



MODEL K-5104

4½ DIGIT PROCESS INDICATOR & CONTROLLER FOR CURRENT/VOLTAGE INPUT

OPERATION AND INSTRUCTION MANUAL



Switzer Instrument Limited

Regd. Off: 29 (Old# 14), Thanikachalam Road, P.B.No.1423, Chennai 600 017

Internet web-site
www.switzerinstrument.com

Sales – Head Office

17 (Old# 9), South Boag Road, Chennai 600 017

Ph : 044-24340999 / 24343956 / 24344321

Fax : 044-24347887 e-mail : sales@switzerinstrument.com

Works

127 Sidco Estates, Chennai 600 098

Ph : 044-26242244 / 26242255 / 26243355

Fax : 044-26248849 e-mail : works@switzerinstrument.com

INTRODUCTION

Model K-5104 Process Indicators are designed and manufactured using the latest 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 4½ digit 10mm LED display provides the readout to ±19999 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.

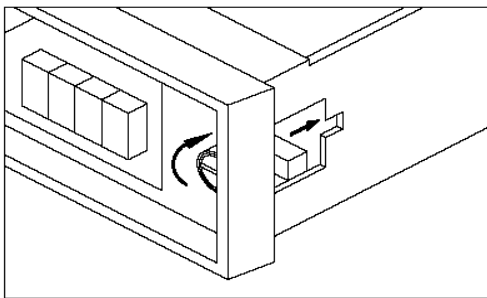
The instrument incorporates a PWM based circuitry for both AC (90 to 250V) and DC (18 to 32V) power input.. The indicator is housed in panel mounted enclosure with size of 96x48mm bezel.

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

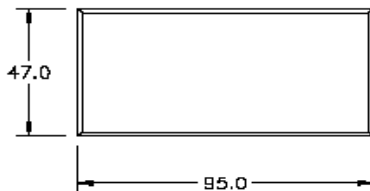


Fig-3: Side

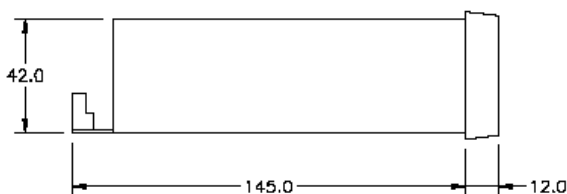
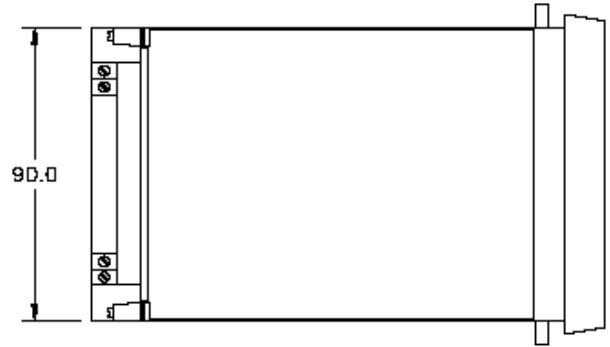


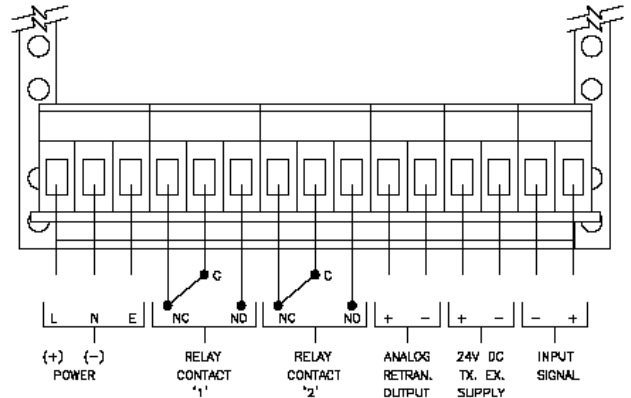
Fig-4: Top



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. 4½ 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

Table-1

No.	Range	4mA (X)	20mA (Y)	Span counts (Y-X)
a	0 to 10000	0	10000	10000
b	-2000 to 12000 (Zero Elevation)	-2000	12000	14000
c	200.0 to 1000.0 (Zero Suppression)	2000	10000	8000



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.

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).

Table-1 Decimal Point Jumper Selection table

J3-0 = Decimal point selection is disabled. No decimal point is ON.
 J3-1 = Decimal point selection is enabled.

Jumper J1	Jumper J2	Display Reading	Decimal Point Status
0	0	1 X X X . X	DP1 ON
0	1	1 X X . X X	DP2 ON
1	0	1 X . X X X	DP3 ON
1	1	1 . X X X X	DP4 ON

For the sample range at 'c' in Table-1, place link at position J1-0, J2-0 & J3-1.

ALARM SETTING (Optional)

(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. Release 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.

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 20 to 50 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

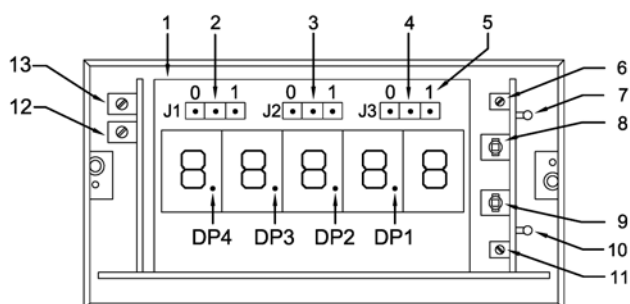
ANALOG OUTPUT (Optional)

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

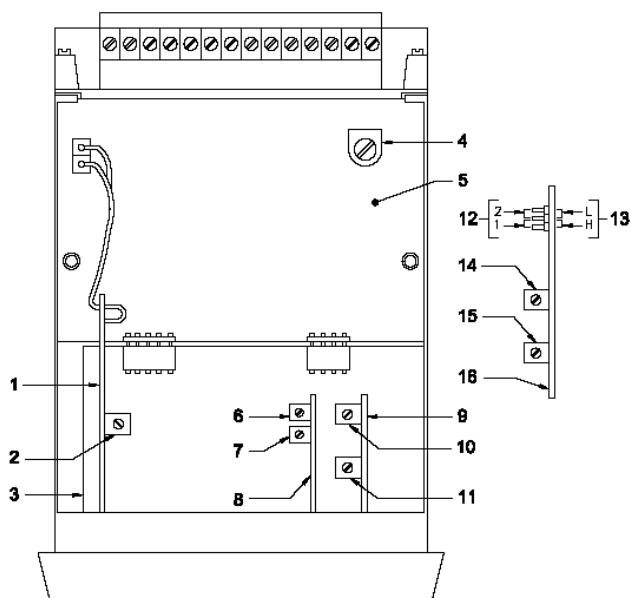


Part Identification – Internal front view

1. Display board
2. Decimal Point Jumper J1
3. Decimal Point Jumper J2
4. Decimal Point Jumper J3
5. Decimal point link position
6. Set point-1 adjust
7. Alarm LED for Set point-1
8. Set point-1 Selection Switch
9. Set point-2 Selection Switch
10. Alarm LED for Set point-2
11. Set point-2 adjust
12. Display SPAN adjust
13. Display ZERO adjust

Note: For Single Set point option only the Set point-1 elements (Parts 6, 7 & 8) 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 for single setpoint option
13. J1 Alarm mode selection for single setpoint option. (Located beneath J2).
14. Dead band adjust for single setpoint option.
15. Offset adjust for single setpoint option.

11. Dead band-2 adjust
12. J2 relay mode selection for single setpoint option
13. J1 Alarm mode selection for single setpoint option. (Located beneath J2).
14. Dead band adjust for single setpoint option.
15. Offset adjust for single setpoint option.
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

Characteristics	Specifications
Model	K-5104 Digital Process Meter with 4½ digit display
Sensor / Input type	Current or Voltage 4-20mA, 0-20mA, 1-5V, 0-5V
Instrument Range	0 to 19999 counts
Range Adjustability	Zero Suppression : 85% of Span Zero Elevation : 35% of Span
Accuracy	±0.1% of calibrated span
Input Impedance	125 Ω typical for Current Input; 200KΩ typical for Voltage Input
Sensor Break Indication	Below the lower range value.
Resolution	0.0001 (or) 0.001 (or) 0.01 (or) 0.1 (or) 1 Count Jumper Selectable
Loop Drop	2.5V Maximum
Transmitter Excitation Supply	24VDC, 30mA capability. (Not available in indicator using 18 to 32 VDC supply)
Display	4½ Digit, 10mm character height (0.39”) RED LED
Power Supply	(1) 90 to 250VAC (or) 100 to 300 VDC (2) 18 to 32 VDC
Power Consumption	5 VA approx.
Alarm Output	1 or 2 setpoint; One SPDT Relay Changeover Contact Rated at 5A 230V AC / 28V DC Res
Deadband	For 1 setpoint: Adjustable from 2 to 200 counts For 2 setpoint: Fixed at 20-50 counts
Analog Output	Current: 4-20mA, 0-20mA; Accuracy: 0.2% of span; Max. load of 750 ohms Voltage: 1-5V, 0-5V; Accuracy: 0.2% of span
Enclosure	Engineering Plastic suitable for flush panel mounting
Overall Dimension	95 (W) x 47 (H) x 157 (L) mm 91 x 43 mm Panel Cut-out 145mm Depth Behind Panel
Ambient Temperature	0 to 50°C
Relative Humidity	Max of 95% RH, non-condensing