OPERATION

MANUAL

LOOP POWERED INDICATOR WITH CONTROL OUTPUT

JM-43

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INTRODUCTION

The Model JM-43 field-mounted micro-controller based Loop Powered Indicator with control outputs is a compact, rugged, and reliable indicating instrument which is designed for accurate process measurement applications.

The instrument is designed for applications where the input signal needs to be retransmitted to a remote location and which can offer relay control in process industries where vibration, inclement atmosphere and corrosive environments prevail.

The Indicator accepts an industrial standard current input signal of 4to 20 mA DC and displays the actual process value calibrated in the desired units, on a linear scale. The process value is displayed on a 4-Digit seven-segment LCD digital display module. The instrument is fully configurable and can be calibrated on any scale range from 0000 to 9999 units. Decimal Point setting is provided in the instrument. Operating ambient temperature is from 0 to 55 degrees Celsius. The field mounted unit has no potentiometers to adjust and all settings can be performed digitally using only the three membrane switches that are available on the front panel. The IP66 rating provides total immunity to corrosive atmospheres, humidity (including condensation) and dust. JM-43 needed external Power Supply 24 VDC to drive the potential free relay contacts.

INSTALLATION

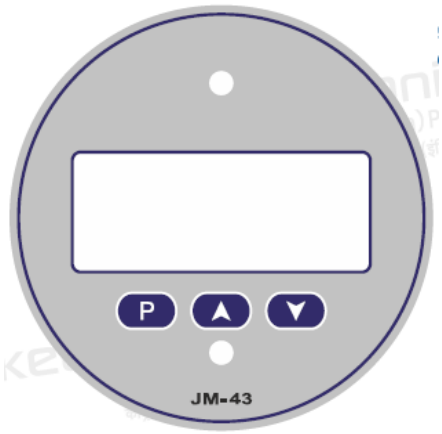
The Model JM-43 is housed in an aluminum alloy LM6 die-cast enclosure suitable for mounting in the field on a 2" pipe. A mounting kit of stainless steel brackets is available**.** All mounting hardware is available from ASHE.

All inter-connections to the instrument should be made with strong multi-strand wire of the order of 1.5 sq. mm. The ends of the wires should be properly ferruled for effective termination. The Cables carrying the Input Signal should be properly isolated from any Power Line cables (even separate router channels), to prevent any electromagnetic interferences in the input signal readings from disturbances in the main power line or line frequencies. The JM-43 needs external 24 VDC power supply to drive the Relay for potential free relay contacts.

It is recommended that the polarities of the input signal be double-checked for correctness before energizing the instrument.

CONTROL KEYS

The instrument has three keys on the front panel, functions of which are described below :



P	The PROGRAM key is the central coordinating key to access the settings of the instrument. Pressing this key allows the operator to sequentially view, change and save the parameters for the digital display.
▲	The INCREMENTING key allows the operator to select the numeral in the digit being set on an increasing scale. The digit will cyclically display 0, 1, 2 …9 on each pressing of the ▲ key. This may be used to configure the instrument and set the parameters.
▼	The DECREMENTING key allows the operator to select the numeral in the digit being set on an decreasing scale. The digit will cyclically display 0, 1, 2 …9 on each pressing of the ▼ key. This may be used to configure the instrument and set the parameters. **This key is also used to SAVE the calibration settings.**

SETTINGS

Ensure that the input signal has been connected at the terminals in the correct polarity and the signal level is above 4 mA. Although the instrument has a thresh-hold limit of 1 mA on the upper and lower signal limits, for the initial turn-on, the signal level should be sufficient to energize the micro-controller based display. Upon energizing the input signal, the digital display will immediately indicate the actual process value. The scale calibration can be changed whenever required with the help of the three-key Membrane Keyboard on the front panel. All settings and adjustments can also be done from the three-key Membrane Keypad on the front panel of the module.

It is strongly recommended that only authorized personnel should attempt any alterations or rectifications in the instrument.

PROGRAMMING INSTRUCTIONS

CALIBRATION MODE

KEY PRESSED	DISPLAY	ALTERNATE DISPLAY	FUNCTION
(POWER ON)	U r F		**Under Range Fault Indication** (If input signal is less than 4 mA DC)
	O r F		**Over Range Fault Indication** (If input signal is greater than 20 mA DC)
	50.0		**Process value indication** (If input signal is between 4 to 20 mA DC) Display will appear as calibrated to input signal
⮟	SCLE	100.00	**Setting of Decimal selection** Use ⮝ or ⮟ key to set decimal point. Options are- • 1000.0 • 100.00 • 10.000 • 10000
P	rnGH	100.00	**Setting of Calibration span Range** Use ⮝ or ⮟ key to set span range value
P	SPAn	050.0	**Setting of Percentage of Gas applied.** e.g. 1. If set 50 then apply 12mA DC 2. If set 100 then apply 20mA DC
P	Zero	GAS	**Zero Gas calibration**
P	wAit	04.00	Apply 4 mA DC Press ⮟ key to save the calibration
	PASS		Calibration saved If applied input is correct then display will show “PASS”
	FAiL		If applied input is incorrect then display will show “FAiL”
P	SPAn	GAS	**Span GAS calibration**
P	wAit	12.00	Apply 12 mA DC Press ⮟ key to save the calibration
	PASS		Calibration saved
	FAiL		If applied input is incorrect.
P	50.00		Display shows the value as per input

This completes the entire calibration setting of the Loop Powered Digital Indicator. All parameters are to be set using INC and DEC keys.

USER SETTING MODE:

KEY PRESSED	DISPLAY	ALTERNATE DISPLAY	FUNCTION
(POWER ON)	UrF		**Under Range Fault Indication** (If input signal is less than 4 mA DC)
	Orf		**Over Range Fault Indication** (If input signal is greater than 20 mA DC)
	50.0		**Process value indication** (If input signal is between 4 to 20 mA DC) Display will appear as calibrated to input signal
^	ALm1	20.00	**Setting of Alarm-1 set point** If you set ALm1 as 20.00 then Relay-1 will energize when process value crosses 20.00
P	ALm2	40.00	**Setting of Alarm-2 set point** If you set ALm2 as 40.00 then Relay-2 will energize when process value crosses 40.00
P	UrF	03.80	**Setting of Under Range Fault set point** It can be set anywhere between 03.60 to 04.00 mA If you set UrF as 3.80 then Relay-3 will de-energize below 3.80 mA input signal and display will show 000.0 process value between 4 mA to 03.80 mA input.
P	OrF	21.00	**Setting of Over Range Fault set point** It can be set anywhere between 20.00 to 22.00 mA If you set OrF as 21.00 then Relay-3 will de-energize above 21.00 mA input.
P	50.00		Display shows the process value as per input

This completes the entire user setting of the Loop Powered Digital Indicator. All parameters are to be set using INC and DEC keys.

TERMINAL DETAILS

EXTERNAL TERMINAL BLOCK – 1 (Lower Row)

1	2	3	4	5	6	7	8	9
+	–	+	–			+	–	
24 VDC INPUT		24 VDC OUTPUT		x		4-20 mA INPUT		X

EXTERNAL TERMINAL BLOCK – 2 (Upper Row)

10	11	12	13	14	15	16	17	18
NC	C	NO	NC	C	NO	NC	C	NO
Alarm-1 Relay			Alarm-2 Relay			Fault Relay		

TERMINAL DETAILS

TERMINAL BLOCK	TERMINAL NO.	NOTATION	DETAILS
TERMINAL BLOCK – 1 (Lower Row)	1	+	24 VDC Input
	2	–	
	3	+	24 VDC Output
	4	–	
	5	X	No Connection
	6		
	7	+	4 to 20 mA DC Input Signal
	8	–	
	9	X	No Connection
TERMINAL BLOCK – 2 (Upper Row)	10	NC	Alarm-1 Relay
	11	C	
	12	NO	
	13	NC	Alarm-2 Relay
	14	C	
	15	NO	
	16	NC	Fault Relay
	17	C	
	18	NO	

TECHNICAL SPECIFICATIONS

Model	:	JM-43.
Type	:	Microcontroller based Digital Loop-Powered Indicator with control output
Input Signal	:	4 to 20 mA DC.
Indication	:	4 digit seven-segment LCD display.
Display height	:	0.5”.
Forward Voltage Drop	:	5.1 Volts @ 20 mA.
Sensing Resistance	:	10.00 Ohms.
Range	:	0000 to 9999.
Calibration Range	:	As required (Configurable).
Calibration	:	By three-key Membrane Keypad.
Control Output	:	Three Potential Free Contacts
Power Supply	:	24 VDC (To drive Potential Free Contacts)
Settings	:	Zero, Span, Decimal point.
Response time	:	Typically 20 mS.
Linearity	:	± 0.1% FS.
Resolution	:	± 0.1%, ± 1 digit.
Dimensions	:	66 x 30 mm.
Enclosure	:	Aluminum Alloy LM6 suitable for hazardous area installations in Class 1, Zone 1, Gas Groups IIA/IIB certified by CIMFR Dhanbad.
Ingress protection	:	IP66 certified.
Execution	:	Field mounting.
Ambient temperature	:	0 to 55 ^{O}C.