

OPERATION MANUAL



LOOP POWERED INDICATOR

JM-408 EX

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INTRODUCTION

The Model JM-408 EX is a Field Mounted micro-controller based Loop Powered Indicator is a compact, rugged, and reliable indicating instrument which is specifically designed for accurate process measurement applications in areas without power availability. It is an ideal substitute to conventional analog indicators.

The Model JM-408 EX is manufactured using selected high-grade components which guarantee its reliability and long operation. It has no moving parts and no potentiometers that may drift over time and high vibration applications.

The unit is designed for use in process industries where vibration, inclement weather and corrosive environments prevail. The electronics are offered in either of the following enclosures:

1. ABS Plastic enclosure for panel mount applications
2. Polycarbonate enclosure for Weather-proof applications
3. Epoxy coated Aluminum housing certified for hazardous area applications

The Indicator accepts an industrial standard current input signal of four (4) to twenty (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/LED digital display module. The instrument is fully configurable and can be calibrated on any scale range from -999 to 9999 units. Decimal Point setting is provided in the instrument. Operating 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 IP65 rating provides total immunity to corrosive atmospheres, humidity (including condensation) and dust. There is no necessity of any external Power Supply since the instrument is Loop Powered.

The principle of operation is briefly as follows: The input signal is passed through a series of amplification and conditioning stages. Initially, the signal is conditioned internally and fed to a signal convertor circuit. Thereafter, the transduced signal output of this convertor is fed into an A/D convertor before being finally passed through a Decoder/Driver digitizing circuit which displays the input signal in the form of decimal digits on a seven-segment display module.

The instrument operates in "Fail-Safe" mode, i.e., in case of a fault in the instrument, the input analog signal will be routed out onwards in the loop – i.e., the circuit will not become "open".

The JM-408EX Indicator is therefore an ideal single unit substitute to conventional analog indicators because of its easy set up procedure and inherent accuracy in process control, besides other superior characteristics like immunity to Shocks, Dust, Ambient temperatures, Humidity and Corrosive atmospheres. Its main advantage is that it is completely current loop-driven, eliminating the requirement of any external power supply source and associated cabling.

The instrument is manufactured using precision high-grade components which guarantee its reliability and long operational parts. There are no moving parts and no potentiometers that may drift over time and in high vibration applications.

INSTALLATION



The Model JM-408 is designed to be mounted either in Panel or in the field, either on a 2" pipe or wall panel. A choice of two (2) Stainless Steel mounting 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. There is no requirement of power supply or earthing.

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 (3) keys on the front panel. Functions of which are described below:

PROG P	The PROG or 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.
SHIFT 	The SHIFT key allows the operator to shift the display during setting to the left by one digit per activation. This key should be used in conjunction with the INC (incrementing) key to set the desired control parameters.
INC 	The INC or 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 INC key. This may be used to set the parameters and other instrument settings. The incrementing action repeats if the key is kept pressed.

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.

All settings and adjustments must be done from the three-key Membrane Keypad on the front panel of the module.

CONNECTIONS

- Locate the two-way Terminals on the rear of the module (see indicative diagram below) :

1	2	3	4
+	-	+	-
4 to 20mA Input		4 to 20mA Output	

PROGRAMMING INSTRUCTIONS

CALIBRATION

(Note: Bold Text indicates flashing)

KEY PRESSED	DISPLAY	FUNCTION
(POWER ON)	+1.8.8.8.8	Initialization of internal controller and self diagnostics
	Process Variable	Display corresponding to input signal
PROG P	+LLLL	Low (Zero) setting of Calibration Range
	+000.0	Flashing Digit shifts Left by one space
SHIFT ←	+000.0	
INC ↑	+001.0	Flashing Digit increments by one count
PROG P	+HHHH	High (Span) setting of Calibration Range
	+100.0	For very minor corrections in input non-linearity, use the ten-turn potentiometer on the rear of the instrument (NOT FOR ZERO ADJUSTMENT - ONLY FOR SPAN ADJUSTMENT).
	+PPPP	Decimal Selection
SHIFT ←	+1999.9	Flashing Digit shifts Left by one space (For Decimal Selection)
PROG P	Process Variable	

IMPORTANT NOTE : To calibrate the scale reading in negative polarity, press the SHIFT key till the active digit is the polarity sign on the extreme left side; once the polarity sign flashes, press the INC key to toggle the Polarity sign cyclically from + to - .

This completes the entire setting of the Loop Powered Digital Indicator. All parameters are to be shifted/selected using SHIFT and INC keys.

TECHNICAL SPECIFICATIONS

Model	:	JM-408 EX.
Type	:	Microcontroller based Digital Loop-powered Indicator.
Input Signal	:	4 to 20 mA DC.
Output 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	:	-999 to 9999.
Calibration Range	:	As required (Configurable).
Polarity	:	Auto-Sensing.
Calibration	:	By three-key Membrane Keypad.
Power Supply	:	Nil (Loop-powered).
Settings	:	Zero, Span, Decimal point.
Response time	:	Typically 20 mS.
Linearity	:	± 0.1% FS.
Resolution	:	± 0.1%, ± 1 digit.
Dimensions	:	140 x 130 x 130 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	:	IP65 certified.
Execution	:	Field mounting.
Execution	:	Field mounting.
Ambient temperature	:	0 to 50 °C.