

SINGLE-PHASE PUMPSAVER CATALOG



PumpSaver[®] Plus
ELECTRONIC PUMP
CONTROL & PROTECTION

Having issues with your SymCom product? Call our **Technical Support Team** with your questions.

To Our Customers:

Many times, issues with a product are the result of an incorrect setting. By calling us, SymCom's Technical Support Team, the issue can be eliminated. With our experienced staff, we can go over the settings with you to ensure that everything is set correctly. We are well versed in all products and applications for SymCom products. Chances are, we have run into your issue before.

The best way to fix an issue is to have you at the unit when you call, that way, we can make sure that all issues are fixed the first time. In the event that we determine your unit is not functioning properly, we will issue you a return material authorization (RMA) number to send the unit in for evaluation. If the unit is determined to be faulty and covered under warranty, we will replace the unit at no charge to you. No need to contact your distributor for a replacement. A new unit will be sent to you directly if it is covered under warranty.

So call our friendly support staff today for any and all of your questions regarding your SymCom products.

Best Regards,

SymCom Technical Support Team

Note: The use of flow restrictors, unusually high head pressures, or low water conditions at the time of calibration may interfere with the detection of dead-head and dry-well conditions.

Grundfos control box, 1/3 - 1hp, 230VAC - Model 232-Insider



The Model 232-Insider single-phase PumpSaver® fits inside 1/2, 3/4, and 1hp, 230V Grundfos® control boxes. It is a pump monitor designed to protect single-phase pumps from dry-well, deadhead, jammed impeller, overvoltage and undervoltage conditions.

A calibration adjustment allows the Insider to be calibrated to your specific pumping applications, thereby reducing the possibility of false or nuisance tripping. A unique microcontroller-based voltage and current-sensing circuit constantly monitors the incoming power for fluctuations, overcurrent, and undercurrent. When an abnormality, such as loss of suction is detected, the PumpSaver® deactivates its output relay and directly disconnects the pump motor. The PumpSaver® then begins its user-selectable restart delay (dry-well recovery) timer. When the timer counts to zero or power is removed and reapplied, the PumpSaver® reactivates its output relay and turns the pump back on. By leaving the restart delay knob in the reset position, the Pump-Saver® will operate in manual reset mode.

The Insider communicates with a hand-held diagnostics tool called the Informer (sold separately). The Informer displays parameters including calibration points, trip points, run time and last faults. An IR Kit-12 (12" fiber optic kit) is included with each Insider, allowing the Informer to access these parameters even when the Insider is enclosed in a control box. This is valuable for troubleshooting the pump while it is running.

Specifications

Functional Specifications	
Adjustments/Settings	
Overcurrent	125% of calibration point
Underload (dry-well)	Approx. 80% of calibration point
Overvoltage	265VAC
Undervoltage	190VAC
Trip Delay Times	
Overcurrent	5 seconds
Dry-well	4 seconds
Restart Delay Times	
Over/undervoltage	2 seconds
All other faults (dry-well recovery timer)	Manual, 2-225 Minutes
Input Characteristics	
Supply Voltage	230VAC
Load Range	1/3 - 1 hp
Frequency	50/60Hz (Note: 50Hz will increase all delay timers by 20%)
Output Characteristics	
Output Contact Rating-SPST	1hp@240VAC (17 amps max.)
General Characteristics	
Operating Temperature	-40° to 70° C (-40° to 158° F)
Maximum Input Power	5 W
Standards Passed	
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 2, 4kV contact, 6kV air
Safety Marks	
UL	UL508
CSA	C22.2 No. 14
Weight	10 oz.
Mounting Methods	Grundfos® Control Box

For a typical wiring diagram see page 28.
 For installation instructions see page 36.

How to order:

232-Insider (Grundfos control box, 1/3 - 1hp, 230VAC)

Grundfos control box, 1/3 - 3hp, 230VAC - Model 234-P



The SymCom PumpSaver®Plus Model 234-P is designed to be mounted inside a Grundfos® control box to protect 1/3-3hp, 2- or 3-wire, 230V pumps.

The Model 234-P protects single-phase pumps from dry-well, dead-head, rapid-cycle, jammed-impeller, and over/undervoltage conditions. Typical applications include residential waterwells, commercial waterwells, irrigation wells, and golf course and other sprinkler systems.

A calibration adjustment allows the PumpSaver®Plus to be calibrated to your specific pumping applications, thereby reducing the possibility of false or nuisance tripping. A unique microcontroller-based voltage and current-sensing circuit constantly monitors the incoming power for fluctuations, overcurrent, and undercurrent. When an abnormality, such as loss of suction is detected, the PumpSaver®Plus deactivates its output relay and directly disconnects the pump motor. The PumpSaver®Plus then begins its user-selectable restart delay (dry-well recovery) timer. When the timer counts to zero or power is removed and reapplied, the PumpSaver®Plus reactivates its output relay and turns the pump back on. By leaving the restart delay knob in the reset position, the PumpSaver®Plus will operate in manual reset mode.

The PumpSaver®Plus communicates with a hand-held diagnostics tool called the Informer (sold separately). The Informer displays parameters including calibration points, trip points, run time and last faults. An IR Kit-12 (12" fiber optic kit) allows the Informer to access these parameters even when the PumpSaver®Plus is enclosed in a control box. This is valuable for troubleshooting the pump while it is running.

NOTE: The PumpSaver®Plus models have a sensitivity adjustment for the dry-well trip point. After calibration is done, you can adjust the sensitivity for the dry-well/dead-head trip point from 70-90% of the full load. This makes the unit even more adaptable to varying pumping applications. If you have a very low producing well, you increase the sensitivity closer to the 90% mark, or if you have a very heavy producing well, you would decrease the sensitivity around the 70% mark.

Specifications

Functional Specifications	
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 a 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 (dry-well recovery timer)	Manual, 2-225 Minutes
Input Characteristics	
Supply Voltage	230VAC
Load Range	1/3 - 3 hp
Frequency	50/60Hz (Note: 50Hz will increase all delay timers by 20%)
Output Characteristics	
Output Contact Rating-SPST	3 hp@240VAC (17 amps max.)
General Characteristics	
Operating Temperature	-40° to 45° C (-40° to 113° F)
Maximum Input Power	5 W
Standards Passed	
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 2, 4kV contact, 6kV air
Dimensions	Fitted to Grundfos® Control Box
Weight	14 oz.
Mounting Methods	Grundfos® Control Box

For a typical wiring diagram see page 29.

How to order:

234-P (Grundfos control box, 1/3 - 3hp, 230VAC)

Grundfos control box, 5 - 7.5hp, 230VAC - Model 236-P



The SymCom PumpSaver®Plus Model 236-P is designed to be mounted inside a Grundfos® control box to protect 5 to 7.5hp, 230V pumps.

The Model 236-P protects single-phase pumps from dry-well, dead-head, rapid-cycle, jammed-impeller, and over/undervoltage conditions. Typical applications include residential waterwells, commercial waterwells, irrigation wells, and golf course and other sprinkler systems.

A calibration adjustment allows the PumpSaver®Plus to be calibrated to your specific pumping applications, thereby reducing the possibility of false or nuisance tripping. A unique microcontroller-based voltage and current-sensing circuit constantly monitors the incoming power for fluctuations, overcurrent, and undercurrent. When an abnormality, such as loss of suction is detected, the PumpSaver®Plus deactivates its output relay and directly disconnects the pump motor. The PumpSaver®Plus then begins its user-selectable restart delay (dry-well recovery) timer. When the timer counts to zero or power is removed and reapplied, the PumpSaver®Plus reactivates its output relay and turns the pump back on. By leaving the restart delay knob in the reset position, the PumpSaver®Plus will operate in manual reset mode.

The PumpSaver®Plus communicates with a hand-held diagnostics tool called the Informer (sold separately). The Informer displays parameters including calibration points, trip points, run time and last faults. An IR Kit-12 (12" fiber optic kit) allows the Informer to access these parameters even when the PumpSaver®Plus is enclosed in a control box. This is valuable for troubleshooting the pump while it is running.

Size	Current	CT*
5 - 7.5 HP	27.5 - 42.1	50:5

* A 50:5 external CT is included.

NOTE: The PumpSaver®Plus models have a sensitivity adjustment for the dry-well trip point. After calibration is done, you can adjust the sensitivity for the dry-well/dead-head trip point from 70-90% of the full load. This makes the unit even more adaptable to varying pumping applications. If you have a very low producing well, you increase the sensitivity closer to the 90% mark, or if you have a very heavy producing well, you would decrease the sensitivity around the 70% mark.

Specifications

Functional Specifications	
Adjustments/Settings	
Overcurrent	125% of calibration point
Underload (dry-well)	Adjustable (70 - 90% of calibrated run power)
Overvoltage	265VAC
Undervoltage	190VAC
Trip Delay Times	
Overcurrent	5 seconds
Dry-well	4 seconds
Restart Delay Times	
Over/undervoltage	2 seconds
All other faults (dry-well recovery timer)	Manual, 2-225 Minutes
Input Characteristics	
Supply Voltage	230VAC
Load Range	5 - 7.5hp (external CT required)
Frequency	50/60Hz (Note: 50Hz will increase all delay timers by 20%)
Output Characteristics	
Output Contact Rating-SPST	A300, 720VA@240VAC General Purpose (10 amps max.)
General Characteristics	
Operating Temperature	-40° to 50° C (-40° to 122° F)
Maximum Input Power	5 W
Standards Passed	
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 2, 4kV contact, 6kV air
Dimensions	Fitted to Grundfos® Control Box
Weight	14 oz.
Mounting Methods	Grundfos® Control Box

For a typical wiring diagram see page 30.

How to order:

236-P-50 (Grundfos control box, 5 - 7.5hp, 230VAC, includes 50:5 CT)

Franklin™, CentriPro™ or Pentek® Control Box
1/3 - 1/2hp, 115VAC - Model 111-Insider-P
1/3 - 1hp, 230VAC - Model 231-Insider-P



SymCom's Model 111-Insider-P single-phase PumpSaver®Plus fits inside 1/3 and 1/2, 115V control boxes and the 231-Insider-P fits in 1/3, 1/2, 3/4, and 1 hp, 230V control boxes. Both models are designed to protect single-phase pumps from dry-well, dead-head, jammed impeller, rapid-cycle, overvoltage, and undervoltage conditions.

A calibration adjustment allows the Insider to be calibrated to your specific pumping applications, thereby reducing the possibility of false or nuisance tripping. A unique microcontroller-based voltage and current-sensing circuit constantly monitors the incoming power for fluctuations, overcurrent, and undercurrent. When an abnormality, such as loss of suction is detected, the PumpSaver® deactivates its output relay and directly disconnects the pump motor. The PumpSaver® then begins its user-selectable restart delay (dry-well recovery) timer. When the timer counts to zero or power is removed and reapplied, the PumpSaver® reactivates its output relay and turns the pump back on. By leaving the restart delay knob in the reset position, the PumpSaver® will operate in manual reset mode.

The Insider communicates with a hand-held diagnostics tool called the Informer (sold separately). The Informer displays parameters including calibration points, trip points, run time and last faults. An IR Kit-12 (12" fiber optic kit) is included with each Insider, allowing the Informer to access these parameters even when the Insider is enclosed in a control box. This is valuable for troubleshooting the pump while it is running.

NOTE: The PumpSaver®Plus models have a sensitivity adjustment for the dry-well trip point. After calibration is done, you can adjust the sensitivity for the dry-well/dead-head trip point from 70-90% of the full load. This makes the unit even more adaptable to varying pumping applications. If you have a very low producing well, you increase the sensitivity closer to the 90% mark, or if you have a very heavy producing well, you would decrease the sensitivity around the 70% mark.

Models 111-Insider-P / 231-Insider-P

Specifications

Functional Specifications	
Adjustments/Settings	
Overcurrent	125% of calibration point
Underload (dry-well)	Adjustable (70 to 90% of calibrated run power)
Overvoltage	
111-Insider-P	132.5VAC
231-Insider-P	265VAC
Undervoltage	
111-Insider-P	95VAC
231-Insider-P	190VAC
Number of restarts allowed in a 60-sec. 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
Input Characteristics	
Supply Voltage	
111-Insider-P	115VAC
231-Insider-P	230VAC
Load Range:	
111-Insider-P	1/3 - 1/2 hp
231-Insider-P	1/3 - 1 hp
Frequency	50/60Hz (Note: 50Hz will increase all delay timers by 20%)
Output Characteristics	
Output Contact Rating-SPST	
111-Insider-P	1/2hp@120VAC (17 amps max.)
231-Insider-P	1hp@ 240VAC (17 amps max.)
General Characteristics	
Operating Temperature	-40° to 60° C (-40° to 140° F)
Maximum Input Power	5 W
Standards Passed	
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 2, 4kV contact, 6kV air
Safety Marks:	
cUR*	UL508, C22.2 No. 14
Weight	10 oz.
Mounting Methods:	Inside a Franklin™, Pentek® or CentriPro™ control box

*The 111-Insider-P and 231-Insider-P are approved by UL for use in the Franklin™, Pentek®, and CentriPro™ type 3R control boxes when installed as described in these instructions. The 111-Insider-P and 231-Insider-P are not intended to provide overload protection, and should be used with thermally or impedance protected motors only.

For a typical wiring diagram see pages 31-33.

For installation instructions see page 36.

How to order:

111-Insider-P (1/3 - 1/2hp, 115VAC, includes IR Kit-12)

231-Insider-P (1/3 - 1hp, 230VAC, includes IR Kit-12)

1/3 - 1hp, 115VAC - Model 111P

1/3 - 1.5hp, 230VAC - Model 233P-1.5

1/3 - 3hp, 230VAC - Model 233P / 233P-UCTD8 (8 sec. UCTD)



The PumpSaver®Plus Models 111P (115 volt, 1/3 to 1hp); 233P-1.5 (230 volt, 1/3 to 1.5hp); and 233P (230 volt, 1/3 to 3hp) protect pumps from dry-well, dead-head, jammed impeller, overvoltage/undervoltage conditions and now rapid-cycle protection whether the pressure switch is mounted before or after our unit.

A calibration adjustment allows the Insider to be calibrated to your specific pumping applications, thereby reducing the possibility of false or nuisance tripping. A unique microcontroller-based voltage and current-sensing circuit constantly monitors the incoming power for fluctuations, overcurrent, and undercurrent. When an abnormality, such as loss of suction is detected, the PumpSaver® deactivates its output relay and directly disconnects the pump motor. The PumpSaver® then begins its user-selectable restart delay (dry-well recovery) timer. When the timer counts to zero or power is removed and reapplied, the PumpSaver® reactivates its output relay and turns the pump back on.

The PumpSaver®Plus communicates with a hand-held diagnostics tool called the Informer (sold separately). The Informer displays parameters including calibration points, trip points, run time and last faults. An IR Kit-12 (12" fiber optic kit) allows the Informer to access these parameters even when the PumpSaver®Plus is enclosed in a control box. This is valuable for troubleshooting the pump while it is running.

NOTE: The PumpSaver®Plus models have a sensitivity adjustment for the dry-well trip point. After calibration is done, you can adjust the sensitivity for the dry-well/dead-head trip point from 70-90% of the full load. This makes the unit even more adaptable to varying pumping applications. If you have a very low producing well, you increase the sensitivity closer to the 90% mark, or if you have a very heavy producing well, you would decrease the sensitivity around the 70% mark.

Specifications

Functional Specifications	
Adjustments/Settings Overcurrent Underload (dry-well) Overvoltage 111P 233P, 233P-1.5 Undervoltage 111P 233P, 233P-1.5 Number of restarts allowed in a 60-sec. period (rapid-cycling) Trip Delay Times Overcurrent Dry-well Restart Delay Times Over/undervoltage All other faults	125% of calibration point Adjustable (70 to 90% of calibrated run power) 132.5VAC 265VAC 95VAC 190VAC 4 5 seconds 4 seconds (optional 8 seconds*) 2 seconds Manual, 2-225 Minutes
Input Characteristics	
Supply Voltage: 111P 233P-1.5, 233P Load Range: 111P 233P-1.5 233P Frequency:	115VAC 230VAC 1/3 - 1 hp 1/3 - 1.5 hp 1/3 - 3 hp 50/60Hz (Note: 50Hz will increase all delay timers by 20%)
Output Characteristics	
Output Contact Rating-SPST: 111P 233P-1.5 233P	1hp@120VAC (16 amps max.) 1.5hp@240VAC (10 amps max.) 3hp@240VAC (17 amps max.)
General Characteristics	
Operating Temperature Maximum Input Power Wire Gauge Terminal Torque Standards Passed: Electrostatic Discharge (ESD) Surge Immunity Safety Marks: cUL Listed Dimensions Weight Mounting Methods:	-40° to 55° C (-40° to 131° F) 5 W Solid or Stranded 10 - 22AWG 13 in.-lbs. IEC 61000-4-2, Level 2, 4kV contact, 6kV air IEC 61000-4-5, Level 4, 4kV line-to-line and line-to-ground UL508, C22.2 No. 14 5.26" W x 2.93" H x 2.90" D 14 oz. #8 screws

* use part number 233P-UCID8
For a typical wiring diagram see page 34.
For installation instructions see page 36.
For product dimensions see page 54.

How to order:

111P (1/3 - 1hp, 115VAC)
233P-1.5 (1/3 - 1.5hp, 230VAC)
233P (1/3 - 3hp, 230VAC)
233P-UCTD8 (1/3 - 3hp, 230VAC, 8 sec. dry-well trip delay)

5 - 15hp, 230VAC - Model 235P



SymCom's Model 235P PumpSaver®Plus is designed to protect 5-15 hp, 230V, single-phase pumps from dry-well, dead-head, jammed impeller and overvoltage and undervoltage conditions.

A calibration adjustment allows the Model 235P to be calibrated to your specific pumping applications, thereby reducing the possibility of false or nuisance tripping. A unique microcontroller-based voltage and current-sensing circuit constantly monitors the incoming power for fluctuations causing overcurrent and undercurrent. When an abnormality, such as loss of suction is detected, the PumpSaver®Plus deactivates its output relay and directly disconnects the pump motor.

The PumpSaver®Plus communicates with a hand-held diagnostics tool called the Informer (sold separately). The Informer displays parameters including calibration points, trip points, run time and last faults. An IR Kit-12 (12" fiber optic kit) allows the Informer to access these parameters even when the PumpSaver®Plus is enclosed in a control box. This is valuable for troubleshooting the pump while it is running.

An external current transformer is required for operation (sold separately).

Size	Current	CT*
5 - 7½ HP	27.5 - 42.1	50:5
10 HP	51	75:5
15 HP	75	100:5

NOTE: The PumpSaver®Plus models have a sensitivity adjustment for the dry-well trip point. After calibration is done, you can adjust the sensitivity for the dry-well/dead-head trip point from 70-90% of the full load. This makes the unit even more adaptable to varying pumping applications. If you have a very low producing well, you increase the sensitivity closer to the 90% mark, or if you have a very heavy producing well, you would decrease the sensitivity around the 70% mark.

Specifications

Functional Specifications	
Adjustments/Settings	
Overcurrent	125% of calibration point
Underload (dry-well)	Adjustable (70 to 90% of calibrated run power)
Overvoltage	265VAC
Undervoltage	190VAC
Number of restarts allowed in a 60-sec. 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
Input Characteristics	
Supply Voltage	230VAC
Load Range	5 - 15 hp
Frequency	50/60Hz (Note: 50Hz will increase all delay timers by 20%)
Output Characteristics	
Output Contact Rating-SPST	A300, 720VA@240VAC (10 amps max.)
General Characteristics	
Operating Temperature	-40° to 55° C (-40° to 131° F)
Maximum Input Power	5 W
Wire Gauge	Solid or Stranded 10 - 22AWG
Terminal Torque	13 in.-lbs.
Standards Passed	
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 2, 4kV contact, 6kV air
Surge Immunity	IEC 61000-4-5, Level 4, 4kV line-to-line and line-to-ground
Safety Marks	
cUL Listed	UL508, C22.2 No. 14
Dimensions	5.26" W x 2.93" H x 2.90" D
Weight	14 oz.
Mounting Methods	#8 screws

For a typical wiring diagram see page 35.

For installation instructions see page 36.

For product dimensions see page 54.

How to order:

235P* (5 - 15hp, 230VAC)

* current transformer sold separately

- 111P-ENCL (enclosure with 111P mounted)
- 233P-1.5-ENCL (enclosure with 233P-1.5 mounted)
- 233P-ENCL (enclosure with 233P mounted)



The ENCL enclosure is a metal electrical box that meets the National Electrical Manufacturers Association's and Underwriter Laboratory's standard for a 3R rating. The ENCL box can house several different single-phase SymCom PumpSaver®Plus models. It has three clear lenses on the cover for viewing the LEDs on the PumpSaver®Plus, allowing the customer to determine the units operational status and to provide access to the IR signal for use with the Informer diagnostic tool.

The ENCL enclosure is sold ONLY in conjunction with the single-phase SymCom PumpSaver®Plus models.

Specifications - Enclosure Only

Functional Specifications	
Classification	NEMA 3R
Grounding	Two separate ground tabs
General Characteristics	
Dimensions	3.5" D x 5.4" W x 8.0" H
Front Cover	Secured by one capture screw. Cover contains three clear lenses, two for viewing the diagnostic LED's on PumpSaver® and one for access to IR Signal for Informer
Weight	2.20 lbs.
Mounting Method	Surface mount (two concave mounting holes)
Knock-outs (seven)	1/2" (1 each side and 2 in bottom) 3/4" (1 each side and 1 in bottom)

Specifications - PumpSaver®Plus

Functional Specifications	
Adjustments/Settings	
Overcurrent	125% of calibration point
Underload (dry-well)	Adjustable (70 to 90% of calibration point)
Overvoltage	
111P	132.5VAC
233P, 233P-1.5	265VAC
Undervoltage	
111P	95VAC
233P, 233P-1.5	190VAC
Number of restarts allowed in a 60-sec. period (rapid-cycling)	4
Trip Delay Times	
Overcurrent	5 seconds
Dry-well	4 seconds (optional 8 seconds*)
Restart Delay Times	
Over/undervoltage	2 seconds
All other faults	Manual, 2-225 Minutes
Input Characteristics	
Supply Voltage	
111P	115VAC
233P-1.5, 233P	230VAC
Load Range	
111P	1/3 - 1 hp
233P-1.5	1/3 - 1.5 hp
233P	1/3 - 3 hp
Frequency	50/60Hz (Note: 50Hz will increase all delay timers by 20%)
Output Characteristics	
Output Contact Rating-SPST	
111P	1hp@120VAC (16 amps max.)
233P-1.5	1.5hp@240VAC (10 amps max.)
233P	3hp@240VAC (17 amps max.)
General Characteristics	
Operating Temperature	-40° to 55° C (-40° to 131° F)
Maximum Input Power	5 W
Wire Gauge	Solid or Stranded 10 - 22AWG
Terminal Torque	13 in.-lbs.
Standards Passed:	
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 2, 4kV contact, 6kV air
Surge Immunity	IEC 61000-4-5, Level 4, 4kV line-to-line and line-to-ground
Safety Marks:	
cUL Listed	UL508, C22.2 No. 14
Dimensions	5.26" W x 2.93" H x 2.90" D
Weight	14 oz.
Mounting Methods:	#8 screws

* use part number 233P-UCTD8

For installation instructions see page 36.

For product dimensions see page 55.

How to order:

111P-ENCL (enclosure with 111P mounted)

233P-1.5-ENCL (enclosure with 233P-1.5 mounted)

233P-ENCL (enclosure with 233P mounted)

233P-UCTD8-ENCL (enclosure with 233P-UCTD8 mounted)

235P-ENCL (enclosure with 235P mounted)



The ENCL enclosure is a metal electrical box that meets the National Electrical Manufacturers Association's and Underwriter Laboratory's standard for a 3R rating. The ENCL box can house several different single-phase SymCom PumpSaver®Plus models. It has three clear lenses on the cover for viewing the LEDs on the PumpSaver®Plus, allowing the customer to determine the units operational status and to provide access to the IR signal for use with the Informer diagnostic tool.

The ENCL enclosure is sold ONLY in conjunction with the single-phase SymCom PumpSaver®Plus models.

Size	Current	CT*
5 - 7½ HP	27.5 - 42.1	50:5
10 HP	51	75:5
15 HP	75	100:5

Specifications - Enclosure Only

Functional Specifications	
Classification	NEMA 3R
Grounding	Two separate ground tabs
General Characteristics	
Dimensions	3.5" D x 5.4" W x 8.0" H
Front Cover	Secured by one capture screw. Cover contains three clear lenses, two for viewing the diagnostic LED's on PumpSaver® and one for access to IR Signal for Informer
Weight	2.20 lbs.
Mounting Method	Surface mount (two concave mounting holes)
Knock-outs (seven)	½" (1 each side and 2 in bottom) ¾" (1 each side and 1 in bottom)

Specifications - PumpSaver®Plus

Functional Specifications:	
Adjustments/Settings	
Overcurrent	125% of calibration point
Underload (dry-well)	Adjustable (70 to 90% of calibration point)
Overvoltage	265VAC
Undervoltage	190VAC
Number of restarts allowed in a 60-sec. 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
Input Characteristics:	
Supply Voltage	230VAC
Load Range	5 - 15 hp
Frequency	50/60Hz (Note: 50Hz will increase all delay timers by 20%)
Output Characteristics	
Output Contact Rating-SPST	A300, 720VA@240VAC General Purpose (10 amps max.)
General Characteristics	
Operating Temperature	-40° to 55° C (-40° to 131° F)
Maximum Input Power	5 W
Wire Gauge	Solid or Stranded 10 - 22AWG
Terminal Torque	13 in.-lbs.
Standards Passed	
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 2, 4kV contact, 6kV air
Surge Immunity	IEC 61000-4-5, Level 4, 4kV line-to-line and line-to-ground
Safety Marks	
cUL Listed	UL508, C22.2 No. 14
Dimensions	5.26" W x 2.93" H x 2.90" D
Weight	14 oz.
Mounting Methods	#8 screws

For installation instructions see page 36.

For product dimensions see page 55.

How to order:

235P-ENCL* (enclosure with 235P mounted)

* current transformer sold separately

Metal Box Only - NEMA-3R-L

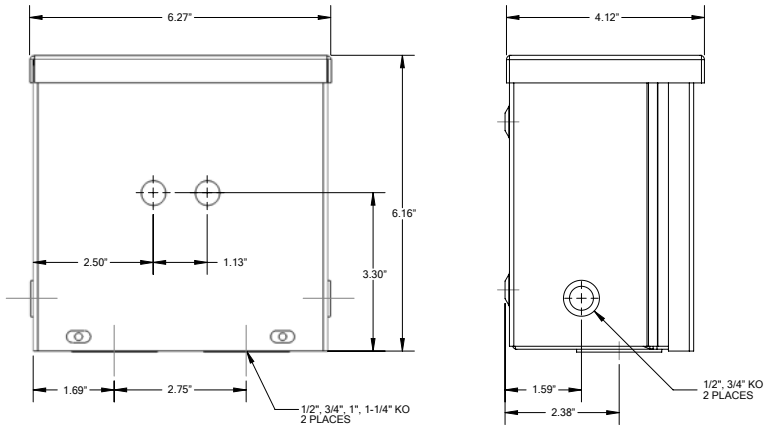


The NEMA 3R-L enclosure is a metal electrical box that meets the National Electrical Manufacturers Association's standard for a 3R enclosure (rain proof). The NEMA 3R-L box can house several different single-phase SymCom PumpSaver® models. It has two clear lenses on the cover for viewing the LEDs on the PumpSaver®, allowing the customer to determine the units operational status.

The NEMA 3R-L is sold separately or in conjunction with the single-phase SymCom PumpSaver® models (while supplies last).

Specifications

Functional Specifications	
Classification	NEMA 3R standard (rain proof)
Grounding	12" long 12-gauge wire secured by ground screw
General Characteristics	
Dimensions	6" x 6" x 4.5" (4" inside depth)
Front Cover	Secured by two machine screws, contains two clear lenses for viewing LED lights on PumpSaver
Weight	3.3 lbs.
Mounting Method	Surface Mount (four pre-drilled concave holes)
Knock-outs (four)	1/2" or 3/4" (one on each side and two on the bottom)
Security	Padlock tab



Dimensions NEMA-3R-L

How to order:
NEMA-3R-L* (metal box only)

* while supplies last

Hand-held Diagnostic Tool - Informer



The Informer is a hand-held diagnostic tool designed for use with single-phase PumpSaver® and PumpSaver®Plus models equipped with infrared LED transmitters.

The Informer uses an infrared receiver to access information sent from the PumpSaver® or PumpSaver®Plus, which can be helpful for troubleshooting the system.

Each SymCom single-phase PumpSaver® and PumpSaver®Plus model, equipped with an infrared LED, transmits valuable information from the device. To retrieve this information, the Informer's receiver must be directed toward the PumpSaver's LED transmitter and be within 10 feet of the unit. The green COMM STATUS light indicates when the Informer is receiving data from the PumpSaver® or PumpSaver®Plus. If communication is lost, the Informer will display the last values it received. The Informer will automatically shut off after 2 minutes of non-use.

An infrared adapter (IR Kit-12*) is included with all new and updated Informers. This adapter allows communication with the PumpSaver® without opening the panel door.

* 12" fiber optic cable

Specifications

Functional Specifications:	
Communication Signal Range	Infrared 1-10 ft. (0-1 ft when using IR Fiber Optic Kit)
Input Characteristics:	
Power: Consumption: Auto Shut-Off:	9 Volts dc (requires one 9-volt alkaline battery) 0.25 Watt (max.) 2 minutes
Output Characteristics:	
Accuracy: Voltage Current Power Resolution: Voltage Current Power	+2% ±2% ±4% 1.0VAC 0.1 Amp AC 0.01kW
General Characteristics:	
Operating Temperature: Display: Size: Enclosure Material: Dimensions: Weight:	0° to 60°C (32°F to 140°F) Liquid Crystal 2 rows x 16 characters Black ABS 5.50" H x 3.6" W x 1.125"D 6 oz. (w/o battery)

How to order:

Informer (Hand-held Diagnostic Tool, includes IR Kit-12)

Programmable Pump Protection - Model 77C-KW/HP

Low-Range Programmable Pump Protection - Model 77C-LR-KW/HP



The 77C-KW/HP is a programmable solid-state power monitor/overload relay that protects single-phase, 100-240VAC, 2-800 amp pumps (external CTs are required for 91-800 amps) from dry-well, dead-head, jammed impeller and other voltage and current conditions.

This PumpSaver is programmable to your specific pumping application and provides a digital display of real-time data of the pump's operation and any fault condition the unit may trip for. The programmability allows the user to set trip points, trip delays and restart delays, to include protection from successive power outages and short cycling/rapid cycling caused by other motor controls, and delays for motor cool-down time and dry-well recovery time.

The 77C-KW/HP can be programmed and monitored through network communications, as well as hooked to a remote display unit to program and monitor the pump protection from an alternate location, or outside the electrical panel to avoid potential arc flash (arc flash is a serious hazard that can happen when opening an electrical panel).

Specifications

Functional Specifications	
Programmable Operating Points LV-Low Voltage Threshold HV-High Voltage Threshold MULT-# of Conductors of CT Ratio (xxx:5) OC-Overcurrent Threshold LP-Low Power Threshold TC-Overcurrent Trip Class PWS-Power Setpoint Range (1,2,3,4)(5,6,7,8) (Settings within ranges are adjusted in LPS settings.) RD1-Rapid-cycle Timer RD2-Restart Delay after all faults except Undercurrent (motor cool down timer) RD3-Restart Delay after undercurrent (dry-well recovery timer) #RU-Number of restarts after undercurrent #RO-Number of restarts after overcurrent ADDR-RS485 Address OPT1-To set linear OC trip delay when TC is set to Lin OPT2-To set RD2 & RD3 in either seconds or minutes	85V - HV Setting LV Setting - 264V 77C-KW/HP: 1-10 Conductors or 100-800 Ratio 77C-LR-KW/HP: 1 or 2 conductors (20-100A) / MULT or 80-120% of CT Primary See PWS below or 0=off 5, J5, 10, J10, 15, J15, 20, J20, 30, J30 or Lin (linear) 1=0.01-0.99kw 5=0.01-1.33hp 2=1.00-9.95kw 6=1.34-13.3hp 3=10.0-99.5kw 7=13.4-133hp 4=100-650kw 8=134-871hp 0, 2-500 Seconds 2-500 Minutes/Seconds 2-500 Minutes/Seconds 0, 1, 2, 3, 4, A (automatic) 0, 1, 2, 3, 4, A (automatic) A01-A99 2-60 seconds 0, 1, 2, 3

Models 77C-KW/HP / 77C-LR-KW/HP

Input Characteristics	
Supply Voltage Frequency Motor Full Load Amp Range 77C-KW/HP 77C-LR-KW/HP	100-240VAC 50/60Hz 2-25 Amps (Loops Required); 26-90 Amps (Direct); 91-800 Amps (External CTs) 1-2 Amps (1 Loop Required); 2.1-9 Amps (Direct)
Output Characteristics	
Output Contact Rating-SPDT (Form C) Expected Life Mechanical Electrical	480VA@240VAC (Pilot Duty) 10A@240VAC (General Purpose) 1 x 10 ⁶ operations 1 x 10 ⁷ operations at rated load
General Characteristics	
Operating Temperature Ambient Operating Ambient Storage Accuracy Voltage Current Timing Power Repeatability Voltage Current Maximum Input Power Pollution Degree Class of Protection Relative Humidity Standards Passed Electrostatic Discharge (ESD) Radio Frequency Immunity (RFI), Conducted Radio Frequency Immunity (RFI), Radiated Fast Transient Burst Short Circuit Surge IEC ANSI/IEEE Hi-potential Test Vibration Shock Safety Marks UL CE Dimensions Weight Mounting Methods	-20° to 70° C (-4° to 158° F) -40° to 80° C (-40° to 176° F) ±1% ±3% (Direct, No External CTs) 5% ± 1 second ± 10% ± 0.5% of nominal voltage ± 1% (Direct, No External CTs) 10 W 3 IP20, NEMA 1 (finger safe) 10-95%, non-condensing per IEC 68-2-3 IEC 61000-4-2, Level 3, 6kV contact, 8kV air IEC 61000-4-6, Level 3 10V/m IEC 61000-4-3, Level 3 10V/m IEC 61000-4-4, Level 3, 3.5kV input power 100kA per UL, 10kA per CSA 61000-4-5, Level 3, 2kV line-to-line; Level 4, 4kV line-to-ground C62.41 Surge and Ring Wave Compliance to a level of 6kV line-to-line Meets UL 508 (2 x rated V + 1000V for 1 minute) IEC 68-2-6, 10-55Hz, 1mm peak-to-peak, 2 hours, 3 axis IEC 68-2-27, 30g, 3 axis, 11ms duration, half-sine pulse UL508, UL1053 IEC 60947-1, IEC 60947-5-1 3.0" H x 5.1" D x 3.6" W 1.2 lbs. 35mm DIN rail or surface mount

For a typical wiring diagram see page 40.

For installation instructions see page 42.

For product dimensions see page 56.

How to order:

77C-KW/HP (Programmable Pump Protection)

77C-LR-KW/HP (Low-Range Programmable Pump Protection)

8-Pin Plug-in Mount, Seal Leak Detector - Model 201-100-SLD
DIN Rail Mount, Seal Leak Detector - Model 460-15-100-SLD



201-100-SLD
8-Pin Plug-in Mount

The MotorSaver® Model 201-100-SLD plug-in mount seal leak detector is used to sense seal failures on submersible pumps. The 201-100-SLD plugs into an OT08-PC or RB08-PC octal socket (sold separately).

When the unit is powered and the resistance from the probe is greater than the sensitivity control level, the internal relay contacts change state. As water leaks into the motor seal, the resistance measured by the probe decreases. When the resistance drops below the sensitivity control level, the unit will trip and the relay contacts will change back to their original state.



460-15-100-SLD
DIN Rail Mount

The MotorSaver® Model 460-15-100-SLD is a DIN rail or surface mountable seal leak detector used to sense seal failures on submersible pumps.

When the unit is powered and the resistance from the probe is greater than the sensitivity control level, the internal relay contacts change state. As water leaks into the motor seal, the resistance measured by the probe decreases. When the resistance drops below the sensitivity control level, the unit will trip and the relay contacts will change back to their original state.

Specifications

Functional Specifications	201-100-SLD	460-15-100-SLD
Sensitivity	4.7k-100kΩ	4.7k-100kΩ
Input Characteristics		
Supply Voltage Frequency	110/120VAC 50/60Hz	110/120VAC 50/60Hz
Output Characteristics		
Output Contact Rating-SPDT	480VA@240VAC Pilot Duty 10A@240VAC General Purpose	360VA@240VAC Pilot Duty 8A@240VAC General Purpose
General Characteristics		
Operating Temperature	-40° to 70° C (-40° to 158° F)	-20° to 70° C (-4° to 158° F)
Maximum Input Power	5 W	2 W
Relative Humidity	10-95%, non-condensing per IEC 68-2-3	10-95%, non-condensing per IEC 68-2-3
Terminals		
Wire Size	Solid or Stranded 12 - 22AWG	Solid or Stranded 12 - 20AWG
Torque	6 in.-lbs.*	6 in.-lbs.
Standards Passed		
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 3, 6kV contact, 8kV air	IEC 61000-4-2, Level 3, 6kV contact, 8kV air
Radio Frequency Immunity, Radiated	150 MHz, 10V/m	150 MHz, 10V/m
Fast Transient Burst	IEC 61000-4-4, Level 3, 3.5kV input power and controls	IEC 61000-4-4, Level 3, 3.5kV input power and controls
Surge		
IEC	IEC 61000-4-5, Level 3, 4kV line-to-line; Level 4, 4kV line-to-ground	IEC 61000-4-5, Level 3, 4kV line-to-line; Level 4, 4kV line-to-ground
ANSI/IEEE	C62.41 Surge and Ring Wave Compliance to a level of 6kV line-to-line	C62.41 Surge and Ring Wave Compliance to a level of 6kV line-to-line
Hi-Potential Test	Meets UL508 (2 x rated V + 1000 V for 1 minute)	Meets UL508 (2 x rated V + 1000 V for 1 minute)
Class of Protection	NEMA 1	IP20, NEMA 1 (finger safe)
Safety Marks		
cUL	UL508 (OT08-PC or RB08-PC octal socket required)	UL508, C22.2 No. 14
CE	IEC 60947-6-2	
Dimensions	2.38" L x 1.75" W x 3.15" H	3.5" L x 2.084" W x 2.35" H
Weight	9 oz.	9 oz.
Mounting Methods	Plugs into 8-pin octal socket (mount socket with screws or on DIN rail)	35 mm DIN rail or Surface Mount (#6 or #8 screws)

* OT08-PC - Octal Socket

For a typical wiring diagram see page 49-50.

For product dimensions see page 52-53.

How to order:

201-100-SLD (8-Pin Plug-in Mount, Seal Leak Detector)

460-15-100-SLD (DIN Rail Mount, Seal Leak Detector)

Liquid Level Sensor - Model 460-15-100-LLS



The PumpSaver® Model 460-15-100-LLS is a liquid level sensor to detect the presence of conductive liquids. The unit has an adjustable debounce timer (2-60 seconds) to help prevent nuisance relay actuations due to waves or liquid splashing into the tank. When the probe is submersed, the PumpSaver's output contacts will change state as soon as the debounce time expires.

Relay logic can be inverted so the PumpSaver's output contacts change state when the probe is no longer submersed.

Specifications

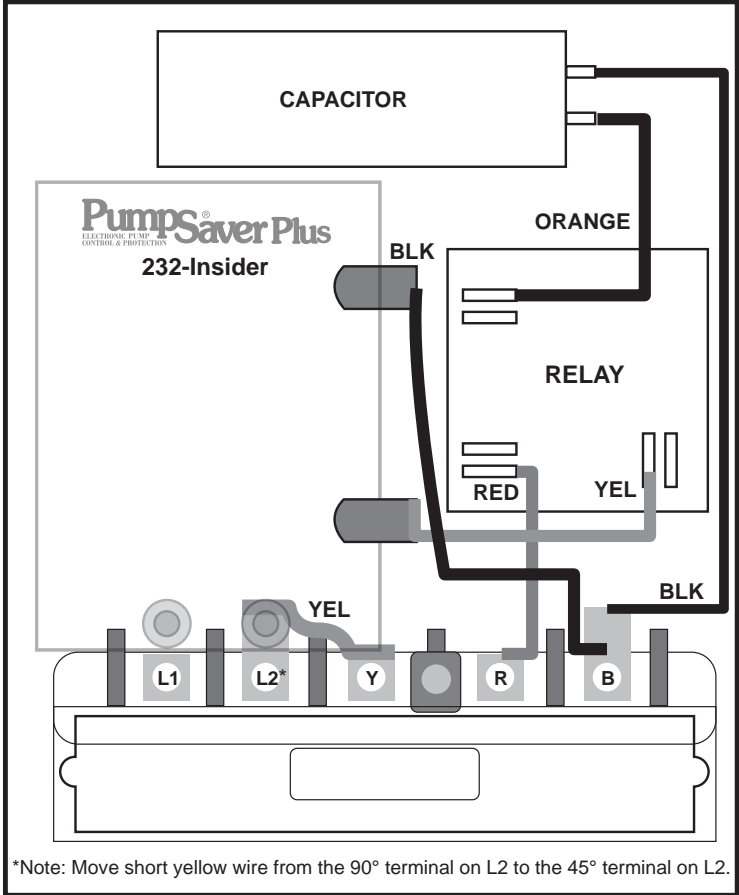
Functional Specifications	
Sensitivity	100k Ω
Debounce Time	2 - 60 seconds
Input Characteristics	
Control Voltage	110/120VAC nominal
Frequency	50/60Hz (Note: 50Hz will increase all delay timers by 20%)
Output Characteristics	
Output Contact Rating-DPST	360VA@240VAC (Pilot Duty) 8A@240VAC (General Purpose)
General Characteristics	
Operating Temperature	-20° to 70° C (-4° to 158° F)
Maximum Input Power	2 W
Relative Humidity	10-95%, non condensing per IEC 68-2-3
Terminals	
Wire Size	12-20 AWG
Torque	6 in.-lbs.
Standards Passed	
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 3, 6kV contact, 8kV air
Radio Frequency Immunity, Radiated	150 MHz, 10 V/m
Fast Transient Burst	IEC 61000-4-4, Level 3, 3.5kV input power and controls
Surge	
IEC	IEC 61000-4-5, Level 3, 4kV line-to-line; Level 4, 4kV line-to-ground
ANSI/IEEE	C62.41 Surge and Ring Wave Compliance to a level of 6kV line-to-line
Hi-Potential Test	Meets UL508 (2 x rated V + 1000 V for 1 minute)
Class of Protection	IP20, NEMA 1 (finger safe)
Safety Marks	
cUL	UL508, C22.2 No. 14
Dimensions	3.5" Lx 2.084" Wx 2.35" H
Weight	9 oz.
Mounting Method	35 mm DIN rail or Surface Mount (#6 or #8 screws)

For a typical wiring diagram see page 51.
For product dimensions see page 52.

How to order:

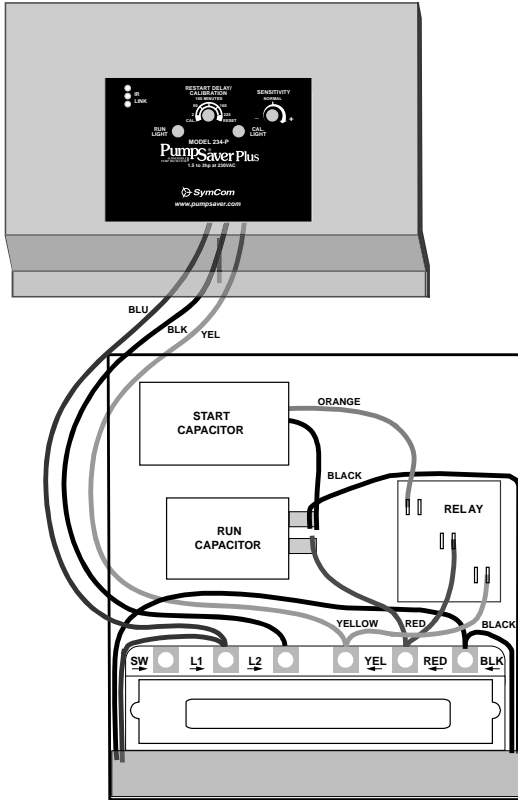
460-15-100-LLS (Liquid Level Sensor)

Grundfos® control box, 1/3 - 1hp, 230VAC - Model 232-Insider
TYPICAL WIRING DIAGRAM



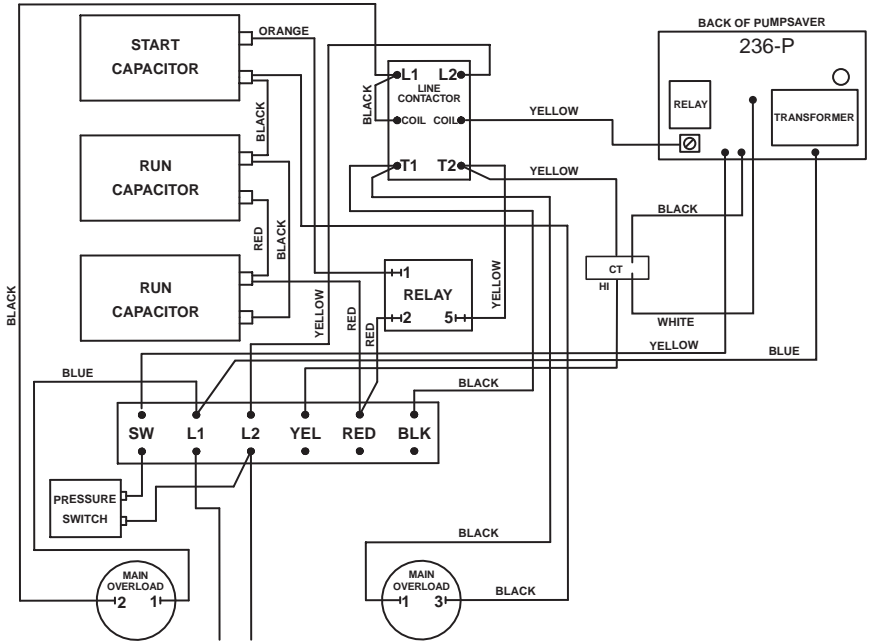
232-Insider
in Grundfos® Control Box

Grundfos® control box, 1/3 - 3hp, 230VAC - Model 234-P
TYPICAL WIRING DIAGRAM



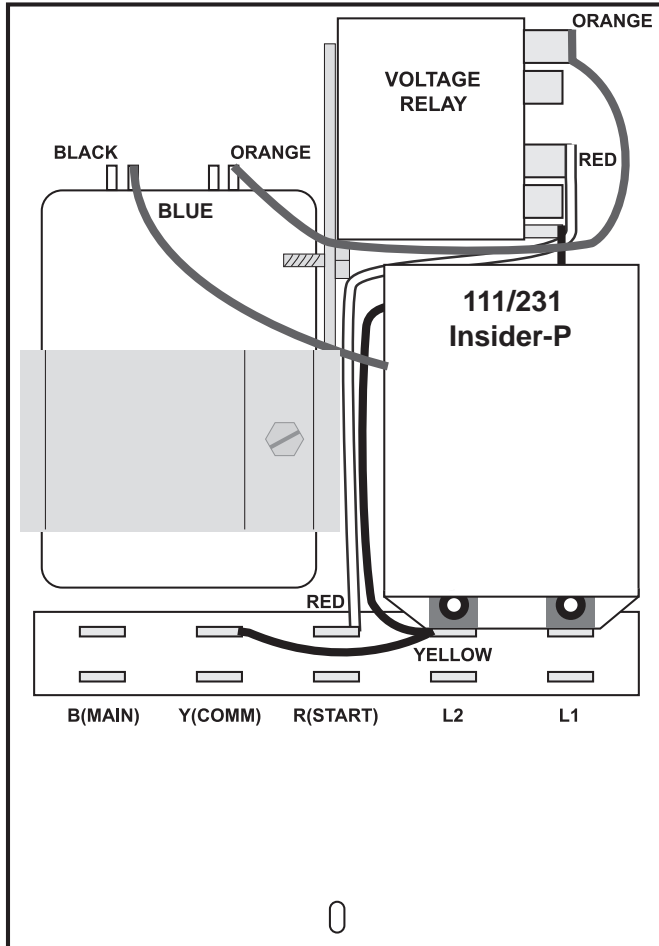
234-P
in Grundfos® Control Box

Grundfos® control box, 5 - 7.5hp, 230VAC - Model 236-P
 TYPICAL WIRING DIAGRAM



236-P
 in Grundfos® Control Box

(PENTEK®CONTROL BOX)
1/3 - 1/2hp, 115VAC - 111-Insider-P/1/3 - 1hp, 230VAC - 231-Insider-P
TYPICAL WIRING DIAGRAM

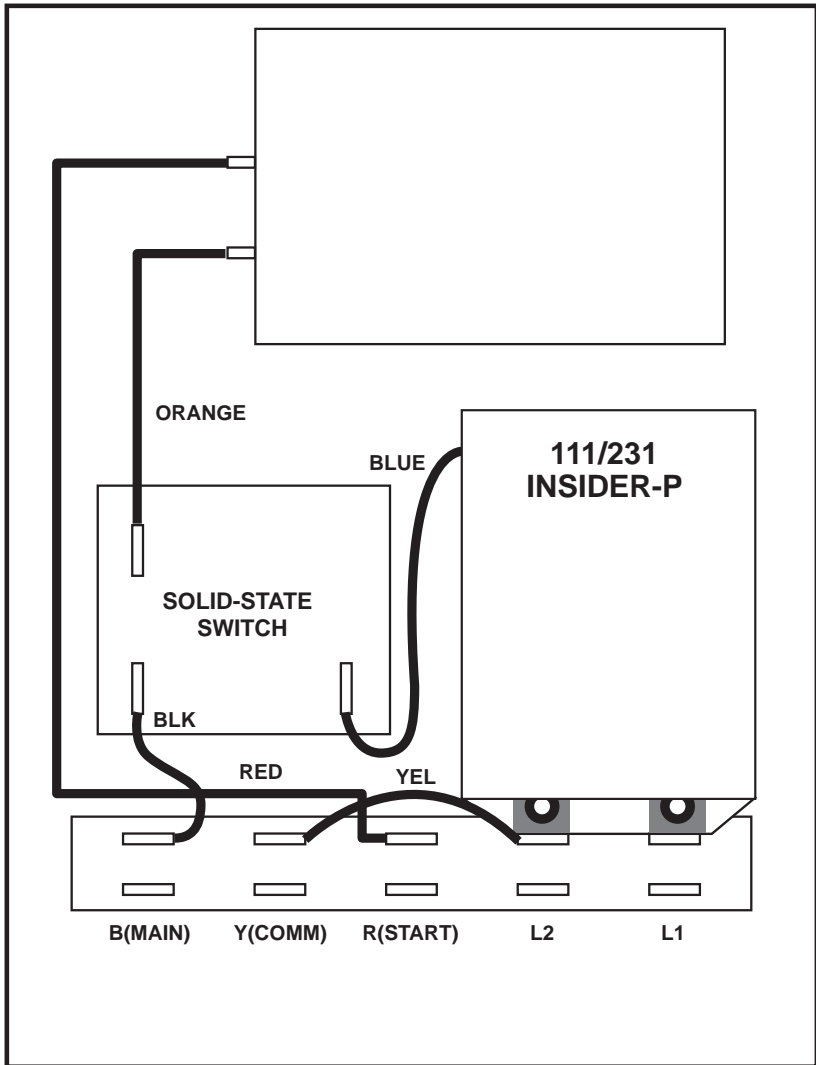


111-Insider-P/231-Insider-P
in Pentek® Control Box

(FRANKLIN™ CONTROL BOX)

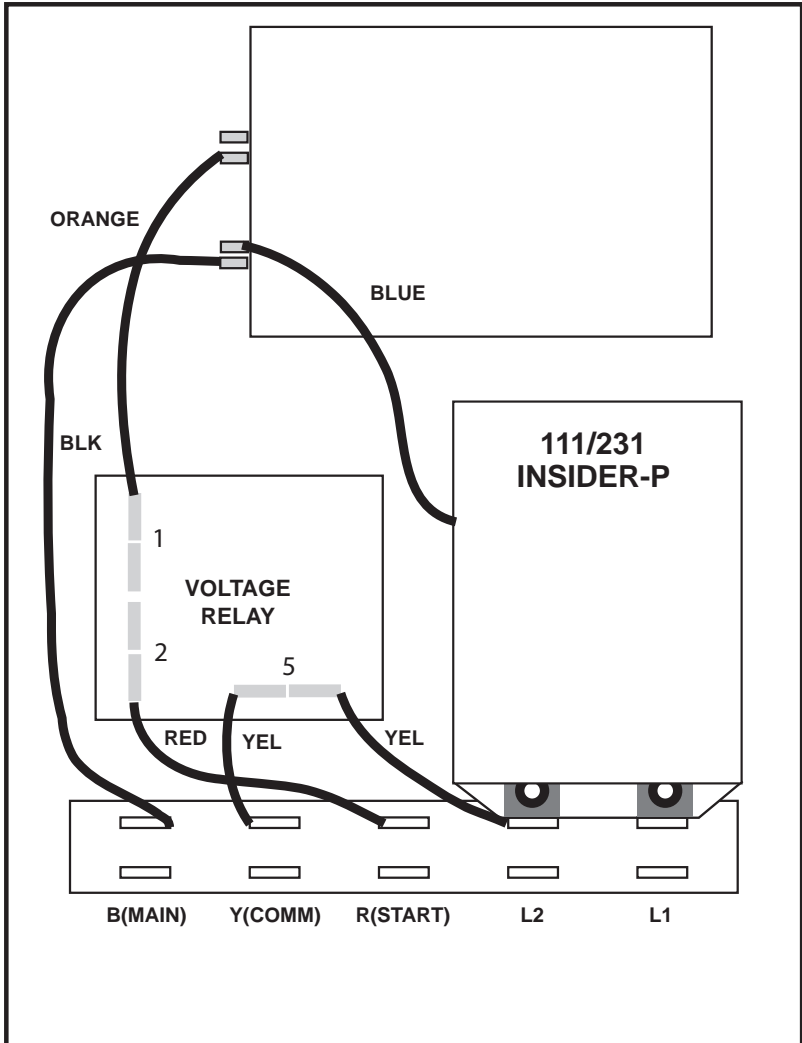
1/3 - 1/2hp, 115VAC - 111-Insider-P / 1/3 - 1hp, 230VAC - 231-Insider-P

TYPICAL WIRING DIAGRAM



111-Insider-P/231-Insider-P
in Franklin™ Control Box

(CENTRIPRO™ CONTROL BOX)
1/3 - 1/2hp, 115VAC - 111-Insider-P / 1/3 - 1hp, 230VAC - 231-Insider-P
TYPICAL WIRING DIAGRAM

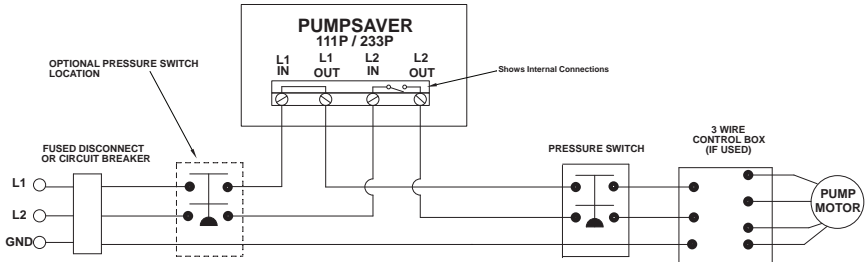


111-Insider-P/231-Insider-P
in CentriPro™ Control Box

1/3 - 1hp, 115VAC - 111P

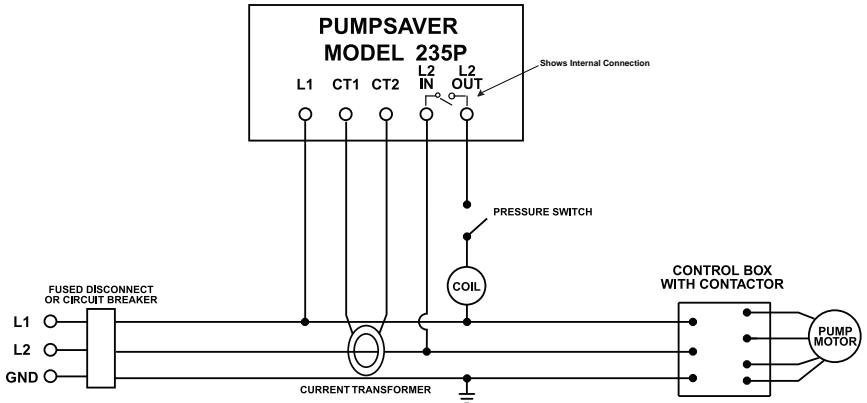
1/3 - 1.5hp, 230VAC - Model 233P-1.5 / 1/3 - 3hp, 230VAC - 233P

TYPICAL WIRING DIAGRAM



Models 111P / 233P

5 - 15hp, 230VAC - Model 235P
 TYPICAL WIRING DIAGRAM



Model 235P

Size	Current	CT*
5 - 7½ HP	27.5 - 42.1	50:5
10 HP	51	75:5
15 HP	75	100:5

* external current transformers sold separately

PUMPSAVER®PLUS

INSTALLATION INSTRUCTIONS

The PumpSaver®Plus INSIDERs fit inside 1/3 – 3hp, 230V Franklin™, Pentek®, Grundfos® or CentriPro™ control boxes. PumpSavers are designed to protect single-phase pumps from dry-well, dead-head, rapid-cycling, jammed impeller, and over/undervoltage conditions. Typical applications include residential waterwells, commercial waterwells, irrigation wells, and golf course and other sprinkler systems.

CONNECTIONS

(INSIDERs)

Refer to specific connection instructions depending on the particular control box being used:

Grundfos® control box	- page 28
Pentek® control box	- page 31
Franklin™ control box	- page 32
CentriPro™ control box	- page 33

(111P / 233P / 235P)

NOTE: Use in conjunction with UL listed or recognized thermal or solid-state overload relays only.

1. Mount the PumpSaver®Plus Model 111P / 233P / 235P in a convenient location in or near the pump control box. If the location is wet or dusy, a NEMA 3R, 4 or 12 enclosure should be used.
2. Refer to Typical Wiring Diagram for 111P / 233P / 235P on pages 34 and 35.

NOTE: For Model 235P, one line from the fused disconnect must pass through the current transformer.

The Model 235P will NOT function without an external CT (sold separately).

NOTE: If the Model 235P immediately trips out upon completion of the calibration process, the current transformer may be installed incorrectly. Switch the CT1 and CT2 connections at the unit, then repeat the calibration process.

CALIBRATION / RESTART DELAY

(INSIDERs)

1. Turn RESTART DELAY/CALIBRATION to the CAL position and close the box cover.
2. Apply power to the system. The pump should run for approximately 10 seconds and then shut off – this indicates the INSIDER has calibrated.
3. Remove power from the system. Open the control box and set the appropriate dry-well recovery time with the RESTART DELAY / CALIBRATION knob.
4. Shut the control box and re-apply power to the system.

(111P / 233P / 235P)

NOTE: The Model 111P / 233P / 235P should be calibrated during normal pumping conditions.

1. Turn the RESTART DELAY/CALIBRATION knob fully counter-clockwise to the CAL. position.

PUMPSAVER®PLUS INSTALLATION INSTRUCTIONS

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 111P / 233P / 235P 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.

MANUAL RESET MODE (111P / 233P / 235P only)

Set the RESTART DELAY/CALIBRATION knob to RESET for manual reset mode. If the 111P / 233P / 235P trips off due to a voltage or load problem, the RESTART DELAY/CALIBRATION knob must be rotated out of the RESET position to restart the pump, and then can be placed back in the RESET position for subsequent manual reset mode.

NOTE: 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.

OPERATION

The PumpSaver®Plus units monitor pump loads 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 units – after the trip delay – will turn off the pump. The PumpSaver®Plus units will automatically restart the pump after the selected restart delay time (unless in the manual reset mode).

The calibration is stored in permanent memory. The PumpSaver®Plus does not need to be recalibrated if power is lost.

SENSITIVITY

The PumpSaver®Plus units have 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 $\pm 10\%$ 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's ability to detect dry-run and/or dead-head conditions.

RUN HOURS

PUMPSAVER®PLUS

INSTALLATION INSTRUCTIONS

The PumpSaver®Plus units record pump run hours. Run hours can be displayed by a PumpSaver®Plus Informer. Run hours can be reset on the PumpSaver®Plus units. – please read the instruction fully before performing the procedure.

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

WARNING: ENSURE POWER IS APPLIED TO THE **INSIDERS** IN A SAFE MANNER WHEN PERFORMING THE FOLLOWING PROCEDURE.

To Reset Run Hours:

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 have successfully been reset.

RAPID CYCLING

Rapid cycling is defined as more than 4 restarts in a 60-second period. Upon detecting rapid-cycling, the PumpSaver®Plus units will lock-out until power is removed and re-applied. Rapid-cycle protection can be disabled. Please read the 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.

WARNING: ENSURE POWER IS APPLIED TO THE **INSIDERS** IN A SAFE MANNER WHEN PERFORMING THE FOLLOWING PROCEDURE.

To Disable Rapid-Cycle Protection: (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 PumpSaverPlus – 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 10 seconds, the CAL. and RUN LIGHTS will blink twice indicating the rapid-cycle protection mode has successfully been changed.

PUMPSAVER®PLUS INSTALLATION INSTRUCTIONS

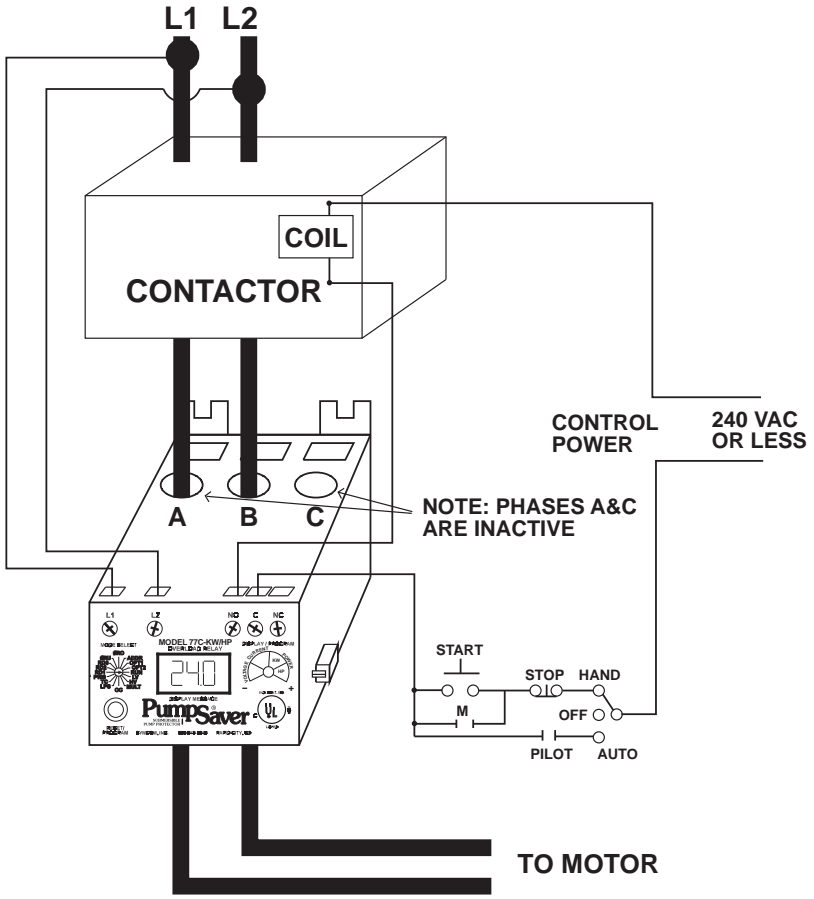
USING AN INFORMER

The PumpSaver®Plus units are equipped with an infrared LED that will communicate to a SymCom Informer – a hand-held, battery operated, diagnostic tool. An Informer IR Kit is required for the PumpSaver®Plus Insider units to communicate to the Informer. The Informer will display the model number; run time; pump starts; restart delay setting; restart delay timer; real-time voltage, current and power; dry-well and overload trip points; calibration voltage; last 20 faults; voltage, current, power and run time for the last 20 faults; highest/lowest voltage and current since calibration; and the CT size if applicable. The Informer can be used on any single-phase PumpSaver®Plus equipped with an infrared LED transmitter – Models 111-Insider-P; 231-Insider-P; 232-Insider; 111P; 233P; 234-P; 235P and 236-P.

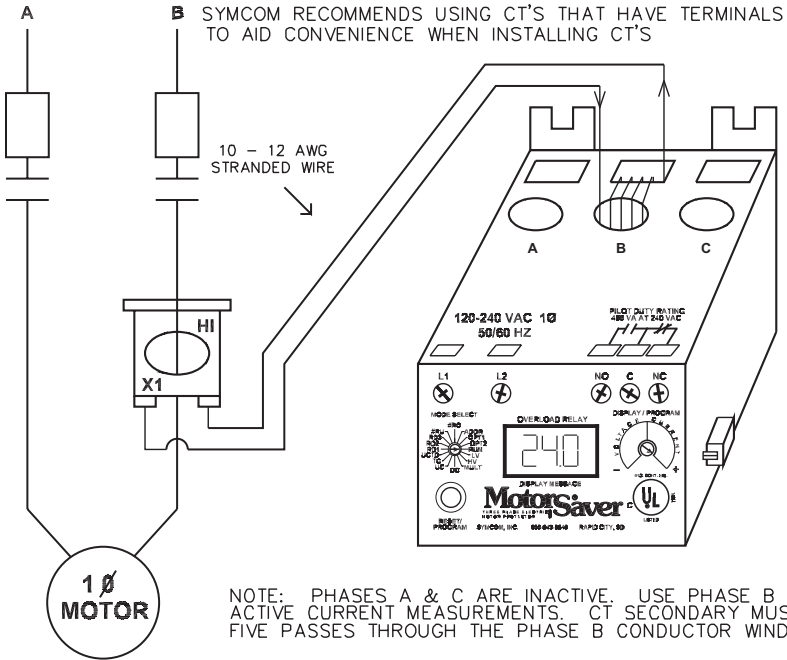
INFORMER TROUBLESHOOTING GUIDE

The Informer does not activate when the ON button is pressed.	Battery Polarity Reversed - Verify the + and - terminals on the battery match the markings inside the battery compartment.
	Low Battery - Replace the battery.
The COMM STATUS light is off and all display values remain at zero.	Weak Signal - Ensure the Informer is aimed directly at the PumpSaver's infrared LED and is within the operating distance.
	PumpSaver®Plus not transmitting - Verify the PumpSaver®Plus is energized and the green RUN light is illuminated.
	Sunlight - Verify the sun is not shining directly onto the Informer's infrared receiver.
The COMM STATUS light is blinking.	Weak Signal - Ensure the Informer is aimed directly at the PumpSaver's infrared LED and is within the operating distance. OR If using an older Informer (version 1.xx or earlier) with a PumpSaver®Plus, this is a normal condition.
The displayed values fluctuate radically.	Weak Signal - Ensure the Informer is aimed directly at the PumpSaver's infrared LED and is within the operating distance.
The Informer displays values even after communication is lost.	This Is Normal - The Informer holds the last values it received before communication was lost. (until the auto shut off)

Programmable Pump Protection - Model 77C-KW/HP
 Low-Range Programmable Pump Protection - Model 77C-LR-KW/HP
 TYPICAL WIRING DIAGRAM



Programmable Pump Protection - Model 77C-KW/HP
Low-Range Programmable Pump Protection - Model 77C-LR-KW/HP
TYPICAL WIRING DIAGRAM



Programmable Pump Protection - Model 77C-KW/HP
 Low-Range Programmable Pump Protection - Model 77C-LR-KW/HP
 INSTALLATION INSTRUCTIONS

Full Load Amps	# or Loops (Required on B phase only)	# of Conductors through B	MULT to Program (CT ratio)
2.0 - 2.5	9	10	10
2.6 - 3.0	8	9	9
3.1 - 3.5	7	8	8
3.6 - 4.0	6	7	7
4.1 - 5.0	5	6	6
5.1 - 6.0	4	5	5
6.1 - 8.0	3	4	4
8.1 - 12	2	3	3
13 - 25	1	2	2
26 - 90	0	1	1
External CTs required. See Wiring Diagram for External CTs.			
91 - 110	4	5	100 (100:5)
111 - 160	4	5	150 (150:5)
161 - 220	4	5	200 (200:5)
221 - 320	4	5	300 (300:5)
321 - 420	4	5	400 (400:5)
421 - 520	4	5	500 (500:5)
521 - 620	4	5	600 (600:5)
621 - 800	4	5	800 (800:5)

Table No. 1
 Wiring configuration based on motor amps.

SUGGESTED SETTINGS (Consult the Motor Manufacturer for their recommendations.)

LV/HV- The recommended settings for “LV” (low voltage) and “HV” (high voltage) depend on many factors such as motor usage, motor size, environmental factors and tolerance of the motor. The motor manufacturer should be consulted for “HV” and “LV” settings. However, the NEMA MG1 standard recommends that “LV” and “HV” be set to no more than ±10% of the motor’s nameplate voltage. The setting can be determined by multiplying the motor’s nameplate voltage by the recommended percent over and under voltage. (eg., The motor nameplate voltage is 230 V, set “LV” to 0.9x230=207, set “HV” to 1.10x230=253) “LV” can not be set higher than “HV”, so “HV” may have to be adjusted higher before the proper “LV” setting can be programmed.

Programmable Pump Protection - Model 77C-KW/HP
Low-Range Programmable Pump Protection - Model 77C-LR-KW/HP
INSTALLATION INSTRUCTIONS

MULT- "MULT" is the multiplication factor for determining true current settings and represents the number of conductors passing through the main current windows marked "A" and "B," or current transformer ratio of external CTs. The appropriate number can be determined from Table No. 1 on page 42. "MULT" must be correctly programmed in order to accurately program the current settings.

OC- Represents the motor's maximum service factor amperage. The "OC" (overcurrent) setting depends on many factors such as motor usage, motor size, environmental factors and tolerance of the motor. The motor manufacturer should be consulted for "OC" settings. However, "OC" is typically between 110% and 125% of full load amperage (FLA) and may be referred to as maximum amps.

LP- LP (low power setting) is used to shut down the motor or pump on an underload condition. Setting LP to 0 disables the underload trip feature. LP is set in either kilowatts (KW) or horsepower (HP) depending on the PWS setting. **NOTE: PWS must be set before setting LP**

TC- "TC" designates the trip class for overload protection. The trip class defines the trip delay when an overload is detected. Trip class is determined by the type of motor and application. Your motor manufacturer should be consulted for the proper setting. The table on page 44 shows the trip class and a general description of the applications.

RD1- "RD1" is the rapid-cycle timer. It will engage when the motor is first powered-up or after the motor controls shut down the motor. An "RD1" setting of 20-30 seconds will generally protect the motor from rapid, successive power outages or short cycling caused by the motor controls. A setting of 0 seconds will allow the motor to start immediately after power-up or after a normal shutdown.

RD2- "RD2" is the restart delay after the overload relay trips on overload. This delay allows the motor to cool down after experiencing an overcurrent. It is also known as a motor cool down timer. Your motor manufacturer should be contacted to determine this setting. Under normal circumstances, a setting of 5-10 minutes will give the motor enough time to cool down between faults.

RD3- "RD3" is the restart delay after an undercurrent. It is also known as a dry well recovery timer and is usually used in submersible pumping applications. The setting of "RD3" depends on the recovery time of the water well and varies widely from application to application.

#RU- "#RU" is the number of successive restart attempts allowed after an undercurrent fault, before the overload relay requires manual reset. The following settings are available: 0, 1, 2, 3, 4 and A. A setting of "0" is manual reset and a setting of "A" is continuously automatic reset.

ADDR- "ADDR" is the address setting for RS485 communications. Available settings are from A01 - A99. You may ignore this setting if RS485 communications are not used.

Programmable Pump Protection - Model 77C-KW/HP
 Low-Range Programmable Pump Protection - Model 77C-LR-KW/HP
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#RO- “#RO” is the number of successive restart attempts allowed after an overcurrent fault. The following settings are available: 0, 1, 2, 3, 4 and A. A setting of “0” is manual reset and a setting of “A” is continuously automatic reset.

PWS - PWS (power scale) is the range setting for the LP setting.
 1=0.01 - 0.99 KW; 2=1.00 - 9.95 KW; 3=10.0 - 99.5 KW; 4=100 - 650 KW
 5=0.01 - 1.30 HP; 6=1.34 - 13.3 HP; 7=13.4 - 133.0 HP; 8=134 - 871 HP
 Settings 1-4 will allow the LP setting to display in KW.
 Settings 5-8 will allow the LP setting to display in HP.

OPT1- Linear overcurrent trip delay (2-60 seconds). This programming position is used only if the TC position is set to LIn. This setting will determine the period of time that will expire before tripping on overcurrent, after the amperage exceeds the OC setting. (See Programming Example #2).

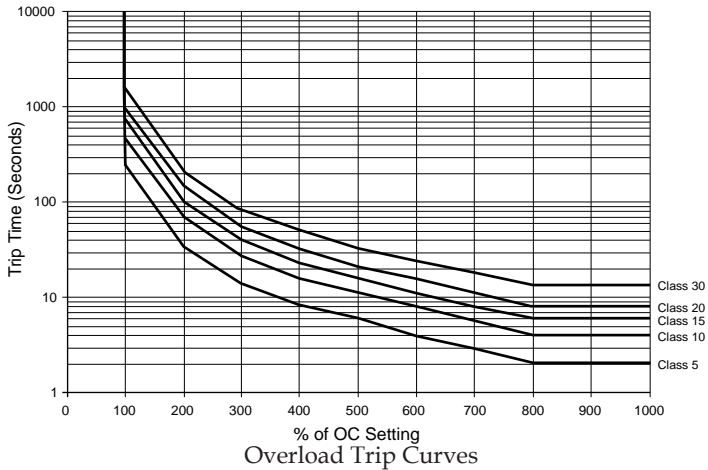
OPT2- RD2 & RD3 time units programming. This position sets the time units used by the RD2 and RD3 timers. (e.g., RD2 = 10, RD3 = 20; OPT2 = 2 from the table below, RD2 = 10 seconds and RD3 = 20 minutes.)

Setting	RD2	RD3
0	Minutes	Minutes
1	Minutes	Seconds
2	Seconds	Minutes
3	Seconds	Seconds

Trip Class	Application Description
5	Small fractional horsepower motors where acceleration times are almost instantaneous or where extremely quick trip times are required.
10	(Fast Trip) Hermetic refrigerant motors, compressors, submersible pumps and general purpose motors that reach rated speed in less than 4 seconds.
15	Specialized applications.
20	(Standard Trip) Most NEMA-rated general purpose motors will be protected by this setting.
30	(Slow Trip) Motors with long acceleration times (>10 seconds) or high inertia loads.
J Prefix	Programming any of the trip classes with the J Prefix will enable jam protection. This additional protection is enabled 1 minute after the motor starts and provides a 2 second trip time for motors exceeding 400% of the “OC” setting, regardless of trip class.
LIn	Programming the trip class to LIn disables the normal trip classes shown above and enables a linear trip delay on overcurrent. The linear trip delay is set in program position OPT1.

Trip Class Table

Programmable Pump Protection - Model 77C-KW/HP
Low-Range Programmable Pump Protection - Model 77C-LR-KW/HP
INSTALLATION INSTRUCTIONS



PROGRAMMING EXAMPLE

Motor To Be Protected: 1Ø, 230 Volt, 10 Hp raw material transfer auger. This auger moves material from a large bulk delivery pit to the production area main storage hopper. The motor has a full load amperage rating of 50 Amps and a maximum service factor of 57 Amps. Use the following calculations and reasoning to determine the appropriate settings for this application.

LV - $230 \times 0.90 = 207$

HV - $230 \times 1.10 = 253$

MULT - From Table No. 1. MULT = 1

OC - 57

LP - Since the motor Hp will run at approximately 8.5Hp and will unload at least 20% less Hp if a shaft shear pin breaks or the auger runs out of material, set the LP at approximately 6.8Hp.

TC - Because the motor is a general purpose motor and the motor should be protected from being jammed by a foreign object, TC - J20

PWS - 6

RD1 - To protect the motor from rapid successive power outages, RD1 - 20

RD2 - N/A, see #RO setting.

RD3 - N/A, see #RU setting.

#RU - Setting #RU to 0 will require a manual reset after undercurrent. Therefore, RD3 has no affect in this application. This setting will allow the auger to be started, and left unattended, and will run until the delivery pit is empty. Pressing a remote reset button will start the auger for the next load.

#RO - Setting #RO to 0 will require a manual reset after an overcurrent. Therefore, RD2 has no affect.

ADDR - N/A

OPT1 - N/A

OPT2 - N/A

Programmable Pump Protection - Model 77C-KW/HP

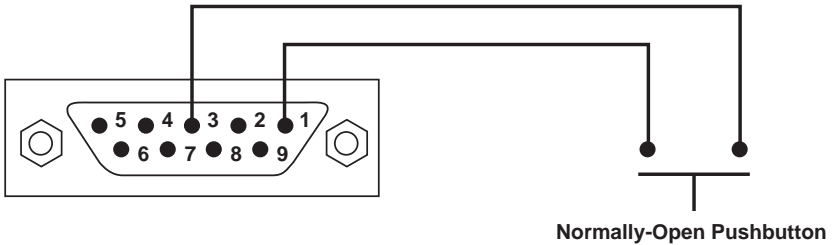
Low-Range Programmable Pump Protection - Model 77C-LR-KW/HP

INSTALLATION INSTRUCTIONS

COMMUNICATIONS PORT / REMOTE RESET

The Model 77C-KW/HP comes standard with a 9-pin Sub D connector for remote communications. The Model 77C-KW/HP supports RS-485 communication standard. This standard allows up to 99 Model 77C-KW/HPs to be controlled and monitored from a single remote personal computer. NOTE: An RS-485 module and software is required to operate the communications bus. (Refer to RS-485 Installation Instructions for more information on this subject.)

The communications port also provides connections for remote reset as shown below.



MULTI-FUNCTION SYSTEM DISPLAY

The output display shows system operating parameters L1-L2 Voltage and L2 Current (B). When the "MODE SELECT" switch is in the "RUN" position, the LED will display one of the above operating parameters. To select or change the displayed parameter, turn the "DISPLAY / PROGRAM" adjustment to the desired position as shown on its label. The multifunction display also announces system faults such as low voltage and high voltage. Any time the "MODE SELECT" switch is in the "RUN" position, the "RESET/PROGRAM" button may be pushed to view the last fault which occurred. The table below shows the possible messages.

Programmable Pump Protection - Model 77C-KW/HP
 Low-Range Programmable Pump Protection - Model 77C-LR-KW/HP
 INSTALLATION INSTRUCTIONS

Displayed Message	Meaning
oc	Tripped on Overcurrent
LPR	Tripped on Low Power
HI	High Voltage (won't allow the motor to start)
Lo	Low Voltage (won't allow the motor to start)
oFF	A stop command was issued from a remote source.

Problem	Solution
The unit will not start. Display alternates "HI" or "Lo" with the "DISPLAY/PROGRAM" switch parameter value.	The incoming voltage is not within the limits programmed in the "HV" and "LV" settings. Adjust the "DISPLAY/PROGRAM" switch to read the incoming line voltage value. Correct the incoming power problem and check programmed limits to verify they are correct.
Display alternates "oc" with "RUN."	The overload relay has tripped on overcurrent and is timing down "RD2" before restarting.
Display alternates "LPR" with "RUN."	The overload relay has tripped on low power and is timing down "RD3" before restarting. If undercurrent is not a normal condition for this installation, check for broken shafts, broken belts, etc.
Display is showing a solid "oc."	The unit has tripped on overcurrent and manual reset is required because of the programmed setting in "#RO." Check the system for problems (like a jam) that would produce the overload fault.
Display is showing the solid "uc."	The unit has tripped on undercurrent and a manual reset is required because of the programmed setting in "#RU." Check the system for problems that would produce an underload condition like a broken belt or shear pin.
Unable to change parameters.	See Tamper Guard.

Troubleshooting Chart

OPERATION

Once the overload relay has been programmed, turn the "MODE SELECT" switch to the "RUN" position. The LED display will flash "RUN" alternatively with a number representing the parameter indicated by the "DISPLAY / PROGRAM" adjustment. After the period of time programmed into RD1, the output contacts will close and the value of the parameter indicated by the "DISPLAY / PROGRAM" adjustment will appear on the LED display. If a message other than those indicated above is shown on the LED display, see the TROUBLESHOOTING section above to diagnose the problem.

Programmable Pump Protection - Model 77C-KW/HP
Low-Range Programmable Pump Protection - Model 77C-LR-KW/HP
INSTALLATION INSTRUCTIONS

Clearing Last Fault

The last fault stored can be cleared on the MotorSaver.

This procedure is outline as follows:

1. Rotate the Mode Select Switch to 'OPT2'.
 2. Press and hold the Reset/Program Button. Adjust the Display/Program adjustment until cLr appears on the display. Release the Reset/Program Button.
- To verify the last fault was cleared, place the Mode Select switch in the Run position. Then press and hold the Reset/Program Button, cLr should be on the display.

Tamper Guard

The MotorSaver can be protected from unauthorized program changes by locking in the setpoints.

This procedure is outlines as follows:

1. Rotate the Mode Select switch to 'OPT2'.
2. Rotate Display/Program adjustment fully clockwise.
3. Press and hold the Reset Button. Adjust the Display/Program adjustment until 'Loc' appears in the display.
4. Release the Reset Button.
5. Turn Mode Select switch to 'run'.

The program is now locked, but all settings can be viewed. The unit can be unlocked by following the procedure above except step three. This step should say: Press and hold the Reset Button. Adjust the Display/Program adjustment until 'unL' appears in the display.

8-Pin Plug-in Mount, Seal Leak Detector - Model 201-100-SLD INSTALLATION INSTRUCTIONS

OPERATION

As water leaks into the motor, the resistance measured by the probe decreases. When the resistance drops below the sensitivity control level, the unit will trip and the relay contacts will change state.

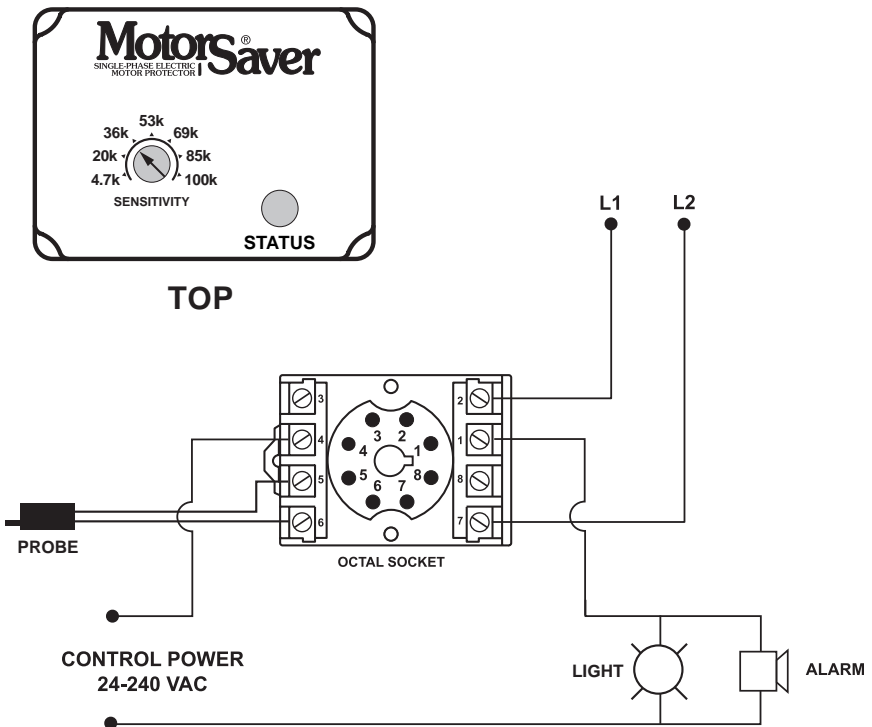
SENSITIVITY SETTING

Rotate the SENSITIVITY knob to the desired minimum resistance allowed before the unit trips.

STATUS

GREEN = RELAY IS ENERGIZED (high resistance detected – NC contact is open)

RED = RELAY IS DE-ENERGIZED (low resistance detected – NC contact is closed)



DIN Rail Mount, Seal Leak Detector - Model 460-15-100-SLD

INSTALLATION INSTRUCTIONS

OPERATION

As water leaks into the motor, the resistance measured by the probe decreases. When the resistance drops below the sensitivity control level, the unit will trip and the relay contacts will change state. The Pass LED is lit when conditions are good (no fault) and the Fail LED is lit when a fault condition occurs.

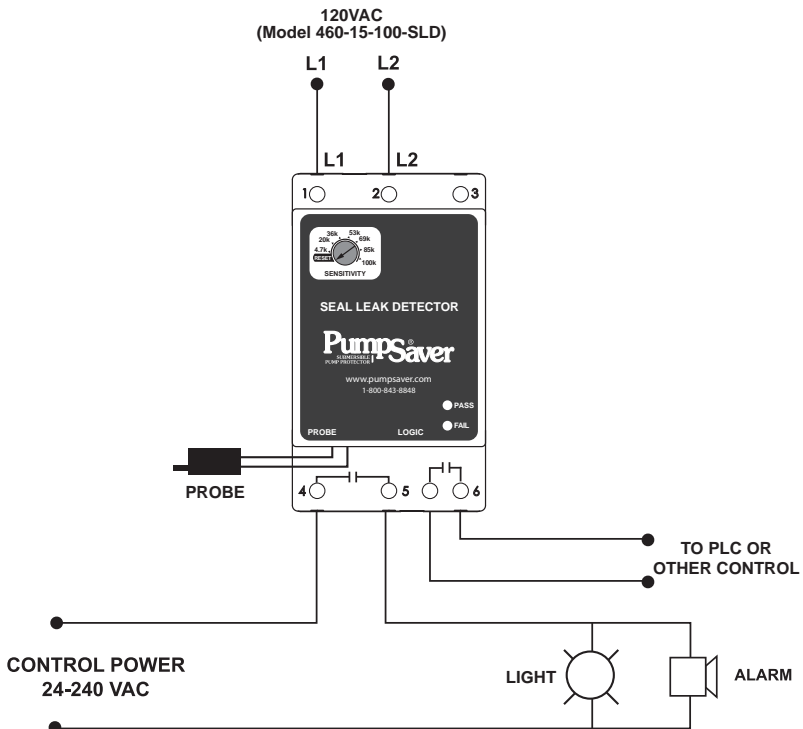
SETTINGS

1. Sensitivity Adjustment:

Rotate this dial to the desired minimum resistance allowed before the unit trips. For this model, the reset position is not used; the unit will reset automatically when a fault is cleared. If the dial is left in the reset position, sensitivity is fixed at 4.7k.

2. Input 1:

Leave jumper installed for positive logic (relay closed on a fault). Remove jumper for negative logic (relay open on a fault).



Liquid Level Sensor - Model 460-15-100-LLS

INSTALLATION INSTRUCTIONS

OPERATION

When a conductive liquid makes contact between the probe it will cause the relay to change state after the debounce time is satisfied. The Run LED indicates that liquid is not present, and the Stop LED indicates that it is present.

SETTINGS

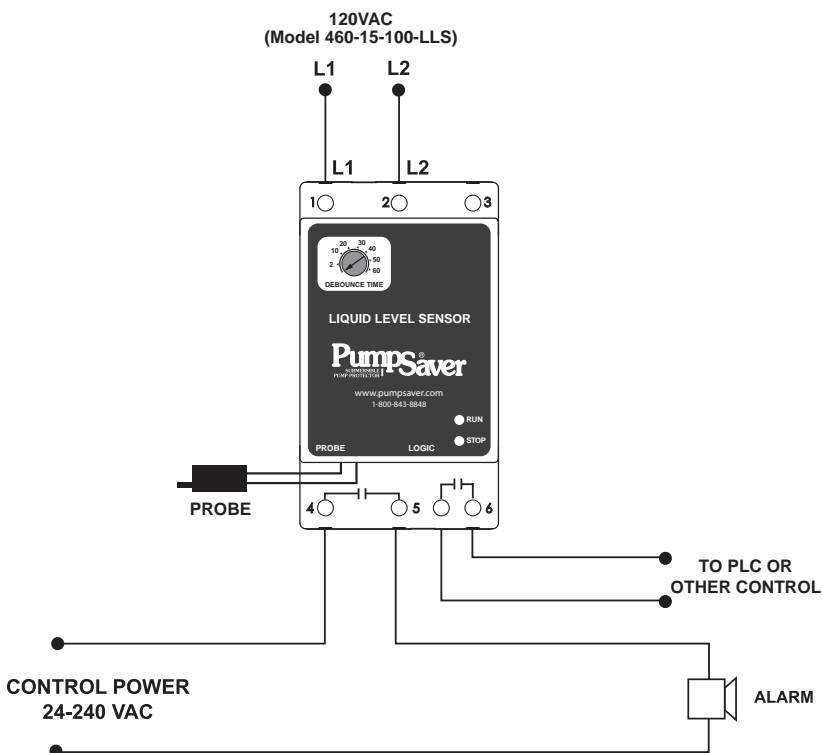
1. Debounce Adjustment:

This adjusts the amount of time that a conductive liquid is in contact with the probe before the relay changes state. Note: If the time dial is changed, the new setting will take effect immediately, minus any time that has already elapsed.

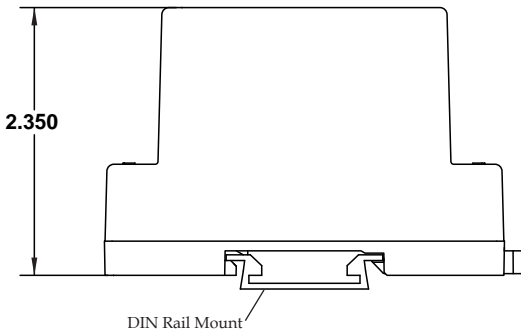
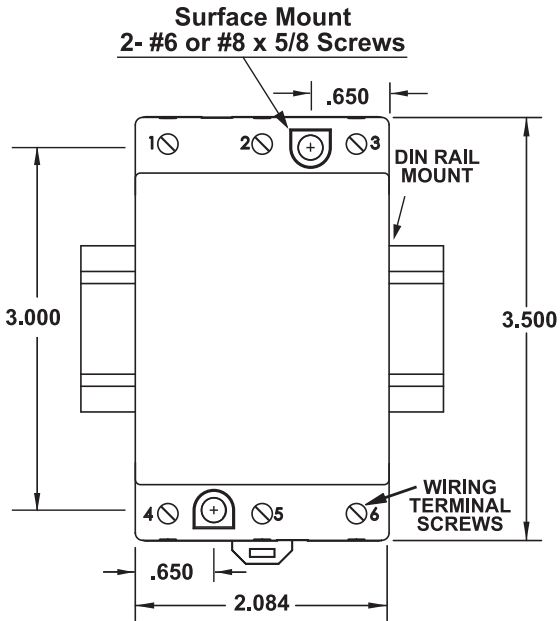
2. Logic Jumper:

Logic Jumper Installed: Relay closes when conductive liquid is in contact with the probe.

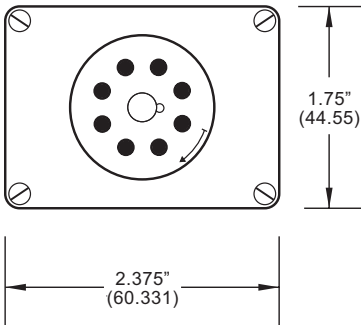
Logic Jumper Removed: Relay opens when conductive liquid is in contact with the probe.



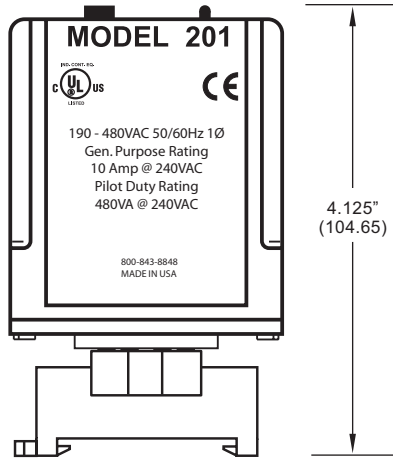
460 type unit - DIMENSIONS



201-100-SLD - DIMENSIONS



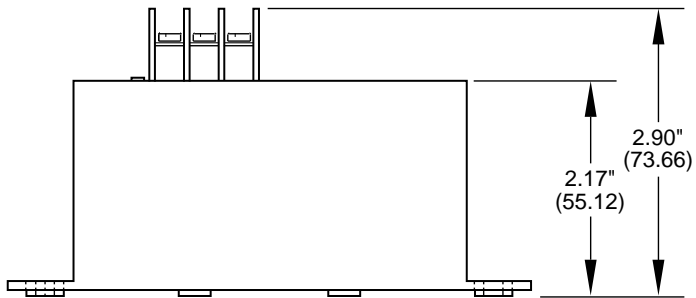
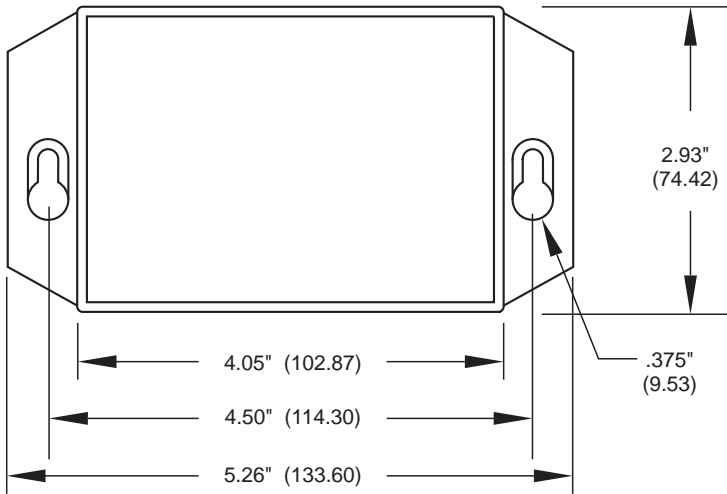
BOTTOM



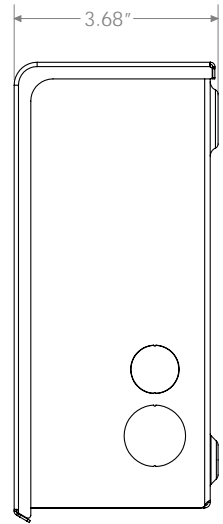
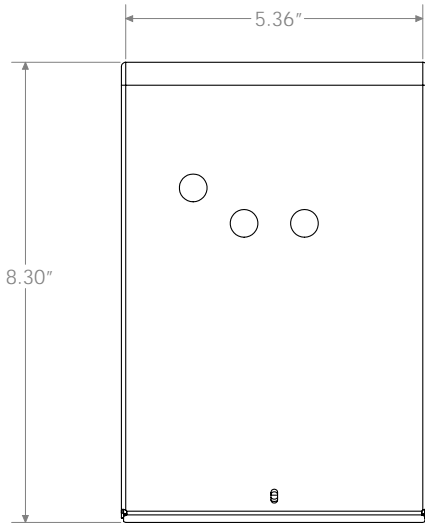
**SIDE
WITH OT08* SOCKET**

* The use of an OT08-PC or RB08-PC octal socket, manufactured by Custom Connector Corp. (available through SymCom), is required for the Model 201-100-SLD to qualify as a UL Listed device. The OT08-PC is 35mm DIN rail compatible.

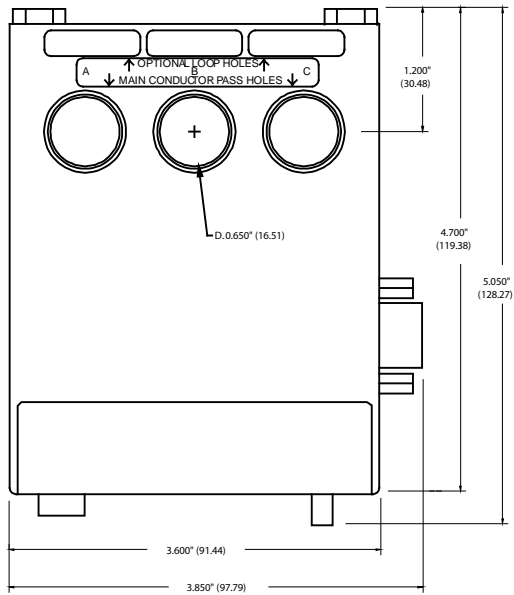
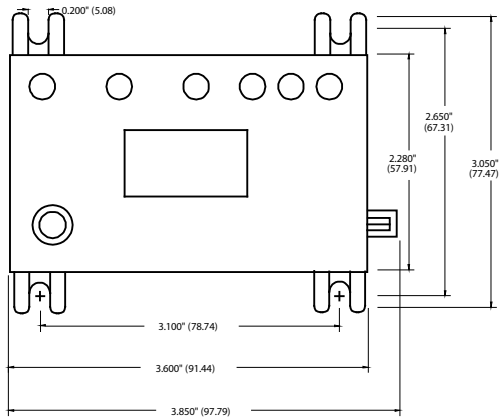
111P / 233P / 235P - DIMENSIONS



ENCL enclosure - DIMENSIONS



77C-KW/HP - DIMENSIONS



Voltage/Current/Power Monitors - Overload Relays

SymCom's 777 family of products are UL listed as Electronic Overload Relays. The KW/HP units are also power monitors that can calculate a Power reading for use with many software solutions.

Communication & I/O Modules

Units that are used for converting the information coming from a 777 family or 601 family product to Modbus, Devicenet, 4-20mA or Profibus signal to be sent over a network.

Remote Monitors

SymCom's remote monitors are used in conjunction with the 777 and 601 families to display real-time voltages and currents. Fault codes are listed on an easy to read display. Using a remote monitor will also help by making it safer for employees to gather real-time information without having to open the electrical panel.

Solutions Software

Used to monitor, log information, control and change configurations and setpoints on the 777 and 601 family of products.

Voltage Monitors, single-phase & 3-phase

Used to monitor incoming line voltages for High or Low voltage, Reverse-phase, Unbalanced voltage and Single-Phased voltages.

Current Monitors, single-phase & 3-phase

Used to monitor current levels in a motor for High or Low current, Unbalanced current and Single-Phased currents.

Alternating Relays

Unit will alternate between two pumps so they will have equal running time, thus not wearing one pump out prematurely.

Intrinsically-Safe Relays

Units designed to be used in hazardous applications where explosive materials are present.

Pump Controllers

Used to control from 2 to 4 pumps in multiple pump applications. Has the ability to be used in pump-up or pump-down configurations. Different models have multiple uses. SymCom also provides Intrinsically-Safe pump controllers.

Load Sensors

Can be used as proof relays to detect tool wear, feed rates and loss of prime on pumps by detecting current levels. Many different configurations can be used for differing uses.

Auxiliary Products

TIMERS - On-delay timer that starts its timer when power is applied. Output contact is energized when the timing is complete, anywhere from 6 seconds to 10 minutes or 0.5 to 12 seconds.

CURRENT TRANSFORMERS - Donut or foot mounted CT used for transmitting current signal from the main conductors to the SymCom units where required.