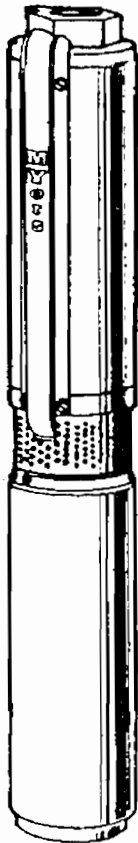


SJ Extension & RANGER Series Heavy Duty Four Inch Submersible Pumps Installation and Operation Guide 25-80 GPM (80-250 LPM)



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Myers[®]

WARNING! IMPORTANT SAFETY INSTRUCTIONS! READ CAREFULLY BEFORE INSTALLATION



FAILURE TO FOLLOW THESE INSTRUCTIONS AND COMPLY WITH ALL CODES MAY CAUSE SERIOUS BODILY INJURY AND/OR PROPERTY DAMAGE.

⚠ 1) Before installing or servicing your pump, BE CERTAIN THE

PUMP POWER SOURCE IS TURNED OFF AND DISCONNECTED.

⚠ 2) All installation and electrical wiring must adhere to state and local codes. Check with appropriate community agencies, or contact your local electrical and pump professionals for help.

⚠ 3) CALL AN ELECTRICIAN WHEN IN DOUBT. Pump must be connected to a separate electrical circuit directly from the entrance box. There must be an appropriately sized fuse or circuit breaker in this line. Tying into existing circuits may cause circuit overloading, blown fuses, tripped circuit breakers, or a burned up motor.

⚠ 4) Do not connect pump to a power supply until the pump is grounded. For maximum safety, a ground fault interrupter should be used. CAUTION: FAILURE TO GROUND THIS UNIT PROPERLY MAY RESULT IN SEVERE ELECTRICAL SHOCK.

⚠ 5) WARNING: Reduced risk of electric shock during operation of this pump requires the provision of acceptable grounding:

a) If the means of connection to the supply-connection box is other than 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, to the grounding screw provided within the wiring compartment.

b) This pump is provided with a means for grounding. To reduce the risk of electric shock from contact with adjacent metal parts, bond supply box to the pump-motor-grounding means and to all metal parts accessible including metal discharge pipes, and the like, by means of a clamp, a weld, or both if necessary, secured to the equipment-grounding terminal.

⚠ 6) The voltage and phase of the power supply must match the voltage and phase of the pump.

⚠ 7) Do not use an extension cord; splices must be made with an approved splice kit. Above ground joints must be made in an approved junction box.

⚠ 8) Do not work on this pump or switch while the power is on.

⚠ 9) Never operate a pump with a frayed or brittle power cord, and always protect it from sharp objects, hot surfaces, oil and chemicals. Avoid kinking the cord.

⚠ 10) Never service a motor or power cord with wet hands or while standing in or near water or damp ground.

⚠ 11) The three phase units must be wired by a qualified electrician, using an approved starter box and switching device.

⚠ 12) Do not use this pump in or near a swimming pool.

⚠ 13) Single phase motors are equipped with automatic resetting thermal protectors. The motor may restart unexpectedly causing the leads to energize or pump to turn. Three phase motors should be protected by proper, thermal and amperage protection. (Check local codes.)

⚠ 14) Check for nicks in the wire and pump insulation by using an ohm meter and checking resistance to ground before installing the pump and after installing the pump. If in doubt on the proper procedure check with a qualified electrician.

⚠ 15) Do not pump gasoline, chemicals, corrosives, or flammable liquids; they could ignite, explode, or damage the pump, causing injury and voiding the warranty.



⚠ 16) Do not run this pump with the discharge completely closed. This will create superheated water, which could damage the seal, and shorten the life of the motor. This superheated water could also cause severe burns. Always

use a pressure relief valve, set below the rating of the tank or system.

CAUTION!

⚠ 17) The following may cause severe damage to the pump and void warranty. It could also result in personal injury:

- Running the pump dry.
- Failure to protect the pump from below freezing temperatures.
- Running the pump with the discharge completely closed.
- Pumping chemicals or corrosive liquids.

⚠ 18) Never work on the pump or system without relieving the internal pressure.

⚠ 19) Do not pump water above 120° Fahrenheit.

⚠ 20) Never exceed the pressure rating of any system component.

Read this guide completely before installation

Myers recommends a waterwell driller or experienced waterwell serviceman to install new water systems – or to replace an existing submersible waterwell pump or pump motor.

Please read this entire Guide before installing your Myers Submersible Pump.

CAUTION: Do not run unit dry. Unit can be severely damaged if run dry. For safe testing, wait until pump is wired, grounded and completely submerged.

A Pump Selection & Inspection

1. Select the right pump & motor

Gallons per minute desired + pressure required + depth to pumping level determines which Myers 4" Submersible Pump size and model is right for your waterwell system.

All 4" Motors are NEMA Standard water lubricated motors. Single phase, 3-wire motors require control boxes

containing the capacitors, relay and combination starter, while three phase units require the Myers combination starters. Single phase, 2-wire motors do not require control boxes.

2. Inspect your new pump & motor

After purchase, check the pump and motor and other contents of the

shipping containers for possible damage. Do NOT lift the Submersible Motor by its attached electric motor cables.

Find the loose owner's information-plates and check the listed model number against the data on the motor and the pump.

B Pre-Installation Preparation

1. New Wells

a) Location of pump. If properly installed, your Myers Submersible Pump will provide years of dependable, trouble-free service. For new wells, always locate well to provide for easy removal and replacement of pump. The water tank and electrical controls can be located some distance from the well.

b) Determine depth of pump in well in order to purchase electrical cables of sufficient gauge and length to reach from pump motor to electrical motor control box – and to purchase galvanized iron pipe of sufficient length to reach from pump discharge to water tank. (See cable-length and cable-size charts.)

c) Location of water tank & electrical controls. Always install the pressure tank and electrical controls in a clean, dry basement or utility room to avoid dampness and temperature extremes. A pressure relief valve piped to a suitable drain is recommended.

2. Replacing pump (or motor only) in existing well

a) Turn off power at electrical control box.

b) Remove well seal from top of well.

c) Remove old pump from well:

1) if galvanized iron pipe was used originally, you'll find a number of rigid sections joined together. Pull pipe upward and dismantle each section as you go, untaping or unbanding electrical motor cables from each section until you reach pump.

2) when old pump is out of well, cut electrical cables as close to original splice connection as possible.

3) while new cable is preferred (because it will remain submerged for a number of years), you may wish to re-use the old cable. Wipe off and clean the insulation, examining carefully for cuts, cracks and abrasions. If in doubt, purchase new cable.

4) if new cable is necessary, measure length of old cable (from pump motor to power source) and purchase sufficient replacement lengths. (See wire-size and cable-length selection charts.)

3. Attaching pump to motor

a) Remove shaft protection clamp from top of motor.

b) Scrape mounting faces of both pump and motor. All rust and dirt must be completely removed.

c) The pump and motor must be kept in a straight line to assure proper shaft and coupling alignment. Carefully lower pump onto motor. If motor shaft splines and pump coupling splines do not engage, lift pump and rotate motor shaft only very slightly. Repeat until motor and pump are properly mated, then securely bolt together.

d) Install cable guard. Cable should be protected at the top of the guard with a heavy layer of tape or rubber pads.

Cable Selection

**SINGLE PHASE MOTOR MAXIMUM CABLE LENGTH (Motor to Service Entrance) (2)
AS RECOMMENDED BY FRANKLIN ELECTRIC INSTALLATION MANUAL SEPT. 1, 1992**

Motor Rating		Copper Wire (1)								
Volts	HP	14	12	10	8	6	4	2	0	00
230V	1	250	400	630	990	1540	2380	3610	5360	6520
	1-1/2	190	310	480	770	1200	1870	2850	4280	5240
	2	150	250	390	620	970	1530	2360	3620	4480
	3	120	190	300	470	750	1190	1850	2890	3610
	5		110	180	280	450	710	1110	1740	2170
	7-1/2			120	200	310	490	750	1140	1410
	10				160	250	390	600	930	1160

**THREE PHASE MOTOR MAXIMUM CABLE LENGTH (Motor to Service Entrance) (2)
AS RECOMMENDED BY FRANKLIN ELECTRIC INSTALLATION MANUAL SEPT. 1, 1992**

Motor Rating		Copper Wire (1)								
Volts	HP	14	12	10	8	6	4	2	0	00
200V 60 Hz	1	430	690	1080	1710	2670	4140			
	1-1/2	310	500	790	1260	1960	3050			
	2	240	390	610	970	1520	2360	3610	5420	
	3	180	290	470	740	1160	1810	2760	4130	
	5		170	280	440	690	1080	1660	2490	3050
	7-1/2			200	310	490	770	1180	1770	2170
	10				230	370	570	880	1330	1640
230V 60 Hz	1	560	910	1430	2260	3520	5460	8290		
	1-1/2	420	670	1060	1670	2610	4050	6160	9170	
	2	320	510	810	1280	2010	3130	4770	7170	8780
	3	240	390	620	990	1540	2400	3660	5470	6690
	5		230	370	590	920	1430	2190	3290	4030
	7-1/2			260	420	650	1020	1560	2340	2870
	10				310	490	760	1170	1760	2160
460V 60 Hz	1	2300	3670	5770	9070					
	1-1/2	1700	2710	4270	6730					
	2	1300	2070	3270	5150	8050				
	3	1000	1600	2520	3970	6200				
	5	590	950	1500	2360	3700	5750			
	7-1/2	420	680	1070	1690	2640	4100	6260		
	10	310	500	790	1250	1960	3050	4680	7050	
575V 60 Hz	1	3630	5800	9120						
	1-1/2	2620	4180	6580						
	2	2030	3250	5110	8060					
	3	1580	2530	3980	6270					
	5	920	1480	2330	3680	5750				
	7-1/2	660	1060	1680	2650	4150				
	10	490	780	1240	1950	3060	4770			

CAUTION: Use of wire size smaller than listed will void warranty.

FOOTNOTES:

- (1) If aluminum conductor is used, multiply lengths by 0.5. Maximum allowable length of aluminum is considerably shorter than copper wire of same size.
- (2) The portion of the total cable which is between the service entrance and a 3Ø motor starter should not exceed 25% of the total maximum length to assure reliable starter operation. Single phase control boxes may be connected at any point of the total cable length.

* 415 and 440 volt may use 115% of table.

† MAXIMUM LENGTH IN METERS. TO CONVERT METERS TO FEET, MULTIPLY BY 3.3.

SINGLE PHASE MOTOR MAXIMUM COPPER CABLE LENGTH

Motor Rating			Metric Cable Size, Square Millimeters †										
Volts	KW	HP	1.5	2.5	4	6	10	16	25	35	50	70	95
220 Volts 50 Hz	.25	1/3	170	280	450	670	1130	1750	2640	3590	4940	6560	8110
	.37	1/2	120	200	320	480	810	1260	1900	2590	3580	4770	5920
	.55	3/4	80	130	220	320	550	850	1290	1760	2430	3230	4000
	.75	1	60	100	170	250	430	670	1010	1380	1910	2550	3160
	1.1	1-1/2	40	70	120	180	300	470	710	980	1360	1850	2320
	1.5	2	30	60	90	130	230	360	550	760	1060	1440	1820
	2.2	3	20	40	60	90	150	230	350	490	680	920	1160
	3.7	5		20	40	60	100	160	250	340	480	670	850

THREE PHASE MOTOR MAXIMUM COPPER CABLE LENGTH

Motor Rating			Metric Cable Size, Square Millimeters †															
Volts	KW	HP	1.5	2.5	4	6	10	16	25	35	50	70	95	120	150	185	240	
220 Volts 50 Hz	.37	1/2	270	450	720	1080	1840	2860	4330	5920	8220							
	.55	3/4	180	300	490	730	1250	1940	2940	4020	5570	7480	9340					
	.75	1	140	230	370	550	940	1460	2220	3040	4230	5710	7160	8810				
	1.1	1-1/2	90	160	250	380	650	1010	1540	2110	2940	3980	5010	6180	7210	8610		
	1.5	2	70	120	190	290	500	780	1190	1630	2270	3080	3870	4770	5570	6650	8030	
	2.2	3	50	80	130	200	340	540	820	1120	1570	2130	2680	3310	3870	4620	5590	
	3	4	40	60	100	150	260	410	630	870	1210	1650	2090	2580	3030	3630	4420	
	3.7	5	30	50	80	120	210	330	500	690	960	1300	1650	2030	2380	2850	3460	
380 Volts 50 Hz *	.37	1.2	810	1350	2160	3240	5500	8530										
	.55	3.4	550	920	1480	2230	3780	5860	8890									
	.75	1	410	680	1090	1640	2780	4330	6570	9010								
	1.1	1-1/2	300	500	810	1210	2060	3200	4850	6640	9220							
	1.5	2	220	370	590	880	1500	2340	3560	4890	6830	9230						
	2.2	3	150	250	400	600	1030	1600	2440	3350	4680	6340	7990	9870				
	3	4	110	190	310	460	790	1230	1880	2590	3630	4930	6230	7720	9060			
	3.7	5	90	150	240	370	630	980	1490	2050	2870	3900	4920	6080	7130	8530		

D Grounding

1. Motor grounding instructions

CAUTION: Failure to ground this unit properly may result in severe electrical shock. Ground your submersible by using a Franklin pigtail with ground. If your unit does not have a grounded pigtail, the motor can be grounded by running a copper grounding wire from the pump discharge bowl to the main electrical system ground. Following is the recommended grounding procedure:

a) The grounding wire to be used must be the same size as the power conductor wires. Insulated stranded, insulated solid, or bare solid copper wire may be used. Aluminum wire is not suitable for this application.

b) If stranded wire is used, attach a crimp type wire ring terminal that will fit

the motor mounting studs. A fork-type terminal with ends turned up is also acceptable. Slip terminal onto stud, followed by locking washer. Securely tighten the screw.

c) If solid wire is being used, loop bare end of it around the stud followed by a locking washer. Securely tighten the nut.

CAUTION: Do not put the ground wire into a bind.

d) Connect the top end of the ground wire to the main electrical system ground.

WARNING: Reduced risk of electric shock during operation of this pump requires the provision of acceptable grounding: **Caution:** Failure to ground this unit properly may result in severe electrical shock. Grounding your new submersible pump is accomplished by running a copper grounding wire from the main electrical system ground to the green ground wire in the motor pigtail. Following is the recommended

grounding procedure: This pump is provided with a means for grounding. To reduce the risk of electric shock from contact with adjacent metal parts, bond supply box to the pump-motor-grounding means and to all metal parts accessible at the well head, including metal discharge pipes, metal well casing, and the like, by means of (1) an equipment-grounding conductor at least the size of the well-cable conductors, or the equivalent, that runs down the well with the well cable and (2) a clamp, a weld, or both if necessary, secured to the equipment-grounding lead, the equipment-grounding terminal, or the grounding conductor on the pump housing. The equipment-grounding lead, if one is provided, is the conductor that has an outer surface of insulation that is green with or without one or more yellow stripes. **NOTE:** N.E.C. requires submersible pumps be grounded at installation.

E Installation of Pump in Well

1. Before lowering pump

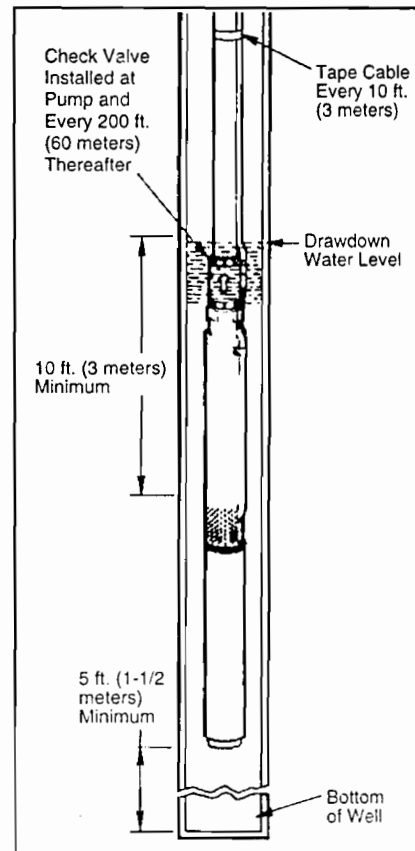
a) Smooth out any rough spots or sharp edges on the top lip of the well casing with a hammer or metal file to prevent damage to the pump or power cables when lowering into well.

b) As you add additional sections of galvanized iron pipe, apply pipe compound only to the male threaded ends of each section and tighten to next section.

c) Tape the power cables to the pipe, straight up from bottom to top. Do NOT spiral cable around the pipe. Use waterproof tape or nylon lock bands every 20 ft. (6 meters) on galvanized iron pipe.

Do not allow any excess cable between bands, cable must be as flat against pipe as possible.

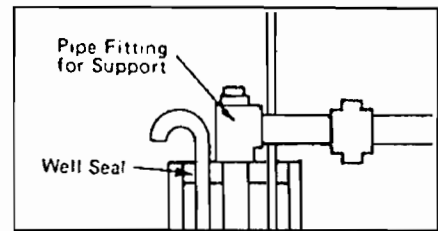
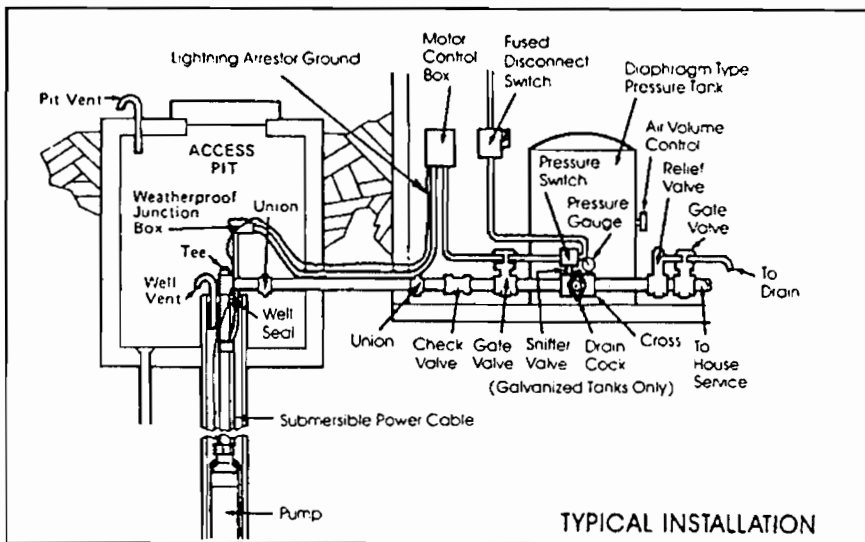
2. Lowering the pump



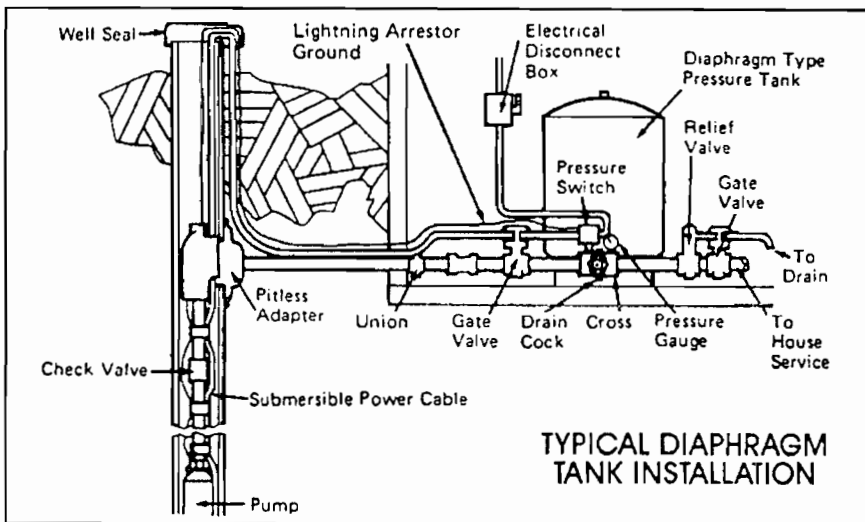
a) Align pump carefully when beginning to lower it down the well casing. Do not let the pump, cables or pipe rub against the well casing. Take care that cable insulation is not dragged or scraped over the top lip of the well casing.

b) Depth of pump setting. Lower pump into well slowly without forcing. (On deep settings, we recommend that a check valve be installed at the pump and every 200 ft. (60 meters) thereafter to prevent water shock from traveling back to pump.)

Lower pump to at least 10 ft. (3 meters) below the maximum draw-down of the water level, if possible, and never closer than 5 ft. (1-1/2 meters) from the bottom of the well.



c) Pipe fitting to support pump. When a well seal is used, either a coupling, elbow or tee is installed on the top end of the last vertical length of pipe and is allowed to rest on the outside of the well seal to support the pipe, power cables and pump. Most well seals provide a fitting to seal the power cables, but if no such fitting is provided, conduit must be used to protect cables and to prevent water and any foreign matter from leaking into well around cable.



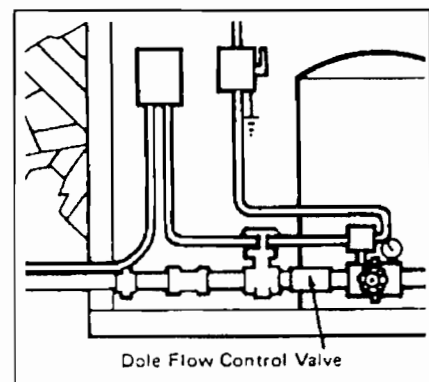
d) Frost-proof pitless installation. In installations where the pipe from the well seal to the water tank is subject to frost or freezing conditions, a pitless installation is recommended. (See diagram below.)

e) Be sure to attach owner-information plates, furnished with the pump, to the lid of the motor control box for 3-wire models; or to fused disconnect switch for 2-wire models. This is the only above-ground record of the pump size.

F Controlling Weak Wells

The flow valve method is the simplest way to prevent drawdown to pump inlet. The capacity of the pump discharge is throttled to equal the well yield. A Dole Flow Valve delivers a constant capacity regardless of pump discharge pressure. The flow valve is installed in the discharge line between the pump and the pressure tank. The usual way to determine what size of flow valve to use is to throttle the

discharge gate valve to a capacity that the well will yield without drawing down to pump inlet. After pump has operated at this capacity for a sufficient time to be sure it is suitable, measure the flow in gallons-per-minute and select a flow valve size nearest to this capacity. Install the flow valve and re-check to be sure operation is satisfactory.



G Trouble-Shooting

The vast majority of service calls on waterwell systems are caused by either water-logged tanks or by problems which are electrical in nature.

The Myers submersible pump and waterwell system should be checked periodically for quality of water, draw-

down, pressure, GPM, cycling periods (how often the pump starts and how long it runs) and proper operation of all automatic controls.

Never operate the pump for long periods of time with the discharge valve closed. This could cause overheating resulting in damage to the

pump and its motor. A properly-sized relief valve should be installed before the tank to prevent the pump from operating with the discharge valve closed.

Familiarize yourself with potential problems and trouble-shooting solutions.

PROBLEM	PROBABLE CAUSE	SOLUTION
Pump won't run	Blown fuse, broken (or loose) electrical connections.	Check fuses, capacitor, relays and all electrical connections.
	Pressure switch not closing.	Adjust or replace.
	Motor overload protection contacts open.	Contacts will close automatically within short time.
	Incorrect control box.	Check & replace if necessary.
	Improper wiring connections.	Check wiring diagram.
	Low voltage.	Check voltage at control box.
	Pump stuck or clogged with foreign matter.	Pull pump and examine.
Pump runs, but no water pumped	Check valve installed backwards.	Reverse and re-install.
	Setting too deep for rating of pump.	Check rating table.
	Pump not submerged; not deep enough in well.	Lower pump if possible. Check recovery of well.
	Pump in mud, impeller plugged or intake strainer clogged.	Pull pump and clean. Check well depth. Raise pump if necessary.
Reduced capacity	Strainer or impellers partially clogged or plugged.	Pull pump and clean.
	Corroded discharge pipe.	Replace pipe.
	Excessive pump wear.	Pull pump and replace worn parts. Or, replace pump.
Pressure switch won't cut out	Pressure switch not set correctly.	Revise settings: 20-lb cut-in, 40-lb cut-out; or 30/50 (depending on tank size).
	Water level too low in well for rating of pump.	Check pump setting.
	Switch opening clogged.	Clean out openings or, if necessary, replace switch.
	Excessive wear on parts.	Replace worn parts.

Trouble-Shooting (Continued)

PROBLEM	PROBABLE CAUSE	SOLUTION
Pump starts too often, runs too long	Water-logged tank (loss of air pressure).	Check tanks for leaks. Re-charge with air pressure to proper level. Check air volume control.
	Check valve leaks.	Replace or repair.
	Pressure switch out of adjustment.	Adjust to proper setting and check to assure setting remains. If not, replace pressure switch.
	Leaks in pipe.	Check above-ground piping for leaks. If none, pull pump and check all pipe connections and connection of pipe to pump.
Any or all the above	All known causes are checked but system won't work properly.	Call Myers, your waterwell driller or your waterwell serviceman.

For your reference

Fill in the following information and keep this Installation & Operation Guide among your important papers. Information about your Myers Submersible Pump will be found on the owner's information-plate. Whenever necessary to contact your dealer or installer, give him this information.

Motor Model No. _____ Pump Model No. _____
HP _____ Phase _____ Volts _____ Cycles _____
Amps: L1 _____ L2 _____ Date of Installation _____
Well depth _____ ft. Pump depth _____ ft.
Name of dealer/installer from whom pump was bought _____
_____ Date purchased _____

FRANKLIN ELECTRIC SERVICE HOTLINE 800/348-2420. In Indiana 800/552-2322.

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