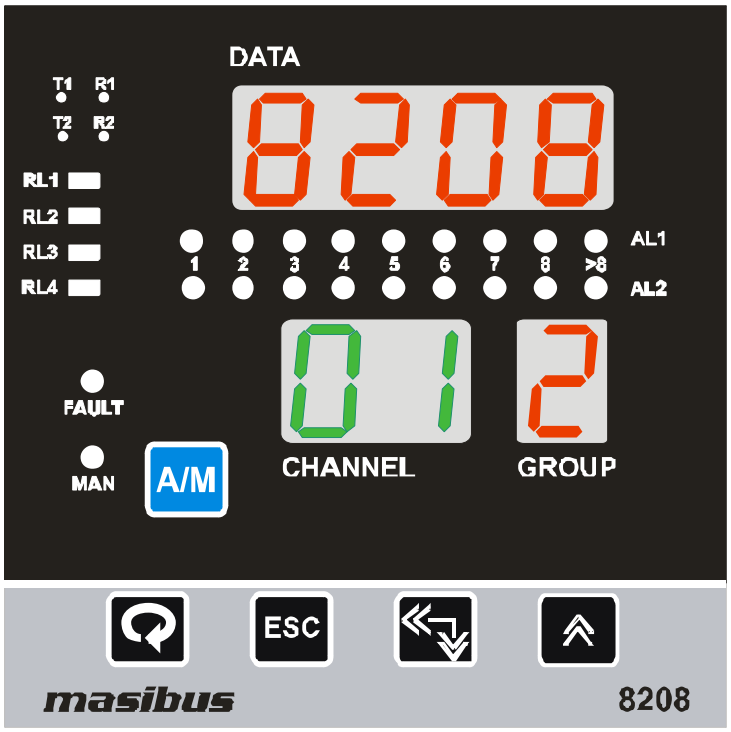
masibus

# Model 8208
# User's Manual 8-Channel Scanner

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# Contents

# 1. INTRODUCTION:

## Foreword

Thank you for purchasing 8208 universal Scanner. This manual describes the basic functions and operation methods of 8208.Please read through this user's manual carefully before using the product.

## Notice

The contents of this manual are subject to change without notice as a result of continuing improvements to the instrument's performance and functions

Every effort has been made to ensure accuracy in the preparation of this manual. Should any errors or omissions come to your attention, however, please inform MASIBUS Sales office or sales representative. Under no circumstances may the contents of this manual, in part or in whole, be transcribed or copied without our permission.

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## Revision

**1st Edition:** July 2010.

## Checking the Contents of the Package

Unpack the box and check the contents before using the product. If the product is different from that which you have ordered, if any parts or accessories are missing, or if the product appears to be damaged, contact your sales representative.

## Product Ordering Code:

The 8208 Scanner unit has a nameplate affixed to the one side of the enclosure. Check the model and suffix codes inscribed on the nameplate to confirm that the product received is that which was ordered.

| Model | Suffix code | Optional code | Remarks |
|---|---|---|---|
| | | | |
| | | | |

## List of Accessories

The product is provided with the following accessories according to the model and suffix codes (see the table below). Check that none of them are missing or damaged.

| No | Item name | Part number | Qty | Remarks |
|---|---|---|---|---|
| | | | | |
| | | | | |

# 2. INSTALLATION:

## How to Install:

**Mounting method:** Panel mounting

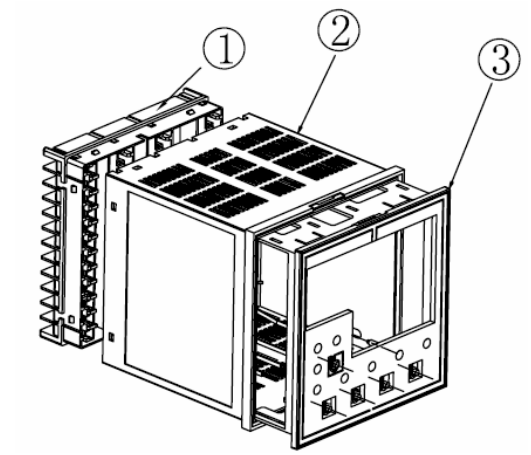
**To install the controller select a location where:**

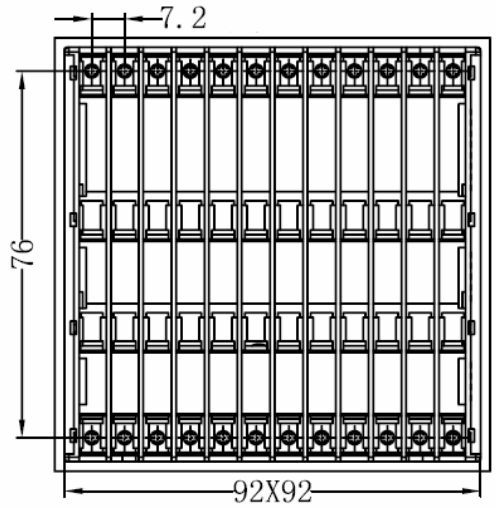
- o no one may accidentally touch the terminals
- o mechanical vibrations are minimal
- o corrosive gas is minimal
- o temperature can be maintained at about 25˚C to 35˚C and the fluctuation is minimal
- o no direct radiant heat is present
- o no magnetic disturbances are caused
- o no wind blows against the terminal board
- o no water splashed
- o no flammable materials are around

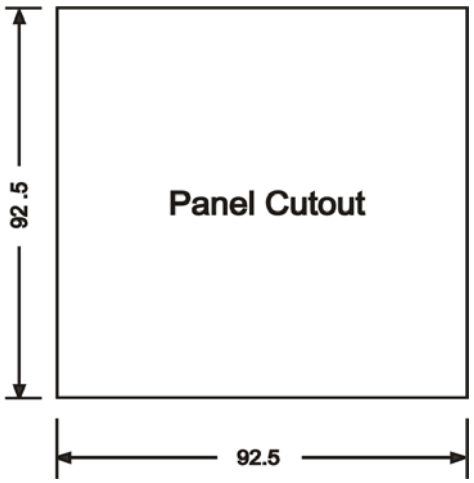
 Turn off the power to the controller before installing it on the panel because there is a possibility of electric shock

**External Dimensions and Panel Cutout Dimensions:**

**Unit: mm**



## How to connect wires:

Before carrying out wiring, turn off the power to the controller and check that the cables to be connected are not alive with a tester or the like because there is a possibility of electric shock.

**NOTE:**

- 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.
- Provide power from a single-phase instrument power supply. If there is a lot of noise in the power line, insert an insulating transformer into the primary side of the line and use a line filter on the secondary side. Do not place the primary and secondary power cables close to each other.
- For thermocouple input, use shielded compensating lead wires for wiring. For RTD input, use shielded wires that have low conductor resistance and cause no significant differences in resistance between the three wires. Do not connect **Terminal NO – 13, 16,19,22,37,40,43,46** when thermocouple or linear input is selected.
- Use repeater after each set of 32 instruments connected in RS-485 Communication.
- Unused terminals should not be used as jumper points as they may be internally connected, which may cause damage to the unit.

**CAUTION:**

High voltage transients may occur when switching inductive loads such as some contactors or solenoid valves. Through the internal contacts, these transients may introduce disturbances which could affect the performance of the instrument.
For this type of load it is highly recommended that a “sunbber” is connected across the normally open contact of the relay switching though load. The sunbber recommended consists of a series connected resistor/capacitor (typically **15nF/100 Ohms**). A sunbber will also prolong the life of the relay contacts. A sunbber should also be connected across the output of a tric output to prevent false triggering under line transient conditions

# 3. Hardware Specification Detail:

**Input type:** Universal input type
Thermocouple, RTD, Millivolt, Voltage, Current INPUT types are software selectable.
**Applicable Standards:** DIN (ITS-90) for Thermocouple and RTD

| Type | Range | Accuracy | Resolution |
|---|---|---|---|
| E | -200 to 1000°C | ±0.1% of instrument range ± 1 digit for temperature equal to or higher than 0° C ± 0.25% of instrument range ± 1 digit for temperature below 0° C<br><br>±0.25% of instrument range ± 1 digit(B,R,S TYPE TC) | 0.1°C<br><br>(1°C B,R,S TYPE TC) |
| J | -200 to 1200°C | | |
| K | -200 to 1370°C | | |
| T | -200 to 400°C | | |
| B | 450 to 1800°C | | |
| R | 0 to 1750°C | | |
| S | 0 to 1750°C | | |
| N | -200 to 1300°C | | |
| RTD | -199.9 to 850.0°C | ± 0.1% of instrument range ± 1 digit | |
| 0 to 75mV | -1999 to 9999 | ± 0.1% of range ± 1 digit | 1 Count |
| 0 to 100mv | | | |
| 0.4 to 2V | | | |
| 0 to 2V | | | |
| 0-20 mA* | | | |
| 4-20 mA* | | | |
| 0 to 5V | | | |
| 1 to 5V | | | |
| 0 to 10V | | | |
| -10 to 20mV | | | |

*For DC current input, 100 Ohms (0.1%, 25 ppm) shunt resistor must be connected externally. For DC current and Voltage input, Scaling is possible and decimal point is selectable.

**Sampling Period**: 100mSec for TC and Linear Input, 200mSec for RTD Input.

**Resolution:** 17-bit

**Burnout detection:** Functions for TC, RTD, linear input signal. (It detects whether sensor is connected or not) ALL Relay output can be selected for Burnout Condition. i.e. Open sensor Up scale or Down Scale

**Measurement current (RTD):** 1milli Ampere

**Input Impedance:** >1 Mohm for thermocouple/ mV/RTD/Volts inputs & 100 ohms for mAmp input.

**Noise Rejection Ratio:**
NMRR (Normal mode rejection ratio) > 40 dB (50/60 Hz) or more
CMRR (Common mode rejection ratio) > 120 dB (50/60 Hz) or more

**Allowable wiring resistance for RTD:** Maximum 15 ohms/wire (Conductor resistance between three wires should be equal).

**Retransmission Output:**
Number of outputs: 1
Process Value, Set point, or Control output can be selected as a Retransmission output.
Output signal: 0-20 mA, 4-20 mA, 0-5 V, 1-5 V or 0-10 V DC.
Voltage or current output can be selected through software and internal jumper settings.
Load resistance: 500 ohms Max. Or less for current output. 3k or higher for voltage output
Output accuracy: ±0.25% of Range

**Relay Contact Outputs:**
Number of outputs: 4
Output signal: Three terminals (NC, NO, and C)
Relay Contact rating: 250 V AC or 30 V DC, 2A (resistive load)
Operating/release time: <10 ms

**Communication:**
Communication Type: Half duplex/Asynchronous (RS-485)
Communication Protocol: MODBUS RTU
Baud rate, Parity and Stop bit are selectable form the key board.
All parameters are Configurable through MODBUS.

Connectable number of unit: 32
Communication error Detection: CRC Check

**Display Specifications:**
PV display: 4-digits, 7-segment, Red LEDs, character height of 0.56''
Channel No. Display: 2-digits, 7-segment, Green LEDs, character height of 0.56'
Relay Group Display: 1-digits, 7-segment, Red LEDs, character height of 0.56'
Status indicating lamps: 16-Red LEDs for Alarms status, 4-Red LEDs for Relay status, 1-Red LED Manual mode status, 1-Red LED Fault status, 2-Green LEDS for Communication.

**Power Supply Specifications:**

Power supply: Rated voltage of 85 to 260V AC at 50/60 Hz, Rated Dc voltage 120 to 360v / Rated voltage of 18 to 36V DC (Optional),

Power consumption: Max. 15 VA
Data backup: Non-volatile memory (can be written up to 100000 times)
Withstanding Voltage:

- Between primary terminals* and secondary terminals** at least 1500VAC for 1 minute
- Between secondary terminals at least 600V AC for 1 minute

Insulation resistance: 20Mohms or more at 500V DC
*Primary terminals indicate power terminals and relay output terminals
** Secondary terminals indicate analog I/O signals, voltage pulse output, Contact input terminals, Remote input, RS 485.

**Signal Isolations Specifications:**

PV input terminals(8 Channel input): Isolated from other input/output terminals.
Retransmission output terminals (voltage/current): Not isolated from current or voltage outputs Isolated from other input/output terminals and internal circuit.
Relay contact control output terminals: Isolated between contact output terminals and from other Input/output terminals and internal circuit.
RS-485 Communication terminals: Isolated from other input/output terminals and internal circuit
Power terminals: Isolated from other input/output terminals and internal circuit.

**Construction, Installation, and Wiring:**

Construction: Only the front panel is dust-proof
Material: ABS resin and Polycarbonate
Case color: Black
Weight: About 0.5 kg or less

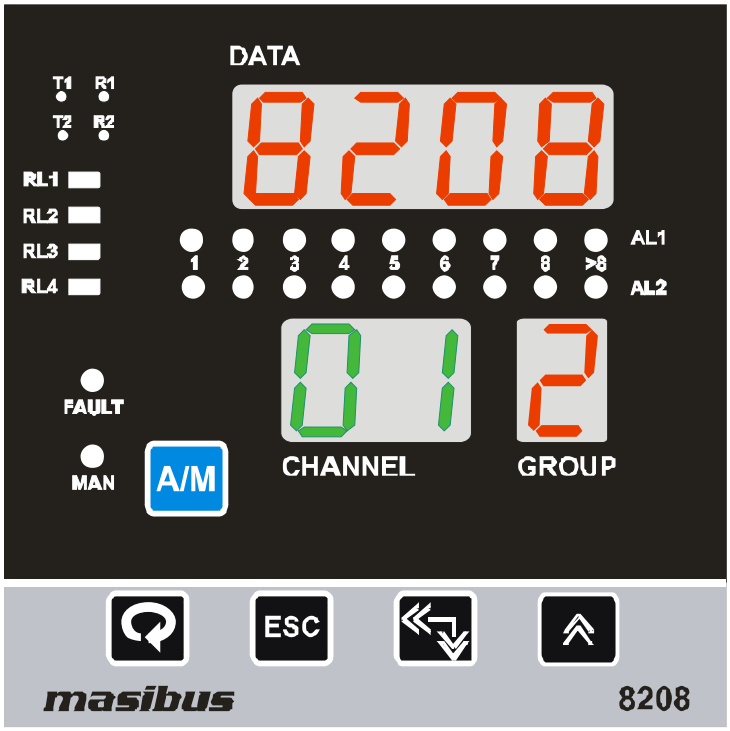
Dimensions: 96 (W) x 96 (H) x 110 (depth from panel face) mm.
Installation: Panel-mounting type. With
Panel cutout dimensions: 92.5 + 0.8(W) x 92.5 + 0.8(H) mm

**Environmental Conditions:**

TEMPCO: FOR PV (Main input) less than 100ppm. FOR Retransmission less than 150ppm.
Humidity: 30% to 95% RH (Non-Condensing)
Instrument Warm-up Time: 30 minutes after power on
Ambient temperature: 0 to 55°C

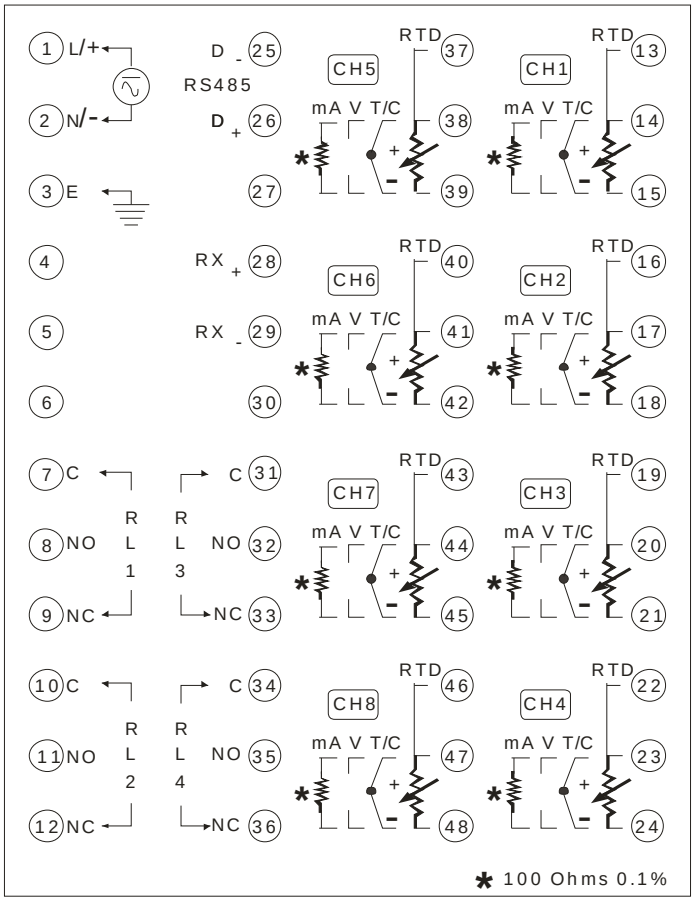
# 4. Front and Back Panel Description:

## FRONT PANEL




| Name of Part | Function |
|---|---|
| Process Value Display**(DATA window)** | Displays Process Value.<br>Display Parameter Name When You Set Parameter.<br>Displays Error Message When An Error Occurs. |
| Channel No. Display **(CHANNEL)** | Displays Channel Number in run mode. Also it will display relay number (01 – 04) in set mode |
| Group No. Display **(GROUP)** | Displays Group Number for Relay Mapping. |
| Relay Indicator LED **(RL1, RL2, RL3, & RL4)** | When Respective Relay LED Lits (In Red). |
| Alarm1(**AL1**) Indicator LEDs for Channel-1 to 8 | When Alarm1 Occurs, Respective Alarm LED for Channel-1 to 8 will Lit (In Red). |
| Alarm1(**AL2**) Indicator LEDs for Channel-1 to 8 | When Alarm2 Occurs, Respective Alarm LED for Channel-1 to 8 will Lit (In Red). |
| Auto/Manual Indicator LED **(MAN)** | If LED is on, it indicates Manual mode and if LED is off Auto Mode. |
| Communication Indicator LED**(T1**,**R1 & T2**,**R2)** | When Communication on, two LEDs blink. |

## BACK PLATE CONNECTION DETAIL:



# 5. KEY FUNCTION Description:

**MENU/ENTER KEY:** 

It is used to enter in the sub menu (various levels) and save the parameters to nonvolatile memory, when user setting a proper data by Increment and shift key for parameter configuration.

**ESCAPE KEY:** 


It is used to come out from any sub menu (various levels) to the run mode.

**INCREMENT KEY:** 

It is used to increment the parameter for selection. Value of parameter can be incremented by pressing this key. When first time increment key pressed, DP (decimal point) in SV display blink, so user can modify the value with increment key. It is used to increment the value in particular digit. Value can be incremented from 0- 9 and from '9' again it rollovers to '0'.

**SHIFT KEY/DECREMENT KEY:** 

It is used to Shift the digit to set the parameter as describe in increment key when DP (decimal point) started to blink. Menu key is used to go forward to show next parameter and Shift key is used to go backward to show previous parameter. Also, in Run mode Shift key is used to give Acknowledge for ALARM and TRIP.

**AUTO/MANUAL KEY:** 


It is used to switch between auto to manual mode and manual to auto mode. During manual mode Increment key is used to change channel number.

# 6. Menu Layout:

**RUN TIME INDICATION:**

Following parameters can view or change during run time.

- Immediately after powering, unit will run in Auto Mode. In auto mode channel will scan automatically according to scan time selection (1-250 second).
- Press A/M Key in run mode, Channel no scanning on display is stopped. By pressing increment key, we can change channel number manually.

**Level – 1:-**

Pressing MENU key DATA window shows LvL 1 (LvL1) message. Press MENU key again PV Display shows PWd (PWD) message, press increment key twice to select password and then press MENU key to enter into Level-1. DATA window shows SP .1 (SP.1) message and by pressing increment key, DATA window shows Set Point-1 Value Use Inc and shift key to modify value. OR press MENU key again to change Set-point 1 for Channel 2. ESCAPE KEY will use to come out SP.1

| **LEVEL 1** | | | | |
|---|---|---|---|---|
| Parameter (DATA window) | | Setting name and description | Default value | Shows only if |
| Symbol | Name | | | |
| PWd (PWD) | Level-1 Password | 0 to 9999 | 0000 | - |
| SP.1 (SP.1) | Target Set point-1 | SetPoint-1 for Channel 1 to 8. | 0100 (for all 8 channel) | - |
| SP.2 (SP.2) | Target Set point-2 | SetPoint-2 for Channel 1 to 8. | 0200(for all 8 channel) | Relay group is selected 2 |
| HYS (HYS) | Hystresis | Hystresis for Channel 1 to 8. | 0002(for all 8 channel) | - |

**LEVEL 2:-**

Pressing MENU key DATA window shows LvL2 (LvL2) message. Press MENU key again DATA window shows PWD (PWD) message, press increment key twice to select password and then press MENU key to enter into Level-2. Following parameters can be configured in LEVEL – 2.

| **LEVEL 2:** | | | | |
|---|---|---|---|---|
| Parameter (DATA Window) | | Setting name and description | Default value | Shows only if |
| Symbol | Name | | | |
| PWD (PWD) | Level-2 Password | 0 to 9999 | 0000 | - |
| inPt (inP.t) | PV Input Type (E, J, K, T Etc.) | Follow Table 3(Input type for 1-8 channel) | K-TC(for all 8 channel) | - |
| PuhI (PV.HI) | Process value range high setting (PV high > PV low) | Range of the sensor /-1999 to 9999 (for linear input types)(1-8 Channel) | 1370(for all 8 channel) | - |
| PuLo (PV.LO) | Process value range lower setting | Range of the sensor /-1999 to 9999 (for linear input types)(1-8 Channel) | -200(for all 8 channel) | - |
| dP (dP) | Decimal Point Setting Only applicable for Linear input type is selected | 0 to 3(1 – 8 Channel) | 0(for all 8 channel) | - |
| rLLG (rL.LG) | Relay Logic(Applicable for 4-RELAY) | nrmL / FLSF<br>0:Noraml<br>1:Fail Safe | Normal(for all 4 Relay) | - |
| rLFn (rL.Fn) | Relay Function(Applicable for 4-RELAY) | ALrm / trIP<br>0:ALARM<br>1:TRIP | Alarm(for all 4 Relay) | - |
| rLdL (rL.dL) | Relay Delay(Applicable for 4-RELAY) | 1 to 99 seconds | 1 second(for all 4 Relay) | - |
| rLoS (rL.o.S) | Relay Open sensor(Applicable for 4-RELAY) | UP / doun<br>0:DOWN<br>1:UP | Up Scale(for all 4 Relay) | - |
| rLmP (rl.mp) | Relay mapping (Applicable for 1 -8 Channel) | See Relay Configuration | Refer Note:1 | - |
| rLtP (rl.tp) | Relay Group Type | See Relay Configuration | Refer Note:2 | - |

## Relay Configuration:

Relay configuration depends on selection of Relay group i.e. Relay group 2 or Relay group 4 in Level-3.

## Relay Group - 2:

If **relay group – 2** is selected, there will be two group of relay. Each group has two relay. **(G-1 and G-2).**

**G-1 means RELAY 1 and RELAY 3**
**G-2 means RELAY 2 and RELAY 4**

**Example:**

| CHANNEL NO | NONE | G-1 | G-2 |
|---|---|---|---|
| 1 | | ✓ | |
| 2 | | | ✓ |
| 3 | ✓ | | |
| 4 | | ✓ | |
| 5 | | | ✓ |
| 6 | | | ✓ |
| 7 | | ✓ | |
| 8 | | | ✓ |

**Note:**

**1)** Both Groups can not be selected for single Channel.
**2)** None means no group is selected for particular channel.

**Relay Type can be selected as shown below:**

| Relay Group | Relay Type |
|---|---|
| G – 1 | High/ Very High (H-uH) or Very Low /Low (uL-L) or Low/High (L-H) |
| G – 2 | High/ Very High (H-uH) or Very Low /Low (uL-L) or Low/High (L-H) |

## Relay Group - 4:

If **relay group – 4** is selected, there will be four group of relay. Each group has one relay. **(G-1, G-2, G-3 and G-4).**

**G-1 means RELAY 1**
**G-2 means RELAY 2**
**G-3 means RELAY 3**
**G-4 means RELAY 4**

**Example:**

| CHANNEL NO | NONE | G-1 | G-2 | G-3 | G-4 |
|---|---|---|---|---|---|
| 1 | | ✓ | | | |
| 2 | ✓ | | | | |
| 3 | | | ✓ | | |
| 4 | | | | | ✓ |
| 5 | | | | ✓ | |
| 6 | ✓ | | | | |
| 7 | | ✓ | | | |
| 8 | | | ✓ | | |

**Note:**

**1)** More than **one Group** can not be selected for single Channel.
**2)** None means no group is selected for particular Channel.

**Relay Type can be selected as shown below:**

| Relay Group | Relay Type |
|---|---|
| G - 1 | Low ON (L) or High ON (H) |
| G - 2 | Low ON (L) or High ON (H) |
| G - 3 | Low ON (L) or High ON (H) |
| G - 4 | Low ON (L) or High ON (H) |

For relay functionality Refer Relay outputs (Chapter – 7).

**LEVEL – 3:**

Pressing MENU key DATA window shows LvL3 (LvL3) message. Press MENU key again DATA window shows PWd (PWD) message, press increment key twice to select password and then press MENU key to enter into Level-3.Following parameters can be configured in LEVEL – 3.

| **LEVEL 3:** | | | | |
|---|---|---|---|---|
| Parameter (DATA Window) | | Setting name and description | Default value | Shows only if |
| Symbol | Name | | | |
| PWd (PWD) | Level-3 Password | 0 to 9999 | 0000 | - |
| SK.P (skip) | Channel skip/Unskip selection. | YES / no<br>0:NO<br>1:YES | 0(for all 8 channel | - |
| rL.LH (rL.LH) | Relay Latch | on / oFF<br>0:OFF<br>1:ON | 0 | - |
| rL.GP (rL.GP) | Relay Group | rGP.4 / rGP.2<br>0:Relay Group-4<br>1:Relay Group-2 | 1 | - |
| SCAn (SCAn) | Scan Time | 1 to 250 seconds | 1 | - |
| A.CJC (A.CJC) | Auto cold junction(Only applicable for TC input type | YES / no<br>0:NO<br>1:YES | 1 | - |
| F.CJC (F.CJC) | Fix cold junction(Only applicable for TC input type | 0.0 to 60.0 Deg C | 0.0 Deg C | - |
| Sr.no (Sr.no) | Unit ID | 1 to 247 | 1 | - |
| bAUd (Baud) | Communication Baud rate | 9600 / 19.2K<br>0:(9600) – 9600 bps<br>1:(19.2K) –19.2 Kbps | 19.2k bps | |
| Pr.St (Pr.St) | Parity/Stop bit selection | P.n.S.1 / P.n.S.2 / P.o.S.1 / P.E.S.1<br>0:(P.N.S.1)-parity none-stop bit-1 | No parity /Stop bit - 2 | |

| | | | | |
|---|---|---|---|---|
| | | 1:(P.N.S.2)-parity none - stop bit-2<br>2:(P.O.S.1)-parity odd -stop bit-1<br>3:(P.E.S.1)-parity even - stop bit-1 | | |
| t.oUt (t.out) | Timeout for display back to Run Mode | 10 to 100 Seconds | 60 | - |
| rt.oS (rt.o.s) | Retrasmission Open sensor | UP / doun<br>0:DOWN<br>1:UP | 1 | - |
| rt.tP (rt.tp) | Retransmission Output Type | 0-20/4-20/ 0-5u/ 1-5u/ 0- 10u<br>0:(0-20) – 0-20mA<br>1:(4-20) – 4-20mA<br>2:(0 - 5) – 0 – 5volt<br>3:(1 - 5) – 1 – 5volt<br>4:(0 – 10) - 0 -10volt | 1 | - |
| rt.dr (rt.dr) | Retransmission direction | dir / rEu<br>1:(dir)<br>0: (rev) | 1 | - |
| rt.CH (rt.CH) | Retransmission Channel | 1 to 8 channel | 1 | - |
| rt.rd (rt.rd) | Retransmission Channel Value | nAll / n In<br>1:(Max)<br>0: (Min) | 1 | If Fix input type selected |
| S.Pud (S.PWD) | Password<br>Set password to lock selected level | 0 to 9999 | 0 | - |

**Calibration:-**

Pressing MENU key, DATA window shows CAL (CAL) message. Press MENU key again, DATA window shows Pud (PWD) message, press increment key twice to select password and then press MENU key to enter into Calibration.

| **Calibration:** | | | | |
|---|---|---|---|---|
| Parameter (DATA Window) | | Setting name and description | Default value | Shows only if |
| Symbol | Name | | | |
| Pud (PWD) | Password | 0 to 9999 | 0000 | - |
| Amb (Amb) | Ambient | Ambient adjustment | - | - |
| CAL.Z (CAL.Z) | Thermocouple, Rtd and Linear Zero Calibtriaon | Depending on PV sensor type selected | - | - |

| | | | | |
|---|---|---|---|---|
| CAL.S (CAL.S) | Thermocouple, Rtd and Linear Span Calibtriaon | Depending on PV sensor type selected | - | - |
| rtr.Z (rtr.Z) | Retransmission voltage and current Zero calibration | Depending on Retrasmission type selected | - | - |
| rtr.S (rtr.S) | Retransmission voltage and current Span calibration | Depending on Retrasmission type selected | - | - |

**Factory Reset Parameters:**

Pressing MENU key, DATA window shows F .rSt (F.rST) message. Press MENU key again, DATA window shows PWd (PWD) message, press Increment key twice to select password and then press MENU key to enter into Factory Reset.

| **Factory Reset Mode:** | | | | |
|---|---|---|---|---|
| Parameter (DATA window) | | Setting name and description | Default value | Shows only if |
| Symbol | Name | | | |
| PWd (Pwd) | Password | 0 to 9999 | - | - |
| LdEF (L.dEF) | LOAD Default | CAL\PArA\ ALL (CAL)\(PARA)\(ALL)<br>**CAL-** Only calibration set to default value<br>**PARA-** All parameters excluding calibration will set to default value<br>**ALL-**Calibration and parameters will set to default value | - | - |

## INPUT TYPE SELECTION TABLE:

| Type | I/P NO | Type Display | Range | Resolution |
|---|---|---|---|---|
| E | 1 | E tc | -200 to 1000°C | 0.1°C |
| J | 2 | J tc | -200 to 1200°C | |
| K | 3 | P tc | -200 to 1370°C | |
| T | 4 | t tc | -200 to 400°C | |
| B | 5 | b tc | 450 to 1800°C | |
| R | 6 | r tc | 0 to 1750°C | |
| S | 7 | S tc | 0 to 1750°C | |
| N | 8 | n tc | -200 to 1300°C | |
| RTD | 9 | rtd | -199.9 to 850.0°C | |
| -10 to 20mV | 10 | -10.20 | -1999 to 9999 Counts | 1 Count |
| 0 to 75mv | 11 | 0-75 | | |
| 0 to 100mV | 12 | 0-100 | | |
| 0.4 to 2V | 13 | 0.4-2 | | |
| 0 to 2V | 14 | 0-2u | | |
| 4 to 20mamp | 15 | 4-20 | | |
| 0 to 20mamp | 16 | 0-20 | | |
| 0 to 5V | 17 | 0-5u | | |
| 1 to 5V | 18 | 1-5u | | |
| 0 to 10V | 19 | 0-10u | | |

**Table 3:**

# 7. Relay Outputs:

Following function can be set for Relay outputs.

**Relay Logic (Direction):**
Relay Logic means Relay contact can be changed from NO – NC OR NC – NO. If relay logic is selected Normal, when Fault occur Relay contact will change from NC to NO. If relay logic is selected Fail Safe, when Fault occur Relay contact will change from NO to NC.

**Relay Function:** Relay function can be selected as ALARM or TRIP.

**Relay Delay:** A time delay can be provided for the actual output.

**Relay Open Sensor**:
Open sensor up scale or down scale can be selected for each relay output.

**Relay Mapping:**
Refer Menu layout LEVEL - 2

**Relay Types:** Various alarm operations are shown in the reference figure. (High, Low, Very High- High, Low-Very Low, High- Low)
For relay types selection Refer Menu layout LEVEL – 2.

## Relay logic table:

**ALARM 1**
**MOMEMTARY ALARM**
**(when in abnormal condition ack not pressed)**

| CONDITION | | | NORMAL | ABNORMAL | UP (O/S) | DOWN (O/S) | ACK ** | NORMAL * | ACK *** |
|---|---|---|---|---|---|---|---|---|---|
| | ALARM LATCH YES | LAMP | OFF | FLASH | FLASH | OFF | | FLASH | OFF |
| | | RELAY | OFF | ON | ON | OFF | | OFF | OFF |
| HIGH | ALARM LATCH NO | LAMP | OFF | FLASH | FLASH | OFF | | OFF | OFF |
| | | RELAY | OFF | ON | ON | OFF | | OFF | OFF |
| | TRIP | LAMP | OFF | FLASH | OFF | OFF | | FLASH | OFF |
| | | RELAY | OFF | ON | OFF | OFF | | ON | OFF |
| | ALARM LATCH YES | LAMP | OFF | FLASH | OFF | FLASH | | FLASH | OFF |
| | | RELAY | OFF | ON | OFF | ON | | OFF | OFF |
| LOW | ALARM LATCH NO | LAMP | OFF | FLASH | OFF | FLASH | | OFF | OFF |
| | | RELAY | OFF | ON | OFF | ON | | OFF | OFF |
| | TRIP | LAMP | OFF | FLASH | OFF | OFF | | FLASH | OFF |
| | | RELAY | OFF | ON | OFF | OFF | | ON | OFF |
| | ALARM LATCH YES | LAMP | OFF | FLASH | OFF | FLASH | | FLASH | OFF |
| | | RELAY | OFF | ON | OFF | ON | | OFF | OFF |
| VLOW | ALARM LATCH NO | LAMP | OFF | FLASH | OFF | FLASH | | OFF | OFF |
| | | RELAY | OFF | ON | OFF | ON | | OFF | OFF |
| | TRIP | LAMP | OFF | FLASH | OFF | OFF | | FLASH | OFF |
| | | RELAY | OFF | ON | OFF | OFF | | ON | OFF |

**ALARM AL2**
**MOMEMTARY ALARM**
**(when in abnormal condition ack not pressed)**

| CONDITION | | | NORMAL | ABNORMAL | UP (O/S) | DOWN (O/S) | ACK ** | NORMAL * | ACK *** |
|---|---|---|---|---|---|---|---|---|---|
| | ALARM LATCH YES | LAMP | OFF | FLASH | FLASH | OFF | | FLASH | OFF |
| | | RELAY | OFF | ON | ON | OFF | | OFF | OFF |
| VHIGH | ALARM LATCH NO | LAMP | OFF | FLASH | FLASH | OFF | | OFF | OFF |
| | | RELAY | OFF | ON | ON | OFF | | OFF | OFF |
| | TRIP | LAMP | OFF | FLASH | OFF | OFF | | FLASH | OFF |
| | | RELAY | OFF | ON | OFF | OFF | | ON | OFF |
| | ALARM LATCH YES | LAMP | OFF | FLASH | FLASH | OFF | | FLASH | OFF |
| | | RELAY | OFF | ON | ON | OFF | | OFF | OFF |
| HIGH | ALARM LATCH NO | LAMP | OFF | FLASH | FLASH | OFF | | OFF | OFF |
| | | RELAY | OFF | ON | ON | OFF | | OFF | OFF |
| | TRIP | LAMP | OFF | FLASH | OFF | OFF | | FLASH | OFF |
| | | RELAY | OFF | ON | OFF | OFF | | ON | OFF |
| | ALARM LATCH YES | LAMP | OFF | FLASH | OFF | FLASH | | FLASH | OFF |
| | | RELAY | OFF | ON | OFF | ON | | OFF | OFF |
| LOW | ALARM LATCH NO | LAMP | OFF | FLASH | OFF | FLASH | | OFF | OFF |
| | | RELAY | OFF | ON | OFF | ON | | OFF | OFF |
| | TRIP | LAMP | OFF | FLASH | OFF | OFF | | FLASH | OFF |
| | | RELAY | OFF | ON | OFF | OFF | | ON | OFF |

**ALARM AL1**
**MAINTAINED ALARM**
**(when in abnormal condition ack is pressed)**

| CONDITION | | | | NORMAL | ABNORMAL | UP (O/S) | DOWN (O/S) | ACK ** | NORMAL * | ACK *** |
|---|---|---|---|---|---|---|---|---|---|---|
| | ALARM | LATCH | LAMP | OFF | FLASH | FLASH | OFF | STEADY | STEADY | OFF |
| | | YES | RELAY | OFF | ON | ON | OFF | ON | OFF | OFF |
| HIGH | ALARM | LATCH | LAMP | OFF | FLASH | FLASH | OFF | STEADY | OFF | OFF |
| | | NO | RELAY | OFF | ON | ON | OFF | OFF | OFF | OFF |
| | TRIP | | LAMP | OFF | FLASH | OFF | OFF | STEADY | STEADY | OFF |
| | | | RELAY | OFF | ON | OFF | OFF | ON | ON | OFF |
| | ALARM | LATCH | LAMP | OFF | FLASH | OFF | FLASH | STEADY | STEADY | OFF |
| | | YES | RELAY | OFF | ON | OFF | ON | ON | OFF | OFF |
| LOW | ALARM | LATCH | LAMP | OFF | FLASH | OFF | FLASH | STEADY | OFF | OFF |
| | | NO | RELAY | OFF | ON | OFF | ON | OFF | OFF | OFF |
| | TRIP | | LAMP | OFF | FLASH | OFF | OFF | STEADY | STEADY | OFF |
| | | | RELAY | OFF | ON | OFF | OFF | ON | ON | OFF |
| | ALARM | LATCH | LAMP | OFF | FLASH | OFF | FLASH | STEADY | STEADY | OFF |
| | | YES | RELAY | OFF | ON | OFF | ON | ON | OFF | OFF |
| VLOW | ALARM | LATCH | LAMP | OFF | FLASH | OFF | FLASH | STEADY | OFF | OFF |
| | | NO | RELAY | OFF | ON | OFF | ON | OFF | OFF | OFF |
| | TRIP | | LAMP | OFF | FLASH | OFF | OFF | STEADY | STEADY | OFF |
| | | | RELAY | OFF | ON | OFF | OFF | ON | ON | OFF |

**ALARM AL2**
**MAINTAINED ALARM**
**(when in abnormal condition ack is pressed)**

| CONDITION | | | | NORMAL | ABNORMAL | UP (O/S) | DOWN (O/S) | ACK ** | NORMAL * | ACK *** |
|---|---|---|---|---|---|---|---|---|---|---|
| | ALARM | LATCH | LAMP | OFF | FLASH | FLASH | OFF | STEADY | STEADY | OFF |
| | | YES | RELAY | OFF | ON | ON | OFF | ON | OFF | OFF |
| VHIGH | ALARM | LATCH | LAMP | OFF | FLASH | FLASH | OFF | STEADY | OFF | OFF |
| | | NO | RELAY | OFF | ON | ON | OFF | OFF | OFF | OFF |
| | TRIP | | LAMP | OFF | FLASH | OFF | OFF | STEADY | STEADY | OFF |
| | | | RELAY | OFF | ON | OFF | OFF | ON | ON | OFF |
| | ALARM | LATCH | LAMP | OFF | FLASH | FLASH | OFF | STEADY | STEADY | OFF |
| | | YES | RELAY | OFF | ON | ON | OFF | ON | OFF | OFF |
| HIGH | ALARM | LATCH | LAMP | OFF | FLASH | FLASH | OFF | STEADY | OFF | OFF |
| | | NO | RELAY | OFF | ON | ON | OFF | OFF | OFF | OFF |
| | TRIP | | LAMP | OFF | FLASH | OFF | OFF | STEADY | STEADY | OFF |
| | | | RELAY | OFF | ON | OFF | OFF | ON | ON | OFF |
| | ALARM | LATCH | LAMP | OFF | FLASH | OFF | FLASH | STEADY | STEADY | OFF |
| | | YES | RELAY | OFF | ON | OFF | ON | ON | OFF | OFF |
| LOW | ALARM | LATCH | LAMP | OFF | FLASH | OFF | FLASH | STEADY | OFF | OFF |
| | | NO | RELAY | OFF | ON | OFF | ON | OFF | OFF | OFF |
| | TRIP | | LAMP | OFF | FLASH | OFF | OFF | STEADY | STEADY | OFF |
| | | | RELAY | OFF | ON | OFF | OFF | ON | ON | OFF |

**Notes :**

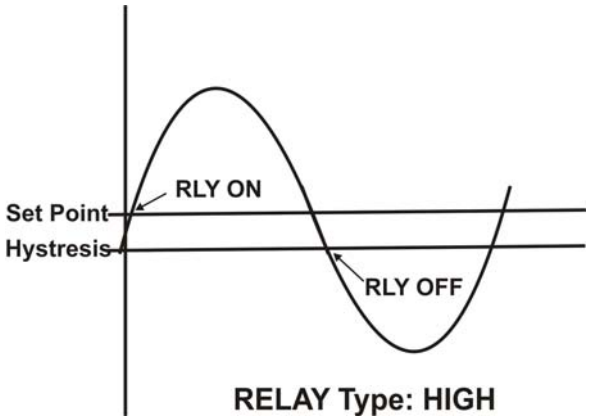
* means normal condition after abnormal has occurred

** means ack pressed in abnormal condition

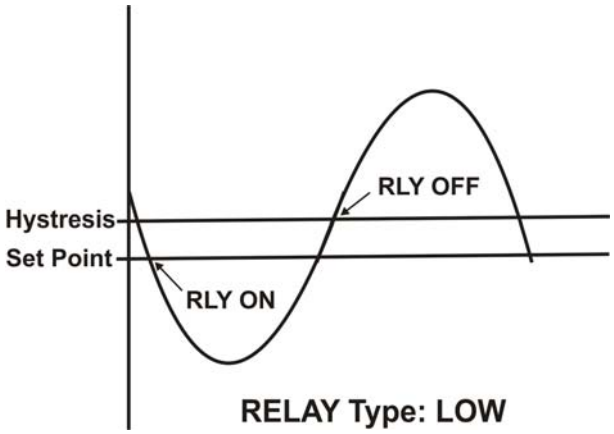
*** means ack pressed in normal condition after abnormal has already occurred.

**Upon pressing Shift / Decrement key for 3 seconds, acknowledgement will be given for alarm and trip relay in abnormal condition.**
**Alarm Latch function applicable only for ALARM, there is no affect when TRIP Selected as a relay function LEVEL – 2.**

## Basic RELAY Function:

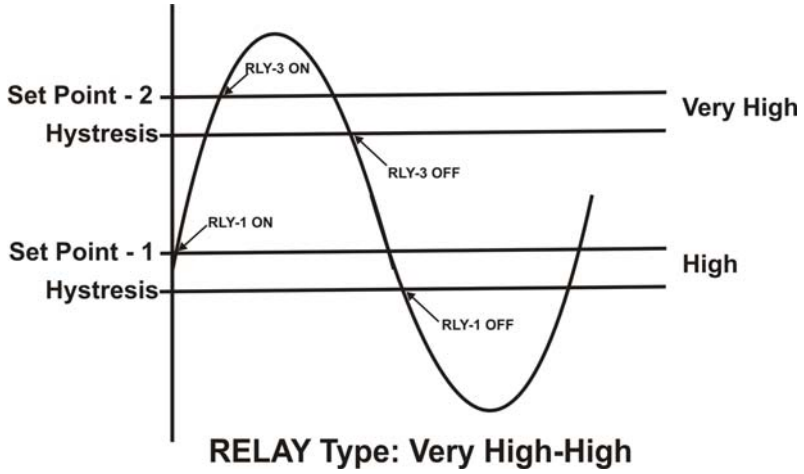



RELAY Type: HIGH

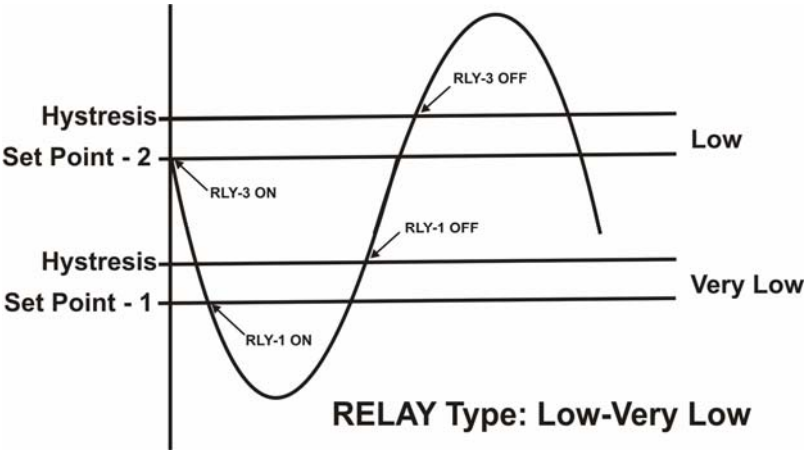



RELAY Type: LOW

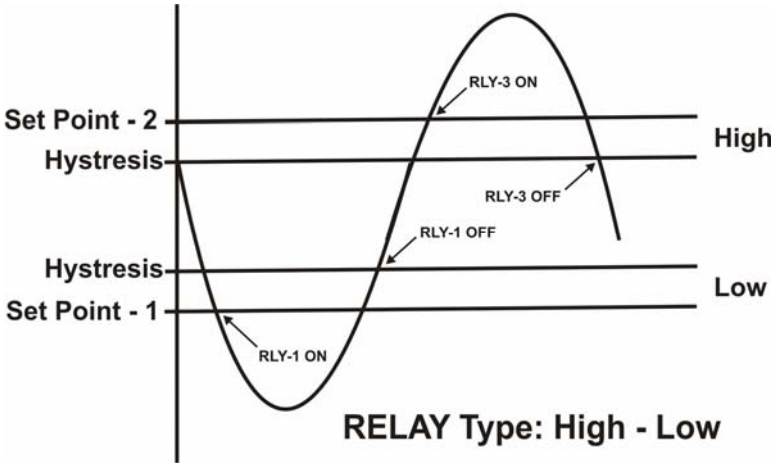
## RELAY GROUP - 4




**RELAY Type: Very High-High**




**RELAY Type: Low-Very Low**




**RELAY Type: High - Low**

## RELAY GROUP - 2

# 8. Calibration Procedure:-

Calibration is provided for ambient temperature, PV sensor input, Retransmission output.
First select the calibration function as described below and then follow the procedure depending on the parameter to be calibrated. The sequences of parameters that will be available for calibration are listed below:

- Ambient temperature adjustment
- PV Sensor input
- Retransmission output (calibration for voltage or current)

**Ambient temperature adjustment:-**
This menu will come up only if; the input sensor selected is Thermocouple type.
PV display shows AMb (Ambient temperature adjusts). PV display shows ambient temperature measured by the controller and by applying old calibration data.
DP of last digit will blink to indicate that the value can be changed. Use Inc/Shift key to adjust it to desired value. Once the desired value set and press MENU key, the blinking DP will go off to indicate that the value has been registered. The controller will automatically save all the new calculations. Ambient temperature adjustment is over.
Press MENU key to calibrate other parameters or press Escape key to come out to normal operation.

**PV input sensor calibration:-**
When user enters in calibration menu, PV display shows message ZEro (Thermocouple/Linear/RTD) for sensor input span calibration for Thermocouple Linear input and RTD type. Feed sensor input using a calibrator, such that process value is close to lower range value.

**Note:** The controller allows the user to calibrate sensor's input anywhere in the range, but it is recommended that it should be calibrate the input at points close to lower and upper range values.

DP of last digit will blink to indicate that the value can be changed. Use Inc/Shift key to correct the displayed reading to the desired process value and press MENU key. The controller will display message CAlt (wait) in the PV display to indicate that it is doing the necessary calculations.
When the calculations are over, the new calibration values are stored automatically.

PV shows the message SPAN (calibration SPAN). PV display shows process value corresponding to input sensor value with old calibration data. Feed sensor input using a calibrator, such that process value is close to sensor's upper range value. Use Inc/Shift key to arrive at the desired process value. Press MENU key to register the changes.
The controller will display message CAlt (wait) in the PV display to indicate that it is doing the necessary calculations. Depending on the situation, this process may take few seconds to calibrate. Zero and Span calibration is over

In case, the controller cannot complete the calibration due to any reason, it will hold previous calibration parameters. Calibration for input sensor is over.

**Retransmission output calibration (Voltage/current output):-**

Press set key repeatedly, till PV display shows message rtr .2 (retransmission output zero calibration).

SV display shows the value being outputted on Retransmission output terminals. Measure the value using a highly accurate digital multi meter. Use Inc/Shift key to correct the displayed reading to the measured value. Press ENT key. The controller will store zero calibration value. Press MENU key to calibrate retransmission output span calibration menu.

PV shows the message rtr .5 (retransmission output span calibration). SV display shows the value being outputted on retransmission output terminals. Measure the value. Use Inc/Shift key to correct the displayed reading to the measured value. Press ENT key. When the calculations are over, the new calibration values are stored automatically. Calibration for Retransmission output is over. Press MENU key to calibrate other parameters or press Escape key to come out to normal operation.

**Group Calibration Detail:-**

| Group NO | Input type | Calibration for input |
|---|---|---|
| 1 | E,J,K,T,N,0-75mv,0-100mv | Either of any input |
| 2 | Pt-100(RTD) | Specific input |
| 3 | B,R,S,-10 to 20mv | Either of any input |
| 4 | 0-2V,0.4-2V,4-20mamp,0-20mamp | Either of any input |
| 5 | 0-10V,0-5v,1-5V | Either of any input |

**NOTE:**

If you calibrate any input from any group i.e. I/P E-TC from Group – 1 than calibration is not required for other input types from Group-1.

# 9. Communication:

The MODBUS Communications protocol as RS-485 or RS-232 interface module is installed. Only RTU mode is supported. Data is transmitted as 8-bit binary bytes with 1 start bit, 1/2 stop bit and optional parity checking (None, Even, Odd). Baud rate may be set to 9600 and 19200.

**Function code use for Modbus:**

| CODE | NAME | Function |
|---|---|---|
| 01 | Write Coil Status | Use to write output and input status |
| 03 | Read Holding registers | Use to read PV for 8-channels |
| 04 | Read input registers | Use to read programmable registers |
| 05 | Force Single Coil | Use to set or reset the coil |
| 06 | Preset Single register | Use to write programmable register |

**Exception responses for Modbus:**

| Code | Name | Meaning |
|---|---|---|
| 01 | ILLEGAL FUNCTION | The function code received in the query is not an allowable action for the slave. If a Poll Program Complete command was issued, this code indicates that no program function preceded it. |
| 02 | ILLEGAL DATA ADDRESS | The data address received in the query is not an allowable address for the slave |
| 03 | ILLEGAL DATA VALUE | A value contained in the query data field is not an allowable value for the slave |
| 06 | Slave Device Busy | When Master device write some parameters to Slave device If slave device busy it will send 06 code to indicate slave device is busy. |

**Modbus Parameter Details for Holding Register:**

**Modbus values for OPEN, OVER, UNDER and SKIP Conditions:**

| SR.NO. | Parameter | Absolute Address | Parameter Type | Min Value | Max Value | Access Type |
|---|---|---|---|---|---|---|
| 1 | PV Channel - 1 | 30001 | INT | - | - | R |
| 2 | PV Channel – 2 | 30002 | INT | - | - | R |
| 3 | PV Channel – 3 | 30003 | INT | - | - | R |
| 4 | PV Channel – 4 | 30004 | INT | - | - | R |
| 5 | PV Channel – 5 | 30005 | INT | - | - | R |
| 6 | PV Channel – 6 | 30006 | INT | - | - | R |
| 7 | PV Channel – 7 | 30007 | INT | - | - | R |
| 8 | PV Channel – 8 | 30008 | INT | - | - | R |
| 9 | Ambient | 30009 | INT | - | - | R |

| SR. NO. | Parameter | Value |
|---|---|---|
| 1 | Open sensor | 32767 |
| 2 | Over reading | 32766 |
| 3 | Under reading | 32765 |
| 4 | Skip Channel | 32764 |

**Modbus Parameter Details for Holding Register:**

| SR. NO. | Parameter | Absolute Address | Parameter Type | Min Value | Max Value | Access Type | NOTE |
|---|---|---|---|---|---|---|---|
| 1 | SP.1 CH – 1 | 40001 | INT | Refer T-1 | Refer T-1 | R/W | |
| 2 | SP.1 CH – 2 | 40002 | INT | Refer T-1 | Refer T-1 | R/W | |
| 3 | SP.1 CH – 3 | 40003 | INT | Refer T-1 | Refer T-1 | R/W | |
| 4 | SP.1 CH – 4 | 40004 | INT | Refer T-1 | Refer T-1 | R/W | |
| 5 | SP.1 CH – 5 | 40005 | INT | Refer T-1 | Refer T-1 | R/W | |
| 6 | SP.1 CH – 6 | 40006 | INT | Refer T-1 | Refer T-1 | R/W | |
| 7 | SP.1 CH – 7 | 40007 | INT | Refer T-1 | Refer T-1 | R/W | |
| 8 | SP.1 CH – 8 | 40008 | INT | Refer T-1 | Refer T-1 | R/W | |
| 9 | SP.2 CH- 1 | 40009 | INT | Refer T-1 | Refer T-1 | R/W | |
| 10 | SP.2 CH- 2 | 40010 | INT | Refer T-1 | Refer T-1 | R/W | |
| 11 | SP.2 CH- 3 | 40011 | INT | Refer T-1 | Refer T-1 | R/W | |
| 12 | SP.2 CH- 4 | 40012 | INT | Refer T-1 | Refer T-1 | R/W | |
| 13 | SP.2 CH- 5 | 40013 | INT | Refer T-1 | Refer T-1 | R/W | |
| 14 | SP.2 CH- 6 | 40014 | INT | Refer T-1 | Refer T-1 | R/W | |
| 15 | SP.2 CH- 7 | 40015 | INT | Refer T-1 | Refer T-1 | R/W | |
| 16 | SP.2 CH- 8 | 40016 | INT | Refer T-1 | Refer T-1 | R/W | |
| 17 | HYS CH – 1 | 40017 | INT | 1 | 250 | R/W | |
| 18 | HYS CH – 2 | 40018 | INT | 1 | 250 | R/W | |
| 19 | HYS CH – 3 | 40019 | INT | 1 | 250 | R/W | |
| 20 | HYS CH – 4 | 40020 | INT | 1 | 250 | R/W | |
| 21 | HYS CH – 5 | 40021 | INT | 1 | 250 | R/W | |
| 22 | HYS CH – 6 | 40022 | INT | 1 | 250 | R/W | |
| 23 | HYS CH – 7 | 40023 | INT | 1 | 250 | R/W | |
| 24 | HYS CH – 8 | 40024 | INT | 1 | 250 | R/W | |
| 25 | INPUT TYPE CH - 1 | 40025 | INT | Refer T-1 | Refer T-1 | R/W | |
| 26 | INPUT TYPE CH - 2 | 40026 | INT | Refer T-1 | Refer T-1 | R/W | |
| 27 | INPUT TYPE CH - 3 | 40027 | INT | Refer T-1 | Refer T-1 | R/W | |
| 28 | INPUT TYPE CH - 4 | 40028 | INT | Refer T-1 | Refer T-1 | R/W | |
| 29 | INPUT TYPE CH - 5 | 40029 | INT | Refer T-1 | Refer T-1 | R/W | |
| 30 | INPUT TYPE CH - 6 | 40030 | INT | Refer T-1 | Refer T-1 | R/W | |
| 31 | INPUT TYPE CH - 7 | 40031 | INT | Refer T-1 | Refer T-1 | R/W | |
| 32 | INPUT TYPE CH - 8 | 40032 | INT | Refer T-1 | Refer T-1 | R/W | |
| 33 | SPAN CH - 1 | 40033 | INT | Refer T-1 | Refer T-1 | R/W | |
| 34 | SPAN CH - 2 | 40034 | INT | Refer T-1 | Refer T-1 | R/W | |
| 35 | SPAN CH - 3 | 40035 | INT | Refer T-1 | Refer T-1 | R/W | |
| 36 | SPAN CH - 4 | 40036 | INT | Refer T-1 | Refer T-1 | R/W | |
| 37 | SPAN CH - 5 | 40037 | INT | Refer T-1 | Refer T-1 | R/W | |
| 38 | SPAN CH - 6 | 40038 | INT | Refer T-1 | Refer T-1 | R/W | |
| 39 | SPAN CH - 7 | 40039 | INT | Refer T-1 | Refer T-1 | R/W | |
| 40 | SPAN CH - 8 | 40040 | INT | Refer T-1 | Refer T-1 | R/W | |

| SR. NO. | Parameter | Absolute Address | Parameter Type | Min Value | Max Value | Access Type | NOTE |
|---|---|---|---|---|---|---|---|
| 41 | ZERO CH - 1 | 40041 | INT | Refer T-1 | Refer T-1 | R/W | |
| 42 | ZERO CH - 2 | 40042 | INT | Refer T-1 | Refer T-1 | R/W | |
| 43 | ZERO CH - 3 | 40043 | INT | Refer T-1 | Refer T-1 | R/W | |
| 44 | ZERO CH - 4 | 40044 | INT | Refer T-1 | Refer T-1 | R/W | |
| 45 | ZERO CH - 5 | 40045 | INT | Refer T-1 | Refer T-1 | R/W | |
| 46 | ZERO CH - 6 | 40046 | INT | Refer T-1 | Refer T-1 | R/W | |
| 47 | ZERO CH - 7 | 40047 | INT | Refer T-1 | Refer T-1 | R/W | |
| 48 | ZERO CH - 8 | 40048 | INT | Refer T-1 | Refer T-1 | R/W | |
| 49 | Decimal Point CH - 1 | 40049 | INT | 0 | 3 | R/W | |
| 50 | Decimal Point CH - 2 | 40050 | INT | 0 | 3 | R/W | |
| 51 | Decimal Point CH - 3 | 40051 | INT | 0 | 3 | R/W | |
| 52 | Decimal Point CH - 4 | 40052 | INT | 0 | 3 | R/W | |
| 53 | Decimal Point CH - 5 | 40053 | INT | 0 | 3 | R/W | |
| 54 | Decimal Point CH - 6 | 40054 | INT | 0 | 3 | R/W | |
| 55 | Decimal Point CH - 7 | 40055 | INT | 0 | 3 | R/W | |
| 56 | Decimal Point CH - 8 | 40056 | INT | 0 | 3 | R/W | |
| 57 | RLY-Logic.1 | 40057 | INT | 0 | 1 | R/W | |
| 58 | RLY-Logic.2 | 40058 | INT | 0 | 1 | R/W | |
| 59 | RLY-Logic.3 | 40059 | INT | 0 | 1 | R/W | |
| 60 | RLY-Logic.4 | 40060 | INT | 0 | 1 | R/W | |
| 61 | RLY-Function.1 | 40061 | INT | 0 | 1 | R/W | |
| 62 | RLY-Function.2 | 40062 | INT | 0 | 1 | R/W | |
| 63 | RLY-Function.3 | 40063 | INT | 0 | 1 | R/W | |
| 64 | RLY-Function.4 | 40064 | INT | 0 | 1 | R/W | |
| 65 | RLY-Delay.1 | 40065 | INT | 1 | 99 | R/W | |
| 66 | RLY-Delay.2 | 40066 | INT | 1 | 99 | R/W | |
| 67 | RLY-Delay.3 | 40067 | INT | 1 | 99 | R/W | |
| 68 | RLY-Delay.4 | 40068 | INT | 1 | 99 | R/W | |
| 69 | RLY-OpenSensor.1 | 40069 | INT | 0 | 1 | R/W | |
| 70 | RLY-OpenSensor.2 | 40070 | INT | 0 | 1 | R/W | |
| 71 | RLY-OpenSensor.3 | 40071 | INT | 0 | 1 | R/W | |
| 72 | RLY-OpenSensor.4 | 40072 | INT | 0 | 1 | R/W | |
| 73 | RLY-Map CH - 1 | 40073 | INT | 0 | 4 | R/W | |
| 74 | RLY-Map CH - 2 | 40074 | INT | 0 | 4 | R/W | |
| 75 | RLY-Map CH - 3 | 40075 | INT | 0 | 2/4 | R/W | |
| 76 | RLY-Map CH - 4 | 40076 | INT | 0 | 2/4 | R/W | |
| 77 | RLY-Map CH - 5 | 40077 | INT | 0 | 2/4 | R/W | |
| 78 | RLY-Map CH - 6 | 40078 | INT | 0 | 2/4 | R/W | |
| 79 | RLY-Map CH - 7 | 40079 | INT | 0 | 2/4 | R/W | |
| 80 | RLY-Map CH - 8 | 40080 | INT | 0 | 2/4 | R/W | |
| 81 | RLY-Type.1 | 40081 | INT | 0 | 2/4 | R/W | |
| 82 | RLY-Type.2 | 40082 | INT | 0 | 2/4 | R/W | |
| 83 | RLY-Type.3 | 40083 | INT | 0 | 2/4 | R/W | |
| 84 | RLY-Type.4 | 40084 | INT | 0 | 2/4 | R/W | |
| 85 | SKIP-Channel CH - 1 | 40085 | INT | 0 | 1 | R/W | |
| 86 | SKIP-Channel CH - 2 | 40086 | INT | 0 | 1 | R/W | |
| 87 | SKIP-Channel CH - 3 | 40087 | INT | 0 | 1 | R/W | |
| 88 | SKIP-Channel CH - 4 | 40088 | INT | 0 | 1 | R/W | |
| 89 | SKIP-Channel CH - 5 | 40089 | INT | 0 | 1 | R/W | |
| 90 | SKIP-Channel CH - 6 | 40090 | INT | 0 | 1 | R/W | |
| 91 | SKIP-Channel CH - 7 | 40091 | INT | 0 | 1 | R/W | |
| 92 | SKIP-Channel CH - 8 | 40092 | INT | 0 | 1 | R/W | |

| SR. NO. | Parameter | Absolute Address | Parameter Type | Min Value | Max Value | Access Type | NOTE |
|---|---|---|---|---|---|---|---|
| 93 | RLY Latch | 40093 | INT | 0 | 1 | R/W | |
| 94 | RLY Group | 40094 | INT | 0 | 1 | R/W | |
| 95 | Scan Rate | 40095 | INT | 1 | 250 | R/W | |
| 96 | Auto CJC | 40096 | INT | 0 | 1 | R/W | |
| 97 | Fix CJC | 40097 | INT | 0 | 600 | R/W | |
| 98 | Machine ID | 40098 | INT | 1 | 247 | R/W | |
| 99 | Baud Rate | 40099 | INT | 0 | 1 | R/W | |
| 100 | Parity/Stop Bit | 40100 | INT | 0 | 3 | R/W | |
| 101 | Timeout | 40101 | INT | 10 | 60 | R/W | |
| 102 | PV Scale Retransmission | 40102 | INT | 0 | 1 | R/W | |
| 103 | Retransmission Type | 40103 | INT | 0 | 4 | R/W | |
| 104 | Retransmission Direction | 40104 | INT | 0 | 1 | R/W | |
| 105 | Retransmission CH - 1 | 40105 | INT | 0 | 1 | R/W | |
| 106 | Retransmission CH - 2 | 40106 | INT | 0 | 1 | R/W | |
| 107 | Retransmission CH - 3 | 40107 | INT | 0 | 1 | R/W | |
| 108 | Retransmission CH - 4 | 40108 | INT | 0 | 1 | R/W | |
| 109 | Retransmission CH - 5 | 40109 | INT | 0 | 1 | R/W | |
| 110 | Retransmission CH - 6 | 40110 | INT | 0 | 1 | R/W | |
| 111 | Retransmission CH - 7 | 40111 | INT | 0 | 1 | R/W | |
| 112 | Retransmission CH - 8 | 40112 | INT | 0 | 1 | R/W | |
| 113 | Retransmission Value | 40113 | | 0 | 1 | R/W | |
| 114 | Retransmission Channel selection | 40114 | INT | 1 | 8 | R/W | |
| 115 | Password | 40115 | INT | 0 | 9999 | R/W | |
| 116 | Future use | | | | | | |
| 117 | Future use | | | | | | |
| 118 | Future use | | | | | | |

**NOTE:** 1) For fix input type, Modbus allow to write Input type, Span, Zero and Decimal point for only First channel. For other channels Input type, Span, Zero and Decimal point set according to First channel.

2) For Retransmission output, Modbus address 40105 to 40113 is applicable only for Fix input type.

## Modbus Parameter Details for Read Output Status Register:

| SR. NO. | Parameter | Absolute Address | Parameter Type | Access Type |
|---|---|---|---|---|
| 1 | Alarm.1 Channel-1 | 1 | BIT | R |
| 2 | Alarm.1 Channel-2 | 2 | BIT | R |
| 3 | Alarm.1 Channel-3 | 3 | BIT | R |
| 4 | Alarm.1 Channel-4 | 4 | BIT | R |
| 5 | Alarm.1 Channel-5 | 5 | BIT | R |
| 6 | Alarm.1 Channel-6 | 6 | BIT | R |
| 7 | Alarm.1 Channel-7 | 7 | BIT | R |
| 8 | Alarm.1 Channel-8 | 8 | BIT | R |
| 9 | Alarm.2 Channel-1 | 9 | BIT | R |
| 10 | Alarm.2 Channel-2 | 10 | BIT | R |
| 11 | Alarm.2 Channel-3 | 11 | BIT | R |
| 12 | Alarm.2 Channel-4 | 12 | BIT | R |
| 13 | Alarm.2 Channel-5 | 13 | BIT | R |
| 14 | Alarm.2 Channel-6 | 14 | BIT | R |
| 15 | Alarm.2 Channel-7 | 15 | BIT | R |
| 16 | Alarm.2 Channel-8 | 16 | BIT | R |
| 17 | RELAY STATUS-1 | 17 | BIT | R |
| 18 | RELAY STATUS-2 | 18 | BIT | R |
| 19 | RELAY STATUS-3 | 19 | BIT | R |
| 20 | RELAY STATUS-4 | 20 | BIT | R |
| 21 | Auto/Manual Mode | 21 | BIT | R/W |
| 22 | Acknowledge For Relay | 22 | BIT | W |
| 23 | Unused | - | - | - |
| 24 | Unused | - | - | - |

**NOTE:** For Auto/Manual Mode, to set Manual mode bit value = 1 and to set Auto mode bit value = 0.
For Acknowledgement function, to give acknowledge for relay bit value = 1.

## INPUT TYPE SELECTION TABLE:

| Input Type | I/P no | Type Display | Zero | Span | Resolution |
|---|---|---|---|---|---|
| E | 1 | E tc | -200 | 1000 | 0.1°C |
| J | 2 | J tc | -200 | 1200 | 0.1°C |
| K | 3 | P tc | -200 | 1370 | 0.1°C |
| T | 4 | t tc | -200 | 400 | 0.1°C |
| B | 5 | b tc | 450 | 1800 | 1°C |
| R | 6 | r tc | 0 | 1750 | 1°C |
| S | 7 | S tc | 0 | 1750 | 1°C |
| N | 8 | n tc | 0 | 1300 | 0.1°C |
| RTD | 9 | rtd | -199.9 | 850.0 | 0.1°C |
| -10 to 20mv | 10 | -10.20 | -1999 | 9999 | 1 Count |
| 0-75mV | 11 | 0-75 | -1999 | 9999 | |
| 0-100mV | 12 | 0-100 | -1999 | 9999 | |
| 0 to 2V | 13 | 0-2u | -1999 | 9999 | |
| 0.4 to 2V | 14 | 0.4-2u | -1999 | 9999 | |
| 4 TO 20mAmp | 15 | 4-20 | -1999 | 9999 | |
| 0 to 20 mAmp | 16 | 0-20 | -1999 | 9999 | |
| 0-5V | 17 | 0-5u | -1999 | 9999 | |
| 1-5V | 18 | 1-5u | -1999 | 9999 | |
| 0-10V | 19 | 0-10u | -1999 | 9999 | |

### Relay Direction:

| Modbus Index | Parameter Value |
|---|---|
| 0 | Normal |
| 1 | Fail Safe |

### Relay Function:

| Modbus Index | Parameter Value |
|---|---|
| 0 | Alarm |
| 1 | Trip |

### Relay Selection for Open sensor:

| Modbus Index | Parameter Value |
|---|---|
| 0 | Down |
| 1 | Up |

### Relay Group - 4 selections:

| Modbus Index | Parameter Value |
|---|---|
| 0 | None |
| 1 | G-1(RELAY – 1) |
| 2 | G-2(RELAY – 2) |
| 3 | G-3(RELAY – 3) |
| 4 | G-4(RELAY – 4) |

### Relay Group 2 Channel selections:

| Modbus Index | Parameter Value |
|---|---|
| 0 | None |
| 1 | G - 1(RELAY 1 & 3) |
| 2 | G – 2(RELAY 2 & 4) |

### Relay Group - 4 Type selections:

| Modbus Index | Parameter Value |
|---|---|
| 0 | Low ON |
| 1 | High ON |

### Relay Group -2 Type selection:

| Modbus Index | Parameter Value |
|---|---|
| 0 | High/Very High |

| | |
|---|---|
| 1 | Low/Very Low |
| 2 | High/LOW |

**Relay Latch selection:**

| Modbus Index | Parameter Value |
|---|---|
| 0 | OFF |
| 1 | ON |

**Relay per Group Selection:**

| Modbus Index | Parameter Value |
|---|---|
| 0 | Relay Per Group – 1 |
| 1 | Relay Per Group – 2 |

**Baud Rate Selection for Communication:**

| Modbus Index | Parameter Value |
|---|---|
| 0 | 9600bps |
| 1 | 19.2kpbs |

**Parity/Stop Bit Selection:**

| Modbus Index | Parameter Value |
|---|---|
| 0 | Parity-None/Stop Bit - 1 |
| 1 | Parity-None/Stop Bit - 2 |
| 2 | Parity Odd/Stop Bit – 1 |
| 3 | Parity Even/Stop Bit – 1 |

**Retransmission OPEN sensor Scale:**

| Modbus Index | Parameter Value |
|---|---|
| 0 | Down |
| 1 | Up |

**Retransmission Type selection:**

| Modbus Index | Parameter Value |
|---|---|
| 0 | 0 – 20mAmp |
| 1 | 4 – 20mAmp |
| 2 | 0 – 5V |
| 3 | 1 – 5V |
| 4 | 0 – 10V |

**Retransmission Direction:**

| Modbus Index | Parameter Value |
|---|---|
| 0 | Reverse |
| 1 | Direct |

**Retransmission Value:**

| Modbus Index | Parameter Value |
|---|---|
| 0 | Minimum |
| 1 | Maximum |

# 10. MISCELLENIOUS

## PV INPUT STATUS DISPLAY DURING BURNOUT CONDITION:

| Input type | Display Message |
|---|---|
| TC-E | OPEN(oPEn) |
| TC-J | OPEN |
| TC-K | OPEN |
| TC-T | OPEN |
| TC-N | OPEN |
| TC-B | OPEN |
| TC-R | OPEN |
| TC-S | OPEN |
| PT 100(RTD) | OPEN |
| 0-10V DC | OPEN |
| 0 to 5V DC | OPEN |
| 1 to 5V DC | OPEN |
| 0 to 2V DC | OPEN |
| 0.4 to 2V DC | OPEN |
| 0 to 20mAmp | PV LOW |
| 4 to 20mAmp | PV LOW |
| -10 to 20mV DC | OPEN |
| 0-100mV DC | OPEN |
| 0-75mV DC | OPEN |

**Table 1**

**Note:** If set PV_low/PV_high for input type is less then maximum value of zero and span for then process value will display readings above 5% of display range, then after it will show ouEr/Undr (OVER/UNDER) message until value crosses maximum value of Sensor range. Process value greater then maximum value of zero/span then display will show oPEn (OPEN) message. Retransmission o/p will follow 5% of display range and then it will give fixed o/p depending up on OPEN sensor selection. In case of linear inputs scaling is applied then during OPEN sensor condition it may not show oPEn (OPEN) message instead it will show either ouEr/Undr (OVER/UNDER).

**RETRAMISSION OUTPUT TABLE FOR OPEN /OVER /UNDER CONDITION:**

| RETRASMISSION | VARIABLE | SCALE | ACTION | OPEN | OVER | UNDER | ERROR |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| **4-20mamp** | PV | UP | DIR | 20.8 | 20.8 | 3.2 | - |
| | | | | | | | |
| | PV | DOWN | REV | 20.8 | 3.2 | 20.8 | - |
| | | | | | | | |
| | PV | UP | REV | 3.2 | 3.2 | 20.8 | - |
| | | | | | | | |
| | PV | DOWN | DIR | 3.2 | 20.8 | 3.2 | - |

**Table 2**

**NOTE: -** 1) For Retransmission output type 0-20mamp, 0-10v, 1-5v and 0-5v also applicable according to above table.

2) Also, 0-20mamp, 0-10v and 0-5v minimum output value will be 0mamp and 0v respectively.

3) For **Mix input type** any one channel can be selected as Retrasmission output. For **Fix input type** more than one channel can be selected for Retrasmission, but output depends on Maximum reading or Minimum reading from the no of channel Retrasmission output Maximum and Minimum can be selected from Level-3.