

DEVAR Inc.

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Model 18-LPIX-4

LOOP POWERED
INDICATOR



Manual# 990617

PRODUCT DESCRIPTION
18-LPIX-4
4 1/2 DIGIT EXPLOSION PROOF INDICATOR

GENERAL DESCRIPTION

The 18-LPIX 4 is a two-wire, digital indicator, in an explosion proof housing, that provides local indication of the measured variable on a 4½ digit liquid crystal display. This indicator can be inserted at any point in a 4 to 20 mA loop. It is powered directly from the loop and drops less than 3.3 Volts across its input terminals.

The 18-LPIX-4 provides a digital readout, which is proportional to the input. It is calibrated at the factory to display 00.00 to 100.00% for a 4 to 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 4 is easily accomplished through the use of switches and trim-pots. The display span can be adjusted from 0 to 39998 counts in 16 switch selectable ranges and the zero offset can be adjusted from -19999 to +19999 counts also in 16 switch selectable ranges. Fine adjustment of span and zero is made on two 15-turn trim-pots. The span and zero pots are non-interactive and provide resolutions of better than one count. Some sample display calibrations are as follows:

0000	to	19999	(direct acting)
19999	to	0000	(reverse acting)
-19999	to	19999	(zero center)
2300	to	17350	(positive offset)
-7200	to	8500	(negative offset)

Display action, direct or reverse, is selected by means of movable jumpers. One of four decimal point positions, or no decimal point is also jumper selectable.

D	3384	REDRAWN IN ELECTRONIC FORMAT		
C	3067	ADD GROUND LUG, SET SCREW, DIMENSION CHANGES	AG	03-14-94
A	3002A	RELEASE	AG	09-18-90
REV.	ECN	DESCRIPTION	APPR.	DATE

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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 posts located at 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 18-LPIX-4 is housed in a rugged, indoor/outdoor, NEMA-4 housing which will withstand direct water spray under hose pressure. The housing is constructed of sand-cast, copper-free aluminum, with two ½” NPT hubs provided for entrance. This housing is also explosion proof and is suitable for use in Class I, Division 1, Groups B, C, and D and Class II, Groups E, F, and G hazardous locations.

Options available include a 2-inch pipe mount (-M36).

SPECIFICATIONS

1. Input
 - a. Input Signal: 4 to 20mA
 - b. Input Voltage Drop: 3.3V @ 20mA, 25°C
 - c. Maximum Input Current: 60mA forward or reverse

2. Display
 - a. Type: 4½ , 7 segment, Digit LCD
 - b. Character Height: 0.4 inches
 - c. Characters: -1.8.8.8.8
 - d. Decimal Point: 4 Positions or absent, jumper selectable
 - e. Polarity Indication: negative sign
 - f. Over-Range: blanks 4 least significant digits

3. Operation
 - a. Span Range: 0 to 39998 counts, 16 ranges, switch selectable
 - b. Zero Range: -19999 to +19999 counts, 16 ranges, switch selectable
 - a. Action: direct (count increases as input increases), reverse (count decreases as input increases), jumper selectable
 - c. Sample Rate: 2.4 per second

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4. Performance

- a. Resolution, max: 0.4 micro-Amps
- b. Resolution: (16000 micro-Amps)/(span counts)
- c. Accuracy (25°C): reading ± 3 counts
- d. Zero tempco: $\pm(0.0003\%$ of span ± 0.4 counts) per °C typical
 $\pm(0.0016\%$ of span ± 0.8 counts) per °C maximum
- e. Span tempco: $\pm 0.001\%$ of span per °C typical
 $\pm 0.009\%$ of span per °C maximum
- f. Operating Temperature: -20 to +70°C
- g. Storage Temperature: -40 to +85°C
- a. Ripple Rejection: reading change of less then 0.01% of span for 1 mA, 60 Hz, ripple applied to the input

5. Enclosure

- a. Material: sand-cast copper-free aluminum
- b. Access: two 1/2 inch NPT ports
- c. Classification: Explosion Proof, NEMA 4 for use in Class I, Division 1, Groups B, C, and D; Class II, Groups E, F, and G, Hazardous locations
- d. Weight: 2.8 lbs.

6. Options

- M36 2-inch pipe mounting bracket
- BL Backlighting Option (Voltage Drop of 5.3V @ 20 mA, 25°C)

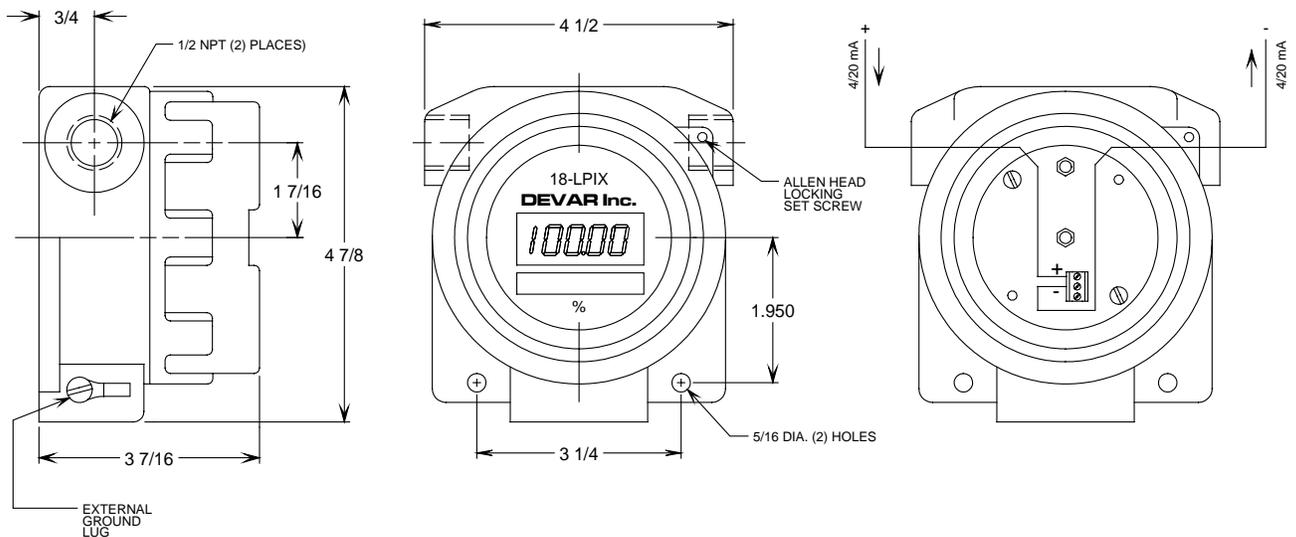
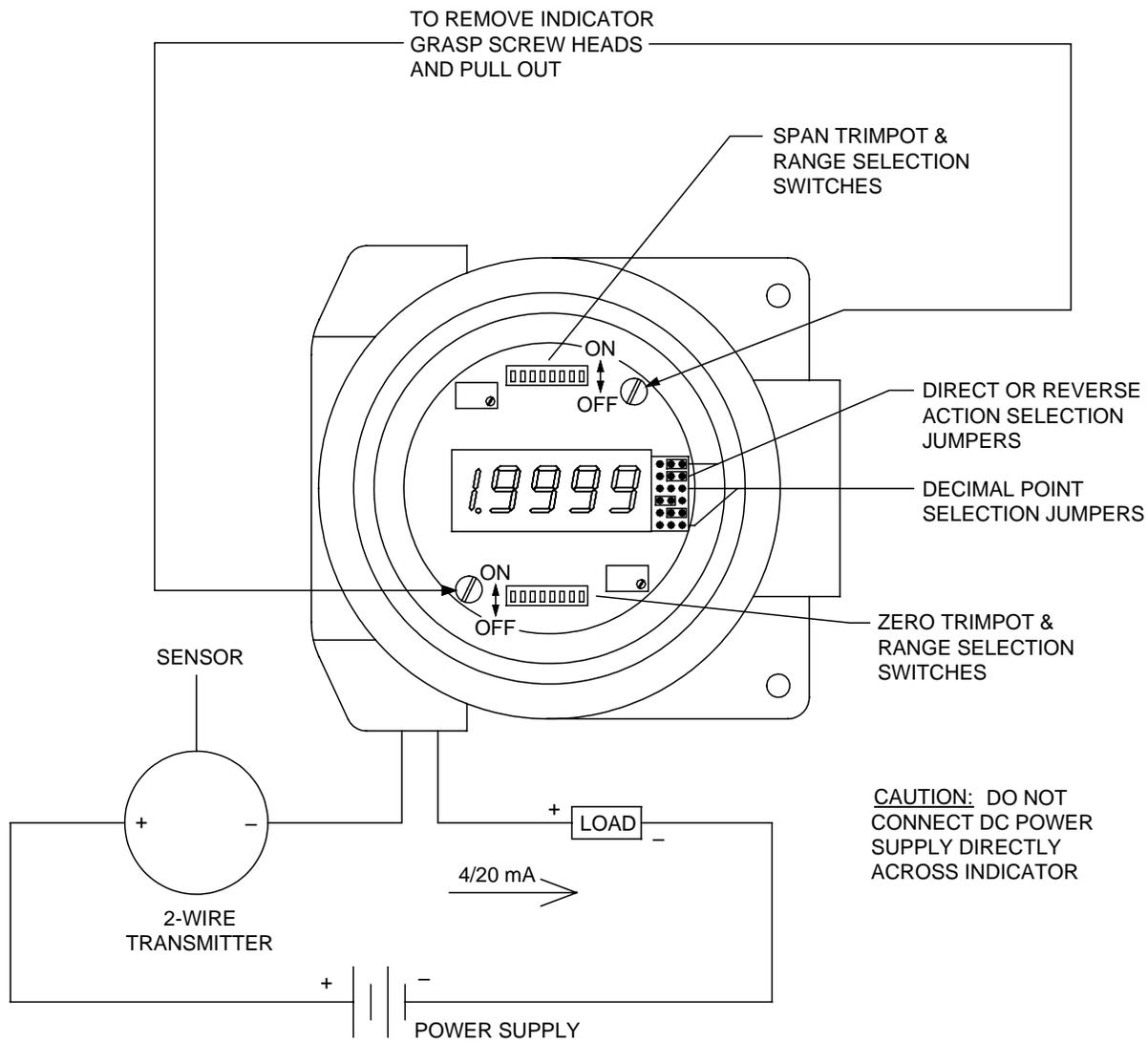


FIG. 1 GENERAL DIMENSIONS AND FIELD WIRING

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CAUTION: DO NOT CONNECT DC POWER SUPPLY DIRECTLY ACROSS INDICATOR

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

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Calibration Procedure

1. Zero Adjustment (Factory calibration):

To prevent the interaction of the span and zero trim pots, the 4 mA offset is compensated for at the output of amplifier "U3". This done by applying a 4 mA input to the indicator and adjusting pot "P1", located on the lower PC board, for 0.0000 volts at the output of "U3". This voltage is measured between the black wire (common) and the blue wire (U3).

2. Calibrate Display:

To calibrate the 18-LPIX-4, remove the front cover and label to expose the calibrating switches and the span and zero pots. Connect a current source to the input terminals (see figs. 1 & 2) and proceed to calibrate the indicator as follows.

- 1) Determine desired display for 4 to 20mA input.
EXAMPLE: 150.0 to 1950.0 lbs
- 2) Set span switches for required span range (figs. 2 & 4).
EXAMPLE: Span = 19500 – 1500 = 18000 counts; set span switch positions 1, 2, 3 & 8 ON and positions 4, 5, 6, & 7 OFF
- 3) Set zero switches for required zero offset. (figs. 2 & 3)
EXAMPLE: Offset = +1500 counts. Set zero switch positions 4, 5, 6 & 7 ON and positions 1, 2, 3 & 8 OFF.
- 4) Select decimal point location.
EXAMPLE: Select DP 1 position by using decimal point selection jumpers. (figs. 2 & 5)
- 5) Select display action, direct or reverse.
EXAMPLE: Select direct action by using action selection jumpers. (figs. 2 & 5)
- 6) Input 4 mA and set zero pot to display bottom of range.
EXAMPLE: adjust zero pot to display 150.0
- 7) Input 20 mA and set span pot to display top of range.
EXAMPLE: adjust span pot to display 1950.0
- 8) The indicator is now calibrated.

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SWITCH POSITIONS		ZERO OFFSET COUNTS	SWITCH POSITIONS		ZERO OFFSET COUNTS
ON	OFF		ON	OFF	
1, 2, 3, 4	5, 6, 7, 8	18336 TO 19999	1, 2, 3, 8	4, 5, 6, 7	-2638 TO 0000
2, 3, 4, 5	1, 6, 7, 8	15723 TO 18336	2, 3, 5, 8	1, 4, 6, 7	-5252 TO -2638
1, 3, 4, 6	2, 5, 7, 8	13109 TO 15723	1, 3, 6, 8	2, 4, 5, 7	-7865 TO -5252
3, 4, 5, 6	1, 2, 7, 8	10487 TO 13109	3, 5, 6, 8	1, 2, 4, 7	-10487 TO -7865
1, 2, 4, 7	3, 5, 6, 8	7865 TO 10487	1, 2, 7, 8	3, 4, 5, 6	-13109 TO -10487
2, 4, 5, 7	1, 3, 6, 8	5252 TO 7865	2, 5, 7, 8	1, 3, 4, 6	-15723 TO -13109
1, 4, 6, 7	2, 3, 5, 8	2638 TO 5252	1, 6, 7, 8	2, 3, 4, 5	-18336 TO -15723
4, 5, 6, 7	1, 2, 3, 8	0000 TO 2638	5, 6, 7, 8	1, 2, 3, 4	-19999 TO -18336

FIG. 3 ZERO OFFSET, DIPSWITCH SETTINGS

SWITCH POSITIONS		SPAN RANGE COUNTS	SWITCH POSITIONS		SPAN RANGE COUNTS
ON	OFF		ON	OFF	
1, 2, 3, 4	5, 6, 7, 8	37233 TO 39998	1, 2, 3, 8	4, 5, 6, 7	17521 TO 20000
2, 3, 4, 5	1, 6, 7, 8	34777 TO 37233	2, 3, 5, 8	1, 4, 6, 7	15065 TO 17521
1, 3, 4, 6	2, 5, 7, 8	32320 TO 34777	1, 3, 6, 8	2, 4, 5, 7	12608 TO 15065
3, 4, 5, 6	1, 2, 7, 8	29856 TO 32320	3, 5, 6, 8	1, 2, 4, 7	10144 TO 12608
1, 2, 4, 7	3, 5, 6, 8	27392 TO 29856	1, 2, 7, 8	3, 4, 5, 6	7680 TO 10144
2, 4, 5, 7	1, 3, 6, 8	24936 TO 27392	2, 5, 7, 8	1, 3, 4, 6	5224 TO 7680
1, 4, 6, 7	2, 3, 5, 8	22479 TO 24936	1, 6, 7, 8	2, 3, 4, 5	2767 TO 5224
4, 5, 6, 7	1, 2, 3, 8	20000 TO 22479	5, 6, 7, 8	1, 2, 3, 4	0000 TO 2767

NOTE: Span counts equal the full scale output (top of range) minus the zero offset (bottom of range)

FIG. 4 SPAN RANGE, DIPSWITCH SETTINGS

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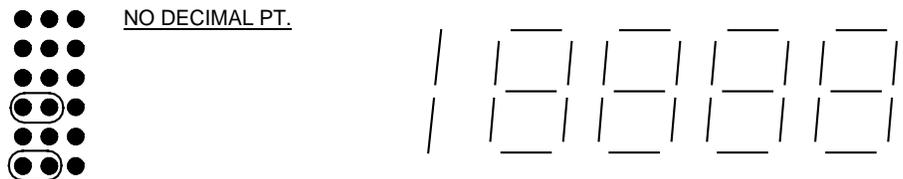
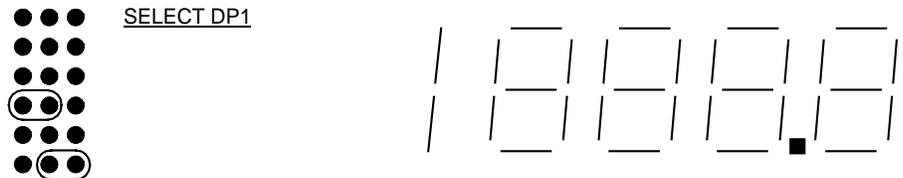
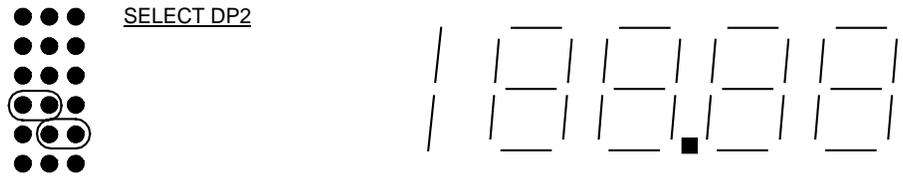
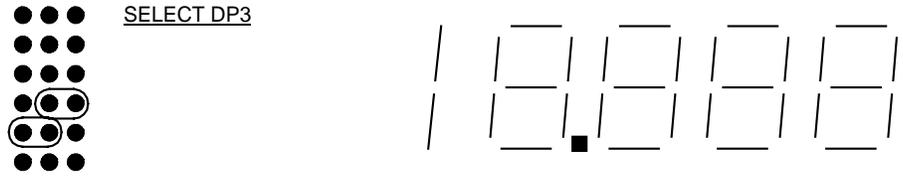
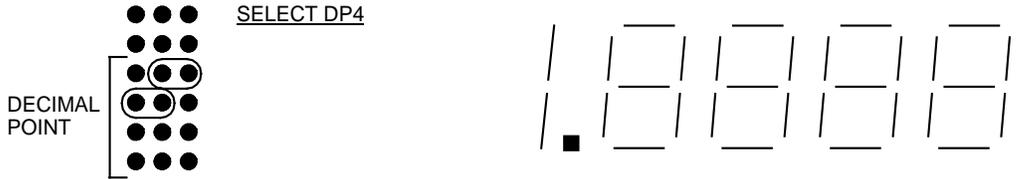
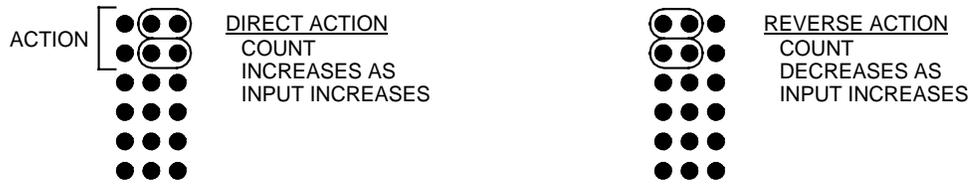


FIG. 5 JUMPER POSITIONS FOR DISPLAY ACTION AND DECIMAL POINT SELECTION

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