

BEST CONTROL™

RESIDENTIAL PUMP CONTROLLER - MOD. PCBC16F16S

OWNER'S MANUAL

115 / 230 VAC DUAL VOLTAGE UNIT



File No: E191502 Mod. MCA, MCB

U.S. PATENT 5,259,733

FEATURES & BENEFITS

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

- 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 adjustment or maintenance required.

READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLATION

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

TABLE OF CONTENTS

	Page
Precautions and warnings.....	2
Technical specifications.....	3
Operation.....	3
Troubleshooting.....	3
Maintenance and spare parts.....	3
Hydraulic connection to the system.....	4
Conduit connections.....	4
Typical BEST CONTROL installation on surface and submersible pumps.....	5
BEST CONTROL installation guidelines and warnings.....	6
When to use pressure tank.....	6
Calibration.....	7
Pressure loss - bypass application.....	8
Electrical connections.....	9
Installation wiring diagram - 115 VAC 2-wire pumps up to 16 FLA.....	9
Installation wiring diagram - 230 VAC 2-wire pumps up to 20 FLA.....	10
Installation wiring diagram - 230 VAC 3-wire pumps up to 20 FLA.....	10
When to use contactors.....	11
Installation wiring diagram - 115 VAC 2-wire pumps exceeding 16 FLA.....	11
Installation wiring diagram - 230 VAC 2-wire pumps exceeding 20 FLA.....	11
Installation wiring diagram - 208 VAC or 230 VAC three phase 3-wire pumps.....	12
Installation wiring diagram - 460 VAC.....	12
Installation wiring diagram - 230 VAC 3-wire pumps exceedings 20 FLA.....	13
Overall dimensions.....	13
Electronic box replacement.....	14



PLEASE READ BEFORE PROCEEDING WITH INSTALLATION

FAILURE TO READ AND CONSIDER SAFETY INSTRUCTIONS IN THIS MANUAL OR ON BEST CONTROL 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, BEST CONTROL, piping, or any other system component containing water to freeze. Freezing may damage system, leading to injury or flooding. Allowing BEST CONTROL or system components to freeze will void warranty.



DANGER

Hazardous voltage.



WARNING

Can shock, burn or cause death.



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



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



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

Install BEST 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 BEST 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	145 psi
- Max working temperature	149 °F (65°C)
- Inlet / Outlet connections	1 " MPT
- Threaded conduit connections	½" FPT
- Electronic box enclosure	12 NEMA

On request BEST CONTROL is available with inlet and outlet connections 1¼" MPT.

OPERATION



(green)

- **Power on** • Displays when power is connected to BEST CONTROL unit.
- In the event of a temporary power outage, BEST CONTROL resets automatically when power is restored.



(yellow)

- **Pump on** • Displays when pump is running.



(red)

- **Failure** • Displays when there is a problem with the system.



(red)

- **Restart** • 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 (Excluding bypass installation)

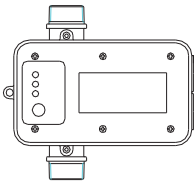
Operating faults	Main causes
Pump does not start	Check wiring connections. Check suction pipe, see page 6.
Pump turns on and off (short-cycles)	Leakage lower than minimum flow.
Pump does not stop	Leakage above minimum flow.
No water flow	Suction problems.
Excessive pressure system	Pump oversized for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

MAINTENANCE AND SPARE PARTS

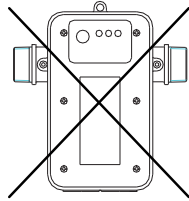
In the case of a fault in the electronic box, this can be replaced without removing the device as it is interchangeable and supplied on request.

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

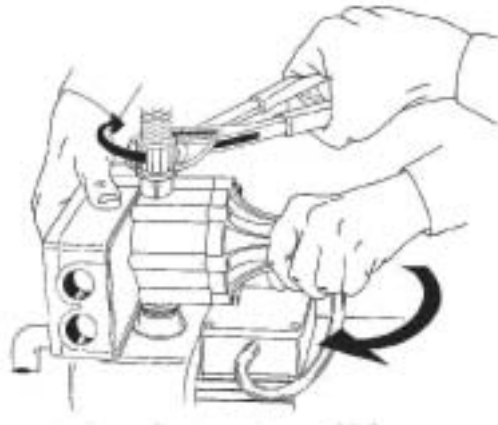
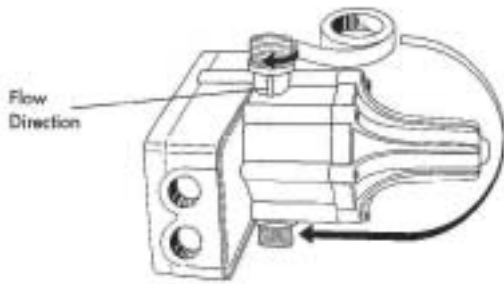


NO

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

Electronic box must be level.

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

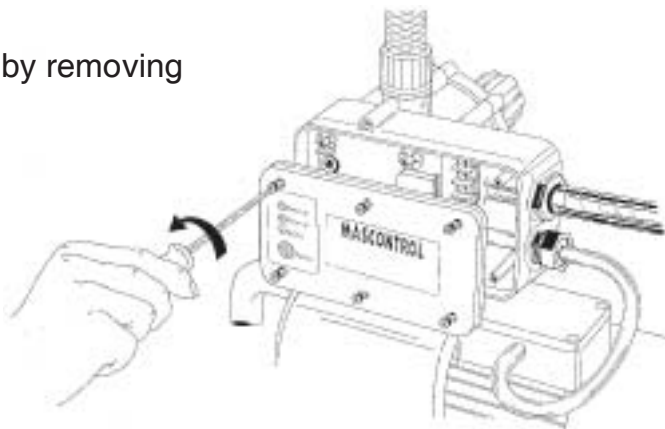


Prepare all threads with Teflon tape only.

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

CONDUIT CONNECTIONS

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

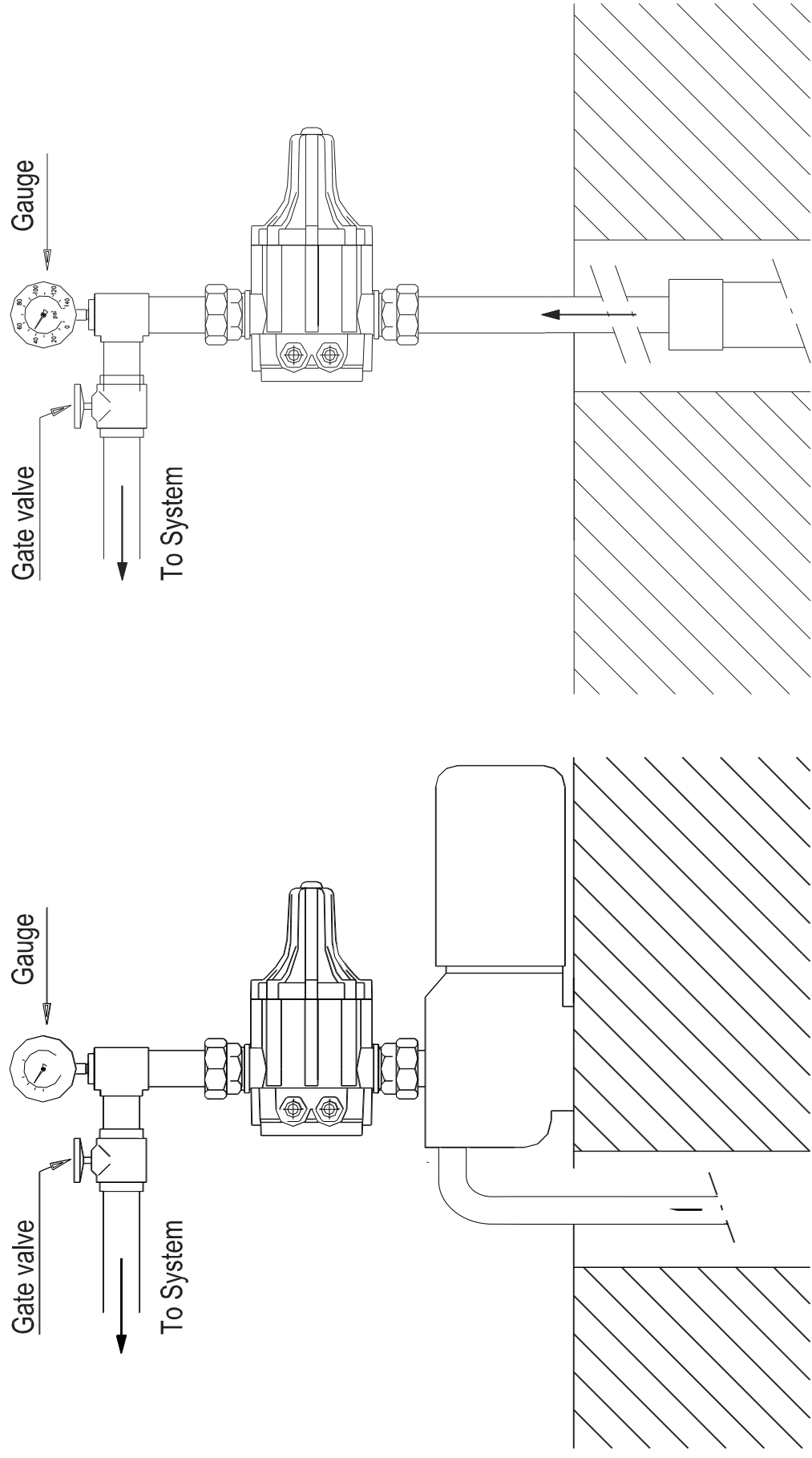


Line voltage and pump wires to the BEST CONTROL should be supplied through “liquid-tight” nonmetallic conduit fittings rated “NEMA 12” or “UL type 12” to achieve NEMA Type 12 enclosure rating.

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

TYPICAL BEST CONTROL INSTALLATION ON ABOVE GROUND AND SUBMERSIBLE PUMPS

BEST CONTROL can be installed on above ground and submersible pumps for residential, domestic irrigation and booster systems.



ABOVE GROUND PUMP

SUBMERSIBLE PUMP

If pressure exceeds 145 psi, install a pressure reducing valve.

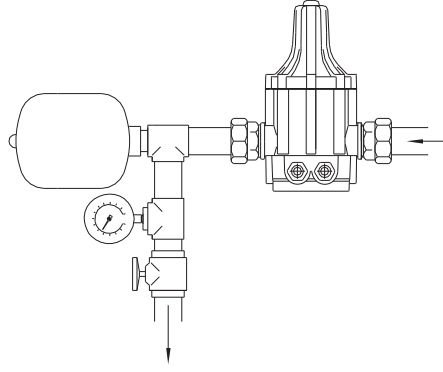
BEST CONTROL INSTALLATION GUIDELINES AND WARNINGS

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

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

- **BEST CONTROL operates the pump to its maximum pressure.**
- **Install BEST CONTROL only in clean water applications.**
- Always confirm pump and system characteristics before installation, see page 5.
- 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 BEST CONTROL.**
- **Install a pressure reducing valve between pump and BEST CONTROL when maximum pressure generated by the pump exceeds 145 psi.**
- Install a gate valve and a pressure gauge after the BEST CONTROL unit. This allows testing of the pump and BEST 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.

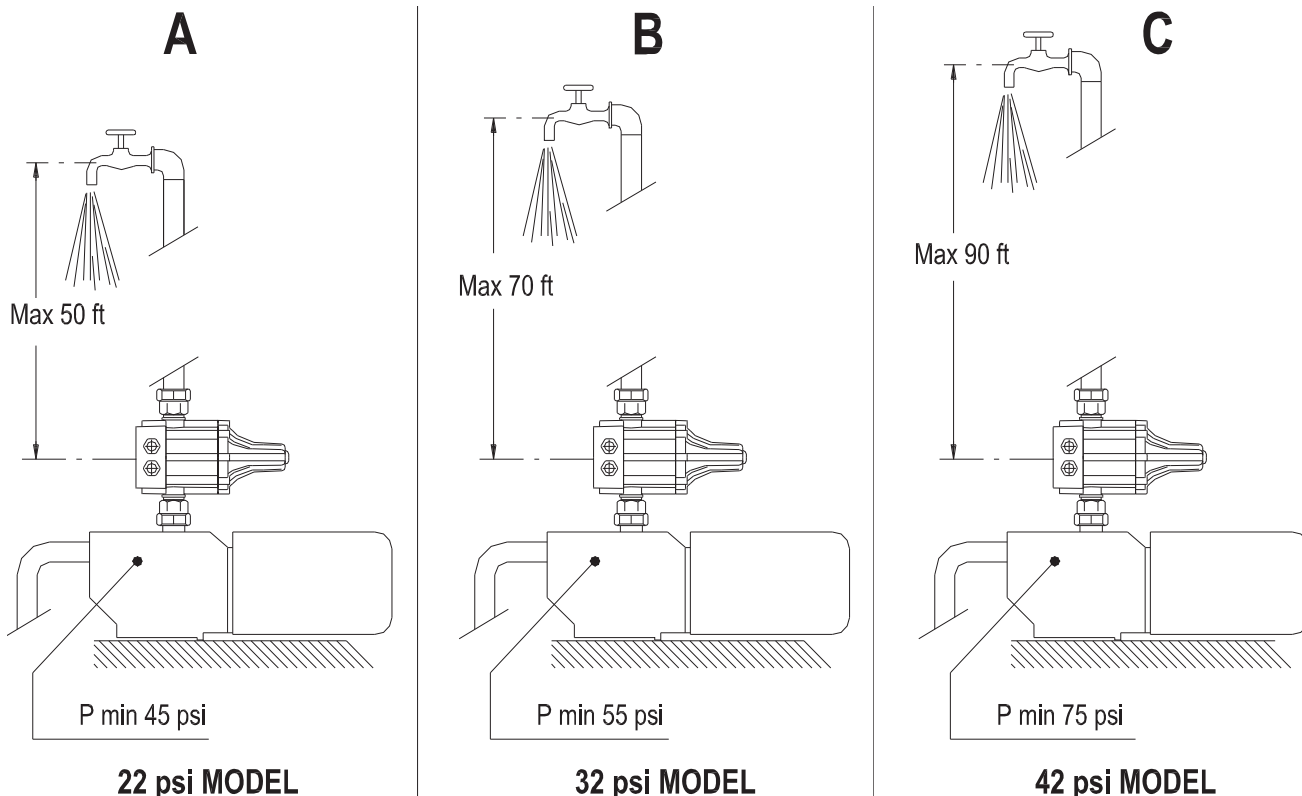
It allows bi-metal switch strips to cool in such a way to warrant the regular pump restart.

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



Both BEST CONTROL models 1 1/4" and 1" can be provided with three different factory preset cut-in pressures. Use the appropriate guidelines below for the specific model.

A - BEST CONTROL preset cut-in pressure 22 psi model:

- Max pressure generated by the pump must be at least 45 psi.
- The column of water between BEST CONTROL and the highest tap must not exceed 50 feet.
- BEST CONTROL unit operates from min 22 psi to the max pressure generated by the pump.

B - BEST CONTROL preset cut-in pressure 32 psi model:

- Max pressure generated by the pump must be at least 55 psi.
- The column of water between BEST CONTROL and the highest tap must not exceed 70 feet.
- BEST CONTROL unit operates from min 32 psi to the max pressure generated by the pump.

C - BEST CONTROL preset cut-in pressure 42 psi model:

- Max pressure generated by the pump must be at least 75 psi.
- The column of water between BEST CONTROL and the highest tap must not exceed 90 feet.
- BEST CONTROL unit operates from min 42 psi to the max pressure generated by the pump.

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 the high of the water column exceeds the level indicated, the unit will not restart the pump.

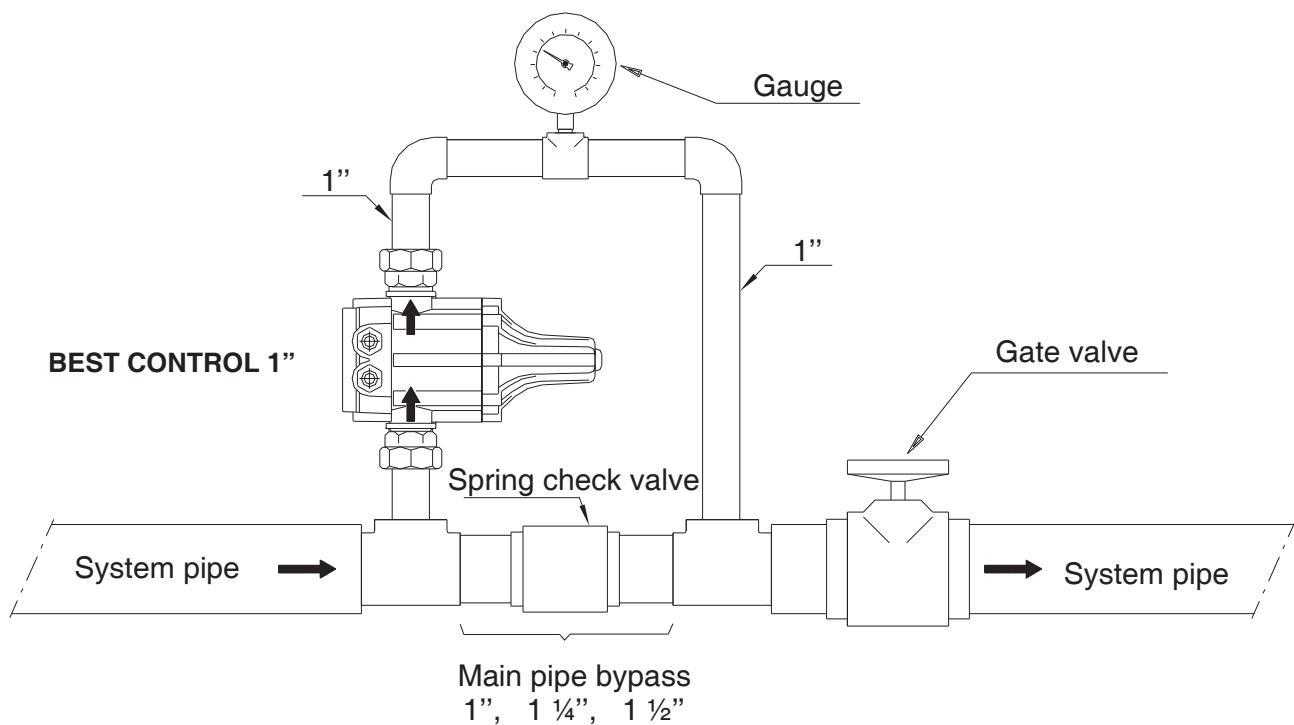
To overcome these problems install BEST CONTROL at a higher level in order to recreate the above mentioned conditions, otherwise use higher cut-in pressure models.

PRESSURE LOSS - BYPASS APPLICATION

Pressure Loss Chart

Flow rate	gpm	5	10	15	18	20	25	30	35	40
Best control 1 ¼" psi loss		/	0.5	1.5	2.5	3.5	5.5	7.5	10	12.5
Best control 1" psi loss		0.5	1.5	4	6.5	8.5	/	/	/	/

Use BEST CONTROL 1" in a bypass when friction loss is excessive.



The main pipe of bypass must not exceed 1 1/2", while the system pipe could be bigger.

Pressure Loss Chart with a bypass application with Best control 1" *

Flow rate	gpm	20	30	40	50	60	70	80
Best control 1" x 1" psi loss		3	5	9	14	19	/	/
Best control 1" x 1 ¼" psi loss		2	2	3	5	8	10	12
Best control 1" x 1 ½" psi loss		2	2	3	4	6	7	8

* Available on request.

ELECTRICAL CONNECTIONS



OBSERVE WARNINGS AND PRECAUTIONS LISTED AT THE FRONT OF THIS MANUAL.

Electrical connections should be made by a qualified professional in compliance with applicable local codes and National Electric Code.

⚠ DANGER ALWAYS SHUT OFF POWER FOR INSTALLATION OR SERVICE.

Check voltage of pump and supply to determine pump motor FLA and follow applicable **BEST CONTROL** wiring diagram. If pump motor FLA exceeds **BEST CONTROL** rating, use magnetic starter wiring diagram for the applicable voltage (see pages 12, 13).

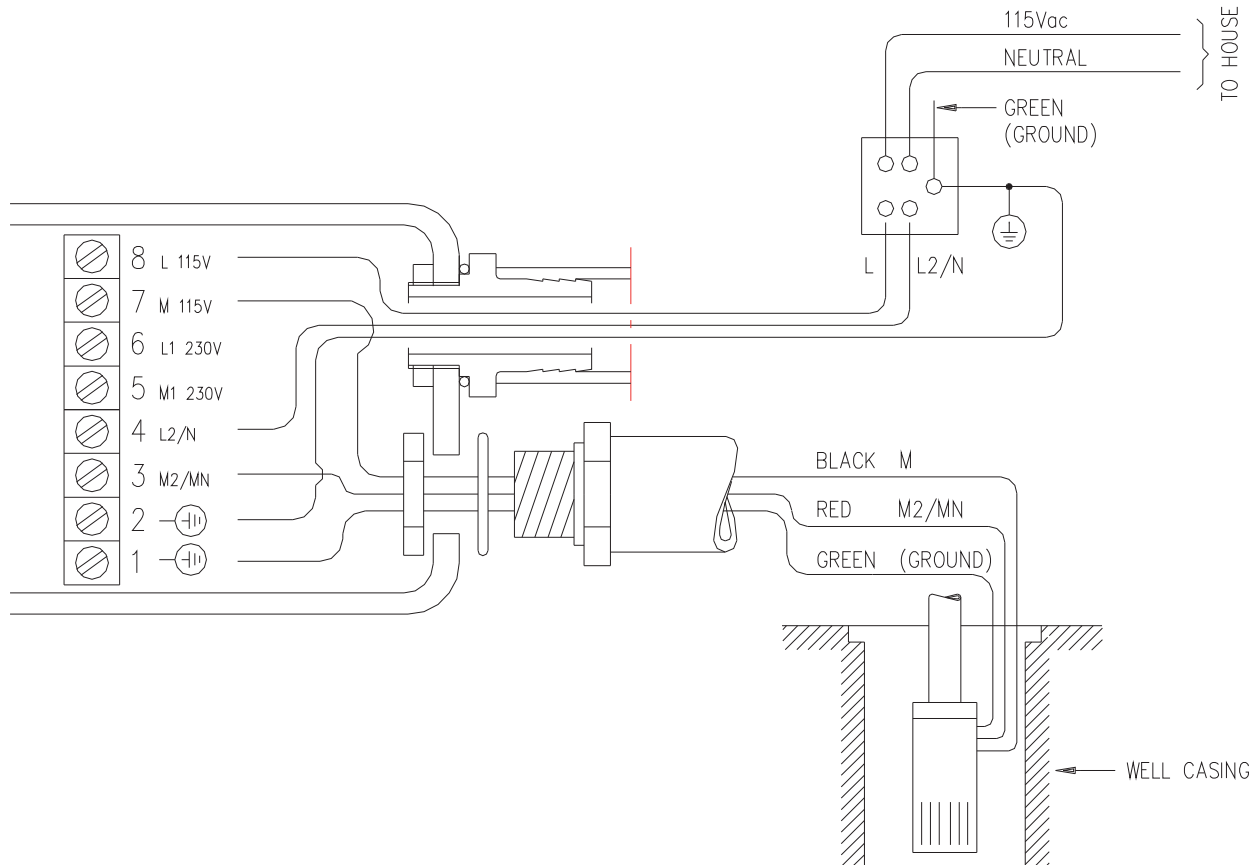


Always remove pressure switch from surface pump and wire BEST CONTROL directly to pump.

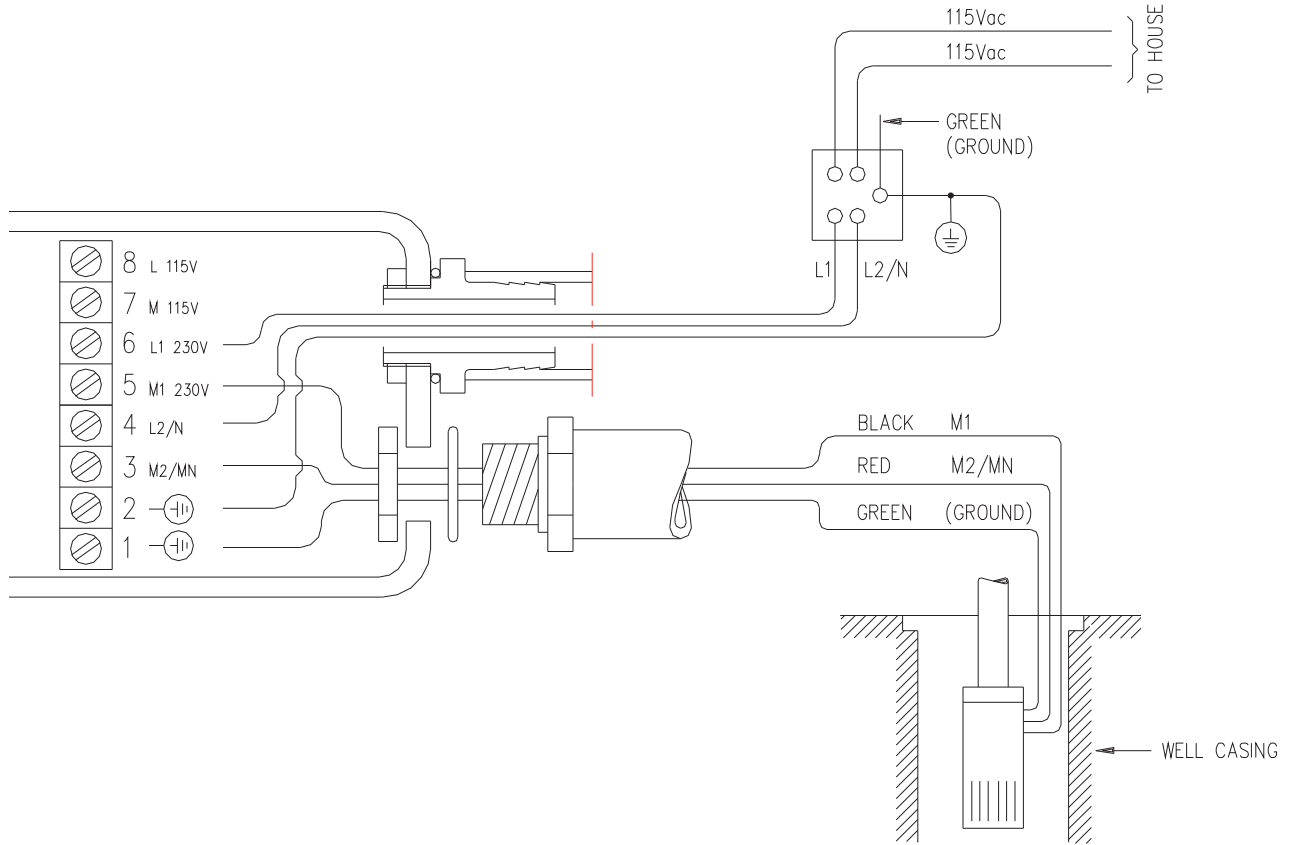


**Use Copper Conductors only.
Use 140 / 167 °F wire.
Use minimum 13 AWG wire.
Device must be properly grounded.**

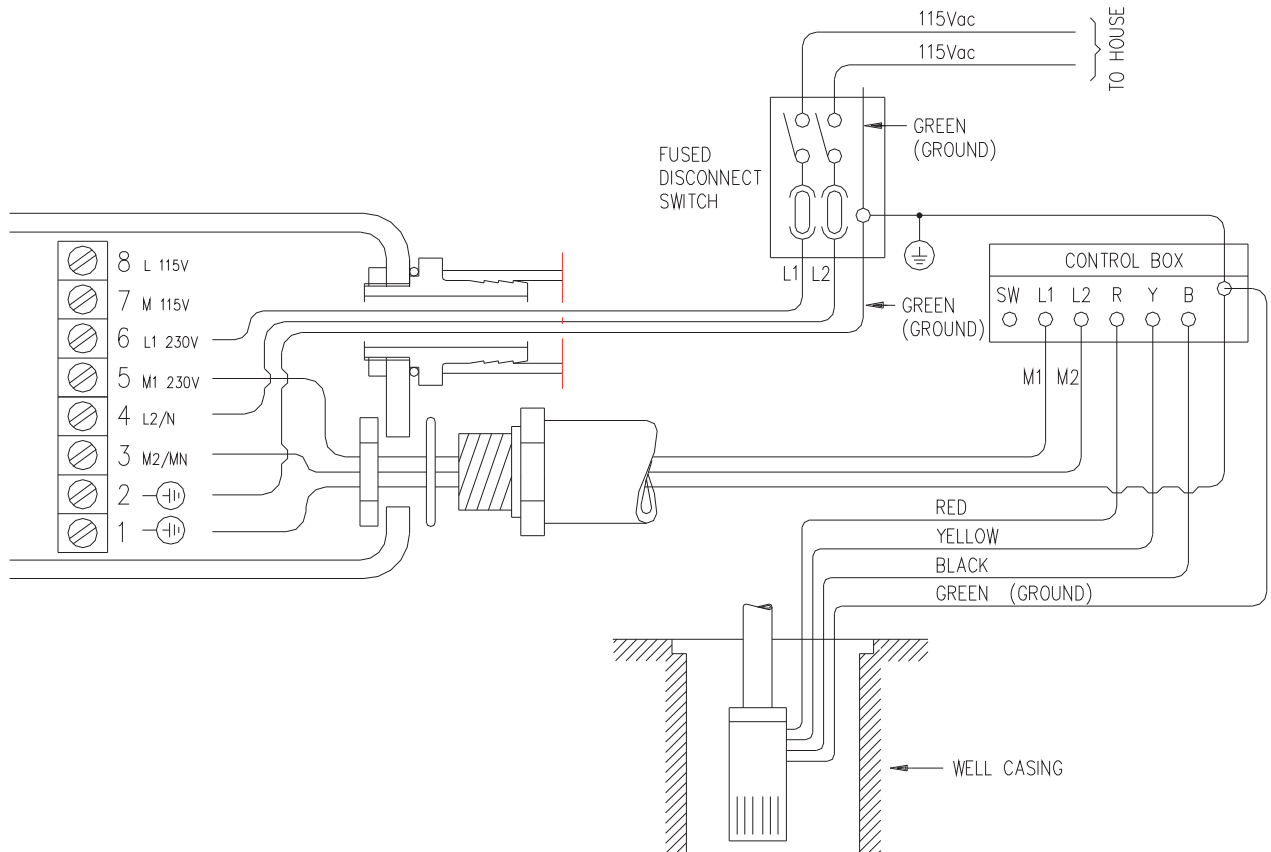
INSTALLATION WIRING DIAGRAM - 115VAC 2-WIRE PUMPS UP TO 16 FLA



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

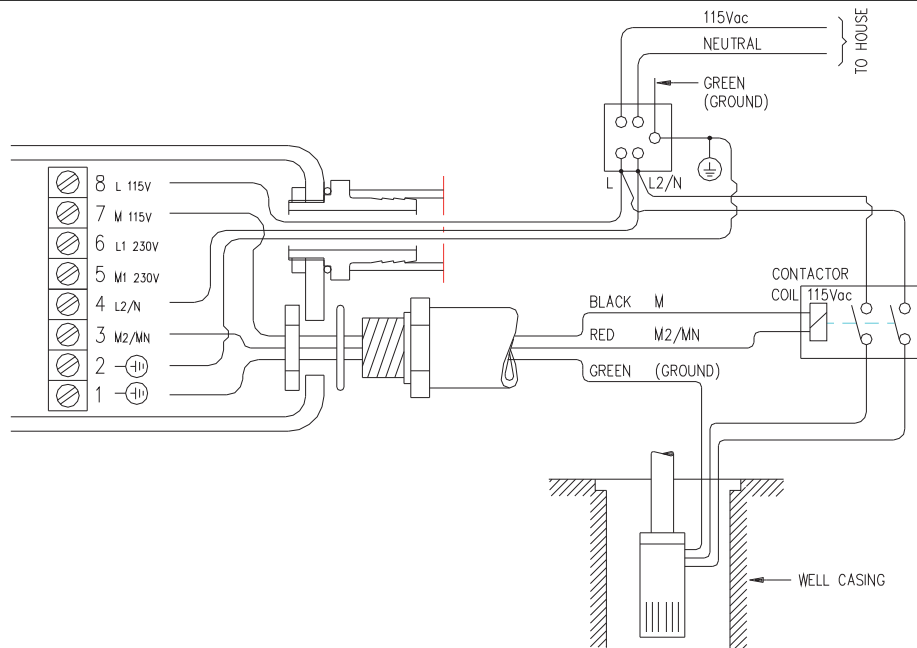
Use a contactor when:

- 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.

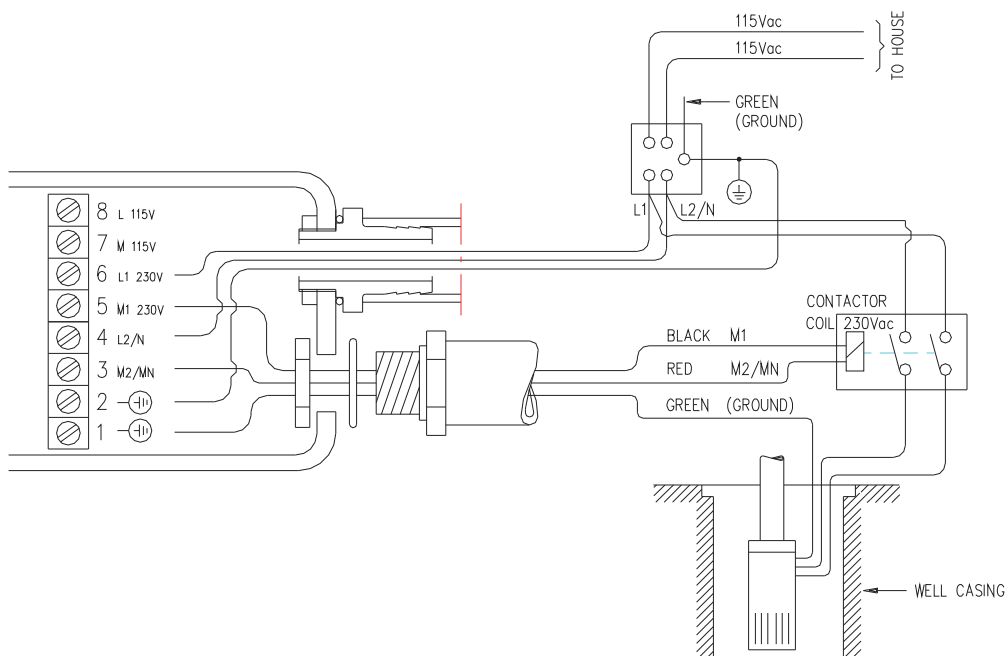
Remember, match coil voltage on contactor with BEST CONTROL voltage.
Either 115V or 230V coils may be used.

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

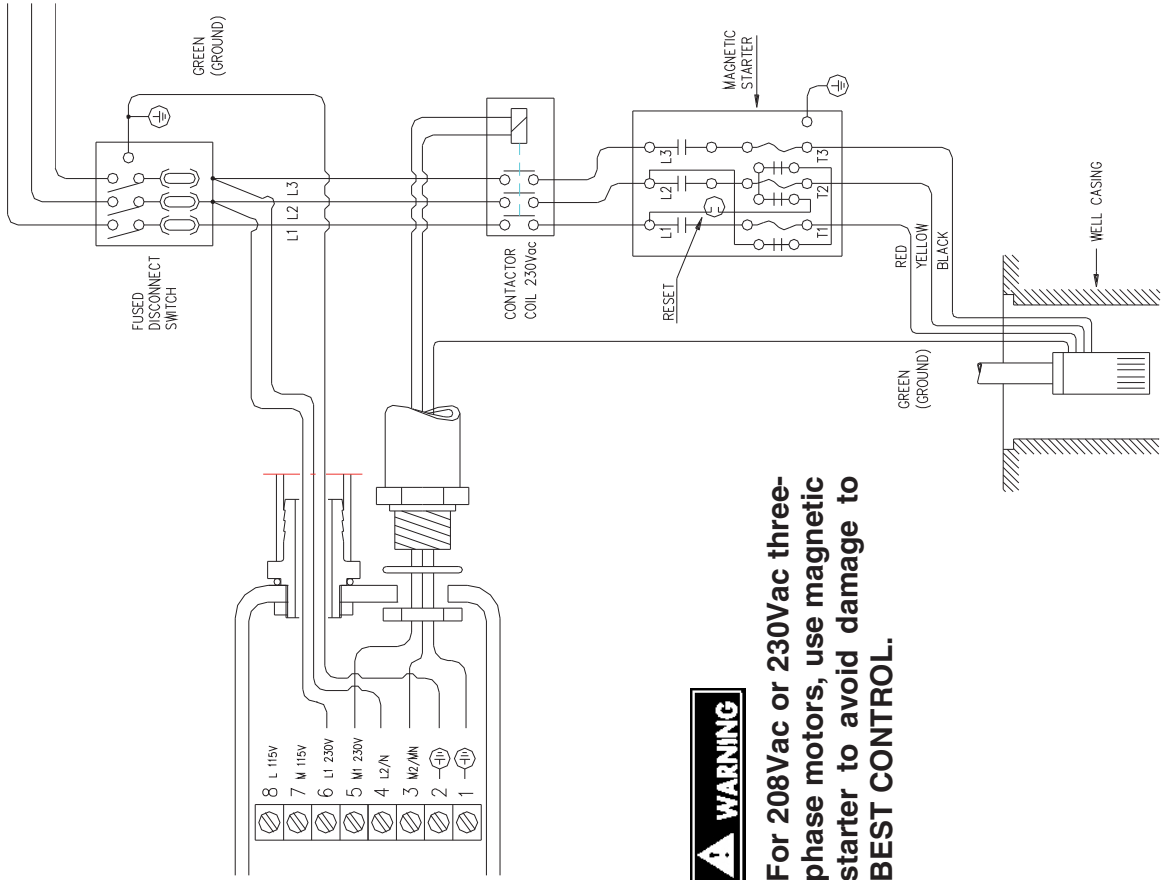
INSTALLATION WIRING DIAGRAM - 115VAC 2-WIRE PUMPS EXCEEDING 16 FLA



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

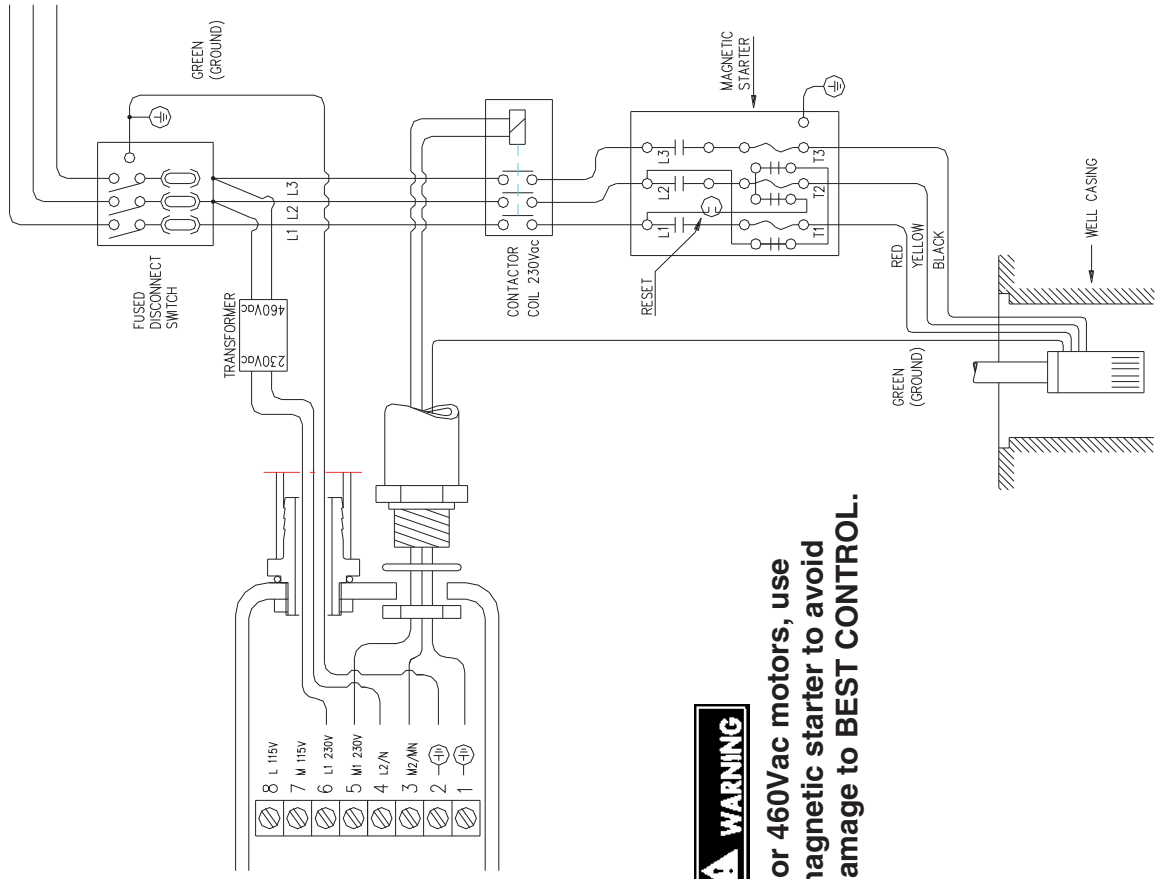


INSTALLATION WIRING DIAGRAM - 208 VAC OR 230 VAC THREE PHASE - 3-WIRE PUMPS



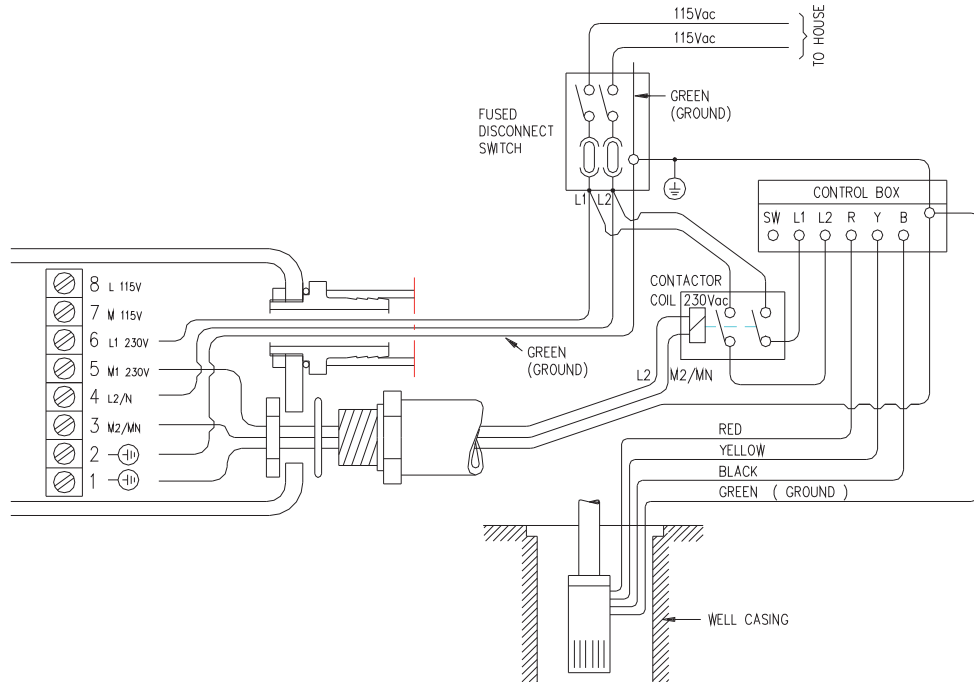
For 208Vac or 230Vac three-phase motors, use magnetic starter to avoid damage to BEST CONTROL.

INSTALLATION WIRING DIAGRAM - 460VAC

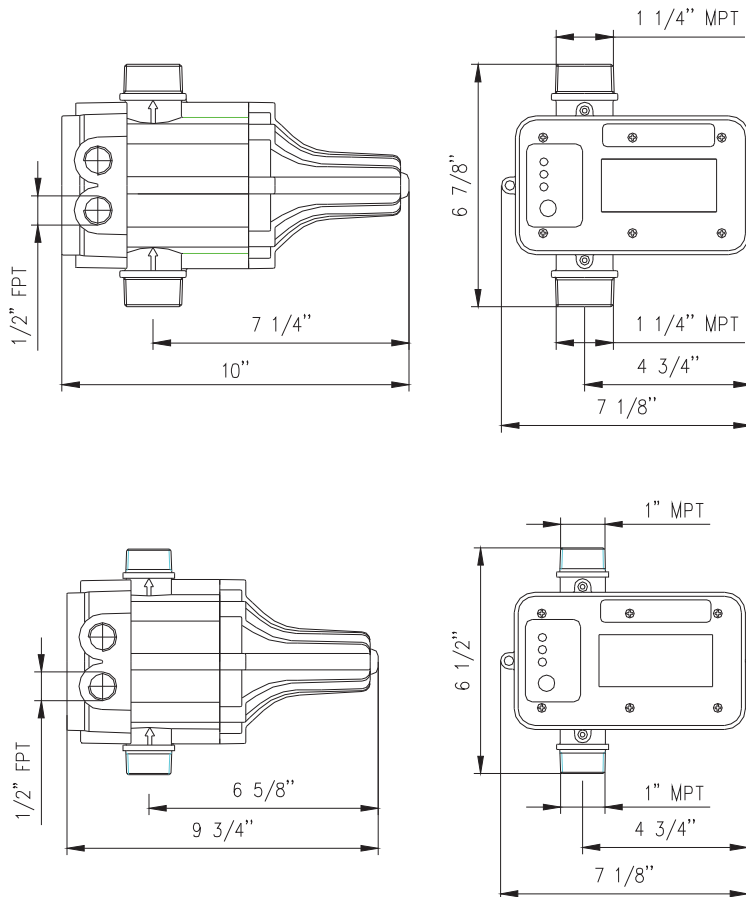


For 460Vac motors, use magnetic starter to avoid damage to BEST CONTROL.

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



OVERALL DIMENSIONS

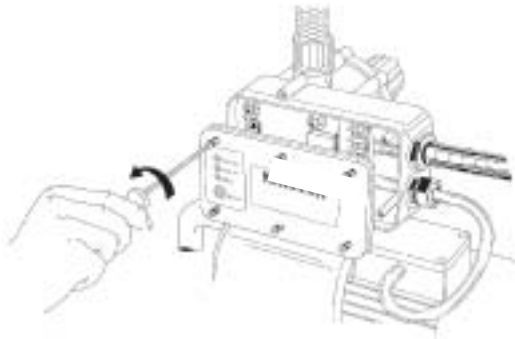


ELECTRONIC BOX REPLACEMENT



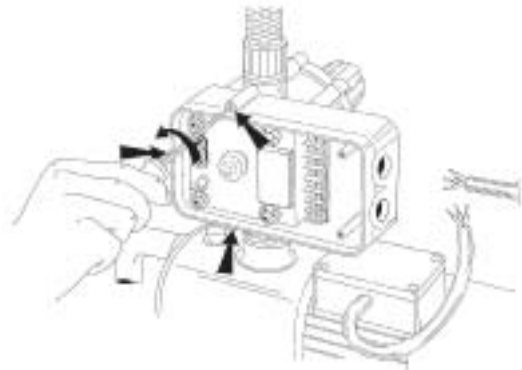
Before removing the electronic box ensure that power unit is off and unit is depressurized.

1



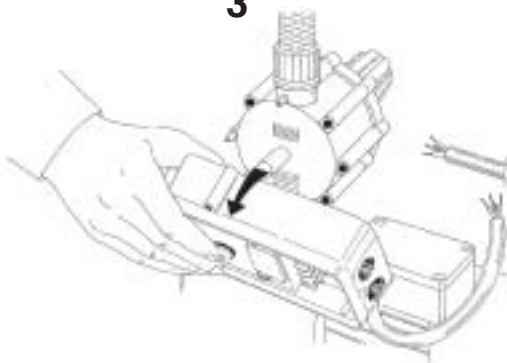
1) Remove the box cover and disconnect the electrical wires.

2



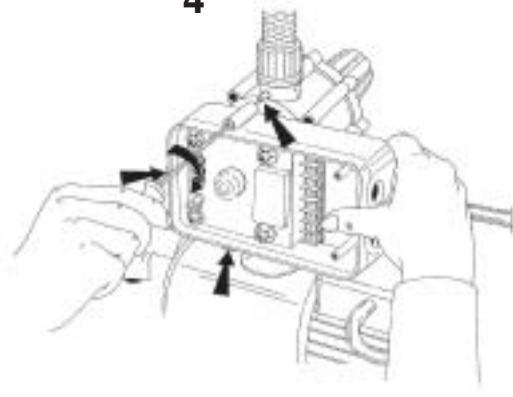
2) Take off the box by removing the three screws attaching the electronic box to the unit body.

3



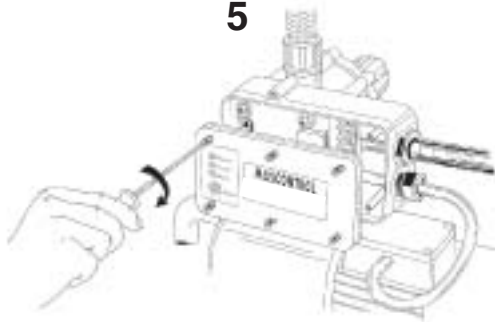
3) Remove the electronic box.

4



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

5



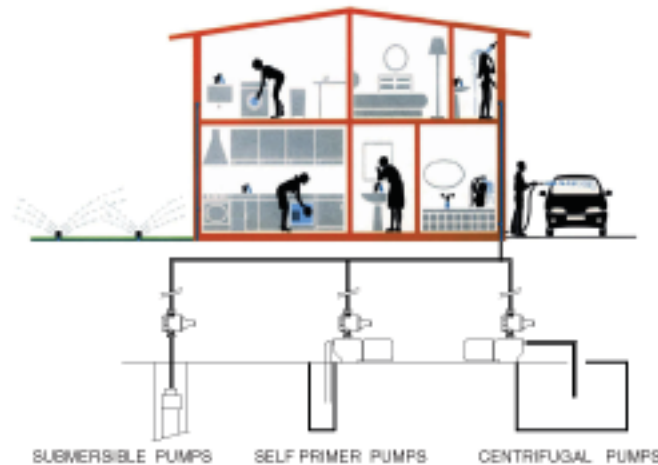
5) Tighten the six screws on the cover of the electronic box to ensure water tight seal.

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.

BEST 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. BEST 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. Manufacturer reserves the right to inspect and evaluate defective units prior to warranty claim settlement. Improper installation, application or mishandling of unit voids the warranty.

PATENT INFRINGEMENT

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

Locally distributed by:

PD OF FLORIDA LLC
3000 W 16Th Ave.
Miami, FI 33012
ph. 001 954 474 9090
fax 001 954 889 0413
www.pearlwatersystem.com

REV: MCO9 05 09