MODEL K-5103

DIGITAL INDICATOR & CONTROLLER FOR CURRENT/VOLTAGE INPUT

OPERATION

AND

INSTRUCTION MANUAL

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#0405-K5103-IM-Rev0

INTRODUCTION

Model K–5103 Process Indicators are designed and manufactured using the latest state of the art technology. The instruments are versatile, compact, easy to install and have wide options to suit customer requirements. This model accepts current or voltage as its input to display any process value in terms of its engineering units. This forms complete control system with 2-wire or 3-wire or 4-wire transmitters which give current or voltage output proportional to the process value.

A 3½ digit 14.2mm LED display provides the readout to ±1999 counts. Also provides either a single or double set point relay output. This set point control can be used for Alarm function with narrow dead band or control purposes with wider dead band.

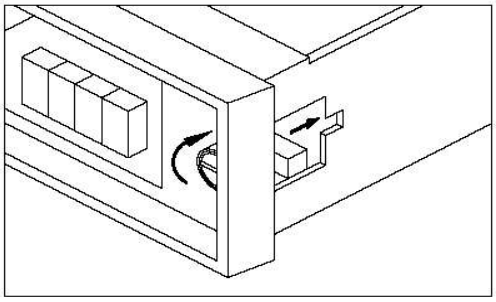
The instrument incorporates a SMPS circuitry for universal mains operation from 90 to 250V AC. The indicator is housed in panel mounted enclosure with size of 96x48mm bezel.

INSTALLATION INSTRUCTIONS

The instrument is designed to fit into a standard panel cutout measuring 91 mm x 43 mm (+0.75mm -0.0)

- The front window should be gently levered from the instrument by using the notch at bottom of the lens.
- Insert the instrument through the cutout from the panel front.
- Once the instrument has been positioned in the cutout, it is securely fitted by tightening the two front facing clamp screws in a clockwise direction.
- Replace the display window by positioning against the window stops on the front and simply pushing into place.

Fig-1: Panel locking arrangement



OVERALL DIMENSIONS

Fig-2: Front

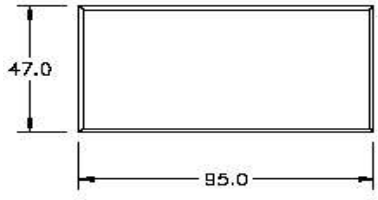


Fig-3: Side

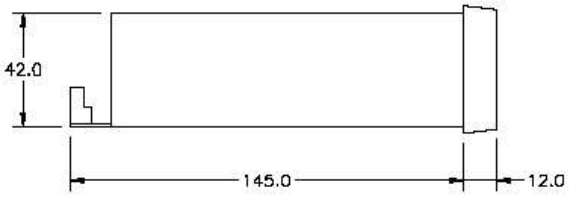
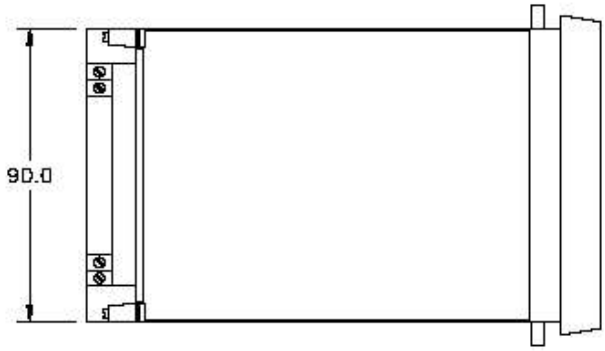


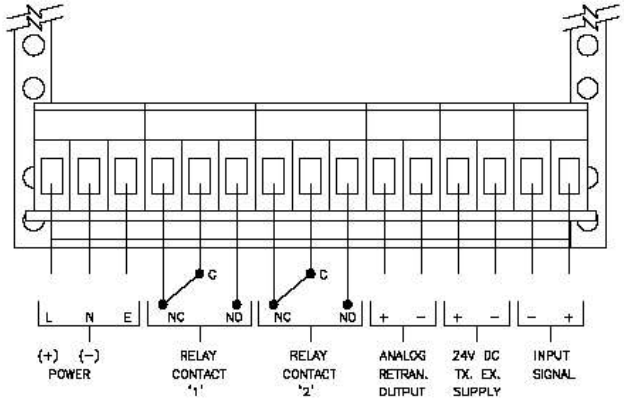
Fig-4: Top



WIRING INSTRUCTION

Terminals for electrical connection are located on the rear of the instrument. These are of screw clamp type to accept 2.5mm² wires maximum either single or multi strand.

Fig-5: Wiring details – Instrument rear view



CALIBRATION PROCEDURE

Equipment Required

1. Milliampere or Voltage simulator.
2. 3½ digit multimeter with accuracy of ±0.05%.

Procedure

1. Remove top cover and front red filter to access Zero, Span and set point adjustments.
2. Connect appropriate power supply to the power terminals.
3. Connect the appropriate input simulator – either current or voltage.
4. The calibration procedure is described with 4-20mA as input. Before calibration, determine the span counts between 4mA and 20mA to be calculated as follows.

Ignore decimal point while determining span counts.

SPAN COUNTS = Y – X

Where Y = counts corresponding to 20mA
X = counts corresponding to 4mA

No.	*Range*	*4mA (X)*	*20mA (Y)*	*Span counts (Y-X)*
a	0 to 1000	0	1000	1000
b	-200 to 1200 *(Zero Elevation)*	-200	1200	1400
c	20.0 to 100.0 *(Zero Suppression)*	200	1000	800

5. Apply 4mA input and adjust ZERO pot for the display to read 000.
6. Apply 20mA input and adjust SPAN pot for the display to read SPAN counts (Y-X).
7. Apply again 4mA input and adjust ZERO pot till the display reads the counts corresponding to 4mA (X) i.e., standard, elevated or suppressed ZERO.
8. Apply 20mA and ensure the display reads the counts corresponding to 20mA (Y). Trim SPAN pot if necessary.
9. Select the required decimal point by means of front access shorting link located on the display board.

Link position	*Display*
0	1999
1	199.9
2	19.99
3	1.999

For the sample range at 'c' above, place link at position “1” for the display to read 20.0 to 100.0.

ALARM SETTING

(A) Set point and Dead band Adjustment for Single Set point option.

Dead band adjustment is applicable for single set point only. The location of potentiometers are given in Fig-6 & 7. Refer following table for jumper selection.

Table-2: High Alarm – Set Jumper J1 to H

Signal Status	*Relay operating mode – Jumper J2*	
	1 - Failsafe	**2 - Normal**
PV < SP	Relay ON	Relay OFF
PV > SP	Relay OFF	Relay ON

Table-3: Low Alarm – Set Jumper J1 to L

Signal Status	*Relay operating mode – Jumper J2*	
	1 -Normal	**2 - Failsafe**
PV > SP	Relay OFF	Relay ON
PV < SP	Relay ON	Relay OFF

1. Select the required alarm and relay mode operations by J1 and J2. Refer above table for details.
2. Press the set point switch and adjust set point pot for the required set point.

High – Normal: J1-H, J2-2

1. Turn offset and dead band pots fully counter clockwise. Relay will be OFF.
2. Bring the process variable to the set point.
3. Turn offset pot clockwise till the relay just comes ON.
4. Turn dead band pot fully clockwise. Relay will remain ON.
5. Bring the process variable to the nearest dead band below the set point.
6. Adjust dead band pot counter clockwise till the relay just goes OFF.
7. Check the operation of relay at the set point and below the set point (equal to dead band).

High – Failsafe: J1-H, J2-1

The setting procedure is identical to High – Normal, except that the relay status is just opposite to the above status.

Low – Normal: J1-L, J2-1

1. Turn offset and dead band pots fully counter clockwise. Relay will be ON.
2. Bring the process variable to the set point.
3. Turn offset pot clockwise till the relay goes OFF and trim it slowly counter clockwise to just make the relay ON.
4. Turn dead band pot fully clockwise. Relay will remain ON.
5. Bring the process variable to the nearest dead band above the set point.
6. Adjust dead band pot counter clockwise till the relay just goes OFF.
7. Check the operation of relay at the set point and above the set point (equal to dead band).

Low – Failsafe: J1-L, J2-2

The setting procedure is identical to Low – Normal, except that the relay status is just opposite to the above status.

(B) Set point and Dead band Adjustment for Dual Set point option.

This option provides a fixed setting about 2 to 5 counts. These are not field adjustable and are factory set. For set point selection and adjustment refer to Fig-6 & 7.

For dual set point option, Relay mode will be normal only. Failsafe mode is not available.

High Alarm
Relay energizes when process value goes above set point.

Low Alarm
Relay energizes when process value goes below set point.

Table-4: Set point selection table for Dual set point option

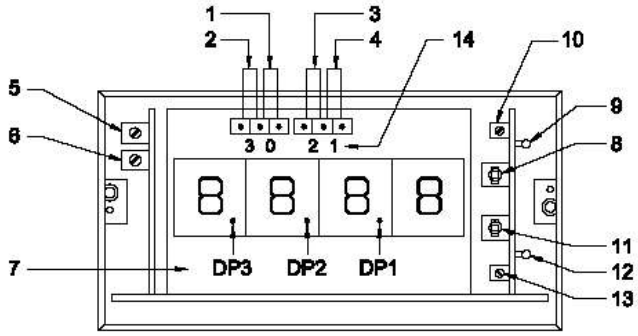
Set point 1 Switch	Set point 2 Switch	Displayed value
Pressed	Pressed	Process value
Released	Pressed	Set point 1
Pressed	Released	Set point 2
Released	Released	Set point 1

ANALOG OUTPUT (OPTIONAL)

Connect multimeter to Analog Retransmission output terminal indicated in Fig-5. Calibration procedure is provided for 4-20 mA retransmission output.

1. Apply low range input (say 4mA).
2. Adjust Zero (4mA) pot for an output current of 4mA measured at the external output terminals.
3. Apply high range input (say 20mA)
4. Adjust Span pot (20mA) pot for an output current of 20mA measured at the external output terminals.
5. Check for linearity at intermediate values, if non linear, repeat steps 1 to 4.

Fig-6: Internal front view

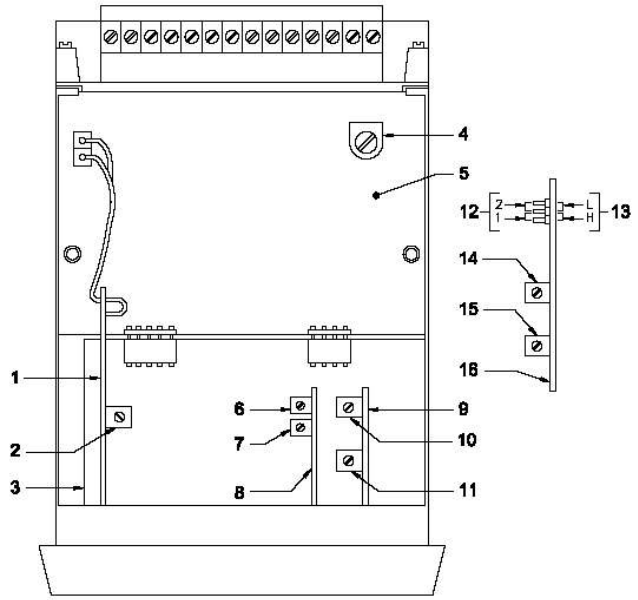


Part Identification – Internal front view

1. NO DECIMAL POINT position for shorting link
2. DP3 select – Link position 3
3. DP2 select – Link position 2
4. DP1 select – Link position 1
5. Display ZERO adjust
6. Display SPAN adjust
7. Display board
8. Set point-1 Selection Switch
9. Alarm LED for Set point-1
10. Set point-1 adjust
11. Set point-2 Selection Switch
12. Alarm LED for Set point-2
13. Set point-2 adjust
14. Decimal point link position

Note: For Single Set point option only the Set point-1 elements (Parts 8, 9 & 10) are present.

Fig-7: Internal top view



Part Identification – Internal top view

1. Input Signal conditioner board
2. Offset adjust. FACTORY SET. DO NOT ADJUST.
3. A/D Converter board
4. Fuse holder
5. Power Supply board
6. Analog output – ZERO adjust
7. Analog output – SPAN adjust
8. Analog output board – Optional
9. Control board – Dual Set point
10. Dead band -1 adjust
11. Dead band-2 adjust
12. J2 relay mode selection
13. J1 Alarm mode selection. *(Located beneath J2)*.
14. Dead band adjust
15. Offset adjust for control function
16. Control board – Single Set point. *(This board is present in place of Dual Set point board for Control Output option which calls for Single Set point. This is Part-9 in the above figure).*

TECHNICAL SPECIFICATIONS

ELECTRICAL

Input	Current or voltage
Range	0 to 1999 counts. Std calibration is for 0 to 1000 counts.
Range adjustability	Zero Suppression – 40% of span Zero Elevation – 90% 0f span
Accuracy	±0.05% of reading ±1 count
Input Impedance	125 Ω for current input; 200 KΩ for voltage input
Resolution	0.001 or 0.01 or 0.1 or 1 count. Selectable by shorting link
Display	3½ digit LED, 7 segment, with Character size of 14.2mm
Power Supply	90 to 250V AC; 100 to 300V DC; 18 to 32V DC
Power Consumption	3VA
Alarm Outputs	1 or 2 set point; 1 SPDT changeover relay contact rated at 5A 230VAC / 28VDC (res) for each set point
Dead band	
For 1 set point	Adjustable from 2 to 20 counts
For 2 set point	Fixed at 2 or 3 counts
Analog Output	
Current output	4-20mA, 0-20mA with accuracy of 0.2% of span; max load of 750Ω
Voltage output	1-5VDC, 0-5VDC with accuracy of 0.2% of span
Transmitter Excitation Supply	Isolated 24V DC, 30mA (Not available in indicator using 18-32VDC power supply)
Electrical Connection	PCB mount Screw clamp terminals

MECHANICAL

Enclosure	Engineering plastic suitable for flush panel mounting
Overall dimensions	95(W) x 47(H) x 157(L) mm
Panel Cutout	91 x 43 mm (+0.75, -0.00 mm)
Depth behind panel	145 mm

TEMPERATURE LIMITS

Ambient	0ºC to 50ºC
Relative Humidity	Max. of 95% RH, non-condensing