



Temperature Indicator

SPECIFICATIONS

Input type	Range
E	-200 to 1000°C
J	-199.9 to 1200°C
K	-199.9 to 1372°C
T	-199.9 to 400°C
B	450 to 1800°C
R	0 to 1768°C
S	0 to 1768°C
PT100 (0.1°C)	-199.9 to 850.0°C
PT100 (1°C)	-200 to 850°C
0-.4K	-1999 to 9999 (Field Scalable)
0-6K	
*4-20mA /1-5VDC	
*0-20mA /0-5VDC	
0-5 V	
1-5 V	
0-2 V	
0.4 – 2V	
± 10V	
0-10 V	
-10-20mV	
± 75 mV	
Serial	
Modbus Master	

*Use external 250ohms, 0.1% for current Input
Table 1.1

Inputs	
Input Type	Thermocouple, RTD, Current, Voltage, Serial
Accuracy T /C, RTD,Linear, Serl Input	±0.1%Of FullSpan±1Digit
Resolution	ADC:17bits,Display:0.1°C/1°C
Sampling Rate	4 Samples/Sec
CJC Error	±2.0 °C
Sensor Burnout current	0.5uA
RTD excitation current	0.8mA (Approx.)
Allowable wiring resistance for RTD	Maximum 15 ohms/wire (Conductor resistance between three wires should be equal)
NMRR	> 40 dB (50HZ)
CMRR	> 100 dB (50HZ)
Input Impedance	> 1MΩ for TC, 0-2V,0.4-2V,0-

	75mV, ± 75mV >840 kΩ for 0-5V,1-5V, 0-10V, ±10V
Max Voltage	20VDC

Display & Keys

Model	409-4IN	409-6IN
PV	Red LED 4-digit, character size 4.00"	6" P10 based Red-Led High brightness module,(32X16 dots)
Status LEDs	Relay & Communication	
Keys	Menu, Enter, Increment, Decrement	

Output Types

Relay Output	
Relays	2
Type	Single Change over (C, NO, NC)
Rating	5A @ 230VAC / 30VDC
Retransmission Output (Optional)	
Current	0/4-20mA @ 500 ohms max.
Voltage	0/1-5V,0-10V @ 2Kohms min.
Accuracy	±0.25% of Full Span
Communication Output	
Interface	RS485 (2 Wire)
Protocol	Modbus-RTU
Baud rate	4800,9600, 19200, 38400 bps
Loop Power Supply	
LPS	24VDC (±10%) @50mAwith Inbuilt Short Circuit Protection

Power Supply

Standard	85-265VAC/ 100-300VDC
Optional	18-36VDC
Power consumption	409-4IN<10 VA 409-6IN<30VA

Isolation (Withstanding voltage)

- Between primary terminals* and secondary terminals**:
- At least 1500 V AC for 1 minute
- Between primary terminals* and grounding terminal:
- At least 1500 V AC for 1 minute
- Between grounding terminal and secondary terminals**:
- At least 1500 V AC for 1 minute
- Between secondary terminals**:
- At least 500 V AC for 1 minute
- * Primary terminals indicate power terminals and relay output terminals.
- ** Secondary terminals indicate analog I/O signal and Communication O/P.

Insulation resistance: 20MΩ or more at 500 V DC between power terminals and grounding terminal.

Advance Feature

- Input scalability for linear input

Physical 409-4IN

Case	IP20	IP65
Dimension (H x W x D)mm	175x440x70	300x500x120
Weight(Approx.)	3 kg	8.3 kg
Enclosure Protection	Panel / Wall / 19" Rack Mount	Wall Mount
Panel Cutout mm	444(+0.8) x 175(+0.8)	
Enclosure Material	MS Powder Coated	

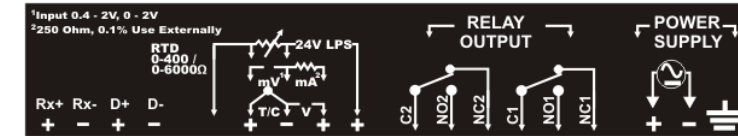
Terminal Cable Size	2.5mm ²
Physical 409-6IN	
Case	IP65
Dimension	405x250x90(H x W x D)mm
Weight(Approx.)	5 kg
Enclosure Protection	Wall Mount
Enclosure Material	MS Powder Coated
Terminal Cable Size	2.5mm ²

Environmental Conditions

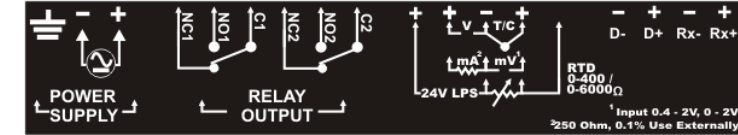
TEMPCO Input to PV Display Display to RX	< 100ppm/°C < 150ppm/°C
Humidity	20% to 95% RH (Non-Condensing)
Instrument Warm-up Time	Approx. 15 minutes
Ambient temperature	0 to 55°C
Storage Temperature	0 to 80°C

TERMINAL CONNECTIONS

Panel Mount

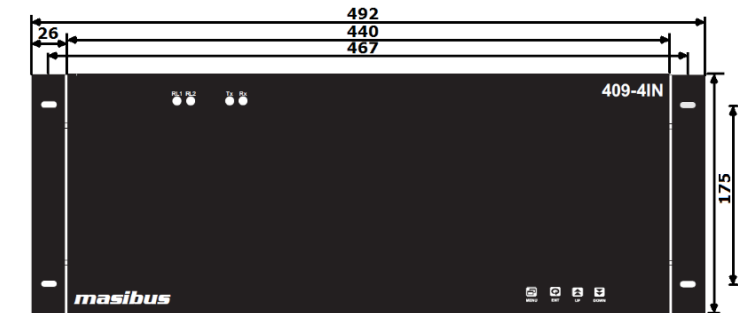


Wall Mount

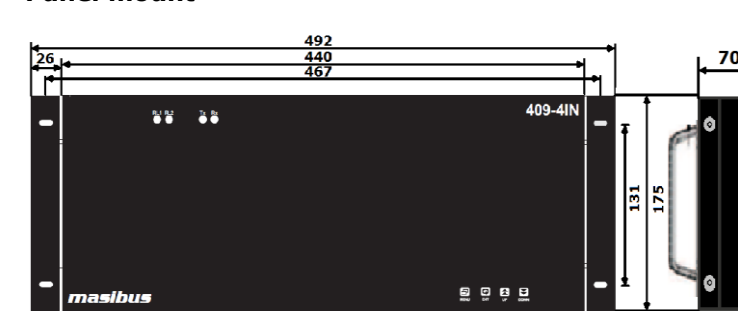


Mounting Details

Wall mount



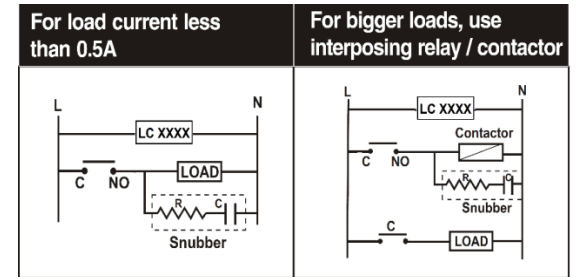
Panel mount



Load Connection

Electrical precautions during use

Electrical noise generated by switching of inductive loads can create momentary disruption, erratic display, and latch up, data loss or permanent damage to the instrument. Use of snubber circuits across loads as shown above, is recommended.



SAFETY/WARNING PRECAUTIONS

To ensure that the device can be operated safely and all functions can be used, please read these instructions carefully. Installation and Start-up must be carried out by qualified personnel only. The relevant county-specific regulations must also be observed. Before start-up it is particularly important to ensure:

- Terminal wiring: check that all cables are correctly connected according to the connection diagram
- All wiring must confirm to appropriate standards of good practice and local codes and regulations. Wiring must be suitable for voltage, current and temperature rating of the system.
- Unused control terminals should not be used as jumper points as they may be internally connected, which may cause damage to the unit.

FRONT PANEL DESCRIPTION

Name of Part	Symbol	Function
UP key		<ul style="list-style-type: none">Increment the Value of any Parameter.Display check, if pressed in Run Mode.
DOWN key		<ul style="list-style-type: none">Decrement the Value of any Parameter.Shows ambient value for T/C Input in RUN mode.
MENU key		<ul style="list-style-type: none">Shows different SET Points, if pressed in RUN mode.In Sub Menu it can be used to get to the next Parameter.
ENTER key		<ul style="list-style-type: none">Use as an acknowledgement for Alarm Status.It is also used to save the parameters to nonvolatile memory, when user setting a proper data by Increment and decrement key for parameter configuration.
PV (Present Value) Display	PV	<ul style="list-style-type: none">4 digital 4 inch RED DisplayDisplay process value.Display parameter name when user set parameter.Display Parameter Value when in Edit mode.Display error message when

		an error occurs.
Relay-1 Indication	RL1	• ON when Relay-1 is energized & OFF otherwise.
Relay-2 Indication	RL2	• ON when Relay-2 is energized & OFF otherwise.
TX Indication	Tx	• ON when device is transmitting some Data (RS-485).
RX Indication	Rx	• ON when device is receiving some Data (RS-485).

PARAMETER SETTING

Following parameters can view or change during run time.

- For Thermocouple input type, Press  key to show ambient temperature
- For Acknowledgment press  key in Run mode.
- Press  and  keys simultaneously will ask to enter password. On entering correct password, press  key unit will show parameters.
- Following parameters can be viewed using  Key. Its value can be viewed using  Key and it can be save using  key, it can bechanged using  or  Keys

Display	Name	Description	Default Value
INPT (<i>inPt</i>)	INPUT Type	Set PV Input Type t/c E/t/c J/t/c P/t/c t/t/c b/t/c r/t/c 5/rtd .1/0- .4u/0-6u / 1- 10/0- 10/0- 5u/ 1-5u/ 0-2u .4- 2/ 1020/ 1- 15/0- 15/5ErL/4-20/0- 20/5ErL/ n5tr	1-5V
DP (<i>dP</i>)	Decimal Point	Set position of Decimal Point on Display. 0/0 .0/0 .00/0 .000	1 (.0)
ZERO (<i>ZEro</i>)	Zero	Can be set to any value within the Input Range & less the SPAN Value.	-199.9 (If 1-5V)
SPAN (<i>SPAn</i>)	Span	Can be set to any value within the Input Range & greater the ZERO Value.	999.9 (If 1-5V)
INLO (<i>inLo</i>)	Input Low Value	Can be set to any value within the Input Range & less the SPAN Value.	1.000 (if 1-5V)
INHI (<i>inhi</i>)	Input High Value	Can be set to any value within the Input Range & greater the ZERO Value.	5.000 (1-5V)
CAL Calibration			
CALZ (<i>CALZ</i>)	Calibration Zero	Calibration Zero for PV Input	-
CALS (<i>CALS</i>)	Calibration Span	Calibration Span for PV Input	-
CALA (<i>ALb</i>)	Ambient	Ambient Adjustment	-

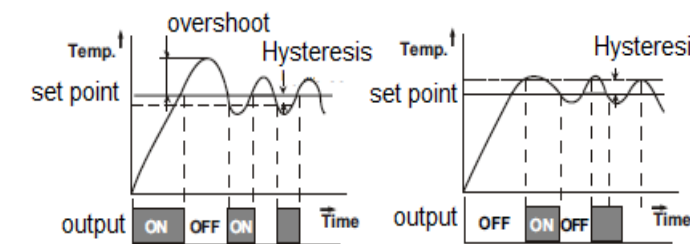
Rtr Retransmission			
RE V (<i>rEt r</i>)	Retransmission voltage	Retransmission Output Type This output is according to PV input. Zero & Span acts as Min & Max value of retransmission o/p scale respectively. 0- 10u/0-5u/ 1-5u 0 : 0-10V 1 : 0-5V 2 : 1-5V Voltage or Current is Jumper Selectable from the Hardware.	0 (0-10)
RTmA (<i>rEt mA</i>)	Retransmission current	Retransmission Output Type This output is according to PV input. Zero & Span acts as Min & Max value of retransmission o/p scale respectively. 4-20/0-20 0 : 4-20mA 1 : 0-20mA Voltage or Current is Jumper Selectable from the Hardware.	0 (4-20mA)
Rcal Retransmission calibration			
RETZ (<i>rEtZ</i>)	Retransmission - ZERO	Calibration Zero for Retransmission Output	-
RETS (<i>rEtS</i>)	Retransmission - SPAN	Calibration Span for Retransmission Output	-
Alarm Alarm Logic			
ATYP (<i>ALtYP</i>)	Alarm Type	Set which Set Point to shown in SV display in RUN mode while device is in Auto Mode HH/HL/LL 0 : HH 1 : HL 2 : LL	2 (LL)
SEL (<i>SEL</i>)		Selection for Alarm 1 & 2. AL 1/AL 2 0: AL1 1: AL2	-
AI1/AL 2 (<i>AL 1/AL 2</i>)	Alarm 1/Alarm 2	Set which Set Point to shown in SV display in RUN mode while device is in Auto Mode ALr n/tr iP 0 : ALRM 1 : TRIP	0 (ALRM)
LACH (<i>LACH</i>)	Latch	Enable or Disable Latch YES/no 0 : YES 1 : NO	1 (NO)
HYST (<i>HYSt</i>)	Hysteresis	Hysteresis Value for Relay 0.0 to 25.5	0.1
OPES (<i>oPEs</i>)	OPEN Sensor Status	Set Control O/P & Retransmission state when Input OPEN condition.	0 (UP)

		UP/down 0 : UP 1 : DOWN	
ST-1 (<i>St-1</i>)	Set Point 1	Range Depending on PV sensor type selected	10.0
ST-2 (<i>St-2</i>)	Set Point 2	Range Depending on PV sensor type selected	10.0
RDLY (<i>rdLY</i>)	Relay Delay (For Relay)	Relay Delay is amount of time (in sec), that Relay will wait before getting ON after the ON condition occurs. 1 to 9999 sec	0 sec
CTRI (<i>CTrL</i>)	Control Relay	Select Control Relay Status on/off 0 : ON 1 : OFF	1 (OFF)
COM communication			
SRNO (<i>SRno</i>)	Serial No.	Unit ID for Modbus-RS485 Communication 1 to 247	1
BAUD (<i>bAUD</i>)	Baud Rate	Set Modbus RS485 Communication Baud Rate 4800/9600/ 19.2K /38.4K 0 : 4800 (4800 bps) 1 : 9600 (9600 bps) 2 : 19.2K (19200bps) 3 : 38.4K (38400bps)	1 (9600)
MTYP (<i>MTYP</i>)	Modbus Type	Enable or Disable Modbus type A/ b 0 : A 1 : B	0 (A)
DTYP* (<i>dYtP</i>)	Data Type	Read Data Type 3 or 4	3
ADRS* (<i>AdRS</i>)	Address	Address Range 1 to 9000	1
TSCN* (<i>tScN</i>)	Scan Rate	Scan Rate 100 to 5000 ms	1000
DFRT* (<i>dFrT</i>)	Data Format	Data Format INT/Long/Float/SLong/5FLT 0 : Integer 1 : Long 2 : Float 3 : Swap Long 4 : Swap Float	0 (INT)
CBRK* (<i>CbRP</i>)	PV value if Connection breaks	PV After timeout (Connection Break) Last/- ---	Last
PASS (<i>PRSS</i>)	Password	Set Device Password 0 to 99	1

*Applicable for Master input only

CONTROL FUNCTION

ON/OFF Control (For L-ON Mode): The relay is 'ON' up to the set temperature and cuts 'OFF' above the set temperature. As the temperature of the system drops, the relay is switched 'ON' at a temperature slightly lower than the set point.



L-ON H-ON
Figure 1.1: Typical Relay operation

HYSTERESIS: The difference between the temperature at which relay switches 'ON' and at which the relay switches 'OFF' is the hysteresis or dead band.