Operator's Manual

408-2IN INDICATOR

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1. TECHNICAL DETAILS

408LD is a versatile micro-controller based indicator. The features offered in this product are better than any other Indicator available in similar price range.

The instrument is made in 192 (W) x 96 (H) x 70 (D) mm size with standard cutout of 188 x 92 mm. Front is sealed membrane type to withstand dusty environment. Process value is displayed using four 1.8" seven segment LED displays.

The product accepts Pt-100 RTD, J, K, R, S and T type thermocouples as well as linear analog input signals like 0-5VDC, 1-5VDC, 4-20mA & 0-20mA. The unit allows configuring input type, zero value, span value, & displaying resolution (decimal point information). Cold junction compensation for the thermocouple type input & 3-wire cancellation for the RTD type input is done using software.

Zero & Span settings in case of RTD and T/C types restrict the usage band, but in no way restrict the sensing of the input signal. In case the measured value is outside the range specified by zero and span settings but within the specified range for the sensor, the actual value is displayed but with flashing. In case of linear type input signals, display flashes for values lower than zero setting and greater than span setting upto 5% of span set.

Outside the ranges discussed above, values lower than lower specified ranges for sensors and (zero – 5% span) for linear inputs, a message "OPEN" is displayed while for values higher than upper specified ranges for sensors and (span + 5%) for linear inputs, a message "OVER" is displayed.

2. SPECIFICATIONS

Display and Operation Function:
PV Display: 4-digit digital Display for engineering data.
(1.8" Red colour)

Operation Keys:
Increment, Decrement and Set/Enter for editing various values

INPUT

- Thermo-couple types J, K, T, S & R (ANSI standard)
- RTD - PT100 3-wire
- 4-20mA/1-5 V dc linear
- 0-20mA/0-5 V dc linear
- Accuracy:
  RTD & TC:
  ± 0.25% of Full Scale + 1 Count
  Linear:
  ± 0.1 % of Full Scale + 1 Count

RANGE

J	-100 to 1200 °C
K	-100 to 1372 °C
T	-100 to 400 °C
R	0 to 1768 °C
S	0 to 1768 °C
PT100	-199 to 850 °C
4-20 mA DC	-1999 to 9999 or 9999 to -1999 (Field Scalable)
1-5 V DC	-1999 to 9999 or 9999 to -1999 (Field Scalable)
0-20mA DC	-1999 to 9999 or 9999 to -1999 (Field Scalable)
0-5 V DC	-1999 to 9999 or 9999 to -1999 (Field Scalable)

Transmitter Power Supply:
One no. of 24V @ 30 mA.

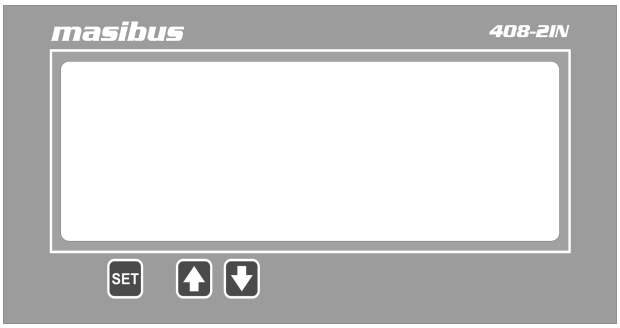
Power Supply: 230VAC @ 50Hz

General:
Ambient temperature:
0 to 55 degree centigrade

Ambient Humidity:
20% to 90% of RH (non-condensing)
Dimension:
192mm (W) X 96mm (H) X 70mm (D)
Cutout: 188mm (W) X 92mm (H)

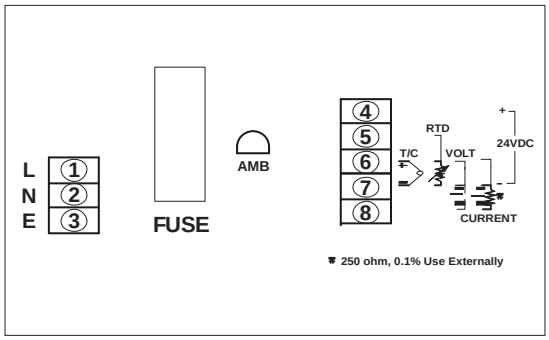
3. FONT FACIA

The instrument front PCB type membrane is fitted.

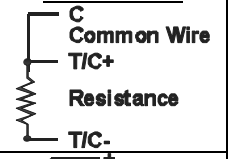


4. CONNECTION DETAIL:

Back panel connections are as shown in diagram given beside.



Terminal Detail of Back plate:

Terminal No.	Description	
1	LINE	Mains Supply 230VAC @50Hz
2	NETURAL	
3	EARTH	
5	C+ COMMON RTD	RTD INPUT 
6	T/C +	
7	T/C -	
6	T/C+	
7	T/C-	
4	+24V	24VDC TPS @30mA
7	-24V	

Terminal No.	Description	
6	T/C+	VOLTAGE INPUT
7	T/C-	
8	VOLT	
6	T/C+	mA INPUT
7	T/C-	
8	mA	

***Use 250 Ohms 0.1% resistor external for mA.**

5. USER GUIDE

INTRODUCTION

This is a micro-controller based Universal Indicator designed for multiple input type.

The manual covers all aspects of operation of the instrument. Please read instructions carefully before altering any programmed data.

POWER SUPPLY

Before switching on the supply power to the unit, ensure that you have connected correct input voltage at right terminals. On application of proper power, the unit will display selected input type for few seconds followed by displaying actual value.

KEY BOARD

Three keys are provided for operation of the unit.

SET - This key is used as an index key during configuration mode.
Pressing this key ***in configuration / calibration mode,*** saves the presently displayed parameter value. After saving, the unit moves over to next menu item automatically.

INCR - In configuration / calibration mode, this key increments the displayed parameter. If kept pressed along with DECR key at power on, unit enters the configuration mode. If INCR key is pressed during configuration mode, unit will enter calibration mode. Cold junction temperature is displayed for units with t/c. type input, if this key is pressed during run mode.

DECR - In configuration / calibration mode, this key decrements the displayed parameter. If kept pressed along with INCR key at power on, unit enters the configuration mode.

6. MODES OF OPERATION

CONFIGURATION MODE

This mode is useful for changing basic configuration of the unit. For entering this mode, switch off the power, press both **INCR** & **DECR** keys simultaneously and switch on the power to the unit.

SET key can be used to move to the next parameter type, **INCR** and **DECR** can be used to change the selected parameter value and **SET** key can be

used to enter/register the new changed value.

Following parameters can be set in this mode sequentially.

INP - Input type
ZERO - Zero setting
SPAN - Span setting
DP - decimal point position (Display resolution)

INPUT TYPE: Display prompts shown below appear sequentially to indicate the type of input that will be selected.

rtd - RTD Pt-100
J tC - J type t/c
K tC - K type t/c
t tC - T type t/c
r tC - R type t/c
S tC - S type t/c
1-5v - 1-5 V / 4-20 mA d.c.
0-5v - 0-5 V / 0-20 mA d.c.

Please note:
1) That in case, the zero and span values are beyond the specification for the selected input type, the unit will automatically change the zero and span value to lower and higher specification limit.
2) That re-calibration is necessary, if the input type is changed.

ZERO & SPAN:
These settings specify the minimum and maximum range of operation. Zero and span setting for sensors can be anywhere in their useful range while it can be set anywhere in between -1999 to 9999 for linear inputs.
Zero & Span settings in case of RTD and T/C types restrict the usage band, but in no way restrict the sensing of the input signal. In case the measured value is outside the range specified by zero and span settings but within the specified range for the sensor, the actual value is displayed but with flashing. In case of linear type input signals, display flashes for values lower than zero setting and greater than span setting upto 5% of span set.
Outside the ranges discussed above, values lower than lower specified ranges for sensors and (zero – 5% span) for linear inputs, a message "OPEN" is displayed while for values higher than upper specified ranges for sensors and (span + 5%) for linear inputs, a message "OVER" is displayed.

DECIMAL POINT POSITION:

This decides the resolution for RTD & T/C type sensors and decimal point for linear inputs. On selecting this parameter, display shows "**0000**" & the currently set decimal point glows. On pressing INCR and DECR key, this decimal point is shifted to right or left respectively, to indicate the new setting.

Input type	Display resolution allowed
RTD, J, K, T	0.1 deg & 1 deg
R, S	1 deg
1-5V, 0-5V	full selection

CALIBRATION MODE

Feed simulated close to full scale input signal to the unit and verify its reading. If the reading is not satisfactory, calibration may be required.
To enter calibration mode, following procedure has to be followed.

For entering this mode, switch off the power, press both **INCR** & **DECR** keys simultaneously and switch on the power to the unit The unit will display "CONF"(configuration mode) message. Now, press the INCR key and message "CAL" (calibration mode) will be displayed.

Different procedures have to be followed for different sensors and are explained below.

CALIBRATION PROCEDURE FOR RTD I/P:

- The unit supports 3-wire RTD Pt-100 input.
- Press SET key. Display shows a message "CALS". Press SET key again. Display will show the actual temperature reading corresponding to the resistance feed which should be close to full scale value.
- Adjust this reading to the desired value using INCR or DECR keys. Press SET key to finish the calibration.
- Software will automatically do the zero calibration for this input type.

CALIBRATION PROCEDURE FOR T/C TYPE I/P :

- The unit supports J, K, T, R, S T/C type inputs. Unit takes care of cold junction compensation automatically.
- Press SET key. "CALA" prompt is displayed. Press SET key again. Display will show the current ambient temperature. Adjust the ambient temperature value using INCR or DECR key. Press SET key to enter / register the change.
- Display shows a message "CALS". Press SET key again. Display will show the actual temperature reading corresponding to the mV feed which should be close to full scale value.
- Adjust this reading to the desired value using INCR or DECR keys. Press SET key to finish the calibration.
- Software will automatically do the zero calibration for this input type.

CALIBRATION PROCEDURE FOR LINEAR I/P:

- The unit supports 1-5V(4-20mA) DC , 0-5V(0-20mA) DC.
- Press SET key. Display shows a message "CALS". Press SET key again. Display will show the actual reading corresponding to the input signal feed which should be close to full scale value.
- Adjust this reading to the desired value using INCR or DECR keys. Press SET key to finish the calibration.
- Software will automatically do the zero calibration for this input type.

SPECIAL NOTE:

This INDICATOR stores all the user programmed data and calibration data in EEPROM. There are lots of software and hardware protections added for safeguarding against data corruption. There is a very rare possibility of data getting corrupted. It is also having software protections against accidental writing to EEPROM.