DEVAR Inc.
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Model 18-LPIX-1V

LOOP POWERED INDICATOR

Manual# 990615

PRODUCT DESCRIPTION
18-LPIX-1V
LOOP POWERED INDICATOR

GENERAL DESCRIPTION

The 18-LPIX 1V is a two-wire, digital indicator, in an explosion proof housing, that provides local process indication on a 3½ digit liquid crystal display. The Indicator features ½ inch high, easy to read digits and is powered directly from the 4 to 20 mA input loop, dropping less than 1 Volt across the input terminals.

The 18-LPIX-1V provides a digital readout directly proportional to the current input. It is calibrated at the factory to display 00.0 to 100.0% for a 4-20 mA input, however, it can be easily recalibrated in the field, to read directly in engineering units, such as temperature or flow. Each indicator comes with a selection of stick-on-labels of commonly used engineering units. These labels can be attached to the display so that an operator can immediately determine what the indicator is reading.

Recalibration of the 18-LPIX 1V is easily accomplished through the use of switches and trimpots. Information on switch positions for the various span and zero calibrations can be found printed on a label attached to the inside wall of the indicator housing. The display span can be adjusted from 0 to 3998 counts in 3 switch selectable ranges and the zero offset can be adjusted from –1999 to +1999 counts also in 3 switch selectable ranges. Fine adjustment of span and zero is made on two 15-turn trimpots. The span and zero pots are non-interactive and provide resolutions of better than one count. Some sample display calibrations for a 4 to 20 mA input are as follows:

0000	to	1999	(forward acting)
1999	to	000	(reverse acting)
-1999	to	1999	(zero center)
230	to	1735	(positive offset)
-720	to	850	(negative offset)

Negative polarity indication is available when required. The negative sign is enabled or disabled through the use of a switch and can be used when displaying quantities such as -350 to 1000°F. Reverse action is achieved by disabling the negative sign and applying the appropriate negative offset. Decimal point selection is also available. Three decimal point positions or no decimal point can be selected through the use of switches.

An additional feature of the 18-LPIX-1V 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 1.5 Volt flashlight battery across the input terminals and switching to the calibrate mode.

To gain access to the indicator assembly, unscrew the cover from the housing, remove the round plastic label from around the display, and then grasping two diagonal corners of the display, pull the indicator assembly out of the housing. The indicator is held in place by two banana plugs, which plug into the base board attached to the bottom of the housing. Field wiring connections are made to a three point, compression type, terminal block located on the baseboard.

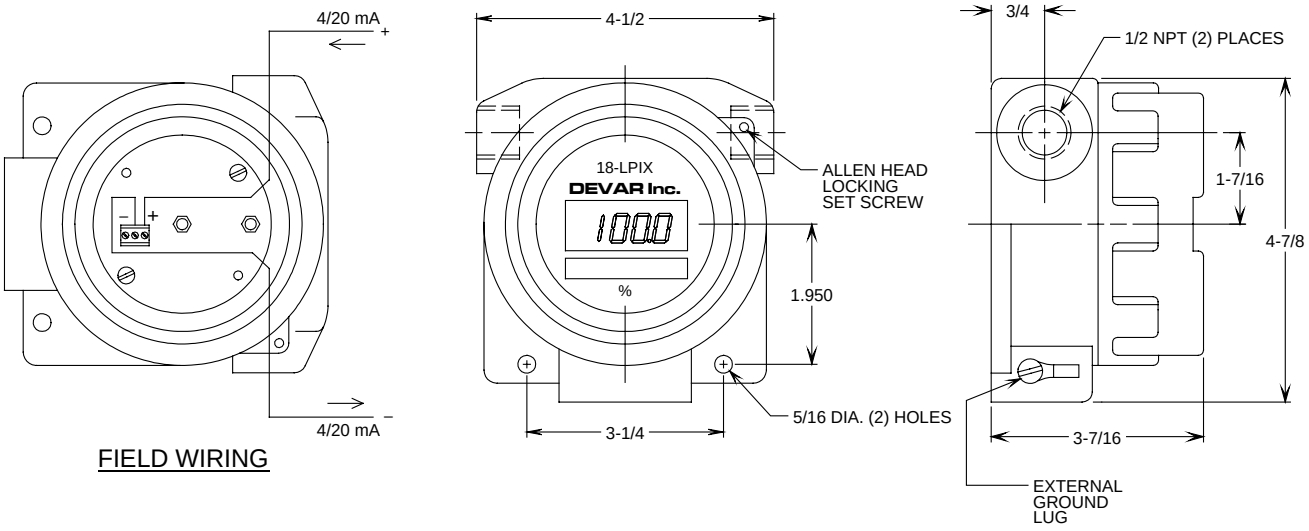
The housing is ruggedly constructed of sand-cast, copper-free aluminum. Two ½ inch NPT hubs are provided for entrance into the housing, which is rated NEMA-4 and NEMA-7 and is classified for use in Class I, Division 1, Groups B, C, and D and Class II, Division 1, Groups E, F, and G hazardous locations.

SPECIFICATIONS

1. Input
    a. Input Range: 4 to 20mA
    b. Voltage Drop: 0.98V @ 20mA, 25°C
    c. Forward Current Over-Range: 100 mA max.
    d. Reverse Current: 100 mA max.
2. Display
    a. Type: 3-½ Digit LCD, ½ inch high digits
    b. Range: -1999 to 1999 counts
    c. Decimal Point: 3 Positions or absent, switch selectable
    d. Polarity Sign: Negative Polarity Indication or none, switch selectable
    e. Action: Forward Acting (count increases with current), Normal Calibration; Reverse Acting (count decreases with current) obtained by adding appropriate negative offset
    f. Over-Range Indication: display blanks except for most significant one
3. Calibration
    a. Span Range: 0 to 3998 counts, 3 ranges, switch selectable, fine adjustment on 15 turn trim pot, non-interactive with zero pot
    b. Offset Range: -1999 to +1999 counts, 3 range switch selectable, fine adjustment on 15 turn trim pot, non-interactive with span pot
    c. Resolution: better than one count

4. Performance
    a. Accuracy: ±0.1% of span counts, ±1 count
    b. Temperature Effect (Zero): ±0.1 count per °C
    c. Temperature Effect (Span): ±0.01% of span counts per °C
    d. Operating Temperature: -20° to +70°C
    e. Ripple Rejection: less than 1 count with 1 mA peak-to -peak, 60 Hz ripple at input
    f. Sample Rate: 2 per second
5. Housing
    a. Material: sand cast copper-free aluminum
    b. Access: Two ½ inch NPT ports
    c. Classification: Explosion proof, NEMA-4, for use in Division 1, hazardous areas Class I, Groups B, C, & D, Class II, Groups E, F, & G
    d. Weight: 2.8 lbs.
6. Options

-M36	2 inch Pipe Mount Kit
-WT	Wide Temperature Range (-40° to 85°F)
-BL	Backlight Display (Note; Backlight derives its power from the 4/20 mA signal and adds an additional 2 V burden to the loop)



FIELD WIRING

FIG. 1 GENERAL DIMENSIONS AND FIELD WIRING

DEVAR Inc.	706 Bostwick Ave. Bridgeport CT 06605 Tel: (203) 368 6751;Fax: (203) 368 3747		PRODUCT DESCRIPTION, 18-LPIX-1V				
PREPARED	RNT	10/20/08	NEXT ASSY.	SCALE	PAGE	DRAWING NO.	REV.
CHECKED			BM515270-0001	NONE	3 of 6	515277	C

CALIBRATION PROCEDURE

1. Set Input Voltage Drop (Factory Calibration):

   Input 20 mA at the input terminals of the indicator. Adjust pot "P2" on the lower PC board for a voltage drop of 0.95 Volts between the input terminals.

2. Zero Adjustment (Factory Calibration):

   To prevent the interaction of the span and zero pots the 4 mA offset is compensated for at the output of amplifier "U1". To do this, input 4 mA into the indicator, set switch 1, position 1, on the lower PC board to the normal operating position, and then adjust pot "P1", also on the lower PC board, for 0.000 volts at the output of amplifier "U1". Measure the voltage between common (the black wire) and pin 6 of U1 (the blue wire).

3. Calibration of Internal Calibrator (Factory Calibration):

   Calibrate display to read 00.0 to 100.0 for a 4 to 20 mA input following the instructions for the calibration of the display. With the indicator operating (the value of the input current does not matter) switch switch 1, position 1, on the lower PC board to the calibrate position (fig. 4). Switch switch 1, position 2 to the zero calibrate position and adjust pot "P3", on the lower PC board until the display reads 00.0. Switch switch 1, position 2 to span calibrating position and adjust pot "P4" on the lower PC board until the display reads 100.0. Return switch 1, position 1 to the normal operating position. Note that the input current has no effect on the display while switch 1 is in the calibrate position.

4. Calibrate Display (Using External Calibrator):

   To calibrate the 18-LPIX-1V, remove the front cover and label to expose the calibrating switches and the span and zero pots, located on the top PC board (Figs. 1 and 2). Input a 4 to 20 mA signal and calibrate the indicator as follows:

   1. Determine desired display for a 4 to 20 mA input.
      Example: -30.0 to 195.0 ^{O}F

   2. Set span switches S1 and S2 for proper span range (figs. 2 & 3).
      Example: Span = 1950 - (-300) = 2250 counts; set S1-off, S2-off

   3. Set zero switches S3 and S4 for proper zero range.
      Example: Zero = -300 counts; set S3-off, S4-off

   4. Select decimal point.
      Example: select P3 decimal point; set S8-on, S6-off, S7-off

   5. Enable or disable negative polarity indication.
      Example: Enable negative sign; set S5-on

   6. Input 4 mA and set "zero pot" for bottom of range.
      Example: adjust zero pot to display -30.0

   7. Input 20 mA and set "span pot" for top of range.
      Example: adjust span pot to display 195.0

   8. The indicator is now calibrated.

5. Calibrate Display (Using Internal Calibrator):

The 18-LPIX-1V can be calibrated using the internal calibrator, while installed in a working loop, or it can be calibrated on the bench using a 1.5 Volt flash light battery connected across the input terminals as a power source.

To use the internal calibrator follow the following procedures:

1. Set the calibrating switches (Fig. 2) for the desired span and offset ranges as described in the preceding section.

2. Set switch 1, position 1 (Fig. 4) located on the lower PC board to the calibrate position

3. Set switch 1, position 2 to the "cal. zero" position, then adjust the "zero pot" located on the top PC board until the display displays the bottom of the range.

4. Set switch 1, position 2 to the "cal. span" position, then adjust the "span pot" located on the top PC board until the display displays the top of the range.

5. Return switch 1, position 1 to the normal operate position. The indicator is now calibrated.

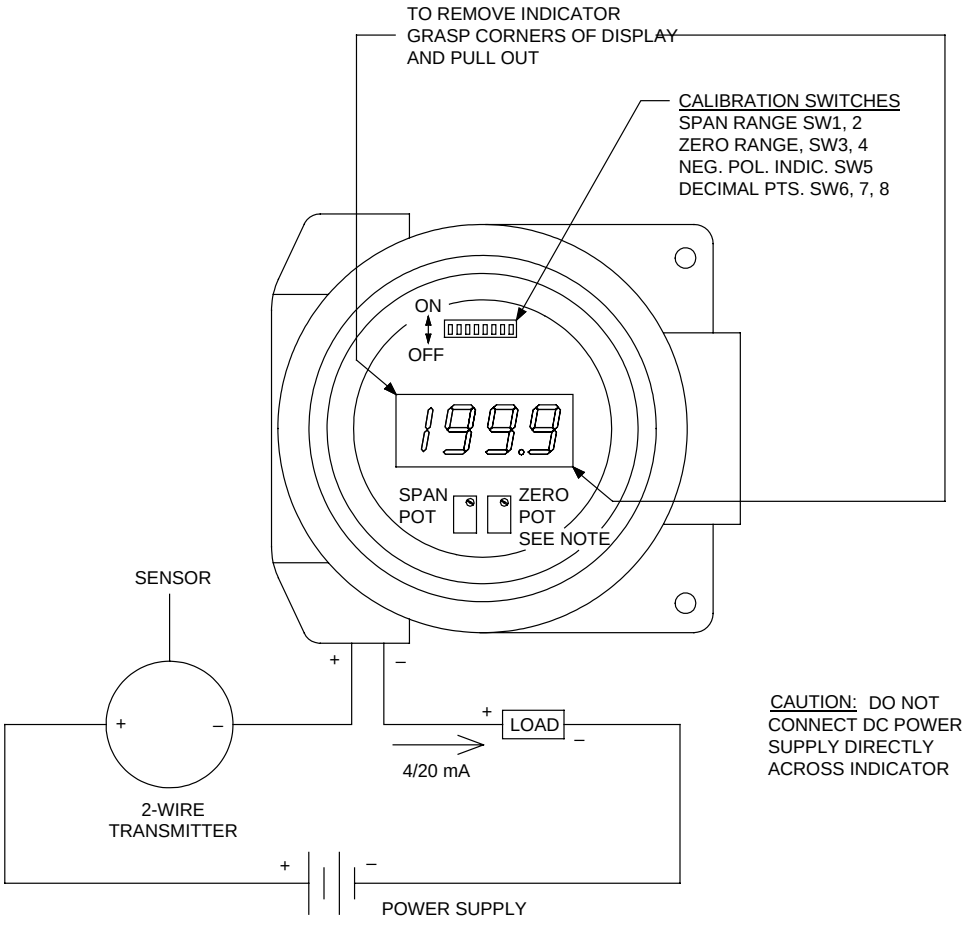


FIG.2 TYPICAL FIELD WIRING CONNECTIONS AND LOCATION OF CALIBRATION SWITCHES AND POTS

CALIBRATION SWITCH SETTING					
SPAN	S1	S2	ZERO	S3	S4
4000 to 2470	ON	OFF	2000 to 573	OFF	ON
2470 to 1530	OFF	OFF	573 to –573	OFF	OFF
1530 to 000	OFF	ON	–573 to –2000	ON	OFF
ENABLE DECIMAL POINT			TO ENABLE NEGATIVE POLARITY INDICATION		
1.999	S6	ON			
19.99	S7	ON	S5 ON		
199.9	S8	ON			

FIG.3 TABLE OF CALIBRATION SWITCH SETTINGS FOR SPAN, ZERO, DECIMAL POINTS, AND POLARITY

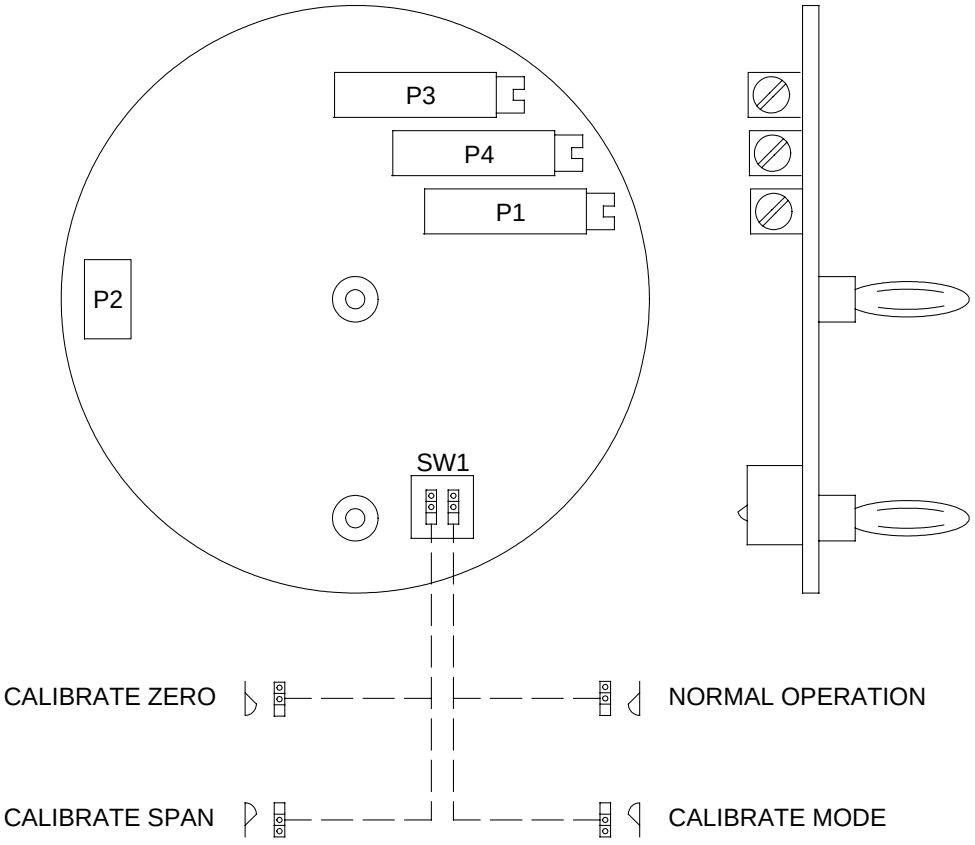
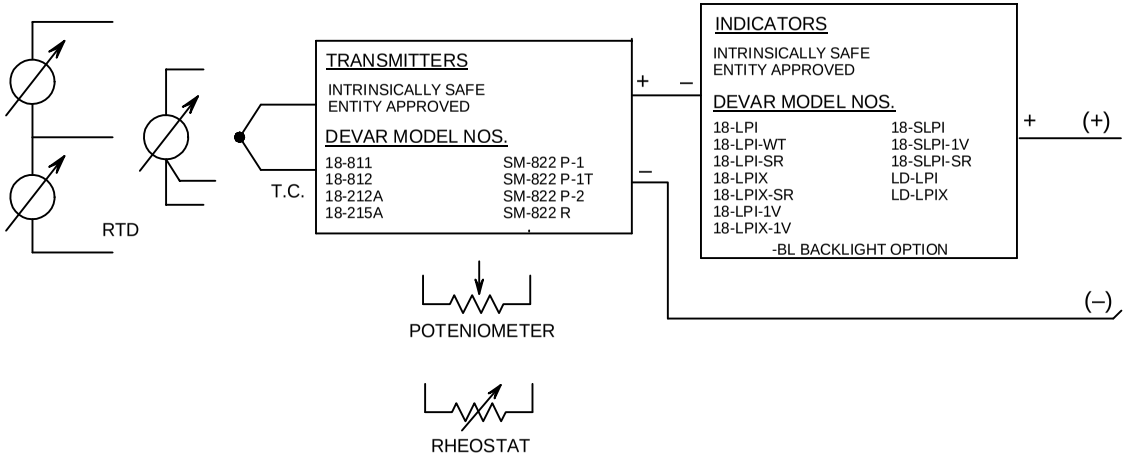


FIG.4 LOWER PC BOARD WITH SWITCH SETTINGS FOR INTERNAL CALIBRATOR

DWG NO. 515107 SH 1

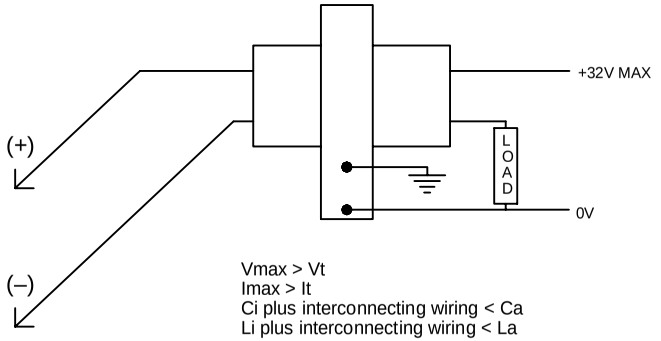
REV	DESCRIPTION	DATE	APPROVED
H	ADD 18-SLPI, 18-SLPI-IV AND 18-SLPI-SR, ECN 3081A	02-08-95	AG
I	ADD LD-LPI, ECN 3154	01-22-98	AG
J	ADD SM-822P-1, SM-822P-1T, SM-822P-2 & SM-822R, ECN 3208	09-09-99	AG
K	ADD LD-LPIX & -BL BACKLIGHT OPTION, ECN 3319	09-13-05	AG
E	RELEASE ECN 2826B	04-22-91	AG
F	ADD 18-LPI-WT, ECN 3027	02-26-92	AG
G	32V WAS 30V, ECN 3081	02-07-95	AG

HAZARDOUS LOCATION



NON-HAZARDOUS LOCATION

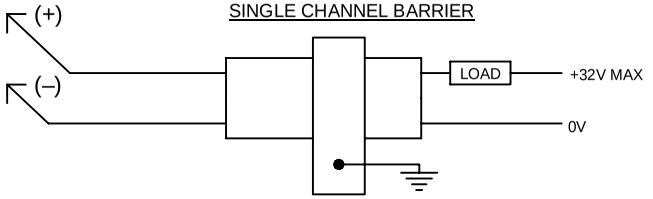
DUAL CHANNEL BARRIER



Vmax > Vt
Imax > It
Ci plus interconnecting wiring < Ca
Li plus interconnecting wiring < La

OR

SINGLE CHANNEL BARRIER



Vmax > Voc
Imax > Isc
Ci plus interconnecting wiring < Ca
Li plus interconnecting wiring < La

NOTES:

1. HAZARDOUS LOCATION RATINGS: CLASS I, DIVISION 1, GROUPS A, B, C, D
2. ENTITY PARAMETERS: Vmax = 32 V, Imax = 150 mA, Ci = 0 µf, Li = 0 mH
3. INSTALLATION OF THE SYSTEM MUST BE IN ACCORDANCE WITH ANSI/ISA RP12.6
4. CONTROL ROOM INSTRUMENTATION TO OPERATE AT LESS THAN 250V rms
5. DO NOT CONNECT mA METER TO TRANSMITTER MONITOR TERMINALS UNLESS AREA IS KNOWN TO BE SAFE
6. THE ABOVE UNITS ARE NONINCENDIVE FOR CLASS I, DIVISION 2, GROUPS A, B, C, D LOCATIONS WITH A Vmax OF 32V. BARRIERS ARE NOT REQUIRED FOR DIVISION 2 OPERATION.
7. NO REVISIONS WITHOUT PRIOR FACTORY MUTUAL APPROVAL

FM APPROVED

UNSPECIFIED DIMENSION TOLERANCE
DECIMAL +/- 0.005"
FRACTION +/- 1/64"
ANGLE +/- 1/2 DEGREE

MATERIAL -N/A-

FINISH -N/A-

NEXT ASSY NO. NONE

CONTRACT NO.

PREPARED	RNT	08-16-05
CHECKED		
MECH		
ELEC		
DESIGN		
APPROVED		
APPROVED		

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INTERCONNECTING DIAGRAM TO INTRINSICALLY SAFE APPARATUS

SIZE B | DRAWING NO. 515107 | REV K

SCALE NONE | WT | SHEET 1 OF 1