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Ordering Information - Phase Monitors

Phase Monitor Designations

Example: M.P.E. Product Number 001 - DVM - 118 Product Number Breakdown:





MOTOR PROTECTION ELECTRONICS

THREE PHASE MOTOR PROTECTION

MADE IN THE U.S.A.

PROTECTS AGAINST: Under Voltage

LLC

Phase Loss Phase Reversal Phase Unbalance (Optional Over Voltage) UL FILE #E101681



OPERATION

Under Voltage:

Over Voltage:

Trip Delay:

Reset Delay:

Storage Temp:

Enclosure:

Trip:

Trip:

Trip:

Reset:

(Delay on Release)

(Delay on Operate)

Input Voltage Range:

Reset:

Reset: Phase Unbalance:

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 deenergized. 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.

SPECIFICATIONS

4%

Output Voltage Rating: 240VAC Maximum

Output Current Rating: 3A* @ -40°C to +65°C

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

- 15% of 200-280V or -10% of 425-525V

+ 15% of 200-280V or +10% of 425-525V

+ 12% of 200-280V or +8% of 425-525V

5 Seconds (Delay is Reduced to 1 Second

if Phase Unbalance is 10% or Greater)

2 Seconds Standard (See Options)

200V to 280V or 425V to 525V

5A* @ -40°C to +50°C

-45°C to +85°C

White Plastic

5% with 5 Second Trip Delay 10% with 1 Second Trip Delay

- 12% of 200-280V or -8% of 425-525V





G30 - 30 Second Reset Delay

G60 - 60 Second Reset Delay

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974 Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: <u>Sales@cabriggs.com</u> - <u>www.cabriggs.com</u>

*Total Load on

Both Outputs



PROTECTS AGAINST: Under Voltage Phase Loss Phase Reversal Phase Unbalance (Optional Over Voltage)

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.

OPERATION

Under Voltage: Trip:

Over Voltage: Trip:

Trip Delay:

Reset Delay:

Output Rating:

Storage Temp:

Enclosure:

Base:

Operating Temp:

Reset:

Reset:

Reset:

(Delay on Release)

(Delay on Operate) Voltage Range:

Phase Unbalance: Trip:

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-The LED will then provide a series of pulses that energized. 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.

Phenolic

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

001-DVM



1 8 - XXXXX

SPECIFICATIONS - 15% of 200-280V or -10% of 425-525V - 12% of 200-280V or -8% of 425-525V + 15% of 200-280V or +10% of 425-525V	LED STATUS CONDITION ON STEADY NORMAL AUTULUT TRIP OF RESET UNDERVOLTAGE OVERVOLTAGE OVERVOLTAGE Ø REVERSAL
+ 12% of 200-280V or +8% of 425-525V	ORDERING INFORMATION
 5% with 5 Second Trip Delay 10% with 1 Second Trip Delay 4% 5 Seconds (Delay is Reduced to 1 Second e) if Phase Unbalance is 10% or Greater) 2 Seconds Standard (See Options) e) 	001 - DVM - 11 8 - XXX Product Type J Operating Voltage (Dual Voltage) Relay Type (SPDT,SPST) Base (8 Pin Octal)
200V to 280V or 425V to 525V 10A Resistive @ 240VAC -40°C to +40°C -45°C to +85°C White Lexan	OV - Over Voltage G5 - 5 Second Reset Delay G10 - 10 Second Reset Delay G20 - 20 Second Reset Delay

- 15%

set Delav set Delay set Delav G30 - 30 Second Reset Delay G60 - 60 Second Reset Delay



PROTECTS AGAINST: Under Voltage Phase Loss Phase Reversal Phase Unbalance (Optional Over Voltage)

DUAL VOLTAGE PHASE MONITORS

THREE PHASE MOTOR PROTECTION



UL FILE #E101681



*UL listed models require use

of an SD12-PC socket.

8

001-DVM-

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 deenergized. 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.



LED STATUS	CONDITION		ç		В		A
ON STEADY JUNION JUNION JUNION JUNION JUNION JUNION	NORMAL TRIP or RESET UNDERVOLTAGE OVERVOLTAGE Ø UNBALANCE Ø REVERSAL	6 7	5	4 9 1	3 10	11	1 12

ORDERING INFORMATION	
001 - DVM - 12 12 - XXX Product Type J 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	<u>(X</u>

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)	
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

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



UL FILE #E101681



MADE IN THE U.S.A.

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.



		1		
SPE	CIFICATIONS		LED STATUS	COND
			ON STEADY	NORMAL
Under Voltage:			www	TRIP or F
Trip:	- 15% of 200V-280V			OVERVO
Reset:	- 12% of 200V-280V			OVERVO
Over Voltage:				
Trip:	+ 15% of 200V-280V	ΙГ		
Reset:	+ 12% of 200V-280V		ORDE	ERING
Trip Delay:	5 Seconds			0
(Delay on Release)			Product 7	Гуре 🗕
Reset Delay:	2 Seconds Standard (See Options)		Operating	g Volta
(Delay on Operate)			Relay Ty	pe (SP
Voltage Range:	200V to 280V		Base (8 F	in Òct
Output Rating:	10A Resistive @ 240VAC		Options:	
- 1 5	6A Inductive @ 240VAC		· ov	- Ove
Operating Temp:	-40°C to +50°C		G5	- 58
Storage Temp:	-45°C to +85°C		G10	0 - 10 S
Enclosure:	White Lexan		G20	0 - 20 S
Base:	Phenolic		G3(0 - 30 S
			GÂ	0 - 60 5



CONDITION

L1 230V L2



MADE IN

THE U.S.A.

PROTECTS AGAINST: Under Voltage

Rapid Load Cycling (Optional Over Voltage)

VOLTAGE MONITORS

SINGLE PHASE MOTOR PROTECTION



UL FILE #E101681



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

 Image: Status Status

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: - 15% of 200V-280V Trip: Reset: - 12% of 200V-280V Over Voltage: + 15% of 200V-280V Trip: 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 - Alternators

Alternator Designations

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







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.

Supply Voltage:120VAC - 1 Phase 50/Output Rating:10A @ Operating VoltaRelay Type:SPDTDevice Dissipation:Loss Then 1 Watt

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





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.





ALTERNATORS

DPDT

BASIC MODEL:

008-120-12



UL FILE #E101681

120

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

Base:

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.

Supply Voltage: 120VAC - 1 Phase 50/60 Hz Output Rating: 10A @ Operating Voltage Relay Type: DPDT

SPECIFICATIONS

Power Dissipation: Less Than 1 Watt Operating Temp: -20 To +60 °C Storage Temp: -45 To +85 °C Enclosure: Lexan Phenolic









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.



ALTERNATORS

DPDT CROSSWIRED POWER ON PINS 5 & 6

BASIC MODEL:

008-120-13



2.375"



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: Inputs: Relay Outputs:

Indicators: Operating Temp: Storage Temp: Enclosure:

120 VAC ±10%, 10 VA max 120 VAC 6A Resistive @ 120 VAC 3.6 A Inductive @ 120 VAC LED's -20 to +60 °C -45 to +85 °C Lexan

ORDERING INFORMATION

Part Number

17

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

009-120-23



FEATURES:

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

TIMERS

DELAY ON OPERATE

MADE IN THE U.S.A.



UL FILE # E101681





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 ± 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





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



BRACKET KIT



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.

HARDWARE



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.



MADE IN THE U.S.A.

MPE Panel Air Vent



DESCRIPTION

The MPE Panel Air Vent is made of an ABS plastic, type ASA that is commonly used to mold exterior automotive parts, resulting in a product that will have a long life when exposed to outdoor conditions. The air vent comes with a foam screen insert filter for use in control panel ventilation. This popular air vent had been discontinued by the previous manufacturer, and has been retooled by M.P. Electronics for their OEM customers.

SPECIFICATIONS

Dimension, Width:	5.0 Inches
Dimension, Thickness:	1.25 Inches
Material:	ABS Plastic, type ASA (Outdoor ABS)
Color:	Black
Filter Type:	Foam, 20ppi, 1/4 inch thick, Charcoal color
NEMA Rating:	NEMA 1





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





Part Number: DR12 12 Pin, Din-Rail Mount Rating: 10A , 600V UL Recognized, CSA





ADJUSTABLE TRANSMITTER



- 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 place 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.

SPECIFICATIONS

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



Connection with Internal Power Supply



Connection with External Power Supply



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

BOAC

Battery Operated Alarm with Charger





UL FILE # E101681

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 where 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 $25 \,\text{mA}$, and the Charge Controller toggles back to the Float Charging Mode. Battery manufacturers typically recommend this dual voltage charging regiment 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°).

SPECIFICATIONS

Input Power: Charging Voltage:	120 VAC ±10% 8.9 VA max Cyclic Charging Mode - 14.6 V ±1% @ 25°C Float Charging Mode - 13.6 V ±1% @ 25°C	ORDERING
Charging Current Limit: Strobe Light Output: Horn Output: Operating Temp: Storage Temp: Enclosure: Plug In Base:	103mA 12VDC @ 500mA or Less 12VDC @ 500mA or Less (See Note on Horn Selection) -20°C to +60°C -45°C to +85°C Lexan Phenolic	INFORMATION Part Number: BOAC-001



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 120 VAC, the BOAC will provide +12 V battery power to Pin 3 to turn on the strobe light. Also, upon a high level alarm, the +12 V 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 120 VAC, 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, 7Ah	EnerSys	NP7-12
Alarm Horn, Multitone Electronic, 12-24VDC, Red Alarm Horn Back Box, Red	Wheelock Wheelock	MT-12/24-R IOB-R
Alarm Strobe Light, 12-48VDC, Red	Federal Signal	LP3M-012-048R
Socket (for BOAC-001), 12 Pin, Surface Mount, 10 A, $600 V$	Custom Connector	SD12-PC





MADE IN THE U.S.A.



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





3.61

ORDERING INFORMATION

Part Number: PMR1



Pump Monitor Relay

CONNECTION DIAGRAMS







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 mA ±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 Pushbutton 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 mA ±5%), the Leakage Indication is turned on and the Leakage Alarm Relay is energized.

SPECIFICATIONS







Part Number: PMR2

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974 Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: <u>Sales@cabriggs.com</u> - <u>www.cabriggs.com</u>

Input Power:

Output Rating: Operating Temp: Storage Temp: Sensor Circuit Voltage: Temp Alarm Trip Point: Leak Alarm Trip Point: Enclosure: Base: 120 VAC ±10%, 7.0 VA max 24 VAC ±10%, 3.5 VA max 24 VDC ±10%, 125 mA max 8A Resistive @ 120VAC -20 °C to +65 °C -45 °C to +85 °C 12 VDC ±10% ≤3.0 mA ±5% ≥22 mA ±5% Blue Lexan Phenolic

Pump Monitor Relay PMR2

CONNECTION DIAGRAM





Pump Monitor Relay PMR3



UL FILE #E101681

OPERATION

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

MADE IN

THE U.S.A.

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 1 and 3.

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 1 and 3 and closing the contacts between terminals 1 and 4.

When the High Motor Temperature condition has cleared, the unit will reset based on the position of Alarm Reset Mode Select When in the Auto position, the Switch (Auto or Manual). 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 2 and 5 to drop below the setting on the potentiometer. When this occurs the unit turns on the Leakage Indication and the Leakage Alarm Relay is energized opening the contacts between terminals 11 and 8 and closing the contacts between terminals 11 and 9.

The alarm trip point may be set by the following procedure: Isolate the Leakage Probe(s) from terminal 2. Connect a resistor, with the desired trip value, across terminals 2 and 5. 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:

Output Rating: Operating Temp: Storage Temp: Temp Sensor Voltage: Leak Sensor Voltage: Enclosure: Base:

230 VAC ±10%, 50 Hz / 60 Hz 7.0 VA max 8A Resistive @ 230 VAC -20 °C to +65 °C -45 °C to +85 °C 6.6 VDC ±10% 4.7 VAC ±10% White Lexan Phenolic







ORDERING INFORMATION Part Number: PMR3





Pump Monitor Relay PMR5





OPERATION

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

MADE IN

THE U.S.A.

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 1 and 3.

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 1 and 3 and closing the contacts between terminals 1 and 4.

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 2 and 5 to drop below the setting on the potentiometer. When this occurs the unit turns on the Leakage Indication and the Leakage Alarm Relay is energized opening the contacts between terminals 11 and 8 and closing the contacts between terminals 11 and 9.

The alarm trip point may be set by the following procedure: Isolate the Leakage Probe(s) from terminal 2. Connect a resistor, with the desired trip value, across terminals 2 and 5. 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: Output Rating: Operating Temp: Storage Temp: Temp Sensor Voltage: Leak Sensor Voltage: Enclosure: Base:

120 VAC ±10%, 7.0 VA max 8A Resistive @ 120VAC -20°C to +65 °C -45°C to +85 °C 6.6 VDC ±10% 4.7 VAC ±10% White Lexan Phenolic

ORDERING INFORMATION Part Number: PMR5

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Pump Monitor Relay PMR5



Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974 Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: <u>Sales@cabriggs.com</u> - <u>www.cabriggs.com</u>

CONNECTION DIAGRAMS

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 deenergized, and the LED is turned off.

TYPICA Lift station controls Anywhere an interfactosure is in a hazar in a nor	AL APPLICATIONS where intrinsic safety is required. ace is required where the contact dous location and the controls are n-hazardous location.	CUL FILE #E189808
SPEC Operating Voltage: Output Rating: Power Consumption: Operating Temp: Storage Temp: Enclosure:	120 VAC, ± 10%, 50/60 Hz 10A @ 120 VAC Resistive 1.25 VA -20 to +60 °C -45 to +85 °C Lexan	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.
Base: Socket:	8 Pin, Round 8 Pin, Din Rail Mount with Special Locking Tab	ORDERING INFORMATION Part Number: 030-120-118



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 <u>and</u> with locking clips attached to base.
- 5. Cable capacitance plus intrinsically safe equipment capacitance (Ci) must be less than the marked capacitance (Ca) and cable inductance plus intrinsically safe equipment inductance (Li) must be less than the marked inductance (La) shown any barrier.
- 6. The simple apparatus (Float Świtch) connected to the ISR shall not be mounted on other electrical apparatus that has a voltage and current rating higher than the ISR (See Enity Parameters Voc and Isc 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: Voc = 9.33V Isc = 0.218mA Ca = 3.6uF La = 100mH

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974 Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: <u>Sales@cabriggs.com</u> - <u>www.cabriggs.com</u> 38



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 (Ci) must be less than the marked capacitance of the Barrier (Ca). Also, the Probe's cable inductance plus Probe's intrinsically safe equipment Inductance (Li) must be less than the marked inductance (La) 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 µH/ft are to be used. Cable capacitance and cable inductance are calculated as follows: 60 pF/ft x 100 ft = 6 nF
- 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: Vt = 30.3 V It = 88.6 mA Ca = 64 nF La = 4.5 mH Po = 336 mW Um = 250 Vrms

Revision Date: 6-19-15

INTRINSICALLY SAFE BARRIER ISB10

Control Drawing No. 0303 Page 2 of 2

UNGROUNDED 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 (Ci) must be less than the marked capacitance of the Barrier (Ca). Also, the Probe's cable inductance plus Probe's intrinsically safe equipment Inductance (Li) must be less than the marked inductance (La) 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 µH/ft are to be used. Cable capacitance and cable inductance are calculated as follows: 60 pF/ft x 100 ft = 6 nF
- 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: Vt = 30.3 V It = 88.6 mA Ca = 64 nF La = 4.5 mH Po = 336 mW Um = 250 Vrms

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).





SPECIFICATIONS

Input Power:	120VAC ± 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



INTRINSICALLY SAFE DUPLEXER - PANEL MOUNT VERSION



INTRINSICALLY SAFE DUPLEXER - SURFACE MOUNT VERSION



INTRINSICALLY SAFE DUPLEXER - DIN RAIL MOUNT VERSION



INTRINSICALLY SAFE DUPLEXER





If the Low Level Alarm is not required place a jumper wire between terminals 1 and C on connector P2.

CONNECTION DIAGRAM - FLOAT SWITCH



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 it's equipment capacitance (Ci) must be less than the capacitance (Ca) marked on the ISD. Also, the Float Switch's cable inductance plus its equipment Inductance (Li) must be less than the inductance (La) 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 μH/ft are to be used. Cable capacitance and cable inductance are calculated as follows: 60 pF/ft x 1000 ft = 60 nF 0.2 μH/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 Ci and Li of the intrinsically safe apparatus exceeds 1% of the Co and Lo parameters of the associated apparatus (excluding the cable), then 50% of Co and Lo 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: Vt = 27.6 V It = 40.5 mA Ca = 86 nF La = 216.7 uH Po = 279 mW Um = 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 (Ci) must be less than the capacitance (Ca) marked on the ISD. Also, the Probe's cable inductance plus the Probe's intrinsically safe equipment Inductance (Li) must be less than the inductance (La) 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 μH/ft are to be used. Cable capacitance and cable inductance are calculated as follows: 60 pF/ft x 1000 ft = 60 nF 0.2 μH/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 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 Ci and Li of the intrinsically safe apparatus exceeds 1% of the Co and Lo parameters of the associated apparatus (excluding the cable), then 50% of Co and Lo 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: Vt = 27.6 V It = 40.5 mA Ca = 86 nF La = 216.7 uH Po = 279 mW Um = 250 Vrms

Revision Date: 9-23-10

INTRINSICALLY SAFE DUPLEXER ISD

Control Drawing No. 0302 Page 3 of 3

UNGROUNDED 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 (Ci) must be less than the capacitance (Ca) marked on the ISD. Also, the Probe's cable inductance plus the Probe's intrinsically safe equipment Inductance (Li) must be less than the inductance (La) 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 μH/ft are to be used. Cable capacitance and cable inductance are calculated as follows: 60 pF/ft x 1000 ft = 60 nF 0.2 μH/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 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 Ci and Li of the intrinsically safe apparatus exceeds 1% of the Co and Lo parameters of the associated apparatus (excluding the cable), then 50% of Co and Lo 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: Vt = 27.6 V It = 40.5 mA Ca = 86 nF La = 216.7 uH Po = 279 mW Um = 250 Vrms

Revision Date: 9-23-10



SIMPLEXER





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.



120V

12

ALARM

ALARM ALARM PUMP LIGHT HORN RUN GND NEU SPECIFICATIONS 2 6 5 4 3 Input Power: 120 VAC ±10%, 10 VA max Т Т 6 A Resistive @ 120 VAC Relay Outputs: 3.6 A Inductive @ 120 VAC Agency Approval: UL 508. CAN/CSA 9 8 10 11 Indicators: LED's COM OFF ON 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 **ORDERING INFORMATION** Enclosure: Lexan Part Number: 010-120-121 P

SIMPLEXER

CONNECTION DIAGRAMS



FLOAT SWITCH



LEVEL PROBE





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

DUPLEXER

MADE IN THE U.S.A.





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 powerup 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







Part Number: 010-120-122 P

Input Power: Relay Outputs:

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



CONNECTION DIAGRAMS

FLOAT SWITCH



SERIAL PORT



The Duplexer Mounting Bracket Kit provides a simple and economical method of securing a Duplexer Controller to the deadfront of a control panel.

TYPICAL APPLICATIONS

• Where the HOA switches, lead select switch and station status indication must be on the deadfront.

FEATURES

- Sturdy aluminum construction.
- Stainless steel Mounting hardware included.
- Faceplate painted white to match Duplexer Enclosure.

ORDERING INFORMATION

Bracket Kit - Part Number: DUPMK-W

12 Pin Socket - Part Number: SD12-PC

(Must Order 12 Pin Socket Separately)



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.

SPECIFICA	TIONS	
Input Power: Power for Analog Input: Agency Approval: Operating Temperature: Storage Temperature: Display Type: Display Range: Indicators: Relay Outputs: Level Analog Input: Color: Enclosure Material: Dimensions:	120 VAC ±10%, 7.8 VA max 24 VDC ±1V, Transient Protected UL 508, CAN/CSA -20 °C to +65 °C -45 °C to +85 °C 4 Digit, 7 Segment, Red LED 0 - 2310 Feet (Selectable Decimal Point Position) Red LED 10A Resistive @ 120 VAC 3.6 A Inductive @ 120 VAC 4-20 mA, 147 Ω Load, Transient Protected White with Blue Lettering Aluminum 6.10" H x 7.70" W x 2.78" D	ORDERING INFORMATION Part Number: SC100









UL FILE # E101681

STATION CONTROLLER SC1000



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: Agency Approvals: Ambient Operating Temp:	120VAC ±10%, 13VA max UL 508, CAN/CSA -20°C to +65°C	Power for Discrete Inputs:	24VDC Unregulated Transient Protected
Level Display: Level Display Range:	3 Digit, 7 Segment LED 0 - 999 ft.	Power for Analog Regulated	20VDC ±1V
	Decimal Point Position Menu Selectable	Input:	Transient Protected
Indicators:	LED	Power For Level	±8V Square-Wave,
Color:	White with Blue Lettering	Probe:	60 Hz.
Relays:	6A @250VAC		
Level Analog Input:	4-20mA, 250Ω 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		



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.	ORDERING INFORMATION Part Number: SC2000 - X X Analog Outputs
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.	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.
Order from CA Bridge Component 200 M	

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



INTRODUCTION

The SC5000 is a Six Pump Controller with Four Control Modes capable of performing:

Level Control Flow Control Pressure Control Booster Control

The four Control Modes are menu selectable and within each Control Mode there are a variety of control options in the setup menu that make the Controller customizable for a large number of applications.

The SC5000 comes with a door mounted HMI, either a **Color Touch Screen HMI** or a **5 Digit Numerical LED HMI**. The HMI makes the Station Status and Setup Parameters readily available to the operator. Dedicated Communication Ports ENET2 or COM1 are provided for connection to the HMI.

A din-rail mounted 24VDC Power Supply is also provided with the Controller.

The Controller alternates the pumps, performs Lag Pump Delays, provides High and Low Level, Flow Rate or Pressure Alarms and many other optional features. It has parameters in the menu that allow the operator to set the Number of Pumps Present, the Maximum Number of Pumps Allowed to Run At the Same Time, and the Maximum Number of Pumps Allowed to Run While On a Generator.

With up to 6 optional Analog Outputs it can also perform VFD speed control.

While the SC5000 functions as a stand alone Pump Controller, it is designed to be easily integrated into a SCADA System. Ethernet Port ENET1 (with Modbus/TCP) is provided on all units for connection to a SCADA system. All units come with 30 Discrete Inputs that may be used to collect discrete telemetry. All units come with 12 Output Relays, any of which can be setup to perform remote control functions. Also available are 8 optional Analog Inputs and 3 optional Pulse Type Flow Meter Inputs for the collection of data. Parameter Security can be enabled to protect the Controller Setup and Remote Control Parameters from being remotely tampered with. The Modbus Registers for all Setup, Status and Remote Control Parameters are fully documented in the manual.

The Controller comes with a USB Host Port for Backup and Restore of Setup Parameters.

LEVEL CONTROL



DESCRIPTION

In the "Level Control" mode, the SC5000 can manage up to 6 pumps and perform in either a Pump Up or a Pump Down application. The Controller turns the pumps on or off based on a comparison of the Level Input with the Pump On / Off Level setup parameters.

The Controller can receive an Analog 4-20mA Level Input from a Transducer or receive a Level Input from a 10 Conductor Level Probe. It can also operate from Float Switches as the primary or backup level input.

The Controller's logic Alternates the pumps, performs Lag Pump Delays, and provides High Level and Low Level alarms.

With optional Analog Outputs, it can provide a pump speed reference for VFD Speed Control.

FLOW CONTROL



DESCRIPTION

In the Flow Control Mode, a PID Controller (Proportional, Integral, Derivative) is provided to regulate the pump speed in order to maintain the Flow Rate at the Flow Rate Setpoint.

The Flow Control logic also determines the number of pumps required to run in order to maintain the Flow Rate at the Flow Rate Setpoint.

The Flow Control logic also Alternates the pumps and provides a Low Level Alarm, High Level Alarm, Low Flow Rate Alarm and a High Flow Rate Alarm.

The Flow Control Mode requires the use of VFDs, so the Controller must be ordered with an optional Analog Output for the speed reference of each pump.

PRESSURE CONTROL



DESCRIPTION

In the Pressure Control Mode, a PID Controller (Proportional, Integral, Derivative) is provided to regulate the pump speed in order to maintain the Discharge Pressure at the Discharge Pressure Setpoint.

The Pressure Control logic also determines the number of pumps required to run in order to maintain the Discharge Pressure at the Discharge Pressure Setpoint.

The Pressure Control logic also Alternates the pumps and provides a Low Supply Liquid Level Alarm, High Supply Liquid Level Alarm, Low Discharge Pressure Alarm and a High Discharge Pressure Alarm.

The Booster Control Mode requires the use of VFDs, so the Controller must be ordered with an optional Analog Output for the speed reference of each pump.

BOOSTER CONTROL



DESCRIPTION

In the Booster Control Mode, a PID Controller (Proportional, Integral, Derivative) is provided to regulate the pump speed in order to maintain the Discharge Pressure at the Discharge Pressure Setpoint.

The Booster Control logic also determines the number of pumps required to run in order to maintain the Discharge Pressure at the Discharge Pressure Setpoint.

The Booster Control logic also Alternates the pumps and provides a Low Supply Pressure Alarm, High Supply Pressure Alarm, Low Discharge Pressure Alarm and a High Discharge Pressure Alarm.

The Booster Control Mode requires the use of VFDs, so the Controller must be ordered with an optional Analog Output for the speed reference of each pump.

CONTROL MODES

- Level Control Mode
- Flow Control Mode
- Pressure Control Mode
- Booster Control Mode

STANDARD I/O

- Ethernet Port ENET1 with Modbus TCP Protocol for connection to: SCADA System Ethernet Port ENET2 with Modbus TCP Protocol - for connection to: SC5000-CTS-HMI RS232 Port COM1 with Modbus RTU Protocol - for connection to: SC5000-LED-HMI
- 1 USB Host Port for Backup and Restore of Setup Parameters
- 1 Analog Output, Isolated 4-20mA (AOX1) May be Assigned to Application Specific Functions
- 2 Analog Inputs, Isolated 4-20mA (AIX1 AIX2) May be Assigned to Application Specific Functions
- 12 Relay Outputs (ROX1 ROX12) May be Assigned to Application Specific Functions
- 30 Discrete Inputs (D1 D30)
 May be Assigned to Application Specific Functions

OPTIONAL I/O

- 6 Analog Outputs, Isolated 4-20mA (AO1 AO6) May be Assigned to Application Specific Functions
- 8 Analog Inputs, Isolated 4-20mA (A1 A8) May be Assigned to Application Specific Functions
- 3 Discrete Pulse Capture Inputs, Isolated (DPC1 DPC3) Discrete Pulse Capture Input DPC1 - Assigned Function of: Pulse Flow Meter PFM1 Discrete Pulse Capture Input DPC2 - Assigned Function of: Pulse Flow Meter PFM2 Discrete Pulse Capture Input DPC3 - Assigned Function of: Pulse Flow Meter PFM3

SPECIFICATIONS

- Input Power: 24 VDC ±10%, 0.6 A max
- Agency Approvals: UL 508, CAN/CSA
- Dimensions (Width x Height x Depth): 10.340" x 6.750" x 6.208"
- Ambient Operating Temperature: -20°C to +65°C (-4°F to +149°F)
- Color: White with Blue Graphics
- Discrete Inputs: ±6 V, 60 Hz Square Wave ±0.6mA max, Transient Protected
- Relay Outputs: 8A @ 120 VAC Resistive
- Analog Outputs: Isolated 4-20mA, Transient Protected, Maximum Load: 900Ω
- Analog Inputs: Isolated 4-20mA, 100 Ω Load, Transient Protected
- Pulse Capture Inputs: Isolated, Transient Protected
 - Maximum Pulse Frequency: 60kHz (with Duty Cycle Between 40% 60%) Power Supply Options: +5VDC, +12VDC, or +24VDC Pull Up or Pull Down Resistor Supplied with Controller: 5.1KΩ

STATION CONTROLLER SC5000 ORDERING INFORMATION



LED = 5 Digit Numerical LED HMI See Section X in Manual

POWER SUPPLY

Part Number: SC5000-PS24

24 VDC 3.8A 35mm DIN Rail Mount



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 measure liquid level for waste water pumping applications. The Level Probe may 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) t is designed to monitor a conductance probe and perform level measurement. level is detected when the liquid level is high enough to touch one or more of stainless steel electrodes on the Level Probe. The controller (or conductance rel sends out a level sense signal to each electrode on the Level Probe. The sig typically consists of an $\pm 8V$ or $\pm 12V$ square wave, capable of supplying no more the 1.5mA. When the liquid being measured touches one of the electrodes, the squ wave signal is diverted to ground through the conductive liquid. The change in 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, should not be used in storm water, well water, lake water, or other liquids which are conductive enough to provide a reliable level measurement.

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

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not	9	H		 2"
ket)	10	Г	<u>+</u> 1.25"	2.5"

	SPECIFI	CATIONS	ORDERING INFORMATION				
Electrode N	/laterial:	High Grade Stainless Steel Alloy	I Probe Leng	Part Number: th (inches) —	LP - <u>A</u> - <u>B</u> - <u>C</u>		
Probe Casi	ng Material:	PVC	Number of I	Electrodes			
Cable Mate Multi-Ele Single-E	erial ectrode: Electrode:	PVC/PVC EPDM	Available C	combinations:			
Operating ⁻	Гетр:	+32 to +140 °F	Probe Length (inches)	Number of <u>Electrodes</u>	Spacing Between <u>Electrodes (inches)</u>		
			A 7	В 1	D X		
			19	3	6		
			52	10	5		
		UL 913	61	10	6		
(U	'	//	79	10	8		
ß	シ	UL FILE #	97	10	10		
119	TEN	E189808	115	10	12		
LIS	ICU						
Intrinsically Safe; For use in Class 1, Groups A, B, C, D. Hazardous Locations when installed with suitable Intrinsically Safe Barrier		Contact M.P. Electronics for custom probe availability.					
in accordar	nce with Con	trol Drawing No. 0304.	Cable Length (f	eet) C 50, 1	00		

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: Vmax = 30.3 V Imax = 88.6 mA Pmax = 672 mW Ci = 6 nF Li = 20 μH
- 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 Voc not exceeding Vmax, Isc must not exceeding Imax, and Po of the Barrier must be less than or equal to the Pmax 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, Ccable, plus intrinsically safe equipment capacitance, Ci, must be less than the marked capacitance, Ca, shown on the Barrier used. The same applies for inductance (Lcable, Li and La respectively). Where cable capacitance and inductance per foot are not known, the following values shall be used: Ccable = 60 pF/ft, Lcable = 0.2 µH/ft.
- 5. If Po of the Barrier is not known, it may be calculated using the formula Po = (Voc * lsc)/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	
Level Probe		Barrier
Vmax	≥	Vt
Imax	≥	lt
Pmax	≥	Po
Ci + Ccable	≤	Ca
Li + Lcable	≤	La

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: Vmax = 30.3 V Imax = 88.6 mA Pmax = 672 mW Ci = 6 nF Li = 20 μH
- 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 Voc not exceeding Vmax, Isc must not exceeding Imax, and Po of the Barrier must be less than or equal to the Pmax 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, Ccable, plus intrinsically safe equipment capacitance, Ci, must be less than the marked capacitance, Ca, shown on the Barrier used. The same applies for inductance (Lcable, Li and La respectively). Where cable capacitance and inductance per foot are not known, the following values shall be used: Ccable = 60 pF/ft, Lcable = 0.2 µH/ft.
- 5. If Po of the Barrier is not known, it may be calculated using the formula Po = (Voc * Isc)/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)	

	Table 1	
Level Probe		Barrier
Vmax	≥	Vt
Imax	≥	lt
Pmax	≥	Po
Ci + Ccable	≤	Ca
Li + Lcable	≤	La

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

Revision Date: 7-13-10

2.5

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TO CONTROL INPUTS

TBC 1 2 3 4 5 6 7 8 9 10

TO CONTROL INPUTS

LPSA10

6 7 8 9 10



LEVEL PROBE SURGE ARRESTOR

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LEVEL PROBE SURGE ARRESTOR

LPSA10

(Hole Sized for #8 Mounting Hardware)

GND

٩

TBL

0.165"

2

3

4

5 h ELECTRODE

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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 ±26V.

Between each MOV and TVS is a 100Ω . 5 Watt 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.



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

SPECIFICATIONS

Supply Voltage: Supply Current: Analog Output:

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



ORDERING INFORMATION Model Number: LPC420

LEVEL PROBE CONVERTER

CONNECTION DIAGRAM





LEVEL PROBE **CONVERTER REVERSE MOUNT**

MADE IN THE U.S.A.

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.

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

SPECIFICATIONS

Supply Voltage: Supply Current: Analog Output:

Sensor Output Voltage: Sensor Output Current: Operating Temp: Storage Temp: Enclosure:

24 VDC ±10% 65 mA max Non-Isolated 4-20 mA Maximum Load 600 Ω ±8 V Square Wave @ 60 Hz 0.8 mA max (per sensor) -20 to +65 °C -45 to +85 °C Aluminum, Panel Mounted



Model Number: LPC420-RM
LEVEL PROBE CONVERTER



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.



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 S	LEVEL PROBE C			TYPICAL SEWAGE		ON LIGHT OFF SEWAGE		
WITCH	ANALOG OUTPUT	OFF	SEC	ON C 5 SEC C		F 10 SEC	ON 30 SEC	
	DELAT	011		011			011	

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, Din Rail Mounted					







ORDERING INFORMATION Model Number: LPC420R

LEVEL PROBE CONVERTER w/ RELAYS



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.



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.

DIP S	LEVEL PRO	OFF TYPICAL OFF SEWAGE			ON LIGHT OFF SEWAGE		
MITCH	ANALOG OUTPUT DELAY	OFF 2 OFF	SEC	ON 5 SEC OFF	OF ON	F 10 SEC	ON 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









ORDERING INFORMATION Model Number: LPC420R-RM

LEVEL PROBE CONVERTER w/ RELAYS



4. WHEN THE UNIT IS POWERED FROM 120VAC, A GROUND CONNECTION IS REQUIRED ON BOTH J2 PIN 3 AND J4 PIN G.



LEVEL PROBE RELAY

MONITORS CONDUCTANCE PROBE AND PROVIDES PUMP CONTROL OR LEVEL ALARM





MADE IN THE U.S.A.

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 S	EWAGE	ON LIGHT SEWAGE			
	4		OFF		OFF			
	3	PUMP MODE	OFF - PUMP	DOWN (EMPTY)	ON - PUMP UP (FILL)			
	4	4 ON DELAY	OFF	ON	OFF 40 SEC	ON 15 SEC		
	5		OFF	OFF	ON	ON		
	6		OFF	ON	OFF 20 SEC	ON		
7		OFF DELAY	OFF	OFF	ON SU SEC	ON		

SPECIFICATIONS

Input Power: Relay Type: Output Rating:

Sensor Output Voltage: Sensor Output Current: Operating Temp: Storage Temp: Enclosure: Base:

120 VAC ±10%, 3.8 VA max DPDT 5 A Resistive @ 240 VAC 5 A Inductive @ 240 VAC ±12 V Square Wave ±1.2 mA max (per sensor) -40°C to +60°C -45°C to +85°C White Lexan Phenolic







12 - PROBE - OFF 11 - PROBE - ON 10 - GROUND 9. 8 🖛 120 VAC 7 - NEUTRAL

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.

DESCRIPTION

MADE IN THE U.S.A.

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 - <u>A</u> - <u>B</u>

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





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.

DESCRIPTION

MADE IN THE U.S.A.

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.

TVB1 Dute:

Note:

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

1 3/4"





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 able 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: Cable Grip Diameter:

Single Eye Closed Mesh Single Weave Stainless Steel .230 to .310 inches

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 functionallyoptimized design contains "make before break" terminals that assure continuity of the 4-20mA signal in both the protected and unprotected state.

	Protected	5
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	imple ^{Tu} CE	-
SPD	Made S Made S Uasec	-
Bann	La Control Con	-
BUSST BUSST	Applements Note Pro- P	1
	No O	1
	a la	

DIMENSIONS



ELECTRICAL DIAGRAM



ORDERING INFORMATION Part Number: LM SURGE

SPECIFIC	ATIONS
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°C
Conductors (Flexible):	14 - 28 AWG
Dinrail Mounting Clip:	35mm
Terminal Torque:	3.5 Lb-In



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 in tended 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



Includes: With Pressure Sensor and 40 feet of Cable

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

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

PRESSURE SENSOR

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

Transmitter Subassembly: WTT40

Includes: 40 feet of Cable with Kellems Grip

MADE IN THE U.S.A.





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).

5' 1 2 3 ۲ 000 00 (÷ LOST O Y LOW O POWER () 5' O O UP 0 0 DOWN WIRELESS TRANSDUCER RECEIVER WTR420 Serial #: 6 ANTENNA ۲



SPECIFICATIONS

Input Power:	24 VDC ±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 °C					
Storage Temp:	-45 to +85 °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



CONNECTION DIAGRAM



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/.

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	MUTUK PROTECTION FLECTRONICS				Page	1 of 3		
_	LLC				Faye			
Cross Reference Listing	M.P. Electronics	ATC - Diversified	Timemark	SSAC	Crouzet (Syrelec)	SymCom	Macromatic	
Phase Monitors								
3 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	SI A-230-ALA						
	001-DVM-1212	SLA-230-ALALI						
	001-DVM-1212						PMPU-FA12	
Surface Mount	002-230-123	SLA-230-ALE						
	002-480-123	SLA-440-ALE						
Duplox Altornators								
Pupier Alternators	008-120-10	ARA_120_ARA	261-5-120		P IR1104	ALT-115-S	4RP12046	
	008-120-105	ARB-120-ABA	261-ST-120	ARP41S	P IRS110A	ALT-115-S	ARP12046R	
	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							
	009 120 12		261 D 120	A DD 4 2			ABD120A2	
11 F III, DF D1	008 120 125		201-D-120	ADD/29				
	008-120-12SP		201-D1-120	AINF 420	LJ1(32110A			
	000-120-1201							
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						
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	ELECTRONICS				Pag	e 2 of 3		
	MPE	DIVERSIFIED						
Intrinsically Safe Relays	030-024-118	ISO-24-AFA						
	030-120-118	ISO-120-AFA						
	MDE		FORM	EIT	EUNCTION			
Voltage Monitors	004-230-118	UOA-240-AFA	Different	Same	MPF=SPDT_Div=D	PDT & Fixed Ad	liustment Pinout Dit	ferent
Voluge Monitors	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 D	Different
	004-230-118	VBA-240-AFA	Same	Different	MPE is Plug-in, Div	is Surface Mou	nted, with Fixed Adj	ustment
	004-230-118	VBA-240-AKA	Same	Different	MPE unit is Plug-in	Div unit is Surf	ace Mounted	
	004-230-118	VBA-240-ALA	Same	Different	MPE is Plug-in, Div	is Surface Mou	nted, with Knob Locl	knut
Phase Monitors								
8-Pin	001-DVM-118	SLA-230-ASA	Same	Same	MPE Unit has Over-	Voltage Protect	ion -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 Protect	ion -Div does not	
	001-DVM-118	SUA-440-ASA	Same	Same	MPE Unit has Over-	Voltage Protect	ion -Div does not	
	001-DVM-118	SLD-440-ASA	Same	Same	Same			
			-		2			
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		Same	Same	Same			
	002-230-123	PBC-230-ALE	Same	Same	MPE Unit has fived	Under & Over V	oltage Settings	
	002-230-123	SI C-230-ALE	Same	Same	Same			
	002-230-123	SI D-230-ALE	Same	Same	Same			
	002-230-123	SLE-230-ALE	Same	Same	MPE Unit does not	have adiustable	U.V. Drop-out	
	002-230-123	SLH-230-ALE	Same	Same	MPE Unit does not	, have Adiustable	Hvsteresis	
	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 Protect	ion - 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	

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	ROTECTION				Page 3 of 3
Triplex Alternators	009-120-23	ARA-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 mod
	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/trilex 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
	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
Time Delay Relays	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-A-AA	Same	Same	Time on Div unit is dip switch selectable

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	LO LO		Of 4	5																	for Single-Po
trode	Numbe			- - - -	M/T	able Length	33 feet	33 feet	33 feet	33 feet	33 feet	33 feet	33 feet	100 feet	100 feet	100 feet	100 feet	100 feet	100 feet	100 feet	k except 1
Multi	s Part	Sheet			MPE	able Leng	50 feet	50 feet	50 feet	50 feet	50 feet	50 feet	50 feet	100 feet	100 feet	100 feet	100 feet	100 feet	100 feet	100 feet	nd S hool
Note -	ronic	ence (Spacing	N/A	6 inch	5 inch	6 inch	8 inch	10 inch	12 inch	N/A	6 inch	5 inch	6 inch	8 inch	10 inch	12 inch	acket ar
Application 1	to M.P. Elect	Cross Refer				Description	Single Point Probe	Three Point Probe	10 Point Probe	10 Point Probe	10 Point Probe	10 Point Probe	10 Point Probe	Single Point Probe	Three Point Probe	10 Point Probe	10 Point Probe	10 Point Probe	10 Point Probe	10 Point Probe	Small Squeegee br
		Ŋ	ROTECTION LECTRONICS LC		Multi-Trode	Part Number	0.2/1-10	0.5/3-10	1.0/10-10	1.5/10-10	2.0/10-10	2.5/10-10	3.0/10-10	0.2/1-30	0.5/3-30	1.0/10-30	1.5/10-30	2.0/10-30	2.5/10-30	3.0/10-30	obes include
			ׅׅׅׅׅׅׅׅׅׅׅׅׅׅׅׅׅׅׅׅׅׅׅ֬֬֬֬֬֬֬֬֬֬֬֬֬֬֬	l evel Prohes:	MPE	Part Number	LP-7-1-50	LP-19-3-50	LP-52-10-50	LP-61-10-50	LP-79-10-50	LP-97-10-50	LP-115-10-50	LP-7-1-100	LP-19-3-100	LP-52-10-100	LP-61-10-100	LP-79-10-100	LP-97-10-100	LP-115-10-100	Notes: MPE Pr

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		to M.P. Elec	tronic	s Part	Num	oer
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	OTOR ROTECTION ECTRONICS					
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MDE	Multi-Trodo				i age	
Part Number	Part Number	Description				
Mounting Bracket	<u>S:</u>					
LPB-1	MTAK-1	Sm. Brkt w/ S hook				
LPB-2	MTAK-2	Lg. Brkt w/ S hook				
Intrinsically Safe	Barrier:					
ISB-10	MTISB10	10 Point Intrinsically Sa	fe Barier			
Level Probe Rela	<u>y:</u>					
LPR-1	MTR3	Level Probe Relay,	120VAC			
LPR-1	MTRA3	* Requires two LPR	-1's,			
		as each LPR-1 cont	rols only	one prob	e point.	
Indicating Control	ller:					
LPC420		24VDC,10 Probe in	put <i>s,</i> 4-2	OmA outp	but	
		(for app.'s that dor	n't need r	elay outp	outs)	
LPC420R	MTIC3	120VAC, 10 Probe 3	Enputs, 4-	20 mA o	utput,	
		10 Output Relays				
LPC420R	MTIC5	24VDC, 10 Probe I	nputs, 4-2	20 mA ou	itput,	

	•	Application No	te - Multitrode
	2	to M.P. Electro	nics Part Number
9 9 9	Ē	Cross Referen	ce Sheet
	CTRONICS		Page 3 of 4
MPE	Multi-Trode		
Part Number	Part Number	Description	
Back-up Controller	<u></u>		
Duplexer p/n	SAFE-FS	120VAC, Duplex, SCAD)A-Ready, Level Probe Controller that can
010-120-122P		be used with two PMR's	s (Pump monitoring Relays) if needed.
ISD-X	SAFE-FS	120VAC, Duplex, Intrir	nsically Safe, SCADA-Ready, Level Probe Controller that
Panel Mt P		can be used with two PA	MR's (Pump monitoring Relays) if needed.
DinRail - D		Optional Ethernet Port	- Comes standard with RS-232 Serial Port.
Surface Mt S			
Simple 2 Pump Co	<u>ntroller:</u>		
Duplexer	M TDPC3	120VAC, Duplex, SCAD)A-Ready, Level Probe / Float Controller
ISD-X	M TDPC3	120VAC, Duplex, Intrinsi	ically Safe, SCADA-Ready, Level Probe/Float Controller
<i>SC</i> 100	M TDPC3	120VAC, Duplex Level (Controller w/ 4-20 mA level input signal
Advanced 2 Pump	<u>Controller:</u>		
<i>SC</i> 1000	M T2PC3	120VAC, Selectable 1 - 3	8 Pumps, RS232 SCADA Ready, Optional Ethernet Port
<i>SC</i> 2000-00	M T2PC3	120VAC, Selectable 1 - 4	ł Pumps. RS232 SCADA Ready, Optional Ethernet Port

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	Multii	Part	heet						232 SCAD	232 SCAD		232 SCAD		232 SCAD		of the fund	', the feat	t have to b			
	lote -	onics	nce S						Pumps, RS	Pumps. RS		Pumps. RS		Pumps. RS		orm many .	r Controllei	and do no			
	ion N	Electr	Refere				n		able 1 - 3	able 1 - 4	::	able 1 - 4	::	able 1 - 4		K can perf	Aulti Smart	customer,			
	plicat	M.P.	OSS				Descriptio		AC, Select	AC, Select	pplication	AC, Select	pplication	AC, Select		5C2000-X)	nlike the <i>N</i>	able to the			
	Ap	t 0	ΰ						120V.	120V.	 r VFD A	3 120V	r VFD A	3 120V		t The S	and u	availo		 	
	1	2	Ð	DIECTION CTRONICS		Multi-Trode	Part Numbe	<u>Controller:</u>	MT3PC3	MT3PC3	Controller fo	MT2PCVFD	Controller fo	AT3PCVFD	iger:	MultiSmar					
0] 			щ	umber	1 3 Pump (000	00-00	1 2 Pump (02-00	1 3 Pump (00-30 A	tion Mana	XX-00					
		1				ΜF	Part Nu	<u>Advance c</u>	SC1(<i>SC</i> 200	<u>Advance c</u>	<i>SC</i> 200	Advancec	<i>SC</i> 200	Pump Sta	<i>SC</i> 200					

		Application Note - Xylem-Flygt
		to M.P. Electronics Part Number
<u></u>		Cross Reference Sheet
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	ELECTRONICS	Page 1 of 3
FLYGT P/N	MPE P/N	Description
<u></u>	<u></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
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	PROTECTION	Page 2 of 3
	ELECTRONICS	
FLYGT P/N	MPE P/N	Description
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 Barier

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

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FLYGT P/N	MPE P/N	Description
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