
User's Manual

Model MLA & MLD Loop Powered Process Indicators

IM 61A01A01-01E-A



Model MLD (Digital)

Model MLA (Analog)

1. PREFACE

The Model MLA and MLD field mounted indicators receive DC voltage or current signals from electronic transmitters and indicate process measurement values. This instruction manual gives instructions on handling, mounting, and wiring of the MLA (analog type) and MLD (digital type) indicators.

2. MODEL CODE AND SPECIFICATIONS

STANDARD SPECIFICATIONS MODEL MLA & MLD

Input Resistance: < 6.5 ohm (MLA-A 4-20mA),
< 13.5 ohm (MLA-B 10-50mA),
~4K ohm (MLA-C 1-5V)

Voltage Drop: 1.8V typ., 2V max. (MLD)

Scale: Black. Analog single graduations 0-100% standard. Digital 0-100.0% w/decimal standard.

Accuracy: ± 1.5% of full scale (MLA)
± 2.0% of full scale (MLA with /T1 Option)
± 0.05% of full scale (1999) ±1 count (MLD)

Operating Temperature Range:
-50 to 60°C (MLA with Options /CF1 and /T1)
-20 to 60°C (MLA/MLD with all other Options)

Temperature drift: ±0.3 Count/°C (MLD)

Insulation Resistance: Between input terminals and case 100 Mohm at 500 V DC

Dielectric Strength: Between input terminals and case: 1000 VAC for 1 minute.

Mounting: Nominal 2" (50mm) pipe mount or surface.

Explosion Protection Type: FM, CSA, EXPLOSIONPROOF CL1, DIV1, GROUPS A,B,C,D, DUST-IGNITIONPROOF CLII / III, GROUPS E,F,G

Case and Cover: Die cast aluminum, baked polyurethane paint. Moss Green; NEMA 4X

Electrical Connection: ½ x 14 NPT or M20 x 1.5

Weight: 3.0 lbs (MLA), 2.7 lbs (MLD)

Model	Suffix Codes	Description
MLA	Field Mounted Loop Indicator (Analog)
MLD	Field Mounted Loop Indicator (Digital)
Input Signal	-A -B -C	4 to 20 mA DC 10 to 50 mA DC (MLA only) 1 to 5 VDC (MLA only)
Mounting	1..... 2	2" Horizontal Pipe 2" Vertical Pipe (or wall mount)
Optional Specifications		
Ex Protection	/FF1 /CF1	FM Explosion Proof CSA Explosion Proof
Calibration	/ENG	Engineering Unit Calibration (MLD Only)
Face plate	/WHT	White scale or face plate (MLA Only)
Scale	/SC	Scale in Engineering units (MLA Only)
Stain Steel Tag	/SST /SSW	Stainless Steel tag screw attached to housing Stainless Steel tag wired to housing
Coating	/X1 /X2	Epoxy resin coating Polyurethane-Epoxy Anti-corrosion coating
Housing	/1 /2	Cast Aluminum Alloy - (Standard Housing) SUS316 Cast Stainless Steel and ASTM CF-8M
Electrical Connection	/00 /10 /20 /30 /40	ANSI ½ NPT female, without blind plug ANSI ½ NPT female, 304 Stainless Steel blind plug ANSI ½ NPT female, 316 Stainless Steel blind plug ISO M20 female, without blind plug ISO M20 female, 316 Stainless Steel blind plug
Temperature	/T1	Low-Temperature (-50°C, MLA only with Option CF1)
Paint	/P1 /P2 /P3 /P4 /P5 /P6 /P7	Light Blue (RAL # 5012) Orange (RAL # 2008) Red (Munsell # 7.5 R4/14) Mint Green Silver (RAL # 9006) Yellow (RAL # 1018) Gray (RAL # 7046)

OPTIONS

Scale: MLA: Special range scale in Engineering Units (/SC).

Scale or Faceplate color: White on request (/WHT)

Scaling: Digital: Special calibration in Engineering Units (/ENG). Max. value = 1999

Other Optional Items: Stainless Steel Tag (attached or wired to housing), Electrical Connections, SUS316 Housing, /X1 or /X2 coatings and Paint.

ORDERING INSTRUCTIONS

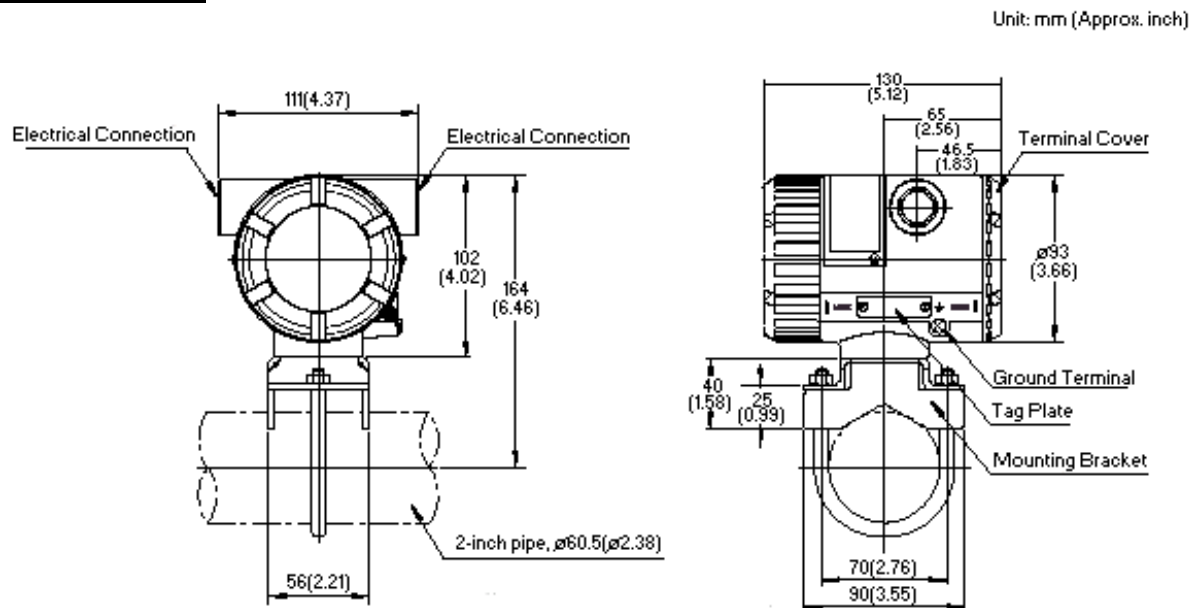
1. Model and Suffix codes.
2. Option Codes

Example Ordering Instructions:

MLD-A1/1/00/FF1/ENG/SST (Field Mounted Indicator (Digital), 4 to 20 mA DC, 2" Horizontal Pipe, FM Explosion Proof, 0-200 InH₂O scale in Engineering Units.) Please specify Scale and Engineering units when ordering /ENG.

FT-201 Specify Tag Number when ordering /SST; Up to 12 Characters.

DIMENSIONS



3. INSTALLATION

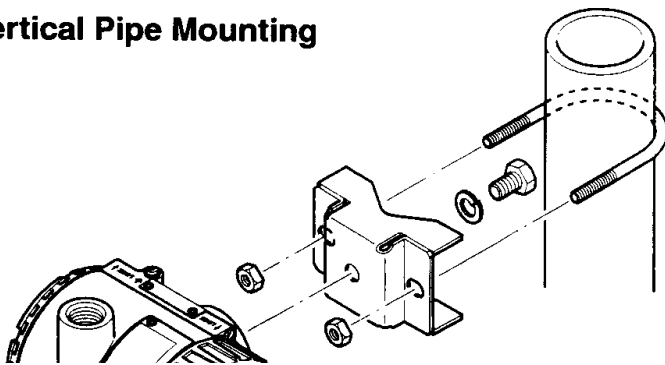
The Loop Powered Indicator can be mounted on a wall or a 2" pipe. The housing is a Nema4X Explosion Proof housing so it can be mounted outside in the field.

Do not install the unit in the following conditions:

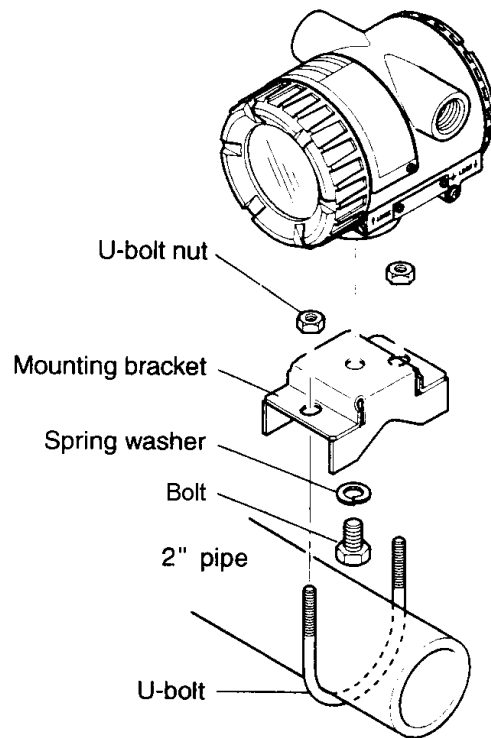
- Extreme Temperatures beyond the temperature rating of the instrument.
- High vibration areas above the vibration rating of the instrument.
- Extremely corrosive environments.

MOUNTING EXAMPLES

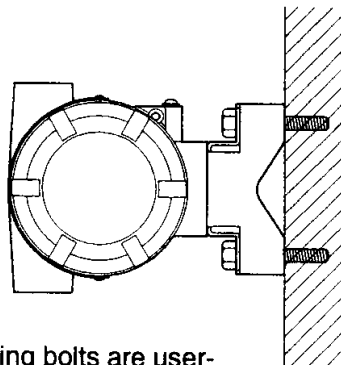
Vertical Pipe Mounting



Horizontal Pipe Mounting



Wall Mounting

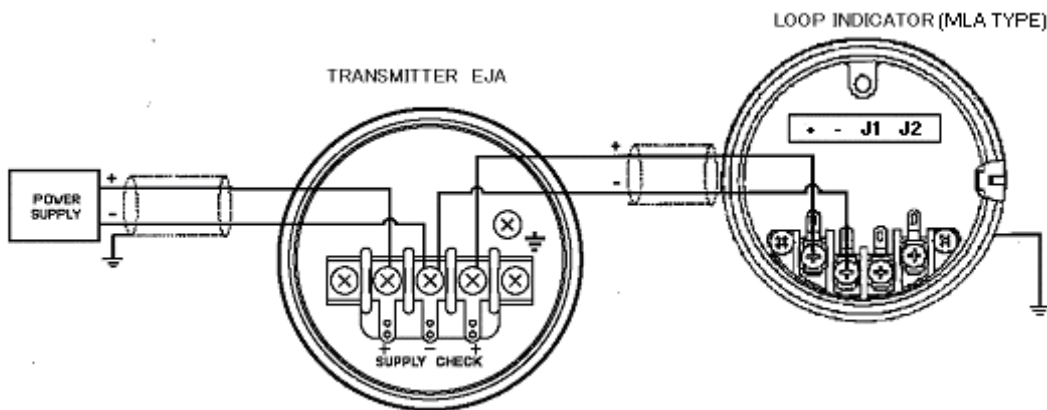


Note: Wall mounting bolts are user-supplied.

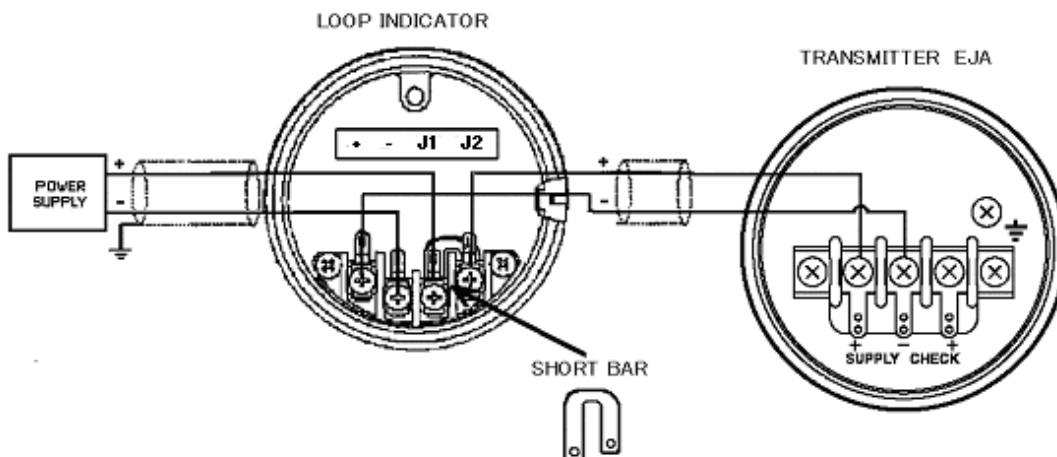
4. WIRING

The loop powered indicator series is powered by the current output loop and does not require external power. All devices must be wired in series with the current loop. Twisted pair shielded cable is recommended.

The following is a typical wiring example of the MLA (Analog type) Loop Indicator connected to an EJA Pressure Transmitter. The impedance of the MLA is low enough that you can connect it across the Check Terminals



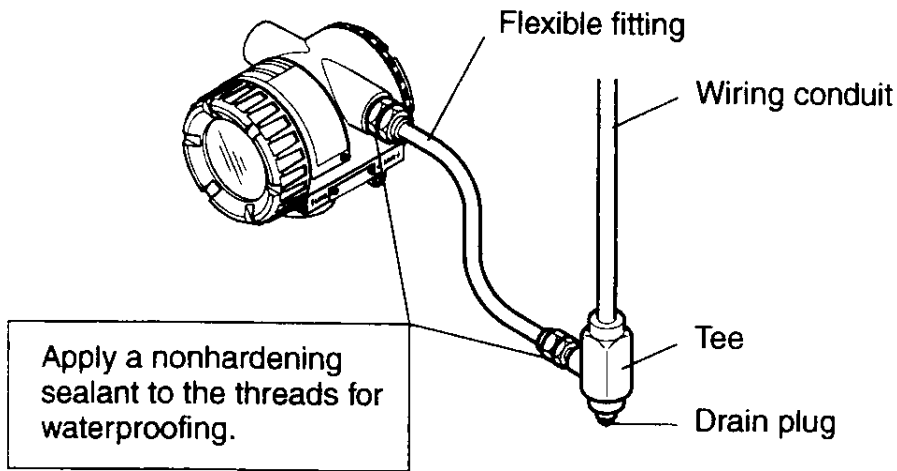
The following is another wiring example of the MLA (Analog type) or MLD (Digital type) Loop Indicator connected to an EJA Pressure Transmitter (Note: The EJA Transmitter below can be replaced with any 4-20mA 2 wire device).



The Loop Indicator is available in FM Explosion Proof and CSA Explosion Proof types for hazardous locations. Wire sealing is required for these approvals. The following diagrams show some wire sealing

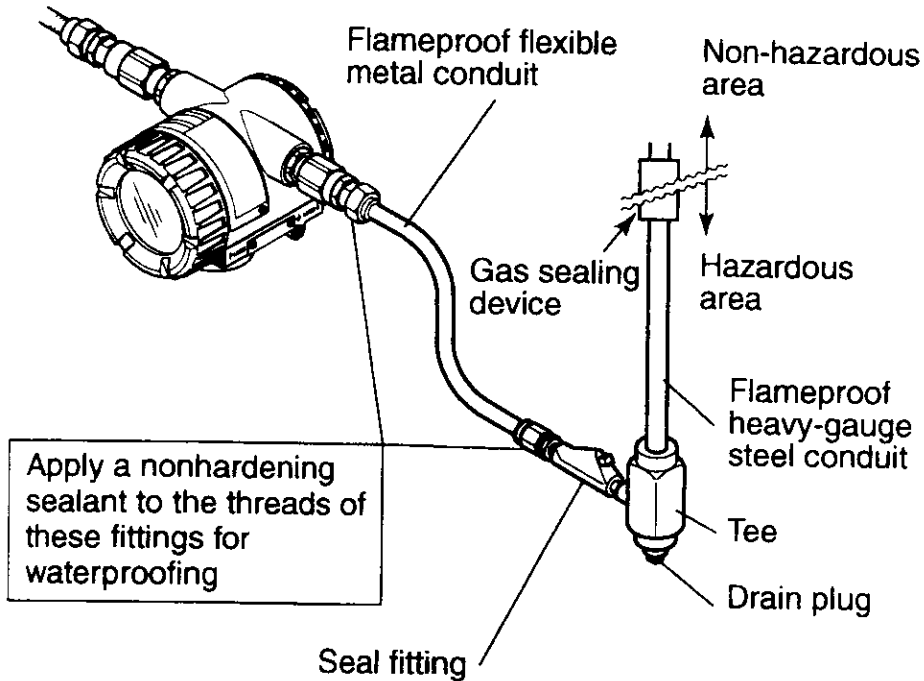
examples.

GENERAL PURPOSE TYPE USING WIRING CONDUIT



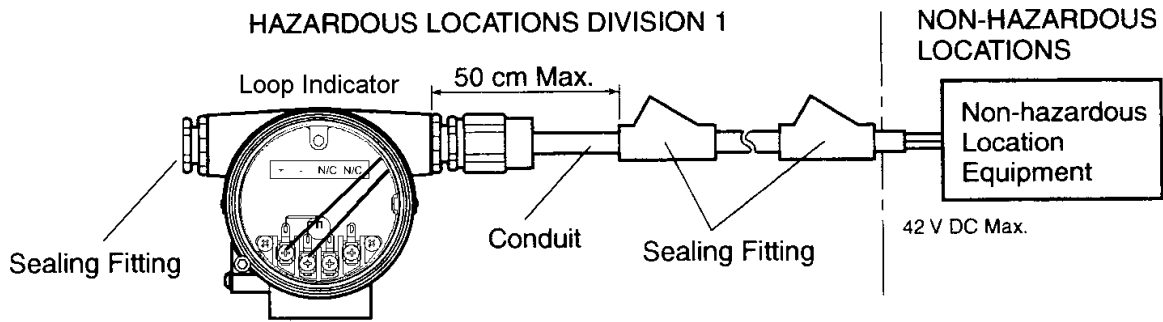
For Flameproof type use Flameproof Packing Adapter or Flameproof Conduit in connection above.

FLAMEPROOF TYPE USING FLAMEPROOF METAL CONDUIT



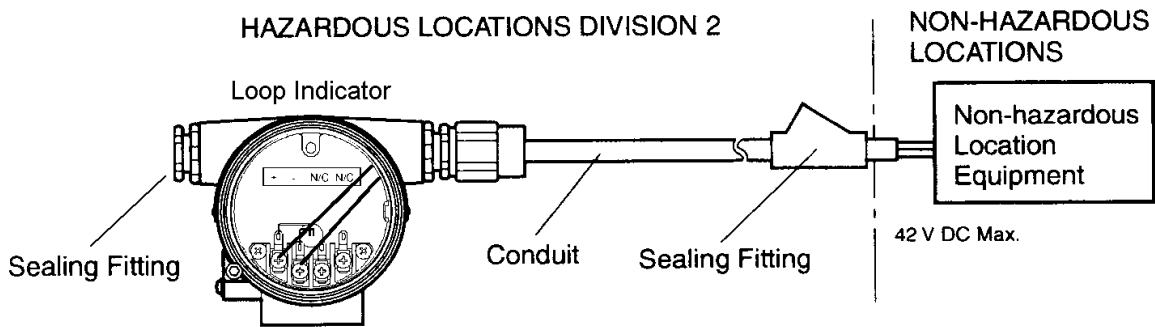
(After wiring, impregnate the fitting)
with a compound to seal tubing.)

MOUNTING IN HAZARDOUS LOCATIONS



Explosionproof Class I, Groups C and D
 Dustignitionproof Class II, Groups E, F and G, Class III

Wiring method shall be suitable for the specified hazardous locations.



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5. CALIBRATION

The Loop Indicators are factory calibrated to 0-100% unless the /SC (for MLA) or /ENG (for MLD) options are specified.

Calibration check for MLA Analog Type Units

- (1) The MLA model ships with a 0-100% scale unless ordered with the /SC Special Scale option.
- (2) Connect unit to Voltage/Current Standard (red to +, black to -). Voltage/Current Standards can be purchased through Yokogawa Corporation of America. Recommended models are CA11 (Voltage/Current Calibrator) or CA71 (Multifunction Calibrator).
- (3) The values to check are shown in the table below. Apply the minimum value and adjust the zero manually first. The zero adjustment can be performed by using a special tool or small needle nose pliers and twisting the white Teflon piece in the center of the meter element. Be careful not to damage the meter movement.

	Suffix –A 4-20mA	Suffix –B 10-50mA	Suffix –C 1-5V
0%	4.0mA	10mA	1.0VDC
20%	7.2mA	18mA	1.8VDC
40%	10.4mA	26mA	2.6VDC
60%	13.6mA	34mA	3.4VDC
80%	16.8mA	42mA	4.2VDC
100%	20.0mA	50mA	5.0VDC

- (4) Verify the meter readings are within specification.

Calibration of MLD Digital Type Units

- (1) The MLD model ships with a calibration range of 0-100% unless ordered with the /ENG Engineering Units option.
- (2) If adjustments are needed the 2 screws holding the plate will need to be removed
- (3) Connect unit to Voltage/Current Standard (red to +, black to -). Voltage/Current Standards can be purchased through Yokogawa Corporation of America. Recommended models are CA11 (Voltage/Current Calibrator) or CA71 (Multifunction Calibrator).
- (4) Set range switches based on the following table (for standard 0-100% unit set SW1 and SW8 to ON):

Desired Display Reading			SW1	SW2	SW3	SW4	SW5
4mA Adjustment	20mA Adjustment Minimum	20mA Adjustment Maximum					
000	1200	1999	OFF	OFF	OFF	OFF	OFF
000	600	1200	ON	OFF	OFF	OFF	OFF
000	400	600	OFF	OFF	ON	OFF	OFF
000	200	400	ON	ON	ON	OFF	OFF
000	100	200	ON	ON	ON	ON	OFF

- (5) Set the Decimal value as follows:
- If tenths (ex. XXX.X) set SW8 on.
 - If hundredths (ex. XX.XX) set SW7 on.
 - If thousandths (ex. X.XXX) set SW6 on.
- (6) The values to check are shown in the table below.

	Suffix –A 4-20mA	Suffix –B 10-50mA	Suffix –C 1-5V
0%	4.0mA	10mA	1.0VDC
25%	8.0mA	20mA	2.0VDC
50%	12mA	30mA	3.0VDC
75%	16mA	40mA	4.0VDC
100%	20mA	50mA	5.0VDC

- (7) Set the voltage standard to the 0% value. Adjust the Zero Pot (top one) to read the minimum value needed.
- (8) Set the Voltage Standard to the 100% value. Adjust the Span Pot (bottom one) to read the maximum value needed.
- (9) Check all points in the table above and verify unit is within specification.

6. ROTATING DISPLAY DIRECTION

The loop indicator display is designed so that it can be rotated in 90 degree increments. This is accomplished by ordering the unit as a horizontal pipe mount or a vertical pipe mount. However there may be the need for the customer to change the angle of the display. The following are procedures for the display rotation:

Display rotation of MLA Analog type

WARNING: The MLA loop indicator contains a very delicate meter movement which can easily be damaged if care is not taken. When performing the following modification avoid contact with the pointer and any of the internal meter movement to avoid damage.

- (1) Remove power from the unit.
- (2) Remove the glass cover from the display side.
- (3) Remove the 2 small screws holding the scale plate onto the meter.
- (4) Carefully remove the scale from the unit (avoid touching the pointer).
- (5) You will notice 2 screws at the 9 and 3 o'clock positions in the bottom of the housing. Remove these screws.
- (6) Rotate the meter to the position desired.
- (7) Replace screws in the 9 and 3 o'clock positions and tighten firmly.
- (8) Carefully put the scale back on the unit (avoid touching the pointer).
- (9) Replace the 2 scale mounting screws.
- (10) Replace the glass cover.

Display rotation of MLD Digital type

- (1) Remove power from the unit.
- (2) Remove the glass cover from the display side.
- (3) Remove the 2 screws holding the mounting plate to the standoffs.
- (4) Rotate the display to the desired position (can be rotated in 90 degree increments).
- (5) Replace and tighten firmly the 2 screws into the standoffs.
- (6) Replace the glass cover.