

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.

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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)

- 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)

- 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 (Excluding bypass installation)

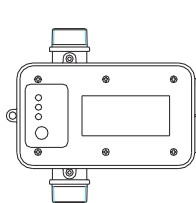
| Operating faults | Main causes |
|--------------------------------------|--|
| Pump does not start | Check wiring connections. Check suction pipe, see page 6. |
| Pump turns on and off (short-cycles) | Leakage lower than minimum flow. |
| Pump does not stop | Leakage above minimum flow. |
| No water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

MAINTENANCE AND SPARE PARTS

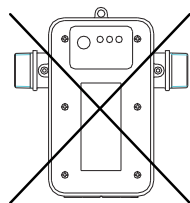
In the case of a fault in the electronic box, this can be replaced without removing the device as it is interchangeable and supplied on request.

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

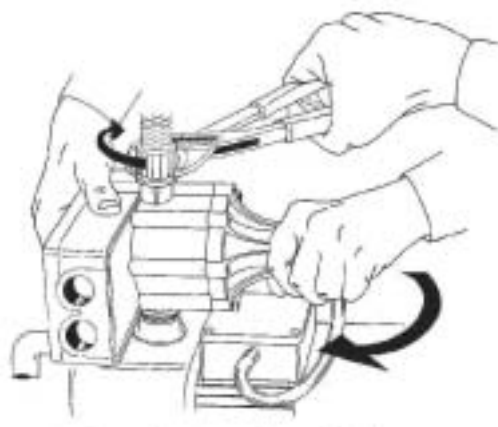
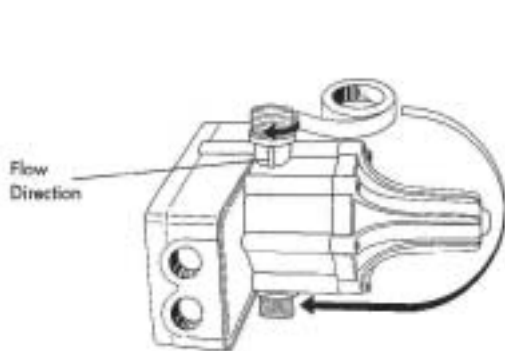


NO

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.

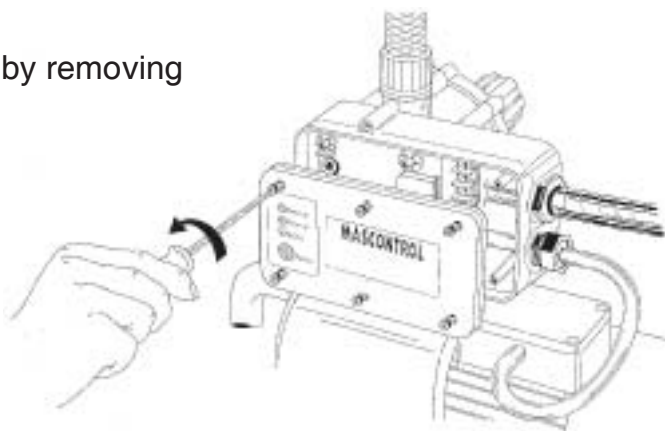


Prepare all threads with Teflon tape only.

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.

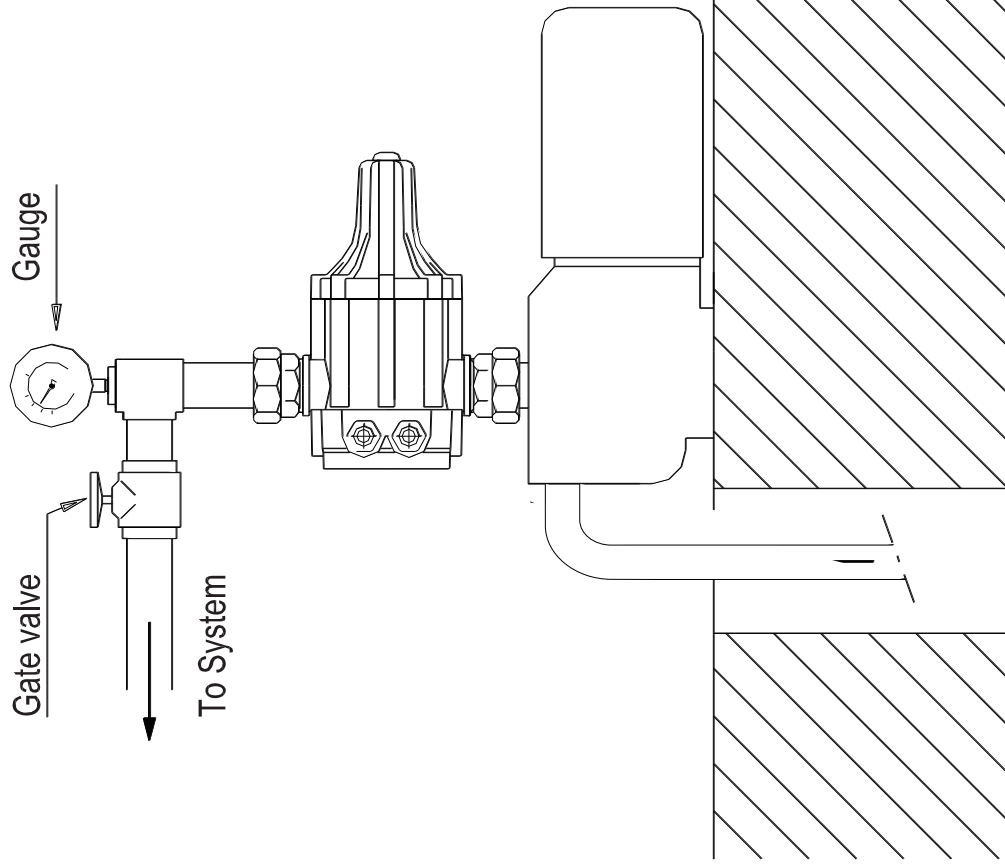


Line voltage and pump wires to the BEST CONTROL should be supplied through “liquid-tight” nonmetallic conduit fittings rated “NEMA 12” or “UL type 12” to achieve NEMA Type 12 enclosure rating.

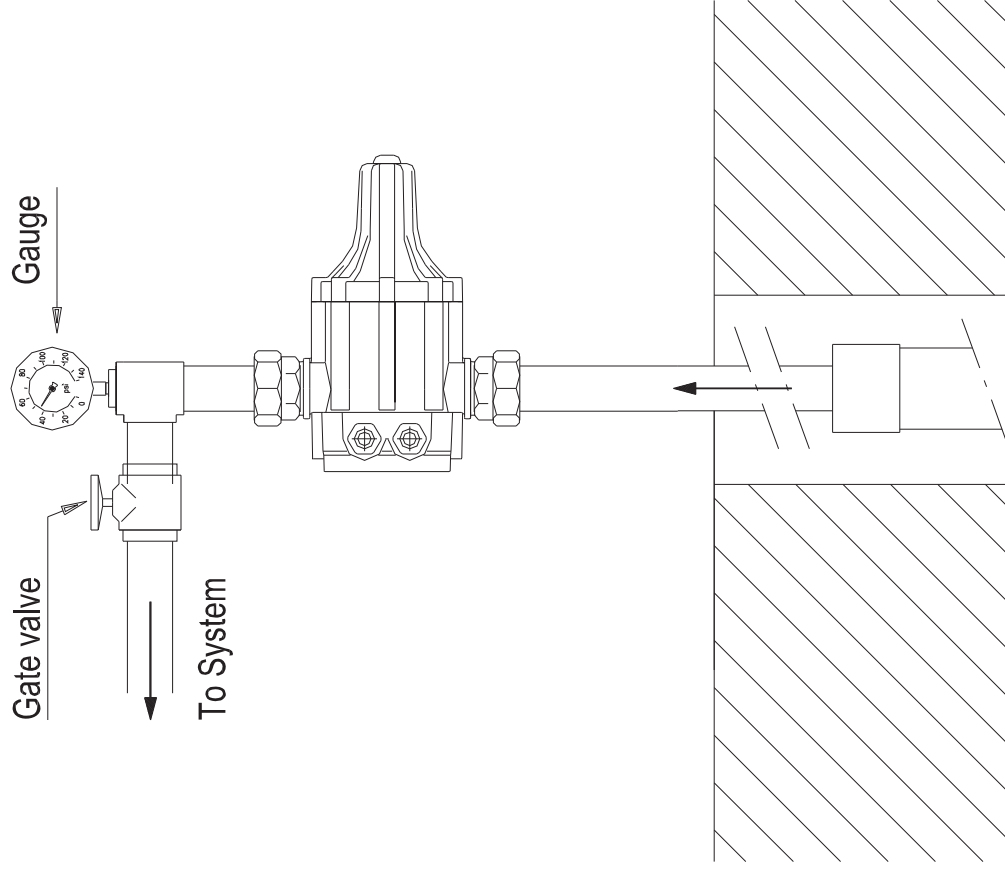
Failure to install unit without use of liquid tight conduit voids warranty!

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.

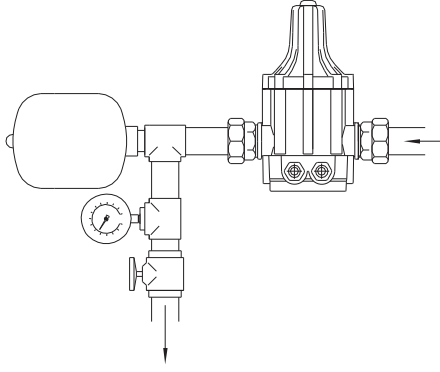
BEST CONTROL INSTALLATION GUIDELINES AND WARNINGS

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.

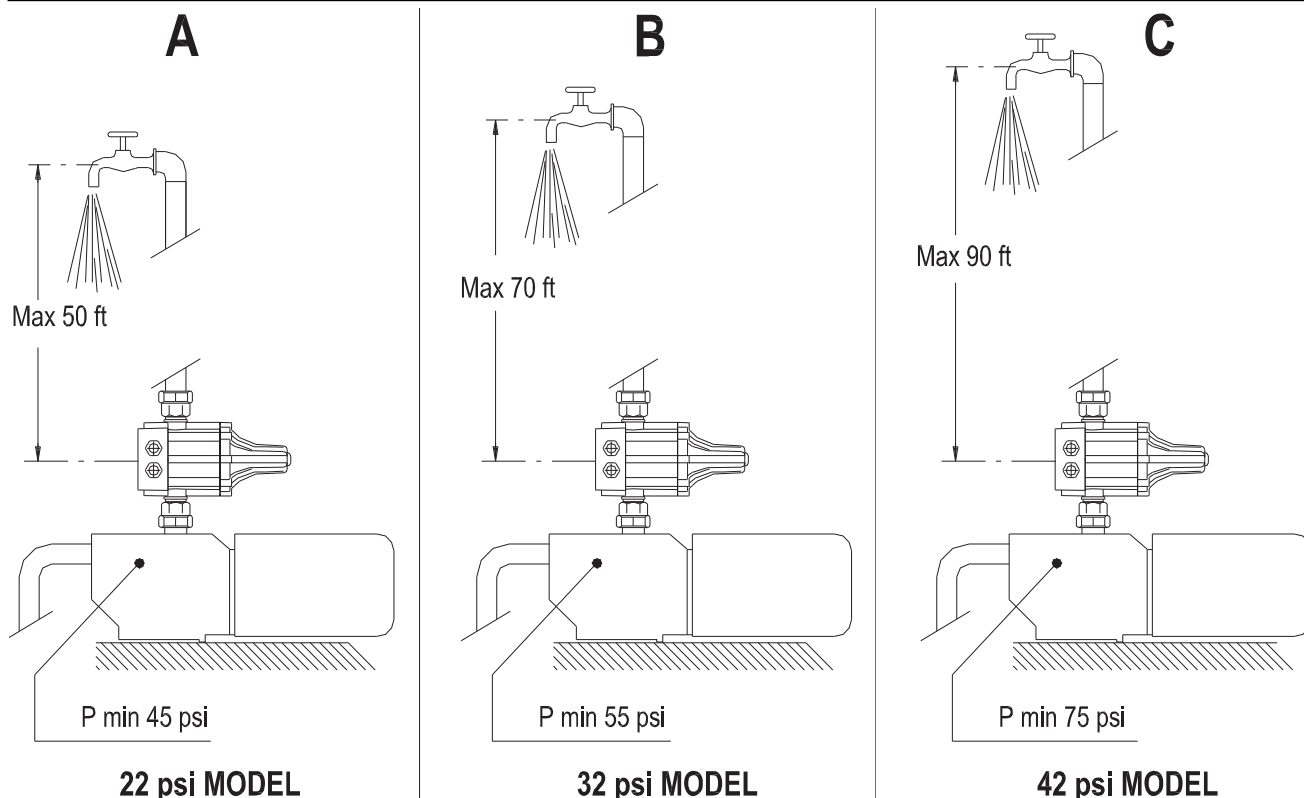
It allows bi-metal switch strips to cool in such a way to warrant the regular pump restart.

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.

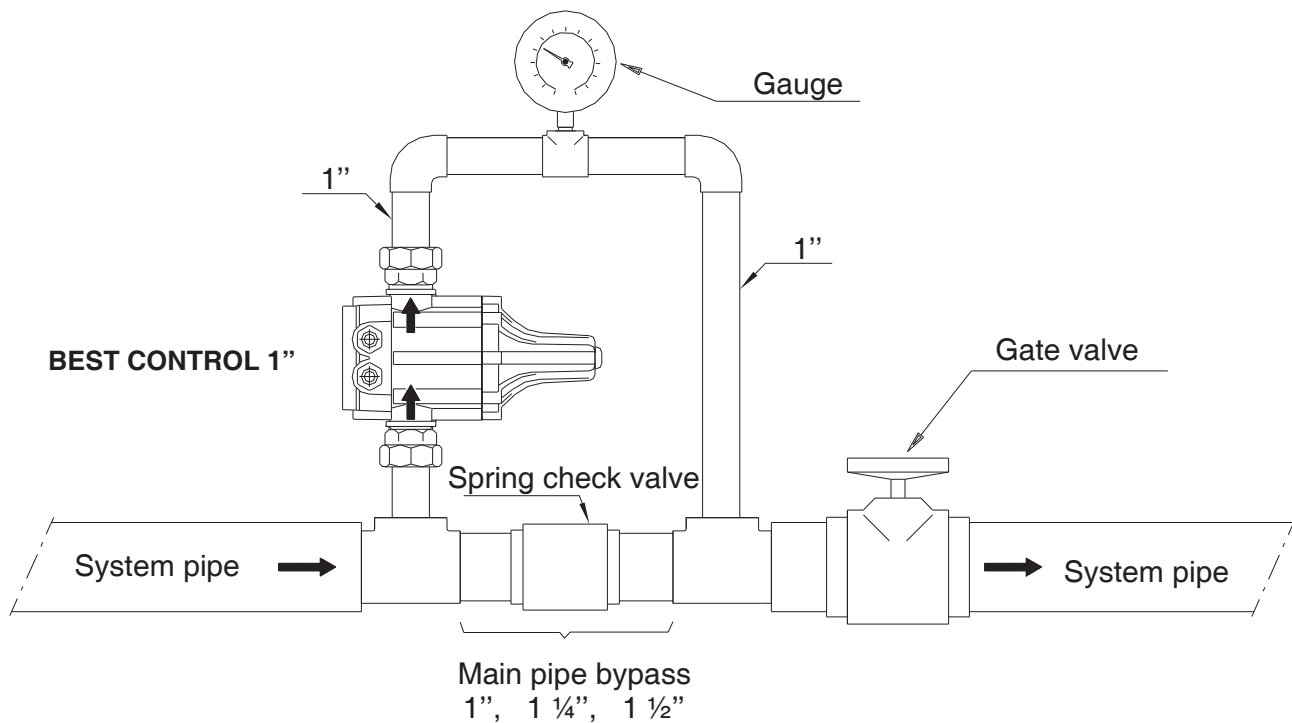
To overcome these problems install BEST CONTROL at a higher level in order to recreate the above mentioned conditions, otherwise use higher cut-in pressure models.

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.



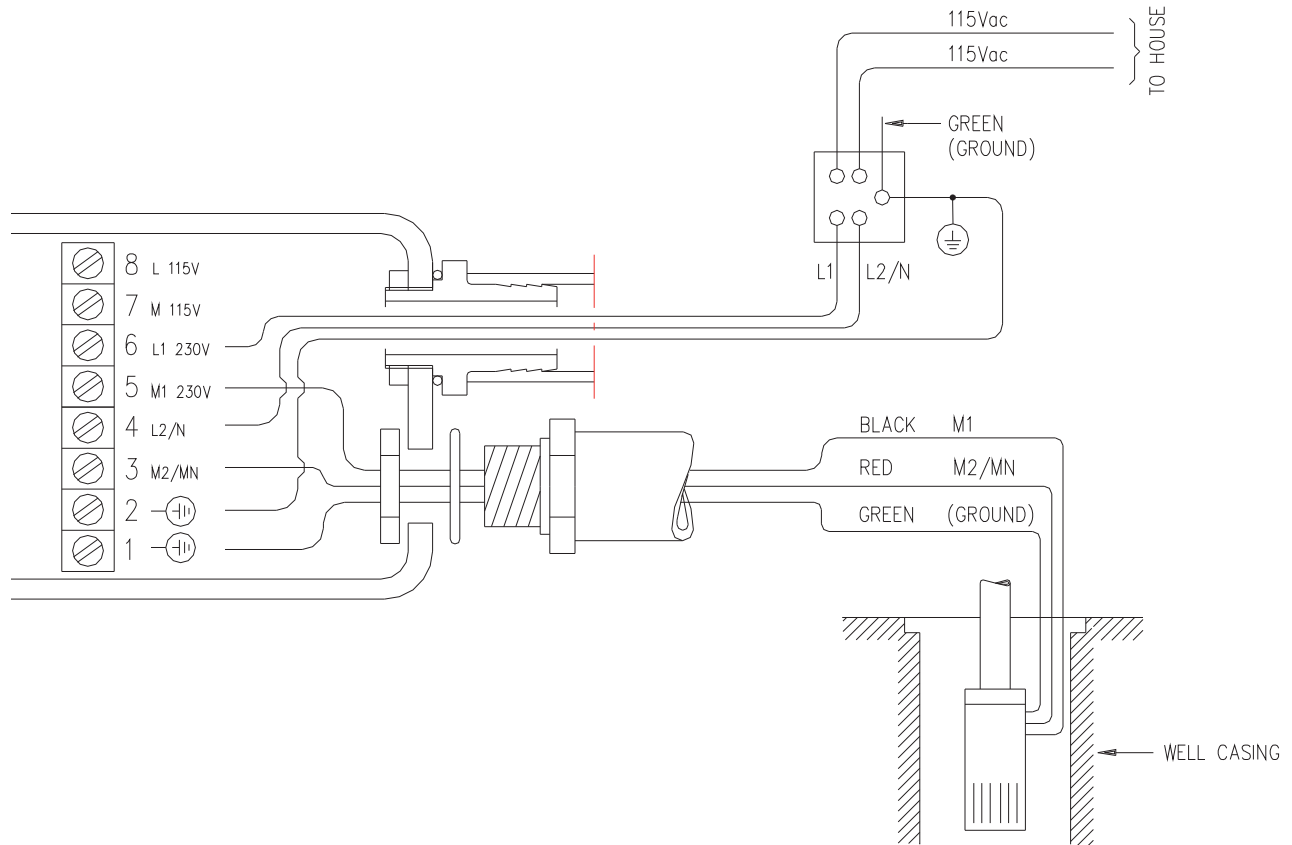
The main pipe of bypass must not exceed 1 ½", while the system pipe could be bigger.

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

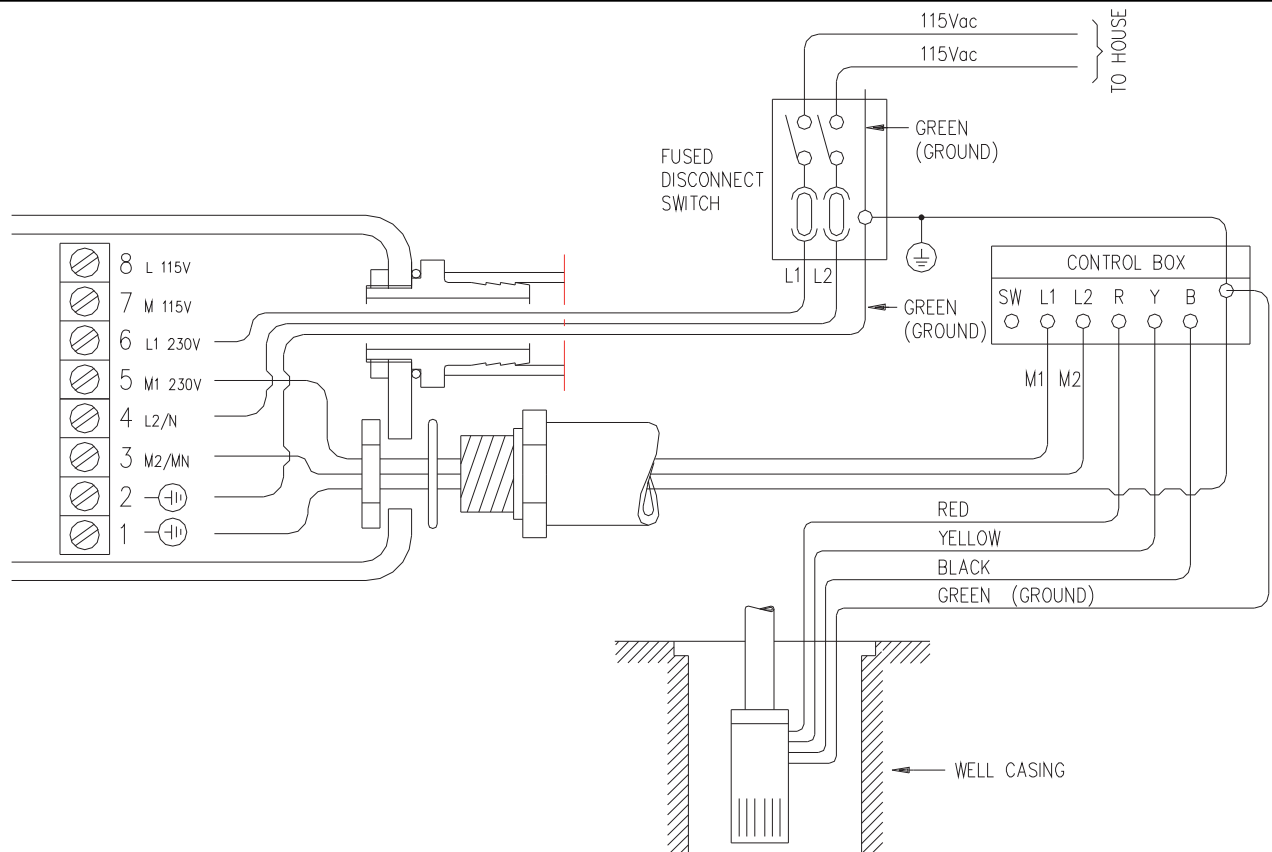
| Flow rate | gpm | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---------------------------------|-----|----|----|----|----|----|----|----|
| Best control 1" x 1" psi loss | | 3 | 5 | 9 | 14 | 19 | / | / |
| Best control 1" x 1 ¼" psi loss | | 2 | 2 | 3 | 5 | 8 | 10 | 12 |
| Best control 1" x 1 ½" psi loss |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

* Available on request.

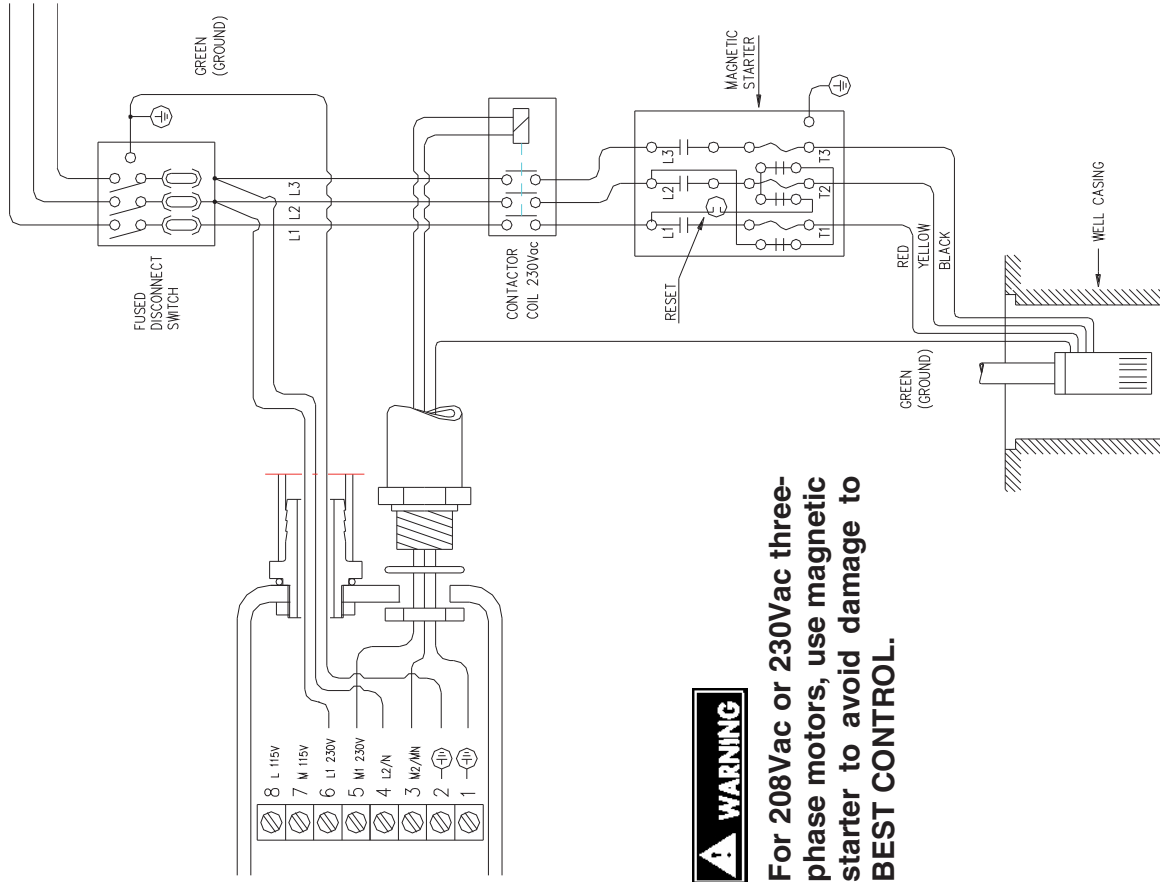
INSTALLATION WIRING DIAGRAM - 230VAC 2-WIRE PUMPS UP TO 20 FLA



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

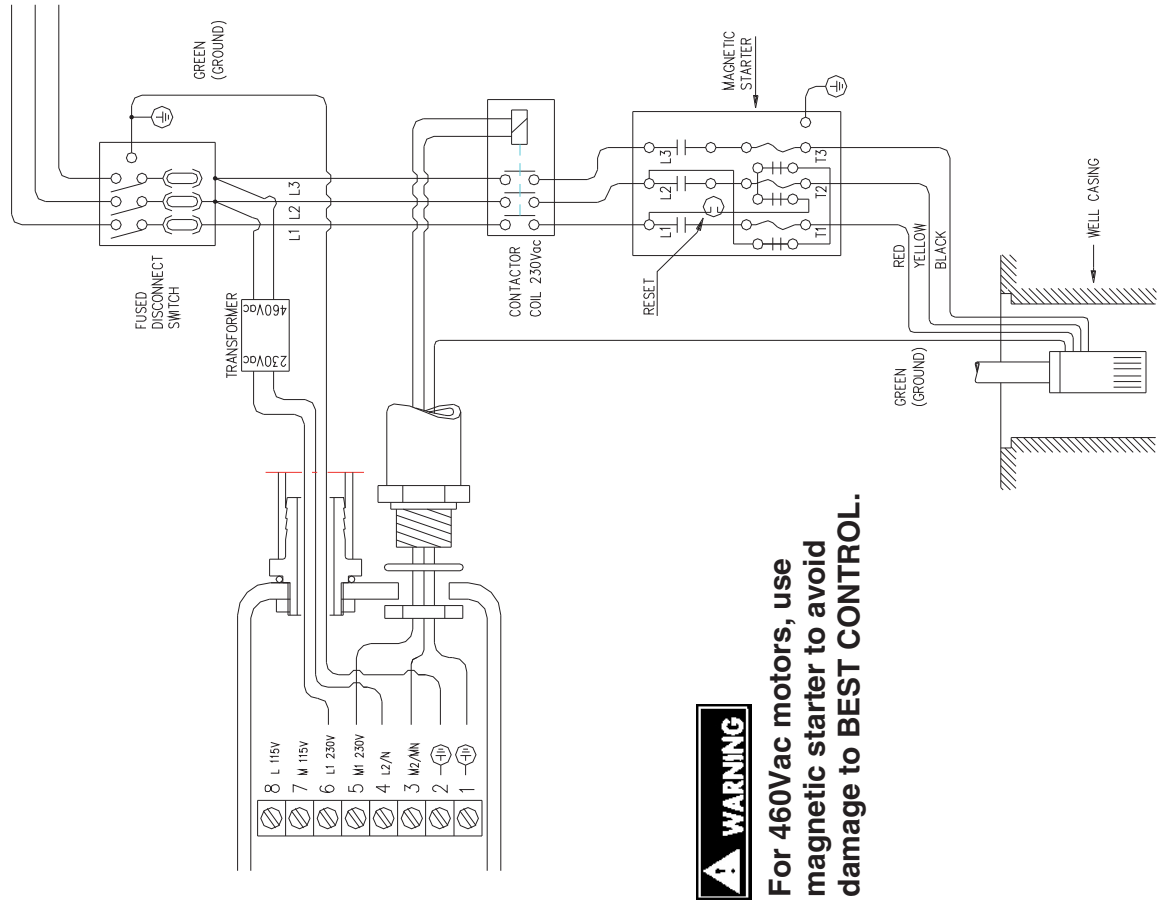


INSTALLATION WIRING DIAGRAM - 208 VAC OR 230 VAC THREE PHASE - 3-WIRE PUMPS



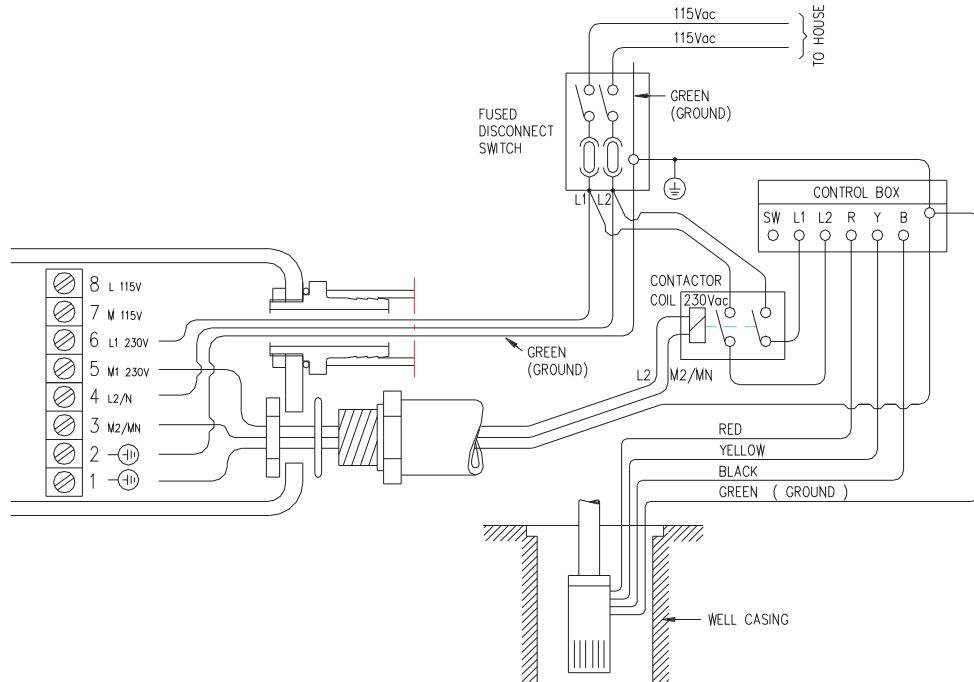
For 208Vac or 230Vac three-phase motors, use magnetic starter to avoid damage to BEST CONTROL.

INSTALLATION WIRING DIAGRAM - 460VAC

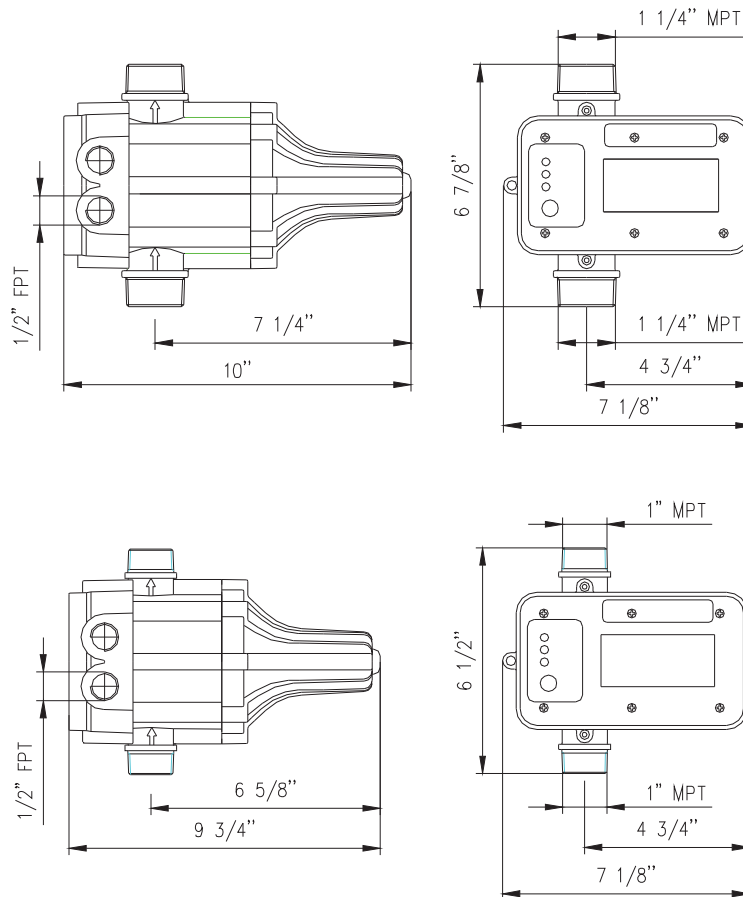


For 460Vac motors, use magnetic starter to avoid damage to BEST CONTROL.

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



OVERALL DIMENSIONS



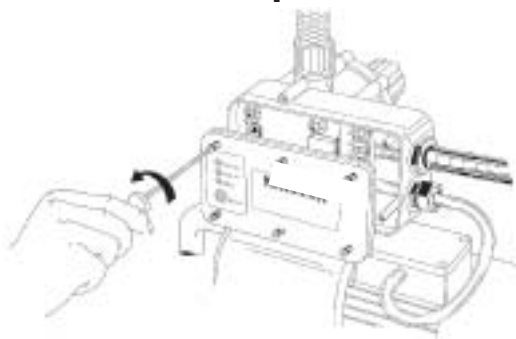
ELECTRONIC BOX REPLACEMENT



WARNING

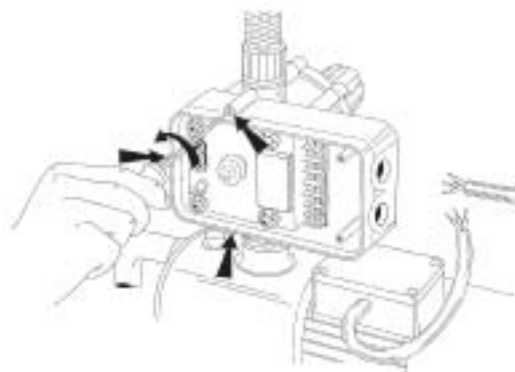
Before removing the electronic box ensure that power unit is off and unit is depressurized.

1



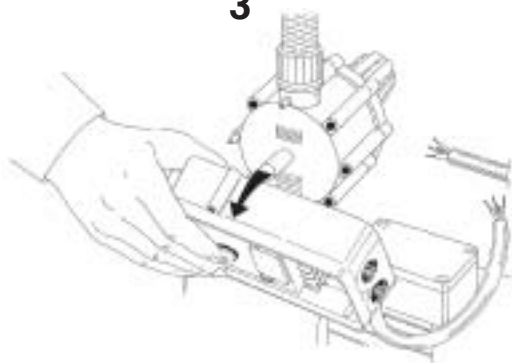
- 1) Remove the box cover and disconnect the electrical wires.

2



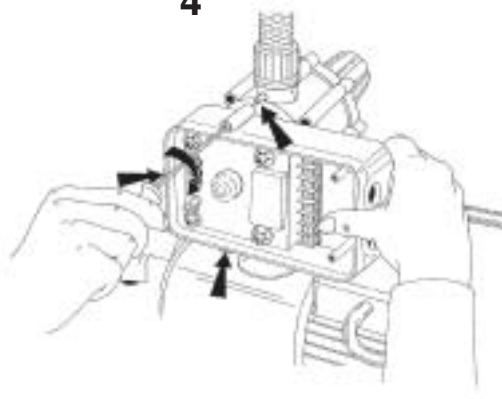
- 2) Take off the box by removing the three screws attaching the electronic box to the unit body.

3



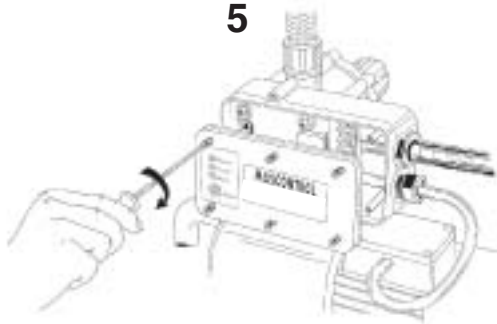
- 3) Remove the electronic box.

4



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

5



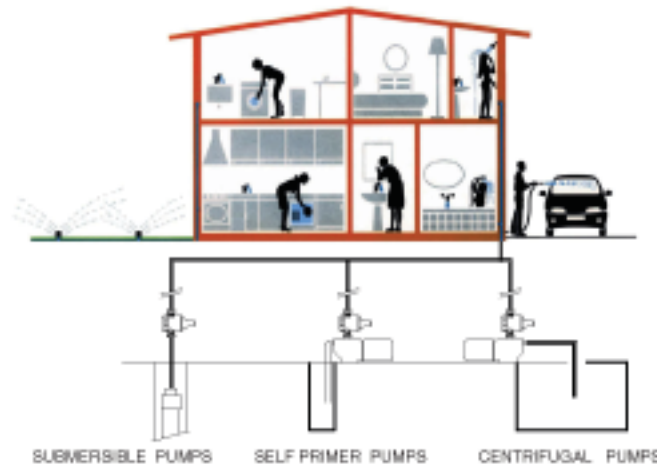
- 5) Tighten the six screws on the cover of the electronic box to ensure water tight seal.

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.

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.

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