**Step 7:** Layer 2 - 1st layer of PVC Insulation tape



**Step 8:** Layer 3 - 1st layer of virgin rubber insulation



**Step 9:** Layer 4 - 2nd layer of PVC Insulation tape



**Fig. 2**  
**Cable Joints For Underwater Application**

### 3. Checking Direction of Rotation of Motor

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- After waterproofing the joint connecting the submersible motor cable and supply cable, check if direction of rotation of the motor shaft matches the direction marked on the visible cable box top face.
- The direction of rotation is counter-clockwise when viewed from the motor shaft end as marked on the cable box.
- Connect free ends of the cable to control panel and energize the motor for a second or two.
- For added protection, continuously pour clean water over the sand guard to remove heat generated.
- Check the direction of rotation of the motor shaft.
- If the direction of rotation is in the same direction as that marked on the cable box face, the connections are correct.
- In case the direction of rotation of the motor shaft does not match the marking on the cable box in three phase motor, interchange any two lead wires at the control panel and confirm as before.

### 4. Checking of Free Rotation and Play

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Before coupling the pump set:

- Ensure the pump and motor free rotation.
- Ensure pump and motor shaft upward and downward movements.

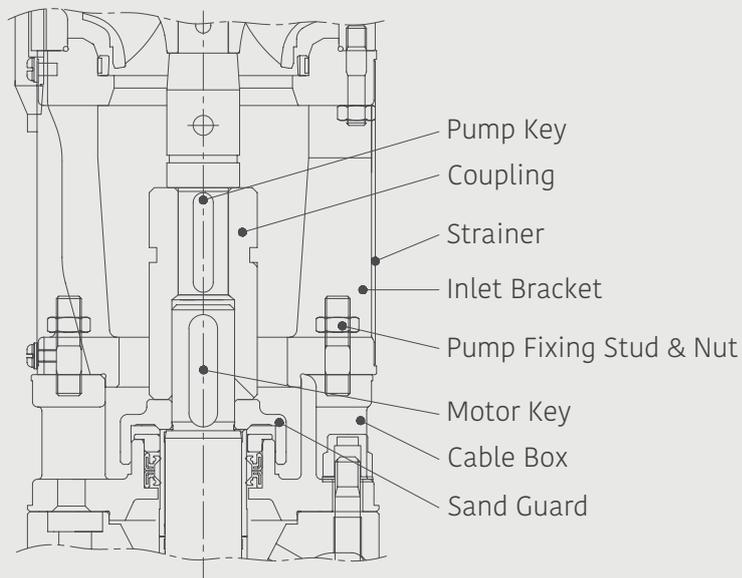
## 5. Coupling Submersible Motor to Pump

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To couple the submersible motor and pump, follow the following procedure:

- The tripod with chain block is erected.
- Unpack submersible pump and remove cable guard and strainer.
- Keep the submersible motor vertical.
- Apply threading compound to internal thread on the delivery casing and external threaded portion of the short length delivery pipe to be fitted to the delivery casing.
- Screw the short length of delivery pipe to the delivery casing.

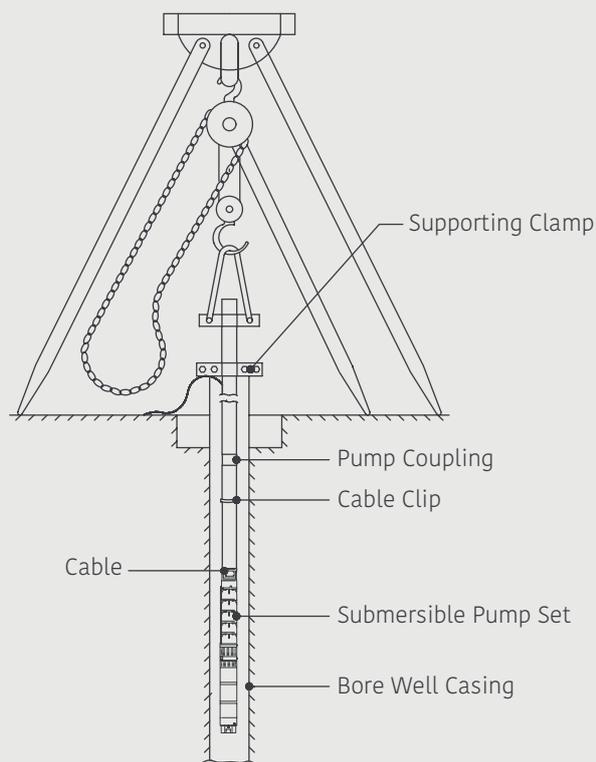
Refer Fig. 3 below for coupling the submersible motor to the pump:



**Fig. 3**  
**Motor and Pump assembly with Coupling**

- Locate the pump key in pump shaft keyway
- Carefully lower pump in such a way that the pump shaft is inserted into the coupling while ensuring that pump shaft key is aligned with keyway in the coupling.
- Ensure that studs on the motor should pass through the holes in the bottom portion of the inlet bracket and that the face of inlet bracket rests on top of the motor seating face.
- Using hexagonal nuts, tighten inlet bracket to cable box of the motor.
- Check the play by lifting the coupling with pump shaft.
- Now fit the cable guard and strainer back in position compulsory
- Install the pump set minimum 20 feet from the bottom of the Borewell.

Fit the supporting clamp to delivery pipe and suspend submersible pump from the chain block (Refer Fig. 4).



**Fig. 5**  
**Typical Tripod Stand For Lowering/Lifting Submersible Pump Sets**

## 6. Electrical Installation

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- Use a single cable from Control Panel right up to Submersible Motor.
- Ground the Submersible Motor.
- Ensure the joint is waterproof as cable joint is submerged in water.
- The cable must not be coiled if it is of extra length. Any excess should be cut off before the connections are made.
- Connect the cable properly to starter terminals to avoid loose connections.
- Factor in low voltage operation while selecting cable size.

## 7. Control Panel

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It is recommended that the Control Panel incorporate the following:

- Contactors of sufficient current ratings with over-current relay.
- Over voltage and under voltage protection.
- Phase failure protection.
- Dry run preventer.
- Ammeter and Voltmeter to display current and voltage.

## Cable Lead Wire Connection To Starter

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### Direct Online Starter

Cable	Terminal
Red	A1
Yellow	B1
Blue	C1

## Cable Lead Wire Connection To Starter

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### Star Delta Starter

Cable	Terminal 1	Terminal 2
Red	A1	A2
Yellow	B1	B2
Blue	C1	C2