
INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE (GB)

S3



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WARNING: Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.

1. General description

The S3 is a 3 inch diameter borehole pump mainly designed for the pumping of water in domestic water supply. This manual is designed to assist in the proper installation and operation of these pumps.

1.1 Applications

Typical applications:

- Residential housing
- Small waterworks
- Pressure boosting
- Liquid transfer in tanks
- Irrigation systems.

2. Pre-installation

2.1 Make sure you have the right pump

Determine the maximum depth of the well and the drawdown level at the maximum pump capacity. Pump selection and setting depth should be made based on this data.

2.2 Pumped liquid requirements

Submersible well pumps are designed for pumping clear, cold water; free of air or gases. Decreased pump performance and life expectancy can occur if the water is not clear, cold or contains air or gases. A check should be made to ensure that the installation depth of the pump will always be at least three feet below the maximum drawdown level of the well. The bottom of the motor should never be installed lower than the top of the well screen or within five feet of the well bottom.



CAUTION: This pump has been approved for pumping a maximum water temperature of 104°F.

2.3 Liquid temperatures/cooling

Figure 1 shows an S3 pump installed in a well. With the pump operating, figure 1 illustrates the following:

- Well diameter
- Pump diameter
- Temperature of pumped liquid
- Flow past the motor to the pump suction strainer.



NOTE: The well diameter must be at least 3 inches. If there is a risk that the motor will be covered with sediment, it is recommended the pump be placed in a flow sleeve. The motor should always be installed above the well screen.

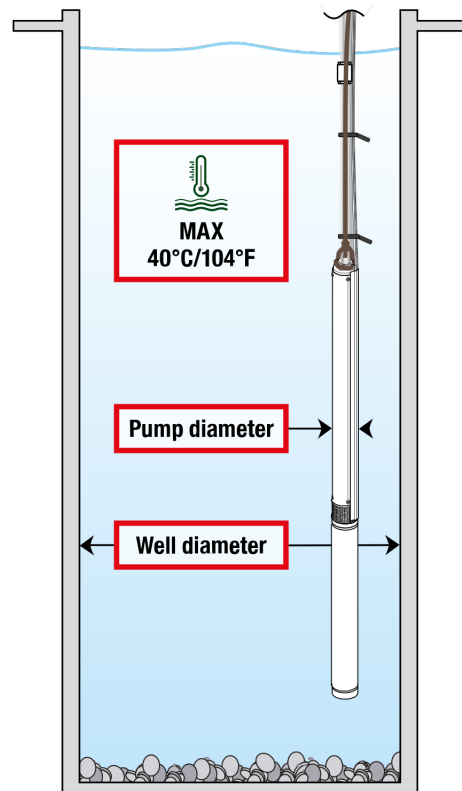


Fig. 1 Pump installed in well

3. Installation positioning

3.1 Positioning requirements

The pump is ideal for vertical as well as horizontal installation, however, the pump shaft must never fall below the horizontal plane, see fig. 2. If the pump is installed horizontally, e.g. in a tank, and there is a risk that the pump might be covered by mud, it must be installed in a flow sleeve.

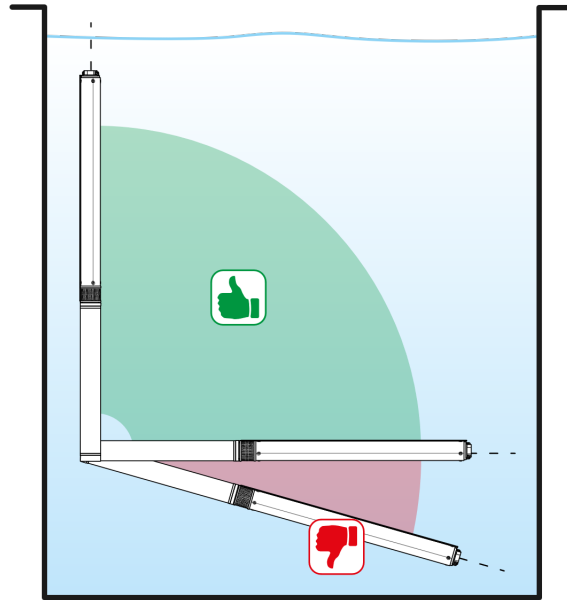


Fig. 2 Pump position

4. Electrical connection

4.1 General

The electrical connection should be completed by an authorized electrician in accordance with local regulations. The supply voltage and rated maximum current appear on the motor nameplate. The required voltage for TESLA submersible motors, measured at the motor terminals, is $-6\%/+6\%$ of the nominal voltage during continuous running.

Supply voltage

1 x 230 V 60 Hz. The current consumption can only be measured accurately with the use of a true RMS instrument.

4.2 Motor protection

The motor has built-in automatic thermal overload protection and requires no additional motor protection.

4.3 Connection of motor

The motor can be connected directly to the main circuit breaker. Start/stop of the pump will typically be done via a pressure switch or VFD, see figs. 3.



NOTE: The pressure switch must be rated for the maximum amps of the specific pump.



WARNING: Reduced risk of electric shock during operation of this pump requires the provision of acceptable grounding. If the means of connection to the supply connected box is not grounded metal conduit, ground the pump back to the service by connecting a copper conductor, at least the size of the circuit conductors supplying the pump.

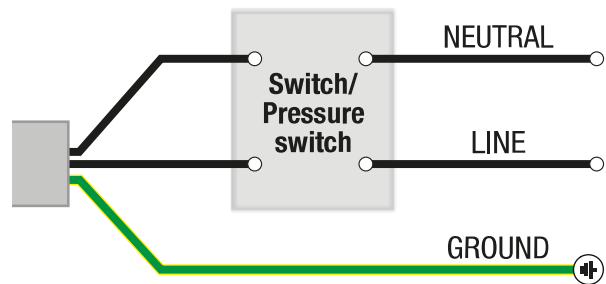


Fig. 3 Wiring diagram for 2-wire TESLA motors (230 V)

5. Cable sizing

Single-phase 60Hz maximum cable length motor service to entrance:

Most of the cable submerged in the water 86°F (30°C):

Motor rating 60hz			Maximum lengths of copper wire in feet (3% voltage drop)						
Volts	hp	amps	14 AWG	12 AWG	10 AWG	8 AWG	6 AWG	4 AWG	2 AWG
230	0,5	6	210	340	550	880	1400	2220	3540
230	0,75	7	180	290	470	750	1200	1900	3030
230	1,0	9,8	130	210	330	530	850	1360	2160

Most of the cable not submerged (laying on air), max. cable temperature 167°F (75°C):

Motor rating 60hz			Maximum lengths of copper wire in feet (3% voltage drop)						
Volts	hp	amps	14 AWG	12 AWG	10 AWG	8 AWG	6 AWG	4 AWG	2 AWG
230	0,5	6	180	290	480	730	1170	1850	3010
230	0,75	7	160	250	410	620	1000	1580	2580
230	1,0	9,8	110	170	290	440	710	1130	1840

6. Splicing the cable

Carefully splice the drop cable with the motor cable. It is recommended to use a third-party-approved watertight junction box or splice connection.

7. Piping

- The pump should only be gripped by the two flats at the top of the pump, see fig. 4.
- The pump can be installed vertically or horizontally. During operation, the pump must always be completely submerged in water.
- When plastic pipe is used, a stainless-steel safety wire is recommended. Fasten the wire to the eyelet on the pump, see fig. 5.
- The threaded joints must be well cut and fit together tightly to ensure that they do not loosen.

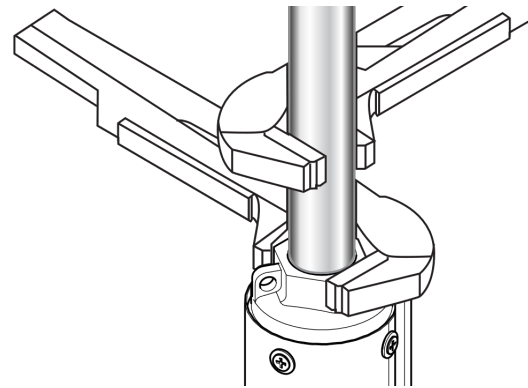


Fig. 4 Gripping the pump

8. Installing the pump

8.1 Installation depth

The dynamic water level should always be above the pump, see fig. 5.

A = Dynamic water level

B = Static water level

C = Minimum 3 inch well diameter

D = Drawdown

E = Installation depth below static water level. Maximum 500 feet.

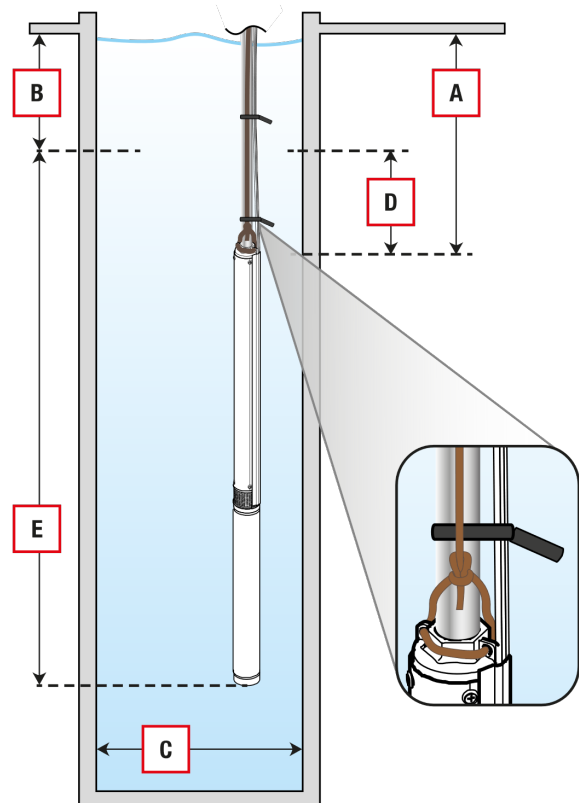


Fig. 5 Installation depth

Procedure

To install the pump, proceed as follows:

1. Attach the enclosed data plate sticker at the well head.
2. Check the well for proper clearance. The well must be at least 3 inches in diameter. It is a good idea to check the well for clearance using a plumb ring (2.95 ø x 10 in.).
3. Attach the first section of riser pipe to the pump.
4. Lower the pump into the well. Make sure the motor cable is not damaged when the pump is lifted or lowered into the well, especially in 3 inch wells.



NOTE: Do not lower or lift the pump using the motor cable.

5. When the pump has been installed to the required depth, the installation should be completed with a well seal.



NOTE that the dynamic water level should always be above the pump.

6. Loosen the safety rope so that it becomes unloaded and lock it to the well seal using a clamp.
7. Complete the electrical connections.

Installation depths

Maximum installation depth: 500 feet below the static water level.

Minimum installation depth: 3 feet below the dynamic water level.

Vertical installation

During start-up and operation, the pump must always be completely submerged in water.

Horizontal installation

The pump must be installed at least 2 feet below the dynamic water level. If there is a risk that the pump might be covered by mud, the pump must be placed in a flow sleeve.

9. Starting the pump for the first time

When the pump has been connected correctly, the pump should be started with the discharge valve closed approximately one third.

9.1 Motor cooling and other considerations

- Make sure the well is capable of yielding a minimum quantity of water corresponding to the pump capacity.
- Do not start the pump until it is completely submerged in the water.
- As the valve is being opened, the drawdown should be checked to ensure that the pump always remains submerged.
- To ensure the necessary cooling of the motor, the pump should never be set so low that it gives no water. If the flow rate suddenly falls, ensure that the pump is not pumping more water than the well can yield. The pump must immediately be stopped and the fault corrected. The cooling speed should never be lower than 0.5 Ft/sec (0.15m/s).

9.2 Maintenance and service

The pumps are normally maintenance-free. Deposits and wear may occur, then check performances periodically.

10. Troubleshooting

Fault	Cause	Remedy
1. The pump does not run.	A. The fuses are blown. B. The circuit breaker has tripped. C. No electricity supply. D. The motor protection has cut off the electricity supply due to overload. E. The drop cable is defective. F. Overvoltage has occurred.	A. Replace the blown fuses. If the new fuses blow too, check the electrical installation and the drop cable. B. Reset the circuit breaker. C. Contact the electricity provider. D. Check for motor/pump blockage. E. Repair or replace the pump/cable. F. Check the electricity supply.
2. The pump runs but gives no water.	A. The discharge valve is closed. B. No water or too low water level in well. C. The check valve is stuck in its closed position. D. The suction strainer is closed. E. The pump is defective.	A. Open the valve. B. Increase the installation depth of the pump, throttle the pump or replace it with a smaller capacity model. C. Pull the pump and clean or replace the valve. D. Pull the pump and clean the strainer E. Repair or replace the pump.

<p>3. The pump runs at reduced capacity.</p>	<p>A. The drawdown is larger than anticipated. B. The valves in the discharge pipe are partly closed/blocked. C. The discharge pipe is partly blocked by impurities (iron bacteria). D. The check valve of the pump is blocked. E. The pump and the riser pipe are partly choked by impurities (iron bacteria). F. The pump is defective. G. Hole in discharge pipe. H. The riser pipe is defective. I. Undervoltage has occurred.</p>	<p>A. Increase the installation depth of the pump, throttle the pump or replace it with a smaller capacity model. B. Check and clean or replace the valves as necessary. C. Clean or replace the discharge pipe. D. Pull the pump and clean or replace the valve. E. Pull the pump. Check and clean or replace the pump, if necessary. Clean the pipes. F. Repair or replace the pump. G. Check and repair the piping. H. Replace the riser pipe. I. Check the electricity supply.</p>
<p>4. Frequent starts and stops.</p>	<p>A. The differential of the pressure switch between the start and stop pressures is too small. B. The water level electrodes or level switches in the reservoir have not been installed correctly. C. The check valve is leaking or stuck half-open. D. The supply voltage is unstable. E. The motor temperature is too high.</p>	<p>A. Increase the differential. However, the stop pressure must not exceed the operating pressure of the pressure tank and the start pressure should be high enough to ensure sufficient water supply. B. Adjust the intervals of the electrodes/level switches to ensure suitable time between the cutting-in and cutting-out of the pump. See installation and operating instructions for the automatic devices used. If the intervals between start/stop cannot be changed via the automatics, the pump capacity may be reduced by throttling the discharge valve. C. Pull the pump and clean or replace the check valve. D. Check the electricity supply. E. Check the water temperature.</p>

11. Environment

During handling, operation, storage and transport, all environment regulations dealing with the handling of hazardous materials must be observed.



WARNING: When the pump is taken out of operation, it must be ensured that no hazardous material, which can be injurious to persons and the environment, is left in the pump and in the riser pipe.

12. Disposal

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

1. Use the public or private waste collection service.

Pump type	Power P2 [hp]	Voltage [V]	Flow range [gpm]	Min. well dia.	Disch.
S3 5/05	0.5	230	1.5-10	3"	1¼" NPT
S3 5/10	0.75	230	1.5-10	3"	1¼" NPT
S3 5/15	1	230	1.5-10	3"	1¼" NPT
S3 10/05	0.5	230	3-14	3"	1¼" NPT
S3 10/10	0.75	230	3-14	3"	1¼" NPT
S3 10/15	1	230	3-14	3"	1¼" NPT
S3 15/05	0.5	230	4-18	3"	1¼" NPT
S3 15/10	0.75	230	4-18	3"	1¼" NPT
S3 15/15	1	230	4-18	3"	1¼" NPT

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