

# **LOOP POWERED INDICATOR**

## **OPERATION MANUAL**

P/N 1862000

Manual 330  
Revision A  
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# INSTRUCTION MANUAL

## 1862000 LOOP POWERED INDICATOR

### General Description

The 1862000 is a two-wire digital indicator that provides local process indication on a 3-1/2 digit liquid crystal display. The indicator features 3-1/2, easy to read, 1 inch high active digits and a dummy zero. It is powered directly from the 4 to 20 mA input loop, dropping less than 1 volt across the input terminals.

The 1862000 provides a digital readout directly proportional to the current input. The indicator is calibrated at the factory to read 0 to 100.0% for a 4 to 20 mA input, however, it can easily be recalibrated in the field to read directly in engineering units, such as temperature or flow. Each indicator comes with a selection of stickon labels of commonly used engineering units such as GPM, PSI, etc. These labels can be attached to the display so that a user can immediately determine what the indicator is reading.

Recalibration of the 1862000 is easily accomplished through the use of switches and trim pots. The span can be adjusted from 0 to 3998 counts in three switch selectable ranges and the zero offset can be adjusted from -1999 to +1999 counts also in three switch selectable ranges. Fine adjustment of span and zero is made on two noninteractive 15 turn trim pots. Another feature of the 1862000 is a nonactive (dummy) zero, which can be enabled or disabled by means of a DIP switch. One of four decimal point positions or no decimal point is also DIP switch selectable. The 1862000 provides negative polarity indication, which appears when displaying quantities such as - 300 to 1000 °F. The negative sign can, if desired, be disabled by means of a DIP switch.

An additional feature of the 1862000 is the internal calibrator. The indicator can be field calibrated while installed in a working 4 to 20 mA loop, regardless of the current through the loop, simply by switching into the calibrate mode. The indicator can also be calibrated on the bench by using a conventional calibrator or by connecting a 1 to 1.5 volt power source (flashlight battery) across the input terminals and switching to the calibrate mode.

The 1862000 is housed in a rugged, indoor/outdoor NEMA 4X, polycarbonate housing. This housing is corrosion resistant and dust-tight, and will withstand direct water spray under hose pressure. Options available include a 1/2 NPT water-tight conduit hub (Option M42), a panel mounting bezel (Option M46), a bracket for 2 inch pipe mounting (Option M36), a 3 inch snap-track mounting bracket (Option M31S) and DIN rail mounting bracket (option M31D).

### Specifications

#### 1. Input

- Range: 4 to 20 mA
- Voltage drop: 0.98V @20mA, 25°C
- Forward current over range: 100 mA max.
- Reverse current: 100 mA max.

#### 2. Display

- Type: 3-1/2 digit LCD, with dummy zero, 1" high digits
- Range: -1999 to 1999 counts
- Decimal point: four positions or absent, switch selectable
- Polarity sign: negative polarity indication or none, switch selectable
- Action: forward acting (count increases with current), normal calibration; reverse acting (count decreases with current), obtained by appropriate zero setting
- Overrange indication: display blanks except for most significant 1

#### 3. Calibration

- Span range: 0 to 3998 counts, 3 ranges switch selectable, fine adjustment on 15 turn trim pot, noninteractive with zero pot
- Offset range: -1999 to +1999 counts, 3 ranges switch selectable, fine adjustment on 15 turn trim pot, noninteractive with span pot
- Resolution: better than 1 count

#### 4. Performance

- Accuracy:  $\pm 0.1\%$  of span counts,  $\pm 1$  count
- Temperature effect (zero):  $\pm 0.1$  count/ °C
- Temperature effect (span):  $\pm .01\%$  of span counts/°C
- Operating temperature: -30 to +85°C
- Ripple rejection: less than 1 count with 1 mA peak- to-peak, 60 Hz ripple at input
- Sample rate: 2 per second

#### 5. Enclosure

- Material: polycarbonate
- Ratings: NEMA 4X, flammability UL 94-5V

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## Field Wiring

Field connections are made to a compression type terminal block located at the bottom of the enclosure. To expose the terminal block remove the cover from the enclosure, loosen the two screws at the corners of the PC board and remove the PC board from the enclosure. Terminals 1 and 2 are the positive and negative input terminals, terminal 3 is a spare which can be used as a tie point. The field wiring terminal block is connected to a two point terminal block located on the top left hand corner of the PC board. When bench testing the unit, input signals can be connected directly to the top terminal block without removing the PC board from the enclosure.

## Initial Setings - Factory Calibrated

1. Set Input Voltage Drop (Factory Calibrated): input 20 milliamps at the input terminals of the indicator. Adjust pot "P1" for a voltage drop of 0.95 volts between the input terminals
2. Zero Adjustment (Factory Calibrated): To prevent the interaction of the span and zero pots the 4 milliamp offset is compensated for at the output of amplifier "U1". To do this, input 4 milliamps into the indicator set switch 2, position 2 to the normal operating position, and then adjust pot "P2" for 0.000 volts between pins 3 and 6 of amplifier "U1".
3. Calibration of Internal Calibrator (Factory Calibrated): Calibrate the display to read 00.0 to 100.0 for a 4 to 20 milliamp input following the instructions for calibrating the display. With the indicator operating (the value of the input current does not matter) set switch 2, position 2, to the Activate Internal Calibrator position. Set switch 2, position 1 to the Calibrate Zero position and adjust pot "P3", until the display reads 00.0. Set switch 2, position 1 to the Calibrate Span position and adjust pot "P4" until the display reads 100.0. Return switch 2, position 2 to the Normal Operating position. Note that the input current has no effect on the display while switch 2 is in the Activate Internal Calibrator position.

## Display Calibration

To calibrate the 1862000, proceed as follows:

1. Determine desired display for a 4 to 20 mA input.  
Example: -30.0 to 195.0° F
2. Set span switches S1-1 and S1-2 for the proper span range.  
Example: Span = 1950 - (-300) 2250 counts;  
set S1-1 off; S1-2 off; (Note: ignore decimal point)

3. Set zero switches S1-3 and S1-4 for proper zero range.  
Example: Zero= -300 counts; set S1-3 off; S1-4 off
4. Select decimal point.  
Example: Select P3 decimal point; set S1-7 on, S1-5, 6, 8 off
5. Enable or disable negative polarity indication.  
Example: Enable negative sign; set S1-10 on
6. Enable or disable dummy zero.  
Example: Disable dummy zero; set S1-9 off
7. Input 4 mA and set "zero pot" for bottom of range.  
Example: Adjust zero pot to display -30.0
8. Input 20 mA and set "span pot" for top of range.  
Example: Adjust span pot to display 195.0
9. The indicator is now calibrated.  
Note that the dummy zero is not an active digit and should not be used when determining span and zero counts.

## Using The Internal Calibrator

The 1862000 can be calibrated using the internal calibrator, while installed in a working loop, or it can be calibrated on the bench by connecting a 1 to 1.5 volt supply across the input terminals as a power source. To use the internal calibrator procede as follows:

1. Set the calibrating switches for the desired span and offset ranges as described in the preceding section.
2. Set switch 2, position 2 to the Activate Internal Calibrator position.
3. Set switch 2, position 1 to the Calibrate Zero position, then adjust the "zero pot" until the bottom of the range is displayed.
4. Set switch 2, position 1 to the Calibrate Span position, then adjust the "span pot" until the the top of the range is displayed.
5. Return switch 2, position 2 to the Normal Operation position. The indicator is now calibrated.

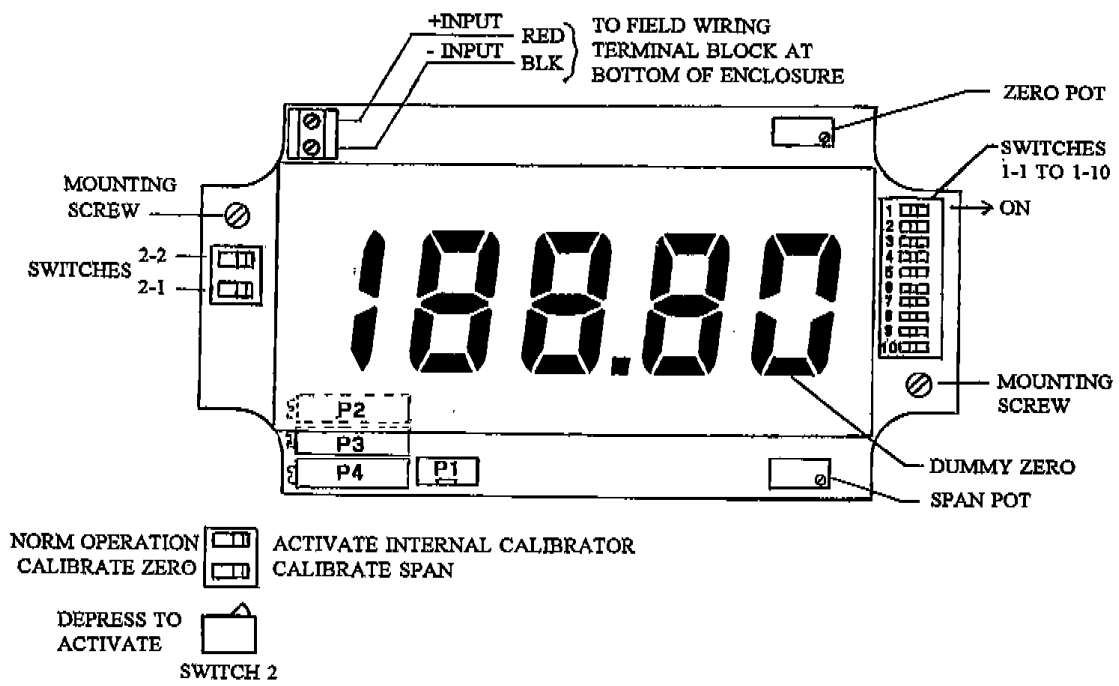


Fig. 1 PC Board Layout

S1-1		S1-2		SPAN RANGE
OFF		ON		000 TO 1530 COUNTS
OFF		OFF		1530 TO 2470 COUNTS
ON		OFF		2470 TO 3998 COUNTS
S1-3		S1-4		ZERO OFFSET
ON		OFF		-573 TO -1999 COUNTS
OFF		OFF		-573 TO 573 COUNTS
OFF		ON		573 TO 1999 COUNTS
S1-5	ON	1.999	_	SELECT DECIMAL POINT
S1-6	ON	19.99	_	
S1-7	ON	199.9	_	
S1-8	ON	1999.	_	
S1-9	ON	19990		ENABLE DUMMY ZERO
S1-10	ON	ENABLES NEGATIVE POLARITY INDICATION		

Fig. 2 Switch Setting Table For S1

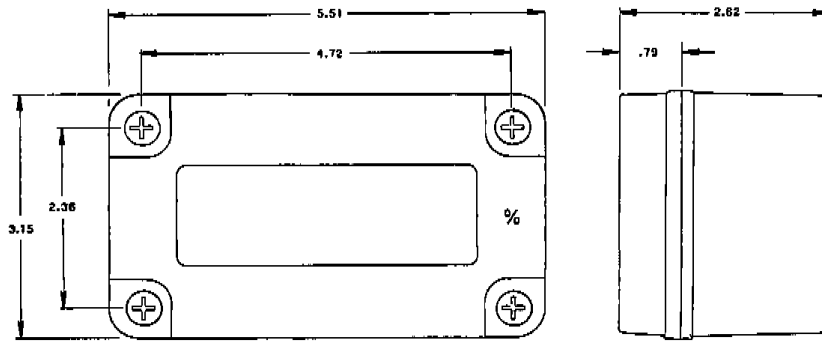


Fig. 3 General Dimensions

Notes:

1. Four mounting holes for # 6 screws are located directly below the cover screws.
2. Access to the enclosure can be made by drilling, punching or sawing holes into the long sides of the enclosure. Locate center of access holes 7/8 of an inch in from the back side of the enclosure.

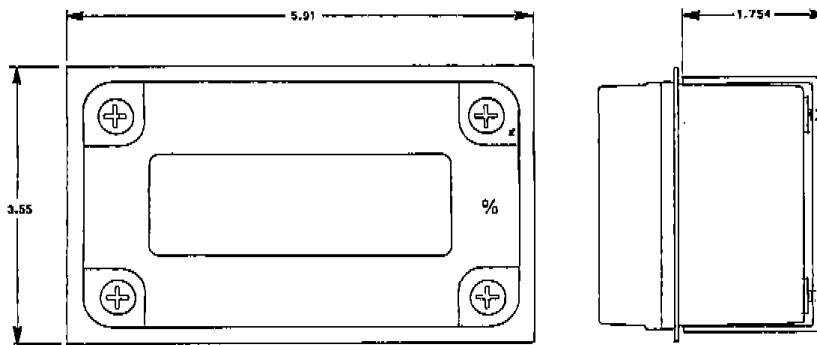


Fig. 4 Panel Mount Dimensions

Panel Cutout: 5.45 X 3.07 ±.015

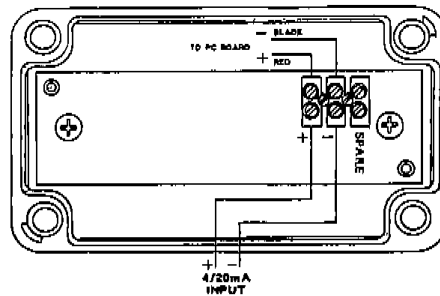


Fig. 5 Field Wiring