

Submersible Motor Installation Check List

1. Motor Inspection

- A. Verify that the model, kW or hp, voltage, number of phases and hertz on the motor nameplate match the installation requirements.
- B. Check that the motor lead is not damaged.
- C. Measure insulation resistance using preferably a 500 volt DC megohmmeter, from each lead wire to the motor/ground. Resistance shall be more than 400 Megohms at 20°C without drop cable for a new motor.
- D. Keep a record of motor model number, kW or hp, voltage, date code and serial number, located above and in the motor nameplate. (Sample: D/C 09H62 S/N08-00019A Type: 234 724 1621)

2. Pump Inspection

- A. Check that the pump rating matches the motor.
- B. Check for pump damage and that shaft turns freely.

3. Motor/Pump Assembly

- A. Lubricate the rotor shaft splines with a food grade, water resistant grease or Vaseline. (see AID 01/2007)
- B. Also lubricate the cylindrical rubber part of the cable connector before screwing into the motor with similar lubricant. (see AID 02/2008)
- C. Check that pump and motor mounting faces are free from dirt, debris and uneven spots
- D. Pumps and motors above 3 kW (4hp) should be assembled in the vertical position to prevent stress on pump brackets and shafts. Assemble pump and motor together so their mounting faces are in contact, and then tighten assembly bolts or nuts **evenly** (crosswise) following manufacturer specifications in terms of torque.
- E. If accessible, check that the pump shaft turns freely. (4" motors: check that motor sandlinger touches/seals the coupling)
- F. Assemble the pump lead guard over the motor leads. Do not cut or pinch lead wires during assembly or installation.

4. Power Supply and Controls (Ensure electric power in the installation is switched off)

- A. Verify that the power supply voltage, Hertz, and kVA capacity match motor requirements.
- B. Verify control box kW (hp) and voltage matches motor (4" PSC, 3-Wire)
- C. Check that the electrical installation and controls meet all local safety regulations and match the motor requirements, including fuse or circuit breaker size and motor overload protection. Connect all metal plumbing and electrical enclosures to the power supply ground to prevent shock hazard. Please observe local electrical safety legislation. Electrical installations must be done by skilled technicians.

5. Lightning and Surge protection

- A. Use properly rated surge (lightning) arrestors on all submersible pump installations. Smaller 4" motors can be factory equipped with "built in" surge arrestors. Check product leaflet. (see AID 4/2005)
- B. Ground all above ground arrestors with copper wire directly to the motor frame, or to a metal drop pipe or casing, which reaches below the well pumping level.

6. Electrical Drop Cable

- A. Use submersible cables sized in accordance with existing regulations and with the cable charts. Motor short lead must be buried in water. Drop cables must meet

capacity and temperature requirements. Ground motor per local codes. (see AID 2 and 3/2005)

- B. If required by regulations, include a ground wire to the motor and surge protection, connected to the power supply ground. Also: always ground a pump set operated outside a drilled well.

7. Motor cooling

- A. Ensure at all times that the installation provides adequate motor cooling ; min. cooling speed to be found in our product leaflets or in the motor nameplate. (see AID 2 – 2009)

8. Motor/Pump Installation

- A. Splice motor leads to supply cable using electrical grade solder or compression connectors, and carefully insulate each splice with watertight tape or adhesive-lined shrink tubing
- B. Support the cable to the delivery pipe every 3 meters (10 feet), with straps or tape, strong enough to prevent sagging. Allow cable to be a bit slack, when using a PP or plastic riser tube/pipe, in order to avoid stress on cable. Use padding between cable and any metal straps.
- C. Verify pump is equipped with a spring loaded check valve. Otherwise an inline valve in the delivery pipe is recommended, within max.8m (25 feet) above the pump, but below the draw down level of the water supply (dynamic water level). (see AID 02/2004)
- D. Assemble all pipe joints as tightly as practical, to prevent unscrewing from motor torque. As a thumb rule: torque should be 2mkg per kW (10 pound feed per hp) .
- E. Set the pump far enough below the lowest pumping level to assure the pump inlet will always have at least the **Net Positive Suction Head (NPSH)**, specified by the pump manufacturer. Pump set should be at least 3 meters (10 feet) from the bottom of the well to allow for sediment build up.
- F. Check insulation resistance as motor/pump assembly is lowered into the well. Resistance may drop gradually as more cable enters the water. A sudden drop indicates possible cable, splice or motor lead damage.

9. After Installation

- A. Check all electrical and water line connections and parts before starting the pump.
- B. Switch on main electrical power switch. Start the pump and check the motor amps and pump delivery. If normal, continue to run the pump until delivery is clear. If three phase pump delivery is low, it may be running backward. Rotation can be reversed (with power off) by interchanging any two motor lead connections to the power supply.
- C. Check three phase motors for current balance within 5% of average. Higher imbalance will cause higher motor temperatures and may cause overload trip, vibration and reduced life.
- D. Verify that starting, running and stopping cause no significant vibration or hydraulic shocks.
- E. After at least 15 minutes running time, verify that pump output, electrical input, pumping level and other characteristics are stable and as specified.
For best electrical protection: Set motor protection (Submonitor or overload relay) close to duty point operation amps.