



## **SUBMERSIBLE MOTOR ENGINEERING**

### **INSTALLATION INSTRUCTIONS FOR COUPLING A SUBMERSIBLE PUMP TO A SUBMERSIBLE MOTOR.**

# **WARNING**

PLEASE REFER TO PUMP MANUFACTURERS INSTALLATION INSTRUCTIONS AS A FIRST STEP. IF YOU CANNOT GET A COPY OF THE PUMP MANUFACTURERS INSTRUCTIONS – PLEASE FOLLOW THESE INSTRUCTIONS.

PLEASE BE AWARE THAT ALL PUMPS ARE DIFFERENT AND THESE INSTRUCTIONS ARE ONLY INDICATIVE OF THE SORTS OF THINGS THAT NEED TO BE CHECKED DURING ASSEMBLY OF THE PUMP TO THE MOTOR.

SME WILL ACCEPT NO RESPONSIBILITY FOR ANY PROBLEMS CREATED BY FOLLOWING THESE INSTRUCTIONS.

#### **HANDLING AND INITIAL CHECKS**

**Inspect the pump and motor for any damage.**

#### **CHECK LIST PRIOR TO INSTALLATION**

**Please check the following:**

- A. Ambient Water Temperature.**
- B. Depth of Water in the Well.**
- C. Total depth of Well and ensure there is enough depth for the pump/motor and allow at least 1 metre from the bottom of the well.**
- D. The condition of the Well Casing.**



### **PUMP CHECK LIST PRIOR TO FITTING THE MOTOR**

**Please check the following:**

- A. The Non Return Valve is fitted to the top of the pump, and is in good working order.**

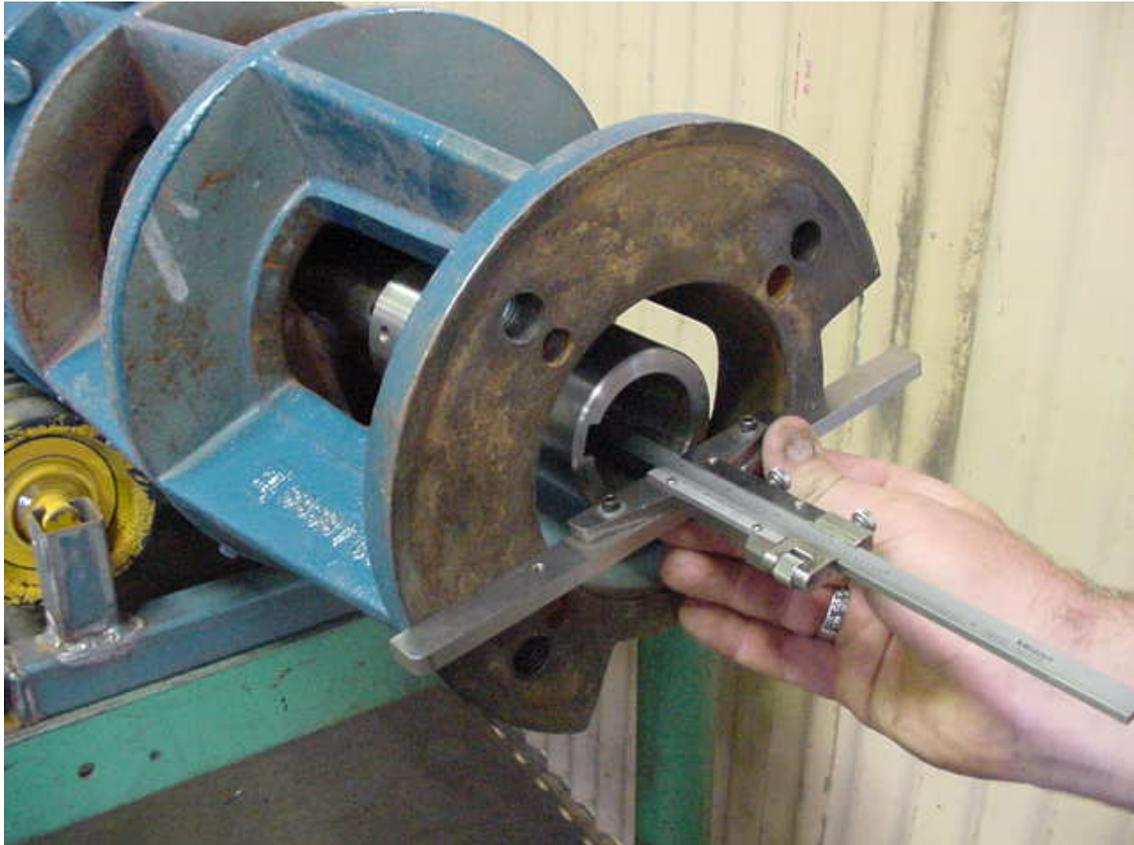


- B. After fitting the coupling to the pump shaft make sure it is the correct position before locking the set screws. (There should be a hardened button inside the coupling or there should be an internal groove inside the coupling and near the middle of the coupling. The end of the pump shaft should be hard up against the hardened button or in line with the internal groove).**



- C. Make sure the pump shaft is free to turn.
- D. Use a lever and a depth gauge to check the internal clearances in the pump. There should be about 2 to 3 mm of movement and when the shaft is in the mean position the depth from the end of the pump shaft to the flange face of the pump should be exactly the same as the height of the motor shaft above the flange face with the rotor pushed down against the thrust bearing in the motor. This setting should allow the pump to move up during “up-thrust” but not make contact with the wear rings. This setting will also allow for some wear on the motor thrust bearing before the impellers will make contact with the wear rings as the pump shaft drops due to thrust bearing wear.





#### **CHECK LIST FOR FITTING PUMP TO MOTOR**

- 1. Clean both mating surfaces thoroughly and make sure that there is no damage to either surface which might create a high spot and misalignment.**
- 2. Line up the key on the motor shaft with the keyway in the coupling, (or the splines with a splined shaft).**
- 3. Slide the motor shaft into the coupling while supporting the weight of the motor. No force should be required.**
- 4. Bolt the pump flange to the motor flange with evenly tightened bolts. No grub screws should be fitted to the coupling on the motor side.**
- 5. Check that the motor/pump assembly is free to turn.**
- 6. Push the whole motor/pump shaft towards the motor and check that position of the pump shaft. It should be at about the mid point of the available float in the pump.**
- 7. Fit the suction screen.**
- 8. Fit the motor cable guard.**
- 9. Megger the motor windings and also measure the winding resistance and compare the reading with the Final Inspection Report for the motor.**

#### **INSTALLATION OF MOTOR AND PUMP IN THE WELL**

- 1. Splice the power cables, and PT100 cable, to the drop cables. (SME have a separate brochure for the correct procedure for cable splicing).**
- 2. Megger the motor windings and also measure the winding resistance.**
- 3. Stand the motor and pump upright beside the well. Try to support the whole assembly during this process and prevent bending or flexing of the whole assembly.**

4. Connect the delivery pipe/column or flexible hose to the outlet on the pump and lower the assembly down the hole.
5. As the assembly is being lowered into the hole make sure the cables are not being damaged. Use stainless steel or nylon strapping to attach the cables to the delivery column every 5 metres.



6. Megger the motor windings and also measure the winding resistance at regular intervals as the motor is being lowered to the operating depth.
7. When the motor/pump has been lowered to the correct depth install the delivery pipe to the well head.



8. Megger the motor windings and also measure the winding resistance and then terminate the drop cables in the control panel or a junction box.
9. Check that the discharge is fully connected or that it will pump to waste in an appropriate place.
10. The motor/pump is now ready to start.

## COMMISSIONING and OPERATION

1. After energising the motor for the first time, ensure that the starting current drops to below the nameplate current within 4 seconds, which means that the motor has run up to full speed. (If motor is being started with a Soft Starter or Auto-transformer the run-up must still be less than 4 seconds).
2. Check the flow and pressure from the pump to make sure the motor is running in the correct direction of rotation. Swapping any 2 of the 3 phase supply leads can change the direction of rotation.
3. While the motor is running for the first time check the water for sand. If sand appears continue to pump until the water clears. If the motor is switched off while the pump is still pumping sand this could accumulate in the pump and cause it to seize up.
4. During testing or checking rotation the number of starts and the time between starts needs to be controlled. As a general rule the motor should be allowed 15 minutes to cool down between each start.
5. All SME motors are fitted with one or more PT100s so the internal temperature can be monitored and these need to be kept below 70 deg.C. on Standard Wet wound motors. The standard insulation wire can operate up to 80 deg.C., and the temperature inside the motor can vary between different parts of the motor. In general the hottest part of these motors is in the stator end winding.
6. **It is strongly recommended that the "Over Current" protection is set to trip at about 5% higher than the steady state current recorded when the motor/pump is commissioned. It is not recommended that the "Over Current" protection is set at just above Full Load Nameplate Current, as, in a lot of cases, this will not protect the motor if the current increases, especially if the motor is not fully loaded. We believe that the operator needs to know if the current starts to increase, so they can determine why.**
7. All temperatures and all 3 phases of voltage and current and insulation levels should be recorded throughout the life of the installation and monitored and reviewed as a form of preventative maintenance.

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