

CLT-X25

LIQUID LEVEL TRANSMITTER OPERATION / INSTRUCTION MANUAL



APPROVED

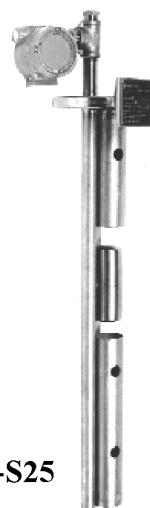
**NON-INCENDIVE
EXPLOSION-PROOF
INTRINSICALLY SAFE**



CLT-C25



CLT-I25



CLT-S25

ProMag LTD

BULLETIN 1008 - R1

DESCRIPTION

The CLT-C25, CLT-I25, and CLT-S25/ PM-1000B are Liquid Level sensing devices designed to measure tank levels directly, and to re-transmit outputs to remote locations. They consist of a Sensing Element mounted in a tube, and an Electronic Transmitter that is mounted at the end of the assembly. This design will measure Liquid Levels by :

1. The Sensing Element tracking a Magnetic Float in the PM-26 Chamber. See Figure 1 (CLT-C25)
2. The Sensing Element tracking a donut shaped Magnetic Float, when the mechanism is inserted inside a vessel environment. Figure 2 (CLT-I25)
3. The Sensing Element tracking a Magnetic Float inside a Stilling Well when the assembly is inserted inside a vessel environment. Figure 3 (CLT-S25)

FEATURES / BENEFITS

- * Unique Magnetic coupling / no contact with process fluids
- * Ease of mounting and adjustments
- * Vibration Resistant
- * Unaffected by specific gravity changes of the measured fluid
- * Accommodates tanks of any size, shape, or type
- * Compact design / ease of handling and calibration
- * Interface Level capability
- * Calibrator simplifies calibration and loop evaluation
- * Integrator facilitates filtering of wildly erratic changing liquid levels



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APPLICATIONS

Butane, Propane, Oil, Solvents, Acids, Chlorine, Water / Interface

Stationary Vessels, Tank Trucks, and Constant Volume Chambers

TRANSMITTER

The PM-1000B transmitter mounts in an Explosion-Proof housing at either the top or the bottom of the CLT-C25, and always at the top of the CLT-I25 and CLT-S25. The Transmitter may also be mounted remotely.

OPERATION

The CLT, Sensing Element, when excited by a constant voltage, works as a voltage divider and provides a voltage output that is proportional to the Liquid Level being measured. This Voltage is then monitored by the PM-1000B Transmitter located in the attached transmitter housing. The sensed voltage is then converted into a standard 4/20 mA current output. The PM-1000 Transmitter works in a 2-wire setup and is normally mounted at one end of the sensing element. Should it become necessary to mount it remotely, three wires are required to connect it to the sensing element.

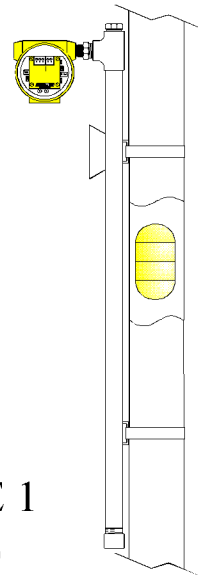


FIGURE 1
(CLT-C25)

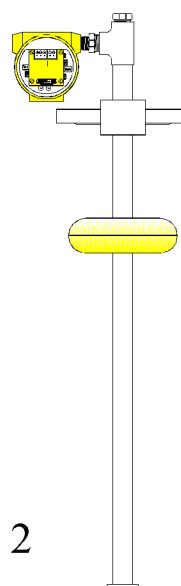


FIGURE 2
(CLT-I25)

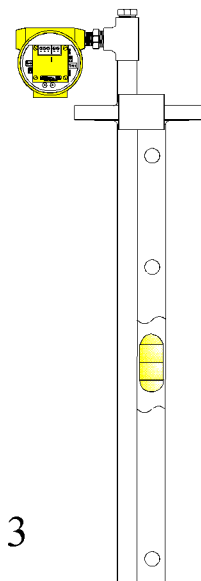


FIGURE 3
(CLT-S25)

CLT-(x)25 CONTINUOUS LEVEL TRANSMITTER

CLT PART NUMBER SELECTION

MODEL TYPE

| | |
|---------|--|
| CLT-C25 | CHAMBER MOUNTED |
| CLT-I25 | INTERNAL TANK MOUNTING (See Note 1 & 2) |
| CLT-S25 | INTERNAL / SIDE STILLING WELL (See Note 1) |

TRANSMITTER

| | |
|------------|-----------------|
| PM-1000B-C | WITH CALIBRATOR |
| PM-1000B-X | NO CALIBRATOR |

MOUNTING

| | | |
|-------------|------------|--------------|
| C - CHAMBER | F - FLANGE | H - HEX PLUG |
|-------------|------------|--------------|

SENSING ELEMENT TUBE MATERIAL

| | |
|------------------|--------------------------|
| 4S - 304 SS | FB - FIBERGLASS |
| 6S - 316 SS | 4T - TFE COATED 304SS |
| 6LS - 316 LSS | FOR SLIP RESISTANCE |
| M - MONEL | 4H - HALAR COATED 304 SS |
| HC - HASTELLOY C | |

FLANGE / PLUG MATERIAL

| | | | | | | | | |
|-------------------------|----|-----|---|----|---|----|----|----|
| 4S | 6S | 6LS | M | HC | F | 4T | 4H | CS |
| (X - NO FLANGE or PLUG) | | | | | | | | |

FLANGE / PLUG SIZE

| | |
|-------------|----------------|
| 1 - 1" | 6 - 6" |
| 15 - 1 1/2" | 8 - 8" |
| 2 - 2" | 10 - 10" |
| 25 - 2 1/2" | X - No |
| 3 - 3" | Flange or Plug |
| 4 - 4" | |

PRESS. RATING

| |
|------------------|
| A - 150 # |
| B - 300 # |
| C - 600 # |
| F - Plug (3000#) |

TERMINAL HOUSING POSITION

| | |
|---------------|------------------|
| T - TOP MOUNT | B - BOTTOM MOUNT |
|---------------|------------------|

OPTIONS

| |
|------------------------|
| X - NONE |
| S - STILLING WELL |
| B - INSULATION BLANKET |
| P - INSULATION PAD |

TRANSMITTER LOCATION

| | |
|-----------|-------------------------|
| L - LOCAL | R - REMOTE (See Note 3) |
|-----------|-------------------------|

POWER

DC - 24 VDC CUSTOMER
SUPPLIED POWER

PROMAG SUPPLIED POWER

| |
|-------------------------|
| AC1 - 110 VAC REMOTE |
| AC2 - 220 VAC REMOTE |
| AC1L - 110 VAC INTEGRAL |
| AC2L - 220 VAC INTEGRAL |
| (See Note 4) |

OUTPUT

| | |
|---------------|---------------|
| 4 - 4/20 mA | 10 - 10/50 mA |
| 10 - 10/50 mA | P - 3/15 PSIG |

RESOLUTION

| |
|-------------------|
| A - 1/2" STANDARD |
| B - 1/4" OPTIONAL |

MEASURE RANGE

SPECIFY IN INCHES
(SEE NOTE 1)

CLT- C 25 PM-1000B-C C 4S X X T X L DC 4 A 100

SPECIFICATIONS

| | |
|--|--|
| * OUTPUT | 4/20 mA, 10/50 mA, 1/5 VDC, and 3/15 PSIG |
| * OUTPUT SIGNAL LOADING | 750 Ohms at 30 VDC |
| * ACCURACY | +/- .25% of Span |
| * PRIMARY ELEMENT REPEAT- ABILITY | +/- 1/5" SS +/- 1/16" Teflon (CLT-C25 Dependent) |
| * CALIBRATOR SETTINGS | 0%, 50%, and 100% 4 mA, 12 mA, and 20 mA Output |
| * INTEGRATOR SETTINGS | 0 - 10 Sec in 16 Steps (Dip Switch Selectable) |
| * POWER | 24 VDC / 30 VDC Max |
| * HOUSING | Copper Free Epoxy Coated Aluminum |
| * SENSING ELEMENT | CLT |
| * MEASURING INCREMENT | 1/2" Standard, 1/4" Optional |
| * OPERATING TEMPERATURE | CLT-I25, and CLT-S25 CLT-C25 Max 800 ° F when an INSULATION PAD or BLANKET is used between the CLT and FLOAT CHAMBER. |
| * CLT SENSING- TUBE | 304SS Standard |



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HAZARDOUS LOCATIONS

| | |
|--------|----------------|
| CL I | GROUPS B, C, D |
| CL II | GROUPS E, F, G |
| CL III | NEMA 4 |

INTRINSICALLY SAFE

| |
|------------------------------|
| CL I, II, DIVISION 1 |
| GROUPS A, B, C, D, E, F, & G |

NON-INCENDIVE

| |
|---|
| CL I DIV 2, GROUPS A, B, C, & D |
| SUITABLE FOR CL II, DIV 2, GROUPS E, F, G AND CLASS III, DIV 2 |

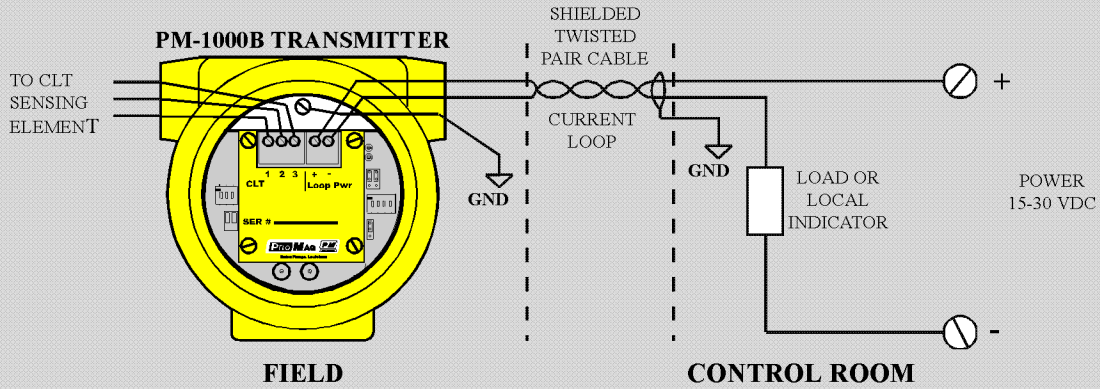
NOTES:

- For the CLT-I25 and CLT-S25, exact tank dimensions will be required.
- A Stilling Well is optional on the CLT-I25, but is required if agitation is present in the vessel.
- PM-1000B mounted remotely from sensing element. Explosion-Proof housing, with terminal strip, mounted on Sensing Element.
- DC Customer Supplied 24 VDC Power.
AC1 110 VAC to 24 VDC power supply remotely mounted from PM-1000B Transmitter.
AC2 220 VAC to 24 VDC power supply remotely mounted from PM-1000B Transmitter.
AC1L 110 VAC to 24 VDC Power Supply supplied in the same housing as the PM-1000B Transmitter.
AC2L 220 VAC to 24 VDC Power Supply supplied in the same housing as the PM-1000B Transmitter.

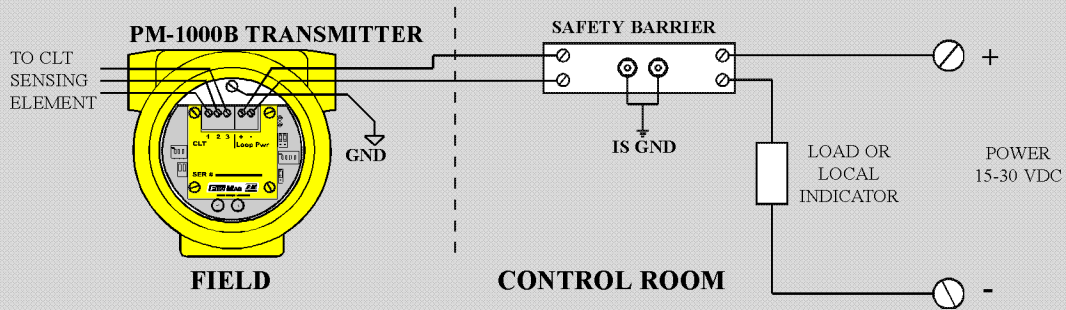
The AC1, and AC2 Power Supply's are supplied as an integral part of other device's such as digital indicators, controllers, and alarm units.
All of the above Power Supply's can power the customers loop as well as the CLT Transmitter.

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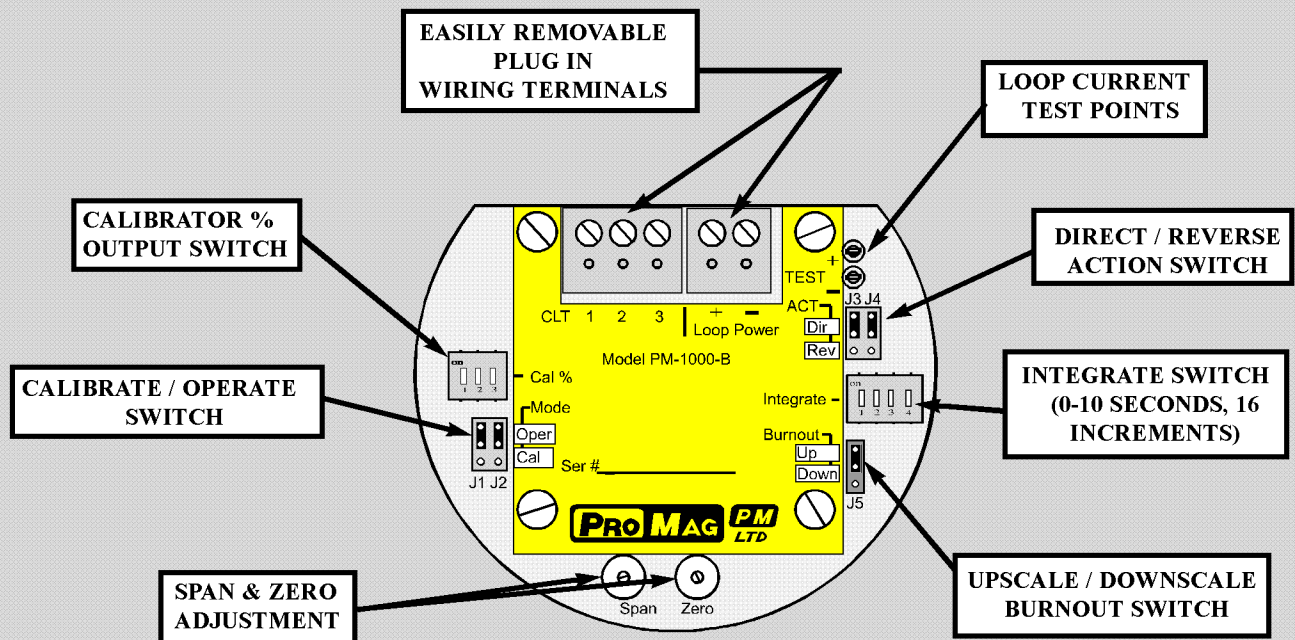
TYPICAL EXPLOSION-PROOF / NON-INCENDIVE APPLICATION WIRING



TYPICAL INTRINSIC SAFE APPLICATION WIRING



PM-1000B SWITCH / JUMPER LOCATIONS



TANK TRUCK LIQUID LEVEL MEASUREMENT

FEATURES

- * **RUGGED** Shock Protected Read-Out, Transmitter and float assembly.
- * **DEPENDABLE** Provides Local / Remote Indication under any conditions
- * **SAFE** Eliminates the need to open the Tank Truck hatch to Dip the Liquid Level.
- * **SELF-CONTAINED** Operates from the 12 VDC vehicle power system.
- * **DIGITAL DISPLAY** Highly visible LCD display in Engineering Units.

SPECIFICATIONS

CONTINUOUS LEVEL TRANSMITTER

- Electrical Specifications are the same as the CLT-I25

DIGITAL INDICATOR

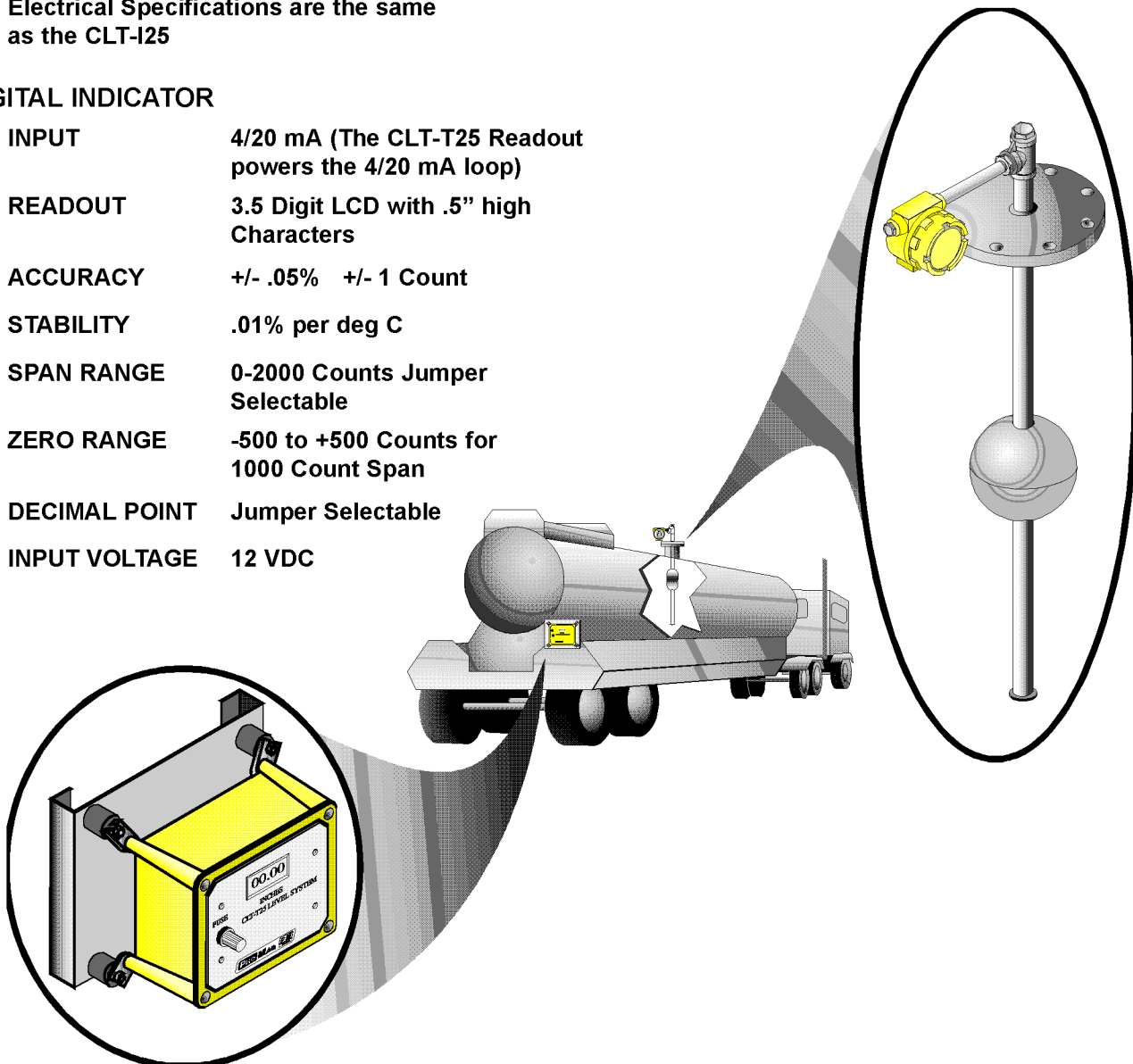
- **INPUT** 4/20 mA (The CLT-T25 Readout powers the 4/20 mA loop)
- **READOUT** 3.5 Digit LCD with .5" high Characters
- **ACCURACY** +/- .05% +/- 1 Count
- **STABILITY** .01% per deg C
- **SPAN RANGE** 0-2000 Counts Jumper Selectable
- **ZERO RANGE** -500 to +500 Counts for 1000 Count Span
- **DECIMAL POINT** Jumper Selectable
- **INPUT VOLTAGE** 12 VDC

OPERATION

Operation of the CLT-T25 Truck CLT System is as follows:

The Liquid level is first magnetically sensed by the primary sensing element which is flange mounted into the top of the Tank Truck. The PM-1000 Transmitter then converts the voltage signal from the primary Sensing Element to a standard 4/20 mA current signal.

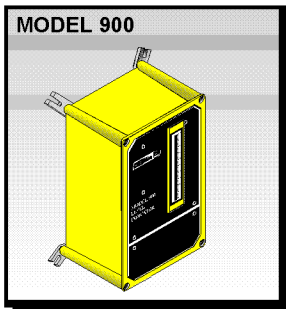
The CLT-T25 Digital ReadOut serves the purpose of converting the 4/20 mA current loop signal into a meaningful signal in Engineering Units, and converts the 12 VDC vehicle power into the 24 VDC required to power the CLT-I25 Liquid Level Transmitter.



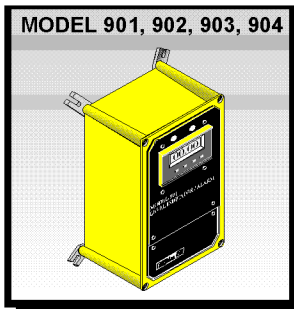
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DIGITAL INDICATORS / ALARMS

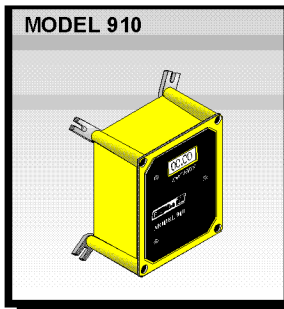
MODEL 900



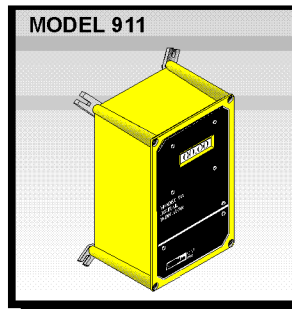
MODEL 901, 902, 903, 904



MODEL 910

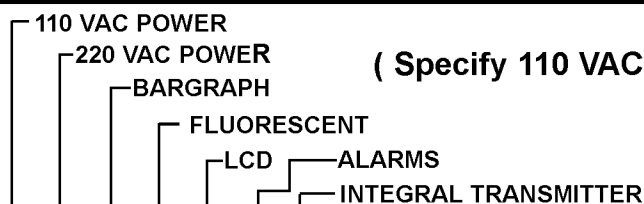


MODEL 911



DESCRIPTION

- * MODEL 900 - BAR GRAPH -101 SEGMENT LED
- * MODEL 901 - FLUORESCENT DIGITAL DISPLAY
- * MODEL 902 - FLUORESCENT DIGITAL DISPLAY / INTEGRAL PM-1000B TRANSMITTER
- * MODEL 903 - FLUORESCENT DIGITAL DISPLAY / DUAL ALARMS
- * MODEL 904 - FLUORESCENT DIGITAL DISPLAY / DUAL ALARMS / INTEGRAL PM-1000B TRANSMITTER
- * MODEL 910 - 3 1/2 DIGIT LCD DISPLAY
- * MODEL 911 - 3 1/2 DIGIT LCD DISPLAY / INTEGRAL PM-1000B TRANSMITTER



(Specify 110 VAC or 220 VAC Operation when Ordering)

| | | | | | | | | |
|-----|---|---|---|---|---|---|---|---|
| 900 | * | * | * | | | | | Additional 0.1% Accuracy Digital Display Available |
| 901 | * | * | | * | | | | Auxiliary 4/20 mA Loop Output Terminals |
| 902 | * | * | | * | | | * | Requires CLT to be ordered with "REMOTE" XMTR Option |
| 903 | * | * | | * | | * | | Alarm Lamps; Alarms may be set as High, Low, and Adjusted from front panel |
| 904 | * | * | | * | | * | * | Alarm Lamps; Front Panel Alarm Adjust, CLT must be ordered w/ "REMOTE" Option |
| 910 | * | * | | | * | | | Compact Size (Approx 8" H x 6" W x 5" D) |
| 911 | * | * | | | * | | | Auxiliary 4/20 mA Loop Output terminals |

MODEL 901, 902, 903, 904 METER SPECIFICATIONS

| | |
|-----------------------|---|
| Display | 7 Segment Numeric blue-green vacuum fluorescent with negative sign and annunciator arrows |
| Character | 3 1/2 Digit / 0.6" High |
| Input Power | 6 Watts typical at 117 VAC, 50/60 Hz (220 VAC Optional) |
| Temp Range | + 5 to + 50 deg C Operating |
| Input Impedance | 250 Ohms (4/20 mA Current Loop) |
| Conversion Rate | 2.5 per Second |
| Noise Rejection | |
| Common Mode | - 130 db Typical |
| Normal Mode | - 90 db Typical |
| Temperature Stability | 50 PPM per deg C Maximum |
| Response Time | 3.2 Seconds w/ Digital Filtering |
| Warm Up Time | Less than 5 Minutes |

Relay Outputs (Models 903, 904 only)

| | |
|--------------------------|--|
| Electromechanical Relays | Form C, 2 Amp Max at 125 VAC Resistive Load |
| Set Point Resolution | +/- 1 Count |
| Control | ON / OFF Deadband Selection .05, .2, .5, and 1% of Span |

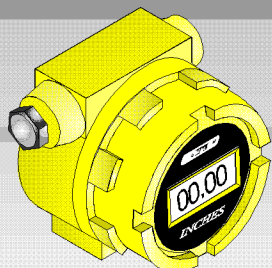
900 BARGRAPH METER SPECIFICATIONS

| | |
|-------------------------|---------------------------------------|
| Accuracy | 1.0 % |
| Linearity | 0.5 % |
| Zero Stability | .01% per deg C |
| Gain Stability | .02% per deg C |
| Input Impedance | 250 Ohm's (Current Loop) |
| Temp Range | 0 to 60 deg C Operating |
| Overload Tolerance | +/- 200% Full Scale (250 Volts Max) |
| Over / Under Indication | Indicated by Flashing Segment |

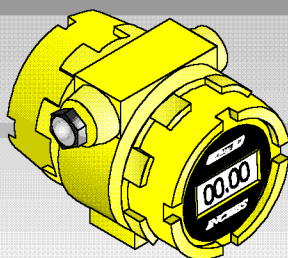
910, 911 METER SPECIFICATIONS

| | |
|-------------------|--|
| Input | 4/20 mA DC |
| Readout | 1/2" High LCD |
| Accuracy | .05% Full Scale Range +/- 1 Count |
| Span Range | 3 1/2 Digit, 0 - 2000 Counts Jumper Selectable |
| Zero Range | 3 1/2 Digit, - 500 to + 500 Counts nominal for a 1000 Count Span |
| Stability | .1 % per deg C |
| Temp Range | - 20 to + 65 deg C Operating |
| Loop Voltage Drop | 2.7 VDC Max |
| Decimal Point | Jumper Selectable |

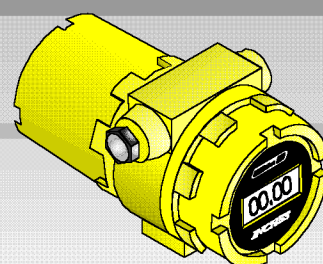
EXPLOSION PROOF DIGITAL INDICATORS



PDI-1101



PDI-1100T



PDI-1100PS
PDI-1100PST

FEATURES

- * Minimal Loop Voltage Drop (2.7 Vdc Typical)
- * 3 1/2 Digit - .5" / .6" High Display
- * User Selectable Ranging / Decimal Points in Engineering Units
- * Suitable for CLASS I , DIV 1, GROUPS B, C, & D

DESCRIPTION

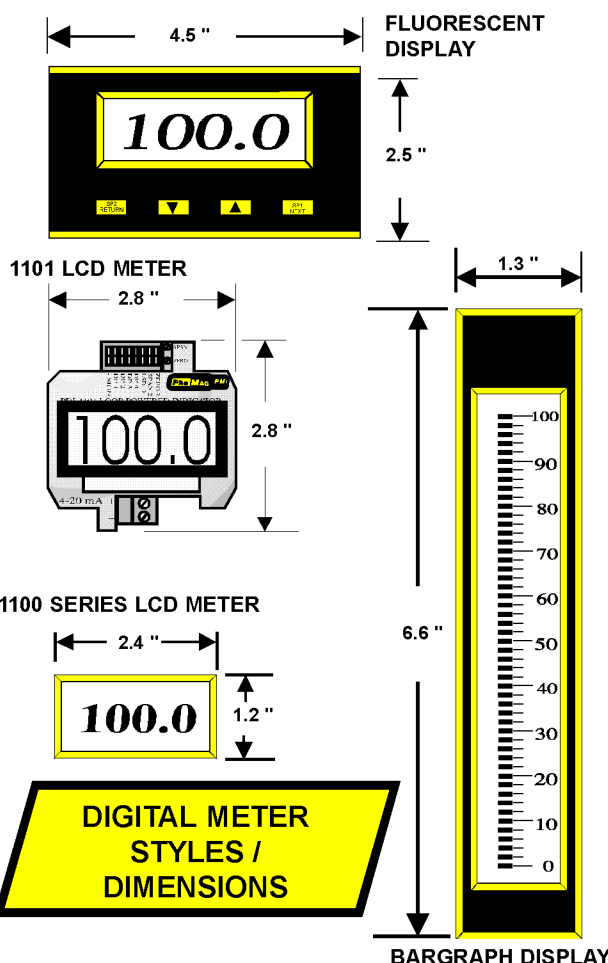
- * PDI-1101 - Explosion Proof Digital Indicator with Plug in Terminal Connections
- * PDI-1100T - Explosion Proof Digital Indicator with Integral PM-1000B Transmitter (for use with CLT-X25 "DC" Option)
- * PDI-1100PS - Explosion Proof Digital Indicator with Integral 24 VDC Loop Power Supply
- * PDI-1100PST - Explosion Proof Digital Indicator with Loop Power Supply and PM-1000B Transmitter

DIGITAL INDICATOR SPECIFICATIONS

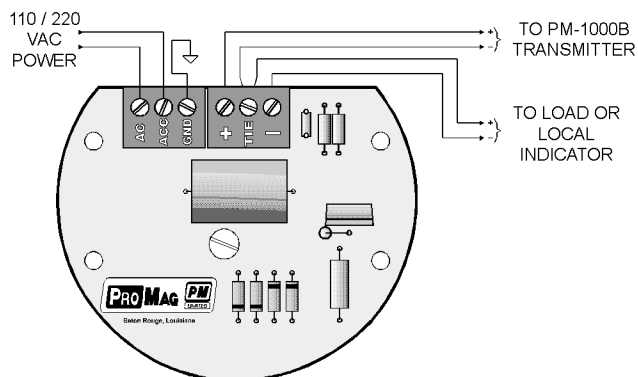
| | |
|----------------------|--|
| Housing | NEMA 7 / NEMA 4 Epoxy Coated Copper free Aluminum |
| Display | 7 Segment 3 1/2 Digit LCD (1101 .6" High, 1100 series .5" High) |
| Input | 4/20 mA Loop Powered |
| PERFORMANCE | |
| Accuracy | 0.1 % Full Scale |
| Update Rate | 2.5 per Second |
| Temp Stability | .01 % per deg C |
| Operating Temp Range | - 20 to + 65 deg C |
| RANGING | |
| Span Range | 0 - 2000 Counts (2 selectable ranges) |
| Zero Range | +/- 500 Counts for 1000 Count Span |

APPLICATION NOTES

- 1) The PDI-1101 is a 4/20mA Loop-Powered Device, and may be electrically installed at any point in a 4/20 mA Instrument Loop where an Explosion-Proof Digital Indicator is Required.
- 2) The PDI-1100T is a Digital Indicator with an integrally mounted PM-1000B Transmitter. It can be mounted locally on the CLT, or may be mounted remotely.
- 3) The PDI-1100PS accepts 110/220 VAC power and provides 24 VDC power for the CLT 4/20 mA Loop.
- 4) The PDI-1100PST is a Digital Indicator with an integrally mounted PM-1000B Transmitter and Loop Power Supply . It can be mounted locally on the CLT, or may be mounted remotely.



PSB POWER SUPPLY



DESCRIPTION

The Promag PSB power supply provides 24 VDC for powering a field mounted PM-1000B Transmitter loop where line voltage AC Power is the only power source available.

SPECIFICATIONS

| | |
|-----------------------|---|
| PRIMARY POWER | 110 VAC Standard, 220 VAC Optional |
| PRIMARY CONSUMPTION | 6 VA |
| OUTPUT | 24 VDC at 30 mA DC (regulated) |
| OPERATING TEMPERATURE | 0 / 60 deg C |
| HOUSING | NEMA 7X Epoxy Coated, Explosion-Proof Suitable for Class 1, Div 1, Groups B, C, and D |

ORDERING INFORMATION

The use of the PSB, when supplied with the CLT, can be integrally mounted with the PM-1000B or it can be mounted in a separate housing. See the CLT part number generation table for description.

The PSB may be also purchased to provide 24 VDC loop power for other devices.

OPTIONAL ELECTRO PNEUMATIC CONTROLLER

DESCRIPTION

The EC-808, when used with the CLT-(x)25, provides for very accurate control of vessel liquid levels.

The outputs may be used to:

- 1) Operate Control Valves
- 2) Transmit Liquid Level Signals (4-20 mA / 3-15 PSIG)

Available housings are:

- 1) NEMA 4 (Shown)
- 2) NEMA 7 Explosion-Proof

FEATURES

- * Unlike displacer designed controllers, The EC-808/CLT-(x)25 control loop is unaffected by changes in fluid temperature and Specific Gravity.
- * There are NO links and levers to bind or wear out as in displacement control devices. (See PM-26 Brochure for more details about these advantages.)
- * The EC-808 may be used as either a Proportional or ON/OFF Controller.
- * Direct or Reverse Action / Full Proportional -Integral - Derivative Control.
- * Non-Intrusive Magnetic Setup / Tuning for Explosion Proof Models.

