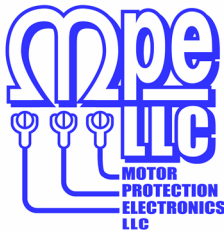


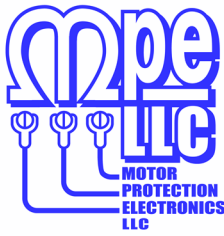
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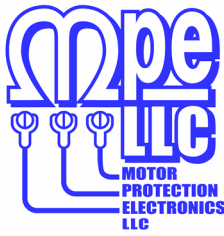
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34	Blank
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51	Duplexer, 010-120-122P, page 1
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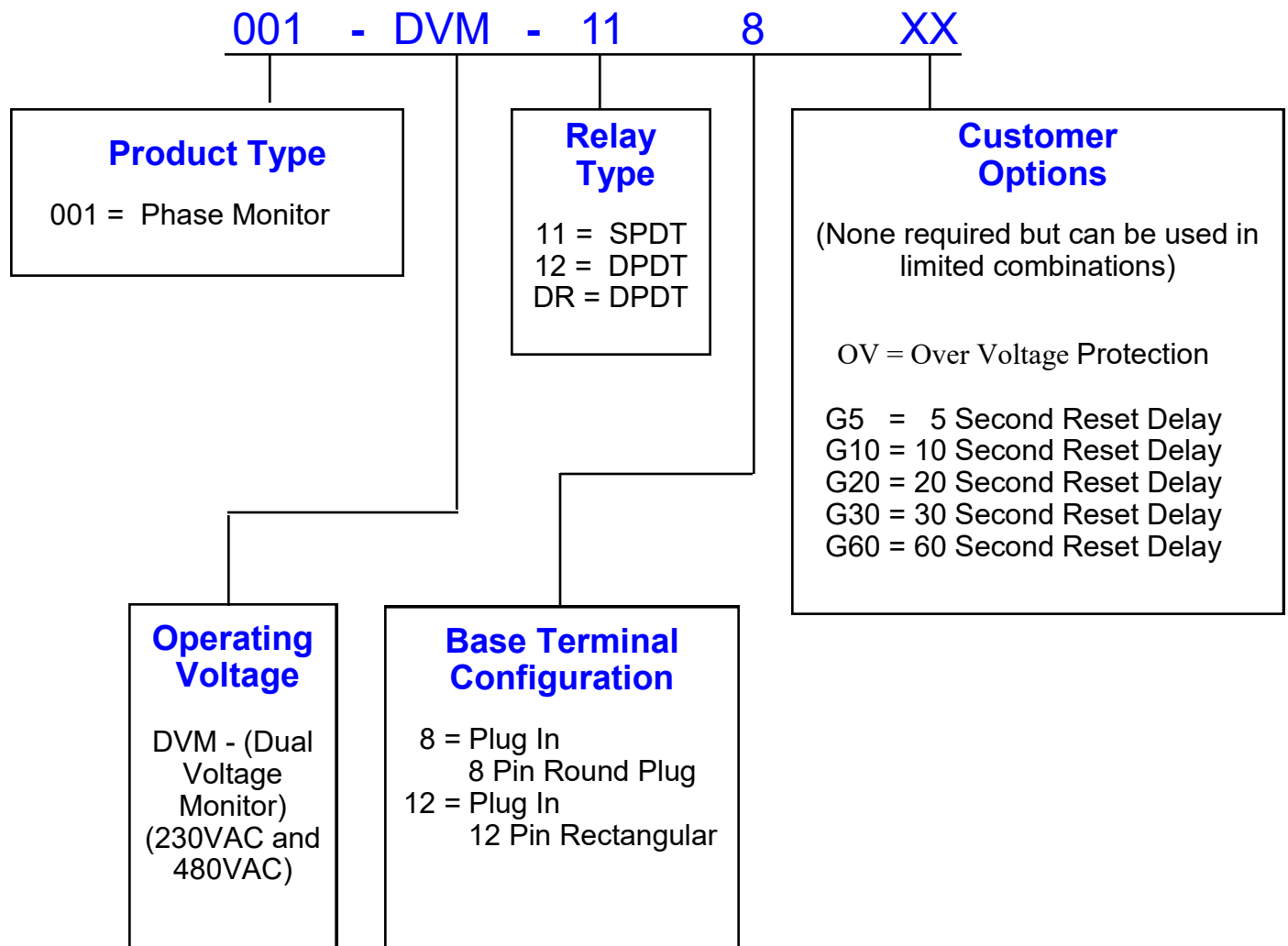
Ordering Information - Phase Monitors

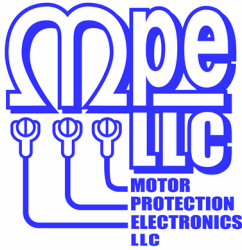
Phase Monitor Designations

Example: M.P.E. Product Number

001 - DVM - 118

Product Number Breakdown:





DUAL VOLTAGE PHASE MONITORS

THREE PHASE MOTOR PROTECTION

MADE IN
THE U.S.A.

UL FILE #E101681



PROTECTS AGAINST:

Under Voltage
Phase Loss
Phase Reversal
Phase Unbalance
(Optional Over Voltage)

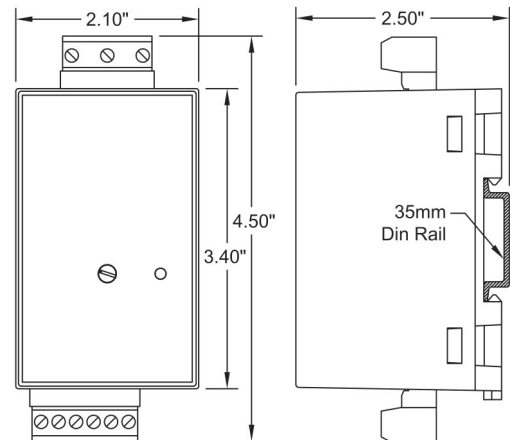
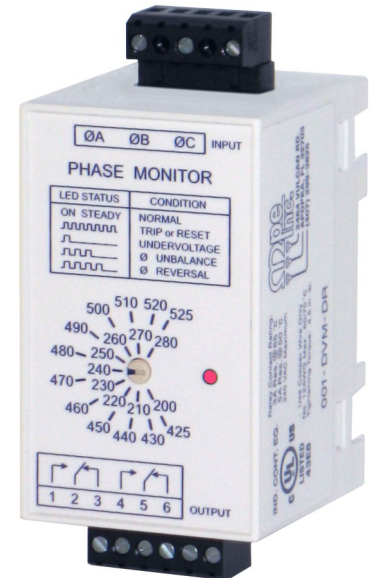
OPERATION

The Dual Voltage Phase Monitor automatically selects which voltage scale to operate from, either 200-280V or 425-525V.

When the proper voltage is connected to the phase monitor the internal relay will be energized and the LED will be on steady. An abnormal condition will cause the LED to blink during the trip delay. When the trip delay has expired the internal relay will be de-energized. The LED will then provide a series of pulses that indicate which fault condition is present. When conditions return to normal, the LED will blink during the reset delay. When the reset delay has expired, the LED will come on steady and the internal relay will be energized. The reset delay is also active immediately after power is turned on to the unit.

These units can be used on Delta or Wye systems, 50/60 Hz.

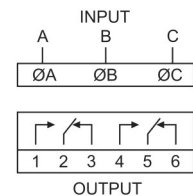
To add the Over Voltage feature select the OV option.
To extend the standard Reset Delay select one of the G options.



SPECIFICATIONS

Under Voltage:	
Trip:	- 15% of 200-280V or -10% of 425-525V
Reset:	- 12% of 200-280V or -8% of 425-525V
Over Voltage:	
Trip:	+ 15% of 200-280V or +10% of 425-525V
Reset:	+ 12% of 200-280V or +8% of 425-525V
Phase Unbalance:	
Trip:	5% with 5 Second Trip Delay 10% with 1 Second Trip Delay
Reset:	4%
Trip Delay:	5 Seconds (Delay is Reduced to 1 Second (Delay on Release) if Phase Unbalance is 10% or Greater)
Reset Delay:	2 Seconds Standard (See Options) (Delay on Operate)
Input Voltage Range:	200V to 280V or 425V to 525V
Output Voltage Rating:	240VAC Maximum
Output Current Rating:	3A* @ -40°C to +65°C *Total Load on 5A* @ -40°C to +50°C Both Outputs
Storage Temp:	-45°C to +85°C
Enclosure:	White Plastic

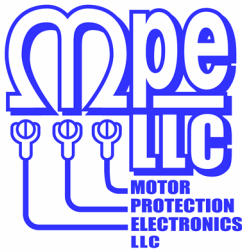
LED STATUS	CONDITION
ON STEADY	NORMAL
⏏	TRIP or RESET
⏏	UNDERVOLTAGE
⏏	OVERVOLTAGE
⏏	Ø UNBALANCE
⏏	Ø REVERSAL



ORDERING INFORMATION

001 - DVM - DR - XXXXX
 Product Type
 Operating Voltage
 (Dual Voltage)
 Din Rail Mount
 Options: _____

OV - Over Voltage
 G5 - 5 Second Reset Delay
 G10 - 10 Second Reset Delay
 G20 - 20 Second Reset Delay
 G30 - 30 Second Reset Delay
 G60 - 60 Second Reset Delay



DUAL VOLTAGE PHASE MONITORS

THREE PHASE MOTOR PROTECTION

MADE IN THE U.S.A.



UL FILE #E101681



*UL listed models require use of an RB08 or RB08-PC socket.



PROTECTS AGAINST:

- Under Voltage
- Phase Loss
- Phase Reversal
- Phase Unbalance
- (Optional Over Voltage)

OPERATION

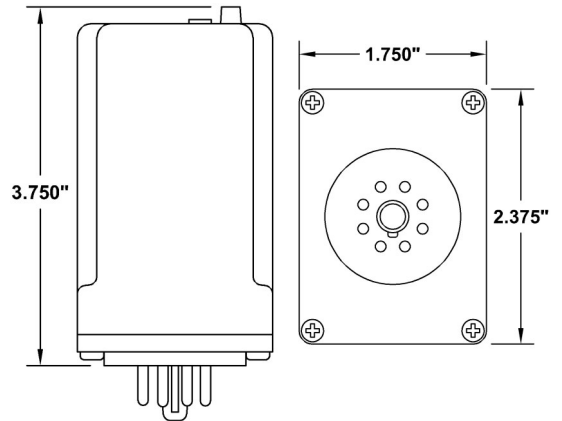
The Dual Voltage Phase Monitor automatically selects which voltage scale to operate from, either the 200-280V or the 425-525V.

When the proper voltage is connected to the phase monitor the internal relay will be energized and the LED will be on steady. An abnormal condition will cause the LED to blink during the trip delay. When the trip delay has expired the internal relay will be de-energized. The LED will then provide a series of pulses that indicate which fault condition is present. When conditions return to normal, the LED will blink during the reset delay. When the reset delay has expired, the LED will come on steady and the internal relay will be energized. The reset delay is also active immediately after power is turned on to the unit.

These units can be used on Delta or Wye systems, 50/60 Hz.

To add the Over Voltage feature select the OV option.

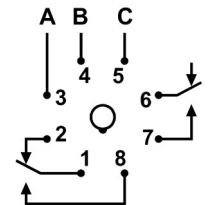
To extend the standard Reset Delay select one of the G options.



SPECIFICATIONS

Under Voltage:	
Trip:	- 15% of 200-280V or -10% of 425-525V
Reset:	- 12% of 200-280V or -8% of 425-525V
Over Voltage:	
Trip:	+ 15% of 200-280V or +10% of 425-525V
Reset:	+ 12% of 200-280V or +8% of 425-525V
Phase Unbalance:	
Trip:	5% with 5 Second Trip Delay 10% with 1 Second Trip Delay
Reset:	4%
Trip Delay:	5 Seconds (Delay is Reduced to 1 Second if Phase Unbalance is 10% or Greater)
Reset Delay:	2 Seconds Standard (See Options)
(Delay on Operate)	
Voltage Range:	200V to 280V or 425V to 525V
Output Rating:	10A Resistive @ 240VAC
Operating Temp:	-40°C to +40°C
Storage Temp:	-45°C to +85°C
Enclosure:	White Lexan
Base:	Phenolic

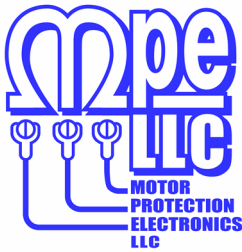
LED STATUS	CONDITION
ON STEADY	NORMAL
⏏	TRIP or RESET
⏏	UNDERVOLTAGE
⏏	OVERVOLTAGE
⏏	UNBALANCE
⏏	REVERSAL



ORDERING INFORMATION

001 - DVM - 11 8 - XXXXX

Product Type	└─┬─┘
Operating Voltage (Dual Voltage)	└─┬─┘
Relay Type (SPDT, SPST)	└─┬─┘
Base (8 Pin Octal)	└─┬─┘
Options:	└─┬─┘
OV - Over Voltage	
G5 - 5 Second Reset Delay	
G10 - 10 Second Reset Delay	
G20 - 20 Second Reset Delay	
G30 - 30 Second Reset Delay	
G60 - 60 Second Reset Delay	



DUAL VOLTAGE PHASE MONITORS

THREE PHASE MOTOR PROTECTION

MADE IN THE U.S.A.



UL FILE #E101681



*UL listed models require use of an SD12-PC socket.



PROTECTS AGAINST:

- Under Voltage
- Phase Loss
- Phase Reversal
- Phase Unbalance
- (Optional Over Voltage)

OPERATION

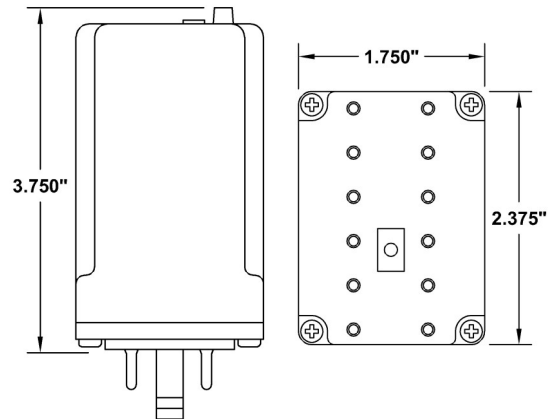
The Dual Voltage Phase Monitor automatically selects which voltage scale to operate from, either the 200-280V or the 425-525V.

When the proper voltage is connected to the phase monitor the internal relay will be energized and the LED will be on steady. An abnormal condition will cause the LED to blink during the trip delay. When the trip delay has expired the internal relay will be de-energized. The LED will then provide a series of pulses that indicate which fault condition is present. When conditions return to normal, the LED will blink during the reset delay. When the reset delay has expired, the LED will come on steady and the internal relay will be energized. The reset delay is also active immediately after power is turned on to the unit.

These units can be used on Delta or Wye systems, 50/60 Hz.

To add the Over Voltage feature select the OV option.

To extend the standard Reset Delay select one of the G options.



SPECIFICATIONS

- Under Voltage:
 - Trip: - 15% of 200-280V or -10% of 425-525V
 - Reset: - 12% of 200-280V or -8% of 425-525V
- Over Voltage:
 - Trip: + 15% of 200-280V or +10% of 425-525V
 - Reset: + 12% of 200-280V or +8% of 425-525V
- Phase Unbalance:
 - Trip: 5% with 5 Second Trip Delay
10% with 1 Second Trip Delay
 - Reset: 4%
- Trip Delay: 5 Seconds (Delay is Reduced to 1 Second if Phase Unbalance is 10% or Greater)
- Reset Delay: 2 Seconds Standard (See Options) (Delay on Operate)
- Voltage Range: 200V to 280V or 425V to 525V
- Output Rating: 10A Resistive @ 240VAC
- Operating Temp: -40°C to +40°C
- Storage Temp: -45°C to +85°C
- Enclosure: White Lexan
- Base: Phenolic

LED STATUS	CONDITION	C	B	A
ON STEADY	NORMAL	•	•	•
⏏	TRIP or RESET	6	5	4
⏏	UNDERVOLTAGE	8	9	10
⏏	OVERVOLTAGE	7	8	9
⏏	UNBALANCE	11	10	9
⏏	REVERSAL	12	11	10

ORDERING INFORMATION

- 001 - DVM - 12 12 - XXXXX
- Product Type
 - Operating Voltage (Dual Voltage)
 - Relay Type (DPDT)
 - Base (12 Pin)
 - Options:
 - OV - Over Voltage
 - G5 - 5 Second Reset Delay
 - G10 - 10 Second Reset Delay
 - G20 - 20 Second Reset Delay
 - G30 - 30 Second Reset Delay
 - G60 - 60 Second Reset Delay

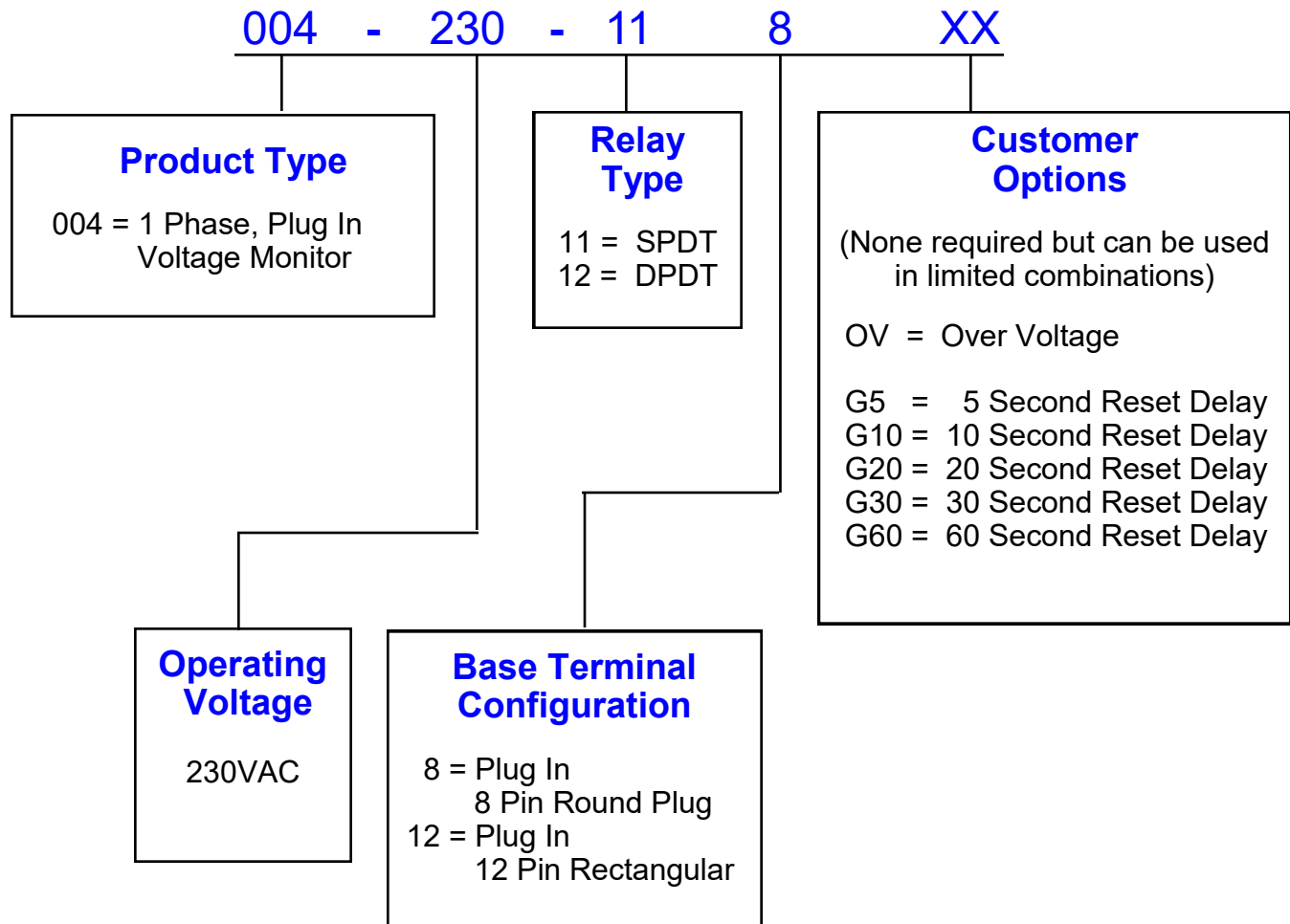
Ordering Information - Voltage Monitors

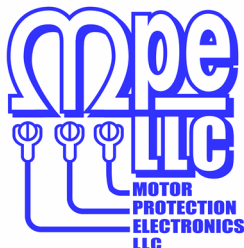
Voltage Monitor Designations

Example: M.P.E. Product Number

004 - 230 - 118

Product Number Breakdown:





VOLTAGE MONITORS

SINGLE PHASE MOTOR PROTECTION

MADE IN
THE U.S.A.

PROTECTS AGAINST:

Under Voltage
Rapid Load Cycling
(Optional Over Voltage)



UL FILE #E101681



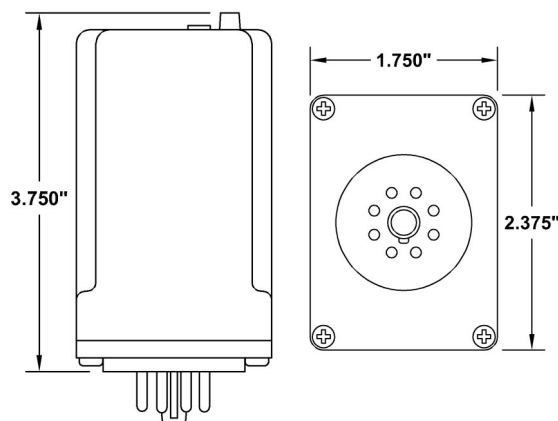
*UL listed models require use of an
RB08 or RB08-PC socket.



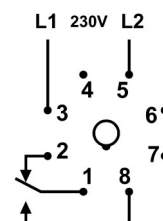
OPERATION

When proper voltage is connected to the voltage monitor the internal relay will be energized and the LED will come on steady. An abnormal condition will cause the LED to blink during the trip delay. When the trip delay has expired the internal relay will be de-energized. The LED will then provide a series of pulses that indicate which fault condition is present. When conditions return to normal, the LED will blink during the reset delay. When the reset delay has expired, the LED will come on steady and the internal relay will be energized. The reset delay is also active immediately after power is turned on to the unit.

To add the Over Voltage feature select the OV option.
To extend the standard Reset Delay select one of the G options.



LED STATUS	CONDITION
ON STEADY	NORMAL
⏏	TRIP or RESET
⏏	UNDERVOLTAGE
⏏	OVERVOLTAGE

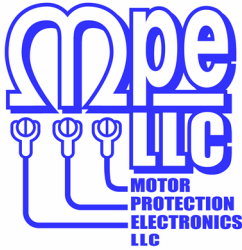


SPECIFICATIONS

Under Voltage:	
Trip:	- 15% of 200V-280V
Reset:	- 12% of 200V-280V
Over Voltage:	
Trip:	+ 15% of 200V-280V
Reset:	+ 12% of 200V-280V
Trip Delay:	5 Seconds
(Delay on Release)	
Reset Delay:	2 Seconds Standard (See Options)
(Delay on Operate)	
Voltage Range:	200V to 280V
Output Rating:	10A Resistive @ 240VAC
	6A Inductive @ 240VAC
Operating Temp:	-40°C to +50°C
Storage Temp:	-45°C to +85°C
Enclosure:	White Lexan
Base:	Phenolic

ORDERING INFORMATION

Product Type	004 - 230 - 11 8 - XXXXX
Operating Voltage	
Relay Type (SPDT)	
Base (8 Pin Octal)	
Options:	
OV	- Over Voltage
G5	- 5 Second Reset Delay
G10	- 10 Second Reset Delay
G20	- 20 Second Reset Delay
G30	- 30 Second Reset Delay
G60	- 60 Second Reset Delay



VOLTAGE MONITORS

SINGLE PHASE MOTOR PROTECTION

**MADE IN
THE U.S.A.**



UL FILE #E101681



*UL listed models require use of an SD12-PC socket.



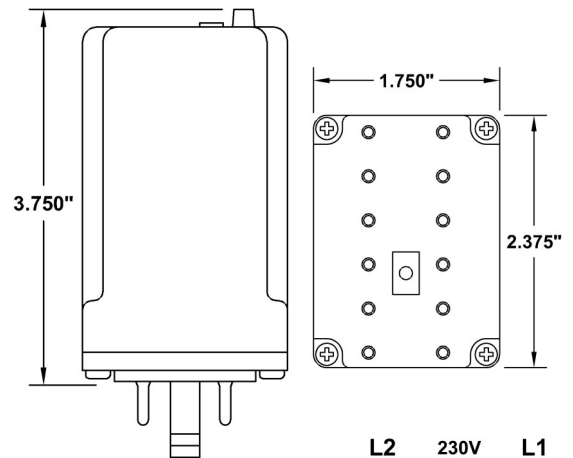
PROTECTS AGAINST:

- Under Voltage
- Rapid Load Cycling
- (Optional Over Voltage)

OPERATION

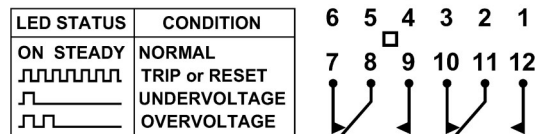
When proper voltage is connected to the voltage monitor the internal relay will be energized and the LED will come on steady. An abnormal condition will cause the LED to blink during the trip delay. When the trip delay has expired the internal relay will be de-energized. The LED will then provide a series of pulses that indicate which fault condition is present. When conditions return to normal, the LED will blink during the reset delay. When the reset delay has expired, the LED will come on steady and the internal relay will be energized. The reset delay is also active immediately after power is turned on to the unit.

To add the Over Voltage feature select the OV option.
To extend the standard Reset Delay select one of the G options.



SPECIFICATIONS

- Under Voltage:
 - Trip: - 15% of 200V-280V
 - Reset: - 12% of 200V-280V
- Over Voltage:
 - Trip: + 15% of 200V-280V
 - Reset: + 12% of 200V-280V
- Trip Delay: 5 Seconds
(Delay on Release)
- Reset Delay: 2 Seconds Standard (See Options)
(Delay on Operate)
- Voltage Range: 200V to 280V
- Output Rating: 10A Resistive @ 240VAC
6A Inductive @ 240VAC
- Operating Temp: -40°C to +50°C
- Storage Temp: -45°C to +85°C
- Enclosure: White Lexan
- Base: Phenolic



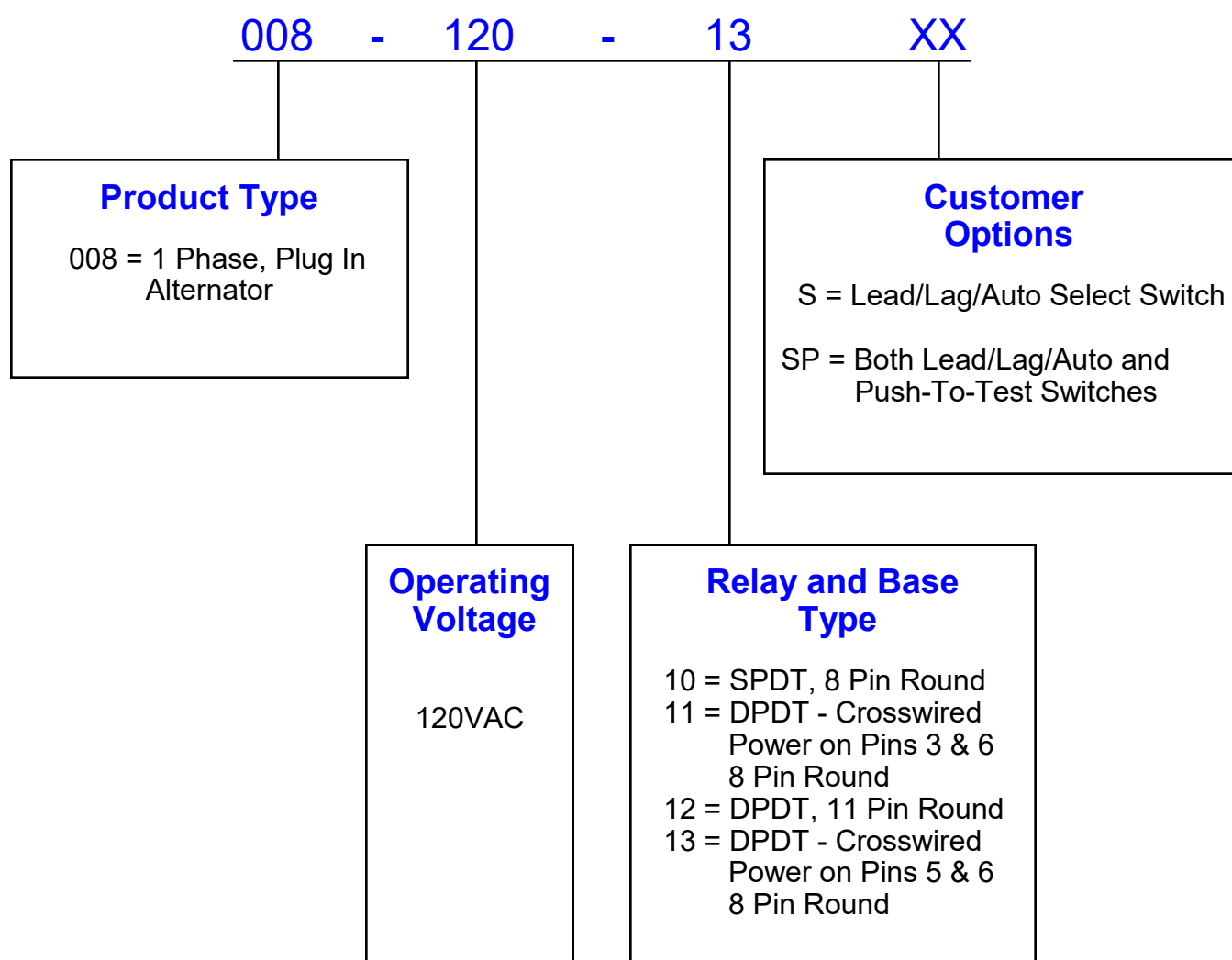
ORDERING INFORMATION

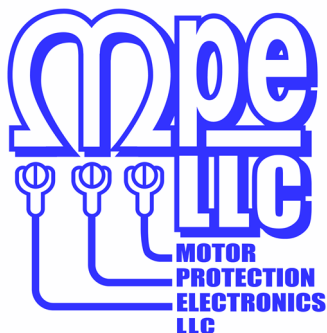
- 004 - 230 - 12 12 - XXXXX
- Product Type
 - Operating Voltage
 - Relay Type (DPDT)
 - Base (12 Pin)
 - Options:
 - OV - Over Voltage
 - G5 - 5 Second Reset Delay
 - G10 - 10 Second Reset Delay
 - G20 - 20 Second Reset Delay
 - G30 - 30 Second Reset Delay
 - G60 - 60 Second Reset Delay

Ordering Information - Alternators

Alternator Designations

Example: M.P.E. Product Number 008-120-13
Product Number Breakdown:





ALTERNATORS

SPDT

BASIC MODEL:

008-120-10



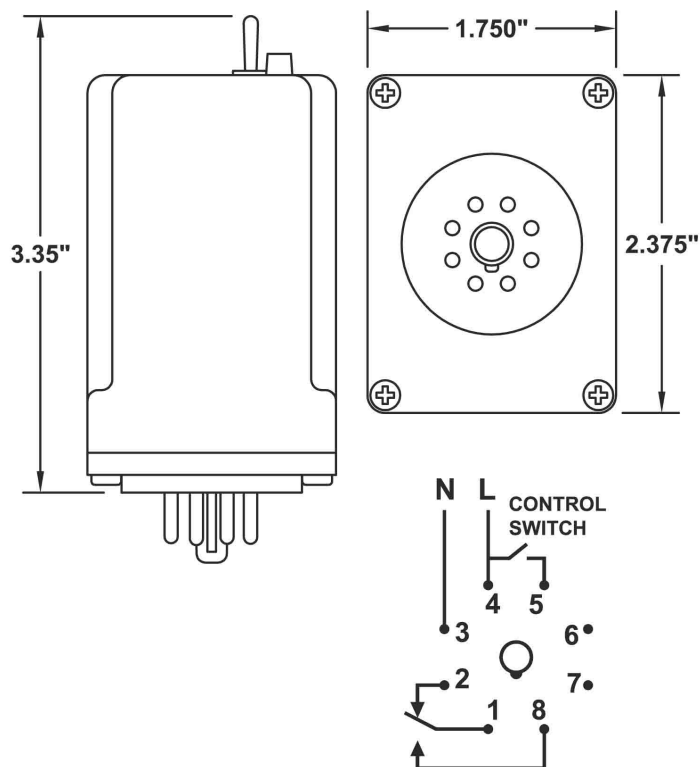
UL FILE #E101681

FEATURES:

- Solid State Circuitry
- Surge Protected
- Replaces Mechanical Types
- Plug In Base
- Economical, Easy to Install
- Lead/Lag/Auto Select Switch Option
- Push-To-Test Switch Option

OPERATION

The 008-120-10 series of alternators were designed for automatic duplex control of motors or other types of loads. When power is applied to the alternator, the output relay contacts change state each time the control voltage is disconnected. Two options are available offering (1) a lead/lag/automatic selector switch and (2) a push-to-test switch for added convenience in testing or trouble shooting.

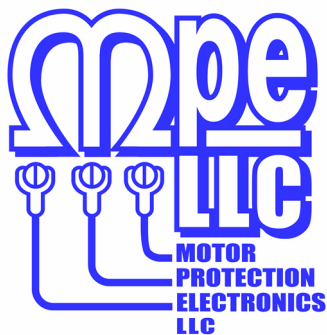


SPECIFICATIONS

Supply Voltage:	120VAC - 1 Phase 50/60 Hz
Output Rating:	10A @ Operating Voltage
Relay Type:	SPDT
Power Dissipation:	Less Than 1 Watt
Operating Temp:	-20 To +60 °C
Storage Temp:	-45 To +85 °C
Enclosure:	Lexan
Base:	Phenolic

ORDERING INFORMATION

	008 - 120 - 10 - XX
Product Type	008
Operating Voltage	120
Relay/Base Wiring	10
Options	XX
	S- Lead/Lag Switch
	SP- Lead/Lag and Push To Test



ALTERNATORS

**DPDT
CROSSWIRED
POWER ON PINS
3 & 6**

BASIC MODEL:

008-120-11



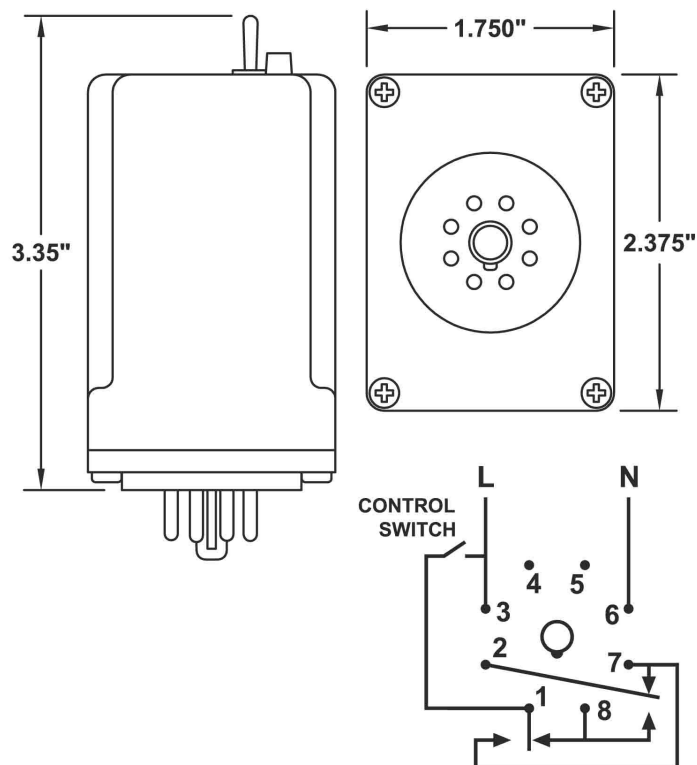
UL FILE #E101681

FEATURES:

- Solid State Circuitry
- Surge Protected
- Replaces Mechanical Types
- Plug In Base
- Economical, Easy to Install
- Lead/Lag/Auto Select Switch Option
- Push-To-Test Switch Option

OPERATION

The 008-120-11 series of alternators were designed for automatic duplex control of motors or other types of loads. When power is applied to the alternator, the crosswired DPDT output relay contacts change state each time the control voltage is disconnected. Two options are available offering (1) a lead/lag/automatic selector switch and (2) a push-to-test switch for added convenience in testing or trouble shooting.

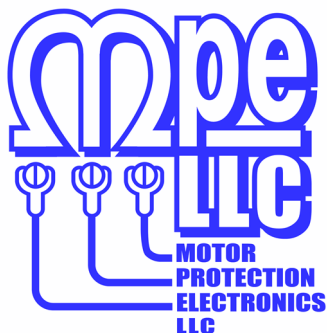


SPECIFICATIONS

Supply Voltage:	120VAC - 1 Phase 50/60 Hz
Output Rating:	10A @ Operating Voltage
Relay Type:	DPDT – Crosswired Contacts
Power Dissipation:	Less Than 1 Watt
Operating Temp:	-20 To +60 °C
Storage Temp:	-45 To +85 °C
Enclosure:	Lexan
Base:	Phenolic

ORDERING INFORMATION

	008 - 120 - 11 - XX
Product Type	└──┘
Operating Voltage	└──┘
Relay/Base Wiring	└──┘
Options	└──┘
	S- Lead/Lag Switch
	SP- Lead/Lag and Push To Test



ALTERNATORS

DPDT

BASIC MODEL:

008-120-12



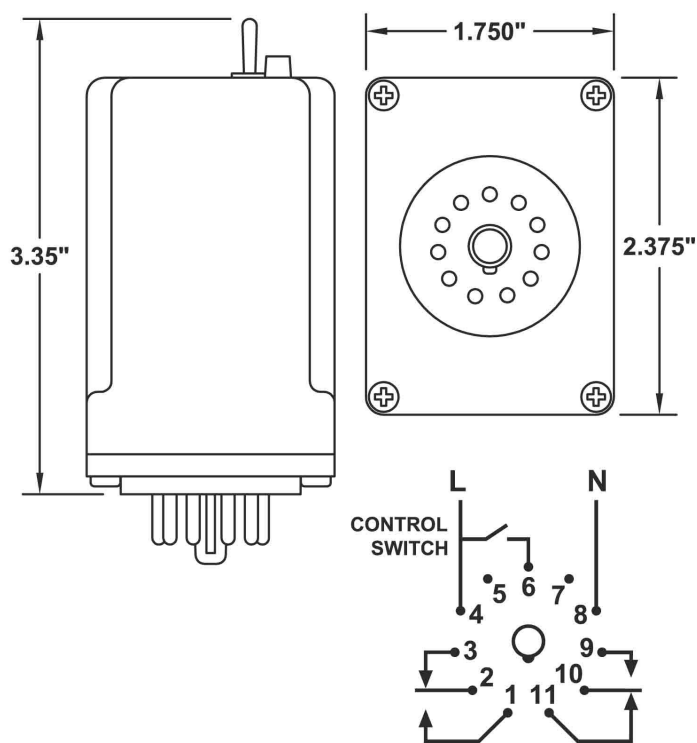
UL FILE #E101681

FEATURES:

- Solid State Circuitry
- Surge Protected
- Replaces Mechanical Types
- Plug In Base
- Economical, Easy to Install
- Lead/Lag/Auto Select Switch Option
- Push-To-Test Switch Option

OPERATION

The 008-120-12 series of alternators were designed for automatic duplex control of motors or other types of loads. When power is applied to the alternator, the DPDT output relay contacts change state each time the control voltage is disconnected. Two options are available offering (1) a lead/lag/automatic selector switch and (2) a push-to-test switch for added convenience in testing or trouble shooting.

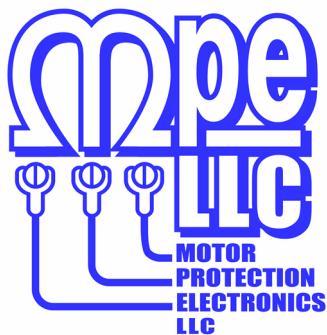


SPECIFICATIONS

Supply Voltage:	120VAC - 1 Phase 50/60 Hz
Output Rating:	10A @ Operating Voltage
Relay Type:	DPDT
Power Dissipation:	Less Than 1 Watt
Operating Temp:	-20 To +60 °C
Storage Temp:	-45 To +85 °C
Enclosure:	Lexan
Base:	Phenolic

ORDERING INFORMATION

	008 - 120 - 12 - XX
Product Type	
Operating Voltage	
Relay/Base Wiring	
Options	
	S- Lead/Lag Switch
	SP- Lead/Lag and Push To Test



ALTERNATORS

**DPDT
CROSSWIRED
POWER ON PINS
5 & 6**

BASIC MODEL:

008-120-13



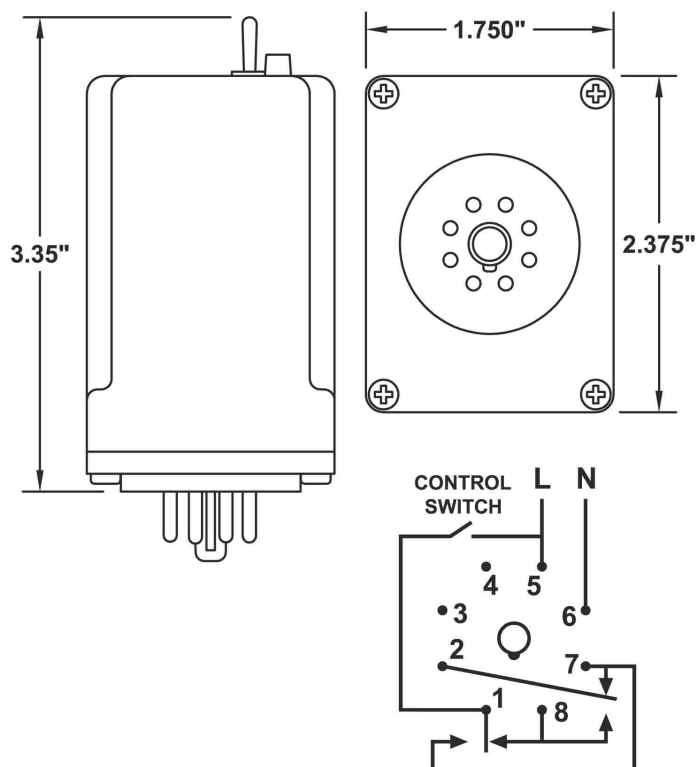
UL FILE #E101681

FEATURES:

- Solid State Circuitry
- Surge Protected
- Replaces Mechanical Types
- Plug In Base
- Economical, Easy to Install
- Lead/Lag/Auto Select Switch Option
- Push-To-Test Switch Option

OPERATION

The 008-120-13 series of alternators were designed for automatic duplex control of motors or other types of loads. When power is applied to the alternator, the crosswired DPDT output relay contacts change state each time the control voltage is disconnected. Two options are available offering (1) a lead/lag/automatic selector switch and (2) a push-to-test switch for added convenience in testing or trouble shooting.

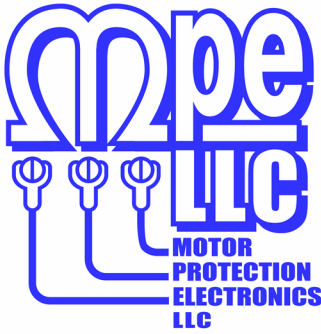


SPECIFICATIONS

Supply Voltage:	120VAC - 1 Phase 50/60 Hz
Output Rating:	10A @ Operating Voltage
Relay Type:	DPDT – Crosswired Contacts
Power Dissipation:	Less Than 1 Watt
Operating Temp:	-20 To +60 °C
Storage Temp:	-45 To +85 °C
Enclosure:	Lexan
Base:	Phenolic

ORDERING INFORMATION

	008 - 120 - 13 - XX
Product Type	└──┘
Operating Voltage	└──┘
Relay/Base Wiring	└──┘
Options	└──┘
	S- Lead/Lag Switch
	SP- Lead/Lag and Push To Test



TRIPLEX ALTERNATOR

MADE IN
THE U.S.A.

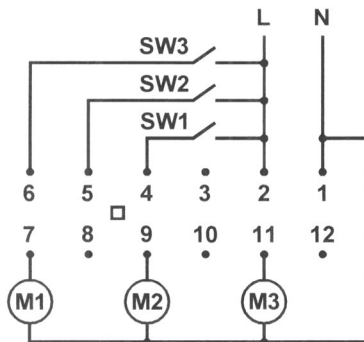


UL FILE #E101681

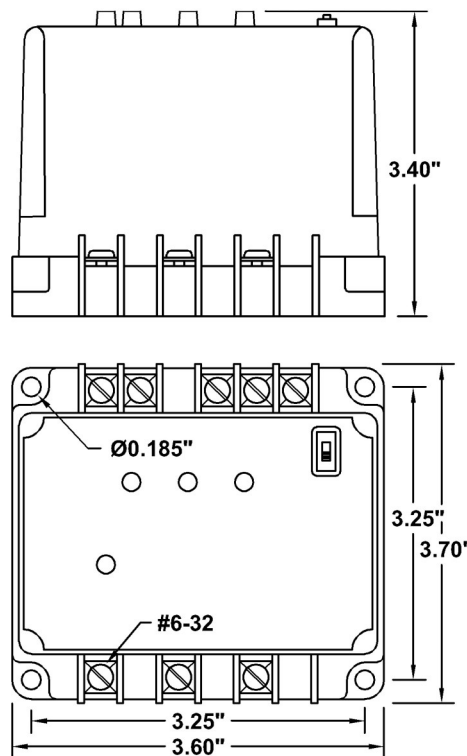


FEATURES:

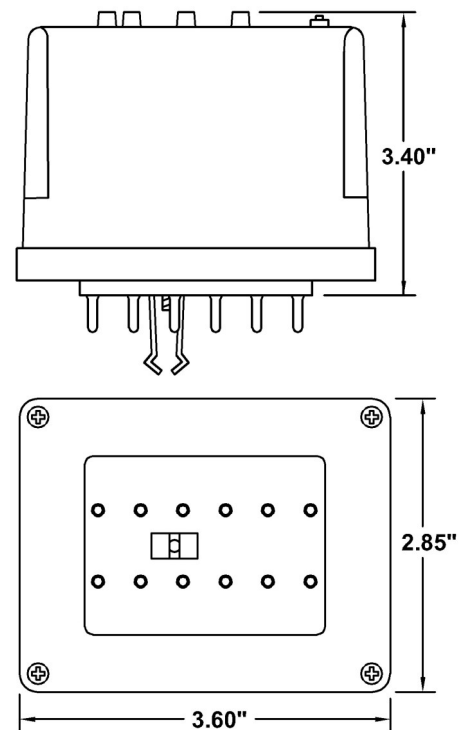
- 120VAC Inputs
- Input to Output Path
Through Relay Contacts
Even if Unit is Not Powered
- Power On Indicator
- Output Indicators
- Duplex or Triplex Operation



Surface Mount



Plug-In



OPERATION

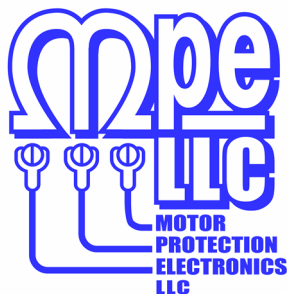
The Triplex Alternator is a 3 input, 3 output, device used to equalize the operational run time of lift station pumps. Upon the opening of all the input switches (SW1, SW2, & SW3), the alternator changes to the next sequence in preparation for the next cycle. For each cycle, the input signals are routed through the internal relay contacts to the outputs in one of three sequences, 1-2-3, 2-3-1 or 3-1-2. The Triplex Alternator may also serve as a Duplex Alternator, with sequences 1-2 or 2-1, by placing the selector switch into position 2.

SPECIFICATIONS

Input Power:	120VAC \pm 10%, 10VA max
Inputs:	120VAC
Relay Outputs:	6A Resistive @ 120VAC 3.6A Inductive @ 120VAC
Indicators:	LED's
Operating Temp:	-20 to +60 °C
Storage Temp:	-45 to +85 °C
Enclosure:	Lexan

ORDERING INFORMATION

	Part Number
Plug-In:	009-120-23P
Surface Mount:	009-120-23



TIMERS

DELAY ON OPERATE

MADE IN
THE U.S.A.



UL FILE # E101681

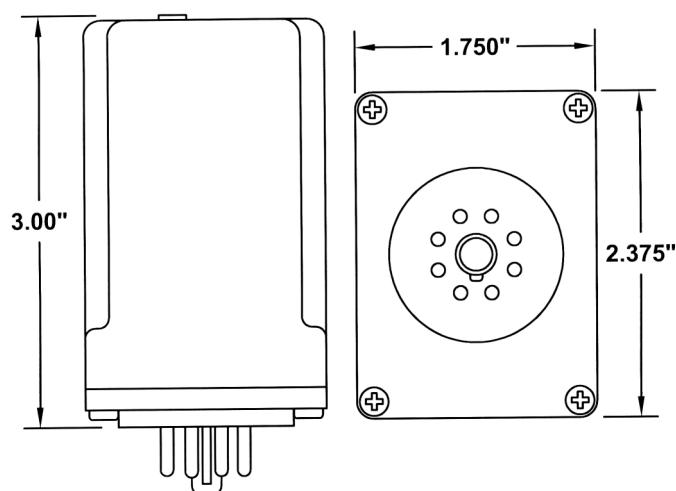


FEATURES:

Solid State Circuitry
Standard Timing Ranges
DPDT 10A Relay
Plug In Base
Economical
Easy to Install

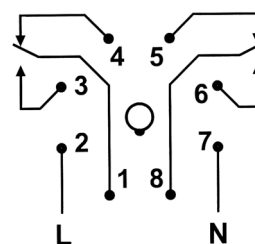
OPERATION

The 021 timer offers a delay on operate function. The timing range is user specified up to one hour. The timer can be manually set to any time within the selected range. Timing is initiated by application of power to the timer between terminals 2 and 7. Upon completion of the timing cycle, the output relay will energize.



SPECIFICATIONS

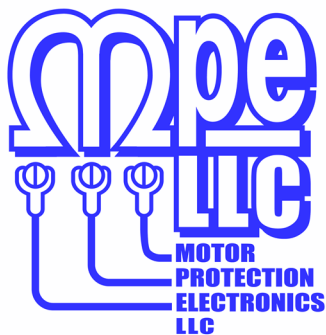
Supply Voltage:	120 VAC \pm 10% 1 Phase 50/60 Hz
Relay Type:	DPDT
Output Rating:	10A Resistive @ 240VAC 3.6A Inductive @ 240VAC
Power Dissipation:	Less Than 1 Watt
Operating Temp:	-40°C to +60 °C
Storage Temp:	-45°C to +85 °C
Typical Reset Time:	30 ms
Enclosure:	White Lexan
Base:	Phenolic



ORDERING INFORMATION

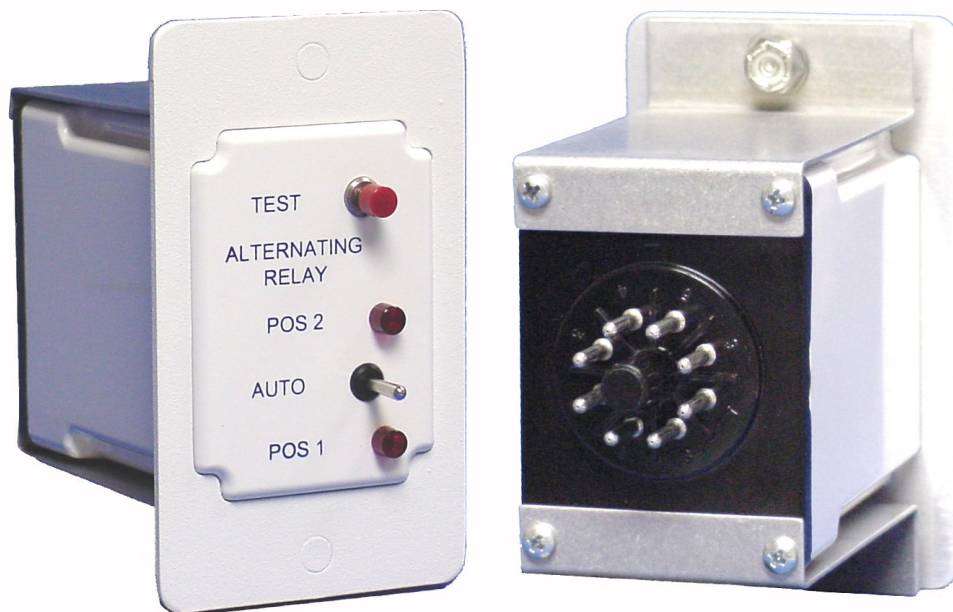
Product Type 021 - 120 - XXXX
Operating Voltage
120 = 120VAC
Timing Range

0010 = 1 to 10 seconds	0200 = 20 to 200 seconds
0020 = 2 to 20 seconds	0300 = 30 to 300 seconds
0030 = 3 to 30 seconds	0600 = 60 to 600 seconds
0060 = 6 to 60 seconds	0900 = 90 to 900 seconds
0090 = 9 to 90 seconds	1200 = 120 to 1200 seconds
0120 = 12 to 120 seconds	1800 = 180 to 1800 seconds
0180 = 18 to 180 seconds	3600 = 360 to 3600 seconds



**MADE IN
THE U.S.A.**

SMALL CASE MOUNTING BRACKET KIT



The Mounting Bracket Kit provides a simple and economical method of securing an Alternating Relay to the deadfront of a control panel.

TYPICAL APPLICATIONS

- Where the lead select switch and/or Alternator test switch must be on the deadfront.

COST SAVINGS!

Punch one hole, attach bracket kit. Compare this to material costs of two switches, multiple contact blocks, labor to wire from deadfront door to Alternator, plus engineering time drawing switches into electrical schematic.

FEATURES

- Sturdy aluminum construction
- Stainless steel stud pressed fit into bracket faceplate
- Mounting hardware included
- Very fine textured painted surface
- Color - White

ORDERING INFORMATION

Part Number: DFB-W

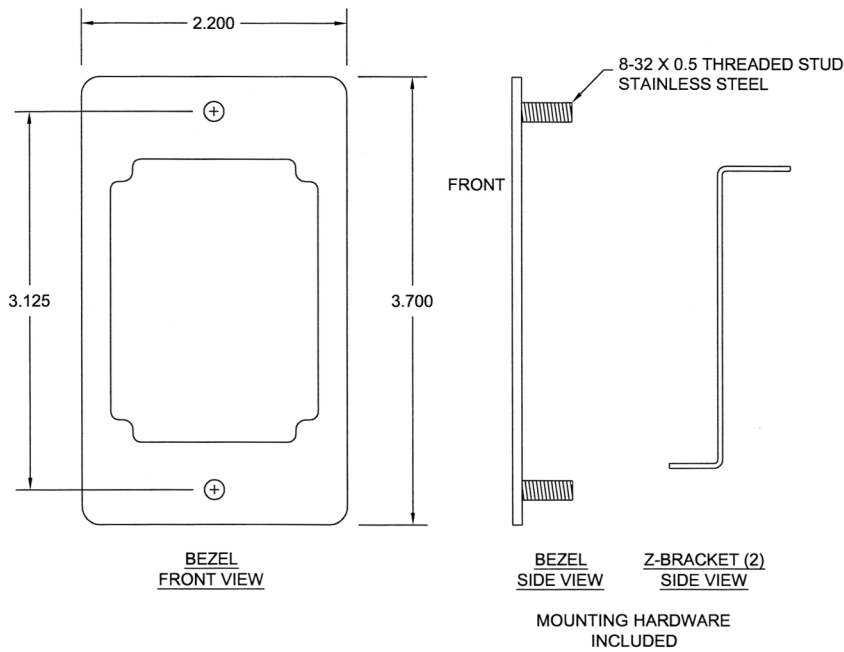
SOCKETS*

(MUST BE ORDERED SEPARATELY)

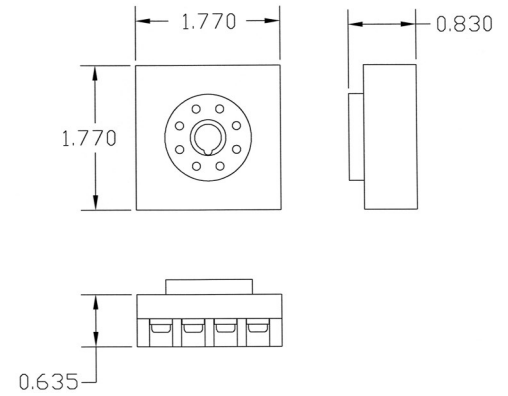
8 Pin Reverse Mount – P3G-08
11 Pin Reverse Mount – P3GA-11

* For customer savings analysis, subtract cost of regular socket from cost of reverse mounted socket.

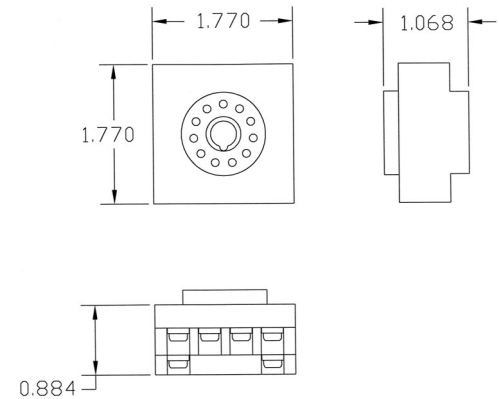
BRACKET KIT



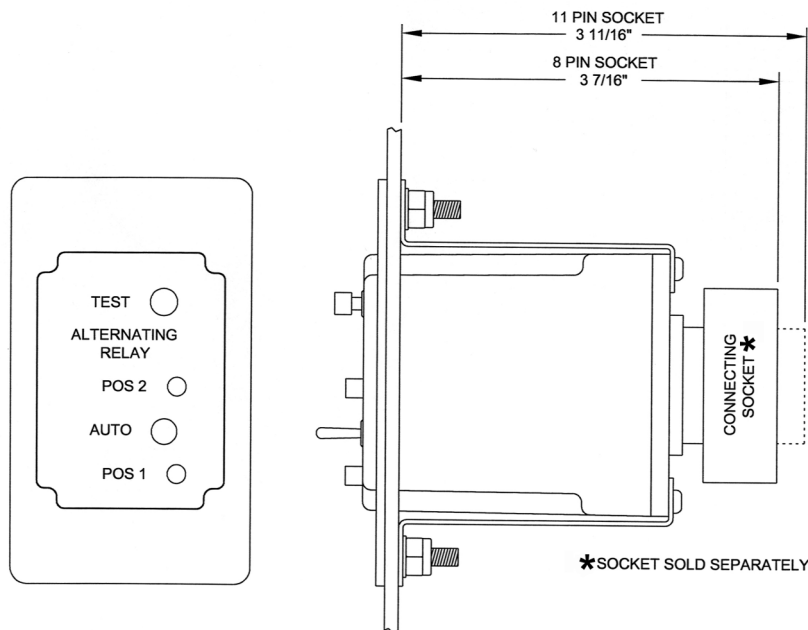
SOCKET - P3G-08



SOCKET - P3GA-11

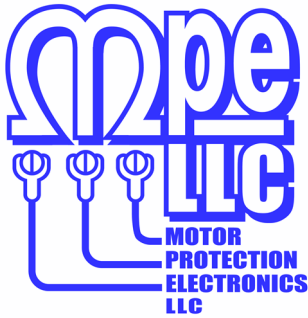


INSTALLATION DIAGRAM



INSTALLATION INSTRUCTIONS

- 1 Attach both Z-brackets to Alternator.
- 2 Cut and drill holes in panel door per installation template.
- 3 Hold the bezel over front of hole cut into deadfront.
- 4 Insert the Alternator through the back of hole.
- 5 Fasten assembly to panel door using hardware provided.



**MADE IN
THE U.S.A.**

Level Probe Mounting brackets and S hook

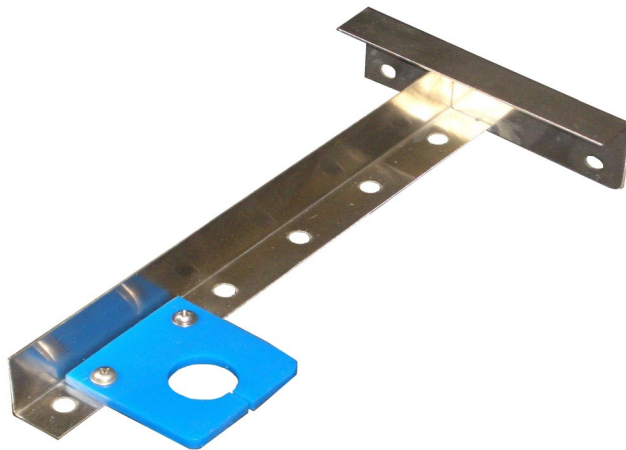


**LEVEL PROBE
BRACKET (SMALL),
LPB-1**

**Bracket Material:
304S.S.**

**Squeegee Material:
Urethane Rubber**

**Hardware:
8/32 S.S.**



**LEVEL PROBE
BRACKET (LARGE),
LPB-2**

**Bracket Material:
304S.S.**

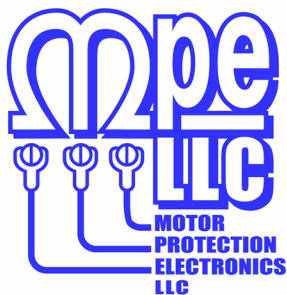
**Squeegee Material:
Urethane Rubber**

**Hardware:
8/32 S.S.**



S HOOK

**Material:
1/4 in. Round Stock,
304 S.S.**



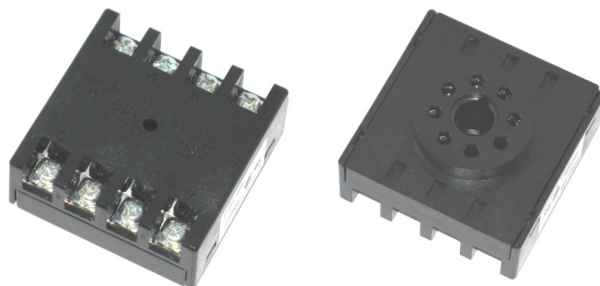
SOCKETS

Part Number: P3G-08

8 Pin, Reverse Mount

Rating: 6A, 250VAC

UL Recognized, CSA

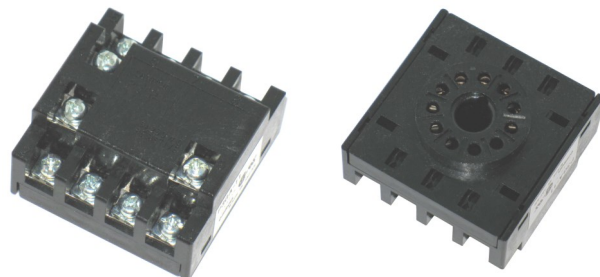


Part Number: P3GA-11

11 Pin, Reverse Mount

Rating: 6A, 250VAC

UL Recognized, CSA



Part Number: PF083A-E

**8 Pin, Din-Rail Mount
with holes for locking clips**

Rating: 10A , 250V

UL Recognized, CSA



Part Number: 70-464-1

8 Pin, Din-Rail Mount

Rating: 10A , 600V

**UL Recognized
USA, Canada**



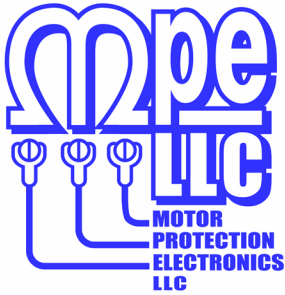
Part Number: SR3P-05

11 Pin, Din-Rail Mount

Rating: 10A , 300V

UL Recognized, CSA





SOCKETS

Part Number: RB08-PC

8 Pin, Surface Mount

Rating: 10A , 600V

UL Recognized, CSA

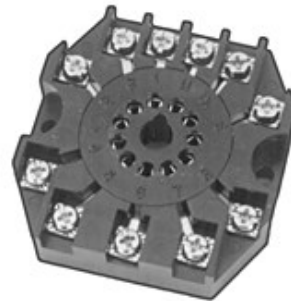


Part Number: RB11-PC

11 Pin, Surface Mount

Rating: 10A , 300V

UL Recognized, CSA

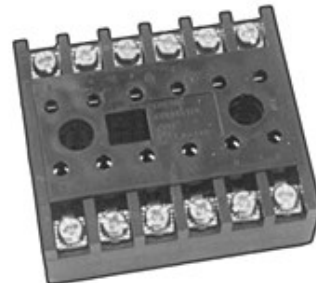


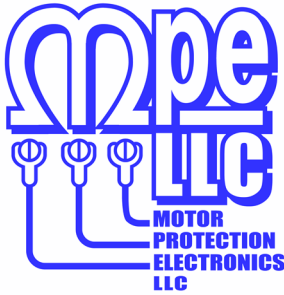
Part Number: SD12-PC

12 Pin, Surface Mount

Rating: 10A , 600V

UL Recognized, CSA





ADJUSTABLE TRANSMITTER

FEATURES

- Single Turn Potentiometer with 4-20 mA Scale
- Transient Voltage Protection
- Internal Fuse
- Internal Series Diode
- Zero and Span Calibration

TYPICAL APPLICATIONS

Used to simulate a 4-20 mA signal from field devices while testing control equipment.

Used to calibrate equipment having a 4-20 mA analog input.

Use as part of a product demo unit that requires control of a 4-20 mA analog input for demonstration purposes.



OPERATION

The Adjustable Transmitter is a device that is placed in an analog current loop in order to test, calibrate or demo equipment. It may be used to simulate analog field devices such as Pressure Transducers or Temperature Transmitters.

When placed in a analog current loop, the Adjustable Transmitter regulates the current in the loop to the setting on the knob, between 4 and 20 mA.

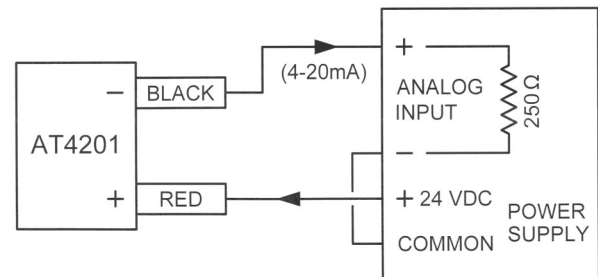
Where a precise current setting is required, an Ammeter may be placed in the current loop, and used to display the loop current.

CALIBRATION

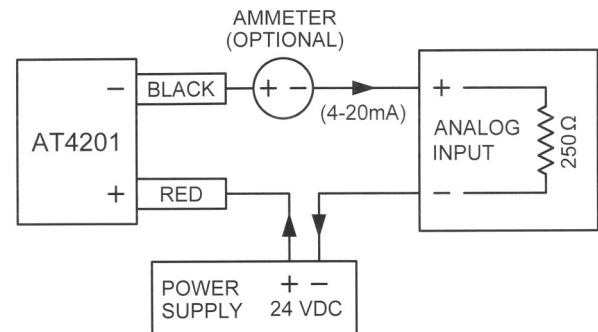
To calibrate the Zero setting, place an Ammeter in the loop, turn the knob all the way to the left and turn the Zero adjustment screw until the Ammeter reads 4.00 mA.

To calibrate the Span setting, turn the knob all the way to the right and turn the Span adjustment screw until the Ammeter reads 20.0 mA.

Connection with Internal Power Supply



Connection with External Power Supply

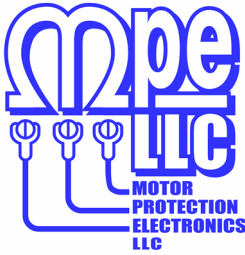


SPECIFICATIONS

Operating Voltage Range:	10.0 – 35.0 VDC
Internal Fuse:	1/8 Amp, 125 Volt
Dimensions:	4.2" x 2.5" x 2.20"
Operating Temperature:	-18 °C to +77 °C
Maximum Loop Resistance:	600 Ohms

ORDERING INFORMATION

Model Number: AT4201



FEATURES:

- 12V Battery Charger
- Power Loss Alarm with Enable/Disable Mode Switch
- Push-To-Test Switch
- Repeat Cycle Timer for Horn

OPERATION

The BOAC is a device that performs the various tasks required to manage a 12VDC alarm system that has an alarm strobe light and horn powered by a 12V backup battery. The BOAC charges the backup battery, provides a Power Loss Alarm (when required), has a repeat cycle timer for the horn, a system push-to-test button and indication of the battery charging mode.

During an alarm condition the alarm strobe light and horn are powered by the battery. After an alarm condition and with 120VAC applied/restored, the BOAC will recharge the 12V backup battery. During an alarm condition battery power is conserved by operating the horn intermittently, on for 2 seconds, and then off for 2 seconds.

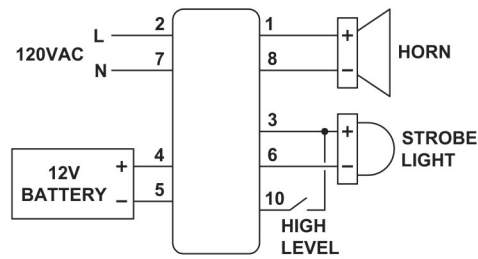
Upon closure of an alarm contact across pins 3 and 10, the strobe light and horn will be activated. Also, upon the loss of 120VAC power, the Power Loss Alarm (if enabled) will activate the strobe light and horn. The Power Loss Alarm may be enabled/disabled by setting the Power Loss Alarm Mode switch to the desired setting.

The push-to-test button is provided to verify system operation. When pushed, the battery charger is turned off so that the strobe light and horn may be powered solely by the battery during the test.

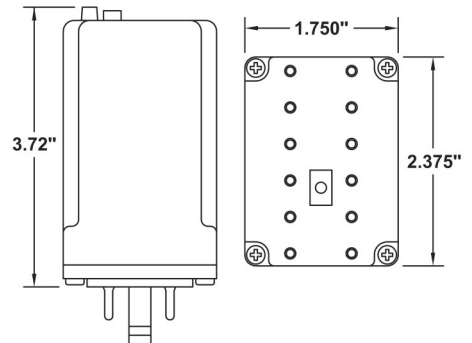
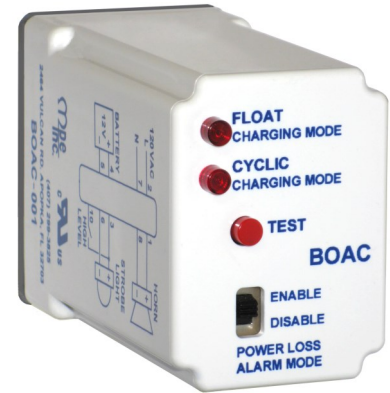
The BOAC utilizes a Battery Charge Controller IC chip that was specifically designed to manage the charging of sealed lead-acid batteries. This chip carefully controls the charging current and voltage during the charging process to maximize battery capacity and life. The Charge Controller has two charging modes, "Cyclic Charging" and "Float Charging". During an alarm event, the strobe light and horn will slowly run down the battery. As long as the battery voltage stays above 12.1V (50% charged), the Charge Controller will stay in the Float Charging Mode. In the Float Charging Mode, the battery will be recharged to 13.6V \pm 1% @ 25°C, when the alarm clears. If the alarm were to be turned on often enough (or stay on long enough) to run the battery down below 12.1V (50% charged), the Charge Controller will toggle into the Cyclic Charging Mode and recharge the battery to 14.6V \pm 1% @ 25°C. After a period of time in the Cyclic Charging Mode with no alarm events, the charging current will drop below 25mA, and the Charge Controller toggles back to the Float Charging Mode. Battery manufacturers typically recommend this dual voltage charging regimen to ensure the optimum capacity and life of their batteries. To accommodate lead-acid battery chemistry, the Charge Controller also adjusts the charging voltage to account for changes in the ambient temperature (-20.7 mV/C° or -11.5 mV/F°).

BOAC

Battery Operated Alarm with Charger



UL FILE # E101681



SPECIFICATIONS

Input Power:	120 VAC \pm 10% 8.9 VA max
Charging Voltage:	Cyclic Charging Mode - 14.6V \pm 1% @ 25°C Float Charging Mode - 13.6V \pm 1% @ 25°C
Charging Current Limit:	103 mA
Strobe Light Output:	12 VDC @ 500 mA or Less
Horn Output:	12 VDC @ 500 mA or Less (See Note on Horn Selection)
Operating Temp:	-20°C to +60°C
Storage Temp:	-45°C to +85°C
Enclosure:	Lexan
Plug In Base:	Phenolic

ORDERING INFORMATION

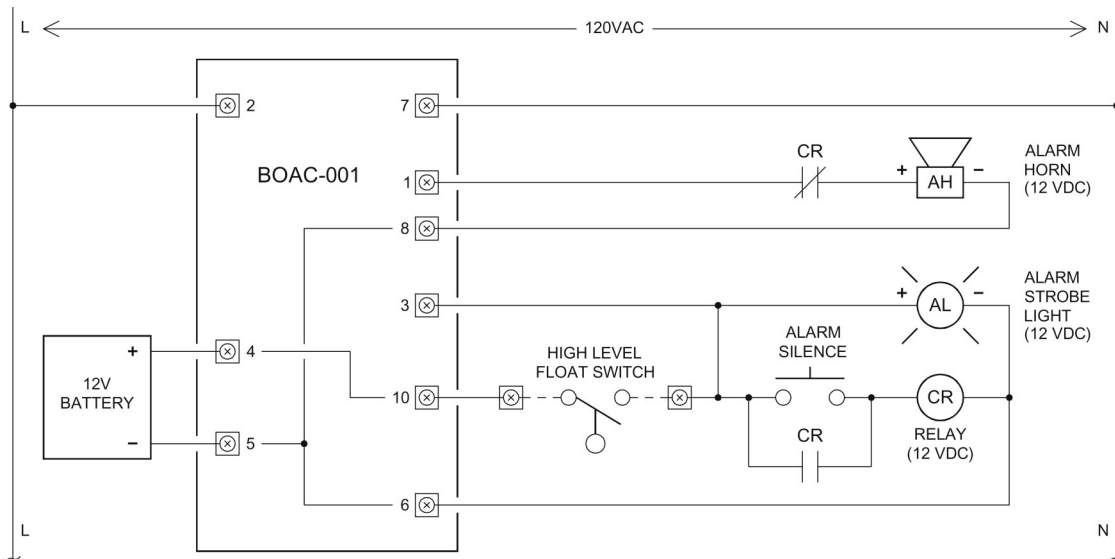
Part Number:
BOAC-001

BOAC

Battery Operated Alarm with Charger

APPLICATION EXAMPLE

The following is an example of how a pushbutton and relay may be connected to the BOAC to provide an alarm horn silence feature:



Notes:

Alarm Silence - In the above example, when there is an alarm condition, pressing the “ALARM SILENCE” pushbutton will energize the control relay (CR) and remove power from the alarm horn. The above circuit has a latch feature formed by having a contact from the control relay wired across the pushbutton. Since the latch is broken when the alarm condition clears, the horn will sound again if the alarm condition returns.

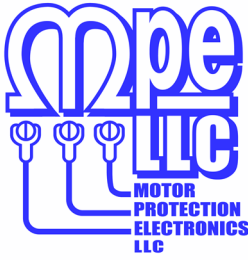
Alarm Light Output Pins 3 & 6 - With the Power Loss Alarm Enabled and upon a loss of 120VAC, the BOAC will provide +12V battery power to Pin 3 to turn on the strobe light. Also, upon a high level alarm, the +12V battery power from Pin 10 will be connected to the strobe light. Pin 6 is connected internally to the battery negative from Pin 5.

Alarm Horn Output Pins 1 & 8 - With the Power Loss Alarm Enabled and upon a loss of 120VAC, the BOAC will provide +12V battery power to Pin 1 to turn on the alarm horn. Also, upon a high level alarm, the +12V battery power from Pin 10 will be connected through the high level float switch to Pin 3. With power connected to Pin 3, the BOAC will turn on the alarm horn output. The output to the horn is always operated intermittently, on for 2 seconds, and then off for 2 seconds. Pin 8 is connected internally to the battery negative from Pin 5.

Alarm Horn Selection - An Electronic or Piezoelectric type horn (such as the Wheelock MT-12/24-R) is required for use with the BOAC. Vibrating electro-mechanical type alarm horns create damaging high voltage transients which cannot be mitigated without affecting the operation of the horn, and therefore must not be used with the BOAC.

Parts Typically used with BOAC-001

Description	Manufacturer	Part Number
Battery, Sealed Lead Acid, 12V, 7 Ah	EnerSys	NP7-12
Alarm Horn, Multitone Electronic, 12-24VDC, Red	Wheelock	MT-12/24-R
Alarm Horn Back Box, Red	Wheelock	IOB-R
Alarm Strobe Light, 12-48VDC, Red	Federal Signal	LP3M-012-048R
Socket (for BOAC-001), 12Pin, Surface Mount, 10A, 600V	Custom Connector	SD12-PC



Pump Monitor Relay PMR1

MADE IN
THE U.S.A.



UL FILE #E101681

OPERATION

The Pump Monitor Relay provides Motor Over Temperature and Seal Leakage alarms for Submersible Pumps.

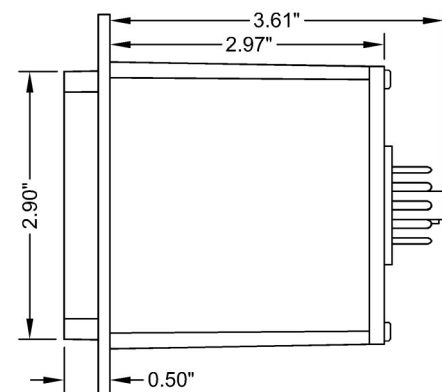
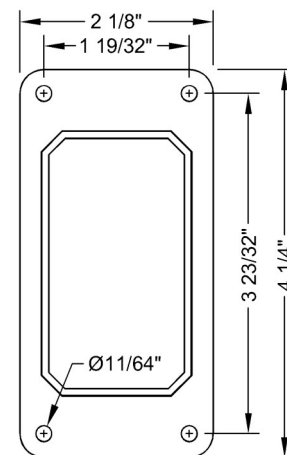
Motor Over Temperature Alarm - The unit applies a low voltage DC signal to the Motor Thermal Sensor to check its status. If the unit detects that the Motor Thermal Sensor contacts are closed (normal condition), the Overtemp indication remains off, and the Overtemp Relay is energized closing the contacts between terminals 2 and 11.

If the Motor Thermal Sensor contacts open (Over Temperature condition), the Overtemp Indication is turned on and the Overtemp Alarm Relay is de-energized opening the contacts between terminals 2 and 11 and closing the contacts between terminals 2 and 1.

When the High Motor Temperature condition has cleared, the unit will reset based on the position of Alarm Reset Mode Select Switch (Auto or Manual). When in the Auto position, the Overtemp Alarm resets automatically. If the switch is in the Manual position, the Overtemp Reset Push-button must be pushed for approximately 1.5 seconds to clear the alarm.

Seal Leakage Alarm - The unit detects moisture inside a pump motor by using a low voltage AC signal to measure the resistance between a single (or dual) Leakage Probe(s) and the grounded motor housing, or across two Leakage Probes. A Seal Leakage condition is considered present when the amount of moisture in the motor causes the resistance between terminal 6 and 5 to drop below the setting on the potentiometer. When this occurs the unit turns on the Leakage Indication and energizes the Leakage Alarm Relay closing the contacts between terminals 9 and 10.

The alarm trip point may be set by the following procedure: Isolate the Leakage Probe(s) from terminals 5 and 6. Connect a resistor, with the desired trip value, across terminals 5 and 6. Slowly adjust the potentiometer to the point where the alarm turns on. Remove the resistor and reconnect to the Leakage Probe(s).



SPECIFICATIONS

Input Power:	120 VAC \pm 10%, 7.0 VA max
Output Rating:	8A Resistive @ 120VAC
Operating Temp:	-20°C to +65 °C
Storage Temp:	-45°C to +85 °C
Temp Sensor Voltage:	6.6 VDC \pm 10%
Leak Sensor Voltage:	4.7 VAC \pm 10%
Enclosure:	White Lexan
Base:	Phenolic

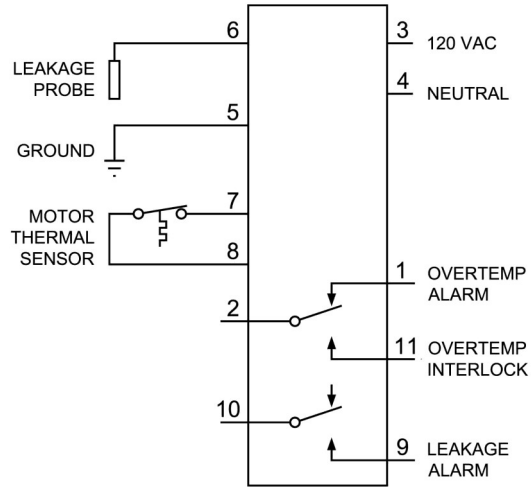
ORDERING INFORMATION

Part Number: PMR1

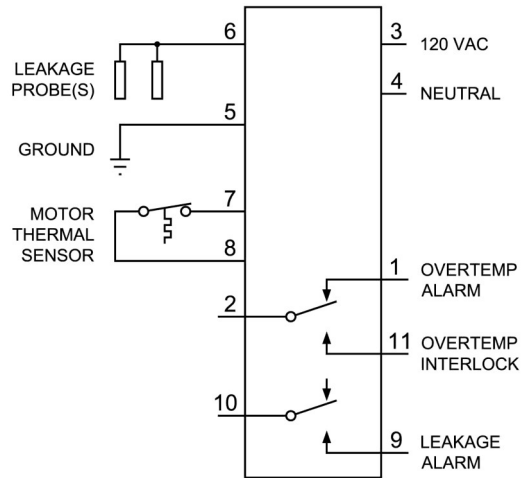
Pump Monitor Relay

CONNECTION DIAGRAMS

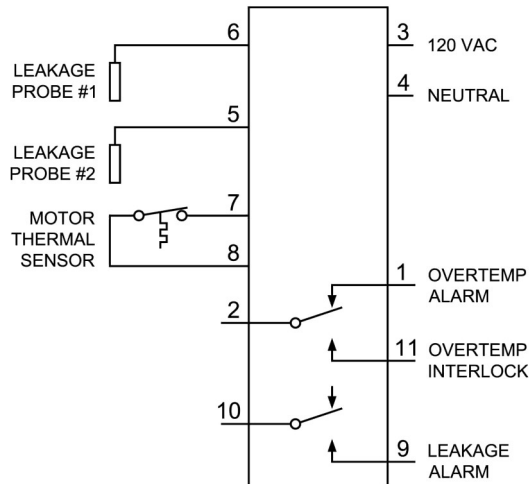
CHECKS RESISTANCE BETWEEN ONE PROBE AND MOTOR HOUSING



CHECKS RESISTANCE BETWEEN TWO PROBES AND MOTOR HOUSING



CHECKS RESISTANCE BETWEEN TWO PROBES





Pump Monitor Relay PMR2

MADE IN
THE U.S.A.



UL FILE #E101681

OPERATION

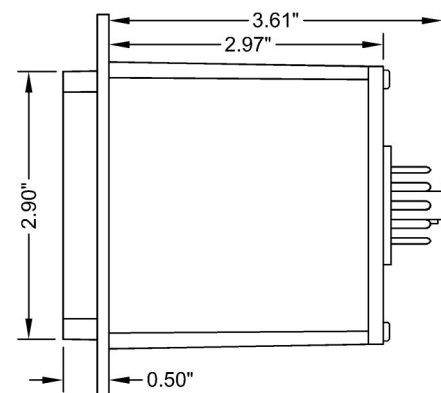
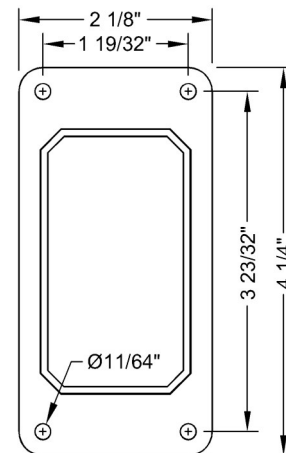
The PMR2 Pump Monitor Relay provides Motor Over Temperature and Seal Leakage alarms for submersible pumps equipped with FLS or CLS sensors.

The PMR2 applies 12 VDC to the sensor and measures the current flow through the sensor. The sensor controls the current in the circuit. If the sensor current is in the normal range the Temperature Alarm Relay is energized to allow normal pump operation. If the sensor circuit becomes shorted, the 12 VDC is turned off and all LEDs flash.

Upon a High Motor Temperature condition, the sensor opens so that the sensor circuit current drops to zero. With the sensor current below the Trip Point ($\leq 3.0 \text{ mA} \pm 5\%$), the Overtemp Indication is turned on and the Temperature Alarm Relay is de-energized, preventing pump operation.

When the High Motor Temperature condition has cleared, the unit will reset based on the position of Alarm Reset Mode Select Switch (Auto or Manual). When in the Auto position, the Overtemp Alarm resets automatically. If the switch is in the Manual position, the Overtemp Reset Push-button must be pushed to clear the alarm.

Upon a Seal Leakage condition, the sensor increases the sensor circuit current above the Trip Point ($\geq 22 \text{ mA} \pm 5\%$), the Leakage Indication is turned on and the Leakage Alarm Relay is energized.



SPECIFICATIONS

Input Power:	120 VAC $\pm 10\%$, 7.0 VA max 24 VAC $\pm 10\%$, 3.5 VA max 24 VDC $\pm 10\%$, 125 mA max
Output Rating:	8A Resistive @ 120VAC
Operating Temp:	-20 °C to +65 °C
Storage Temp:	-45 °C to +85 °C
Sensor Circuit Voltage:	12 VDC $\pm 10\%$
Temp Alarm Trip Point:	$\leq 3.0 \text{ mA} \pm 5\%$
Leak Alarm Trip Point:	$\geq 22 \text{ mA} \pm 5\%$
Enclosure:	Blue Lexan
Base:	Phenolic

ORDERING INFORMATION

Part Number: PMR2



TOUCH SCREEN INTERFACE DEVICE

DESCRIPTION

The Touch Screen Interface Device (TSID) is an optional piece of equipment that is used to perform troubleshooting, customization, and Demo of SCADA features for the following MPE products:

DUPLEXER

INTRINSICALLY SAFE DUPLEXER (ISD)

WIRELESS TRANSDUCER

Typical Uses of the Touch Screen Interface Device:

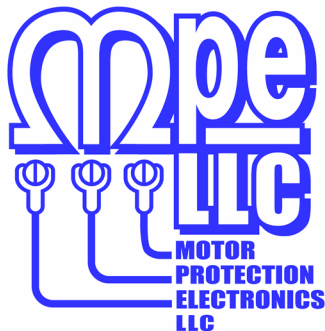
- View Status of Discrete and Analog I / O
- Setup of Parameters Such As:
 - Pump Up / Down Mode
 - Lag Pump Delay
 - Level Input Sensitivity
 - SCADA Communication
- View and Reset Fault Codes
- Demo SCADA Features

The Touch Screen Interface Device (TSID) consists of a 6 inch Touch Screen panel made by Automation Direct, housed in a durable carrying case with a power cord and an interface cable for connection to the serial port. It is programmed as a Modbus Master that continually polls the device it's connected to.



ORDERING INFORMATION

Part Number: **TSID**



INTRINSICALLY SAFE RELAY

MADE IN
THE U.S.A.

FEATURES:

LED Indicator
Surge Protection
Relay Contact Output
Din Rail Mounting Socket Included



OPERATION

The Intrinsically Safe Relay provides a safe and reliable method of load control when interfaced with a contact closure in a hazardous location. When the control switch input is closed between pins 1 and 8, the output relay becomes energized, and the LED is illuminated. When the control switch input is open, the output relay is de-energized, and the LED is turned off.

TYPICAL APPLICATIONS

Lift station controls where intrinsic safety is required.

Anywhere an interface is required where the contact closure is in a hazardous location and the controls are in a non-hazardous location.

SPECIFICATIONS

Operating Voltage:	120 VAC, $\pm 10\%$, 50/60 Hz
Output Rating:	10A @ 120VAC Resistive
Power Consumption:	1.25VA
Operating Temp:	-20 to +60 °C
Storage Temp:	-45 to +85 °C
Enclosure:	Lexan
Base:	8 Pin, Round
Socket:	8 Pin, Din Rail Mount with Special Locking Tab



73VL
UL913

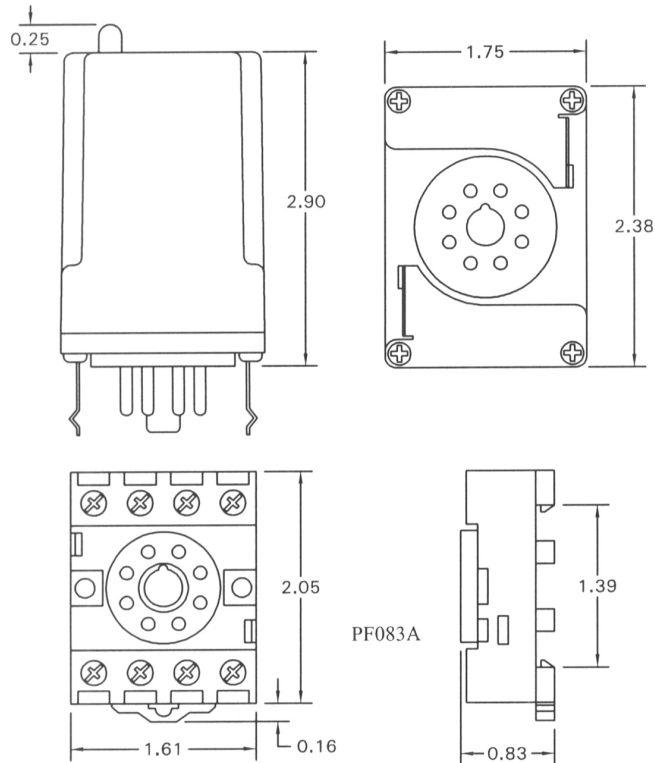
UL FILE
#E189808

This associated apparatus provides intrinsically safe circuits for use in Class I, Groups A, B, C, D Class II, Groups E, F, G and Class III - Hazardous Locations in accordance with the M.P.E. drawing Number 0301.

ORDERING INFORMATION

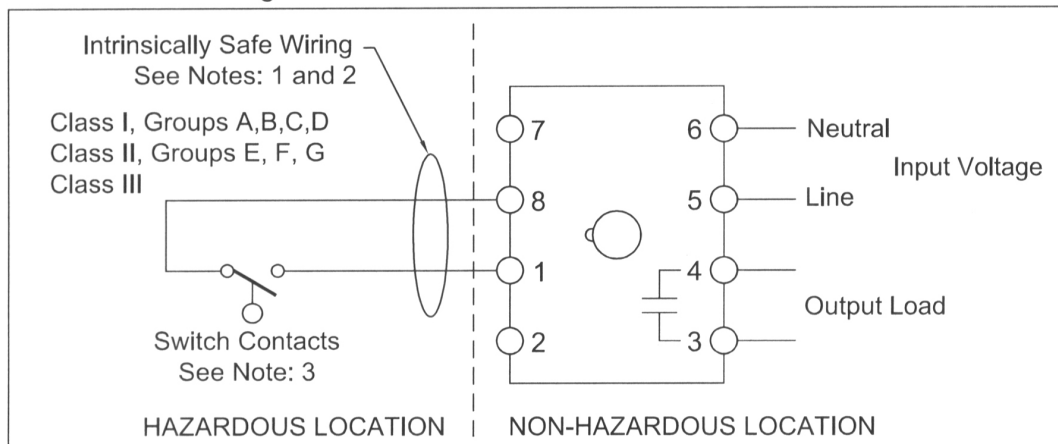
Part Number: **030 -120 -118**

INTRINSICALLY SAFE RELAY



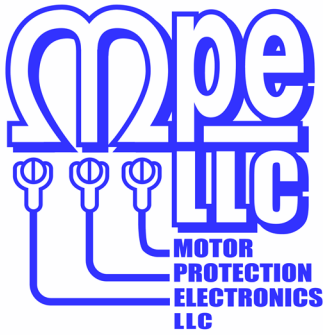
UL Control Drawing No. 0301

Revision Date: 3-28-05



Notes for UL Control Drawing 0301:

1. All intrinsically safe wiring shall be separated from non-intrinsically safe wiring. Refer to article 504 of the National Electric Code (ANSI/NFPA 70) for installation of intrinsically safe wiring.
2. Maximum distance between unit and switch contacts is 1000 feet.
3. Switch contact shall be any non-energy storing or generating switch type device containing no capacitance or inductance.
4. Device must be installed in MPE socket P/N DS-8-A or PF083A **and** with locking clips attached to base.
5. Cable capacitance plus intrinsically safe equipment capacitance (C_i) must be less than the marked capacitance (C_a) and cable inductance plus intrinsically safe equipment inductance (L_i) must be less than the marked inductance (L_a) shown any barrier.
6. The simple apparatus (Float Switch) connected to the ISR shall not be mounted on other electrical apparatus that has a voltage and current rating higher than the ISR (See Entity Parameters V_{oc} and I_{sc} below). A simple apparatus (Such as a Float Switch) is defined as an electrical component or combination of components of simple construction with well defined electrical parameters that does not generate more than 1.5V, 100mA and 25mW, or a passive component that does not dissipate more than 1.3W and is compatible with the intrinsic safety of the circuit in which it is used.
7. If the electrical parameters of the cable are unknown, then a capacitance value of 60pF/ft – and an inductance of 0.20uH/ft are to be used.
8. Entity Parameters: $V_{oc} = 9.33V$ $I_{sc} = 0.218mA$ $C_a = 3.6\mu F$ $L_a = 100mH$



INTRINSICALLY SAFE BARRIER ISB10



UL 913

UL FILE
#E189808

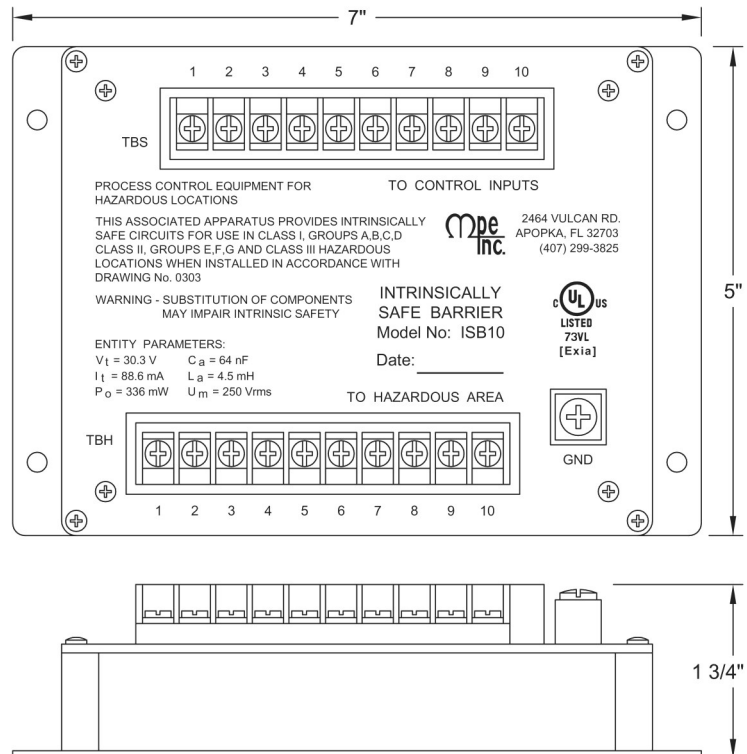
This associated apparatus provides intrinsically safe circuits for use in Class I, Groups A, B, C, D Class II, Groups E, F, G and Class III Hazardous Locations when installed in accordance with drawing No. 0303.

TYPICAL APPLICATIONS

For use with any of MPE's conductance probes where intrinsic safety is required.

DESCRIPTION

The ISB10 provides an intrinsically safe barrier between a 10 channel conductance probe in a hazardous location and pump controls in a non-hazardous area. The barrier is designed to allow the level sense signal ($\pm 12V$ square wave) from the pump control device to pass through unchanged. If an accident or malfunction occurs in the control panel that would potentially connect spark-inducing energy to the probe wiring in the wet well, the barrier clamps to limit the voltage and current to a safe level. The barrier has a fuse in each channel that is capable of disconnecting the barrier from a high energy source that may be present in the control panel.



SPECIFICATIONS

Operating Temp:	-20 to +60 °C
Storage Temp:	-45 to +85 °C
Enclosure:	Aluminum
Rated Operating Voltage:	$\pm 12.0 V$
Barrier Clamp Voltage:	$\pm 15.15 V$
Internal Resistance:	1.92 k Ω Nominal Per Channel

ENTITY PARAMETERS

$V_t = 30.3 V$	$C_a = 64 nF$
$I_t = 88.6 mA$	$L_a = 4.5 mH$
$P_o = 336 mW$	$U_m = 250 Vrms$

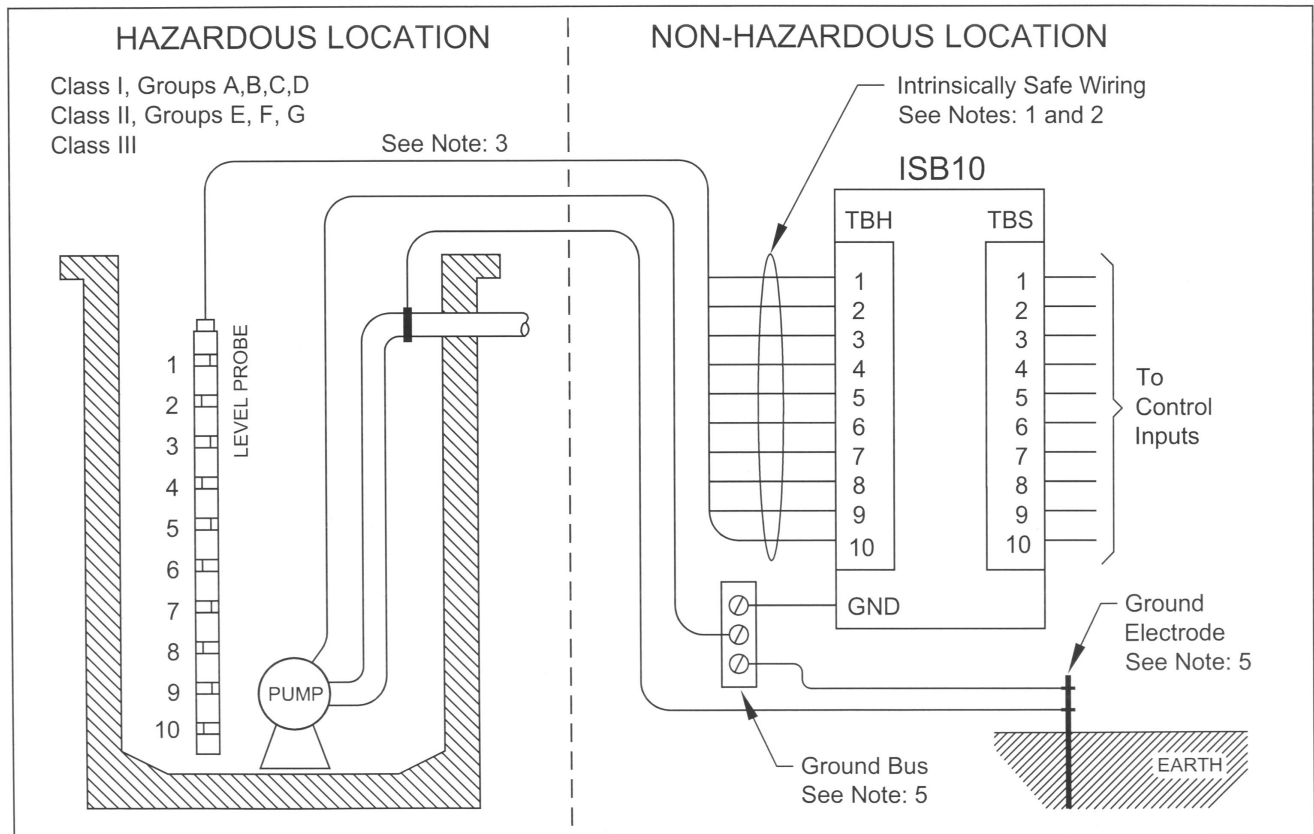
ORDERING INFORMATION

Model Number: **ISB10**

INTRINSICALLY SAFE BARRIER ISB10

Control Drawing No. 0303 Page 1 of 2

TYPICAL LIFT STATION APPLICATION



Notes for Control Drawing 0303 Page 1 of 2:

1. All intrinsically safe wiring shall be separated from non-intrinsically safe wiring. Refer to article 504.2 of the National Electric Code (ANSI/NFPA 70), Section 18 of the Canadian Electric Code, or other local codes, as applicable.
2. Maximum distance between Barrier and Probe is 100 feet.
3. The Probe's cable capacitance plus the Probe's intrinsically safe equipment capacitance (C_i) must be less than the marked capacitance of the Barrier (C_a). Also, the Probe's cable inductance plus Probe's intrinsically safe equipment Inductance (L_i) must be less than the marked inductance (L_a) shown on Barrier. If the electrical parameters of the cable are unknown, then a capacitance value of 60 pF/ft – and an inductance of 0.20 μ H/ft are to be used. Cable capacitance and cable inductance are calculated as follows: 60 pF/ft x 100 ft = 6 nF 0.2 μ H/ft x 100 ft = 20 μ H
4. The Barrier must be installed in an enclosure suitable for the application in accordance with the National Electric Code (ANSI/NFPA 70) for installation in the United States, the Canadian Electrical Code for installations in Canada, or other local codes, as applicable.
5. The hazardous location ground and the Barrier ground must be connected to the ground bus in the power distribution panel. The ground bus must be connected to a suitable ground electrode per the National Electric Code (ANSI/NFPA 70), Section 18 of the Canadian Electric Code, or other local codes, as applicable. The resistance of the ground path from the Barrier to the ground electrode must be less than 1 Ohm.
6. The Barrier must not be connected to devices that use or generate more than 250 Vrms or dc with respect to earth.
7. This associated apparatus (Barrier) has not been evaluated for use in combination with another associated apparatus.

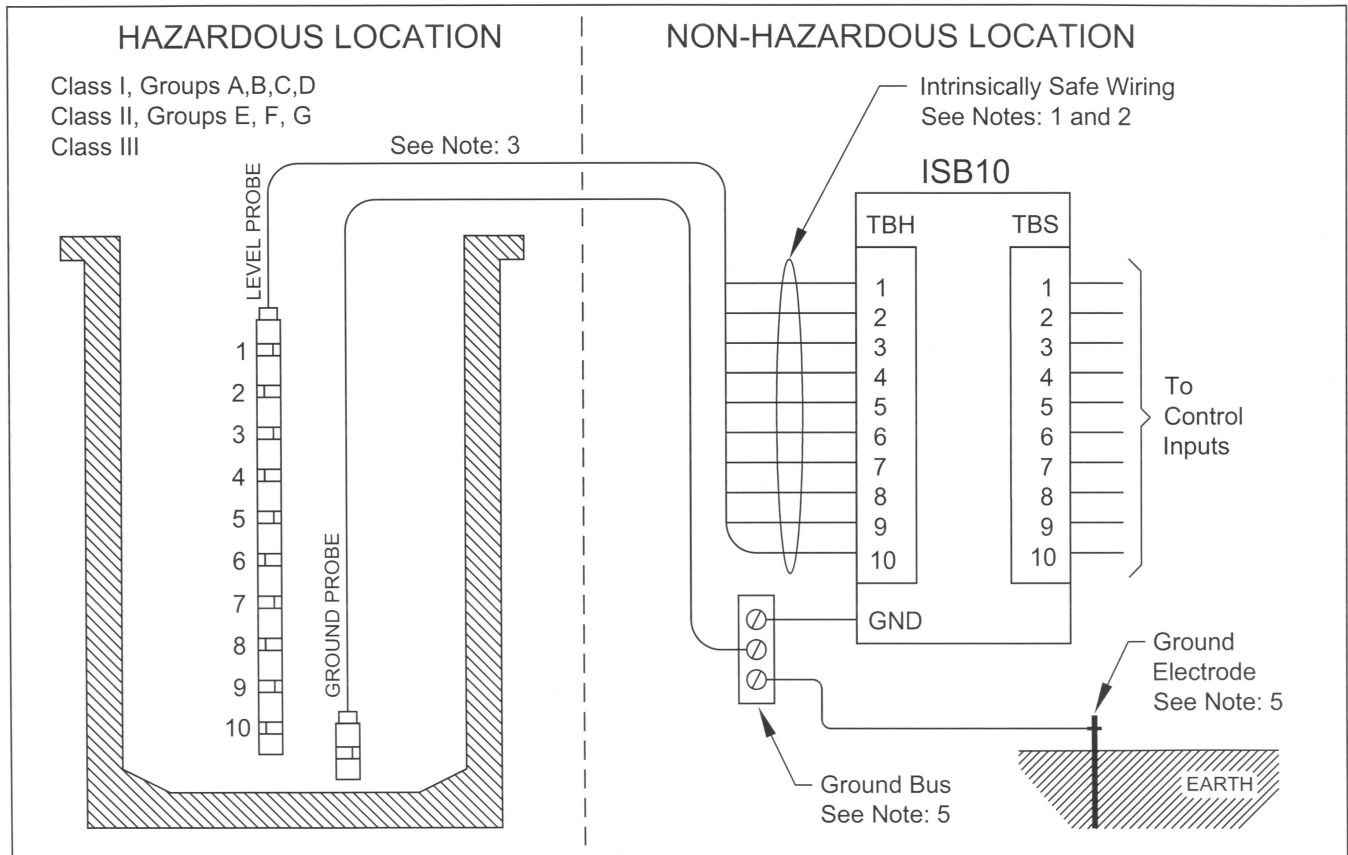
Barrier Entity Parameters: $V_t = 30.3\text{V}$ $I_t = 88.6\text{mA}$ $C_a = 64\text{nF}$ $L_a = 4.5\text{mH}$ $P_o = 336\text{mW}$ $U_m = 250\text{Vrms}$

Revision Date: 6-19-15

INTRINSICALLY SAFE BARRIER ISB10

Control Drawing No. 0303 Page 2 of 2

UNGROUNDING TANK APPLICATION

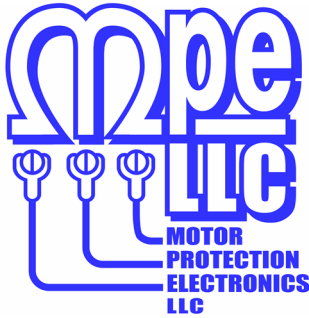


Notes for Control Drawing 0303 Page 2 of 2:

1. All intrinsically safe wiring shall be separated from non-intrinsically safe wiring. Refer to article 504.2 of the National Electric Code (ANSI/NFPA 70), Section 18 of the Canadian Electric Code, or other local codes, as applicable.
2. Maximum distance between Barrier and Probe is 100 feet.
3. The Probe's cable capacitance plus the Probe's intrinsically safe equipment capacitance (C_i) must be less than the marked capacitance of the Barrier (C_a). Also, the Probe's cable inductance plus Probe's intrinsically safe equipment Inductance (L_i) must be less than the marked inductance (L_a) shown on Barrier. If the electrical parameters of the cable are unknown, then a capacitance value of 60 pF/ft – and an inductance of 0.20 μ H/ft are to be used. Cable capacitance and cable inductance are calculated as follows: 60 pF/ft x 100 ft = 6 nF 0.2 μ H/ft x 100 ft = 20 μ H
4. The Barrier must be installed in an enclosure suitable for the application in accordance with the National Electric Code (ANSI/NFPA 70) for installation in the United States, the Canadian Electrical Code for installations in Canada, or other local codes, as applicable.
5. The hazardous location ground probe and the Barrier ground must be connected to the ground bus in the power distribution panel. The ground bus must be connected to a suitable ground electrode per the National Electric Code (ANSI/NFPA 70), Section 18 of the Canadian Electric Code, or other local codes, as applicable. The resistance of the ground path from the Barrier to the ground electrode must be less than 1 Ohm.
6. The Barrier must not be connected to devices that use or generate more than 250 Vrms or dc with respect to earth.
7. This associated apparatus (Barrier) has not been evaluated for use in combination with another associated apparatus.

Barrier Entity Parameters: $V_t = 30.3V$ $I_t = 88.6mA$ $C_a = 64nF$ $L_a = 4.5mH$ $P_o = 336mW$ $U_m = 250Vrms$

Revision Date: 6-19-15



INTRINSICALLY SAFE DUPLEXER

MADE IN
THE U.S.A.

DESCRIPTION

The Intrinsically Safe Duplexer, ISD, is a low cost SCADA ready intrinsically safe pump controller designed to perform level control for duplex lift station applications.

The controller's level inputs may be connected to either five float switches, five single point conductance probes, or five selected points on a ten point conductance probe.

The level inputs are intrinsically safe and allow maintenance personnel to safely handle the float switches or conductance probes while the unit is in operation.

The unit provides a 10 second power-up start delay, a 5 second lag pump delay, and duplex alternation.

The unit has LEDs that show power on status, level input status, pump call status, high & low alarm status, and level input out-of-sequence indication.

Relay contacts are provided for the pump 1 & 2 call, and high & low level alarm outputs.

Toggle switches allow the operator to set the Hand, Off, or Auto mode for each pump, to select automatic alternation, or to set one pump as lead.

Level simulation (Push-to-Test) is accomplished by pressing and holding the push-button. Releasing the push-button allows the simulated level to return to normal.

The high level status indication latches upon high level, until reset by pressing the reset push-button (the high level relay does not stay latched).

The out-of-sequence logic detects when the inputs fail to close in the correct order. The logic also compensates for most out-of-sequence conditions and allows for continued pump operation.

Connecting the RS-232 serial port (or optional Ethernet Port) to a SCADA system allows the lift station to be monitored and controlled remotely.

The Low level input operates as a redundant off.

Additional setup and troubleshooting features are available using the separately supplied Touch Screen Interface Device (TSID).



UL 913

UL FILE #E189808

This associated apparatus provides intrinsically safe circuits for use in Class I, Groups A, B, C, D Class II, Groups E, F, G and Class III – Hazardous locations in accordance with the UL Control Drawing No. 0302.

SPECIFICATIONS

Input Power:	120VAC \pm 10%, 7.7 VA max
Agency Approvals:	UL 913, CAN/CSA
Ambient Operating Temperature:	-20°C to +60°C (-4°F to +140°F)
Indicators:	LED
Color:	White with Blue Silkscreen
Relays:	6A @ 120VAC
Enclosure Material:	Aluminum

ORDERING INFORMATION

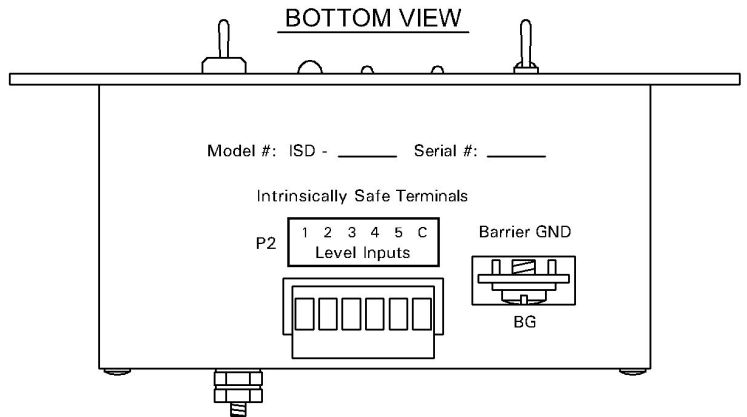
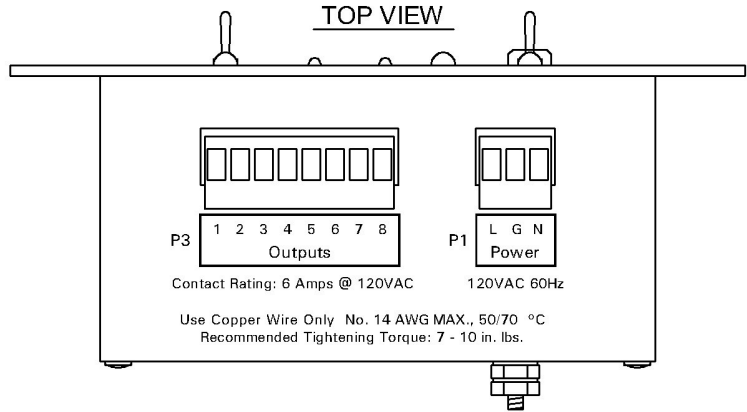
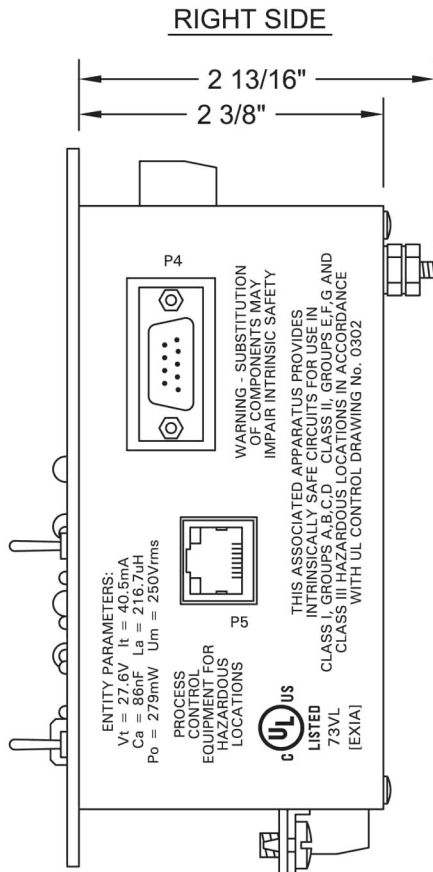
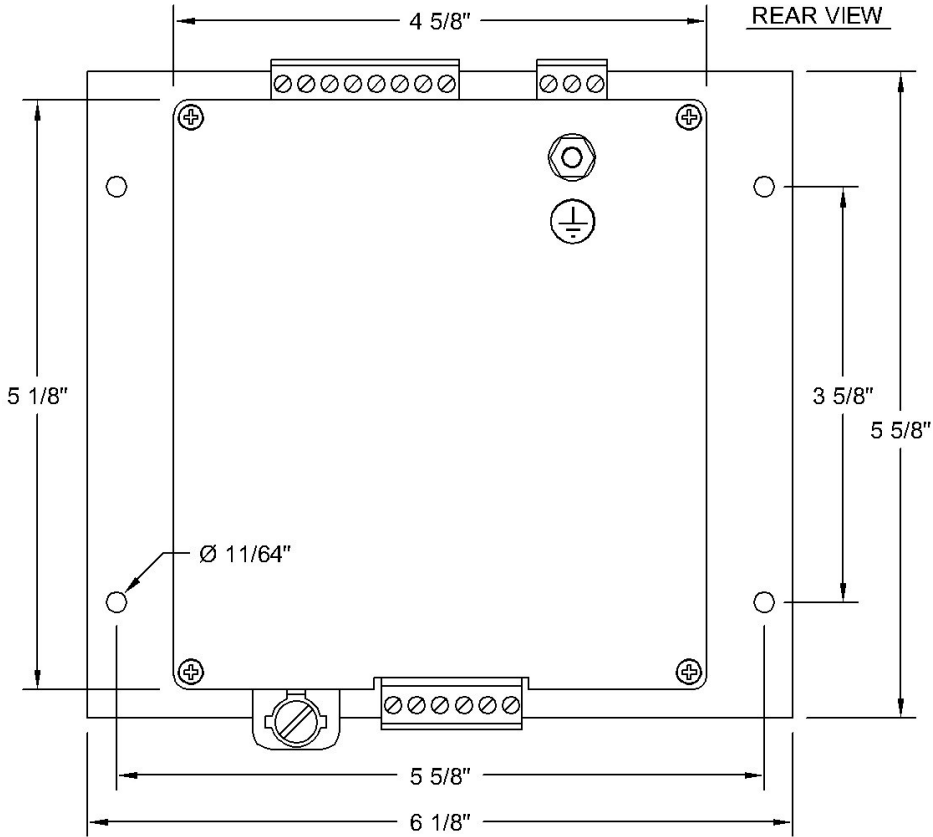
Product Type ISD - X X
 Mounting Options _____
 Communications Option _____

Case Options: S = Surface Mount
 D = Din Rail Mount
 P = Panel Mount

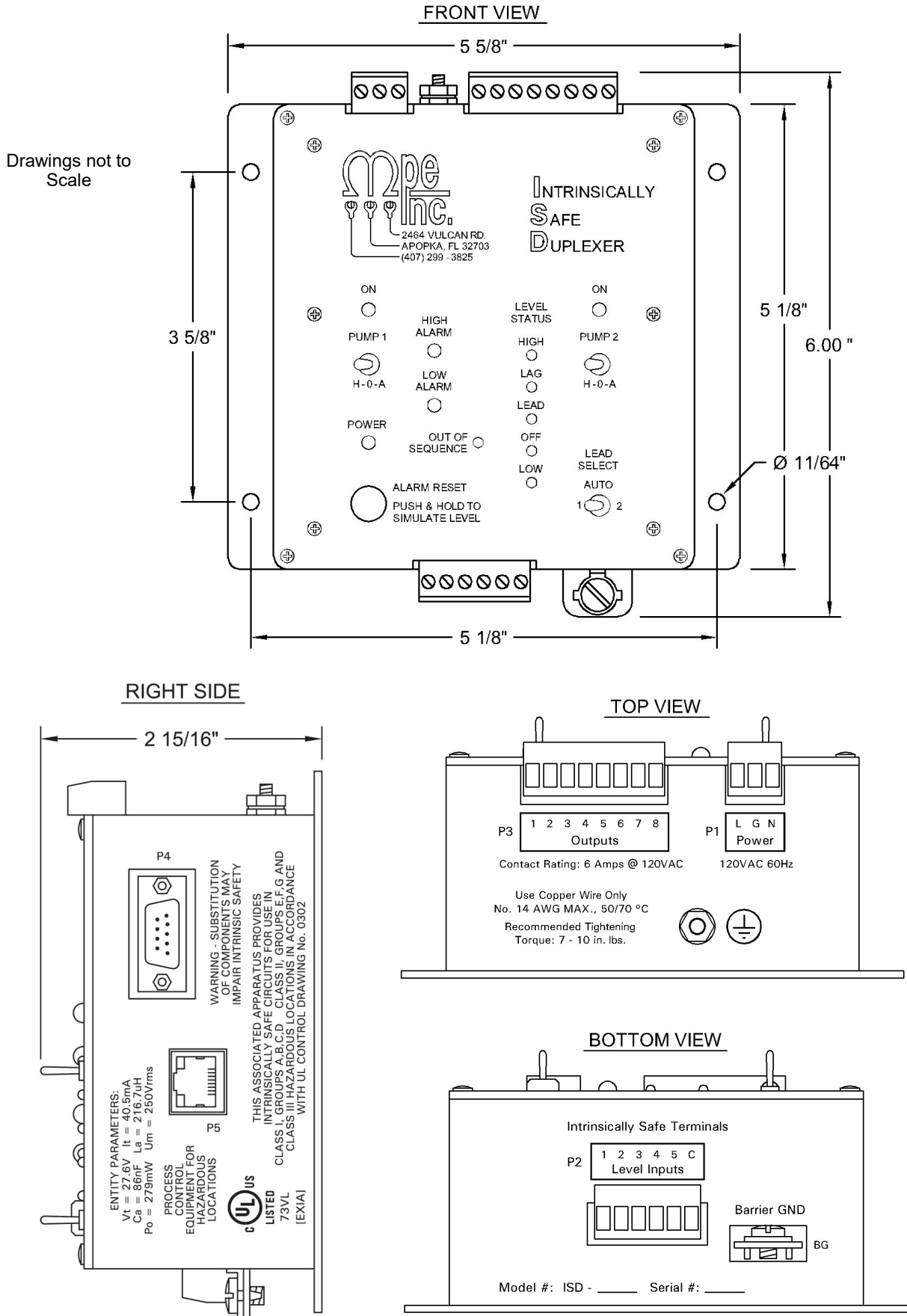
Communications Option: Blank = Standard Unit
 E = Ethernet Port

INTRINSICALLY SAFE DUPLEXER - PANEL MOUNT VERSION

Drawings not to Scale

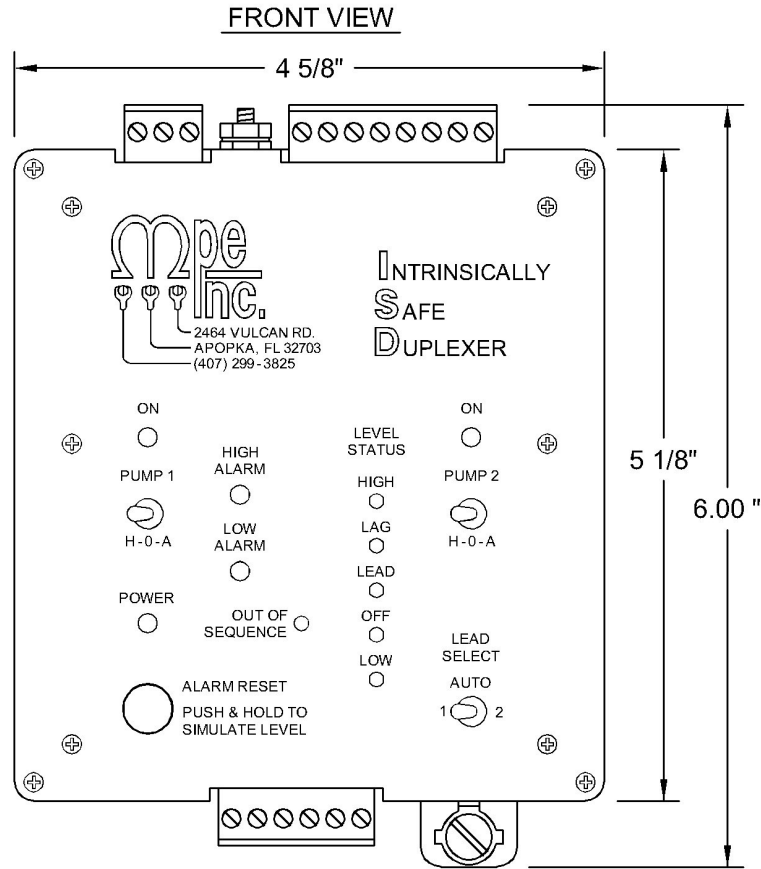


INTRINSICALLY SAFE DUPLEXER - SURFACE MOUNT VERSION

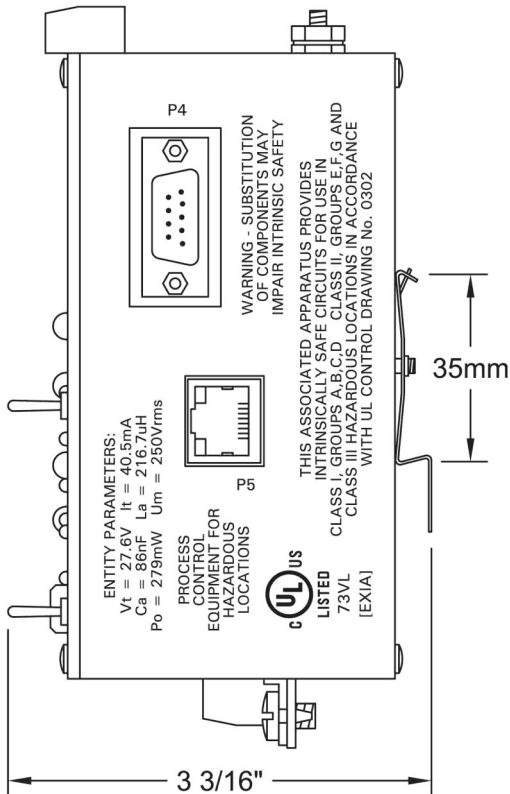


INTRINSICALLY SAFE DUPLEXER - DIN RAIL MOUNT VERSION

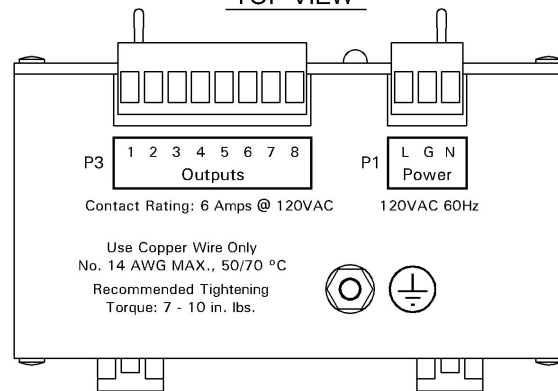
Drawings not to Scale



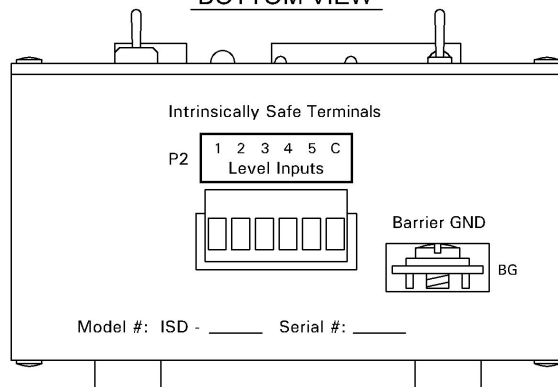
RIGHT SIDE



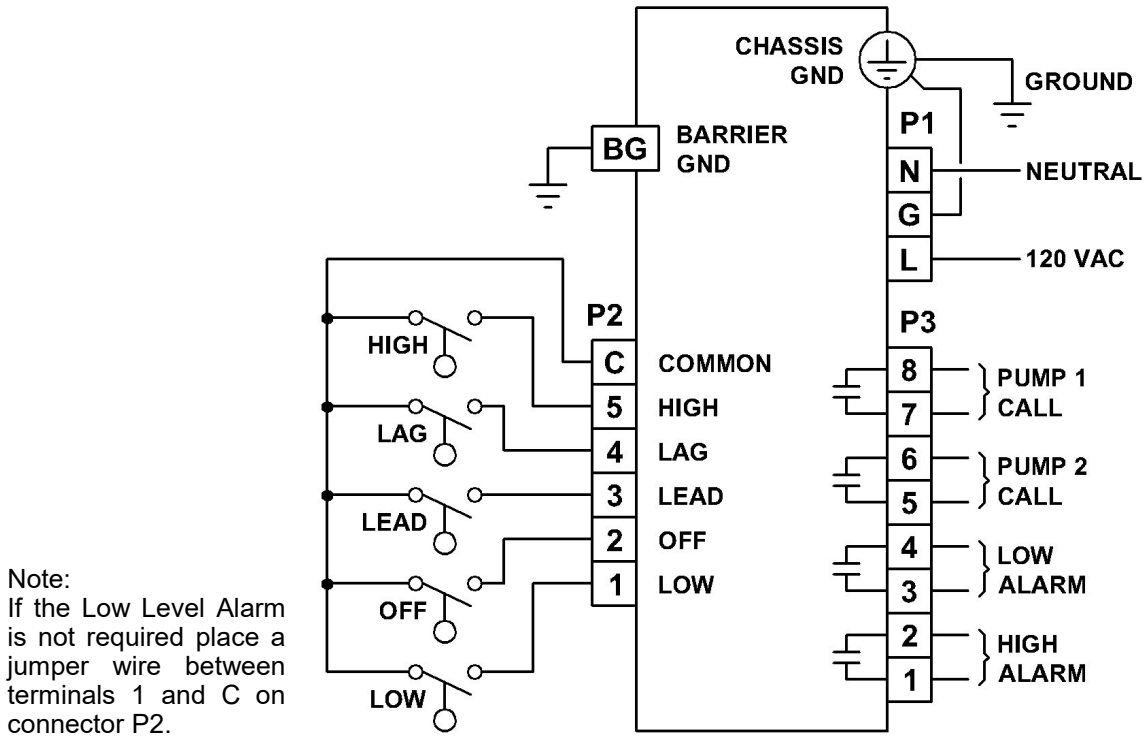
TOP VIEW



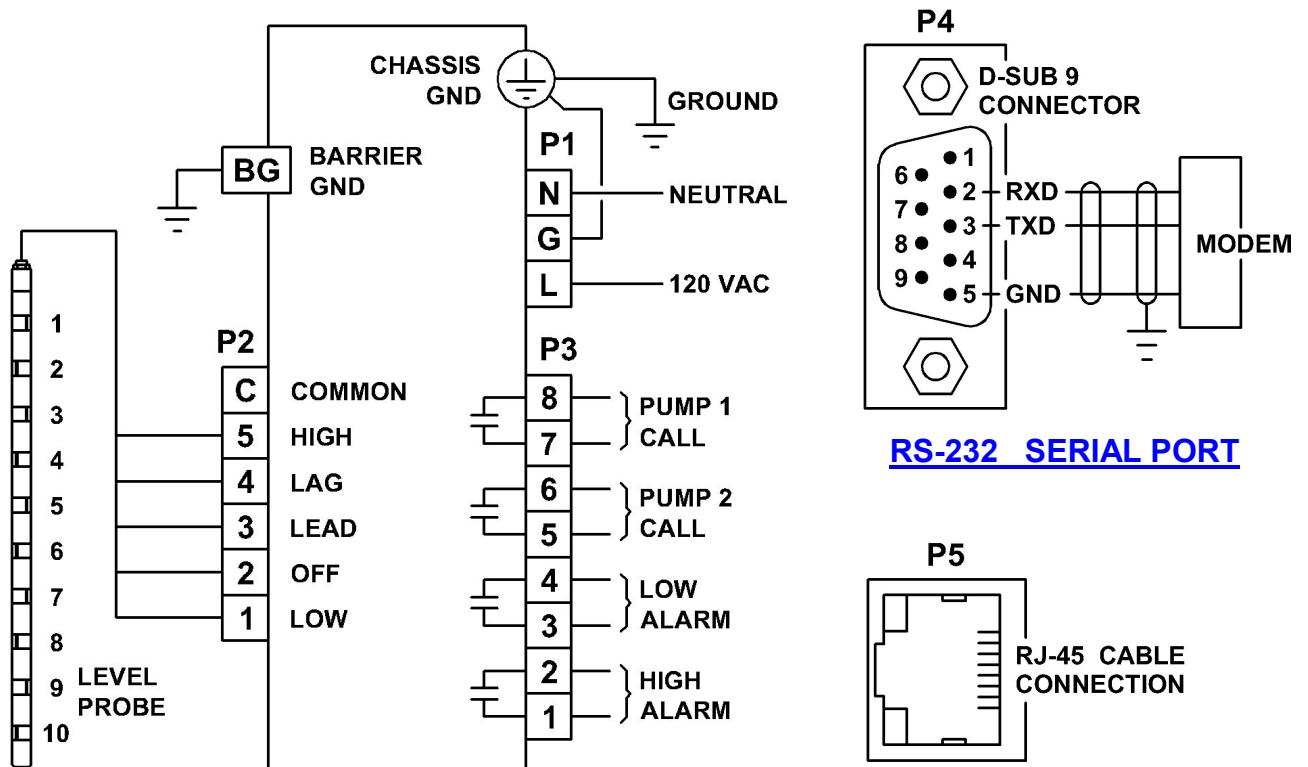
BOTTOM VIEW



INTRINSICALLY SAFE DUPLEXER



CONNECTION DIAGRAM - FLOAT SWITCH



CONNECTION DIAGRAM - LEVEL PROBE

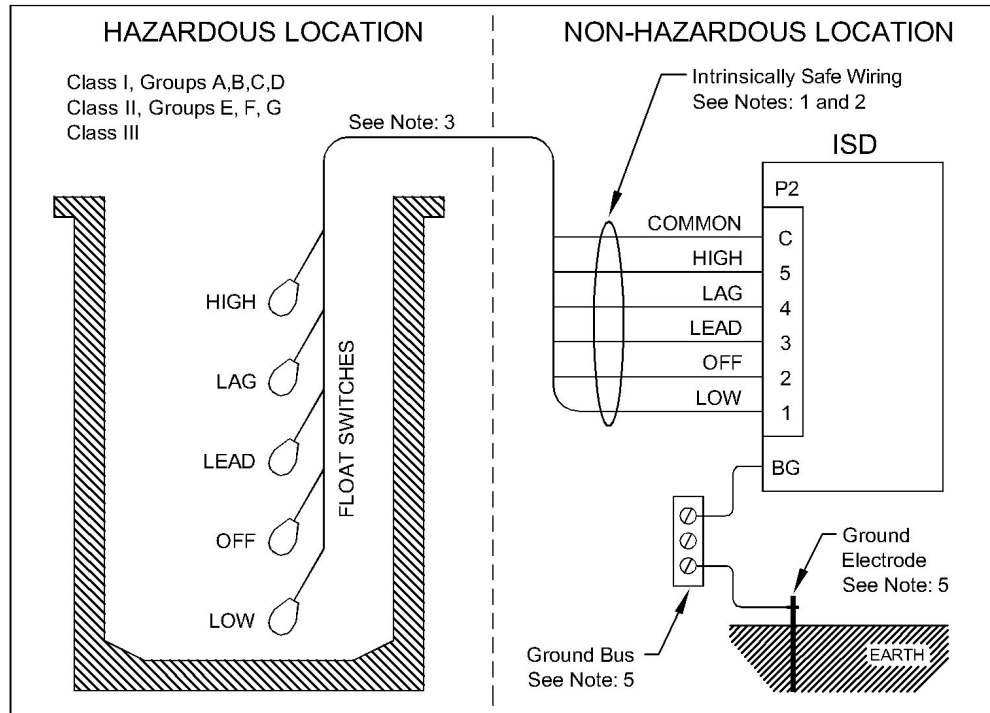
RS-232 SERIAL PORT

Optional ETHERNET PORT

INTRINSICALLY SAFE DUPLEXER ISD

Control Drawing No. 0302 Page 1 of 3

FLOAT SWITCH APPLICATION



Notes for Control Drawing 0302 Page 1 of 3:

1. All intrinsically safe wiring shall be separated from non-intrinsically safe wiring. Refer to article 504.2 of the National Electric Code (ANSI/NFPA 70) or other local codes, as applicable.
2. Maximum distance between ISD and Float Switches is 1000 feet.
3. The Float Switches used with the ISD shall be any non-energy storing or generating switch type device containing no capacitance or inductance. The Float Switch's cable capacitance plus its equipment capacitance (C_i) must be less than the capacitance (C_a) marked on the ISD. Also, the Float Switch's cable inductance plus its equipment inductance (L_i) must be less than the inductance (L_a) marked on the ISD. If the electrical parameters of the cable are unknown, then a capacitance value of 60 pF/ft – and an inductance of 0.20 μ H/ft are to be used. Cable capacitance and cable inductance are calculated as follows: 60 pF/ft x 1000 ft = 60 nF 0.2 μ H/ft x 1000 ft = 0.20 mH
4. The ISD must be installed in an enclosure suitable for the application in accordance with the National Electric Code (ANSI/NFPA 70) for installation in the United States, the Canadian Electrical Code for installations in Canada, or other local codes, as applicable.
5. The ISD barrier ground must be connected to the ground bus in the power distribution panel. The ground bus must be connected to a suitable ground electrode per the National Electric Code (ANSI/NFPA 70) or other local codes, as applicable. The resistance of the ground path from the ISD barrier ground to the ground electrode must be less than 1 Ohm.
6. The ISD must not be connected to devices that use or generate more than 250 Vrms or dc with respect to earth.
7. This associated apparatus (ISD) has not been evaluated for use in combination with another associated apparatus.
8.
 - A. For installations in which both the C_i and L_i of the intrinsically safe apparatus exceeds 1% of the C_o and L_o parameters of the associated apparatus (excluding the cable), then 50% of C_o and L_o parameters are applicable and shall not be exceeded.
 - B. The output current of this associated apparatus is limited by a resistor such that the output voltage-current plot is a straight line drawn between open-circuit voltage and short-circuit current.

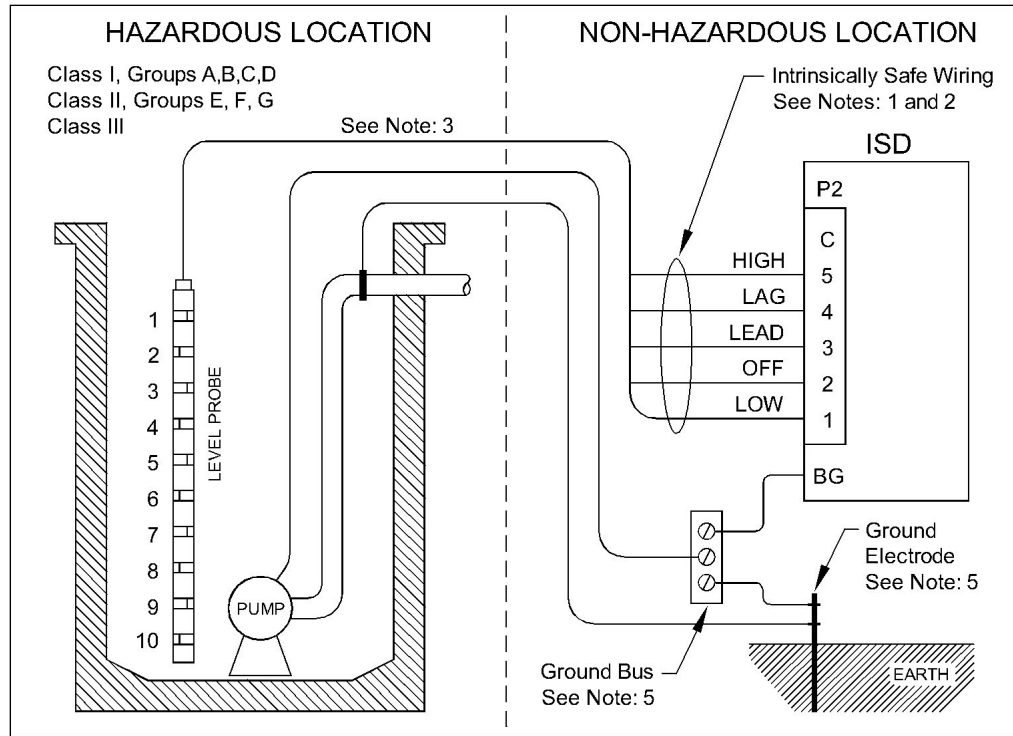
ISD Entity Parameters: $V_t = 27.6$ V $I_t = 40.5$ mA $C_a = 86$ nF $L_a = 216.7$ μ H $P_o = 279$ mW $U_m = 250$ Vrms

Revision Date: 9-23-10

INTRINSICALLY SAFE DUPLEXER ISD

Control Drawing No. 0302 Page 2 of 3

GROUNDED TANK APPLICATION



Notes for Control Drawing 0302 Page 2 of 3:

1. All intrinsically safe wiring shall be separated from non-intrinsically safe wiring. Refer to article 504.2 of the National Electric Code (ANSI/NFPA 70) or other local codes, as applicable.
2. Maximum distance between ISD and Probe is 1000 feet.
3. The Probe's cable capacitance plus the Probe's intrinsically safe equipment capacitance (C_i) must be less than the capacitance (C_a) marked on the ISD. Also, the Probe's cable inductance plus the Probe's intrinsically safe equipment Inductance (L_i) must be less than the inductance (L_a) marked on the ISD. If the electrical parameters of the cable are unknown, then a capacitance value of 60 pF/ft – and an inductance of 0.20 μ H/ft are to be used. Cable capacitance and cable inductance are calculated as follows:

$$60 \text{ pF/ft} \times 1000 \text{ ft} = 60 \text{ nF}$$

$$0.2 \mu\text{H/ft} \times 1000 \text{ ft} = 0.20 \text{ mH}$$
4. The ISD must be installed in an enclosure suitable for the application in accordance with the National Electric Code (ANSI/NFPA 70) for installation in the United States, the Canadian Electrical Code for installations in Canada, or other local codes, as applicable.
5. The hazardous location ground and the ISD barrier ground must be connected to the ground bus in the power distribution panel. The ground bus must be connected to a suitable ground electrode per the National Electric Code (ANSI/NFPA 70) or other local codes, as applicable. The resistance of the ground path from the ISD barrier ground to the ground electrode must be less than 1 Ohm.
6. The ISD must not be connected to devices that use or generate more than 250 Vrms or dc with respect to earth.
7. This associated apparatus (ISD) has not been evaluated for use in combination with another associated apparatus.
8.
 - A. For installations in which both the C_i and L_i of the intrinsically safe apparatus exceeds 1% of the C_o and L_o parameters of the associated apparatus (excluding the cable), then 50% of C_o and L_o parameters are applicable and shall not be exceeded.
 - B. The output current of this associated apparatus is limited by a resistor such that the output voltage-current plot is a straight line drawn between open-circuit voltage and short-circuit current.

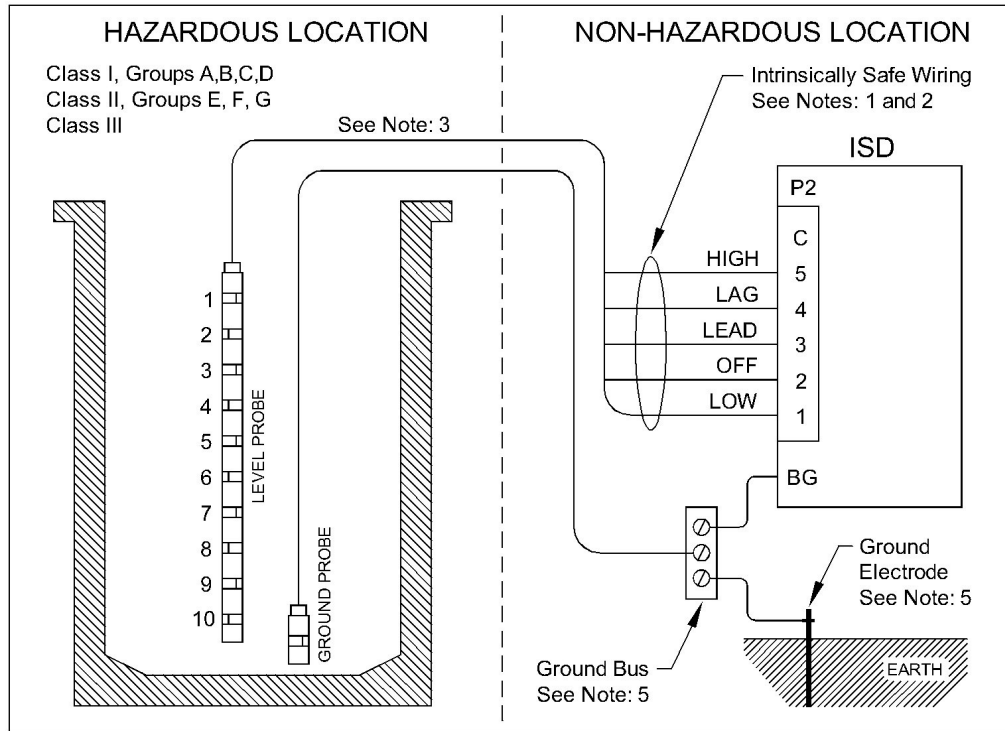
ISD Entity Parameters: $V_t = 27.6 \text{ V}$ $I_t = 40.5 \text{ mA}$ $C_a = 86 \text{ nF}$ $L_a = 216.7 \mu\text{H}$ $P_o = 279 \text{ mW}$ $U_m = 250 \text{ Vrms}$

Revision Date: 9-23-10

INTRINSICALLY SAFE DUPLEXER ISD

Control Drawing No. 0302 Page 3 of 3

UNGROUNDING TANK APPLICATION

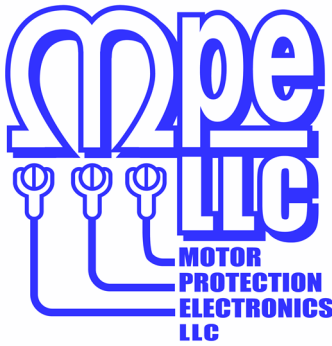


Notes for Control Drawing 0302 Page 3 of 3:

1. All intrinsically safe wiring shall be separated from non-intrinsically safe wiring. Refer to article 504.2 of the National Electric Code (ANSI/NFPA 70) or other local codes, as applicable.
2. Maximum distance between ISD and Probe is 1000 feet.
3. The Probe's cable capacitance plus the Probe's intrinsically safe equipment capacitance (C_i) must be less than the capacitance (C_a) marked on the ISD. Also, the Probe's cable inductance plus the Probe's intrinsically safe equipment Inductance (L_i) must be less than the inductance (L_a) marked on the ISD. If the electrical parameters of the cable are unknown, then a capacitance value of 60 pF/ft – and an inductance of 0.20 μ H/ft are to be used. Cable capacitance and cable inductance are calculated as follows: $60 \text{ pF/ft} \times 1000 \text{ ft} = 60 \text{ nF}$
 $0.2 \mu\text{H/ft} \times 1000 \text{ ft} = 0.20 \text{ mH}$
4. The ISD must be installed in an enclosure suitable for the application in accordance with the National Electric Code (ANSI/NFPA 70) for installation in the United States, the Canadian Electrical Code for installations in Canada, or other local codes, as applicable.
5. The hazardous location ground and the ISD barrier ground must be connected to the ground bus in the power distribution panel. The ground bus must be connected to a suitable ground electrode per the National Electric Code (ANSI/NFPA 70) or other local codes, as applicable. The resistance of the ground path from the ISD barrier ground to the ground electrode must be less than 1 Ohm.
6. The ISD must not be connected to devices that use or generate more than 250 Vrms or dc with respect to earth.
7. This associated apparatus (ISD) has not been evaluated for use in combination with another associated apparatus.
8. A. For installations in which both the C_i and L_i of the intrinsically safe apparatus exceeds 1% of the C_o and L_o parameters of the associated apparatus (excluding the cable), then 50% of C_o and L_o parameters are applicable and shall not be exceeded.
B. The output current of this associated apparatus is limited by a resistor such that the output voltage-current plot is a straight line drawn between open-circuit voltage and short-circuit current.

ISD Entity Parameters: $V_t = 27.6 \text{ V}$ $I_t = 40.5 \text{ mA}$ $C_a = 86 \text{ nF}$ $L_a = 216.7 \mu\text{H}$ $P_o = 279 \text{ mW}$ $U_m = 250 \text{ Vrms}$

Revision Date: 9-23-10



SIMPLEXER



UL FILE # E101681

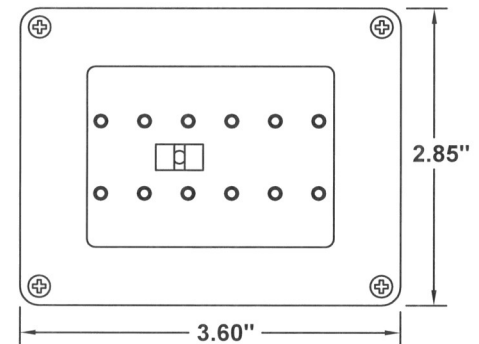
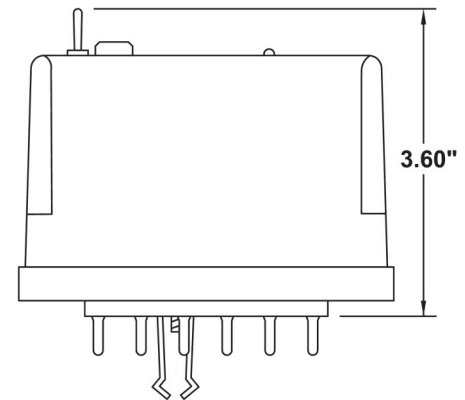


FEATURES

Float or Conductance Probe Level Inputs
 Level Input Indication
 Pump Call Indication
 High Level Alarm Indication
 Surge Protected Level Inputs
 Level Simulation / Alarm Silence Push-Button
 HOA Switch
 Pump Call Relay
 High Level Alarm Light Relay
 High Level Alarm Horn Relay
 RS232 Serial Port with Modbus Protocol

UL Listed only
 When used with
 SD12-PC socket.

**MADE IN
 THE U.S.A.**

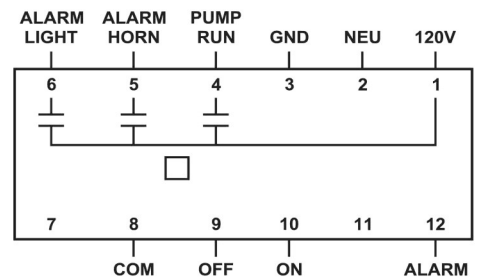


DESCRIPTION

The SIMPLEXER is a low cost SCADA ready pump controller designed to perform level control for simplex lift station applications. The level inputs can be connected to either three float switches or to a conductance probe. LED's provide level input status, pump call status, and high level alarm status indication. Output relays are provided for pump run, high level alarm for alarm light and high level alarm for alarm horn. HOA switch is also provided. Level simulation is accomplished by pressing and holding the push-button. Releasing the push-button allows the simulated level to return to normal. The push-button may also be pressed to silence the alarm horn. Connecting the serial port to a SCADA system allows the lift station to be monitored and controlled remotely. By connecting a programming device to the serial port (MPE p/n TSID), a number of settings may be accessed to customize the unit.

SPECIFICATIONS

Input Power:	120 VAC $\pm 10\%$, 10 VA max
Relay Outputs:	6 A Resistive @ 120 VAC 3.6 A Inductive @ 120 VAC
Agency Approval:	UL 508, CAN/CSA
Indicators:	LED's
Sensor Output Voltage:	± 12 V Square wave
Sensor Output Current:	± 1.2 mA max (per sensor)
Operating Temp:	-20 to +60 °C
Storage Temp:	-45 to +85 °C
Enclosure:	Lexan



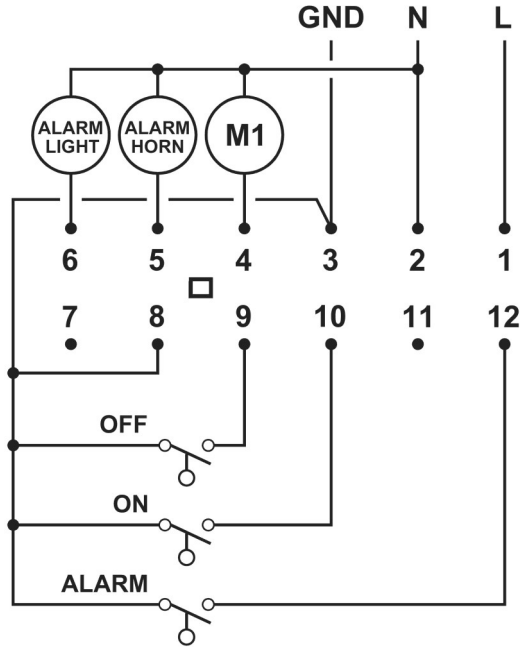
ORDERING INFORMATION

Part Number: 010-120-121P

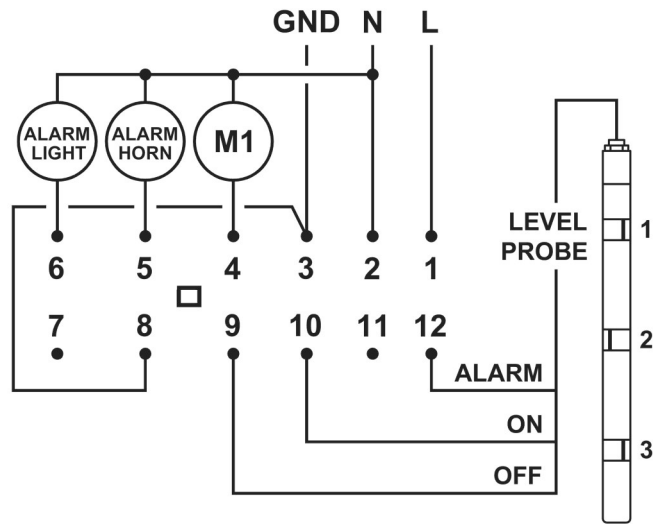
SIMPLEXER

CONNECTION DIAGRAMS

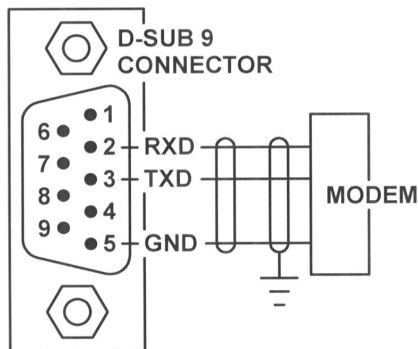
FLOAT SWITCH

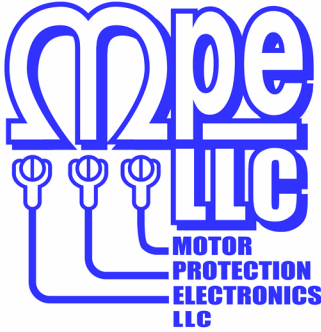


LEVEL PROBE



RS-232 SERIAL PORT





DUPLEXER

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THE U.S.A.

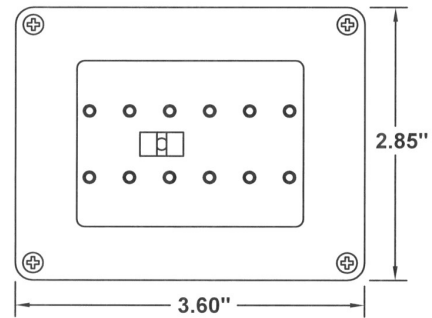
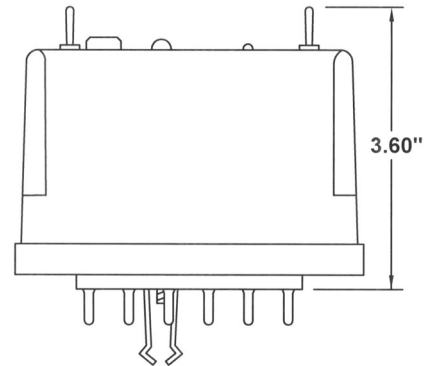


FEATURES:

- Float or Conductance Probe Level Inputs
- Duplex Alternation
- Level Input Indication
- Pump Call Indication
- High Level Alarm Indication
- Power On Indication
- Surge Protected Level Inputs
- Power Up and Lag Pump Delays
- Level Simulation Push-Button
- HOA and Lead Select Switches
- Pump Call and High Level Alarm Relays
- RS232 Serial Port with Modbus RTU Protocol

UL FILE # E101681

UL Listed only when
used with an
SD12 or SD12-PC socket.

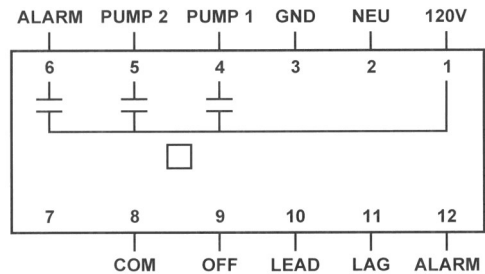


DESCRIPTION

The DUPLEXER is a low cost SCADA ready pump controller designed to perform level control for duplex lift station applications. The level inputs can be connected to either four float switches or to a conductance probe. The Duplexer provides a 10 second power-up start delay, 5 second lag pump delay, and duplex alternation. LEDs provide power on status, level input status, pump call status, and high level alarm status indication. Pump 1&2 call and high level alarm relays are provided. HOA and lead select toggle switches are also provided. The high level status indication latches upon high level, until reset by pressing the reset push-button (the relay does not stay latched). Level simulation is accomplished by pressing and holding the push-button. Releasing the push-button allows the simulated level to return to normal. Connecting the serial port to a SCADA system allows the lift station to be monitored and controlled remotely. By connecting a programming device to the serial port (MPE p/n TSID), a number of settings may be accessed to customize the unit.

SPECIFICATIONS

Input Power:	120VAC \pm 10%, 10VA max
Relay Outputs:	6A Resistive @ 120VAC 3.6A Inductive @ 120VAC
Agency Approval:	UL 508, CAN/CSA
Indicators:	LED's
Sensor Output Voltage:	\pm 12V Square wave
Sensor Output Current:	\pm 1.2mA max (per sensor)
Operating Temp:	-20 to +60 °C
Storage Temp:	-45 to +85 °C
Enclosure:	Lexan
Base:	Rhynite



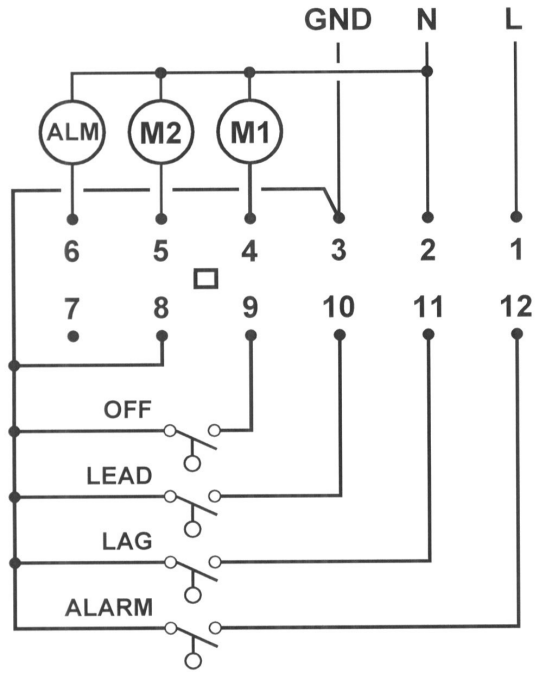
ORDERING INFORMATION

Part Number: 010-120-122P

DUPLEXER

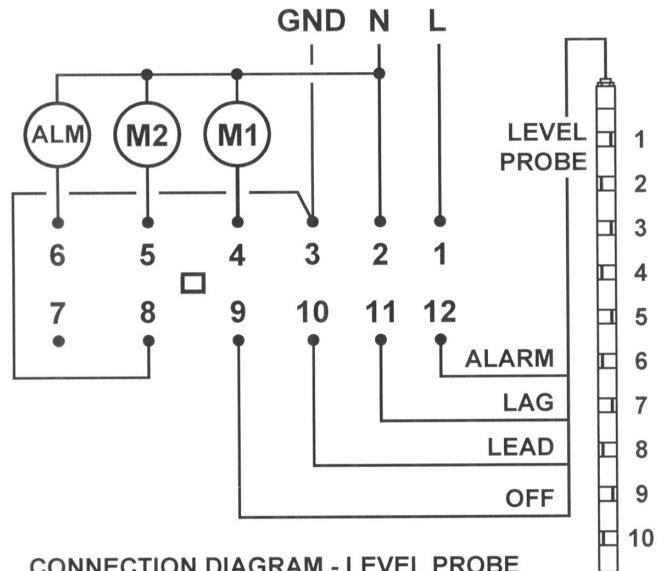
CONNECTION DIAGRAMS

FLOAT SWITCH



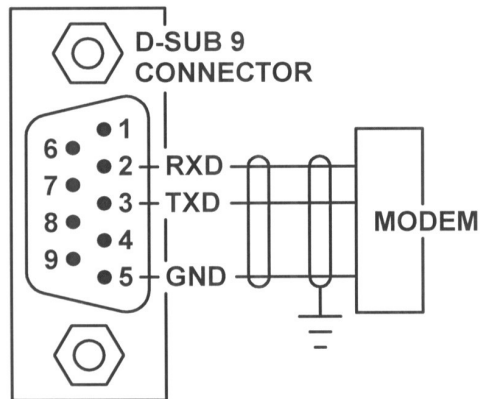
CONNECTION DIAGRAM - FLOAT SWITCH

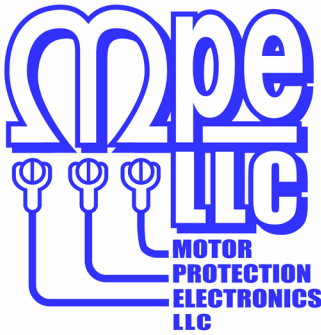
LEVEL PROBE



CONNECTION DIAGRAM - LEVEL PROBE

SERIAL PORT





**MADE IN
THE U.S.A.**



UL FILE # E101681

STATION CONTROLLER SC100



DESCRIPTION

The SC100 controller is a low cost, simple to use simplex or duplex controller for lift station liquid level control. It operates the pumps based on the selected setup parameter values and the 4-20mA wet well level input signal. The controller has relays for two pump call outputs, and for high and low level alarms outputs. A regulated 24 VDC power supply is provided for powering the pressure transducer circuit. A four digit seven segment red LED display is provided for parameter setup and level display. Red LED's are provided for pump 1 and 2 call and for high and low level alarm indication. Alternation of the pumps is provided, and a fixed 1-2 or 2-1 sequence may also be selected through the menu. The controller can be setup to perform either pump up control (fill a tank) or pump down control (empty a tank). It also has a fixed 10 second power-up delay, and an adjustable lag pump delay to prevent the turning on of one or both of the pumps immediately after a power interruption. Zero and Span parameters are provided for field calibration of the level input for a wide variety of submersible pressure transducers. The level display is made even more flexible by the addition of a parameter to set the decimal point position, and by a parameter to adjust how fast the level display responds to changes in the level input signal, from very slow to fast. A level simulation feature is provided to test the lift station controls and pump operation.

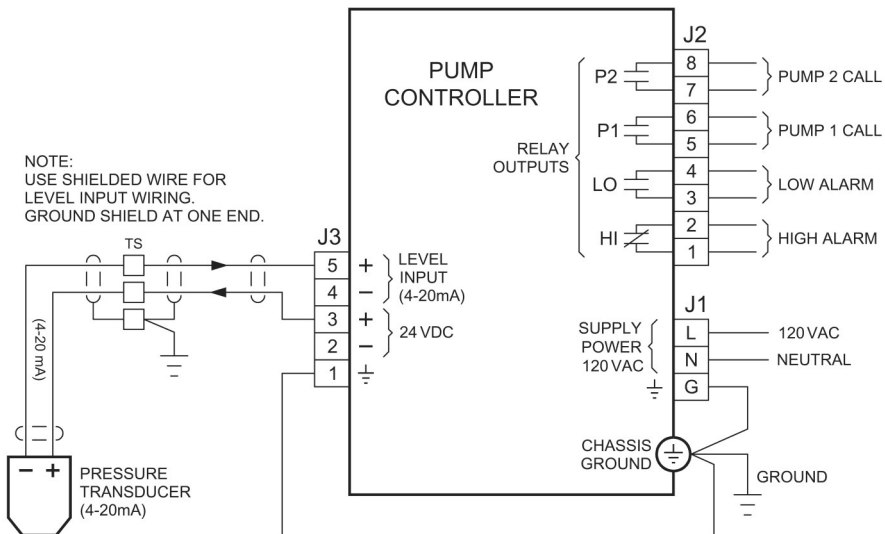
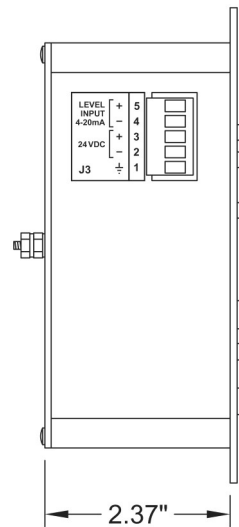
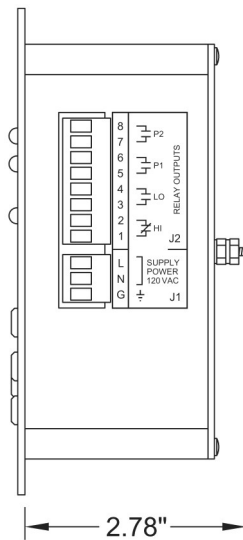
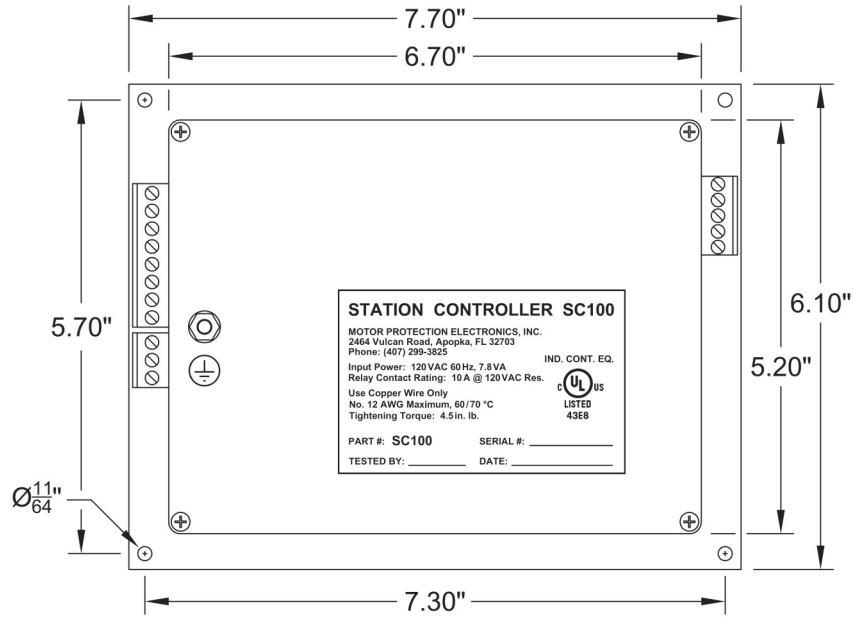
SPECIFICATIONS

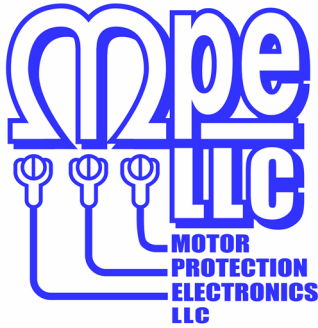
Input Power:	120VAC \pm 10%, 7.8VA max
Power for Analog Input:	24VDC \pm 1V, Transient Protected
Agency Approval:	UL 508, CAN/CSA
Operating Temperature:	-20 °C to +65 °C
Storage Temperature:	-45 °C to +85 °C
Display Type:	4 Digit, 7 Segment, Red LED
Display Range:	0 - 2310 Feet (Selectable Decimal Point Position)
Indicators:	Red LED
Relay Outputs:	10A Resistive @ 120VAC 3.6A Inductive @ 120VAC
Level Analog Input:	4-20mA, 147 Ω Load, Transient Protected
Color:	White with Blue Lettering
Enclosure Material:	Aluminum
Dimensions:	6.10" H x 7.70" W x 2.78" D

ORDERING INFORMATION

Part Number:
SC100

STATION CONTROLLER SC100





STATION CONTROLLER SC1000

MADE IN
THE U.S.A.



UL FILE # E101681



TYPICAL APPLICATIONS

Simplex, Duplex, Triplex Single Speed Pump Control
Level Pump Down (Empty a Tank) or Pump Up (Fill a Tank) Control

DESCRIPTION

The SC1000 is a SCADA ready pump controller designed to perform level control in a wide range of lift station applications. The SC1000 operates the pumps based on the selected setup values and the wet well level signal. The level input source is menu selectable for either a 4-20 mA pressure transducer, or a conductance probe. The S1000 alternates the pumps, performs lag pump delays, and provides high and low level alarms. The SC1000 has a variety of control options available in the setup menu that may be used to customize the controller for a specific application.

The SC1000 comes standard with 12 Discrete Inputs, 10 Level Probe Inputs, 5 Relay Outputs, an Analog Input for the level input, and an RS232 Serial Port with the Modbus RTU protocol.

The SC1000 can be ordered with the following options:

- Isolation of the Analog (4-20mA) Level Input.
- Ethernet Port with the Modbus TCP protocol.

ORDERING INFORMATION

Part Number: SC1000

To add Isolation to the Analog Level Input, add S to end of part number.

To add an Ethernet Port with the Modbus TCP protocol, add E to end of part number.

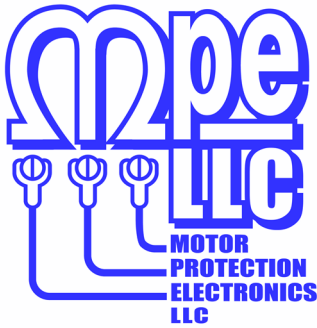
STATION CONTROLLER SC1000 STANDARD FEATURES:

- ◆ All Setup Parameter Values May be Viewed or Changed From the Front of Unit
- ◆ 120 VAC input power
- ◆ Level Input Source - Menu Selectable
 - Analog Level Input (4-20mA from Pressure Transducer)
 - Level Probe (Conductance Probe with 10 Electrodes)
- ◆ 20 VDC Power for Analog Level Input Loop
- ◆ 6 Amp Relay Outputs for: Pump Call, High Level, and Low Level Alarms
- ◆ RS-232 Serial Port, Modbus RTU Protocol
- ◆ Optional Ethernet Port for Modbus TCP and Modbus RTU Protocols
- ◆ Alternation Modes - Menu Selectable
 - Standard Alternation
 - Pump 1 Always Lead - Stays On with Other Pumps
 - Pump 1 Always Lead - Turns Off with Other Pumps On
 - Pumps 1 & 2 Alternate, and Pump 3 Always Last
 - Fixed Sequence - Pump 1 Always Leads
 - Stepped On/Off - Only One Pump Runs at a Time
- ◆ Alternation - First On - Last Off or First On - First Off
- ◆ Alternator Logic Skips Disabled Pumps
- ◆ Remembers Lead Pump Position During Power Outage
- ◆ Timed [1 minute] Level Simulation
- ◆ Plug-in Style Connectors
- ◆ 12 Discrete Inputs that can be Programmed for the Following Functions:
 - Pump Disable with HOA in OFF, or Pump Fault
 - External Lead Pump Selector Switch
 - All Pump Disable - for Connection to Phase Monitor
 - Limit Number of Pumps Called While on Emergency Power
 - Alternation by External Time Clock
 - Float Switch Backup
 - A Variety of Telemetry Functions
- ◆ Status of Discrete Inputs May Be Viewed From Front of Controller
- ◆ Flush Cycle Feature to Reduce Sludge Build-up within the Wetwell
- ◆ Flow Calculator Feature for Latest Inflow Rate, Average Daily Flow, Pump Outflow Rate
- ◆ Unused Output Relays Programmable via SCADA for Additional Control Uses
- ◆ Full manual available in pdf format at our website: www.mpelectronics.com

SPECIFICATIONS

Input Power:	120VAC \pm 10%, 13VA max
Agency Approvals:	UL 508, CAN/CSA
Ambient Operating Temp:	-20°C to +65°C
Level Display:	3 Digit, 7 Segment LED
Level Display Range:	0 - 999 ft. Decimal Point Position Menu Selectable
Indicators:	LED
Color:	White with Blue Lettering
Relays:	6A @250VAC
Level Analog Input:	4-20mA, 250 Ω Load Transient Protected
External Dimensions:	6.9"H x 8.5" W x 4.1" D
Cut Out Dimensions:	6.0" H x 7.5" W

Power for Discrete Inputs:	24VDC Unregulated Transient Protected
Power for Analog Regulated Input:	20VDC \pm 1V Transient Protected
Power For Level Probe:	\pm 8V Square-Wave, 60 Hz.



**MADE IN
THE U.S.A.**



UL FILE # E101681

STATION CONTROLLER SC2000



TYPICAL APPLICATIONS

Simplex, Duplex, Triplex or Quadraplex Pump Control
Single Speed or Variable Speed Control

DESCRIPTION

The SC2000 is a SCADA ready pump controller designed to perform level control in a wide range of lift station applications. The SC2000 operates the pumps based on the selected setup values and the wet well level signal. The level input source is menu selectable for either a 4-20 mA pressure transducer, or a conductance probe. The SC2000 alternates the pumps, performs lag pump delays, and provides high and low level alarms. The SC2000 has a variety of control options available in the setup menu that may be used to customize the controller for a specific application.

The SC2000 comes standard with 18 Discrete Inputs, 10 Level Probe Inputs, 6 Relay Outputs, an Analog Input for the level input, and an RS232 Serial Port with the Modbus RTU protocol.

The SC2000 can be ordered with the following options:

- Up to 4 Isolated Analog Outputs for VFD speed control.
- Up to 4 Isolated Analog Inputs for collecting analog data.
- Isolation of the Analog (4-20mA) Level Input.
- Ethernet Port with the Modbus TCP and DNP3 protocols.

ORDERING INFORMATION

Part Number: SC2000 - X X

Analog Outputs _____

- 0 = No Analog Outputs
- 1 = 1 Analog Output
- 2 = 2 Analog Outputs
- 3 = 3 Analog Outputs
- 4 = 4 Analog Outputs

Analog Inputs _____

- 0 = No Aux. Analog Inputs
- 1 = 1 Aux. Analog Input
- 2 = 2 Aux. Analog Inputs
- 3 = 3 Aux. Analog Inputs
- 4 = 4 Aux. Analog Inputs

To add Isolation to the Analog Level Input, add S to end of part number.

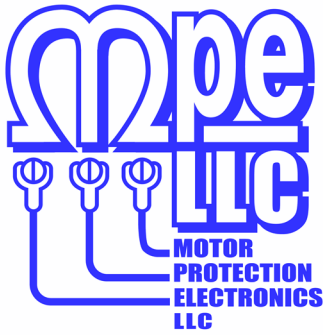
To add an Ethernet Port with Modbus TCP and DNP3 protocols, add E to end of part number.

STATION CONTROLLER SC2000 STANDARD FEATURES:

- ◆ All Setup Parameter Values May be Viewed or Changed From the Front of Unit
- ◆ 120 VAC input power
- ◆ Level Input Source - Menu Selectable
 - Analog Level Input (4-20 mA from Pressure Transducer)
 - Level Probe (Conductance Probe with 10 Electrodes)
- ◆ 20 VDC Power for Analog Level Input Loop
- ◆ 6 Amp Relay Outputs for: Pump Call, High Level, and Low Level Alarms
- ◆ RS-232 Serial Port, Modbus RTU Protocol
- ◆ Optional Ethernet Port for Modbus TCP and Modbus RTU Protocols
- ◆ Alternation Modes - Menu Selectable
 - Standard Alternation
 - Pump 1 Always Lead - Stays On with Other Pumps
 - Pump 1 Always Lead - Turns Off with Other Pumps On
 - Split Alternation - Pumps 1 & 2, and Pumps 3 & 4
 - Fixed Sequence - Pump 1 Always Leads
 - Stepped On/Off - Only One Pump Runs at a Time
- ◆ Alternation - First On - Last Off or First On - First Off
- ◆ Alternator Logic Skips Disabled Pumps
- ◆ Remembers Lead Pump Position During Power Outage
- ◆ Timed [1 minute] Level Simulation
- ◆ Security Code Protected Parameter Setup
- ◆ 18 Discrete Inputs that can be Programmed for the Following Functions:
 - Pump Disable with HOA in OFF, or Pump Fault
 - External Lead Pump Selector Switch
 - All Pump Disable - for Connection to Phase Monitor
 - Limit Number of Pumps Called While on Emergency Power
 - Alternation by External Time Clock
 - Call Pump Last - for Connection to VFD/Bypass Logic
 - Float Switch Backup
 - A Variety of Telemetry Functions
- ◆ Status of Discrete Inputs May Be Viewed From Front of Controller
- ◆ Flush Cycle Feature to Reduce Sludge Build-up within the Wetwell
- ◆ Flow Calculator Feature for Latest Inflow Rate, Average Daily Flow, Pump Outflow Rate
- ◆ Unused Output Relays Programmable via SCADA for Additional Control Uses
- ◆ Plug-In Style Connectors
- ◆ Full manual available in pdf format at our website: www.mpelectronics.com

SPECIFICATIONS

Input Power: 120VAC \pm 10%, 13VA max Agency Approvals: UL 508, CAN/CSA Ambient Operating Temp: Without Analog Outputs: -20°C to +65°C With Analog Outputs: -20°C to +50°C Level Display: 3 Digit, 7 Segment LED Level Display Range: 0 - 999 ft. Decimal Point Position Menu Selectable Indicators: LED Color: White with Blue Lettering Relays: 6A @250VAC Analog Level Input: 4-20mA, 250Ω Load Transient Protected External Dimensions: 6.9"H x 8.5" W x 4.9" D Cut Out Dimensions: 6.0" H x 7.5" W	Power for Discrete Inputs: 24VDC Unregulated Transient Protected Power for Analog Input: 20VDC \pm 1V Regulated Transient Protected Analog Outputs: Isolated 4-20mA Maximum Load 600Ω Transient Protected Aux. Analog Inputs: Isolated 4-20mA 250Ω Load Transient Protected Power for Level Probe: \pm 8V Square-Wave, 60 Hz
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LEVEL PROBE

TYPICAL APPLICATION

For use with any of MPE's pump controllers or conductance relays designed to operate with conductance probe.

**MADE IN
THE U.S.A.**

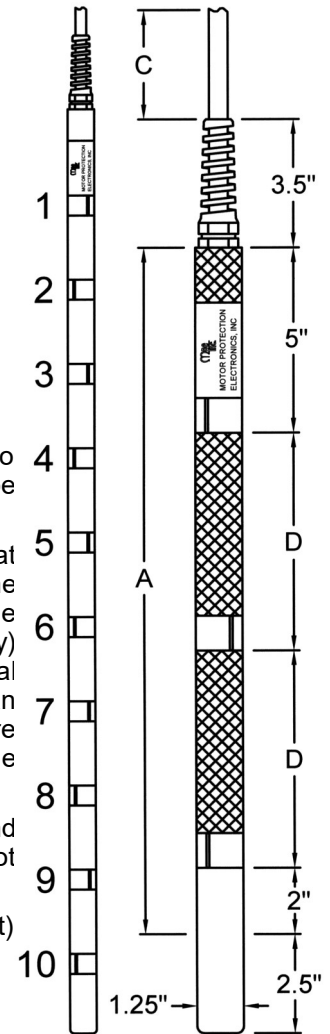
DESCRIPTION

The Level Probe provides a rugged, safe, reliable and cost-effective means to measure liquid level for waste water pumping applications. The Level Probe may be ordered with one, two, three or ten electrodes with various spacing in between.

The Level Probe is typically connected to a pump controller (or conductance relay) that is designed to monitor a conductance probe and perform level measurement. The level is detected when the liquid level is high enough to touch one or more of the stainless steel electrodes on the Level Probe. The controller (or conductance relay) sends out a level sense signal to each electrode on the Level Probe. The signal typically consists of an $\pm 8V$ or $\pm 12V$ square wave, capable of supplying no more than 1.5mA. When the liquid being measured touches one of the electrodes, the square wave signal is diverted to ground through the conductive liquid. The change in the signal is detected by the control device and used to determine the liquid level.

The Level Probe is suitable for use in conductive liquids such as waste water, and should not be used in storm water, well water, lake water, or other liquids which are not conductive enough to provide a reliable level measurement.

All non single point probes come standard with a LPB-1 (small level probe bracket) and S Hook.



SPECIFICATIONS

Electrode Material:	High Grade Stainless Steel Alloy
Probe Casing Material:	PVC
Cable Material	
Multi-Electrode:	PVC/PVC
Single-Electrode:	EPDM
Operating Temp:	+32 to +140 °F



UL 913

UL FILE #
E189808

Intrinsically Safe; For use in Class 1, Groups A, B, C, D. Hazardous Locations when installed with suitable Intrinsically Safe Barrier, in accordance with Control Drawing No. 0304.

ORDERING INFORMATION

Part Number: LP - A - B - C

Probe Length (inches) _____
 Number of Electrodes _____
 Cable Length (feet) _____

Available Combinations:

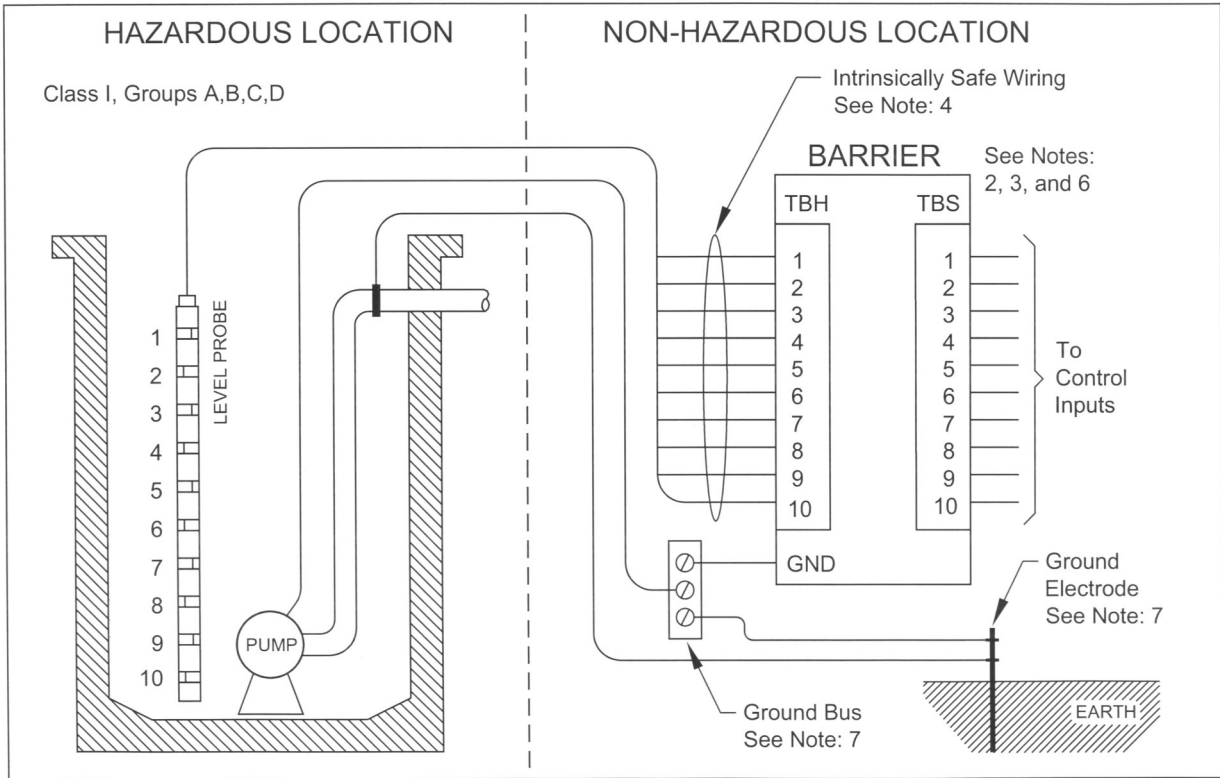
Probe Length (inches)	Number of Electrodes	Spacing Between Electrodes (inches)
A	B	D
7	1	X
19	3	6
52	10	5
61	10	6
79	10	8
97	10	10
115	10	12

Contact M.P. Electronics for custom probe availability.

Cable Length (feet) C 50, 100

LEVEL PROBE

Control Drawing No. 0304 Page 1 of 2 TYPICAL LIFT STATION APPLICATION



Notes for Control Drawing 0304 Page 1 of 2:

1. Level Probe Entity Parameters: $V_{max} = 30.3V$ $I_{max} = 88.6mA$ $P_{max} = 672mW$ $C_i = 6nF$ $L_i = 20\mu H$
2. The Barrier output current must be limited by a resistor such that the output voltage versus current plot is a straight line drawn between the open-circuit voltage and the short-circuit current.
3. The Barrier must be third party listed as providing intrinsically safe circuits for the application, and have V_{oc} not exceeding V_{max} , I_{sc} must not exceeding I_{max} , and P_o of the Barrier must be less than or equal to the P_{max} of the Level Probe, as shown in Table 1.
4. The capacitance and inductance of the cable from the Level Probe to the Barrier shall be calculated and must be included in the system calculations as shown in Table 1. Cable capacitance, C_{cable} , plus intrinsically safe equipment capacitance, C_i , must be less than the marked capacitance, C_a , shown on the Barrier used. The same applies for inductance (L_{cable} , L_i and L_a respectively). Where cable capacitance and inductance per foot are not known, the following values shall be used: $C_{cable} = 60pF/ft$, $L_{cable} = 0.2\mu H/ft$.
5. If P_o of the Barrier is not known, it may be calculated using the formula $P_o = (V_{oc} * I_{sc})/4$.
6. The Barrier must be installed in accordance with its manufacturer's control drawing and Article 504 of the National Electric Code (ANSI/NFPA 70) for installation in the United States, or Section 18 of the Canadian Electrical Code for installations in Canada.
7. The hazardous location ground and the Barrier ground must be connected to the ground bus in the power distribution panel. The ground bus must be connected to a suitable ground electrode per the National Electric Code (ANSI/NFPA 70) or other local codes, as applicable. The resistance of the ground path from the Barrier to the ground electrode must be less than 1 Ohm.
8. This associated apparatus (Barrier) must not be used in combination with another associated apparatus unless permitted by the associated apparatus certification.

Level Probe Part Number: LP - - -

Probe Length (inches)

Number of Electrodes 1, 2, 3, or 10

Cable Length (feet)

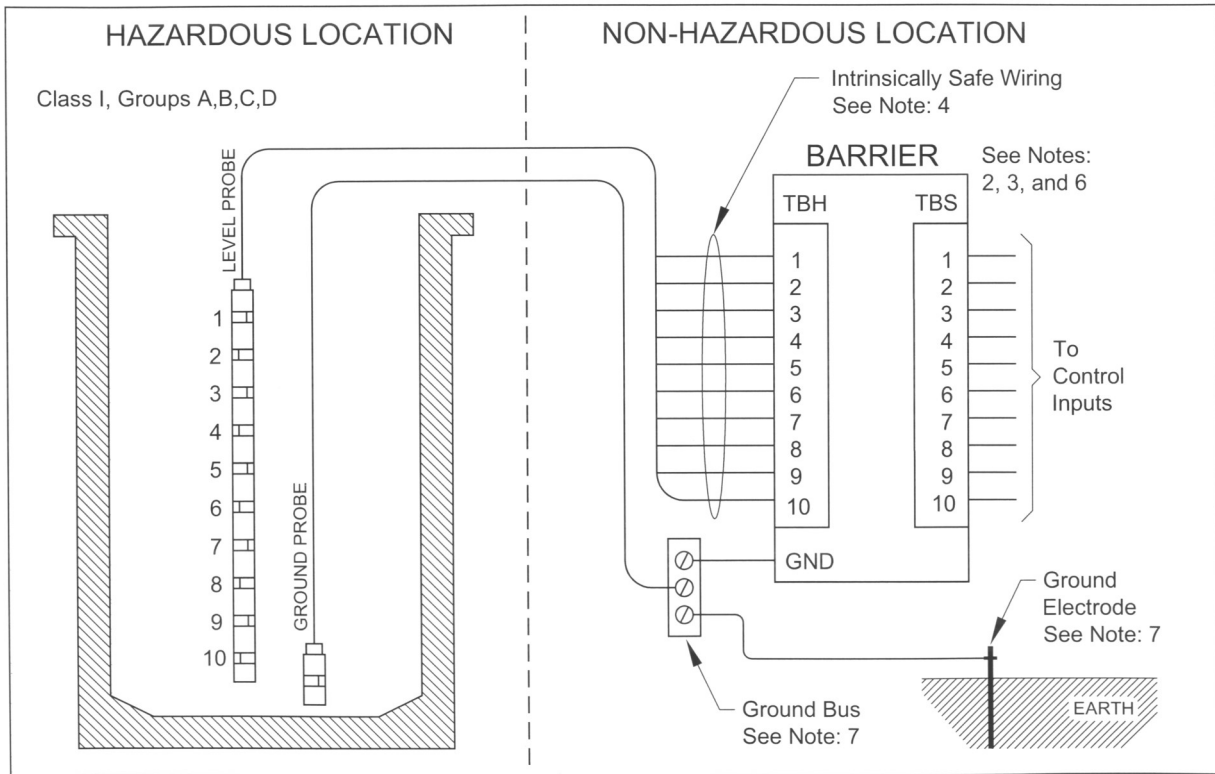
Table 1		
<u>Level Probe</u>	≥	<u>Barrier</u>
V_{max}	≥	V_t
I_{max}	≥	I_t
P_{max}	≥	P_o
$C_i + C_{cable}$	≤	C_a
$L_i + L_{cable}$	≤	L_a

Revision Date: 7-13-10

LEVEL PROBE

Control Drawing No. 0304 Page 2 of 2

UNGROUNDED TANK APPLICATION



Notes for Control Drawing 0304 Page 2 of 2:

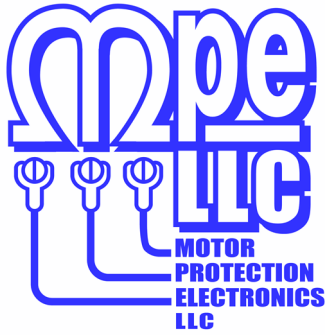
1. Level Probe Entity Parameters: $V_{max} = 30.3\text{ V}$ $I_{max} = 88.6\text{ mA}$ $P_{max} = 672\text{ mW}$ $C_i = 6\text{ nF}$ $L_i = 20\text{ }\mu\text{H}$
2. The Barrier output current must be limited by a resistor such that the output voltage versus current plot is a straight line drawn between the open-circuit voltage and the short-circuit current.
3. The Barrier must be third party listed as providing intrinsically safe circuits for the application, and have V_{oc} not exceeding V_{max} , I_{sc} must not exceeding I_{max} , and P_o of the Barrier must be less than or equal to the P_{max} of the Level Probe, as shown in Table 1.
4. The capacitance and inductance of the cable from the Level Probe to the Barrier shall be calculated and must be included in the system calculations as shown in Table 1. Cable capacitance, C_{cable} , plus intrinsically safe equipment capacitance, C_i , must be less than the marked capacitance, C_a , shown on the Barrier used. The same applies for inductance (L_{cable} , L_i and L_a respectively). Where cable capacitance and inductance per foot are not known, the following values shall be used: $C_{cable} = 60\text{ pF/ft}$, $L_{cable} = 0.2\text{ }\mu\text{H/ft}$.
5. If P_o of the Barrier is not known, it may be calculated using the formula $P_o = (V_{oc} * I_{sc})/4$.
6. The Barrier must be installed in accordance with its manufacturer's control drawing and Article 504 of the National Electric Code (ANSI/NFPA 70) for installation in the United States, or Section 18 of the Canadian Electrical Code for installations in Canada.
7. The hazardous location Ground Probe and the Barrier ground must be connected to the ground bus in the power distribution panel. The ground bus must be connected to a suitable ground electrode per the National Electric Code (ANSI/NFPA 70) or other local codes, as applicable. The resistance of the ground path from the Barrier to the ground electrode must be less than 1 Ohm.
8. This associated apparatus (Barrier) must not be used in combination with another associated apparatus unless permitted by the associated apparatus certification.

Level Probe Part Number: LP -	
Probe Length (inches)	_____
Number of Electrodes 1, 2, 3, or 10	_____
Cable Length (feet)	_____

Ground Probe Part Number: LP - 7 - 1 - Cable Length
--

Table 1		
Level Probe		Barrier
V_{max}	\geq	V_t
I_{max}	\geq	I_t
P_{max}	\geq	P_o
$C_i + C_{cable}$	\leq	C_a
$L_i + L_{cable}$	\leq	L_a

Revision Date: 7-13-10



LEVEL PROBE SURGE ARRESTOR

TYPICAL APPLICATIONS

For use with MPE's level control devices that have conductance probe inputs for level measurement.

DESCRIPTION

The Level Probe Surge Arrestor provides transient surge protection for the control inputs of any of MPE's pump control devices that have conductance probe inputs for level measurement.

The unit has ten channels and may be used with any of MPE's ten electrode conductance probes (Level Probes), but can also be used with single electrode, or three electrode probes.

Each channel has an MOV (Metal-Oxide Varistor) that is capable of shunting large transient currents to ground (up to 1000 Amps).

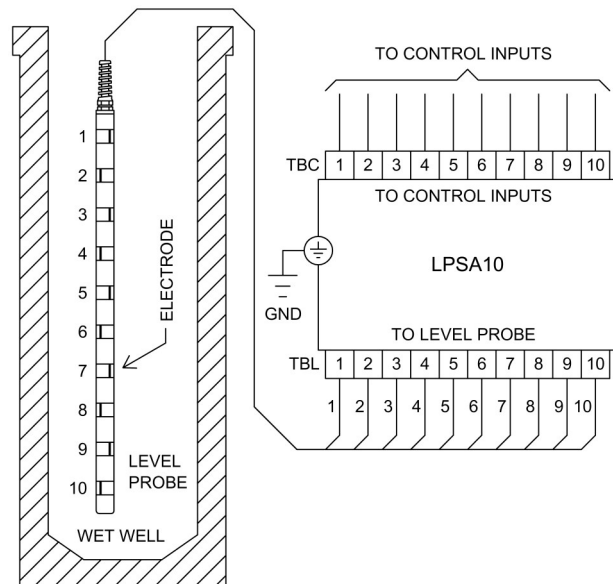
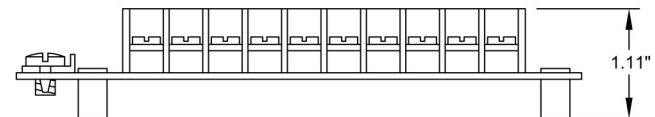
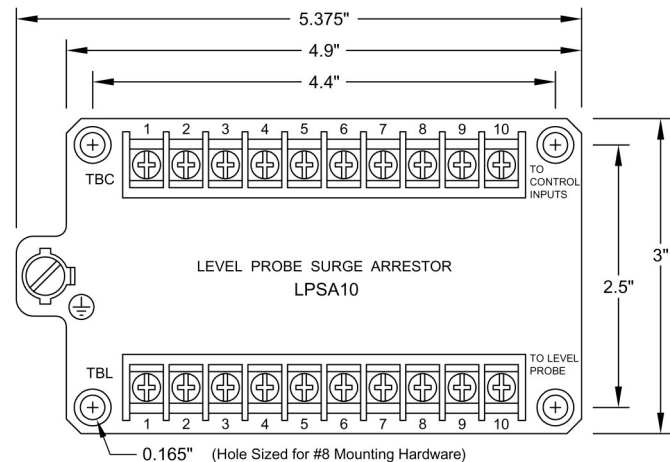
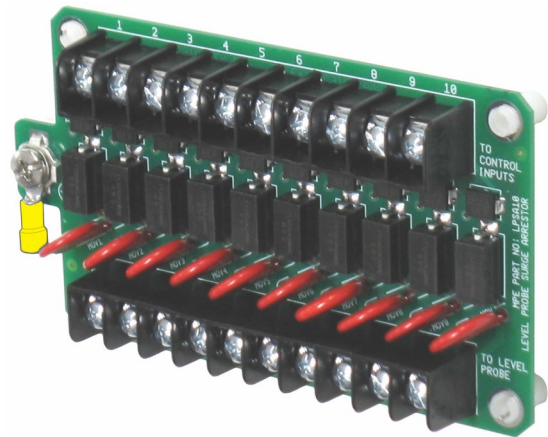
Following each MOV is a TVS (Transient Voltage Suppressor Diode) capable of limiting the voltage going to the controls inputs from going beyond $\pm 26V$.

Between each MOV and TVS is a 100 Ω , 5Watt wirewound resistor that protects the TVS from excessive voltages and currents not stopped by the MOV.

The grounding terminal on the LPSA10 must be connected to the control panel ground by a 12AWG wire.

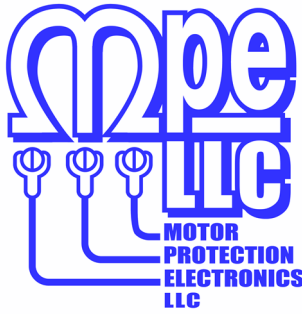
SPECIFICATIONS

Rated Operating Voltage:	$\pm 12V$
Maximum Operating Voltage:	$\pm 15V$
Maximum Clamping Voltage:	$\pm 26V$
Maximum Clamping Current:	$\pm 1000A$
Internal Resistance:	100 Ω (per sensor)
Operating Temp:	-20 to +65 $^{\circ}C$
Storage Temp:	-45 to +85 $^{\circ}C$



ORDERING INFORMATION

Part Number: **LPSA10**



LEVEL PROBE CONVERTER

MADE IN
THE U.S.A.

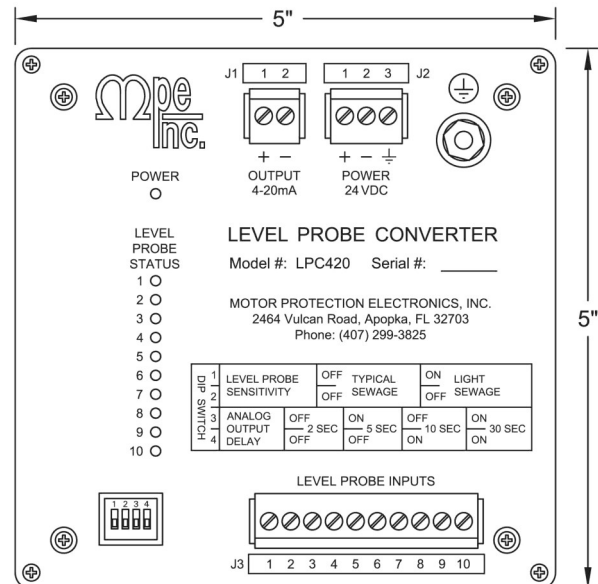
TYPICAL APPLICATIONS

For use with any 10 electrode conductance probe where an analog 4-20mA level signal is required.



DESCRIPTION

The Level Probe Converter senses liquid level and provides a 4-20mA analog output for use by a pump controller or PLC to control liquid level. The unit monitors the ten electrodes on a Level Probe, and provides an analog signal that is proportional to level. All setup is easily done using the four DIP switches on the unit. The Sensitivity of the unit must be set for the type of liquid being detected (see table below). The Analog Output Delay setting provides control over how fast the analog output transitions from one level output value to another. It takes 10 times the Analog Output Delay setting value to go from 4mA to 20mA, when the electrodes are covered quickly. When the electrodes are slowly covered one at a time, the Analog Output Delay is used to provide a smooth transition as the level goes from electrode to electrode.

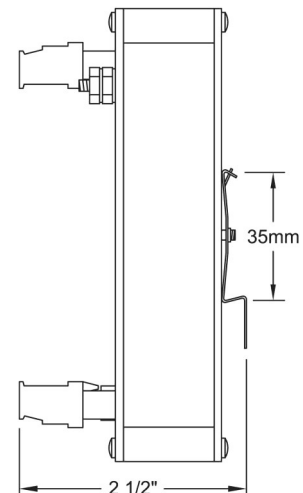


DIP SWITCH	1	LEVEL PROBE SENSITIVITY	OFF	TYPICAL	ON	LIGHT			
	2		OFF	SEWAGE	OFF	SEWAGE			
3	ANALOG OUTPUT DELAY	OFF	2 SEC	ON	5 SEC	OFF	10 SEC	ON	30 SEC
		4	OFF	OFF	ON	ON			

SPECIFICATIONS

Supply Voltage: 24 VDC \pm 10%
 Supply Current: 75 mA max
 Analog Output: Non-Isolated 4-20 mA
 Maximum Load 600 Ω
 Sensor Output Voltage: \pm 8 V Square Wave @ 60 Hz
 Sensor Output Current: 0.8 mA max (per sensor)
 Operating Temp: -20 to +65 $^{\circ}$ C
 Storage Temp: -45 to +85 $^{\circ}$ C
 Enclosure: Aluminum, Din Rail Mounted

NUMBER OF ELECTRODES COVERED	ANALOG OUTPUT
NONE	4.0 mA
1	5.6 mA
2	7.1 mA
3	8.8 mA
4	10.4 mA
5	12.0 mA
6	13.6 mA
7	15.2 mA
8	16.8 mA
9	18.4 mA
10	20.0 mA

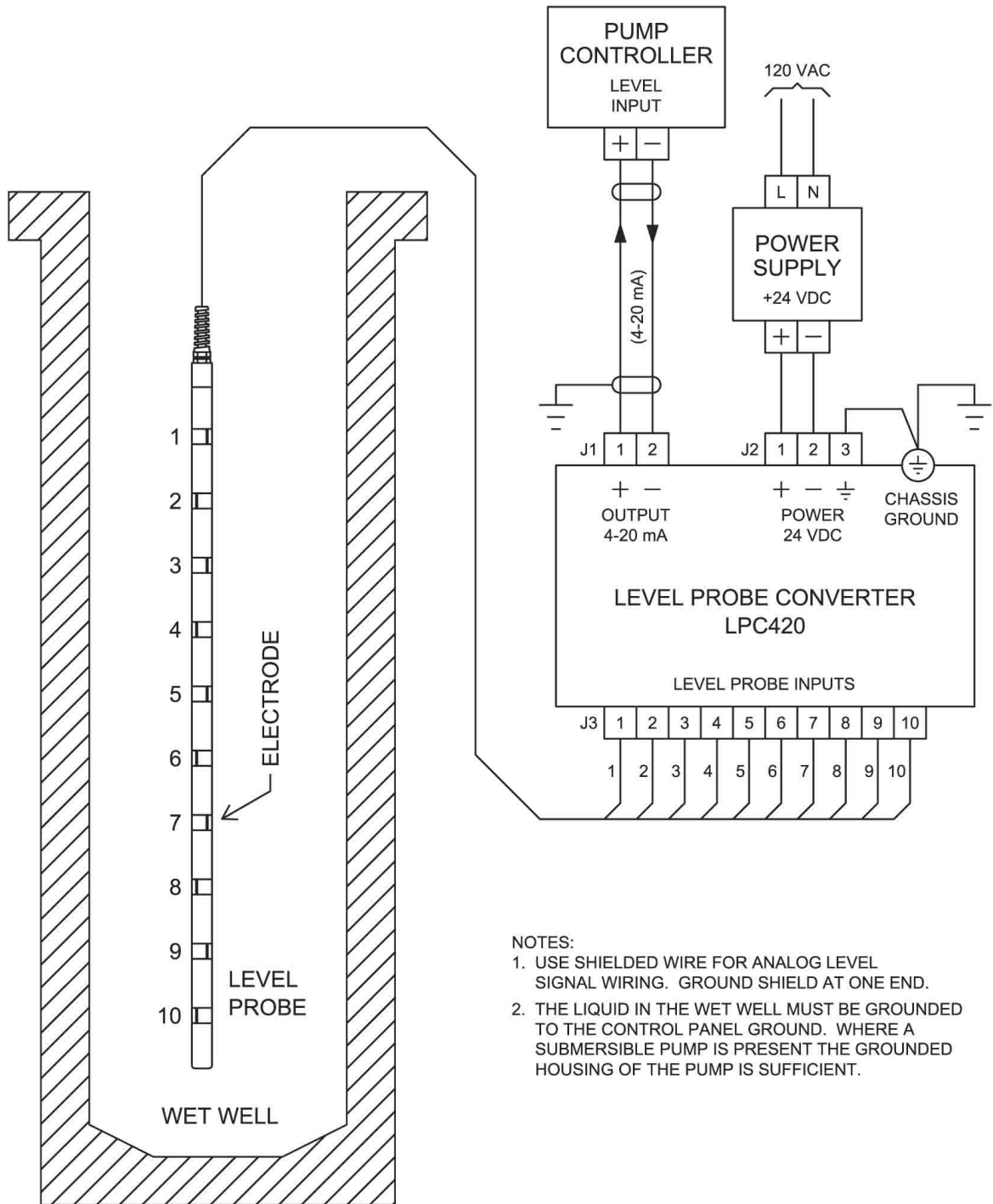


ORDERING INFORMATION

Model Number: **LPC420**

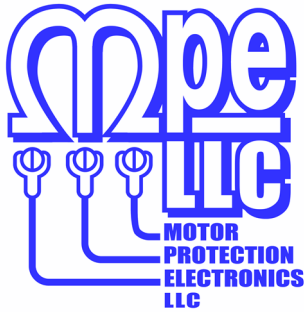
LEVEL PROBE CONVERTER

CONNECTION DIAGRAM



NOTES:

1. USE SHIELDED WIRE FOR ANALOG LEVEL SIGNAL WIRING. GROUND SHIELD AT ONE END.
2. THE LIQUID IN THE WET WELL MUST BE GROUNDED TO THE CONTROL PANEL GROUND. WHERE A SUBMERSIBLE PUMP IS PRESENT THE GROUNDED HOUSING OF THE PUMP IS SUFFICIENT.



LEVEL PROBE CONVERTER REVERSE MOUNT

MADE IN
THE U.S.A.



**PANEL
MOUNT VIEW**

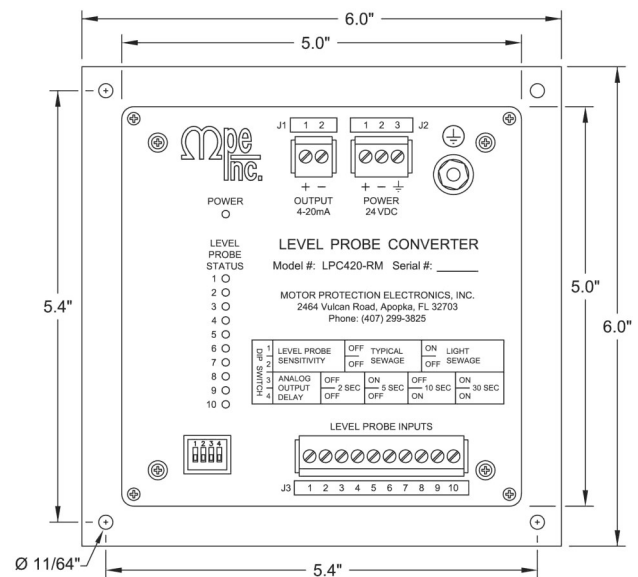
TYPICAL APPLICATIONS

For use with any 10 electrode conductance probe where an analog 4-20mA level signal and a panel mounted level display are required.

DESCRIPTION

The Reverse Mount LPC420 allows for viewing of the level display with the deadfront door closed, as well as open. Settings and connections are made on rear of unit.

The Level Probe Converter senses liquid level and provides a 4-20mA analog output for use by a pump controller or PLC to control liquid level. The unit monitors the ten electrodes on a Level Probe, and provides an analog signal that is proportional to level. All setup is easily done using the four DIP switches on the unit. The Sensitivity of the unit must be set for the type of liquid being detected (see table below). The Analog Output Delay setting provides control over how fast the analog output transitions from one level output value to another. It takes 10 times the Analog Output Delay setting value to go from 4mA to 20mA, when the electrodes are covered quickly. When the electrodes are slowly covered one at a time, the Analog Output Delay is used to provide a smooth transition as the level goes from electrode to electrode.



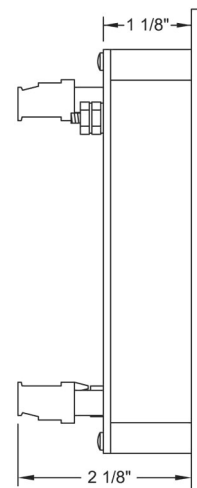
REAR VIEW

DIP SWITCH	LEVEL PROBE SENSITIVITY	OFF	TYPICAL SEWAGE	ON	LIGHT SEWAGE
		OFF	ON	OFF	ON
3	ANALOG OUTPUT DELAY	OFF	2 SEC	ON	5 SEC
4		OFF	10 SEC	ON	30 SEC

SPECIFICATIONS

Supply Voltage:	24 VDC \pm 10%
Supply Current:	65 mA max
Analog Output:	Non-Isolated 4-20 mA Maximum Load 600 Ω
Sensor Output Voltage:	\pm 8 V Square Wave @ 60 Hz
Sensor Output Current:	0.8 mA max (per sensor)
Operating Temp:	-20 to +65 $^{\circ}$ C
Storage Temp:	-45 to +85 $^{\circ}$ C
Enclosure:	Aluminum, Panel Mounted

NUMBER OF ELECTRODES COVERED	ANALOG OUTPUT
NONE	4.0 mA
1	5.6 mA
2	7.1 mA
3	8.8 mA
4	10.4 mA
5	12.0 mA
6	13.6 mA
7	15.2 mA
8	16.8 mA
9	18.4 mA
10	20.0 mA



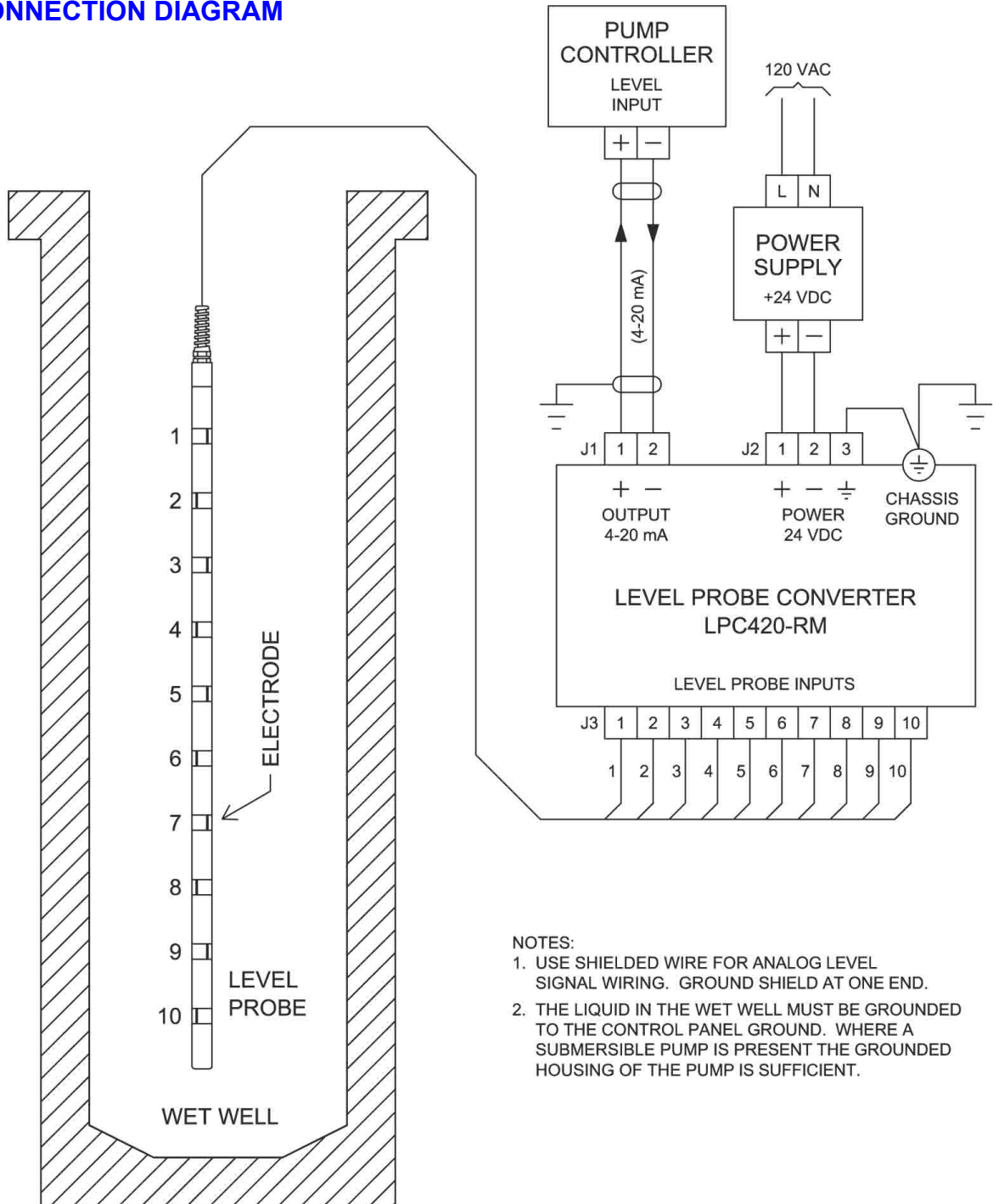
LEFT SIDE VIEW

ORDERING INFORMATION

Model Number: **LPC420-RM**

LEVEL PROBE CONVERTER

CONNECTION DIAGRAM



NOTES:

1. USE SHIELDED WIRE FOR ANALOG LEVEL SIGNAL WIRING. GROUND SHIELD AT ONE END.
2. THE LIQUID IN THE WET WELL MUST BE GROUNDED TO THE CONTROL PANEL GROUND. WHERE A SUBMERSIBLE PUMP IS PRESENT THE GROUNDED HOUSING OF THE PUMP IS SUFFICIENT.



LEVEL PROBE CONVERTER w/ RELAYS

MADE IN
THE U.S.A.

TYPICAL APPLICATIONS

For use with any 10 electrode conductance probe where an Analog 4-20mA level signal and Relay Outputs are required.



UL FILE # E101681

DESCRIPTION

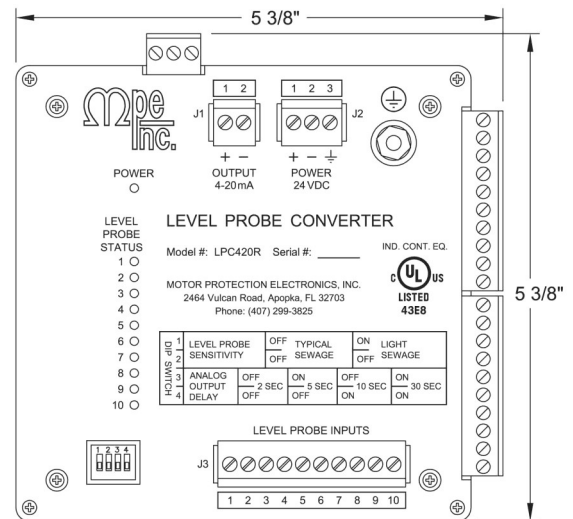
The Level Probe Converter senses liquid level and provides a 4-20mA analog output for use by a pump controller or PLC to control liquid level. The unit monitors the ten electrodes on a Level Probe, and provides an analog signal that is proportional to level. The unit also provides 10 Relay Outputs with contacts that close as the liquid covers the respective Level Probe electrodes. The Relay Outputs may be used for pump control, level alarms or telemetry.

All setup is easily done using the four DIP switches on the unit. The Sensitivity of the unit must be set for the type of liquid being detected (see table below). The Analog Output Delay setting provides control over how fast the analog output transitions from one level output value to another. It takes 10 times the Analog Output Delay setting value to go from 4mA to 20mA, when the electrodes are covered quickly. When the electrodes are slowly covered one at a time, the Analog Output Delay is used to provide a smooth transition as the level goes from electrode to electrode.

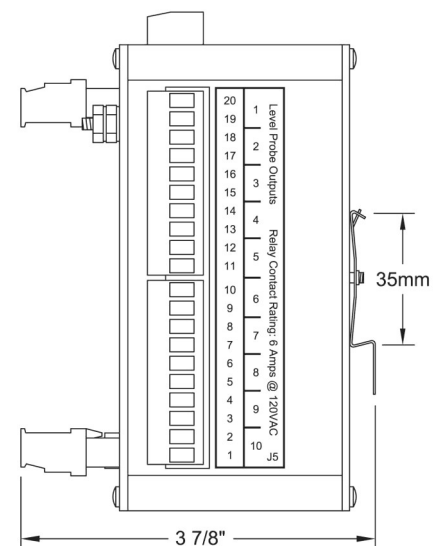
DIP SWITCH	LEVEL PROBE SENSITIVITY	OFF		ON	
		TYPICAL	SEWAGE	LIGHT	SEWAGE
3	ANALOG OUTPUT DELAY	OFF	ON	OFF	ON
4		2 SEC	5 SEC	10 SEC	30 SEC

SPECIFICATIONS

Input Power:	120 VAC \pm 10% 7.7 VA max or 24 VDC \pm 10% 160 mA max
Analog Output:	Non-Isolated 4-20 mA Maximum Load 600 Ω
Relay Outputs:	6 A @ 120 VAC
Sensor Output Voltage:	\pm 8 V Square Wave @ 60 Hz
Sensor Output Current:	0.8 mA max (per sensor)
Operating Temp:	-20 to +65 $^{\circ}$ C
Storage Temp:	-45 to +85 $^{\circ}$ C
Enclosure:	Aluminum, Din Rail Mounted



NUMBER OF ELECTRODES COVERED	ANALOG OUTPUT
NONE	4.0 mA
1	5.6 mA
2	7.1 mA
3	8.8 mA
4	10.4 mA
5	12.0 mA
6	13.6 mA
7	15.2 mA
8	16.8 mA
9	18.4 mA
10	20.0 mA

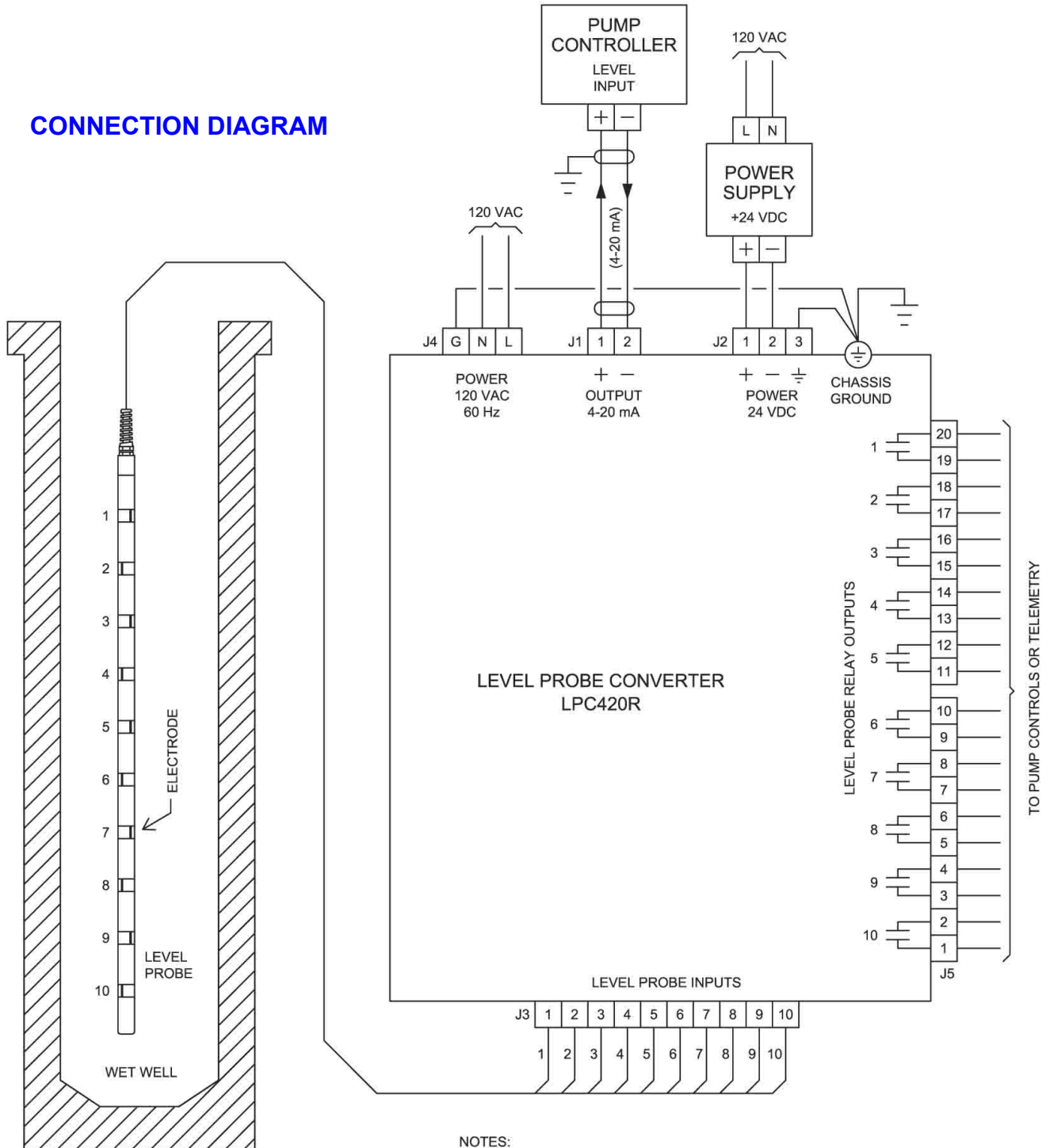


ORDERING INFORMATION

Model Number: **LPC420R**

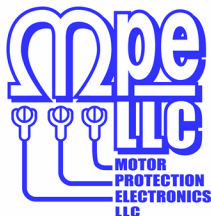
LEVEL PROBE CONVERTER w/ RELAYS

CONNECTION DIAGRAM



NOTES:

1. USE SHIELDED WIRE FOR ANALOG LEVEL SIGNAL WIRING. GROUND SHIELD AT ONE END.
2. THE LIQUID IN THE WET WELL MUST BE GROUNDED TO THE CONTROL PANEL GROUND. WHERE A SUBMERSIBLE PUMP IS PRESENT THE GROUNDED HOUSING OF THE PUMP IS SUFFICIENT.
3. UNIT MAY BE POWERED BY 24VDC OR 120VAC, BUT NOT BOTH.
4. WHEN THE UNIT IS POWERED FROM 120VAC, A GROUND CONNECTION IS REQUIRED ON BOTH J2 PIN 3 AND J4 PIN G.



LEVEL PROBE CONVERTER w/ RELAYS REVERSE MOUNT

TYPICAL APPLICATIONS

For use with any 10 electrode conductance probe where an analog 4-20mA level signal, relay outputs and a panel mounted level display are required.



UL FILE # E101681



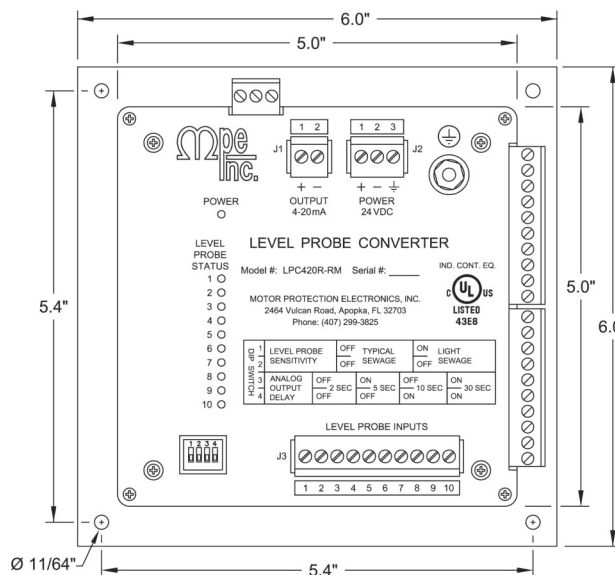
PANEL MOUNT VIEW

DESCRIPTION

The Reverse Mount LPC420 allows for viewing of the level display with the deadfront door closed, as well as open. Settings and connections are made on rear of unit.

The Level Probe Converter senses liquid level and provides a 4-20mA analog output for use by a pump controller or PLC to control liquid level. The unit monitors the ten electrodes on a Level Probe, and provides an analog signal that is proportional to level. The unit also provides 10 Relay Outputs with contacts that close as the liquid covers the respective Level Probe electrodes. The Relay Outputs may be used for pump control, level alarms or telemetry.

All setup is easily done using the four DIP switches on the unit. The Sensitivity of the unit must be set for the type of liquid being detected (see table below). The Analog Output Delay setting provides control over how fast the analog output transitions from one level output value to another. It takes 10 times the Analog Output Delay setting value to go from 4mA to 20mA, when the electrodes are covered quickly. When the electrodes are slowly covered one at a time, the Analog Output Delay is used to provide a smooth transition as the level goes from electrode to electrode.



REAR VIEW

1	LEVEL PROBE SENSITIVITY	OFF	TYPICAL	ON	LIGHT
		OFF	SEWAGE	OFF	SEWAGE
3	ANALOG OUTPUT DELAY	OFF	2 SEC	ON	10 SEC
		OFF	5 SEC	ON	30 SEC

SPECIFICATIONS

Input Power: 120 VAC ± 10% 7.7 VA max
or
24 VDC ± 10% 160 mA max

Analog Output: Non-Isolated 4-20 mA
Maximum Load 600 Ω

Relay Outputs: 6 A @ 120 VAC

Sensor Output Voltage: ± 8 V Square Wave @ 60 Hz

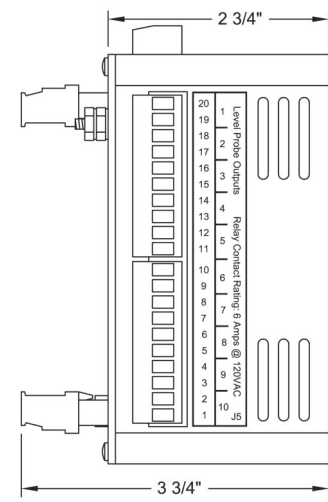
Sensor Output Current: 0.8 mA max (per sensor)

Operating Temp: -20 to +65 °C

Storage Temp: -45 to +85 °C

Enclosure: Aluminum, Panel Mounted

NUMBER OF ELECTRODES COVERED	ANALOG OUTPUT
NONE	4.0 mA
1	5.6 mA
2	7.1 mA
3	8.8 mA
4	10.4 mA
5	12.0 mA
6	13.6 mA
7	15.2 mA
8	16.8 mA
9	18.4 mA
10	20.0 mA



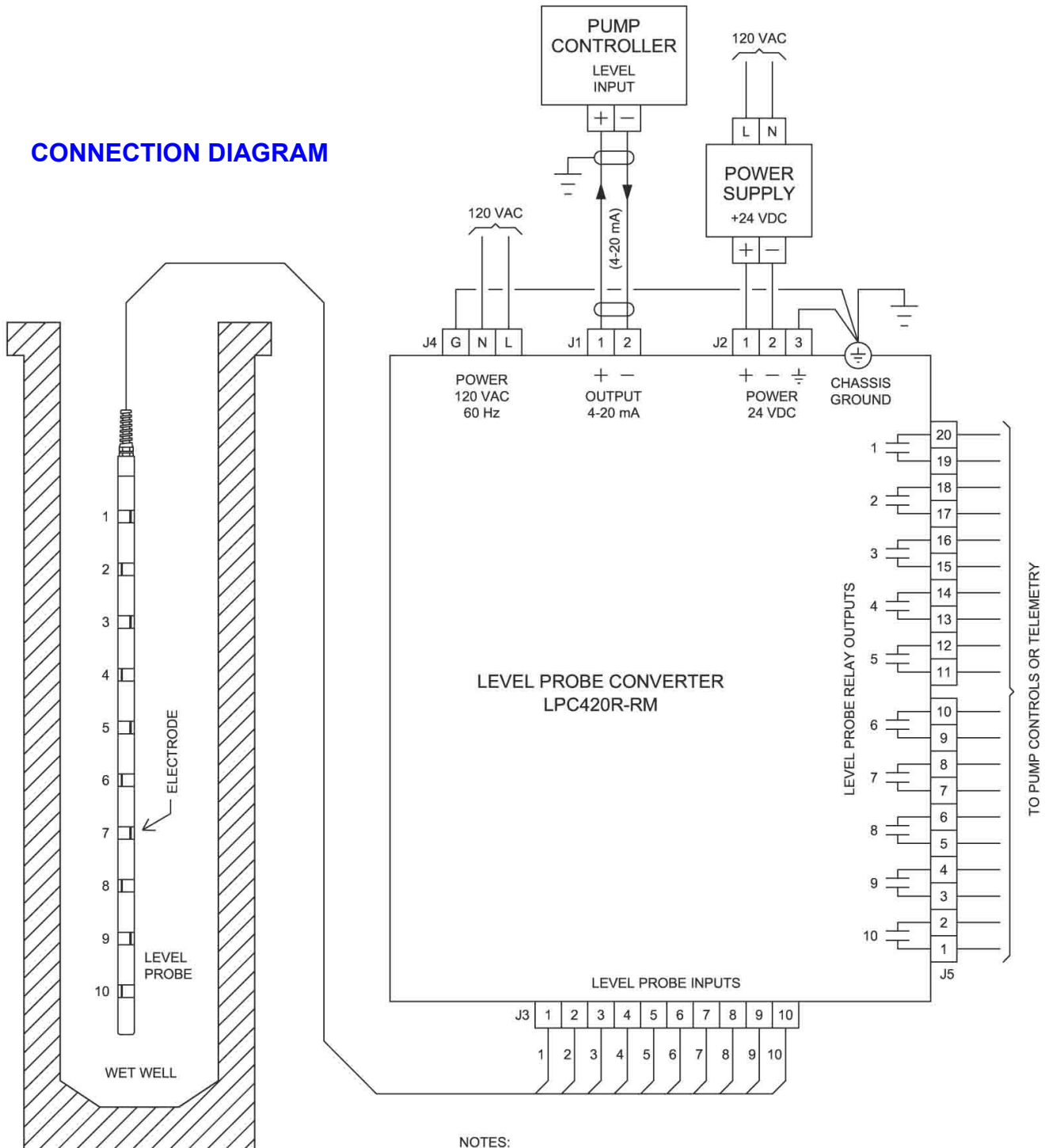
LEFT SIDE VIEW

ORDERING INFORMATION

Model Number: **LPC420R-RM**

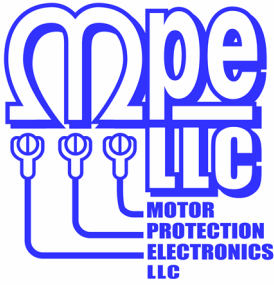
LEVEL PROBE CONVERTER w/ RELAYS

CONNECTION DIAGRAM



NOTES:

1. USE SHIELDED WIRE FOR ANALOG LEVEL SIGNAL WIRING. GROUND SHIELD AT ONE END.
2. THE LIQUID IN THE WET WELL MUST BE GROUNDED TO THE CONTROL PANEL GROUND. WHERE A SUBMERSIBLE PUMP IS PRESENT THE GROUNDED HOUSING OF THE PUMP IS SUFFICIENT.
3. UNIT MAY BE POWERED BY 24VDC OR 120VAC, BUT NOT BOTH.
4. WHEN THE UNIT IS POWERED FROM 120VAC, A GROUND CONNECTION IS REQUIRED ON BOTH J2 PIN 3 AND J4 PIN G.



MADE IN THE U.S.A.

LEVEL PROBE RELAY

MONITORS CONDUCTANCE PROBE AND PROVIDES PUMP CONTROL OR LEVEL ALARM



UL FILE #E101681

*UL listed models require use of an SD12 or SD12-PC socket.

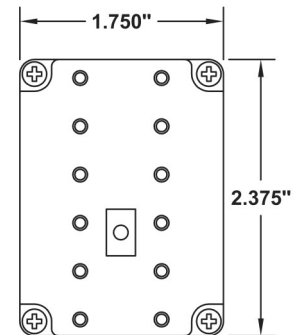
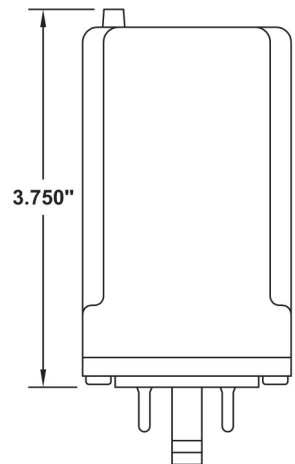


DESCRIPTION

The Level Probe Relay senses liquid level and provides a relay output for controlling a pump or level alarm. The unit has two inputs, an ON and an OFF, for connection to two electrodes of a conductance probe. All setup is easily done using the seven DIP switches on the unit. When used for a level alarm the ON and OFF inputs may be connected to the same electrode on the probe, or the ON input may be used by itself. When used for pump control the ON and OFF inputs are typically connected to two different level probe electrodes to provide a latching function. The unit has two pump control modes, Pump Down (empty a tank) and Pump Up (fill a tank) (see table below). When in the Pump Down mode and both inputs detect liquid, the unit energizes the relay and keeps it energized until the level drops to the point where the OFF input no longer detects liquid. When in the Pump Up mode and both inputs detect no liquid, the unit energizes the relay and keeps it energized until the level rises to where the OFF input detects liquid. The Sensitivity of the unit must be set for the type of liquid being detected (see Dip Switch table below). The unit provides a 10 second power up delay to prevent a pump from being turned on too soon after a power interruption. An adjustable ON Delay is provided for use as a lag pump delay.

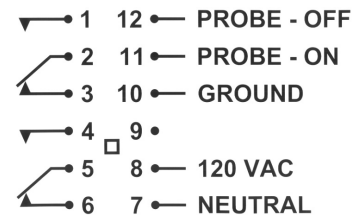
The adjustable OFF Delay is provided so that the unit may be used to provide timed off, backup pump control. (See the Dip Switch table for the ON and OFF delay settings).

1	SENSITIVITY	OFF — TYPICAL SEWAGE		ON — LIGHT SEWAGE	
		OFF		OFF	
3	PUMP MODE	OFF — PUMP DOWN (EMPTY)		ON — PUMP UP (FILL)	
4	ON DELAY	OFF	ON	OFF	ON
		1 SEC	5 SEC	10 SEC	15 SEC
5	OFF DELAY	OFF	ON	OFF	ON
		1 SEC	5 SEC	30 SEC	60 SEC
7		OFF	ON	OFF	ON



SPECIFICATIONS

Input Power: 120 VAC ± 10%, 3.8 VA max
 Relay Type: DPDT
 Output Rating: 5 A Resistive @ 240 VAC
 5 A Inductive @ 240 VAC
 Sensor Output Voltage: ±12 V Square Wave
 Sensor Output Current: ±1.2 mA max (per sensor)
 Operating Temp: -40°C to +60°C
 Storage Temp: -45°C to +85°C
 Enclosure: White Lexan
 Base: Phenolic



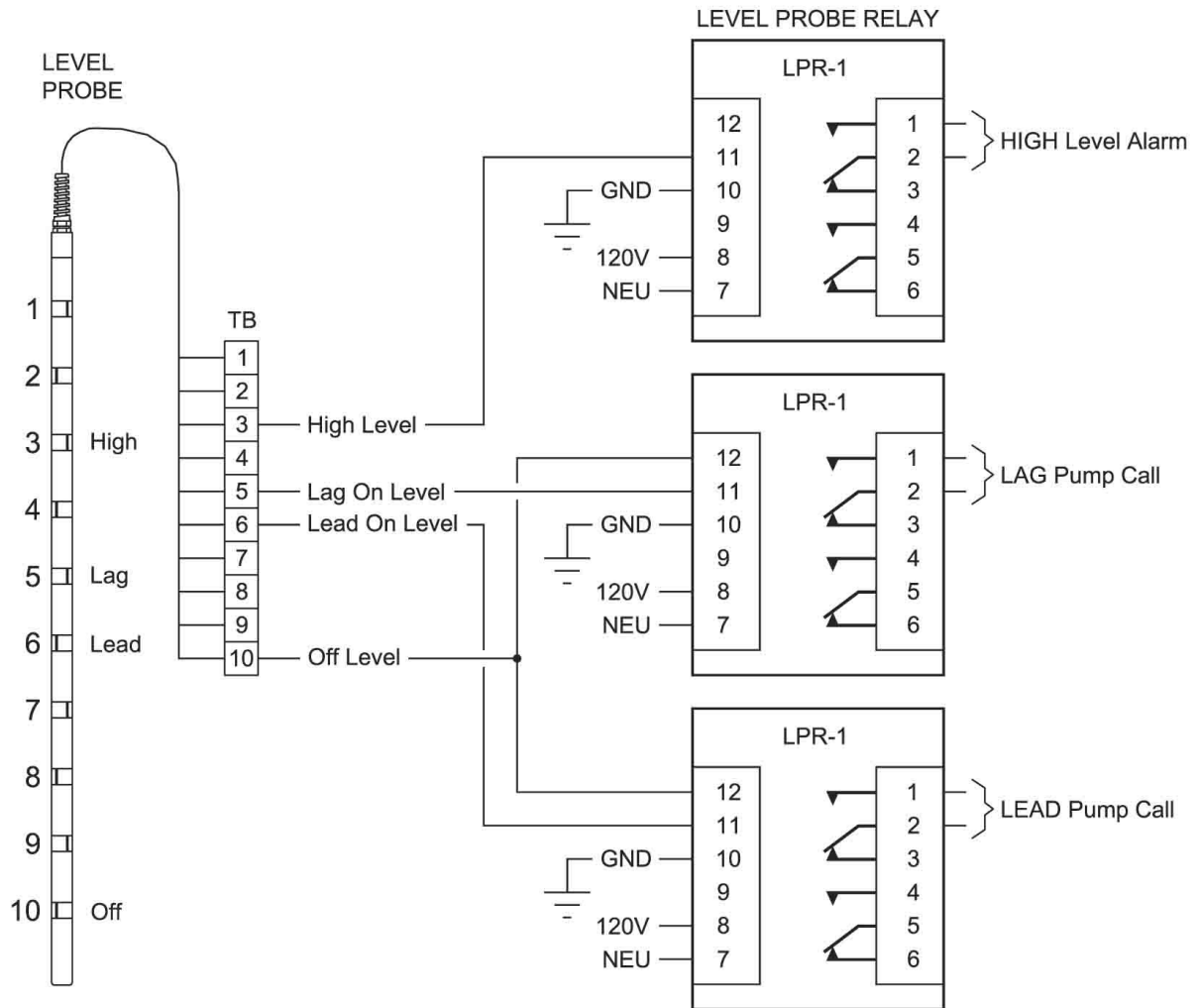
ORDERING INFORMATION

Part Number: LPR-1

LEVEL PROBE RELAY

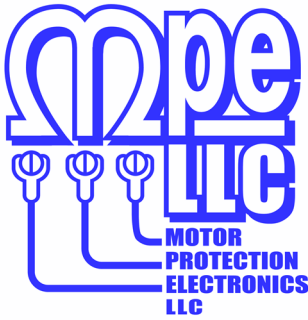
APPLICATION EXAMPLE

The following is an example of how to connect three LEVEL PROBE RELAYs to a LEVEL PROBE, to provide a High Level Alarm and Lead & Lag Pump Call outputs for a typical duplex pump down application:



Notes:

1. The liquid in the wet well must be grounded to the control panel ground. Where a submersible pump is present, the grounded housing of the pump will provide the required ground connection. If there is no ground connection, a single point Level Probe may be placed near the bottom of the wet well and connected to the control panel ground.
2. The High Alarm, Lead On, Lag On and Off Levels are set by selecting the appropriate terminals on the terminal strip (TB), as shown above.
3. A Lag Pump Delay may be accomplished by setting 5, 10, or 15 seconds on DIP Switches 4 & 5 on the Lag Pump Call Level Probe Relay.



LEVEL MONITOR

SUBMERSIBLE PRESSURE TRANSDUCER

TYPICAL APPLICATION

For use with any of MPE's Station Controllers or other pump controllers that require a 4-20mA level input.

**MADE IN
THE U.S.A.**

DESCRIPTION

The Level Monitor provides a rugged and cost-effective means to measure liquid level for water and wastewater pumping applications.

When submersed in liquid, the Level Monitor converts the pressure exerted by the liquid into a 4-20mA analog signal that represents liquid level. The vent tube in the cable transmits atmospheric pressure down the cable to the reference side of pressure sensor, to correct for changes in atmospheric conditions.

A stainless steel diaphragm and silicone oil fill is provided to isolate and protect the pressure sensor from the liquid being measured.

The weight of the Level Monitor acts to reduce its movement when placed in a moving liquid. A Strength Cord in the cable provides ample support for its weight. In applications where strong currents are present, the 1/2" NPT fitting on top may be used to mount the Level Monitor in a fixed position. Also, the 3.75" diameter of the Level Monitor enclosure allows it to fit inside a Stilling Well made from a 4" PVC pipe.

A two stage surge suppressor circuit using both an MOV and TVS provide high voltage transient protection for the transducer circuitry.

The Transducer Vent Bellows (TVB1) is provided with the Level Monitor and is to be connected to the end of the vent tube to prevent moisture from entering the vent tube.

The Kellems Grip (K-Grip) is provided with the Level Monitor allowing a field installation of the cable that is kink free.

The Level Monitor may be ordered with various lengths of cable, and with one of three pressures ranges 5, 10, or 15 psi (11.5, 23.1, or 34.6 Feet).



SPECIFICATIONS

Enclosure Material:	316 Stainless Steel
Enclosure Diameter:	3.75"
Cable Jacket Material:	Polyurethane
Cable Diameter:	0.270 inch
Wire Size:	20 AWG
Vent Tube Diameter:	0.060 inch
Operating Voltage:	13 - 29 VDC
Output Signal:	4 - 20 mA, two wire
Operating Temp:	+32 to +140 °F
Accuracy:	± 0.5 % full scale
Weight (with 40 feet cable):	6.0 lbs
Additional Cable Weight:	0.34 lbs per 10 Feet

ORDERING INFORMATION

Part Number: LM - A - B

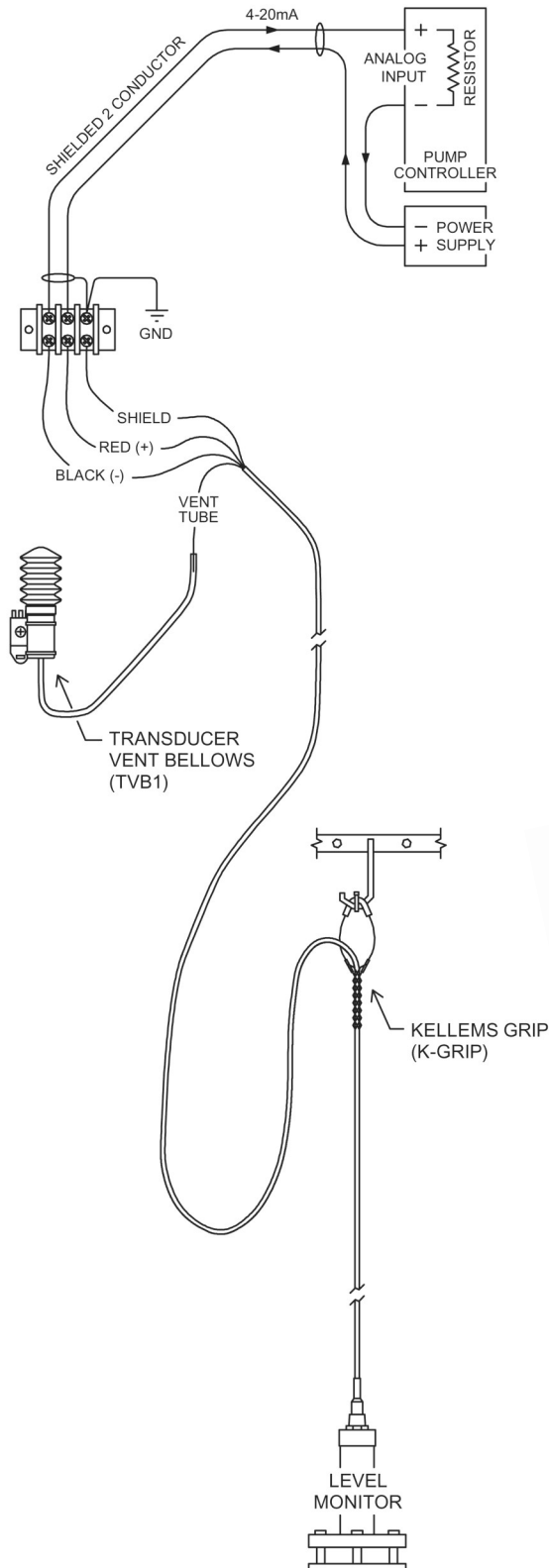
Pressure Range (psi): _____
5, 10, or 15

Cable Length (feet): _____
40 feet is standard for 5 & 10 psi range
60 feet is standard for 15 psi range

Provided with Level Monitor:
Transducer Vent Bellow (TVB1)
Kellems Grip (K-GRIP)

LEVEL MONITOR

CONNECTION DIAGRAM



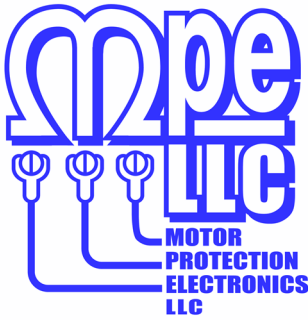
TRANSUCER VENT BELLOWS (TVB1)

Provided With Level Monitor



KELLEMS GRIP (K-GRIP)

Provided With Level Monitor



TRANSDUCER VENT BELLOWS

TYPICAL APPLICATION

For use with all of MPE's Submersible Pressure Transducers that Require the Protection of their Vent Tube from Moisture Entry.

**MADE IN
THE U.S.A.**

DESCRIPTION

The Transducer Vent Bellows (TVB1) provides maintenance free protection for a submersible transducer vent tube against the entry of moisture. The bellows allows normal atmospheric pressure changes to be transmitted to the transducer element without letting moisture latent air into the vent tube. A small rubber hose connects the TVB1 unit to the vent tube of the submersible transducer.

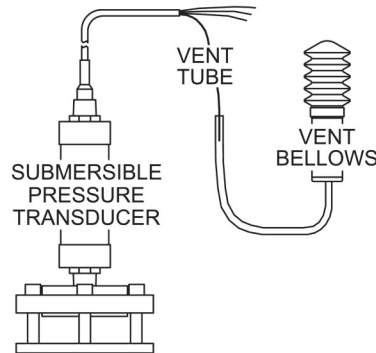
Some submersible pressure transducers come with a desiccant container for attaching to the vent tube. The desiccant is present to help prevent moisture in the air from entering the vent tube.

Desiccant type devices must be periodically replaced or serviced to remain effective. Other submersible pressure transducers come with a small ceramic like vent filter attached to the vent tube. The ceramic filter devices block water as a liquid from entering the vent tube, but they do not block water vapor.

Without adequate protection of the vent tube, moisture from warm air will enter the vent tube and migrate down to the transducer body. As the transducer body is typically cooler than the warm air, the water vapor in the warm air may condense into liquid. The use of a TVB1 is the most effective method for preventing moisture intrusion into the submersible transducer.

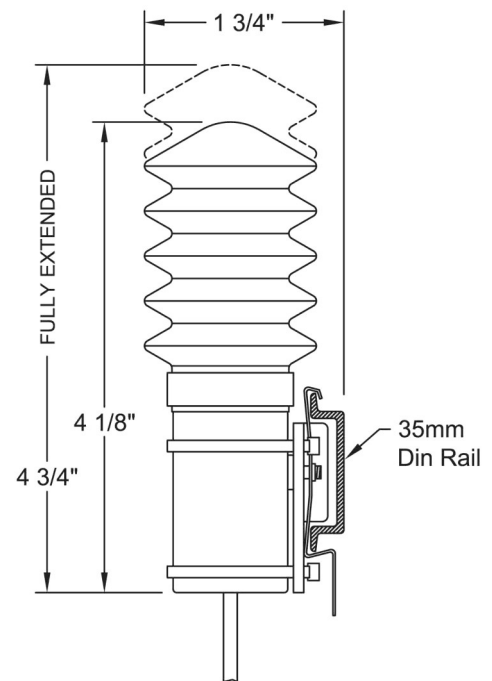
Warning:

Transducer operation without protection will allow moisture in the air to migrate down the transducer's vent tube and condense inside the transducer, causing it to malfunction.



Note:

Adequate space must be left above the bellows for expansion. See below.

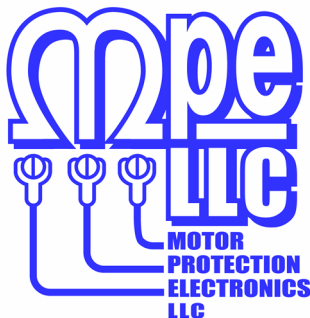


SPECIFICATIONS

Bellows Material:	Silicone
Tube Material:	Clear Polycarbonate
Dinrail Mounting Clip:	35mm O.D.
For use with Vent Tube Diameter:	0.060 inch
Operating Temp:	+32°F to +140°F

ORDERING INFORMATION

Part Number: TVB1



Kellems Grip

TYPICAL APPLICATION

For use with all of MPE's Level Monitor Submersible Pressure Transducers.



DESCRIPTION

The Kellems Grip (K-Grip) for use with the M.P. Electronics Level Monitor Submersible Transducer perfectly fits the transducer cable, allowing a field installation that is professional, and problem free.

Use of the K-Grip ensures that the Level Monitor cable will be properly supported during the installation process so that the cable does not become damaged. Once properly installed, the K-Grip will ensure that the vent tube within the cable does not become crimped.

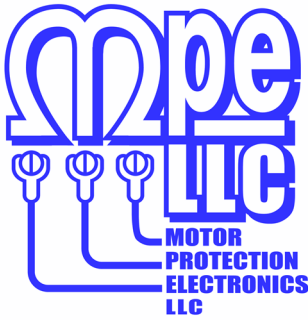
The use of the K-Grip is the most effective method for preventing damage to the transducer cable.

SPECIFICATIONS

K-Grip Material:	Stainless Steel
Cable Grip Diameter:	.230 to .310 inches
Single Eye	
Closed Mesh	
Single Weave	

ORDERING INFORMATION

Part Number: K- Grip



TRANSDUCER SURGE ARRESTER

DESCRIPTION

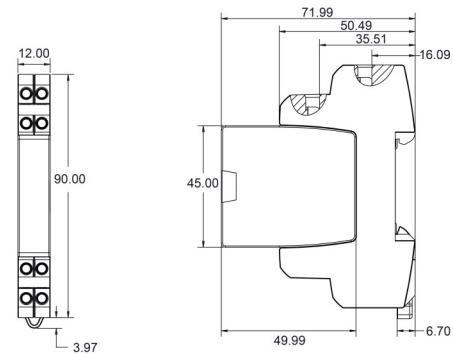
The Transducer Surge Arrester (LM SURGE) is a Din-Rail mounted Surge Protection device, providing effective protection of the 4-20mA loop while taking only minimal space within the control panel.

The LM Surge product can protect two 4-20mA signals, one signal protected via pins 1,1' and 2,2' and a second signal protected by pins 3,3' and 4,4'. The LM Surge product can be used in both standard and intrinsically safe applications. The LM Surge product is not an Intrinsically Safe Barrier, but has been designed to provide surge protection for Zone 2 intrinsically safe applications.

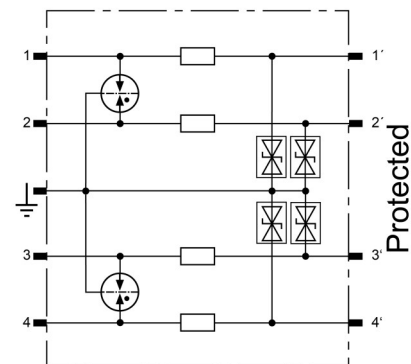
The LM SURGE Arrester has a removable protection module, that can be easily removed and replaced. The functionally-optimized design contains "make before break" terminals that assure continuity of the 4-20mA signal in both the protected and unprotected state.



DIMENSIONS



ELECTRICAL DIAGRAM

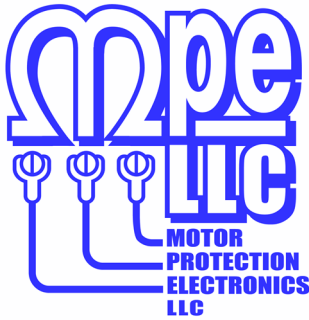


SPECIFICATIONS

Degree of Protection:	IP20
UL Rating:	UL497B
ATEX Approvals:	DEKRA 12ATEX0254 X: II 3 G Ex nA IIC T4 Gc
IECEx Approvals:	DEKRA 11ATEX0089 X: II 3 G Ex nA
Test Standards:	IEC 61643-21, EN61643-21, UL497B
IEC61643-21 Test Category:	D1, C2, C3
SIL Classification:	SIL2, SIL3
Nominal Voltage (U_N):	24V
Max. Continuous Operating DC Voltage (U_C):	33V
Grounding:	Via Din-Rail
Series Impedance per line:	1.8 Ohms
Capacitance, line to line:	≤ 5 nF
Operating Temp:	-40°C to $+80^\circ\text{C}$
Conductors (Flexible):	14 - 28 AWG
Dinrail Mounting Clip:	35mm
Terminal Torque:	3.5 Lb-In

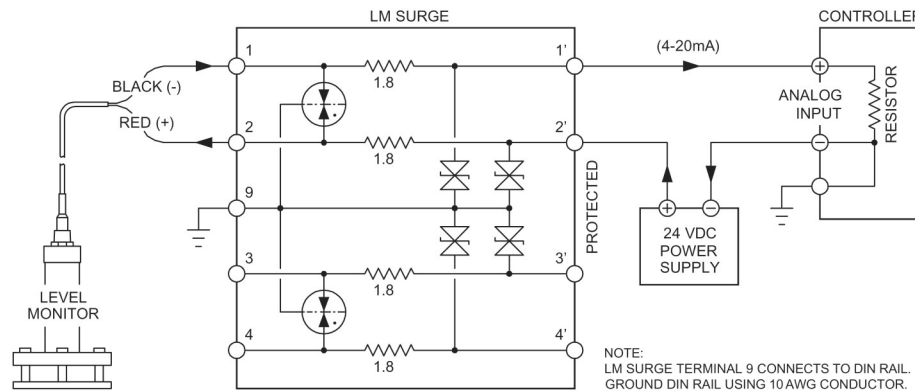
ORDERING INFORMATION

Part Number: LM SURGE

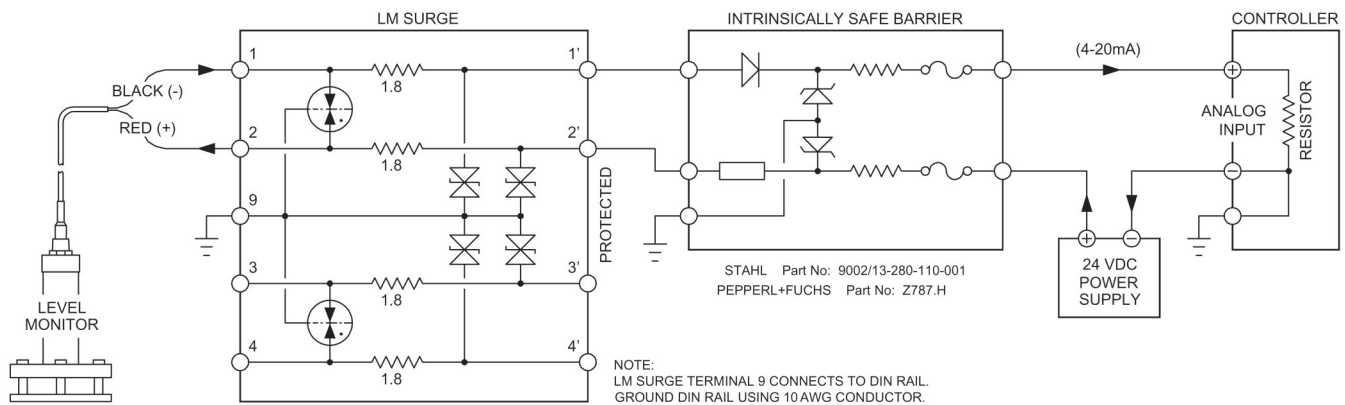


TRANSDUCER SURGE ARRESTER CONNECTION DIAGRAMS

Typical Application

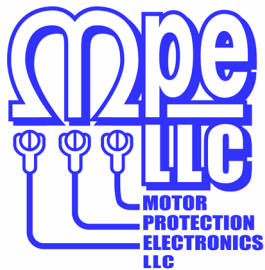


Intrinsically Safe Application



Notes for Using the LM Surge in an Intrinsically Safe Application:

1. Grounding to terminate to an equipotential bonding point. The cross section of the ground conductor from the LM Surge device to the equipotential bonding point must be 6 mm^2 or 10 AWG.
2. LM Surge and I.S. Barrier must be mounted in the non-hazardous location.
3. Entity parameters for the Submersible Pressure Transducer must be compatible with the entity parameters of the I.S. Barrier.
4. Ex Rating for the LM Surge product is II 3G ExnA IIC T4 Gc. Equipment in this category is intended for use in areas (other than mines) which explosive atmospheres by gases or vapors are unlikely to occur, or if they do, are likely to do so infrequently and for a short time only. The LM Surge is rated for Zone 2 application.



WIRELESS TRANSDUCER



WIRELESS TRANSDUCER

Includes: **WIRELESS TRANSDUCER TRANSMITTER**
With Pressure Sensor and 40 feet of Cable

WIRELESS TRANSDUCER RECEIVER
With Antenna and Antenna Cable

ORDERING INFORMATION

Part Number: **WTT40 WTR420 A B**

Analog Output Calibration:

05 = 20mA @ 11.5 Ft/H₂O

10 = 20mA @ 23.1 Ft/H₂O

15 = 20mA @ 34.6 Ft/H₂O

Communications Option:

Blank = Standard Unit — **E** = Ethernet Port



WIRELESS TRANSDUCER TRANSMITTER

TYPICAL APPLICATIONS

For use where having a wireless connection between the transducer and the control panel or telemetry panel is required.

DESCRIPTION

**MADE IN
THE U.S.A.**

TRANSMITTER

The Wireless Transducer Transmitter performs the liquid level measurement and sends the data by radio signal to the Receiver. The device consist of two parts, connected by a cable; the Transmitter and the Pressure Sensor. The Transmitter is suspended above the liquid, and the Pressure Sensor is submerged in the liquid near the bottom of the tank.

The Transmitter transmits updated level data and battery condition data once every second. To conserve battery power, most of the circuitry is powered down and asleep between updates. After being asleep for one second, the Transmitter wakes up, powers up the Pressure Sensor, checks the level, checks the condition of the battery, transmits the new data to the Receiver, and then goes back to sleep.

PRESSURE SENSOR

When submersed in liquid, the Pressure Sensor converts the pressure exerted by the liquid into an analog voltage signal that represents the liquid level. The sensor measures the absolute pressure, so a correction for the barometric pressure must be made. This correction is performed in the Receiver where the local barometric pressure is measured and subtracted from the signal.

A stainless steel diaphragm and silicone oil fill is provided to isolate and protect the pressure sensor from the liquid being measured.

The weight of the Pressure Sensor acts to reduce its movement when placed in a moving liquid. A Strength Cord in the cable provides ample support for its weight. A Kellems Grip is provided to secure the Pressure Sensor Cable to a float hanger.

The Pressure Sensor and the Transmitter come connected together tested and calibrated as a unit. It is calibrated to read levels between 0.0 feet and 34.6 feet and provide a 16 bit number to the Receiver that represents the measured level.



TRANSMITTER SPECIFICATIONS

Enclosure Material:	PVC
Operating Temp:	-20 to +65 °C
Radio Frequency:	2.4 GHz
Battery:	Lithium, 3.6V, Size "D"
A/D Converter Resolution:	16 bit

PRESSURE SENSOR

Enclosure Material:	316 Stainless Steel
Cable Jacket Material:	Polyurethane
Operating Temp:	0 to +60 °C
Accuracy:	± 1.0 % full scale

Transmitter Subassembly: WTT40

Includes: 40 feet of Cable with Kellems Grip



WIRELESS TRANSDUCER RECEIVER

TYPICAL APPLICATIONS

For use where having a wireless connection between the transducer and the control panel or telemetry panel is required.

DESCRIPTION

The Wireless Transducer Receiver reads the liquid level information in the radio signal from the nearby Wireless Transducer Transmitter and provides an analog 4-20mA output and SCADA register data that represents the liquid level being monitored.

The Wireless Transducer Transmitter is suspended above the liquid in the nearby tank and is connected by cable to the Pressure Sensor submerged near the bottom of the tank. The Transmitter obtains the liquid level from the Pressure Sensor and sends the data by radio signal to the Receiver.

The Transmitter and Receiver are capable of reliable communication even with the Transmitter under a concrete slab inside a lift station wet well. The Receiver with its Antenna must however, be mounted nearby. For applications where the Transmitter and Receiver Antenna have line of site, reliable communication can be maintained at distances up to 125 feet.

The Pressure Sensor measures the Absolute Pressure, so in order to accurately determine the liquid level, the WTR420 measures the barometric pressure and makes the necessary correction.

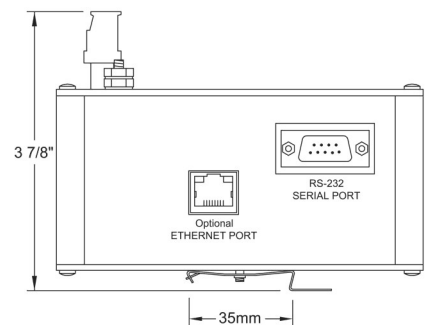
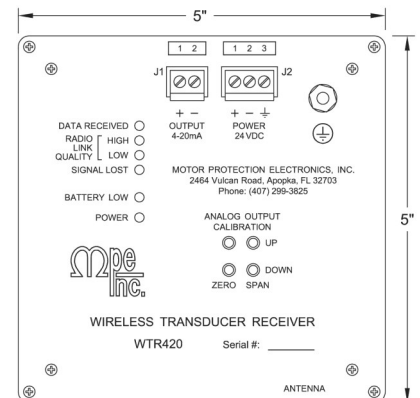
The WTR420 provides three levels of Radio Link Quality indication. HIGH, which indicates good communication. LOW, which indicates less than ideal communication. LOST, which indicates no communication with the Transmitter.

The BATTERY LOW indication on the WTR420 is provided to indicate the condition of the battery in the Transmitter. The indicator blinks when the battery has low voltage and must be replaced.

The 4-20mA Analog Output may be calibration in the field using the Zero and Span push-buttons on the front of the unit. The Span adjustment range is between 20mA @ 3.0 feet/H₂O and 20mA @ 34.6 feet/H₂O.

Connecting the RS-232 serial port (or optional Ethernet Port) to a SCADA system allows the liquid level to be monitored remotely. The WTR420 acts as a Modbus RTU slave.

Additional setup and troubleshooting features are available using the separately supplied Touch Screen Interface Device (TSID).



SPECIFICATIONS

Input Power:	24 VDC \pm 10% 120 mA max
Analog Output:	Non-Isolated 4-20 mA Maximum Load 600 Ω
Radio Frequency:	2.4 GHz
Operating Temp:	-20 to +65 $^{\circ}$ C
Storage Temp:	-45 to +85 $^{\circ}$ C
Enclosure:	Aluminum, Din Rail Mounted

Receiver Subassembly: WTR420 A B

Analog Output Calibration: _____

05 = 20mA @ 11.5 Ft/H₂O

10 = 20mA @ 23.1 Ft/H₂O

15 = 20mA @ 34.6 Ft/H₂O

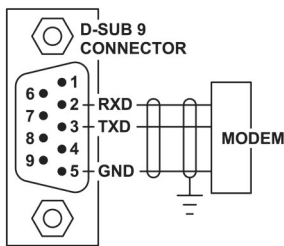
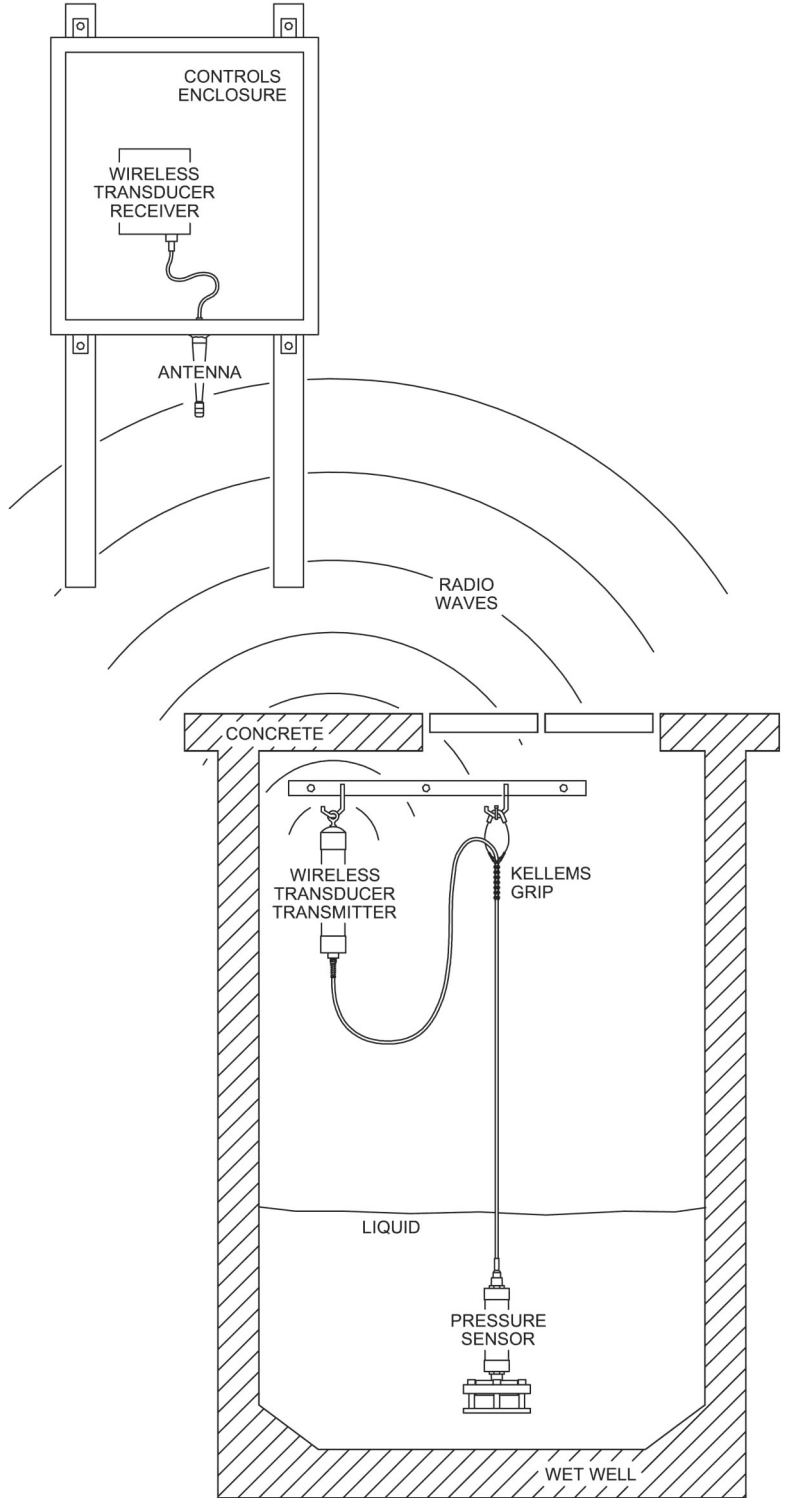
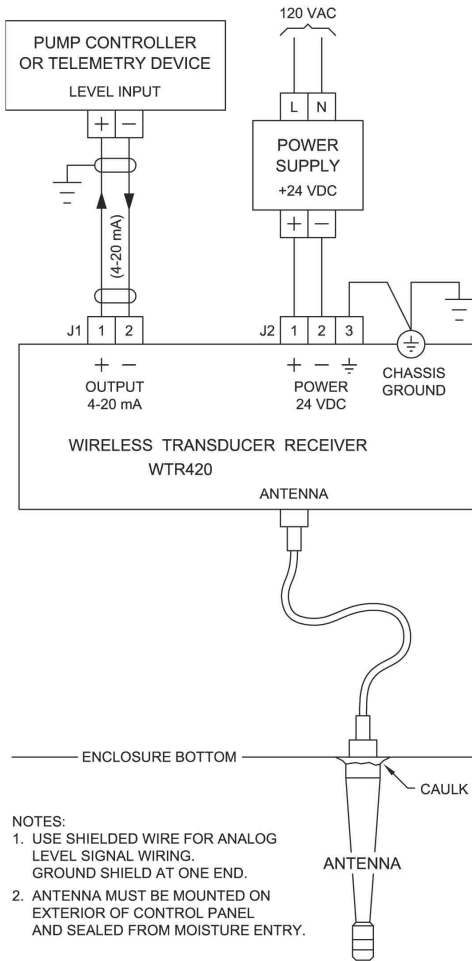
Communications Option: _____

Blank = Standard Unit **E** = Ethernet Port

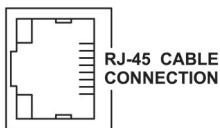
Includes: Antenna and Antenna Cable

WIRELESS TRANSDUCER

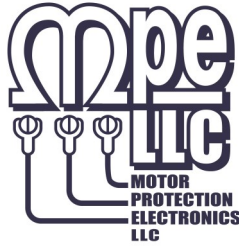
CONNECTION DIAGRAM



RS-232 SERIAL PORT



Optional ETHERNET PORT



Limited Warranty

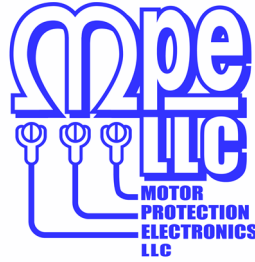
Motor Protection Electronics, Inc. (hereinafter referred to as M.P.E.) warrants the entire line of M.P.E. products to be free from defects in material and workmanship for a period of three (3) years from date of purchase.

This warranty is limited to the original purchaser and further limited to repair or replacement as M.P.E. deems most appropriate. The obligation of M.P.E. under this warranty is limited to repair or replacement as M.P.E. deems most appropriate. The warranty does not cover reimbursement for labor, transportation, removal, installation, shipping, or other expenses which may be incurred in connection with repair or replacement. This warranty does not apply to any product that has been subjected to improper installation, unauthorized entry or alteration, abuse, misuse, destruction by acts of God, Nature, electrical transient damage, or other circumstances beyond the control of M.P.E..

The Level Monitor Submersible Transducer is Supplied with a Transducer Vent Bellows (TVB1) and Kellems Grip. For warranty consideration, proof of installation of the TVB1 and Kellems Grip is required (via installation pictures). We also recommend purchase and installation of the LM-Surge for additional surge protection.

This warranty covers only the products manufactured by M.P.E. and shall in no event cover any resultant systems failures or consequential damages. Similarly, this warranty does not apply to products or parts in instances where adjustment thereof will correct the alleged defect. M.P.E. neither assumes nor authorizes any other person to assign any other warranties or liabilities on its behalf. The forgoing warranty is exclusive and in lieu of all other express and implied warranties except warranty of title, included but limited to implied warranties of merchantability and fitness for a particular purpose.

Please Contact your local Representative or Distributor for assistance with warranty covered items.



M.P.E. Return Policy

For a standard M.P.E. product to be returned, the product must be returned in its original box, unopened, and be less than 1 year old. Returns will be accepted in exchange for the same dollar amount of a different product or they will be subject to a 20% restocking fee.

Products that are sold with options or have been manufactured as a special, or a product that has become obsolete cannot be returned.

The information presented in this publication has been carefully checked for reliability; however, no responsibility is assumed for inaccuracies. Specifications are subject to change without notice and M.P.E. reserves the right to make changes in its products without being obligated to update previous versions.

If you would like a competitor's part number crossed to an M.P.E. part number, please contact the factory by phone or by e-mail.

Phone: (407) 299-3825
info@mpelectronics.com

Revision Date : April 2019



California Proposition 65 Message

WARNING: Some of the products listed in this document can expose you to chemicals which are known to the State of California to cause cancer, birth defects, or other reproductive harm.

For more information, go to <http://www.p65warnings.ca.gov/>.



Application Note

M.P. Electronics

Cross Reference Sheet

Page 1 of 3

Cross Reference Listing	M.P. Electronics	ATC - Diversified	Timemark	SSAC	Crouzet (Syrelec)	SymCom	Macromatic
Phase Monitors							
8 Pin, SPDT	001-DVM-118	SLA-230-ASA	B247, 258B	PLM6405	PWRL230A, PWRS220A	201A (D/V)	PAP208, PAP240
	001-DVM-118	SLA-440-ASA	A257B, A258B	PLM9405	PWRL480A, PWRS440A	201A (D/V)	PAP480
	001-DVM-118	SLU-100-ASA	-----	PLMU11	-----	201A (D/V)	PMPU, PMPU-FA8
	001-DVM-118	SLD-230-ASA	-----	-----	-----	-----	PMPU-FA8X
12 Pin, DPDT	001-DVM-1212	SLA-230-ALA	-----	-----	-----	-----	-----
	001-DVM-1212	SLA-230-ALAU	-----	-----	-----	-----	-----
	001-DVM-1212	-----	-----	-----	-----	-----	PMPU-FA12
Surface Mount	002-230-123	SLA-230-ALE	-----	-----	-----	-----	-----
	002-480-123	SLA-440-ALE	-----	-----	-----	-----	-----
Duplex Alternators							
8 Pin, SPDT	008-120-10	ARA-120-ABA	261-S-120	ARP41	PJR110A	ALT-115-S	ARP120A6
	008-120-10S	ARB-120-ABA	261-ST-120	ARP41S	PJRS110A	ALT-115-S	ARP120A6R
	008-120-10SP	-----	-----	-----	-----	-----	-----
8 Pin, DPDT, Crosswired	008-120-11	ARA-120-ACA	261-DX-120	ARP43	PJR110A	ALT-115X	ARP120A3
	008-120-11S	ARB-120-ACA	261-DXT-120	ARP43S	PJRXS110A	ALT-115-X-SW	ARP120A3R
	008-120-11SP	-----	-----	-----	-----	-----	-----
11 Pin, DPDT	008-120-12	ARA-120-ADA	261-D-120	ARP42	LJR2110A	-----	ARP120A2
	008-120-12S	ARB-120-ADA	261-DT-120	ARP42S	LJRS2110A	-----	ARP120A2R
	008-120-12SP	-----	-----	-----	-----	-----	-----
8 Pin, DPDT, Crosswired	008-120-13	ARA-120-AEA	-----	-----	-----	-----	ARP12-A5
	008-120-13S	ARB-120AEA	-----	-----	-----	-----	ARP120A5R
	008-120-13SP	-----	-----	-----	-----	-----	-----
Triplex Alternator	009-120-23	ARA-120-AFE	-----	-----	-----	-----	-----



Application Note

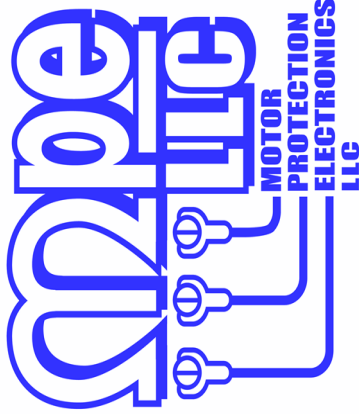
M.P. Electronics

Cross Reference Sheet

Page 2 of 3

	MPE	DIVERSIFIED
Intrinsically Safe Relays	030-024-118	ISO-24-AFA
	030-120-118	ISO-120-AFA

	MPE	DIVERSIFIED	FORM	FIT	FUNCTION
Voltage Monitors	004-230-118	UOA-240-AFA	Different	Same	MPE=SPDT, Div=DPDT & Fixed Adjustment, Pinout Different
	004-230-118	UOA-240-AKA	Different	Same	MPE = SPDT, Div = DPDT, Pinout is Different
	004-230-118	UOA-240-ALA	Different	Same	MPE = SPDT, Div = DPDT & Knob Locknut, Pinout is Different
	004-230-118	VBA-240-AFA	Same	Different	MPE is Plug-in, Div is Surface Mounted, with Fixed Adjustment
	004-230-118	VBA-240-AKA	Same	Different	MPE unit is Plug-in, Div unit is Surface Mounted
	004-230-118	VBA-240-ALA	Same	Different	MPE is Plug-in, Div is Surface Mounted, with Knob Locknut
Phase Monitors					
8-Pin	001-DVM-118	SLA-230-ASA	Same	Same	MPE Unit has Over-Voltage Protection -Div does not
	001-DVM-118	SLD-230-ASA	Same	Same	Same
	001-DVM-118	SLA-440-ASA	Same	Same	MPE Unit has Over-Voltage Protection -Div does not
	001-DVM-118	SUA-440-ASA	Same	Same	MPE Unit has Over-Voltage Protection -Div does not
	001-DVM-118	SLD-440-ASA	Same	Same	Same
12-Pin	001-DVM-1212	SLA-230-ALA	Same	Different	Same
	001-DVM-1212	SLA-230-ALAU	Same	Different	Same
Surface Mount	002-230-123	SLA-230-ALE	Same	Same	Same
	002-230-123	PBC-230-ALE	Same	Same	MPE Unit has fixed Under & Over Voltage Settings
	002-230-123	SLC-230-ALE	Same	Same	Same
	002-230-123	SLD-230-ALE	Same	Same	Same
	002-230-123	SLE-230-ALE	Same	Same	MPE Unit does not have adjustable U.V. Drop-out
	002-230-123	SLH-230-ALE	Same	Same	MPE Unit does not have Adjustable Hysteresis
	002-230-123	SLM-230-ALE	Same	Same	MPE Unit does not have Frequency & Phase Shift
	002-480-123	SLA-440-ALE	Same	Same	MPE Unit has Over-Voltage Protection - Div does not
	002-480-123	PBC-480-ALE	Same	Same	MPE Unit has Fixed Under & Over Voltage Settings
	002-480-123	SLC-440-ALE	Same	Same	Same
	002-480-123	SLD-440-ALE	Same	Same	Same
	002-480-123	SLE-440-ALE	Same	Same	MPE Unit does not have U.V. Drop-out Adjustment
	002-480-123	SLH-440-ALE	Same	Same	MPE Unit does not have Adjustable Hysteresis
	002-480-123	SLM-440-ALE	Same	Same	MPE unit does not have frequency & phase shift



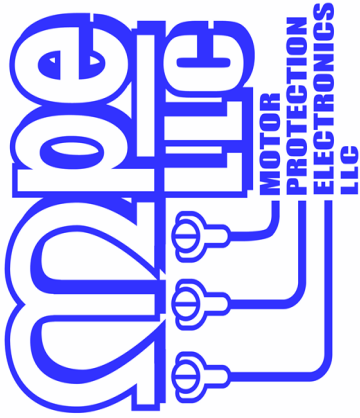
Application Note

M.P. Electronics

Cross Reference Sheet

Page 3 of 3

		MPE		DIVERSIFIED	
Triplex Alternators	009-120-23	009-120-AFE	Same	Same	Same except MPE unit has switch for duplex/triplex operation
	009-120-23	009-120-AME	Same	Same	Same
	009-120-23	ARA-120-AHE	Same	Same	Same except MPE unit always locks out output #3 in duplex mode
	009-120-23	ARA-120-AJE	Same	Same	Same except MPE unit always alternates 1-2-3, 2-3-1, 3-1-2
	009-120-23P	ARA-120-AFE	Same	Different	MPE is plug-in, MPE unit has switch for duplex/triplex operation
	009-120-23P	009-120-AME	Same	Different	MPE is plug-in
	009-120-23P	ARA-120-AHE	Same	Different	MPE is plug-in, MPE unit always locks out the #3 in duplex mode
Time Delay Relays	009-120-23P	ARA-120-AJE	Same	Different	MPE is plug-in, MPE unit always alternates 1-2-3, 2-3-1, 3-1-2
	021-024-0010	TDC-024-AKA-010	Same	Same	Same
	021-024-0010	TDC-024-ALA-010	Same	Same	Div unit has knob lockout
	021-024-0010	TDC-024-AFA-010	Same	Same	Div unit has fixed delay for 10 seconds
	021-024-0010	TUC-024-AKA-010	Same	Same	Same
	021-024-0010	TUC-024-ALA-010	Same	Same	Div unit has Knob locknut
	021-024-0010	TUC-024-AFA-010	Same	Same	Div unit has fixed delay for 10 seconds
021-024-0010	TBC-024-AA	Same	Same	Time on Div unit is dip switch selectable	



**Application Note - Multitrode
to M.P. Electronics Part Number
Cross Reference Sheet**

<u>Level Probes:</u>		MPE	Multi-Trode			
Part Number	Part Number	Description	Spacing	MPE	M/T	
LP-7-1-50	0.2/1-10	Single Point Probe	N/A	50 feet	33 feet	
LP-19-3-50	0.5/3-10	Three Point Probe	6 inch	50 feet	33 feet	
LP-52-10-50	1.0/10-10	10 Point Probe	5 inch	50 feet	33 feet	
LP-61-10-50	1.5/10-10	10 Point Probe	6 inch	50 feet	33 feet	
LP-79-10-50	2.0/10-10	10 Point Probe	8 inch	50 feet	33 feet	
LP-97-10-50	2.5/10-10	10 Point Probe	10 inch	50 feet	33 feet	
LP-115-10-50	3.0/10-10	10 Point Probe	12 inch	50 feet	33 feet	
LP-7-1-100	0.2/1-30	Single Point Probe	N/A	100 feet	100 feet	
LP-19-3-100	0.5/3-30	Three Point Probe	6 inch	100 feet	100 feet	
LP-52-10-100	1.0/10-30	10 Point Probe	5 inch	100 feet	100 feet	
LP-61-10-100	1.5/10-30	10 Point Probe	6 inch	100 feet	100 feet	
LP-79-10-100	2.0/10-30	10 Point Probe	8 inch	100 feet	100 feet	
LP-97-10-100	2.5/10-30	10 Point Probe	10 inch	100 feet	100 feet	
LP-115-10-100	3.0/10-30	10 Point Probe	12 inch	100 feet	100 feet	

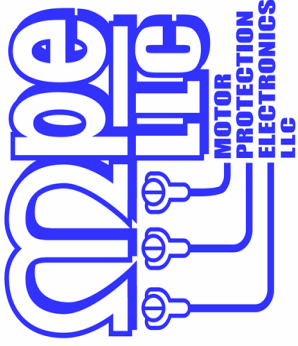
Notes: MPE Probes include Small Squeegee bracket and S hook except for Single-Point Probes



Application Note - Multitrode to M.P. Electronics Part Number Cross Reference Sheet

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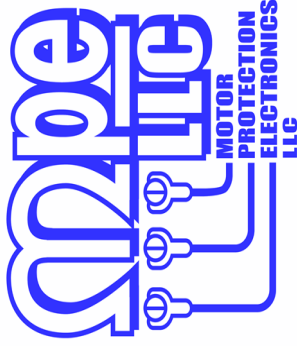
MPE Part Number	Multi-Trode Part Number	Description
<u>Mounting Brackets:</u>		
LPB-1	MTAK-1	Sm. Brkt w/ S hook
LPB-2	MTAK-2	Lg. Brkt w/ S hook
<u>Intrinsically Safe Barrier:</u>		
ISB-10	MTISB10	10 Point Intrinsically Safe Barrier
<u>Level Probe Relay:</u>		
LPR-1	MTR3	Level Probe Relay, 120VAC
LPR-1	MTRA3	* Requires two LPR-1's, as each LPR-1 controls only one probe point.
<u>Indicating Controller:</u>		
LPC420		24VDC, 10 Probe inputs, 4-20mA output (for app.'s that don't need relay outputs)
LPC420R	MTIC3	120VAC, 10 Probe Inputs, 4-20 mA output, 10 Output Relays
LPC420R	MTIC5	24VDC, 10 Probe Inputs, 4-20 mA output,



**Application Note - Multitrode
to M.P. Electronics Part Number
Cross Reference Sheet**

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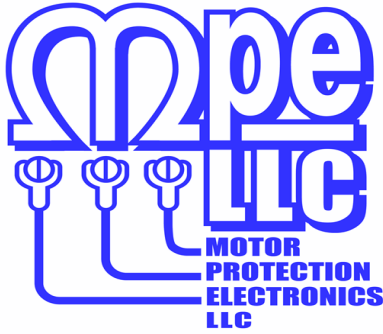
MPE	Multi-Trode				
Part Number	Part Number	Description			
<u>Back-up Controllers:</u>					
Duplexer p/n	SAFE-FS	120VAC, Duplex, SCADA-Ready, Level Probe Controller that can			
010-120-122P		be used with two PMR's (Pump monitoring Relays) if needed.			
ISD-X	SAFE-FS	120VAC, Duplex, Intrinsically Safe, SCADA-Ready, Level Probe Controller that			
Panel Mt. - P		can be used with two PMR's (Pump monitoring Relays) if needed.			
DinRail - D		Optional Ethernet Port - Comes standard with RS-232 Serial Port.			
Surface Mt. - S					
<u>Simple 2 Pump Controller:</u>					
Duplexer	MTDPC3	120VAC, Duplex, SCADA-Ready, Level Probe / Float Controller			
ISD-X	MTDPC3	120VAC, Duplex, Intrinsically Safe, SCADA-Ready, Level Probe/Float Controller			
SC100	MTDPC3	120VAC, Duplex Level Controller w/ 4-20 mA level input signal			
<u>Advanced 2 Pump Controller:</u>					
SC1000	MT2PC3	120VAC, Selectable 1 - 3 Pumps, RS232 SCADA Ready, Optional Ethernet Port			
SC2000-00	MT2PC3	120VAC, Selectable 1 - 4 Pumps. RS232 SCADA Ready, Optional Ethernet Port			



Application Note - Multitrode to M.P. Electronics Part Number Cross Reference Sheet

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MPE	Multi-Trode		
Part Number	Part Number	Description	
Advanced 3 Pump Controller:			
SC1000	MT3PC3	120VAC, Selectable 1 - 3 Pumps, RS232 SCADA Ready, Optional Ethernet Port	
SC2000-00	MT3PC3	120VAC, Selectable 1 - 4 Pumps, RS232 SCADA Ready, Optional Ethernet Port	
Advanced 2 Pump Controller for VFD Application:			
SC2000-20	MT2PCVFD3	120VAC, Selectable 1 - 4 Pumps, RS232 SCADA Ready, Optional Ethernet Port	
Advanced 3 Pump Controller for VFD Application:			
SC2000-30	MT3PCVFD3	120VAC, Selectable 1 - 4 Pumps, RS232 SCADA Ready, Optional Ethernet Port	
Pump Station Manager:			
SC2000-XX	MultiSmart	The SC2000-XX can perform many of the functions of the MultiSmart Controller, and unlike the MultiSmart Controller, the features within the SC2000-XX are all available to the customer, and do not have to be purchased individually.	



Application Note - Xylem-Flygt to M.P. Electronics Part Number Cross Reference Sheet

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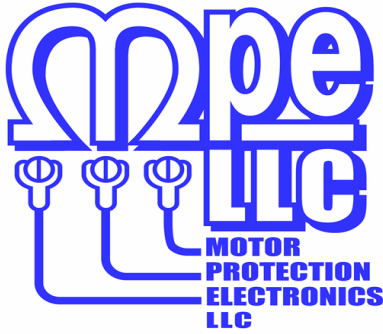
<u>FLYGT P/N</u>	<u>MPE P/N</u>	<u>Description</u>
14-403184	008-120-12	Alternator, 120V, DPDT
14-403185	008-120-12S	Alternator, 120V, DPDT, w/ Lead Select Switch
14-403186	008-120-13SP	Alternator, 120V, Cross Wired, W/ PTT & Lead Select Sw.
14-403187	001-DVM-118	Phase Monitor, 230V, 8 Pin
14-403188	001-DVM-118	Phase Monitor, 480V, 8 Pin
14-403189	004-230-118	Voltage Monitor, 230V, 8 Pin
14-403190	021-120-0010	Time Delay Relay, 120V, 1-10 Seconds
14-403191	021-120-0060	Time Delay Relay, 120V, 6-60 Seconds
14-403193	010-120-122P	Duplexer Controller
14-403196	010-120-121P	Simplex Controller
14-403202	008-120-10	Alternator, 120V, SPDT
14-403203	008-120-11	Alternator, 120V, Cross-Wired
14-403212	001-DVM-1212	Phase Monitor, 230V, 12 Pin
14-403213	001-DVM-1212	Phase Monitor, 480V, 12 Pin
14-403214	001-DVM-1212	Phase Monitor, 480V, 12 Pin
14-403220	009-120-23P	Triplex Alternator, Plug-In
14-403222	030-120-118	Intrinsically Safe Relay, 120V
14-403235	ISD-P	Panel Mount Intrinsically Safe Duplex Controller
14-405081	BOAC-001	Battery Operated Charger and Alarm Unit
14-407113	PMR2	Direct Replacement for 24V MiniCas
14-407129	PMR2	MPE Version of Mini-Cas120
14-407123	RB08-PC	8 Pin Socket w/ Pressure Clamp Terminals
14-407124	SD12-PC	12 Pin Rect. Socket w/ Pres.Clamp Terminals
14-407130	P3GA11	Reverse mounted Socket for Mini-cas 120



Application Note - Xylem-Flygt to M.P. Electronics Part Number Cross Reference Sheet

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<u>FLYGT P/N</u>	<u>MPE P/N</u>	<u>Description</u>
14-414000	LP-7-1-50	Single Pt.Probe w/ 50' cable
14-414001	LP-19-3-50	3-Pt. Probe w/ 50' cable
14-414002	LP-52-10-50	10 Pt. Probe, 5"spacing, 50' cable
14-414003	LP-61-10-50	10 Pt. Probe, 6"spacing, 50' cable
14-414004	LP-79-10-50	10 Pt. Probe, 8"spacing, 50' cable
14-414005	LP-97-10-50	10 Pt. Probe, 10"spacing, 50' cable
14-414006	LP-115-10-50	10 Pt. Probe, 12"spacing, 50" cable
14-414009	LP-7-1-100	Single Pt. Probe w/ 100' cable
14-414010	LP-19-3-100	3-Pt. Probe w/ 100' cable
14-414011	LP-52-10-100	10 Pt. Probe, 5"spacing, 100'cable
14-414012	LP-61-10-100	10 Pt. Probe, 6"spacing, 100' cable
14-414013	LP-79-10-100	10 Pt. Probe, 8"spacing, 100' cable
14-414014	LP-97-10-100	10 Pt. Probe, 10"spacing, 100' cable
14-414015	LP-115-10-100	10 Pt. Probe, 12"spacing, 100" cable
14-414007	LPB-1	Sm. Probe Mtg Brkt w/ Sq.&S hook
14-414008	LPB-2	Lg. Probe Mtg Brkt w/ Sq.& S hook
14-414016	LPR-1	Level Probe Relay
14-414017	ISB-10	10 Point Intrinsically Safe Barrier



Application Note - Xylem-Flygt to M.P. Electronics Part Number Cross Reference Sheet

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Discontinued

<u>FLYGT P/N</u>	<u>MPE P/N</u>	<u>Description</u>
14-403192	010-120-101P	See App Note for Conversion to MPE p/n 030-120-118
14-403194	010-120-123	Obsolete
14-403195	010-120-121	Obsolete
14-403199	004-120-118	Obsolete
14-403204	009-120-23	Obsolete
14-403215	091-120-103	Obsolete
14-403217	010-120-123P	Obsolete
14-403218	009-120-34	Obsolete
14-407122	RBO8	Obsolete
14-403182	008-024-12	Alternator, 24V, DPDT
14-403183	008-024-12S	Alternator, 24V, DPDT, w/ Lead Select Switch
14-403200	008-024-10	Alternator, 24V, SPDT
14-403201	008-024-11	Alternator, 24V, Cross-Wired
14-403205	021-024-0010	Time Delay Relay, 120V, 6-60 Seconds
14-403198	021-024-0060	Time Delay Relay, 24V, 6-60 Seconds
14-403219	009-120-34P	Quad Alternator, Plug-In
14-403221	030-024-118	Intrinsically Safe Relay, 24V
14-403225	PS100	24VDC, 100mA Power Supply
14-405082	025-120-105	Flasher
14-403249	SC100-16	SC100, 0-16ft. Level Range (Flygt Only)
14-403250	SC100-32	SC100, 0-32ft. Level Range (Flygt Only)
14-407121	RB11-PC	11 Pin Socket w/ Pressure Clamp Terminals
14-500057	GCM500	Ground Check Relay