

# TOTAL CONTROL™

RESIDENTIAL PUMP CONTROLLER - MOD. PCTC16F16S

## OWNER'S MANUAL

115 / 230 VAC DUAL VOLTAGE UNIT



File No: E191502 Mod. CP

### FEATURES & BENEFITS

TOTAL CONTROL can be installed on surface and submersible pumps for residential, domestic irrigation and booster systems.

- Provides for an adjustable downstream pressure.
- Avoids pressure and flow fluctuations.
- Eliminates pump pressure switch.
- Built-in pressure and flow switch.
- Built-in check valve.
- Built-in dry-run protection.
- Dual voltage 115 / 230 VAC.
- All inoxidable components.
- Assists in absorbing water hammer.
- Can be used with or without pressure tank.
- Simple installation saves space and time.
- No maintenance required.

**READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLATION**

INSTALLER - PLEASE LEAVE THIS MANUAL WITH THE UNIT OR GIVE TO END USER.

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## PLEASE READ BEFORE PROCEEDING WITH INSTALLATION

**FAILURE TO READ AND CONSIDER SAFETY INSTRUCTIONS IN THIS MANUAL OR ON TOTAL CONTROL PRES MAY RESULT IN PERSONAL INJURY OR SERIOUS DAMAGE TO PIPING OR FIXTURES !**



This is the safety alert. When you see this symbol in this manual, look for one of the following signal words and be alert to the potential for personal injury.



**DANGER**

Warns about hazards that **will** cause serious personal injury, death or major property damaged if ignored.



**WARNING**

Warns about hazards that **can** cause serious personal injury, death or major property damaged if ignored.



**DANGER**

**Hazardous pressure.**



**WARNING**

Under certain conditions, submersible pumps can develop extremely high pressure. Install a pressure reducing valve to limit pressure to safe levels for application. Be sure well is equipped with a pressure relief valve.



Do not allow pump, TOTAL CONTROL, piping, or any other system component containing water to freeze. Freezing may damage system, leading to injury or flooding. Allowing TOTAL CONTROL or system components to freeze will void warranty.



**DANGER**

**Hazardous voltage.**



**WARNING**

Can shock, burn or cause death.



Install ground and wire TOTAL CONTROL according to local code and National Electrical Code requirements.



Depressurize the system and disconnect power supply before installing or servicing TOTAL CONTROL.



Make sure line voltage and frequency of power supply match motor nameplate voltage and frequency and TOTAL CONTROL voltage and frequency.

Install TOTAL CONTROL according to all plumbing, pump and well code requirements.

Pipe joint compound can cause cracking in plastic. Use only Teflon tape when sealing joints in plastic pipe or connecting pipe to thermoplastic pumps and TOTAL CONTROL.

For threaded conduit opening - To be used with UL Listed or Recognized, liquid-tight non-metallic (plastic) conduit fittings.

**The manufacturer is not responsible or liable for damage due to improper installation or use.**

## TECHNICAL SPECIFICATIONS

- Single phase power-supply voltage	115 / 230 VAC
- Voltage variation tolerance	+/- 10 %
- Frequency	50 / 60 Hz
- Full load amp rating 115 VAC	16 FLA
- Full load amp rating 230 VAC	20 FLA
- Max working pressure	174 psi
- Pressure adjusting rangem	in 45 psi max 95 psi
- Max working temperature	149 °F (65°C)
- Inlet / Outlet connections	1 ¼" MPT
- Threaded gauge connection	¼" FPT
- Threaded conduit connections	½" FPT
- Electronic box enclosure	12 NEMA

## OPERATION



( green )

- Displays when power is connected to TOTAL CONTROL unit.
- In the event of a temporary power outage, TOTAL CONTROL resets automatically when power is restored.



( yellow )

- Displays when pump is running.



( red )

- Displays when there is a problem with the system.



( red )

- Press and hold to reset for 3-5 seconds ( with a tap opened ). Green "Power on" light and yellow "Pump on" should display. This indicates system is operating properly.
- If red "Failure" light comes back on, refer to Troubleshooting Guide.

## TROUBLESHOOTING

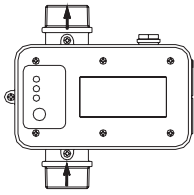
Operating faults	Main causes
Pump does not start	Check wiring connections. Check suction pipe, see page 6.
Pump turns on and off (short-cycles)	Leakage lower than minimum flow.
Pump does not stop	Leakage above minimum flow.
No water flow	Suction problems.

## MAINTENANCE AND SPARE PARTS

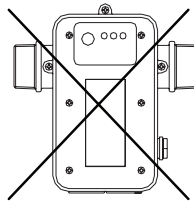
In the case of a fault in the electronic box, this can be replaced without removing the device as it is interchangeable and supplied on request.

Further malfunctioning can be avoided by checking the features of the device, pump and system with the warnings indicated in the installation guidelines.

## HYDRAULIC CONNECTION TO THE SYSTEM



OK

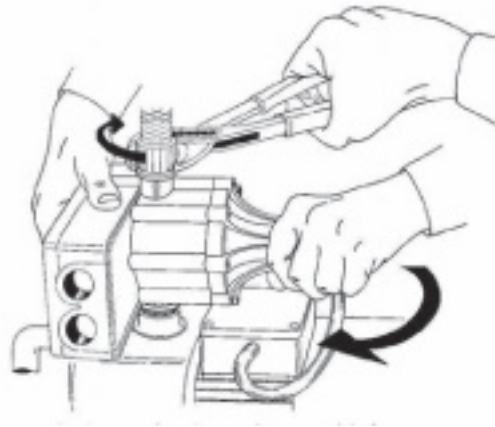
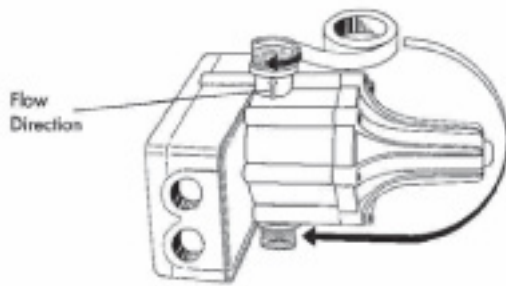


NO

Always install TOTAL CONTROL with flow arrows in the vertical position.

Electronic box must be level.

**Do not install any tee or tap between pump and TOTAL CONTROL unit.**

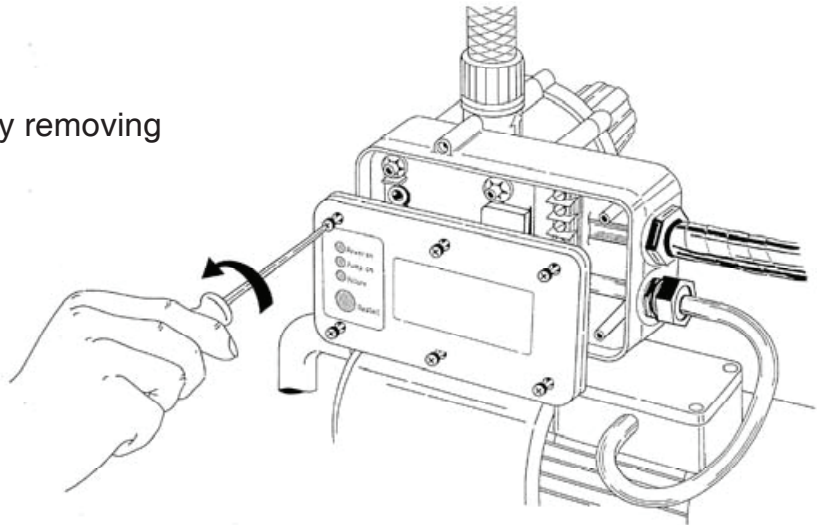


Prepare all threads with Teflon tape only.

**Do not over tighten water connections**, especially when installing with metal couplings. Damage to TOTAL CONTROL may result.

## CONDUIT CONNECTIONS

Open the electronic box cover by removing the six screws from the cover.

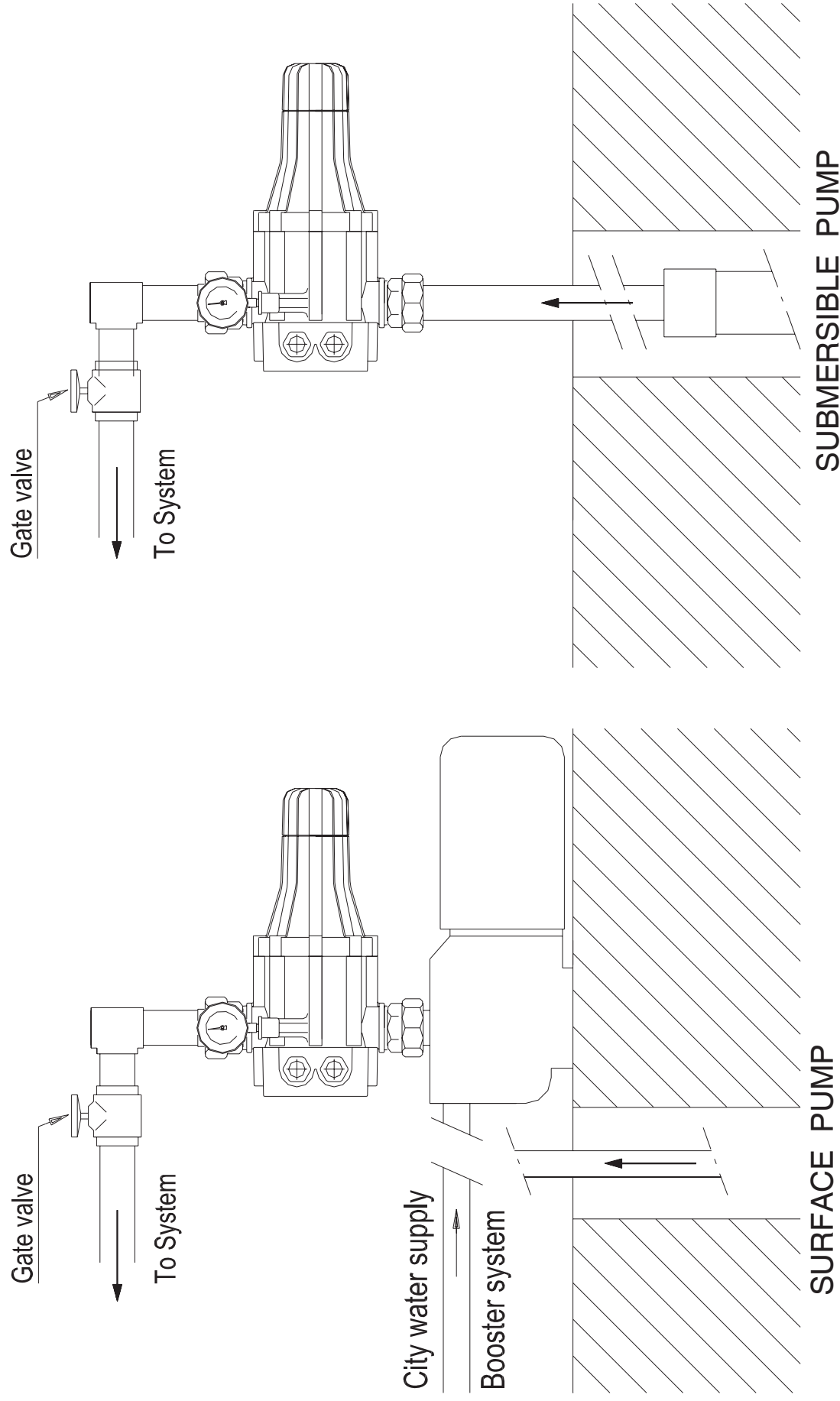


Line voltage and pump wires to the TOTAL CONTROL should be supplied through “liquid-tight” nonmetallic conduit fittings rated “NEMA 12” or “UL type 12” to achieve NEMA Type 12 enclosure rating.

**Failure to install unit without use of liquid tight conduit voids warranty!**

## TYPICAL TOTAL CONTROL INSTALLATION ON SURFACE AND SUBMERSIBLE PUMPS

TOTAL CONTROL can be installed on surface and submersible pumps for residential, domestic irrigation and booster systems.



If pressure exceeds 174 psi, install a pressure reducing valve.

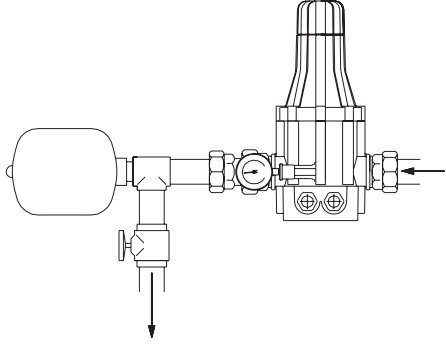
## TOTAL CONTROL INSTALLATION GUIDELINES AND WARNINGS

PLEASE READ PRECAUTIONS AND WARNINGS ON PAGE 2 BEFORE PROCEEDING WITH INSTALLATION

REMOVE PRESSURE SWITCH FROM PUMP AND WIRE TOTAL CONTROL DIRECTLY TO PUMP.

- **TOTAL CONTROL** provides for an adjustable downstream pressure between 45 psi to 95 psi.
- **Install TOTAL CONTROL only in clean water applications.**
- Always confirm pump and system characteristics before installation, see pages 7, 8.
- Confirm electrical characteristics of pump motor before installation, e.g. full load amps and voltage.
- **Must always be installed in the vertical position, flow arrows up, electronic box level.**
- **Do not install any tap or tee between the pump and the TOTAL CONTROL.**
- Install a gate valve after the TOTAL CONTROL unit. This allows testing of the pump and TOTAL CONTROL unit for efficiency and to confirm pump pressure.

## WHEN TO USE PRESSURE TANK



**A small pressure tank ( 1/2 to 2 gallons ) may be used:**

**1 - In case of pumps using BIAC switch starting system motors.**

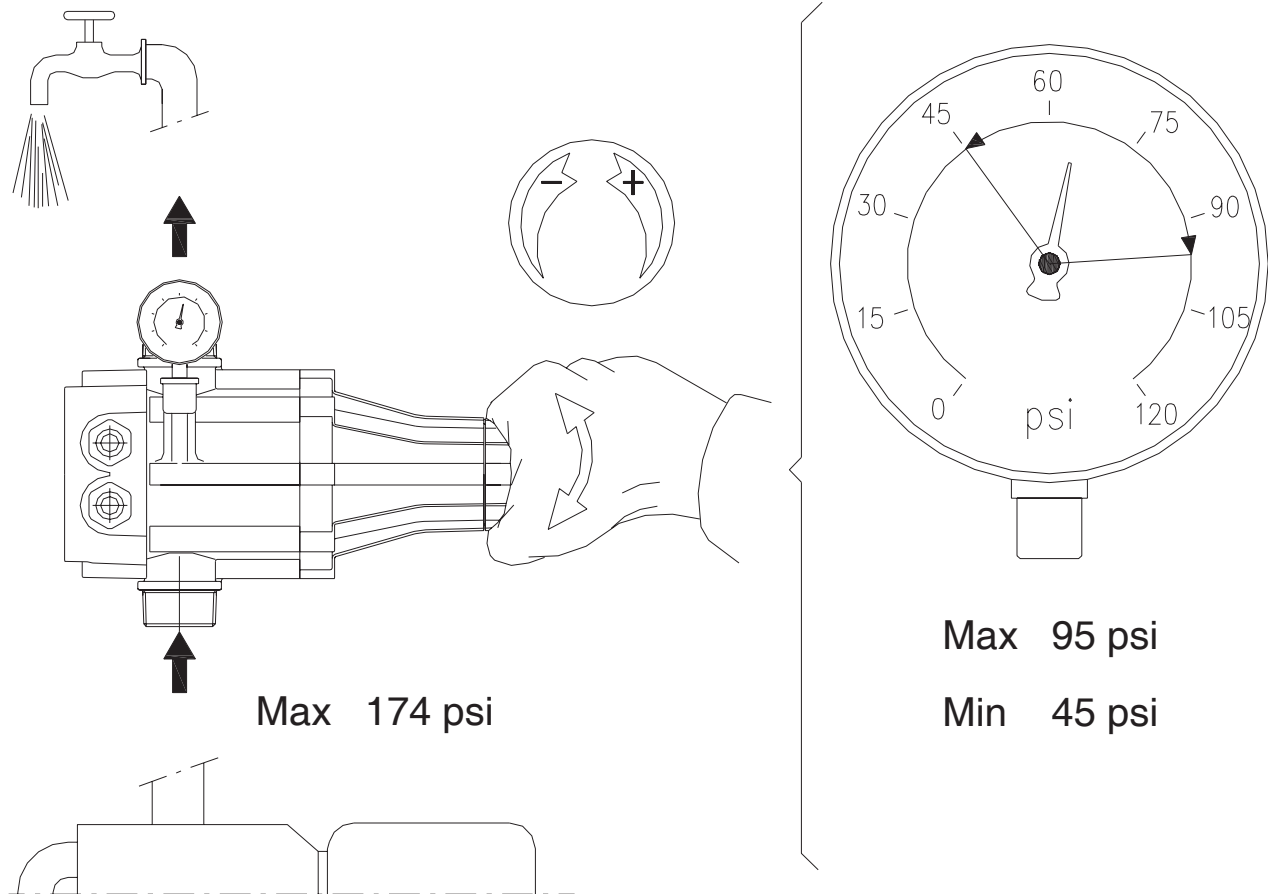
It allows bi-metal switch strips to cool in such a way to warrant the regular pump restart.

**2 - In case of minimal delivery demands.**

It allows for reducing the pump start-ups.

( Example: a glass of water, ice-making machine, inverse osmosis systems, or old systems with small losses).

## CALIBRATION



TOTAL CONTROL has a built-in pressure reducing valve, allowing for downstream pressure adjustment according to system requirements.

**System pressure can be adjusted between minimum 45 psi and maximum 95 psi.**

Open a tap to start up the pump, close the tap and wait for pump to stop, then check the system pressure on the pressure gauge, normally factory calibrated at 45 psi.

## PRESSURE LOSS

Flow rate	gpm	15	18	20	25	30	35
Total control	psi loss	4	6	7	10	14	19



## PRESSURE ADJUSTING PROCEDURE

Open a tap.

**TO INCREASE THE PRESSURE** turn the knob in the rear part of the unit clockwise.

**TO DECREASE THE PRESSURE** turn the knob counterclockwise.

Close the tap, wait several seconds for pump to stop and check the adjusted pressure.

Repeat the above operations until the desired pressure is obtained.

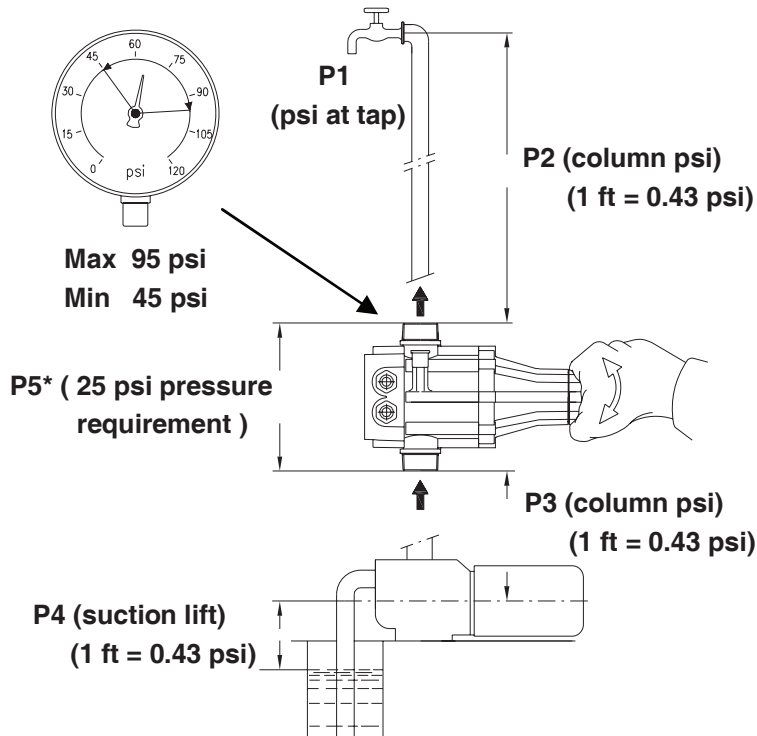
TDH = P1, P2, P3 and P4 total.

( consider friction loss )

**Minimum pump requirement is 25 psi ( P5 \* ) plus TDH.**

**Max inlet pressure to TOTAL CONTROL is 174 psi.**

104 ft ( 45 psi ) outlet of unit requires minimum 162 ft ( 70 psi ) at inlet.



Example: SUCTION SYSTEM

P1 = 90 ft ( 40.0 psi )

P2 = 20 ft ( 8.5 psi )

P3 = 1 ft ( 0.5 psi )

P4 = 15 ft ( 6.5 psi )

P5 \* = 57 ft ( 25.0 psi )

183 ft ( 80.5 psi ) = min pump requirement

Example: BOOSTER SYSTEM

P1 = 139 ft ( 60.0 psi )

P2 = 20 ft ( 8.5 psi )

P3 = 1 ft ( 0.5 psi )

P4 = <46 ft> (<20.0 psi>) ( incoming pressure )

P5 \* = 57 ft ( 25.0 psi )

171 ft ( 74.0 psi ) = min pump requirement

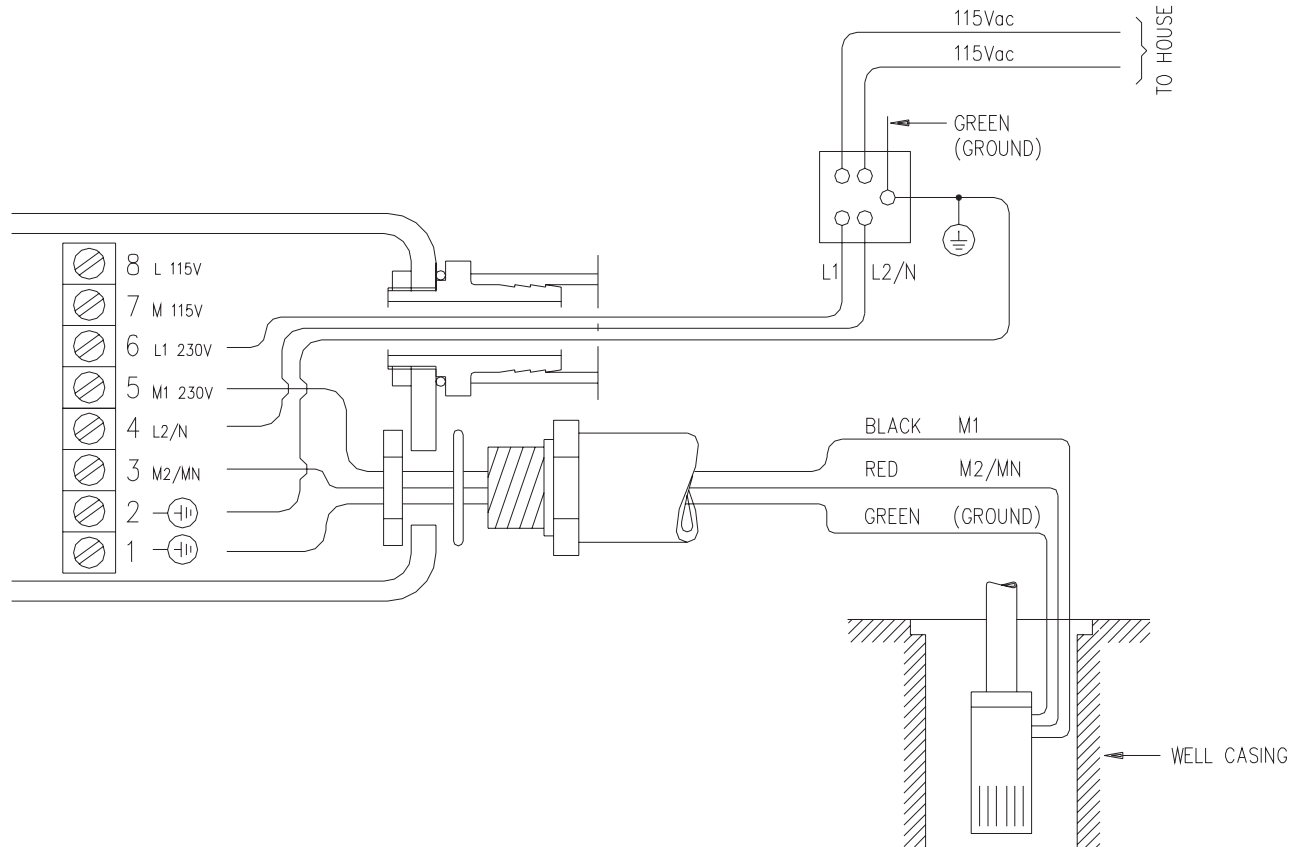
In the event the pump pressure does not reach the value stated above, the unit will go into Failure mode and will not restart the pump. In the event height of the water column exceeds the level indicated, the unit will not restart the pump.

To overcome these problems adjust system pressure to higher value.

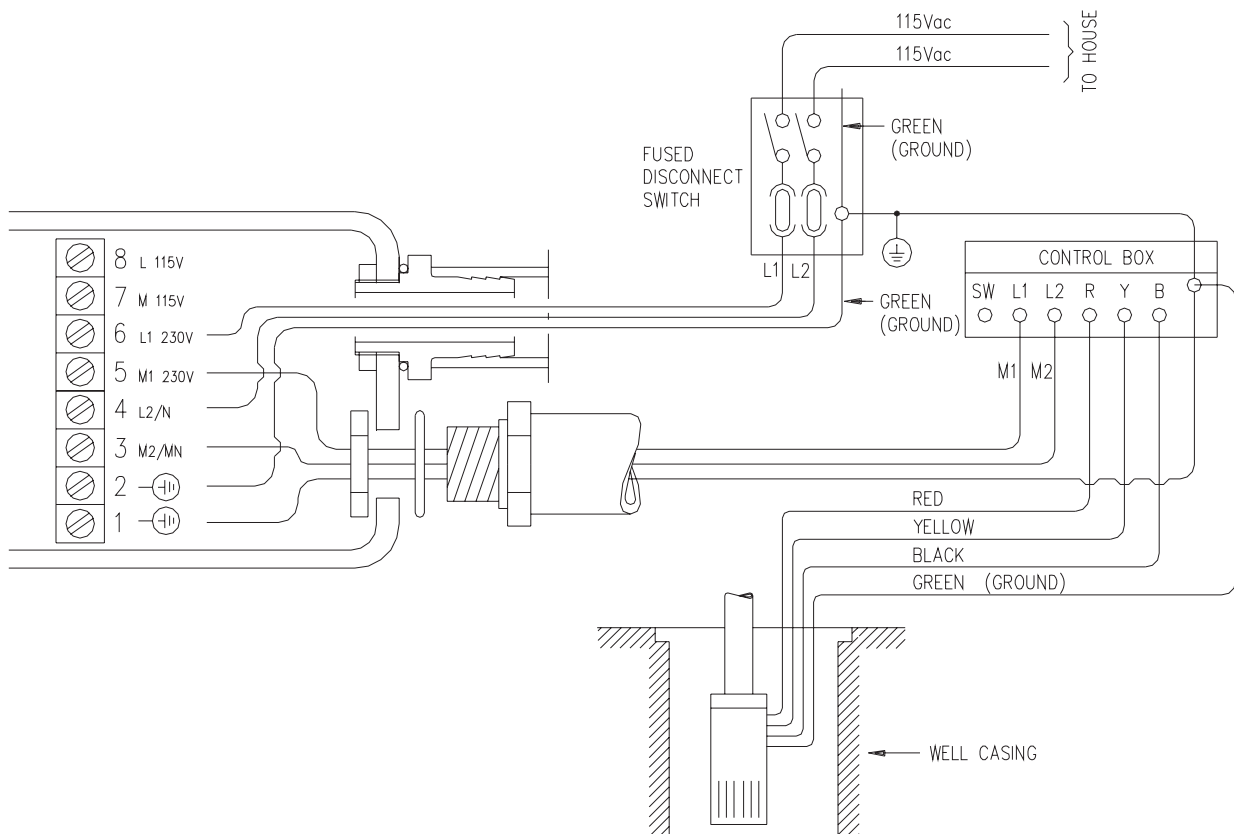
\* TOTAL CONTROL requires 25 psi to operate.



## INSTALLATION WIRING DIAGRAM - 230VAC 2-WIRE PUMPS UP TO 20 FLA



## INSTALLATION WIRING DIAGRAM - 230VAC 3-WIRE PUMPS UP TO 20 FLA



## WHEN TO USE CONTACTORS

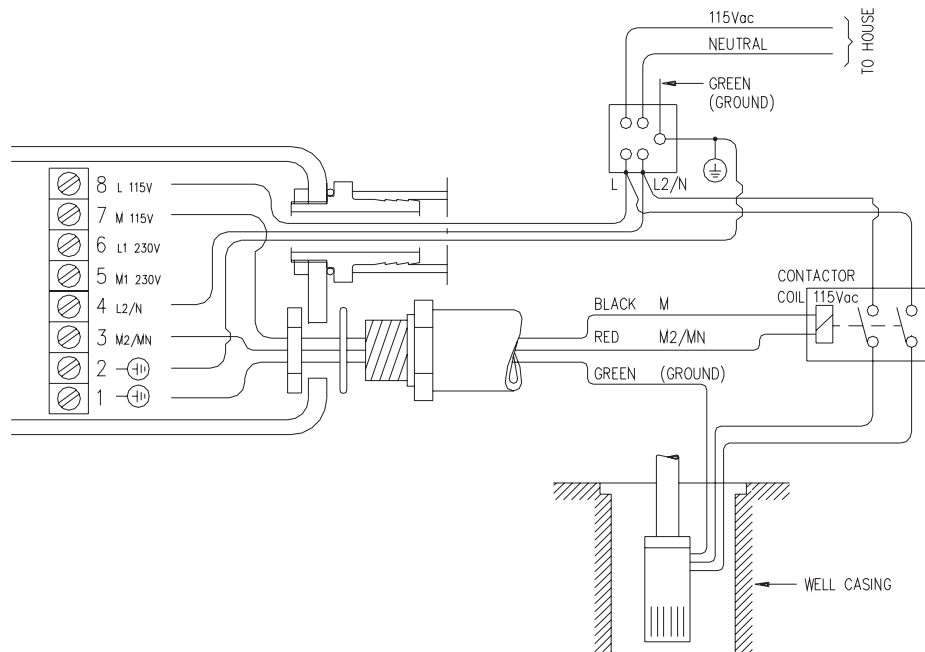
Use a contactor when:

- On 115V installations pump motor full load amps exceed 16 FLA.
- On 230V installations pump motor full load amps exceed 20 FLA.
- On all three-phase applications.

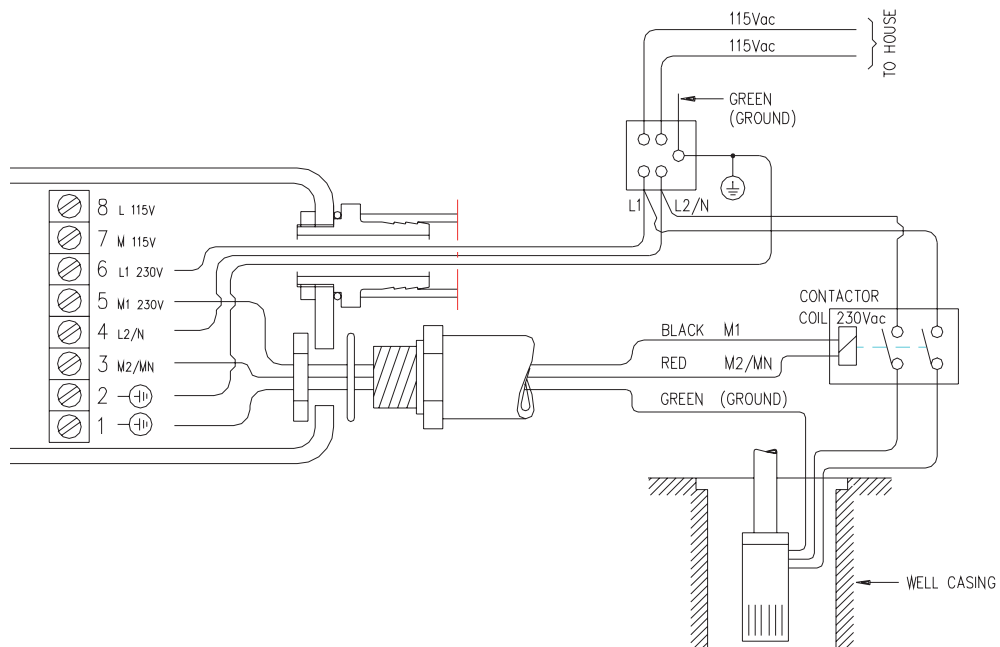
Remember, match coil voltage on contactor with TOTAL CONTROL voltage.  
Either 115V or 230V coils may be used.

Use of magnetic starter to avoid damage to the device is determined by pump motor.

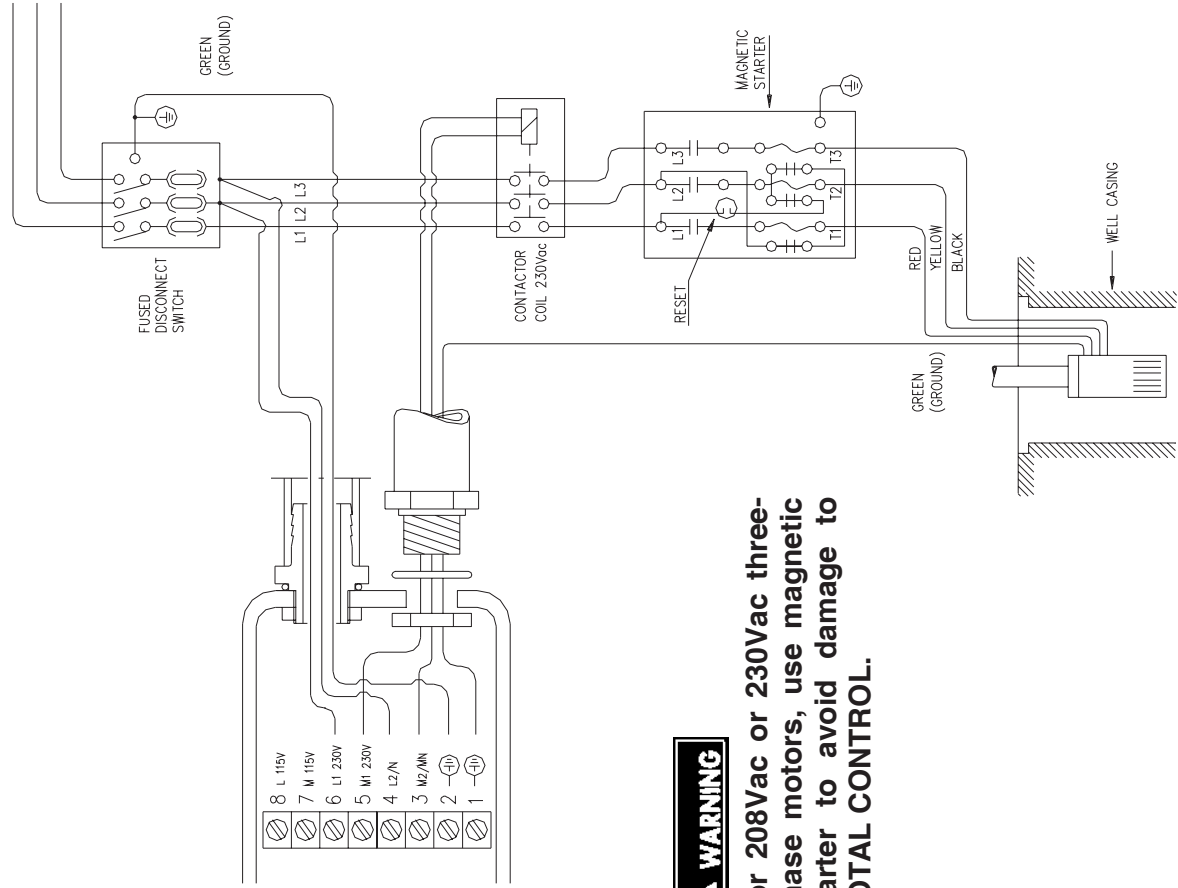
### INSTALLATION WIRING DIAGRAM - 115VAC 2-WIRE PUMPS EXCEEDING 16 FLA



### INSTALLATION WIRING DIAGRAM - 230VAC 2-WIRE PUMPS EXCEEDING 20 FLA

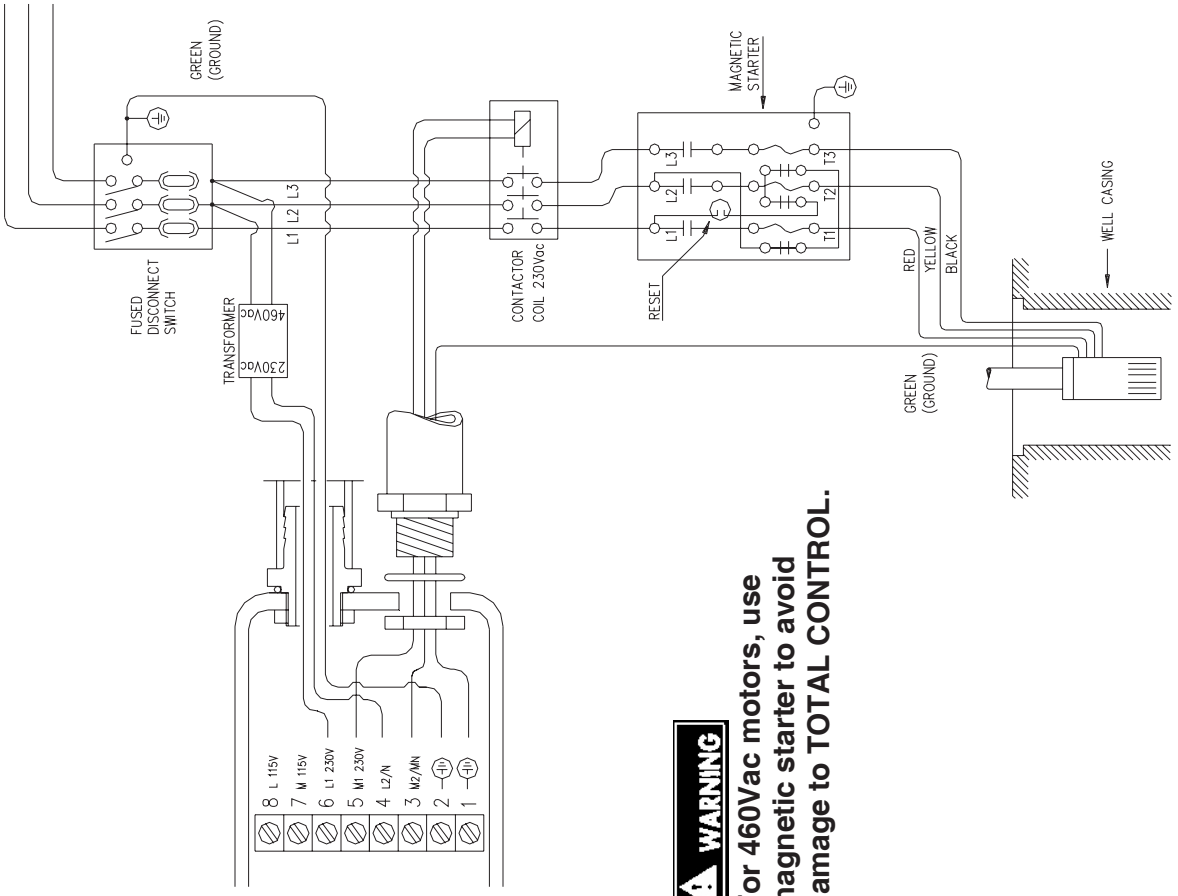


## INSTALLATION WIRING DIAGRAM - 208 VAC OR 230 VAC THREE PHASE - 3-WIRE PUMPS



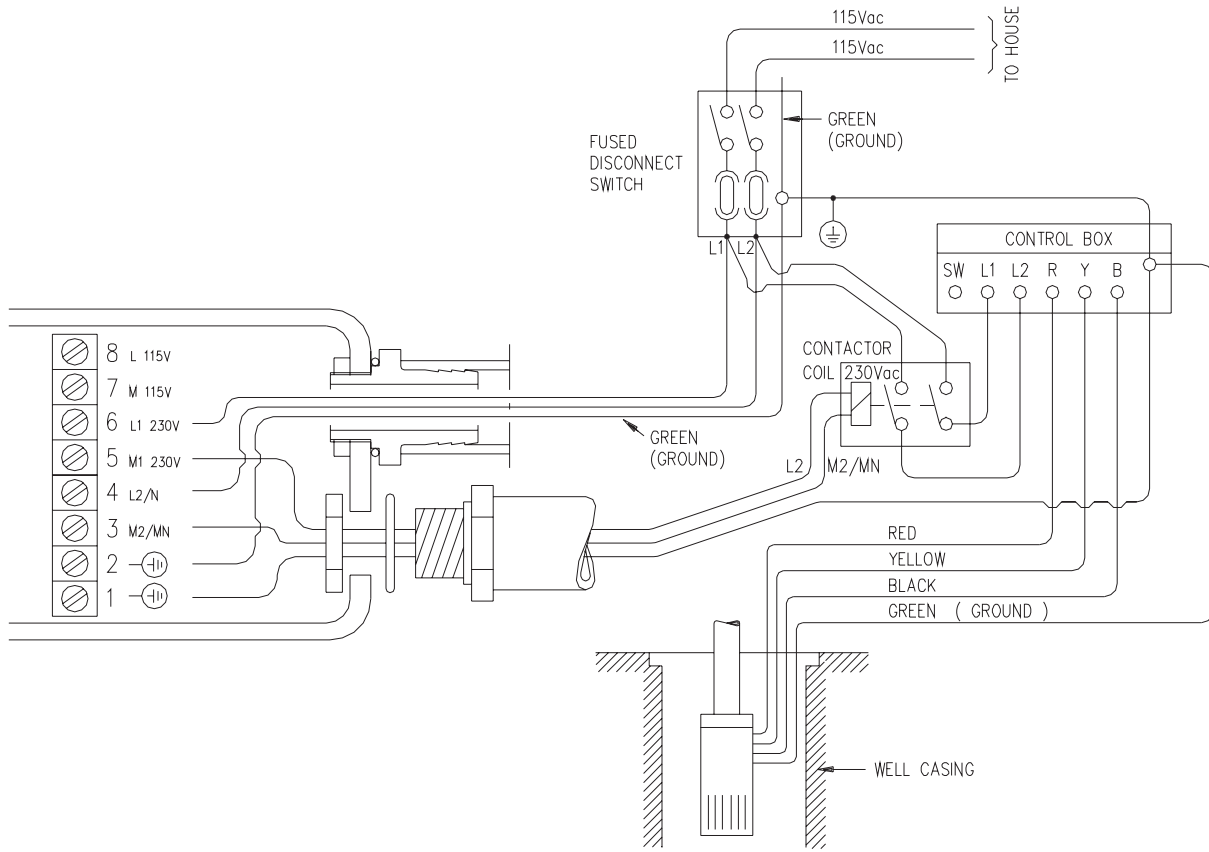
**For 208Vac or 230Vac three-phase motors, use magnetic starter to avoid damage to TOTAL CONTROL.**

## INSTALLATION WIRING DIAGRAM - 460VAC

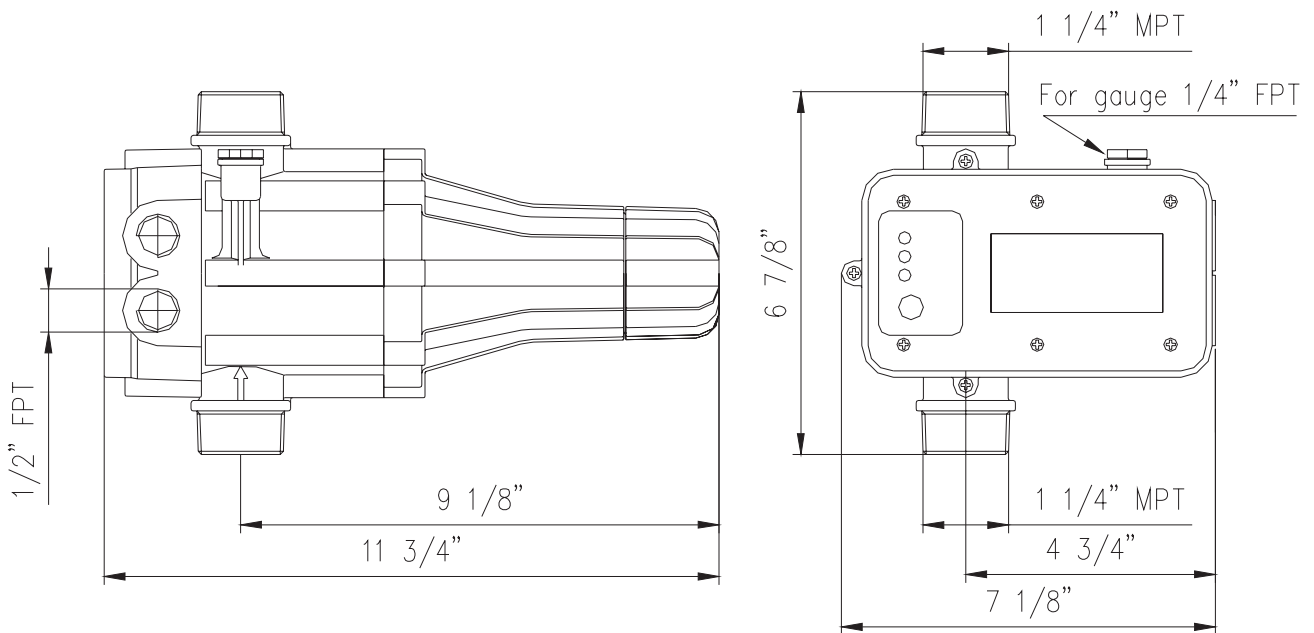


**For 460Vac motors, use magnetic starter to avoid damage to TOTAL CONTROL.**

# **INSTALLATION WIRING DIAGRAM - 230VAC 3-WIRE PUMPS EXCEEDING 20 FLA**



## **OVERALL DIMENSIONS**



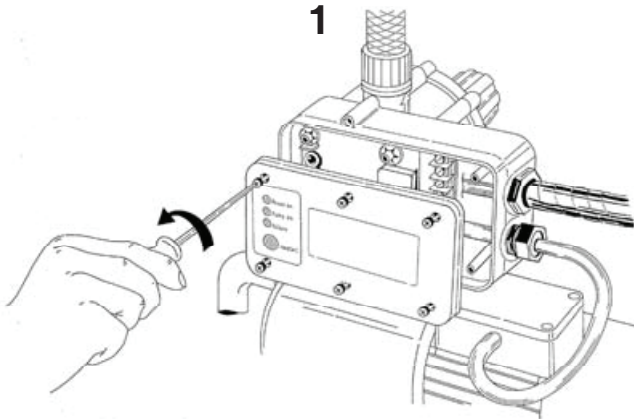
## ELECTRONIC BOX REPLACEMENT



**WARNING**

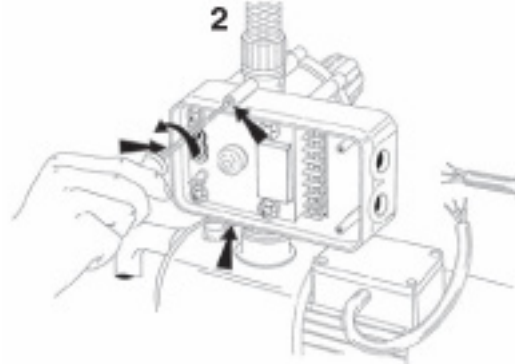
Before removing the electronic box ensure that power unit is off and unit is depressurized.

1



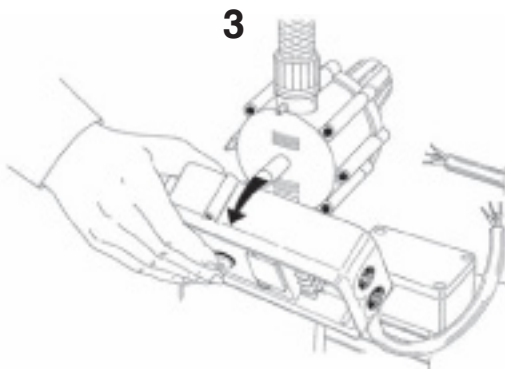
- 1) Remove the box cover and disconnect the electrical wires.

2



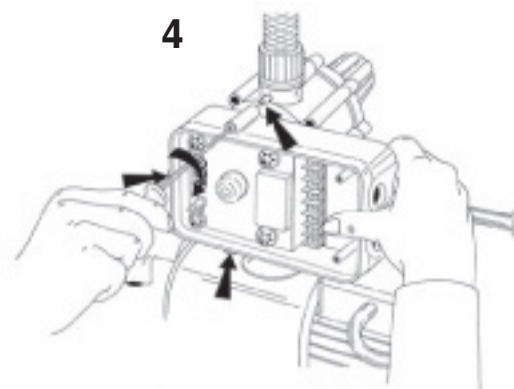
- 2) Take off the box by removing the three screws attaching the electronic box to the unit body.

3



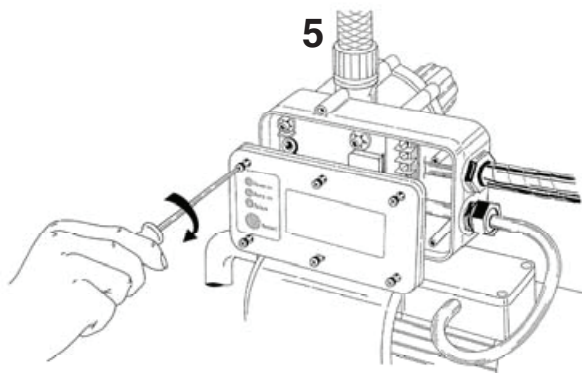
- 3) Remove the electronic box.

4



- 4) Install the new electronic box and tighten the three screws.  
Do not overtighten or damage to threads may result.

5



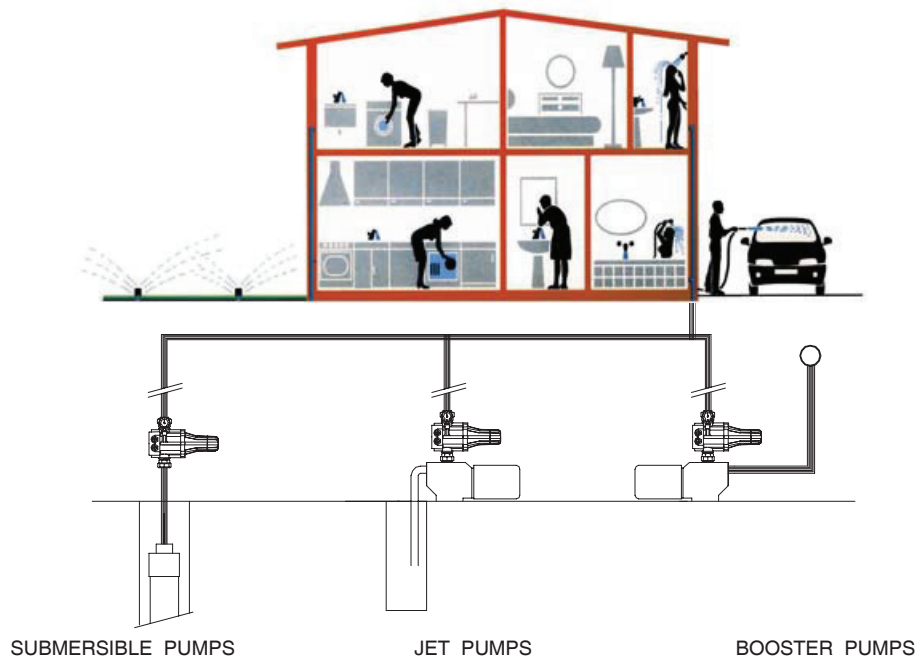
- 5) Tighten the six screws on the cover of the electronic box to ensure water tight seal.

**If cover is not securely fastened, RESET button will not operate.**

**WARNING: Do not turn on power until the box cover has been securely fastened.**

# TOTAL CONTROL™

## DOMESTIC PUMP CONTROL



### WARRANTY

#### THE WARRANTY PERIOD IS ONE YEAR FROM INSTALLATION DATE

##### WARRANTY AND DISCLAIMER OF WARRANTY

The following warranty for the product is in lieu of all other conditions or warranties, whether express, implied or statutory, including but not limited to any implied conditions or warranties of merchantability or fitness for a particular purpose and on any implied conditions or warranty obligation on the part of manufacturer or its distributors, which are hereby expressly disclaimed. TOTAL CONTROL is warranted to be free of defects occurring either in hydraulic or electronic parts for a period of one year from the date of installation when installed by a licensed professional in accordance with the product manual and due professional care.

### PATENT INFRINGEMENT

Our devices are protected under world-wide patents including the United States Patent Office. Any violation and or attempt to copy the products in any part or form to the extent such copying or duplication in any part or form infringes upon the patents will be swiftly and aggressively prosecuted.  
U.S. Patent 5,259,733.

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