



4" Submersible Pumps

Installation and Operation Instructions

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Owner's Information

Pump Model Number: _____

Pump Serial Number: _____

Motor Model Number: _____

Motor Serial Number: _____

Dealer: _____

Dealer Telephone: _____

Purchase Date: _____

Installation Date: _____

Goulds Pumps



ITT Industries

INSTALLATION QUICK STEPS!

1 The well should be clean and disinfected before the pump is installed. You should always develop the well before pump installation.

2 Write the pump model number, pump serial number, and motor serial number in the space provided in this Instruction Manual (IOM). Leave the completed IOM attached to the tank or control box in a dry area or give it to the owner. We suggest you attach your business card to promote referral business.

3 Inspect all components for shipping damage and insure that you have all the components that are required: Pump with Motor, Motor Control Box (1Ø / 3-wire) or Starter w/Overloads (3Ø), Hydro-Pro Tank, Pressure Switch, Copper Wire, Pressure Relief Valve (if required), Torque Arrestor (if required), Pipe, and Fittings. *See 1.0*

4 Verify that motor voltage and power supply voltage match. *See 4.2*

NOTE: Do not power the unit or run the pump until all electrical and plumbing connections are completed and the pump is filled with water. Under no circumstance should the pump be run dry to test it.

Doing so will void the warranty and damage the impellers! We suggest you check the rotation on a three phase motor before assembling it to the water end (pump). All 4" motors should rotate counterclockwise when viewed from the shaft end. See 4.3 C and 4.4

5 Select a well-ventilated, shaded location in which to vertically mount the motor control box. *See 4.1*



6 Connect the pump motor leads (wires) to the drop cable using a heat shrink kit or waterproof electrical tape. Match the drop cable wire colors to the pump motor leads or identify the leads to insure correct connections at the three-wire motor control box where used. *See 3.1 A&B and 4.3*

7 If using unthreaded discharge pipe install a stainless steel adapter fitting into the pump discharge head. Consult your pump supplier for other available adapter materials. Connect the discharge pipe to the pump. Do not use galvanized connections on stainless steel discharge heads as galvanic corrosion may occur. *See 2.4*

8 You can now lower the pump into the well. Set the pump at least 10' off the bottom. Protect the wires from chafing on the well casing. Never lower the pump by the wires. *See 2.5*



9 Connect the discharge pipe to the pressure tank and the house plumbing. Install the pressure switch at the tank cross tee. *See 2.2*



10 Decide what system pressure you want to use. Adjust the pressure switch to the desired range. Typically a 20 pound differential is used, eg.: 30-50 or 40-60 psi. Furnas switches have adjustment instructions on the inside of the cover.



11 Set the pressure tank pre-charge 2 psi lower than the pump cut-in pressure. Check tank pre-charge only when tank is completely empty. *See 2.3*



12 Install a pressure relief valve in any system capable of over 100 psi or 230' TDH. Install and set per relief valve manufacturers instructions. *See 2.2*



13 Connect the motor leads to the control box (3-wire), pressure switch (2-wire), or starter on 3 phase systems. *See 4.3*



14 Connect the leads between the control box or starter and the pressure switch. *See 4.3*

15 Check all piping connections before starting pump.
See 2.0 and 5.0



16 Restrict flow between pump and tank if well has a high static level or there is a long discharge pipe between well and tank. A partially closed ball or globe valve works well for throttling. *See 5.1*

17 Open a faucet in the discharge piping. This will allow air to escape the system and water to flow without filling the tank with dirty water. *See 5.3*



18 Turn breaker ON to power system. Pump should run. Allow water to flow until well clears. You can then close the faucet and allow the tank to fill and pressure to build. Switch should go ON and OFF without any chatter. *See 5.3*

19 Run a few cycles to check pump and switch operation. *See 5.3*



20 Check amps and insure they are within nameplate amp range from motor data sheet or motor nameplate. Amps should be between Rated Input and Service Factor Amps. Enter the amp reading in this manual along with the model number.
See Motor Specifications

1.0 TYPICAL INSTALLATIONS

HYDRO-PRO™ TANK INSTALLATION

NOTICE: TANK PRE-CHARGE PRESSURE CHANGES MUST BE MADE USING THE AIR VALVE ON TOP OF THE TANK.

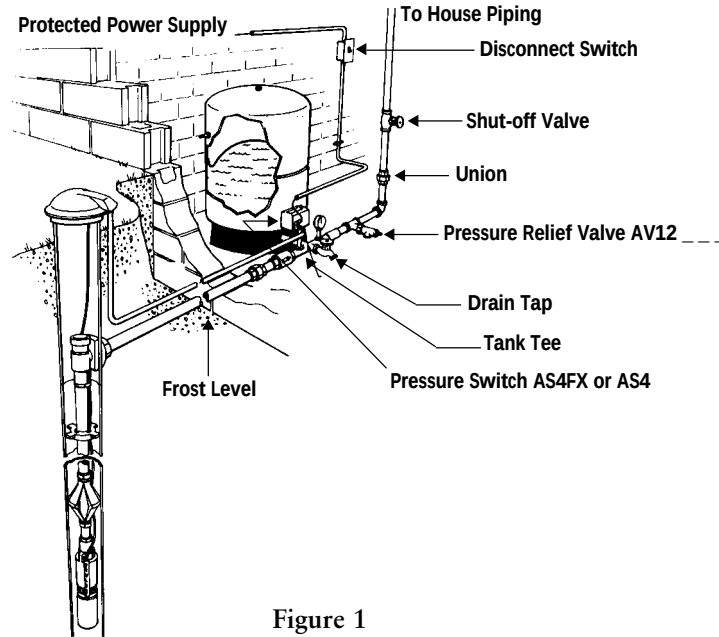
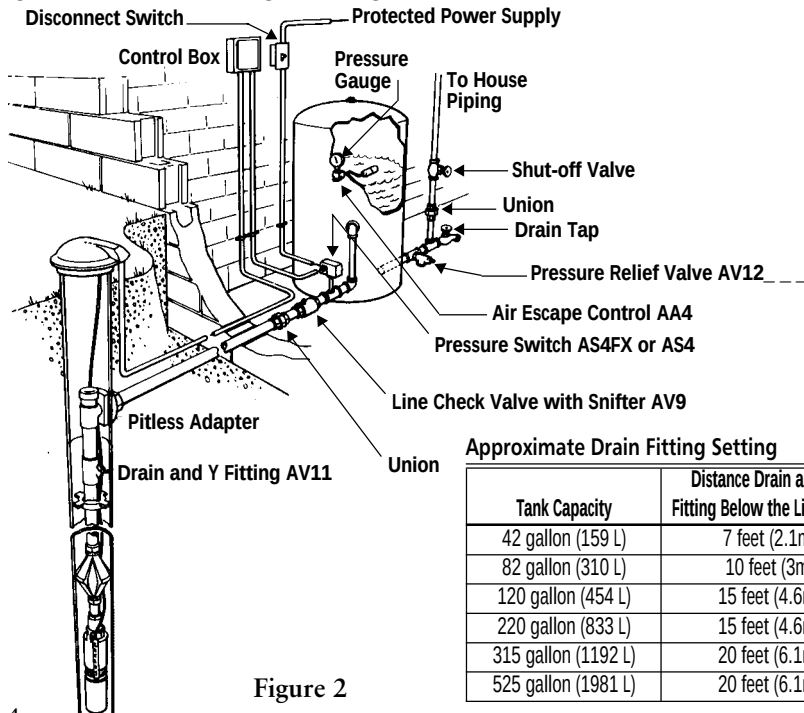


Figure 1

GALVANIZED TANK INSTALLATION



Approximate Drain Fitting Setting

Tank Capacity	Distance Drain and "Y" Fitting Below the Line Check
42 gallon (159 L)	7 feet (2.1m)
82 gallon (310 L)	10 feet (3m)
120 gallon (454 L)	15 feet (4.6m)
220 gallon (833 L)	15 feet (4.6m)
315 gallon (1192 L)	20 feet (6.1m)
525 gallon (1981 L)	20 feet (6.1m)

Figure 2

2.0 PIPING

Notice: All 4" Goulds Pumps submersibles have left-hand discharge head threads, hold the pump only at the "discharge head" with a wrench when installing fittings or threaded pipe.



2.1 General

The pump discharge piping should be sized for efficient pump operation. We suggest using the Friction Loss

Tables to calculate Total Dynamic Head using different pipe sizes. As a rule of thumb use 1" for up to 10 gpm, 1 1/4" for up to 30 gpm, 1 1/2" for up to 45 gpm, and 2" for up to 80 gpm. In the case of long pipe runs it is best to increase pipe size.

Some pumps are capable of very high discharge pressures, please select pipe accordingly. Since Goulds Pumps does not sell pipe, we suggest you consult with your pipe supplier to determine the best type of pipe for each installation.



2.2 Pressure Tank, Pressure Switch and Pressure Relief Valve

Select an area in which the ambient temperature is always above 34° F (1° C) in which to install the tank, pressure switch, and pressure relief valve. The tank should be located in an area where a leak will not damage property.

The pressure switch should be located at the tank cross tee and never more than 4' from the tank. Locating the switch more than 4' from the tank will cause switch chatter.

There should be no valves, filters, or high loss fittings between the switch and the tank(s) as switch chatter may result. As an example, a 1 1/4" spring check valve has friction loss equal to 12' of pipe, placing the valve between the pressure switch and the pressure tank is the same as moving the pressure switch 12' away from the tank. It will create switch chatter.

On multiple tank installations the switch should be as close to the center of the tanks as possible. Multiple tank installations should have a manifold pipe at least 1 1/2 times the size of the supply pipe from the pump. This is to reduce the Friction Head in the manifold and to reduce the possibility of switch chatter.

The cut-in setting on a 30 - 50 pressure switch is 30 psi. Cut-in is the lower of the pressure settings.

Pressure relief valves are required on any system that is capable of producing 100 psi or 230' TDH. If in an area where a water leak or blow-off may damage property connect a drain line to the pressure relief valve. Run it to a suitable drain or an area where the water will not damage property.

2.3 Adjusting Tank Pre-Charge

Insure that the tank is empty of water. Use a high quality pressure gauge to check the tank pre-charge pressure. The pressure should be 2 psi below the pump cut-in pressure. As an example, a 30-50 psi system would use a tank pre-charge of 28 psi.

2.4 Discharge Pipe and Check Valve

Note: The discharge head is threaded into the casing with left-hand threads. Please hold the pump only at the discharge head with a pipe wrench when installing fittings. Failure to hold the discharge head will loosen it and pump damage will result on start-up.

If your pipe requires an adapter we strongly recommend using stainless steel. Galvanized fittings or pipe should never be connected directly to a stainless steel discharge head as galvanic corrosion may occur. Plastic or brass pumps can use any material for this connection. Barb type connectors should always be double clamped.

The pump discharge head has a loop for attaching a safety cable. The use of a safety cable is at the discretion of the installer.

2.5 Installing Pump in Well

If you are using a torque arrestor, install it per the manufacturer's installation instructions. Goulds Pumps does not sell torque arrestors and has no installation instructions, please consult the seller for information.

Connect the discharge pipe to the discharge head or adapter you previously installed. Barb style connectors should always be double clamped. You can install the pump into the well using a pitless adapter or similar device at the wellhead. Consult the fitting manufacturer or pitless supplier for specific installation instructions. Using waterproof electrical tape fasten the wires to the drop pipe at

10' intervals. Make sure that the tape does not loosen as it will block the pump suction if it falls down the well. Pump suppliers also sell clip-on style wire connectors that attach to the drop pipe.

2.6 Special Piping For Galvanized Tank Systems

When using a galvanized tank you should install an AV11 Drain & Y fitting in the well and an AV9 check valve with snifter valve at the tank. This will add air to the tank on each pump start and prevent water logging the tank. Use an AA4 Air Escape on the tank to allow excess air to escape. The distance between the AV11 and AV9 determines the amount of air introduced on each cycle. See the table for recommended settings. *See Fig. 2 in Sec 1.0.*

Gaseous wells should use galvanized tanks with AA4 air escapes to vent off excess air and prevent "spurting" at the faucets.

Methane and other explosive or dangerous gases require special water treatment for safe removal. Consult a water treatment specialist to address these issues.

Installations with top feeding wells should use flow sleeves on the pump.



3.0 WIRE SIZING, SPLICING and POWER SUPPLY

Always follow the National Electric Code (N.E.C.), Canadian Electrical Code, and any state, provincial, or local codes.

We suggest using only copper wire. Size wire from the charts found in your Goulds Pumps catalog - Jet & Sub Accessories - Electrical Section, in the Franklin Electric AIM manual, or an N.E.C. (National Electric Code) code book. If discrepancies exist the N.E.C. book takes precedence over a manufacturer's recommendations.

3.1 Splicing Wire to Motor Leads

When the drop cable must be spliced or connected to the motor lead it is necessary that the splice be watertight. The splice can be done with heat shrink kits or waterproof tape.

A. Heat Shrink Splice Instructions

To use a typical heat shrink kit: strip $\frac{1}{2}$ " from the motor wires and drop cable wires, it is best to stagger the splices. Place the heat shrink tubes on the wires. Place the crimps on the wires and crimp the ends. Slide the heat shrink tubes over the crimps and heat from the center outward. The sealant and adhesive will ooze out the ends when the tube shrinks. The tube, crimps, sealant, and adhesive create a very strong, watertight seal.

B. Taped Splice Instructions

- A) Strip individual conductor of insulation only as far as necessary to provide room for a stake type connector. Tubular connectors of the staked type are preferred. If connector O.D. is not as large as cable insulation, build-up with rubber electrical tape.
- B) Tape individual joints with rubber electrical tape, using two layers; the first extending two

inches beyond each end of the conductor insulation end, the second layer two inches beyond the ends of the first layer. Wrap tightly, eliminating air spaces as much as possible.

- C) Tape over the rubber electrical tape with #33 Scotch electrical tape, or equivalent, using two layers as in step "B" and making each layer overlap the end of the preceding layer by at least two inches.

In the case of a cable with three conductors encased in a single outer sheath, tape individual conductors as described, staggering joints.

Total thickness of tape should be no less than the thickness of the conductor insulation.



4.0 WIRING THE CONTROLS and SWITCH

4.1 Mounting the Motor Control Box

Franklin and Goulds Pumps single phase 3-wire control boxes meet U.L. requirements for Type 3R enclosures. They are suitable for vertical mounting in indoor and outdoor locations. They will operate at temperatures between 14°F (-10°C) and 122°F (50°C). Select a shaded, dry place to mount the box. Insure that there is enough clearance for the cover to be removed.

4.2 Verify Voltage and Turn Supply Power Off

Insure that your motor voltage and power supply voltage are the same.

Place the circuit breaker or disconnect switch in the OFF position to prevent accidentally starting the pump before you are ready.

Three-phase starter coils are very voltage sensitive; we suggest you always verify actual supply voltage with a voltmeter.

High or low voltage, greater than $\pm 10\%$, will damage motors and controls and is not covered under warranty.

4.3 Connecting Motor Leads to Motor Control Box, Pressure Switch, or Starter



Caution Do not power the unit or run the pump until all electrical and plumbing connections are completed. Verify that the disconnect or breaker is OFF before connecting the pressure switch line leads to the power supply. Follow all local and national codes. Use a disconnect where required by code.

A. Three-Wire Single Phase Motor

Connect the color coded motor leads to the motor control box terminals - Y (yellow), R (red), and B (black); and the Green or bare wire to the green ground screw.

Connect wires between the Load terminals on the pressure switch and control box terminals L1 and L2. Run a ground wire between the

switch ground and the control box ground. *See Figure 4 or 5*

B. Two-Wire Single Phase Motor

Connect the black motor leads to the Load terminals on the pressure switch and the green or bare ground wire to the green ground screw. *See Figure 3*

C. Three phase motors

Connect the motor leads to T1, T2, and T3 on the 3 phase starter. Connect the ground wire to the ground screw in the starter box. Follow starter manufacturers instructions for connecting pressure switch or *see Figure 6*.



4.4 Connect To Power Supply

Complete the wiring by making the connection from the single phase pressure switch Line terminals to the circuit breaker panel or disconnect where used.

On three phase installations make the connections between L1, L2, L3, and ground on the starter to the disconnect or circuit breaker.

Three phase submersible motors require Class 10 Quick-Trip overloads. Our ESP100 starters use adjustable overloads which you must adjust during installation. Goulds Pumps sells Furnas starters which use “K” heaters for Class 10 ambient compensated overload protection. Use of Class 20 overloads voids the motor warranty.

Three phase installations must be checked for motor rotation and phase unbalance. To reverse motor rotation switch (reverse) any two

leads. See the instructions for checking three phase unbalance in the Technical Section of this manual. Failure to check phase unbalance can cause premature motor failure and nuisance overload tripping. If using a generator, see Technical Data for generators.

5.0 STARTING THE PUMP



5.1 Throttling Discharge On Start-Up

If the pump will be operated to clear the well and/or operate with no pressure or very little head we strongly suggest you throttle the discharge. Install a ball valve in the discharge line. Open the valve to approximately $\frac{1}{3}$ open on system start-up. After starting, use the valve to adjust the flow. This will prevent upthrust damage to the pump and motor bearings. It will also keep the pump running in its recommended operating range. *Starting or running a pump with little or no head is a major cause of premature failure.*



5.2 Throttling A High Static Level Well To Prevent Upthrust

Any well with a high static water level may allow the pump to operate off the curve to the right or outside the “Recommended Range” shown on the pump curve. We recommend using a “Dole” flow restrictor or throttling with a ball valve to prevent upthrust damage to the pump and motor. The maximum flow must be restricted to be within the pumps recommended operating

range. If you use a ball valve, set it, remove the handle, tape the handle to the pipe, and tag the valve with a note saying, “Do not open this valve or pump may be damaged”. The easiest way to “set” the flow is to fill a 5 gallon bucket and time how long it takes to produce 5 gallons. Calculate the flow in gpm based on this value. As the water level drops in the well the flow will be reduced due to increased head and the valve will not interfere with performance.

5.3 Start the Pump

Partially open a valve (faucet) in the system and turn the breaker to the ON position.

Check all fittings for leaks.

Close the valve when the water clears and allow the pressure to build. If properly adjusted the switch should turn the pump off at the preset pressure. Open a few faucets and allow the pump to run through a few cycles. Check switch operation and verify that pressure settings are correct.

Recheck all fittings for leaks.

6.0 PAPERWORK and IOM

Please give the owner all warranty and IOM paperwork. It is wise to include your business card with the Goulds Pumps supplied paperwork. A sticker with your name and phone number on the tank or control box is a great sales tool for future business!

Congratulations on completing a professional installation of a Goulds Pump.

SINGLE PHASE – 60 HZ MOTOR SPECIFICATIONS ①

Type, Tipo, Type	Goulds # Goulds n°	Franklin # Franklin n°	HP, CV, hp	Volts, Voltios, V	Hz	S.F. FS	Amps, Amperios, A	S.F. Amps A avec FS	⑤ Ohms M=Main S=Start	⑥ Std. Cir. Br.	⑦ Delay Fuse	⑧ Control Box
④ 4" 2W	S04932	2445040	½	115	60	1.60	10.0	12.0	1.0 – 1.3	30	15	N/R, NR
	S04942	2445050	½	230	60	1.60	5.0	6.0	4.2 – 5.2	15	7	N/R, NR
	S05942	2445070	¾	230	60	1.50	7.2	8.4	3.0 – 3.6	25	10	N/R, NR
	S06942	2445081	1	230	60	1.40	8.2	9.8	2.2 – 2.7	25	12	N/R, NR
	S07942	2445091	1½	230	60	1.30	10.6	13.1	1.5 – 1.9	35	15	N/R, NR
③ 4" 3W	S04930	2145044	½	115	60	1.60	Y=10.0 B=10.0 R=0.0	Y=12.0 B=12.0 R=0.0	M = 1.0 – 1.3 S = 4.1 – 5.1	30	15	00043
	S04940	2145054	½	230	60	1.60	Y=5.0 B=5.0 R=0.0	Y=6.0 B=6.0 R=0.0	M = 4.2 – 5.2 S = 16.7 – 20.5	15	7	00044
	S05940	2145074	¾	230	60	1.50	Y=5.0 B=5.0 R=0.0	Y=6.0 B=6.0 R=0.0	M = 3.0 – 3.6 S = 11.0 – 13.4	25	10	00054
	S06940	2145081	1	230	60	1.40	Y=8.2 B=8.2 R=0.0	Y=9.8 B=9.8 R=0.0	M = 2.2 – 2.7 S = 10.1 – 12.3	25	12	00064
② 4" 3W with RunCap	S07940	2243001	1½	230	60	1.30	Y=10.0 B=9.9 R=1.3	Y=11.6 B=11.0 R=1.3	M = 1.5 – 2.3 S = 6.2 – 12.0	30	15	00074
	S08940	2243011	2	230	60	1.25	Y=10.0 B=9.9 R=2.6	Y=13.2 B=11.9 R=2.6	M = 1.6 – 2.3 S = 5.2 – 7.15	30	15	00084
	S09940	2243027	3	230	60	1.15	Y=14.0 B=12.2 R=4.7	Y=17.0 B=14.5 R=4.5	M = 0.9 – 1.5 S = 3.0 – 4.9	45	20	00094
	S10940	2243037	5	230	60	1.15	Y=23.0 B=19.1 R=8.0	Y=27.5 B=23.2 R=7.8	M = 0.68 – 1.0 S = 2.1 – 2.8	70	30	00104

⑨ M = Main Winding – Black to Yellow, S = Start Winding – Red to Yellow

⑩ Y = Yellow lead – line amps, B = Black lead – main winding amps, R = Red lead, start or auxiliary winding amps

FS = facteur de surcharge ; NR = non requise.

1. ESPECIFICACIONES DE MOTOR DE 60 HZ, MONOFÁSICO

1. CARACTÉRISTIQUES DES MOTEURS MONOPHASÉS, 60 Hz

2. 4" de tres alambres con capacitor de funcionamiento

2. 4 po, 3 fils et condensateur de marche

3. 4" de tres alambres

3. 4 po, 3 fils

4. 4" de dos alambres

4. 4 po, 2 fils

5. L1-L2 Resistencia – M=Principal, S=Arranque

5. Voir le renvoi 9. Le 10 est en p. 11.

10

6. Cortacircuitos estándar

6. Disjoncteur standard

7. Fusible de retardo

7. Fusible à action retardée

8. Caja de control

8. Boîte de commande

9. M=Devanado principal – Negro a amarillo;

S=Devanado de arranque – Rojo a Amarillo

9. M = enroulement principal – entre le fil noir et le jaune ;

S = enroulement de démarrage – entre le fil rouge et le jaune.

THREE PHASE – 60 HZ MOTOR SPECIFICATIONS ①

Type, Tipo, Type	Goulds # Goulds n°	Franklin # Franklin n°	HP, CV hp	Volts, V	Hz	S.F. FS	Amps, Amperios A	S.F. A avec FS	⑫ Ohms	⑬ Locked Rotor Amps	KVA Code ⑭	⑥ Std. Cir. Br.	⑦ Delay Fuse	FURNAS Class 16 Starter Size ⑮	Htrs. ⑯
4" 3450 RPM, 4 po, 3 450 r/min	S04978	234501	½	200	60	1.6	2.8	3.4	6.64 – 7.3	17.3	N	10	5	16AD	K29
	S04970	234511	½	230	60	1.6	2.4	2.9	9.5 – 10.4	15.0	N	8	4	16AG	K28
	S04975	234521	½	460	60	1.6	1.2	1.5	38.4 – 41.6	7.5	N	4	2	16AH	K21
	S05978	234502	¾	200	60	1.5	3.6	4.4	4.66 – 5.12	24.6	N	12	6	16AD	K34
	S05970	234512	¾	230	60	1.5	3.1	3.8	7.24 – 7.84	21.4	N	11	5	16AG	K32
	S05975	234522	¾	460	60	1.5	1.6	1.9	27.8 – 30.2	10.7	N	5	3	16AH	K23
	S06978	234503	1	200	60	1.4	4.5	5.4	4.1 – 4.5	31.0	M	15	6	16AD	K37
	S06970	234513	1	230	60	1.4	3.9	4.7	5.2 – 5.6	27.0	M	12	6	16AG	K34
	S06975	234523	1	460	60	1.4	2.0	2.4	21.2 – 23.0	13.5	M	6	3	16AH	K26
	S07978	234504	1½	200	60	1.3	5.8	6.8	2.5 – 3.0	38.1	K	20	8	16AD	K42
	S07970	234514	1½	230	60	1.3	5.0	5.9	3.2 – 4.0	33.1	K	15	7	16AG	K39
	S07975	234524	1½	460	60	1.3	2.5	3.1	13.0 – 16.0	16.6	K	8	4	16AH	K29
	S07979	234534	1½	575	60	1.3	2.0	2.4	20.3 – 25.0	13.2	K	6	3	16AE	K26
	S08978	234305	2	200	60	1.25	7.7	9.3	1.9 – 2.4	53.6	L	25	10	16AD	K50
	S08970	234315	2	230	60	1.25	6.7	8.1	2.4 – 3.0	46.6	L	20	10	16AG	K43
	S08975	234325	2	460	60	1.25	3.4	4.1	9.7 – 12.0	23.3	L	15	5	16AH	K33
	S08979	234335	2	575	60	1.25	2.7	3.2	15.1 – 18.7	18.6	L	15	4	16AE	K29
	S09978	234306	3	200	60	1.15	10.9	12.5	1.3 – 1.7	71	K	35	15	16AD	K55
	S09970	234316	3	230	60	1.15	9.5	10.9	1.8 – 2.2	62	K	30	12	16AG	K52
	S09975	234326	3	460	60	1.15	4.8	5.5	7.0 – 8.7	31	K	15	6	16AH	K37
	S09979	234336	3	575	60	1.15	3.8	4.4	10.9 – 13.6	25	K	12	5	16AE	K34
	S10978	234307	5	200	60	1.15	18.3	20.5	.70 – .94	122	K	50	25	16AD	K62
	S10970	234317	5	230	60	1.15	15.9	17.8	.93 – 1.2	106	K	45	20	16AG	K61
	S10975	234327	5	460	60	1.15	8.0	8.9	3.6 – 4.4	53	K	25	10	16AH	K49
	S10979	234337	5	575	60	1.15	6.4	7.1	5.6 – 6.9	43	K	20	8	16AE	K42
	S119784	234308	7½	200	60	1.15	26.5	30.5	.46 – .57	188	K	80	35	16CD	K70
	S119704	234318	7½	230	60	1.15	23.0	26.4	.61 – .75	164	K	70	30	16BG	K67
	S119754	234328	7½	460	60	1.15	11.5	13.2	2.4 – 3.4	82	K	35	15	16AH	K55
	S129724	234339	10	460	60	1.15	13.6	15.0	2.8 – 3.5	93	K	40	20	16AH	K61

10. Y=Conductor amarillo - amperios de línea. B=Conductor negro - amperios del devanado principal. R=Conductor rojo - amperios del devanado de arranque o auxiliar.

10. Y=fil jaune ; B=fil noir - enroulement principal ; R=fil rouge - enroulement de démarrage ou auxiliaire.

11.ESPECIFICACIONES DE MOTOR DE 60 HZ, TRIFÁSICO

11.CARACTÉRISTIQUES DES MOTEURS TRIPHASÉS, 60 Hz

12. Ohmios

12. Ω

14. KVA Código

14. Code kV·A

16. FURNAS Class 16 Calentador

16. Dispositif de protection contre la surcharge Furnas, classe 16

FS = facteur de surcharge

13. Rotor frenado amperios

13. A avec rotor bloqué

15. FURNAS Class 16 Arrancador

15. Démarreur Furnas, classe 16

Technical Data

MOTOR INSULATION RESISTANCE READINGS

Normal Ohm/Megohm readings, ALL motors, between all leads and ground



To perform insulation resistance test, open breaker and disconnect all leads from QD control box or pressure switch. Connect one ohmmeter lead to any motor lead and one to metal drop pipe or a good ground. **R x 100K Scale**

Condition of Motor and Leads	OHM Value	Megohm Value
New motor, without power cable	20,000,000 (or more)	20.0
Used motor, which can be reinstalled in well	10,000,000 (or more)	10.0
Motor in well – Readings are power cable plus motor		
New motor	2,000,000 (or more)	2.0
Motor in reasonably good condition	500,000 to 2,000,000	0.5 – 2.0
Motor which may be damaged or have damaged power cable <i>Do not pull motor for these reasons</i>	20,000 to 500,000	0.02 – 0.5
Motor definitely damaged or with damaged power cable <i>Pull motor and repair</i>	10,000 to 20,000	0.01 – 0.02
Failed motor or power cable <i>Pull motor and repair</i>	Less than 10,000	0 – 0.01

Generator Operation

- For externally regulated generator kilovolt amperes (KVA) ratings see Table 1. Electrical voltage, frequency, phase and ampacity, **MUST** match that shown on the motor nameplate, or pump control box.



FAILURE TO USE A MANUAL OR AUTOMATIC TRANSFER SWITCH WHEN GENERATOR IS USED AS STANDBY OR BACKUP CAN CAUSE SHOCK, BURNS OR DEATH.

Min. Generator Rating	Pump Motor Horsepower ①							
	1/3	1/2	3/4	1	1 1/2	2	3	5
KVA	1.9	2.5	3.8	5.0	6.3	9.4	12.5	18.8
KW	1.5	2.0	3.0	4.0	5.0	7.5	10.0	15.0

① **NOTE:** For two-wire motors, minimum generator ratings 50% higher than shown are necessary.

NOTICE: FOLLOW THE GENERATOR MANUFACTURER'S INSTRUCTIONS CAREFULLY.

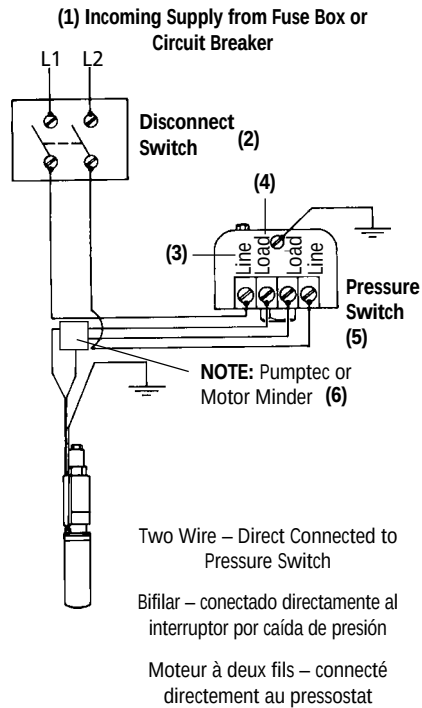
Courtesy of Franklin Electric Company

Troubleshooting



DISCONNECT AND LOCKOUT ELECTRICAL POWER BEFORE ATTEMPTING ANY SERVICE. FAILURE TO DO SO CAN CAUSE SHOCK, BURNS OR DEATH.

Symptom	Probable Cause	Recommended Action
PUMP MOTOR NOT RUNNING	1. Motor thermal protector tripped a. Incorrect control box b. Incorrect or faulty electrical connections c. Faulty thermal protector d. Low voltage e. Ambient temperature of control box/starter too high f. Pump bound by foreign matter g. Inadequate submergence	1. Allow motor to cool, thermal protector will automatically reset a – e. Have a qualified electrician inspect and repair, as required f. Pull pump, clean, adjust set depth as required g. Confirm adequate unit submergence in pumpage
	2. Open circuit breaker or blown fuse	2. Have a qualified electrician inspect and repair, as required
	3. Power source inadequate for load	3. Check supply or generator capacity
	4. Power cable insulation damage 5. Faulty power cable splice	4 – 5. Have a qualified electrician inspect and repair, as required
LITTLE OR NO LIQUID DELIVERED BY PUMP	1. Faulty or incorrectly installed check valve	1. Inspect check valve, repair as required
	2. Pump air bound	2. Successively start and stop pump until flow is delivered
	3. Lift too high for pump	3. Review unit performance, check with dealer
	4. Pump bound by foreign matter	4. Pull pump, clean, adjust set depth as required
	5. Pump not fully submerged	5. Check well recovery, lower pump if possible
	6. Well contains excessive amounts of air or gases	6. If successive starts and stops does not remedy, well contains excessive air or gases
	7. Excessive pump wear	7. Pull pump and repair as required
	8. Incorrect motor rotation – three phase only.	8. Reverse any two motor electrical leads



1. Suministro de entrada de la caja de fusibles o del cortacircuitos

2. Interruptor de desconexión

3. Línea

4. Carga

5. Interruptor por caída de presión

6. NOTA: Pumptec o Motor Minder

7. Caja de control trifilar

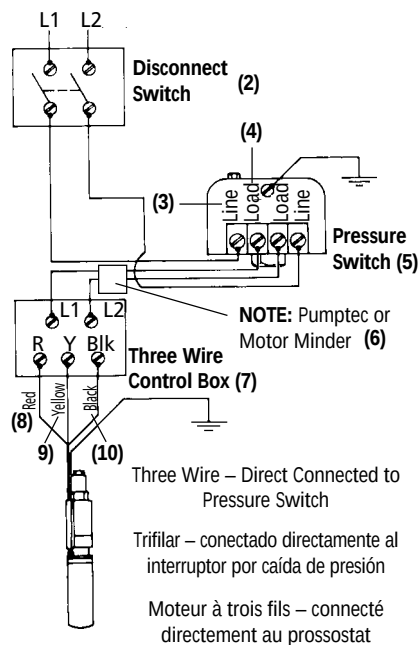
8. Rojo

9. Amarillo

10. Negro

Figure (Figura) 3

(1) Incoming Supply from Fuse Box or Circuit Breaker



4. Charge

5. Pressostat

6. Protection Pumptec ou Motor Minder

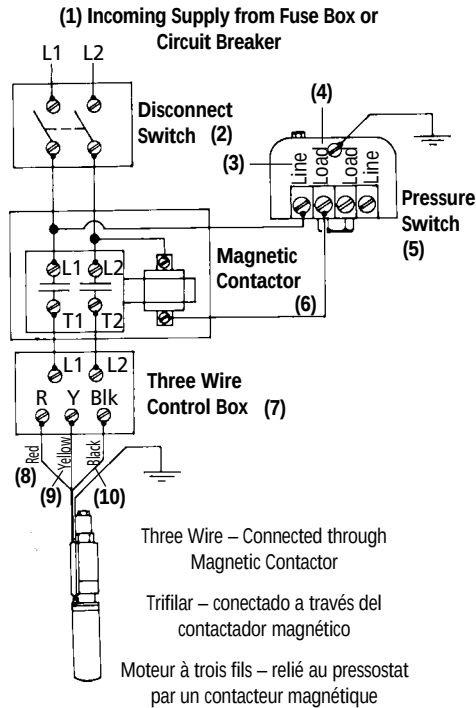
7. Boîte de commande à trois fils

8. Rouge

9. Jaune

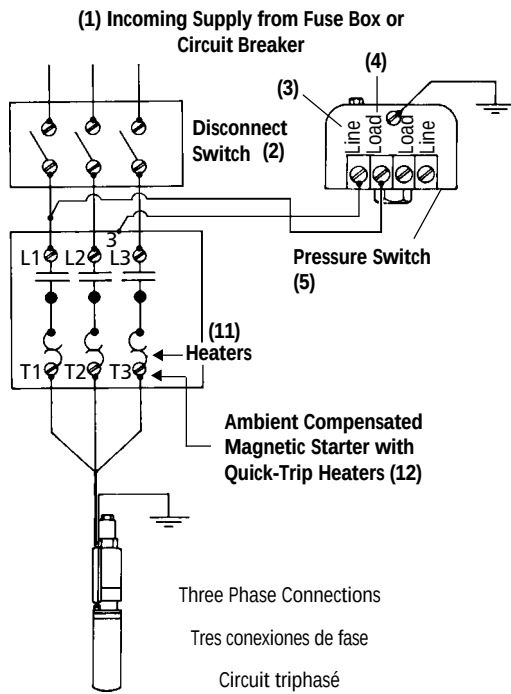
10. Noir

Figure (Figura) 4



1. Suministro de entrada de la caja de fusibles o del cortacircuitos
2. Interruptor de desconexión
3. Línea
4. Carga
5. Interruptor por caída de presión
6. Contactador magnético
7. Caja de control trifilar
8. Rojo
9. Amarillo
10. Negro
11. Calentadores
12. Arrancador magnético con compensación ambiental con calentadores de disparo rápido

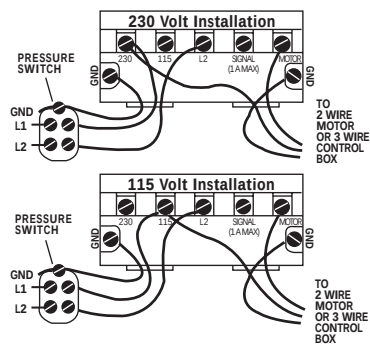
Figure (Figura) 5



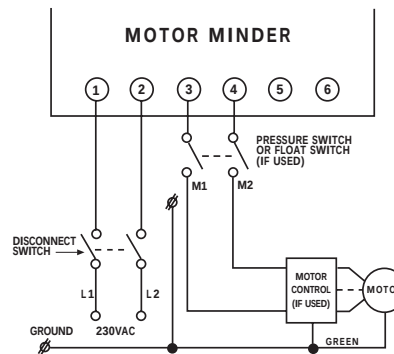
1. Courant d'entrée provenant de la boîte à fusibles ou du disjoncteur
2. Sectionneur
3. Ligne
4. Charge
5. Pressostat
6. Contacteur magnétique
7. Boîte de commande à trois fils
8. Rouge
9. Jaune
10. Noir
11. Dispositifs de protection contre la surcharge (DPS)
12. Démarreur magnétique compensé (température ambiante) avec DPS à déclenchement rapide

Figure (Figura) 6

PUMPTEC WIRING



MOTOR MINDER WIRING



ACCESSORIES

Hydro-Pro™ Tanks

Tanks should be sized to allow pumps between $\frac{1}{2}$ and $1\frac{1}{2}$ hp to run for at least 1 minute. Two (2) hp and larger pumps should run at least 2 minutes. If the pump averages 10 gpm and you run it for 1 minute you need a 10 gallon “drawdown” tank. See your Goulds Pumps Products catalog for Hydro-Pro™ Tank data.

Low Water Protection

Goulds Pumps offers Franklin Electric Pumptec, Pumptec Plus, QD Pumptec for single phase, and Subtrol for 3 Ø low water protection. We also sell Integra Motor Check and Motor Minders which are available for single and three phase low water protection. See the Jet & Submersible

Accessories -Electrical Section in your catalog or contact your pump supplier for information.

Electrical Panels

Goulds Pumps will build custom pump control panels. We will build custom panels only with written specifications. Please send written specifications to your authorized distributor. They will forward it to the Goulds Pumps Customer Service Group that supports their product line. Specifications should include pump HP, voltage, phase, Nema enclosure type, sequence of operation, special options needed, and a brief statement describing any special logic for alarms, timers, or duplexing features. The name and number of a contact person to answer questions is also appreciated and will speed the quote.

THREE PHASE POWER UNBALANCE

A full three phase supply consisting of three individual transformers or one three phase transformer is recommended. "Open" delta or wye connections using only two transformers can be used, but are more likely to cause poor performance, overload tripping or early motor failure due to current unbalance.

Check the current in each of the three motor leads and calculate the current unbalance as explained below.

If the current unbalance is 2% or less, leave the leads as connected.

If the current unbalance is more than 2%, current readings should be checked on each leg using each of the three possible hook-ups. Roll the motor leads across the starter in the same direction to prevent motor reversal.

To calculate percent of current unbalance:

- A. Add the three line amp values together.

- B. Divide the sum by three, yielding average current.

- C. Pick the amp value which is furthest from the average current (either high or low).

- D. Determine the difference between this amp value (furthest from average) and the average.

- E. Divide the difference by the average.
Multiply the result by 100 to determine percent of unbalance.

Current unbalance should not exceed 5% at service factor load or 10% at rated input load. If the unbalance cannot be corrected by rolling leads, the source of the unbalance must be located and corrected. If, on the three possible hookups, the leg farthest from the average stays on the same power lead, most of the unbalance is coming from the power source.

Contact your local power company to resolve the imbalance.

	Hookup 1			Hookup 2			Hookup 3		
Starter Terminals	L1	L2	L3	L1	L2	L3	L1	L2	L3
	$\frac{\perp}{\text{T}}$	$\frac{\perp}{\text{T}}$	$\frac{\perp}{\text{T}}$	$\frac{\perp}{\text{T}}$	$\frac{\perp}{\text{T}}$	$\frac{\perp}{\text{T}}$	$\frac{\perp}{\text{T}}$	$\frac{\perp}{\text{T}}$	$\frac{\perp}{\text{T}}$
Motor Leads	R	B	Y	Y	R	B	B	Y	R
	T3	T1	T2	T2	T3	T1	T1	T2	T3

Example:

T3-R = 51 amps	T2-Y = 50 amps	T1-B = 50 amps
T1-B = 46 amps	T3-R = 48 amps	T2-Y = 49 amps
T2-Y = <u>53</u> amps	T1-B = <u>52</u> amps	T3-R = <u>51</u> amps
Total = 150 amps	Total = 150 amps	Total = 150 amps
÷ 3 = 50 amps	÷ 3 = 50 amps	÷ 3 = 50 amps
— 46 = 4 amps	— 48 = 2 amps	— 49 = 1 amps
4 ÷ 50 = .08 or 8%	2 ÷ 50 = .04 or 4%	1 ÷ 50 = .02 or 2%

GOULDS PUMPS LIMITED WARRANTY

This warranty applies to all water systems pumps manufactured by Goulds Pumps.

Any part or parts found to be defective within the warranty period shall be replaced at no charge to the dealer during the warranty period. The warranty period shall exist for a period of twelve (12) months from date of installation or eighteen (18) months from date of manufacture, whichever period is shorter.

A dealer who believes that a warranty claim exists must contact the authorized Goulds Pumps distributor from whom the pump was purchased and furnish complete details regarding the claim. The distributor is authorized to adjust any warranty claims utilizing the Goulds Pumps Customer Service Department.

The warranty excludes:

- (a) Labor, transportation and related costs incurred by the dealer;
- (b) Reinstallation costs of repaired equipment;
- (c) Reinstallation costs of replacement equipment;
- (d) Consequential damages of any kind; and,
- (e) Reimbursement for loss caused by interruption of service.

For purposes of this warranty, the following terms have these definitions:

- (1) "Distributor" means any individual, partnership, corporation, association, or other legal relationship that stands between Goulds Pumps and the dealer in purchases, consignments or contracts for sale of the subject pumps.
- (2) "Dealer" means any individual, partnership, corporation, association, or other legal relationship which engages in the business of selling or leasing pumps to customers.
- (3) "Customer" means any entity who buys or leases the subject pumps from a dealer. The "customer" may mean an individual, partnership, corporation, limited liability company, association or other legal entity which may engage in any type of business.

THIS WARRANTY EXTENDS TO THE DEALER ONLY.

GARANTÍA LIMITADA DE GOULDS PUMPS

Esta garantía es aplicable a todas las bombas para sistemas de agua fabricadas por Goulds Pumps.

Toda parte o partes que resulten defectuosas dentro del período de garantía serán reemplazadas sin cargo para el comerciante durante dicho período de garantía. Tal período de garantía se extiende por doce (12) meses a partir de la fecha de instalación, o dieciocho (18) meses a partir de la fecha de fabricación, cualquiera se cumpla primero.

Todo comerciante que considere que existe lugar a un reclamo de garantía deberá ponerse en contacto con el distribuidor autorizado de Goulds Pumps del cual adquiriera la bomba, y ofrecer información detallada con respecto al reclamo. El distribuidor está autorizado a liquidar todos los reclamos por garantía a través del Departamento de Servicios a Clientes de Goulds Pumps.

La presente garantía excluye:

- (a) La mano de obra, el transporte y los costos relacionados en los que incurra el comerciante;
- (b) los costos de reinstalación del equipo reparado;
- (c) los costos de reinstalación del equipo reemplazado;
- (d) daños emergentes de cualquier naturaleza; y
- (e) el reembolso de cualquier pérdida causada por la interrupción del servicio.

A los fines de esta garantía, los términos "Distribuidor", "Comerciante" y "Cliente" se definen como sigue:

- (1) "Distribuidor" es aquel individuo, sociedad, corporación, asociación u otra entidad jurídica que opera entre Goulds Pumps y el comerciante para la compra, consignación o contratos de venta de las bombas en cuestión.
- (2) "Comerciante" es todo individuo, sociedad, corporación, asociación u otra entidad jurídica que realiza negocios de venta o alquiler-venta (leasing) de bombas a clientes.
- (3) "Cliente" es toda entidad que compra o que adquiere bajo la modalidad de leasing las bombas en cuestión de un comerciante. El término "cliente" puede significar un individuo, una sociedad, una corporación, una sociedad de responsabilidad limitada, una asociación o cualquier otra entidad jurídica con actividades en cualquier tipo de negocios.

LA PRESENTE GARANTÍA SE EXTIENDE AL COMERCIANTE ÚNICAMENTE

GARANTIE LIMITÉE DE GOULDS PUMPS

La présente garantie s'applique à chaque pompe de système d'alimentation en eau fabriquée par Goulds Pumps.

Toute pièce se révélant défectueuse sera remplacée sans frais pour le détaillant durant la période de garantie suivante expirant la première : douze (12) mois à compter de la date d'installation ou dix-huit (18) mois à partir de la date de fabrication.

Le détaillant qui, aux termes de cette garantie, désire effectuer une demande de règlement doit s'adresser au distributeur Goulds Pumps agréé chez lequel la pompe a été achetée et fournir tous les détails à l'appui de sa demande.

Le distributeur est autorisé à régler toute demande par le biais du service à la clientèle de Goulds Pumps.

La garantie ne couvre pas :

- a) les frais de main-d'œuvre ou de transport ni les frais connexes encourus par le détaillant ;
- b) les frais de réinstallation de l'équipement réparé ; c) les frais de réinstallation de l'équipement de remplacement ;
- d) les dommages indirects de quelque nature que ce soit ; e) ni les pertes découlant de la panne.

Aux fins de la présente garantie, les termes ci-dessous sont définis comme suit :

- 1) « Distributeur » signifie une personne, une société de personnes, une société de capitaux, une association ou autre entité juridique servant d'intermédiaire entre Goulds Pumps et le détaillant pour les achats, les consignations ou les contrats de vente des pompes en question.
- 2) « Détaillant » veut dire une personne, une société de personnes, une société de capitaux, une association ou autre entité juridique dont les activités commerciales sont la vente ou la location de pompes à des clients.
- 3) « Client » signifie une entité qui achète ou loue les pompes en question chez un détaillant. Un « client » peut être une personne, une société de personnes, une société de capitaux, une société à responsabilité limitée, une association ou autre entité juridique se livrant à quelque activité que ce soit.

CETTE GARANTIE SE RAPORTE AU DÉTAILLANT SEULEMENT.