

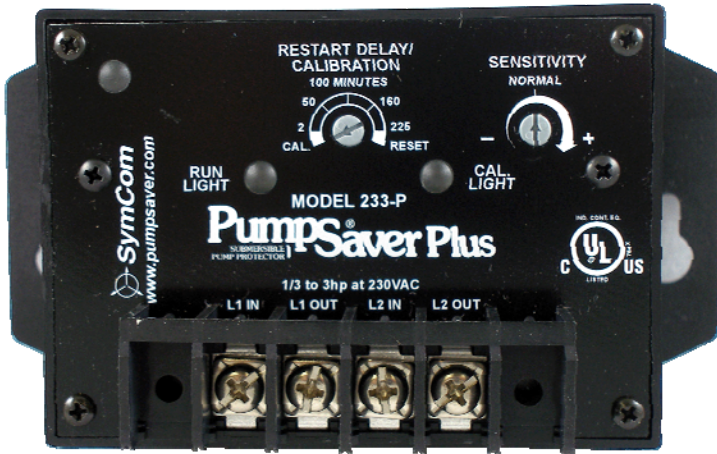
# INSTALLATION INSTRUCTIONS

Revision B  
Rapid City, SD, USA, 09/2008

# Pumpsaver® Plus

ELECTRONIC PUMP  
CONTROL & PROTECTION

## MODEL 233-P/233-1.5-P



IL\_233-P\_B

## **DANGER!**



**HAZARDOUS VOLTAGES MAY BE PRESENT DURING INSTALLATION.**

Electrical shock can cause death or serious injury.

Installation should be done by qualified personnel following all national, state and local electrical codes.



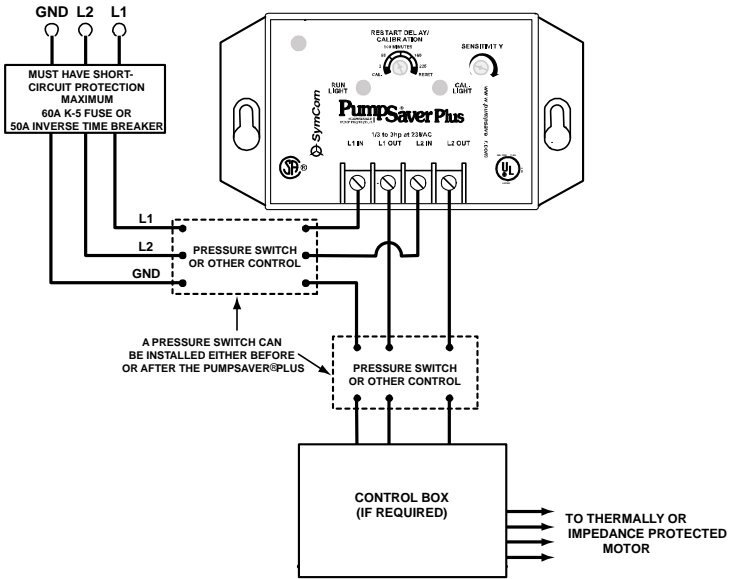
**BE SURE POWER IS DISCONNECTED PRIOR TO INSTALLATION!  
FOLLOW NATIONAL, STATE AND LOCAL CODES.  
READ THESE INSTRUCTIONS ENTIRELY BEFORE INSTALLATION.**

SymCom PumpSaver Plus<sup>®</sup>Plus Models 233-P and 233-1.5-P protect 230V, 2 or 3-wire, single-phase pumps from dry-well, dead-head, rapid-cycle, jammed-impeller, overvoltage and undervoltage conditions. Model 233-P is rated for a 1/3-3hp load range; Model 233-1.5-P is rated for a 1/3–1.5hp load range. Typical applications include submersible pumps, centrifugal pumps, circulating pumps, cooling pumps, environmental pumps, residential waterwells, commercial waterwells, irrigation wells, and golf course and other sprinkler systems.

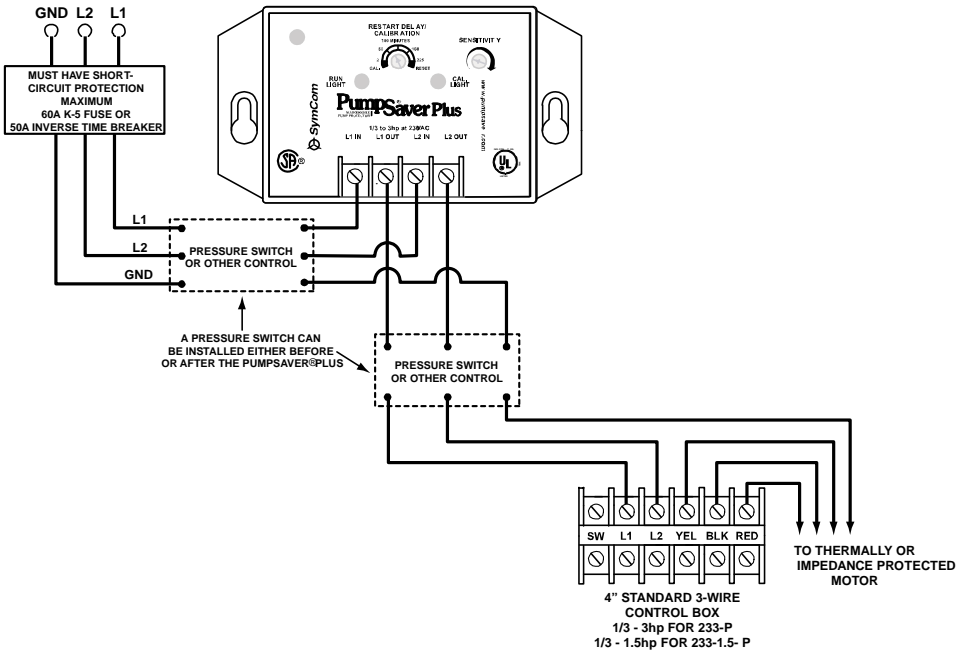
### **CONNECTIONS**

**NOTE: Use with UL/CSA listed overload or impedance protected pumps or motors only.**

1. Mount the PumpSaver<sup>®</sup>Plus Model 233-P or 233-1.5-P in a convenient location in or near the pump control box. If the location is wet or dusty, a NEMA 3R, 4, or 12 enclosure should be used. The PumpSaver<sup>®</sup>Plus must be protected by a fuse or circuit breaker (60A K5 fuse or 50A inverse time breaker max).
2. Connect one line from the fused disconnect to the PumpSaver<sup>®</sup>Plus's **L1 IN** terminal. Run a wire from the **L1 OUT** terminal to the other in-line controls such as pressure or float switches.
3. Connect the other line from the fused disconnect to the PumpSaver<sup>®</sup>Plus's **L2 IN** terminal. Run a wire from the **L2 OUT** terminal to the other in-line controls such as pressure or float switches (see Figure 1).
4. Refer to the appropriate wiring diagram for your specific application:
  - Typical wiring diagram – Figure 1
  - Standard 3-wire control box – Figure 2
  - Deluxe control box – Figure 3
  - 2-Wire pump direct feed – Figure 4



**FIGURE 1: Typical Wiring Diagram**



**FIGURE 2: Standard Control Box Wiring Diagram**

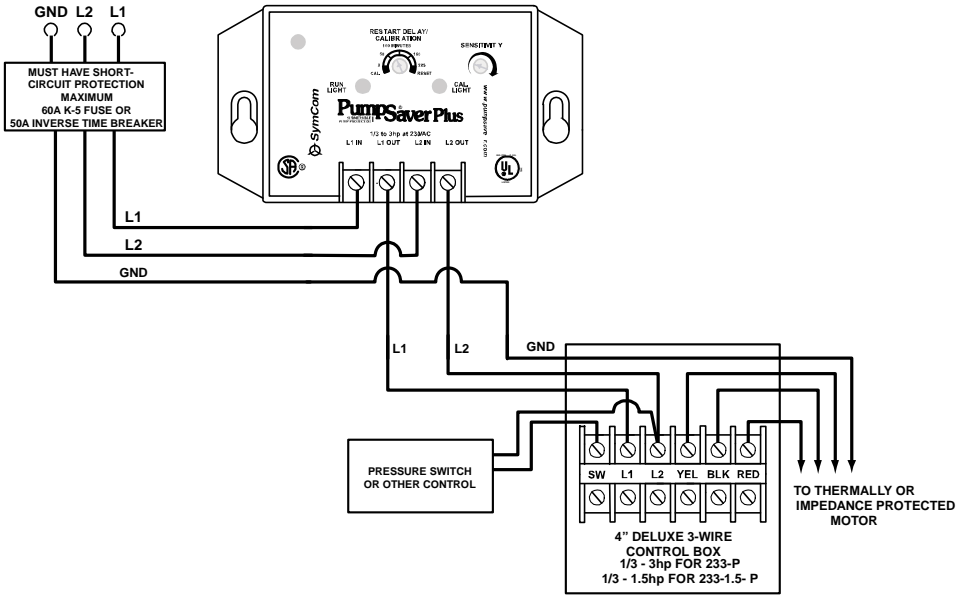


FIGURE 3: Deluxe Control Box Wiring Diagram

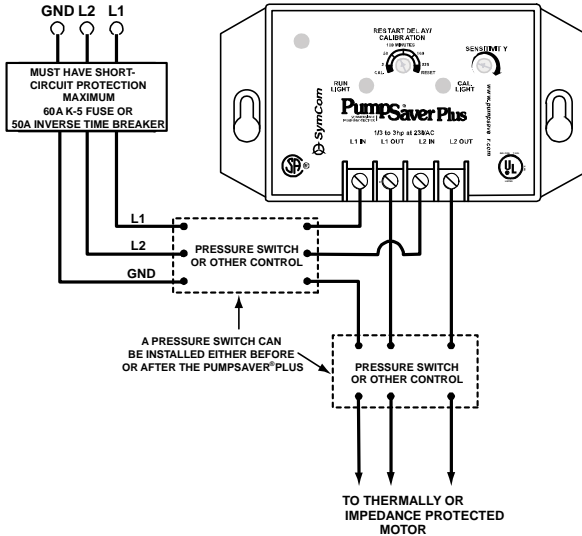


FIGURE 4: 2-Wire Pump Direct-Feed Wiring Diagram

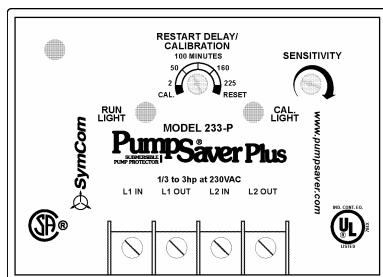
## OPERATION

The Model 233-P/233-1.5-P monitors pump load in amps and kilowatts. When the current (amps) exceeds approximately 125% of calibrated current, or power (kW) drops below the adjustable underload trip point, the PumpSaver®Plus—after the trip delay—will turn off the pump. The PumpSaver®Plus will time through the restart delay, and then restart the pump. The calibration is stored in permanent memory—it **does not need to be recalibrated if power is lost**.

## CALIBRATION

**NOTE: The Model 233-P/233-1.5-P should be calibrated during normal pumping conditions.**

1. Turn the **RESTART DELAY/ CALIBRATION** knob fully counter-clockwise to the **CAL.** position.
2. Apply power—the pump will run for approximately 10 seconds then shut off.
3. Set the **RESTART DELAY/ CALIBRATION** knob to the desired restart delay (dry-well recovery time)—the pump will turn on.



## CALIBRATING WHILE PUMPING

The Model 233-P/233-1.5-P can also be calibrated while the pump is running. Turn the **RESTART DELAY/CALIBRATION** knob to **CAL.** while pumping. Wait for the pump to turn off (approximately 10 seconds), then adjust the **RESTART DELAY/CALIBRATION** knob to the desired setting.

## SENSITIVITY

The PumpSaver®Plus has an adjustment knob to set the underload trip sensitivity. Setting **SENSITIVITY** to the middle position (straight up) is equivalent to SymCom's standard underload trip level. Adjust the **SENSITIVITY** knob to increase/decrease underload sensitivity up to approximately 10% of the standard trip. It may be necessary to increase the sensitivity if the PumpSaver®Plus does not trip on dry-run or dead-head or it is known that the water level in the well is very low relative to the pumps capabilities.

**WARNING: Decreasing the SENSITIVITY may compromise the PumpSaver®Plus's ability to detect dry-run and/or dead-head conditions.**

## RESET MODE / RESTART DELAY

Any restart delay can be bypassed by rotating the **RESTART DELAY/CALIBRATION** knob to the **RESET** position and back to the desired restart delay setting.

**NOTE:** The restart delay can be changed at any time. The next trip will follow the new restart delay setting.

For test purposes, the **RESTART DELAY/CALIBRATION** knob can be placed in the **RESET** position for manual reset. If the PumpSaver®Plus trips off in this mode due to a voltage or load problem, the **RESTART DELAY/CALIBRATION** knob must be rotated out of the **RESET** position to restart the pump.

## **RUN HOURS / FAULT HISTORY**

The PumpSaver®Plus records pump run hours. Run hours can be displayed by a PumpSaver®Plus Informer (see USING AN INFORMER on the following page). Run hours and fault history can be cleared on the PumpSaver®Plus. Read the following instructions fully before performing the procedure.

**NOTE:** Turn the **SENSITIVITY** knob **completely** to the left (counter-clockwise) or **completely** to the right (clockwise) when directed.

### **To Reset Run Hours and Clear Fault History:**

1. Remove power to the PumpSaver®Plus.
2. Set the **RESTART DELAY/CALIBRATION** knob to **RESET** and the **SENSITIVITY** knob to the middle (12:00) position.
3. Apply power to the PumpSaver®Plus—the **CAL. LIGHT** will turn on.
4. Turn the **SENSITIVITY** knob to the **right**—the **CAL. LIGHT** will turn off and the **RUN LIGHT** will turn on.
5. Turn the **SENSITIVITY** knob to the **left**—both lights will turn on.
6. Turn the **SENSITIVITY** knob to the **right**.
7. After 10 seconds, the **CAL.** and **RUN LIGHTS** will blink twice indicating the run hours and fault history have successfully been cleared.

## **RAPID CYCLING**

Rapid cycling is defined as more than 4 restarts in a 60-second period. The Model 233-P/233-1.5-P is capable of detecting a rapid-cycle condition whether a control device, such as a pressure switch, is installed before or after the PumpSaver®Plus. Upon detecting either form of rapid cycling, the PumpSaver®Plus will lock-out until power is removed and re-applied.

Protection against rapid cycling of a pressure switch installed before the PumpSaver®Plus can be disabled. Read the following instructions fully before performing the procedure.

**NOTE:** Turn the **SENSITIVITY** knob **completely** to the left (counter-clockwise) or **completely** to the right (clockwise) when directed.

### **To Disable Rapid-Cycle Protection when a Pressure Switch is Installed BEFORE the PumpSaver Plus:** (to re-enable, follow the same procedure)

1. Remove power to the PumpSaver®Plus.
2. Set the **RESTART DELAY/CALIBRATION** knob to **RESET** and the **SENSITIVITY** knob to the middle (12:00) position.
3. Apply power to the PumpSaver®Plus —the **CAL. LIGHT** will turn on.
4. Turn the **SENSITIVITY** knob to the **right**—the **CAL. LIGHT** will turn off, **RUN LIGHT** will turn on.
5. Turn the **SENSITIVITY** knob to the **left**—both lights will turn on.
6. Turn the **SENSITIVITY** knob **right—left—right—left—right**.
7. After 2 seconds, the **CAL.** and **RUN LIGHTS** will blink once.

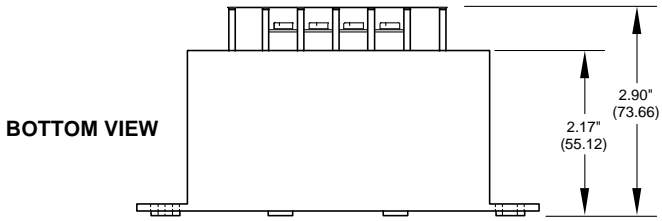
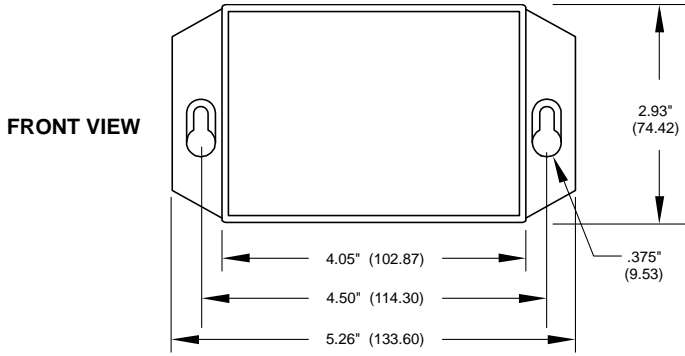
## **USING AN INFORMER**

The Model 233-P/233-1.5-P is equipped with an infrared LED that will communicate to a SymCom Informer—a handheld, battery-operated, diagnostic tool. The Informer—when directed at the Model 233-P/233-1.5-P —will display real-time voltage, current and power; dry-well and overcurrent trip points; calibration voltage; last 20 faults; voltage, current and power at the last fault; highest/lowest voltage and current since calibration; the model number; and the CT size if applicable. The Informer can be used on any single-phase PumpSaver®Plus equipped with an infrared LED transmitter. Contact SymCom for more information at 800-843-8848 or visit our website: [www.symcom.com](http://www.symcom.com).

## TROUBLESHOOTING

<b>RUN LIGHT</b>	<b>CAL. LIGHT</b>	<b>PROBLEM or FUNCTION</b>	<b>CORRECTIVE ACTION</b>
On Steady	Off	<b>RUN:</b> Pump is running—or ready to run—no problems in operation	If pump is not running, check for loose wiring and ensure proper function of pressure or float switches.
On Steady	On Steady	<b>CAL:</b> The PumpSaver®Plus is in the calibration process.	None
Off	On Steady	<b>CAL COMPLETE:</b> The PumpSaver®Plus has calibrated, the RESTART DELAY/ CALIBRATION knob was left in the CAL position. Pump is off.	Pump will restart as soon as the RESTART DELAY/ CALIBRATION knob is rotated out of the CAL position.
Off	Off	<b>OFF / MANUAL RESTART:</b> The pump is not running. Either the PumpSaver®Plus has tripped on dry-run, dead-head, or overcurrent while the RESTART DELAY/ CALIBRATION knob was in the RESET position or source power is not present.	If knob is in the RESET position, rotate out of RESET—If the CAL light blinks, check for an overcurrent condition. If the RUN light blinks, look for a dry-run or dead-head condition. If no lights come on, check incoming power for adequate voltage.
Blinking	Off	<b>DRY RUN / DEAD HEAD:</b> The PumpSaver®Plus has shut the pump off due to a dry run or dead head condition. The unit is timing through the restart delay and will try to restart.	Check for restricted flow or inadequate supply of liquid.
Off	Blinking	<b>OVERCURRENT:</b> The PumpSaver®Plus has shut the pump off due to an overcurrent condition. The unit is timing through the restart delay and will try to restart if line voltage is at an acceptable level.	Check for low or high voltage or jammed pump impellers. If these conditions do not exist, recalibrate the unit while it is drawing higher current (amps should not exceed SFA).
Blinking alternately with the CAL. LIGHT	Blinking alternately with the RUN LIGHT	<b>VOLTAGE FAULT:</b> The PumpSaver®Plus is preventing the pump from starting due to voltage problems. The voltage is being interrogated and the unit will remain in this mode until the voltage is at an acceptable level.	If the unit remains in this state for more than 5 seconds, check for high or low voltage.
Blinking in unison with the CAL. LIGHT	Blinking in unison with the RUN LIGHT	<b>RAPID CYCLE:</b> The PumpSaver®Plus has shut down on rapid cycling. Power must be removed and reapplied to reset the unit.	Check for a broken bladder in the pressure tank (if used), or check for a defective pressure or float switch.

**PHYSICAL DIMENSIONS**





## **SPECIFICATIONS**

<b>Functional Specifications</b>	
Adjustments/Settings	
Overcurrent	125% of calibration point
Underload (dry-well)	Adjustable (70-90% of calibrated run power)
Overvoltage	265VAC
Undervoltage	190VAC
Number of restarts allowed in 60 second period (rapid-cycling)	4
Trip Delay Times	
Overcurrent	5 seconds
Dry-well	4 seconds
Restart Delay Times	
Over/undervoltage	2 seconds
All other faults	Manual, 2-225 minutes
<b>Input Characteristics</b>	
Supply Voltage	230 VAC
Load Range	
233-P	1/3 – 3 hp
233-1.5-P	1/3 – 1.5 hp
Frequency	50/60 Hz (note: 50Hz will increase all delay timers by 20%)
<b>Output Characteristics</b>	
Output Contact Rating-SPST	
233-P	3hp @ 240VAC (17 Amps max.)
233-1.5-P	1.5hp @ 240VAC (10 Amps max.)
<b>General Characteristics</b>	
Operating Temperature	
Ambient	-40° to 40°C (-40° to 104°F)
Surrounding Air	-40° to 55°C (-40° to 131°F)
Storage Temperature	-40° to 80° C (-40° to 176°F)
Power Consumption	5 Watts (max.)
Wire Gauge	Solid or stranded 10 - 22AWG
Terminal Torque	13 in.-lbs.
Standards Passed	
Electrostatic Discharge (ESD)	IEC 1000-4-2, Level 2, 4kV contact, 6kV air
Safety Marks	
UL	UL508
CSA	C22.2 No. 14
Dimensions	5.26" W x 2.93" H x 2.90" D
Weight	14 oz.
Mounting Methods	#8 screws

## NOTES

## NOTES

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our complete product listing!*

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