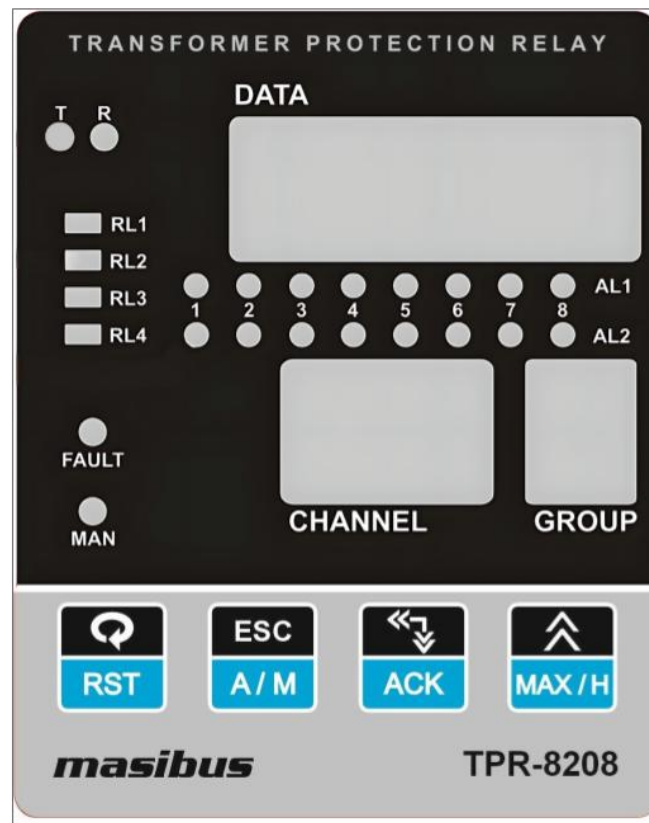


## User Manual

# Model TPR-8208 Transformer Protection Relay 8-Channel Scanner



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## **1. INTRODUCTION**

### **Foreword**

Thank you for purchasing TPR-8208 universal Scanner. This manual describes the basic functions and operation methods of TPR-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.

### **Trademarks**

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**Version Number** : 1.01 , July 2024.

### **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

## 2. HARDWARE SPECIFICATION DETAIL

### 2.1 Input Specification

<b>NO. OF CHANNEL</b>	4 or 8
<b>APPLICABLE STANDARDS</b>	DIN (ITS-90) for Thermocouple and RTD
<b>INPUT TYPE</b>	As specified in Table 1
<b>SAMPLING PERIOD PER INPUT</b>	100 ms for TC and Linear Input and 200 ms for RTD
<b>RESOLUTION</b>	17 bit
<b>BURNOUT DETECTION</b>	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.
<b>MEASUREMENT CURRENT</b>	1 m A
<b>INPUT IMPEDANCE</b>	>1 Mohm for thermocouple/ mV/RTD/Volts inputs & 100 ohms for mAmp input.
<b>NOISE REJECTION RATIO</b>	<ul style="list-style-type: none"> <li>• NMRR (Normal mode rejection ratio) &gt; 40 dB (50/60 Hz) or more</li> <li>• CMRR (Common mode rejection ratio) &gt;120 dB (50/60 Hz) or more</li> </ul>
<b>ALLOWABLE WIRING RESISTANCE FOR RTD</b>	Maximum 15 ohms/wire (Conductor resistance between three wires should be equal).
<b>MAXIMUM TEMPERATURE MODE</b>	Display Maximum Temperature of all Channels.
<b>MAXIMUM TEMPERATURE STORAGE</b>	Maximum Temperature logging at every 30 min interval.

**Table 1. Input types, their ranges, accuracy and resolution**

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	0.1°C
J	-200 to 1200°C		
K	-200 to 1370°C		
T	-200 to 400°C		
B	450 to 1800°C	±0.25% of instrument range ± 1 digit	1°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	0.1°C
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.

## 2.2 Output Specification

### 2.2.1 Digital Output - Relay

<b>NUMBER OF OUTPUTS</b>	4
<b>PURPOSE</b>	Alarm, Trip, Fan.
<b>OUTPUT SIGNAL</b>	Two terminals (C and NO) (Jumper selectable for NO or NC selection)
<b>RELAY CONTACT RATING</b>	250 VAC / 30 VDC @ 2A
<b>NO. OF RELAY OPERATION</b>	1 X 10 <sup>5</sup> @ rated current

### 2.2.2 Analog Output - Retransmission Output(Optional)

<b>NUMBER OF OUTPUTS</b>	1
<b>OUTPUT SIGNAL</b>	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)
<b>LOAD RESISTANCE</b>	500 ohms Max. Or less for current output. 3k or higher for voltage output
<b>OUTPUT ACCURACY</b>	±0.25% of span

## 2.3 Programming and Setting

<b>KEYPAD</b>	4-keys (Menu/Set/RST, Escape / A/M , Shift/Down/ ACK , Increment Key/Max Temperature Mode/Maximum Temperature High Capsense membrane keypad provided for modification of all control and functional parameters.
<b>MEMORY</b>	Non volatile, restored after power loss

## 2.4 Communication Specification

<b>NO. OF COMMUNICATION PORT</b>	1-RS485
<b>COMMUNICATION TYPE</b>	Half duplex/Asynchronous
<b>COMMUNICATION PROTOCOL</b>	MODBUS RTU (Baud rate and Parity bit are selectable). All parameters are Configurable through MODBUS Protocol.
<b>MAXIMUM NO. OF UNITS</b>	32
<b>COMMUNICATION ERROR DETECTION</b>	CRC Check

## 2.5 Display Specification

<b>DATA DISPLAY</b>	4-digits, 7-segment, Red, 0.56" character height
<b>CHANNEL NO. DISPLAY</b>	2-digits, 7-segment, Green , 0.56" character height

<b>RELAY GROUP DISPLAY</b>	1-digits, 7-segment, Red, 0.56" character height
<b>STATUS LEDs</b>	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.

## 2.6 Power Supply Specification

<b>RATED VOLTAGE</b>	85-265VAC-50/60Hz <sup>(1)</sup> / 100-300VDC or 18-36VDC (Optional)
<b>POWER CONSUMPTION</b>	Max. 15 VA

<sup>(1)</sup> Unit can also work on 120-360VDC Power Supply range.

## 2.7 Signal Isolation and Insulation Specification

<b>ISOLATION RATING</b>	Withstanding Voltage: 1) Between primary terminals <sup>(1)</sup> and secondary terminals <sup>(2)</sup> : 1500VAC for 1 minute 2) Between secondary terminals: 500V AC for 1 minute
<b>SIGNAL ISOLATION</b>	As specified in Table 2
<b>INSULATION RESISTANCE</b>	> 20 Mohms at 500V DC

**Table 2. Signal Isolation Specification**

Sr No	Signals	Signal Isolation
1	Power Input	Isolated from other input/output terminals and internal circuit
2	Analog Inputs	Not isolated from other analog input terminals and from the internal circuit. But isolated from other input/output terminals.
3	RS-485 Communication	Isolated from other input/output terminals and internal circuit
4	Relay contacts	Isolated between contact output terminals and from other Input/output terminals and internal circuit

## 2.8 Environmental Specification

<b>AMBIENT TEMPERATURE</b>	0 to 70°C
<b>STORAGE TEMPERATURE</b>	0 to 85°C
<b>HUMIDITY</b>	30% to 95% RH (Non-Condensing)
<b>TEMPERATURE COEFFICIENT</b>	FOR PV (Main input) less than 100ppm. FOR Retransmission less than 150ppm.
<b>INSTRUMENT WARM-UP TIME</b>	30 minutes after power on

### 3. PHYSICAL SPECIFICATION AND MOUNTING DETAILS

#### 3.1 Physical Specification for IP Enclosure

<b>MOUNTING METHOD</b>	Wall Mounting with the help of 4 NOS bolts of size M8
<b>UNIT</b>	mm
<b>WEIGHT</b>	Max. 4 Kg
<b>TYPE OF PROTECTION</b>	NEMA 4
<b>IP PROTECTION</b>	IP 65
<b>MATERIAL</b>	Enclosure and door: 1.6 mm Thick M.S. Sheet Metal Fabricated
<b>CASE COLOR</b>	Powder Coated
<b>ENCLOSURE DIMENSION</b>	200 mm (W) X 200 mm (H) X 120mm (D)
<b>CABLE ENTRY SIZE / NO</b>	PG11– 06 NOS

Note: \*Standard 6 nos. PG11 glands are supplied for 8 channel Scanner. In 8 channel scanner up to 12 nos.PG11 glands can be provided. If required then please consult factory.

Note : Check out the next page for IP enclosure Drawing



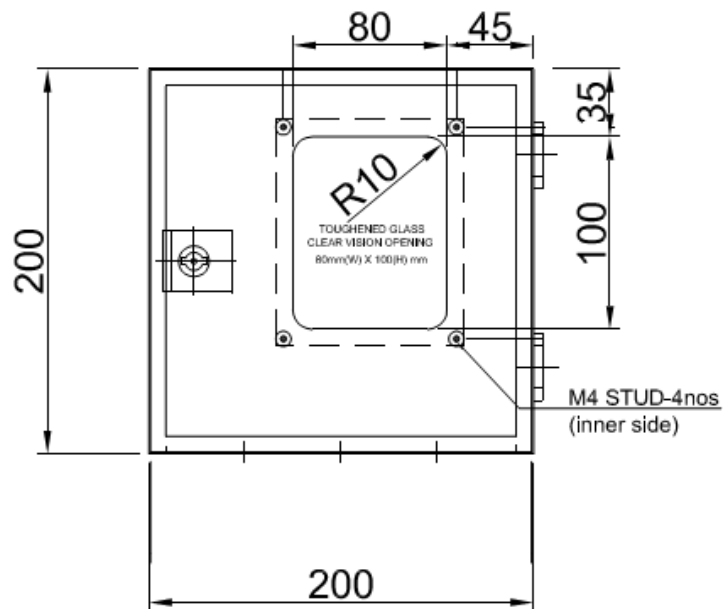


Figure 1. IP Enclosure Front View

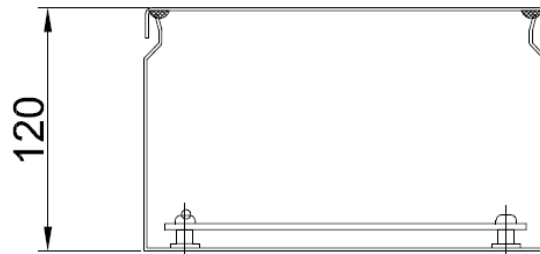


Figure 2. IP Enclosure Bottom View

## 4. FRONT PANEL DESCRIPTION

### 4.1 Front Panel Diagram

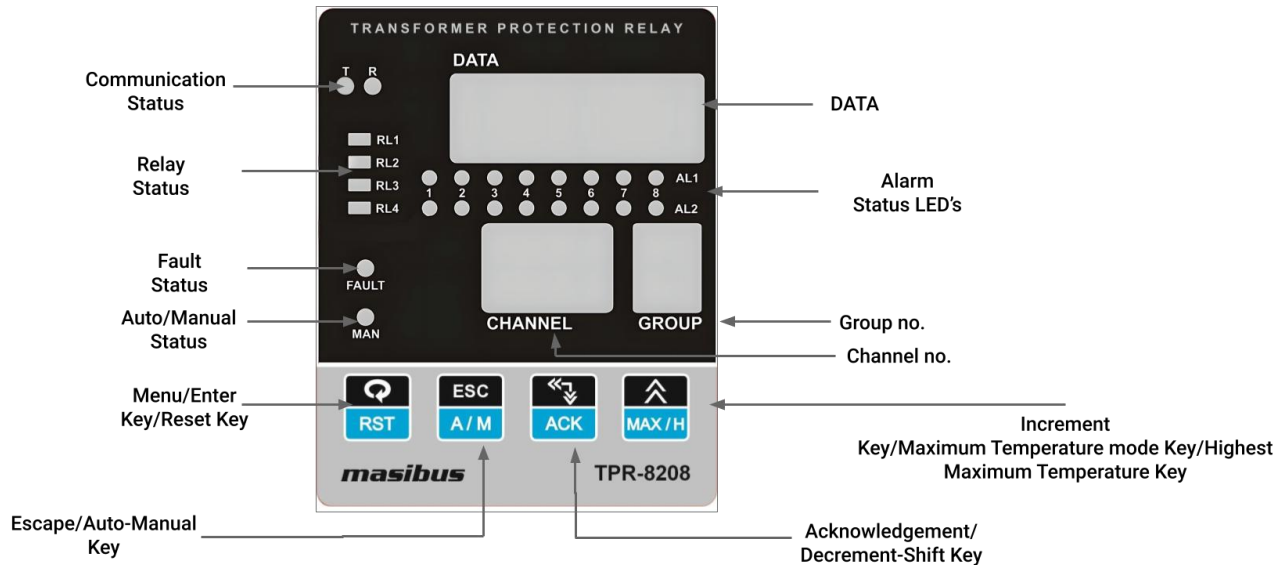






Figure 3 Front Panel for IP Enclosure

Table 3. Front Panel Description

Name of Part	Function
Process Value Display( <b>DATA window</b> )	Displays Process Value. Display Parameter Name When You Set Parameter. Displays Error Message When An Error Occurs.
Channel No. Display ( <b>CHANNEL</b> )	Displays Channel Number in run mode.
Group No. Display ( <b>GROUP</b> )	Displays Group Number for Relay Mapping.
Relay Indicator LED ( <b>RL1, RL2, RL3, &amp; RL4</b> )	When Respective Relay LED Lits (In Red).
Alarm1( <b>AL1</b> ) Indicator LEDs for Channel-1 to 8	When Alarm1 Occurs, Respective Alarm LED for Channel-1 to 8 will Lit (In Red).
Alarm1( <b>AL2</b> ) 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 ( <b>MAN</b> )	If LED is on, it indicates Manual mode and if LED is off Auto Mode.
Communication Indicator LED( <b>T, R</b> )	When Communication on, two LEDs blink.

## 4.2 Key Function Description

Keys	Operation
<b>MENU/ENTER KEY</b> 	<p>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. It is also used to Reset Maximum Temperature of channel in Maximum Temperature Mode.</p>
<b>ESCAPE / AUTO MANUAL KEY</b> 	<p>It is used to come out from any sub menu (various levels) to the run mode.</p> <p>In Run Mode, it can be used to switch between auto to manual mode and manual to auto mode.</p> <p>In Maximum Temperature mode, it can be used to switch between auto to manual mode and manual to auto mode.</p> <p>In Maximum Temperature mode, when long press ESC key for 5 Sec to exit Maximum Temperature Mode.</p>
<b>INCREMENT KEY</b> 	<p>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'.</p> <p>In Run Mode, when Inc key is long pressed for 5 sec then it will enter in to maximum temperature mode.</p> <p>In Maximum Temperature mode when Inc key is long pressed then it will display Highest Maximum Temperature channel and its value.</p>
<b>SHIFT /DECREMENT/ ACKNOWLEDGEMENT KEY</b> 	<p>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.</p> <p>In Run mode, it can be used to give Acknowledge for ALARM and TRIP.</p>

## 5. WIRING GUIDELINES

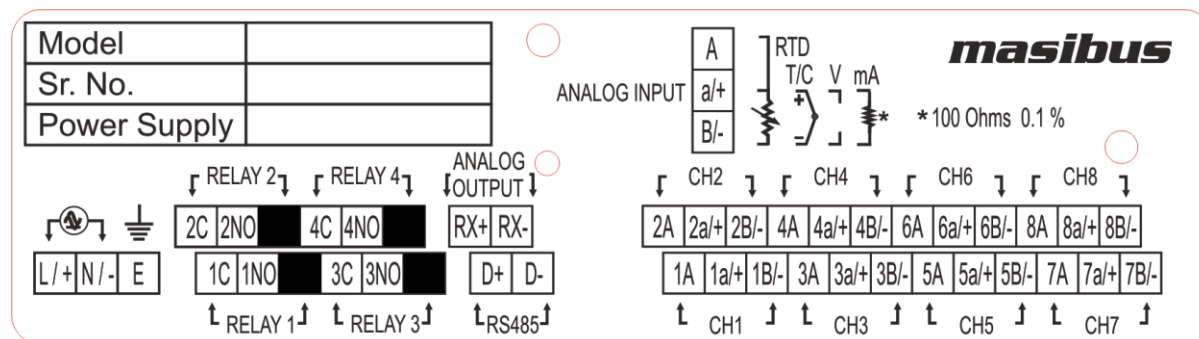


Figure 4 Terminal Connection Detail

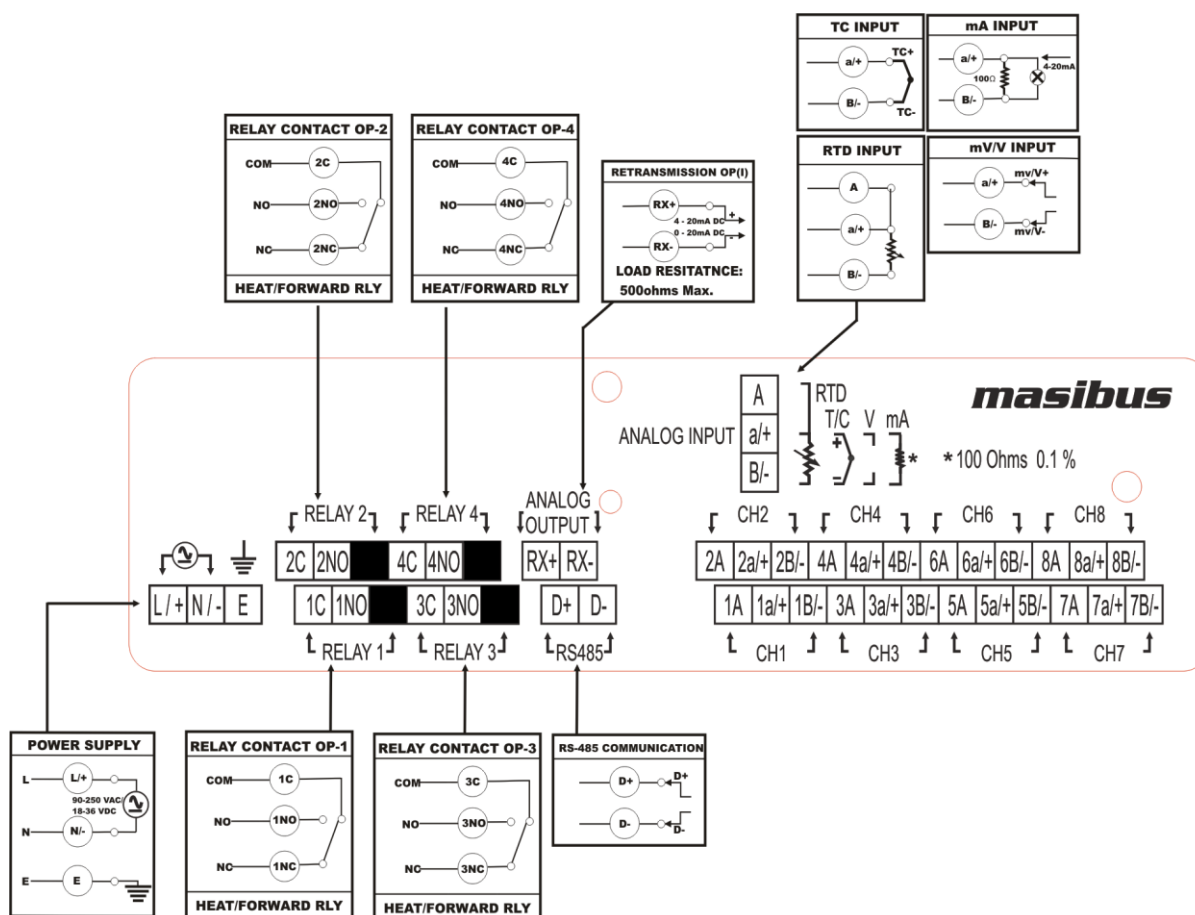


Figure 5 Wiring Diagram

## 5.1 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 – 1A, 2A , 3A, 4A, 5A, 6A, 7A or 8A** 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



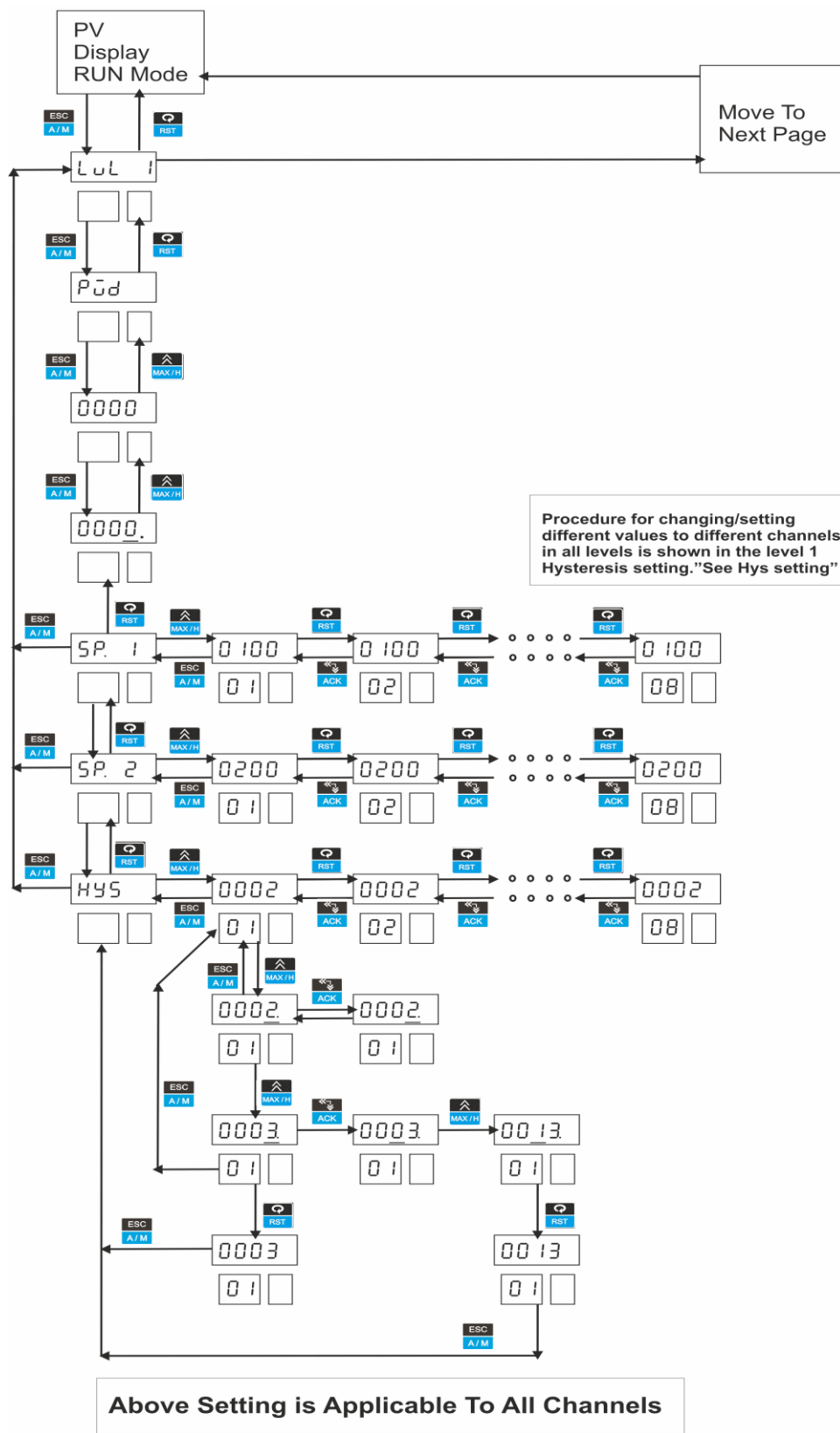


Figure 6 Level 1 Parameters

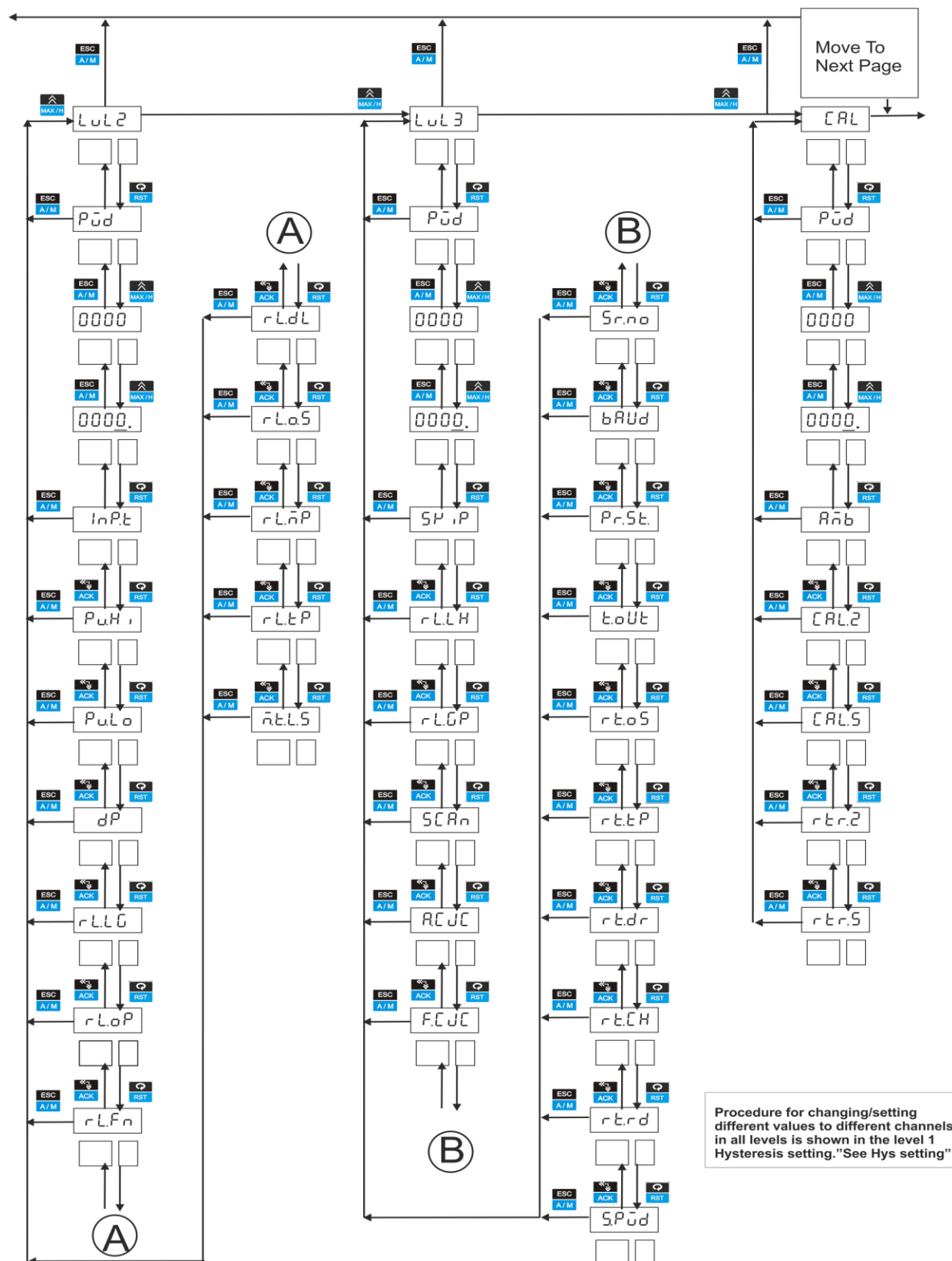
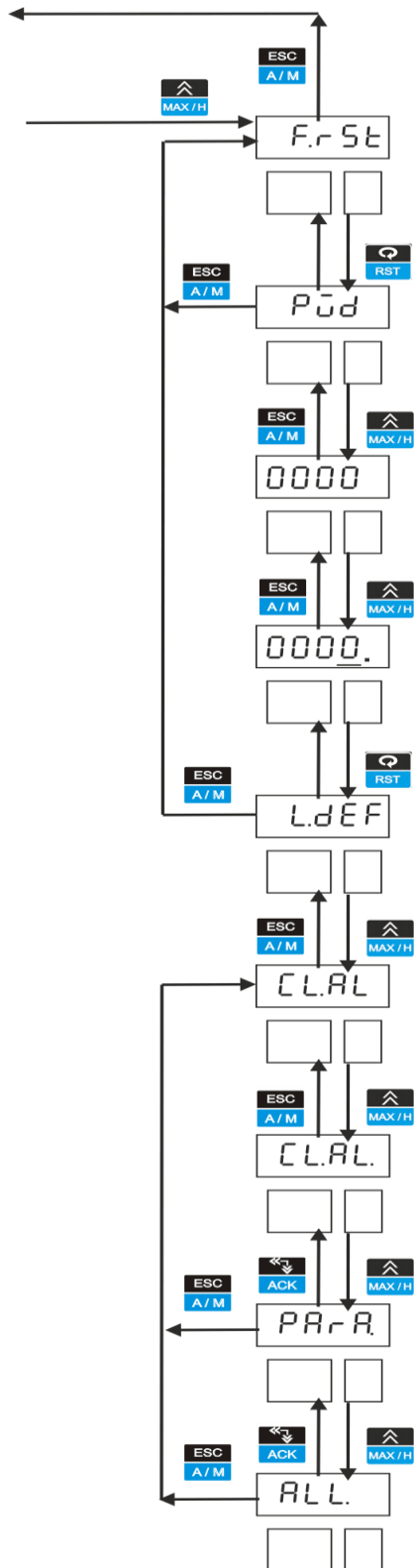


Figure 7 Level 2, Level 3 and Calibration Parameters





Procedure for changing/setting different values to different channels in all levels is shown in the level 1 Hysteresis setting."See Hys setting"

**Figure 8 Factory Reset Parameters**

## 6.2 Menu Parameters- In Detail

- **Run Mode :**

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 number scanning on display is stopped. By pressing increment key, we can change channel number manually.
- Press Shift/Decrement / ACK key in run mode, relay acknowledgement can be done.

- 1. **Maximum Temperature Mode:**

For entering in **Maximum Temperature Mode**, long press Inc key in RUN mode for 5 Sec.

Following parameters can view or change during Maximum Temperature Mode.

- Press A/M Key in **Maximum Temperature mode**, Channel number scanning on display is stopped. By pressing increment key, we can change channel number manually.
- To **Reset Channel Maximum Temperature** first enable Manual Mode then select channel with inc key then Long press Reset Key for 10 sec will reset Maximum Temperature to Range Low.
- To check **Highest Maximum Temperature** long press inc key for 5 sec in Auto mode then it will display highest maximum temperature channel and the Temperature value then Automatically return to Maximum Temperature mode.
- To Return to **Run Mode** long press esc key for 5 sec then it will return to Run Mode.

- **Other Modes :**

For entering in Menu, press Menu/Enter key in RUN mode. There are total Five levels in Menu. By pressing increment or decrement key, mode can be changed. To enter into any mode press Menu/enter key again.

1. Level 1(Programming Mode)
2. Level 2(Configuration mode)
3. Level 3(Configuration Mode)
4. Calibration Mode
5. Factory Reset Mode

The tables below show the description and menu detail of the all the modes. In general to enter into any menu Or to edit sub menu, press Menu/Enter key, to change the submenu parameter press increment or decrement key. To come out from any menu press Esc key.

### **Level – 1:-**

Pressing MENU key DATA window shows **LVL1** (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

**Table 4. Level 1 Parameters**

<b>LEVEL 1</b>				
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.	0150 (for all 8 channel)	Relay group is selected 2
SP.3 (SP.3)	Target Set point-3	SetPoint-3 for Channel 1 to 8.	0200 (for all 8 channel)	Relay group is selected 1
SP.4 (SP.4)	Target Set point-4	SetPoint-4 for Channel 1 to 8.	0250 (for all 8 channel)	Relay group is selected 1
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.

**Table 5. Level 2 Parameters**

<b>LEVEL 2:</b>				
Parameter (DATA Window)		Setting name and description	Default value	Shows only if
Symbol	Name			
Pwd (PWD)	Level-2 Password	0 to 9999	0000	-
Inp.t	PV Input Type (E, J, K, T Etc.)	Follow Table 3 (Input type for 1-8 channel)	K-TC (for all 8)	-

(inP.t)			channel)	
Pu.Hi (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)	-
Pu.Lo (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)	-
rL.IG (rL.LG)	Relay/OC Logic(Applicable for 4-RELAY)	<b>nrml / flsf</b> 0:Noraml 1:Fail Safe	Normal(for all 4 Relay)	-
RI.oP (rL.oP)	Relay Operation	<b>Al / Co</b> (Alarm / Control Output) 0:Alarm 1: Control Output	Alarm	-
rL.Fn (rL.Fn)	Relay/OC Function(Applicable for 4-RELAY)	<b>ALRM / TRiP</b> 0:ALARM 1:TRIP	Alarm(for all 4 Relay)	-
rL.dL (rL.dL)	Relay/OC Delay(Applicable for 4-RELAY)	1 to 99 seconds	1 second(for all 4 Relay)	-
rL.os (rL.o.S)	Relay/OC Open sensor(Applicable for 4-RELAY)	<b>up / DoWn</b> 0:DOWN 1:UP	Up Scale(for all 4 Relay)	-
rL.MP (rL.mp)	Relay/OC mapping (Applicable for 1 -8 Channel)	See Relay Configuration	Refer Note:1	-
rL.tp (rL.tp)	Relay/OC Group Type	See Relay Configuration	Refer Note:2	-
M.t.L.S	Maximum temperature Log Storage	<b>EN / DIS</b> 0:DISABLE 1:ENABLE	DIS-DISABLE EN-ENABLE	-

### **Relay Configuration:**

Relay configuration depends on selection of Relay group i.e. Relay Group 1 or group 2 or Relay group 4 in Level-3.

### **Relay Group - 1:**

If **relay group - 1** is selected, there will be only one group of relay. That group has four relays. **(G-1).**

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

#### **Example:**

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

#### **Note 1:**

1) 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)

### **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:**

2) Both Groups can not be selected for single Channel.

3) None means no group is selected for particular channel.

### **Relay/OC Type can be selected as shown below:**

Relay Group	Relay Type
G - 1	High/ Very High (H-VH) or

	Very Low /Low ( <b>VL-L</b> ) or Low/High ( <b>L-H</b> )
G - 2	High/ Very High ( <b>H-VH</b> ) or Very Low /Low ( <b>VL-L</b> ) or Low/High ( <b>L-H</b> )

### **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			✓		

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

Relay Group	Relay Type
G - 1	Low ON ( <b>L</b> ) or High ON ( <b>H</b> )
G - 2	Low ON ( <b>L</b> ) or High ON ( <b>H</b> )
G - 3	Low ON ( <b>L</b> ) or High ON ( <b>H</b> )
G - 4	Low ON ( <b>L</b> ) or High ON ( <b>H</b> )

### **Note:**

- 1) More than **one Group** can not be selected for single Channel.
- 2) None means no group is selected for particular Channel.
- 3) If **rL.oP** is set to **Co** then All relay will be assigned Channel no 1 to Channel No4.

Whenever **rL.oP** is set to **Co** then All relay will be assigned channelwise and all assignments are remain fixed. And Relay type

### **Example:**

CHANNEL NO	NONE	G -1	G -2	G -3	G -4
1		✓			
2			✓		
3				✓	
4					✓

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

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

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

**Maximum Temperature Logging (M.t.L.S):**

- If Maximum Temperature Logging is “Enable” then Maximum Temperature will be logged at every 30 minutes after enabling.

**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.

**Table 6. Level 3 Parameters**

<b>LEVEL 3:</b>				
Parameter (DATA Window)		Setting name and description	Default value	Shows only if
Symbol	Name			
Pwd (PWD)	Level-3 Password	0 to 9999	0000	-
skip (skip)	Channel skip/Unskip selection.	<b>yes / no</b> 0:NO 1:YES	0(for all 8 channel)	-
rL.LH (rL.LH)	Relay/OC Latch	<b>on / off</b> 0:OFF 1:ON	0	-
rL.GP (rL.GP)	Relay/OC Group	<b>RGP.4 / rGP.2 / rGP.1</b> 0:Relay Group-4 1:Relay Group-2 2:Relay Group-1	1	-
SCan (SCAn)	Scan Time	1 to 250 seconds	1	-
A.CJC (A.CJC)	Auto cold junction(Only applicable for TC input type	<b>yes / no</b> 0:NO 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	Communication		19.2k bps	-

(Baud)	Baud rate	<b>9600 / 19.2K</b> 0:(9600) – 9600 bps 1:(19.2K) –19.2 Kbps		
Pr.St (Pr.St)	Parity/Stop bit selection	<b>p.n.S.1 / P.nS.2 / P.o.s1 / P.ES.1</b> 0:(P.N.S.1)-parity none-stop bit-1 1:(P.N.S.2)-parity none - stop bit-2 2:(P.O.S.1)-parity odd -stop bit-1 3:(P.E.S.1)-parity even - stop bit-1	No parity /Stop bit - 2	
t.out (t.out)	Timeout for display back to Run Mode	10 to 100 Seconds	60	-
rT.os (rt.o.s)*	Retrasmission Open sensor	<b>up / DoWn</b> 0:DOWN 1:UP	1	-
Rt.tp (rt.tp)*	Retransmission Output Type	<b>0-20/4-20/ 0-5v/1-5v/ 0-10v</b> 0:(0-20) – 0-20mA 1:(4-20) – 4-20mA 2:(0 - 5) – 0 – 5volt 3:(1 - 5) – 1 – 5volt 4:(0 – 10) - 0 -10volt	1	-
rt.dr (rt.dr)*	Retransmission direction	<b>Dir / rev</b> 1:(dir) 0: (rev)	1	-
Rt.CH (rt.CH)*	Retransmission Channel	1 to 8 channel	1	-
Rt.rd (rt.rd)*	Retransmission Channel Value	<b>MAx / MIn</b> 1:(Max) 0: (Min)	1	-
s.pwd (S.PWD)	Password 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 **pwd** (PWD) message, press increment key twice to select password and then press MENU key to enter into Calibration.

**Table 7. Calibration Parameters**

<b>Calibration:</b>				
Parameter (DATA Window)		Setting name and description	Default value	Shows only if
Symbol	Name			
pwd (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.

**Table 8. Factory Reset Parameters**

<b>Factory Reset Mode:</b>				
Parameter (DATA window)		Setting name and description	Default value	Shows only if
Symbol	Name			
Pwd (Pwd)	Password	0 to 9999	-	-
L.def (L.dEF)	LOAD Default	<b>CAL\PARAM all</b> (CAL)\(PARAM)\(ALL) <b>CAL-</b> Only calibration set to default value <b>PARAM-</b> All parameters excluding calibration will set to default value <b>ALL-</b> Calibration and parameters will set to default value	-	-

## 7. RELAY OUTPUT

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:**

**Table 9. Alarm 1 and Alarm 2 Momentary Alarm Logic**

#### **ALARM 1**

#### **MOMENTARY ALARM**

(when in abnormal condition ack not pressed)

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

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

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

**Table 10 Alarm 1 and Alarm 2 Maintained Alarm Logic**

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

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

**Notes :**

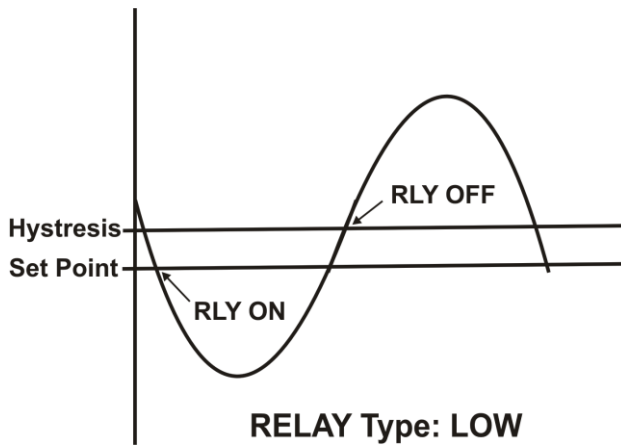
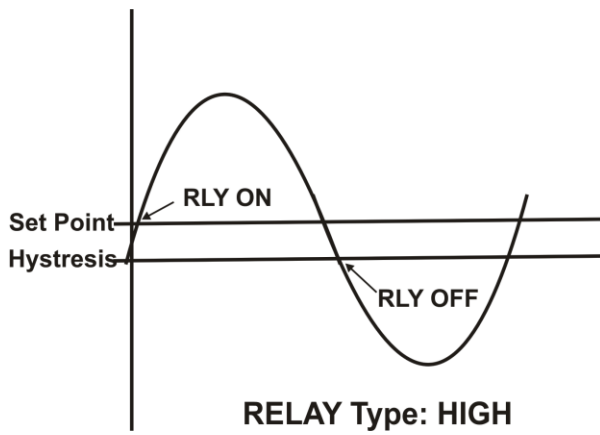
\* means normal condition after abnormal has occurred

\*\* means ack pressed in abnormal condition

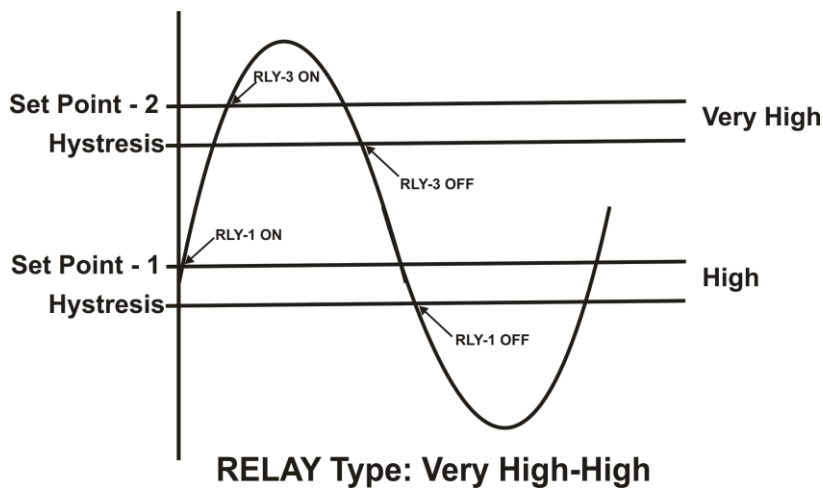
\*\*\* means ack pressed in normal condition after abnormal has already occurred.

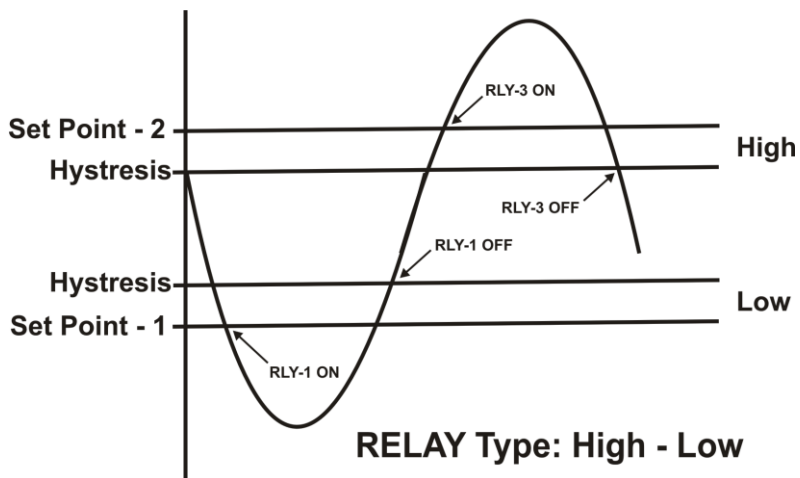
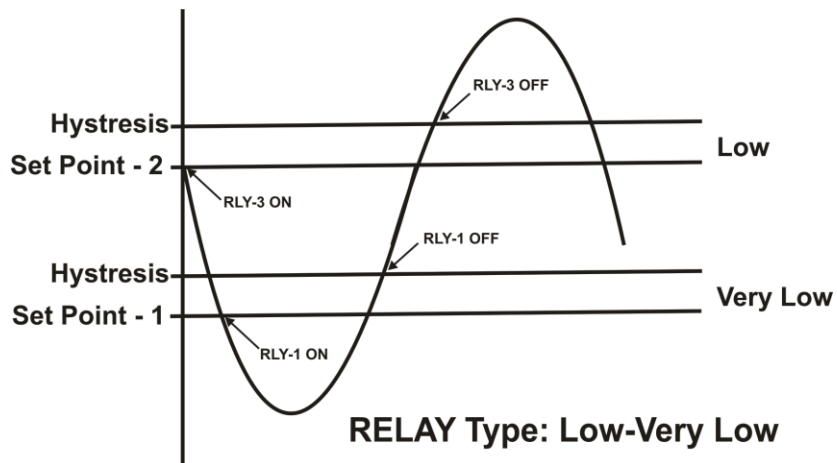
**Upon pressing Shift/Decrement key for 3 seconds, acknowledgement will be given for alarm and trip relay in abnormal condition.  
 Alarm Latch function applicable only for ALARM, there is no affect when TRIP Selected as a relay function LEVEL – 2.**

### **Basic RELAY/OC Function:**

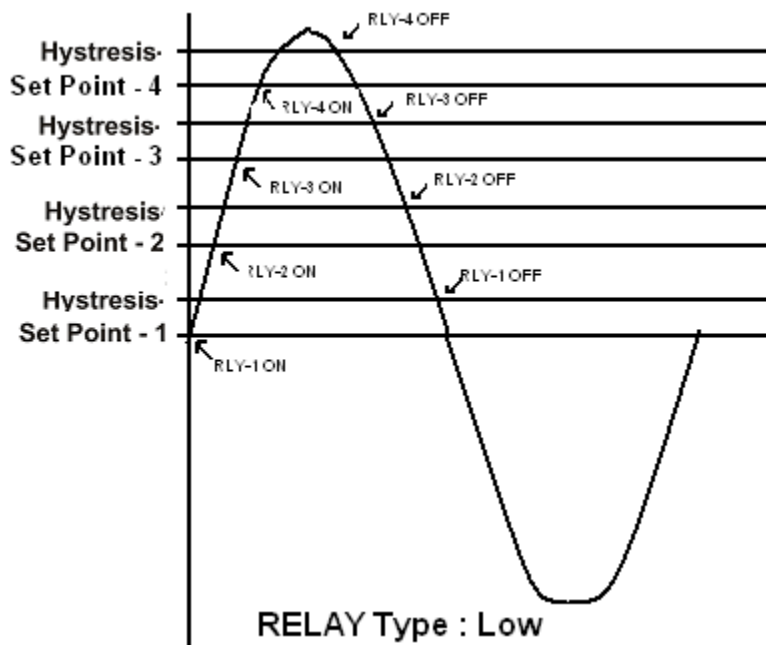
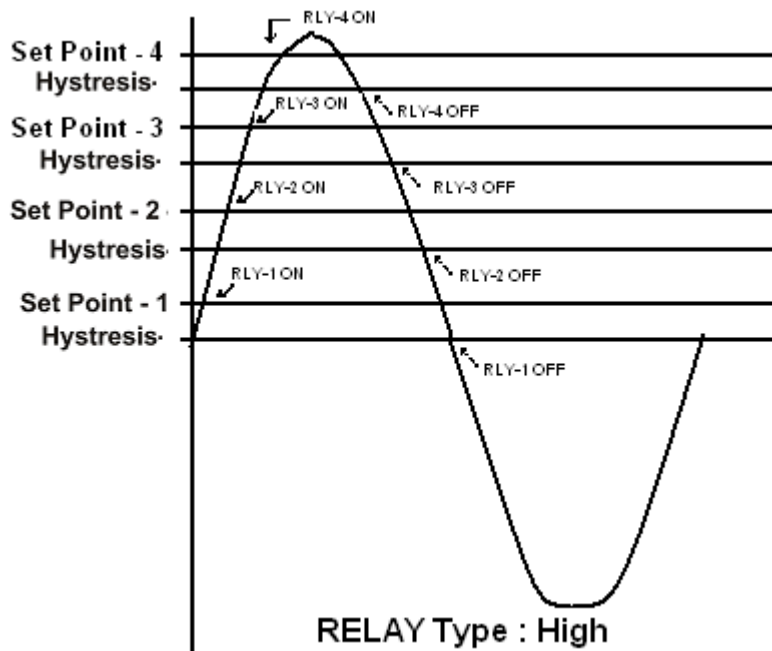


### **RELAY/OC GROUP - 4**





**RELAY/OC GROUP - 2**



**RELAY GROUP - 1**

### **Control Output (ON/OFF Control ) :-**

ON/OFF Controller is the simplest form of temperature control device. The output from the device is either on or off, with no middle state. An on-off controller will switch the output only when the temperature crosses the set point. For heating control, the output is on when the temperature is below the set point, and off above set point. Since the temperature crosses the set point to change the output stage, the process temperature will be cycling continually, going from below set point to above, and back below. In cases where this cycling occurs rapidly, and to prevent contactors and valves from getting damaged, an on-off differential, or "hysteresis," is added to the controller operations. This hysteresis assures, if temperature exceed set point by a certain amount before then only output will turn off or on again. On-Off hysteresis prevents the output from "chattering" or making fast, continual switches if the cycling above and below the set point occurs very rapidly.

Relay type High (H-ON):

For High type of set value, once process value reaches up to set point + Hysteresis value, relay will be ON after few seconds (as per relay delay) and it will be ON until process value goes down to Set point.

Relay type Low (L-ON):

For Low type of set value, once process value reaches down to set point - Hysteresis value relay will be ON after nearly few seconds (as per relay delay) and it will be ON until process value goes up toward Set point.

#### **NOTE:-**

**TPR-8208 has both Control Logic (ON-OFF) & Alarm Logic. If Control Logic (ON-OFF) is required, rloP in lml2 must be selected as Co.**

**Whenever Control Output(ON-OFF) logic is selected , all relays are mapped as shown in chapter no.6. As well as, relay latch is off and relay group is assigned as relay per group 1(rGP.4). In this logic, user cannot change relay mapping, relay latch and relay group and user cannot acknowledge relays.**



## 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 **wait** (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 **wait** (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) (Optional):**

Press set key repeatedly, till PV display shows message **rtr.Z** (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.S** (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.

**Table 11. 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. MODBUS COMMUNICATION DETAIL

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.

**Table 12. Function code used 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

**Table 13. 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.

**Table 14. Modbus values for OPEN, OVER, UNDER and SKIP Conditions**

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

**Table 15. Modbus Parameter Details for Process Value**

SR. NO.	Parameter	Absolute Address	Parameter Type	Min Value	Max Value	Access Type	NOTE
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	
10	Max Temp Channel - 1	30010	INT	-	-	R	
11	Max Temp Channel - 2	30011	INT	-	-	R	
12	Max Temp Channel - 3	30012	INT	-	-	R	
13	Max Temp Channel - 4	30013	INT	-	-	R	
14	Max Temp Channel - 5	30014	INT	-	-	R	
15	Max Temp Channel - 6	30015	INT	-	-	R	
16	Max Temp Channel - 7	30016	INT	-	-	R	
17	Max Temp Channel - 8	30017	INT	-	-	R	

**Table 16. 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 Table 18	Refer Table 18	R/W	
2	SP.1 CH - 2	40002	INT	Refer Table 18	Refer Table 18	R/W	
3	SP.1 CH - 3	40003	INT	Refer Table 18	Refer Table 18	R/W	
4	SP.1 CH - 4	40004	INT	Refer Table 18	Refer Table 18	R/W	
5	SP.1 CH - 5	40005	INT	Refer Table 18	Refer Table 18	R/W	
6	SP.1 CH - 6	40006	INT	Refer Table 18	Refer Table 18	R/W	
7	SP.1 CH - 7	40007	INT	Refer Table 18	Refer Table 18	R/W	
8	SP.1 CH - 8	40008	INT	Refer Table 18	Refer Table 18	R/W	
9	SP.2 CH- 1	40009	INT	Refer Table 18	Refer Table 18	R/W	
10	SP.2 CH- 2	40010	INT	Refer Table 18	Refer Table 18	R/W	
11	SP.2 CH- 3	40011	INT	Refer Table 18	Refer Table 18	R/W	
12	SP.2 CH- 4	40012	INT	Refer Table 18	Refer Table 18	R/W	
13	SP.2 CH- 5	40013	INT	Refer Table 18	Refer Table 18	R/W	
14	SP.2 CH- 6	40014	INT	Refer Table 18	Refer Table 18	R/W	
15	SP.2 CH- 7	40015	INT	Refer Table 18	Refer Table 18	R/W	
16	SP.2 CH- 8	40016	INT	Refer Table 18	Refer Table 18	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 Table 18	Refer Table 18	R/W	
26	INPUT TYPE CH - 2	40026	INT	Refer Table 18	Refer Table 18	R/W	
27	INPUT TYPE CH - 3	40027	INT	Refer Table 18	Refer Table 18	R/W	
28	INPUT TYPE CH - 4	40028	INT	Refer Table 18	Refer Table 18	R/W	
29	INPUT TYPE CH - 5	40029	INT	Refer Table 18	Refer Table 18	R/W	
30	INPUT TYPE CH - 6	40030	INT	Refer Table 18	Refer Table 18	R/W	

31	INPUT TYPE CH - 7	40031	INT	Refer Table 18	Refer Table 18	R/W	
32	INPUT TYPE CH - 8	40032	INT	Refer Table 18	Refer Table 18	R/W	
33	SPAN CH - 1	40033	INT	Refer Table 18	Refer Table 18	R/W	
34	SPAN CH - 2	40034	INT	Refer Table 18	Refer Table 18	R/W	
35	SPAN CH - 3	40035	INT	Refer Table 18	Refer Table 18	R/W	
36	SPAN CH - 4	40036	INT	Refer Table 18	Refer Table 18	R/W	
37	SPAN CH - 5	40037	INT	Refer Table 18	Refer Table 18	R/W	
38	SPAN CH - 6	40038	INT	Refer Table 18	Refer Table 18	R/W	
SR. NO.	Parameter	Absolute Address	Parameter Type	Min Value	Max Value	Access Type	NOTE
39	SPAN CH - 7	40039	INT	Refer Table 18	Refer Table 18	R/W	
40	SPAN CH - 8	40040	INT	Refer Table 18	Refer Table 18	R/W	
41	ZERO CH - 1	40041	INT	Refer Table 18	Refer Table 18	R/W	
42	ZERO CH - 2	40042	INT	Refer Table 18	Refer Table 18	R/W	
43	ZERO CH - 3	40043	INT	Refer Table 18	Refer Table 18	R/W	
44	ZERO CH - 4	40044	INT	Refer Table 18	Refer Table 18	R/W	
45	ZERO CH - 5	40045	INT	Refer Table 18	Refer Table 18	R/W	
46	ZERO CH - 6	40046	INT	Refer Table 18	Refer Table 18	R/W	
47	ZERO CH - 7	40047	INT	Refer Table 18	Refer Table 18	R/W	
48	ZERO CH - 8	40048	INT	Refer Table 18	Refer Table 18	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	
93	RLY Latch	40093	INT	0	1	R/W	
94	RLY Group	40094	INT	0	1	R/W	
SR. NO.	Parameter	Absolute Address	Parameter Type	Min Value	Max Value	Access Type	NOTE
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	SP.3 CH - 1	40116	INT	Refer T-1	Refer T-1	R/W	
117	SP.3 CH - 2	40117	INT	Refer T-1	Refer T-1	R/W	
118	SP.3 CH - 3	40118	INT	Refer T-1	Refer T-1	R/W	
119	SP.3 CH - 4	40119	INT	Refer T-1	Refer T-1	R/W	
120	SP.3 CH - 5	40120	INT	Refer T-1	Refer T-1	R/W	
121	SP.3 CH - 6	40121	INT	Refer T-1	Refer T-1	R/W	
122	SP.3 CH - 7	40122	INT	Refer T-1	Refer T-1	R/W	
123	SP.3 CH - 8	40123	INT	Refer T-1	Refer T-1	R/W	
124	SP.4 CH - 1	40124	INT	Refer T-1	Refer T-1	R/W	
125	SP.4 CH - 2	40125	INT	Refer T-1	Refer T-1	R/W	
126	SP.4 CH - 3	40126	INT	Refer T-1	Refer T-1	R/W	
127	SP.4 CH - 4	40127	INT	Refer T-1	Refer T-1	R/W	
128	SP.4 CH - 5	40128	INT	Refer T-1	Refer T-1	R/W	
129	SP.4 CH - 6	40129	INT	Refer T-1	Refer T-1	R/W	
130	SP.4 CH - 7	40130	INT	Refer T-1	Refer T-1	R/W	
131	SP.4 CH - 8	40131	INT	Refer T-1	Refer T-1	R/W	
132	Relay Operation	40132	INT	0	1	W	
133	Max Temp Reset CH - 1	40133	INT	0	1	W	
134	Max Temp Reset CH - 2	40134	INT	0	1	W	
135	Max Temp Reset CH - 3	40135	INT	0	1	W	
136	Max Temp Reset CH - 4	40136	INT	0	1	W	
137	Max Temp Reset CH - 5	40137	INT	0	1	W	
138	Max Temp Reset CH - 6	40138	INT	0	1	W	
139	Max Temp Reset CH - 7	40139	INT	0	1	W	
140	Max Temp Reset CH - 8	40140	INT	0	1	W	

141	Max Temp Logging	40141	INT	0	1	R/W	
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SR. NO.	Parameter	Absolute Address	Parameter Type	Min Value	Max Value	Access Type	NOTE
1	Calibration Password	49001	INT	0	65000	W	
2	Ambient Calibration	49002	INT	-	-	W	
3	Zero Calibration Channel-1	49003	INT	-	-	W	
4	Zero Calibration Channel-2	49004	INT	-	-	W	
5	Zero Calibration Channel-3	49005	INT	-	-	W	
6	Zero Calibration Channel-4	49006	INT	-	-	W	
7	Zero Calibration Channel-5	49007	INT	-	-	W	
8	Zero Calibration Channel-6	49008	INT	-	-	W	
9	Zero Calibration Channel-7	49009	INT	-	-	W	
10	Zero Calibration Channel-8	49010	INT	-	-	W	
11	Span Calibration Channel-1	49011	INT	-	-	W	
12	Span Calibration Channel-2	49012	INT	-	-	W	
13	Span Calibration Channel-3	49013	INT	-	-	W	
14	Span Calibration Channel-4	49014	INT	-	-	W	
15	Span Calibration Channel-5	49015	INT	-	-	W	
16	Span Calibration Channel-6	49016	INT	-	-	W	
17	Span Calibration Channel-7	49017	INT	-	-	W	
18	Span Calibration Channel-8	49018	INT	-	-	W	

**Table 17. Modbus Parameter Details for Read Output Status(Read Coil) 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	-	-	-
25	Alarm.3 Channel-1	25	BIT	R
26	Alarm.3 Channel-2	26	BIT	R
27	Alarm.3 Channel-3	27	BIT	R
28	Alarm.3 Channel-4	28	BIT	R
29	Alarm.3 Channel-5	29	BIT	R
30	Alarm.3 Channel-6	30	BIT	R
31	Alarm.3 Channel-7	31	BIT	R
32	Alarm.3 Channel-8	32	BIT	R
33	Alarm.4 Channel-1	33	BIT	R
34	Alarm.4 Channel-2	34	BIT	R
35	Alarm.4 Channel-3	35	BIT	R
36	Alarm.4 Channel-4	36	BIT	R
37	Alarm.4 Channel-5	37	BIT	R
38	Alarm.4 Channel-6	38	BIT	R
39	Alarm.4 Channel-7	39	BIT	R
40	Alarm.4 Channel-8	40	BIT	R

**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

**Table 18. 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	K 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	0-2V	-1999	9999	
0.4 to 2V	14	0.4-2V	-1999	9999	
4 TO 20mAmp	15	4-20	-1999	9999	
0 to 20 mAmp	16	0-20	-1999	9999	
0-5V	17	0-5V	-1999	9999	
1-5V	18	1-5V	-1999	9999	
0-10V	19	0-10V	-1999	9999	



**Table 19. Relay Logic Selection**

Modbus Index	Parameter Value
0	Normal
1	Fail Safe

**Table 20. Relay Function Selection**

Modbus Index	Parameter Value
0	Alarm
1	Trip

**Table 21. Relay Open Sensor Selection**

Modbus Index	Parameter Value
0	Down
1	Up

**Table 22. 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)

**Table 23. Relay Group-2 Selections**

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

**Table 24. Relay Group-4 Type Selections**

Modbus Index	Parameter Value
0	Low ON
1	High ON

**Table 25. Relay Group-2 Type Selections**

Modbus Index	Parameter Value
0	High/Very High
1	Low/Very Low
2	High/LOW

**Table 26. Relay Latch Selection**

Modbus Index	Parameter Value
0	OFF
1	ON

**Table 27. Relay per Group Selection**

Modbus Index	Parameter Value
0	Relay Per Group – 4
1	Relay Per Group – 2
2	Relay Per Group – 1

**Table 28. Com Port Baud Rate Selection**

Modbus Index	Parameter Value
0	9600bps
1	19.2kpbs

**Table 29. 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

**Table 30. Retransmission Open Sensor Selection**

Modbus Index	Parameter Value
0	Down
1	Up

**Table 31. Retransmission Type Selection**

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

**Table 32. Retransmission Direction Selection**

Modbus Index	Parameter Value
0	Reverse
1	Direct

**Table 33. Retransmission Value Selection**

Modbus Index	Parameter Value
0	Minimum
1	Maximum

**Table 34 Maximum Temperature Logging**

Modbus Index	Parameter Value
0	Disable
1	Enable

**Table 35. Maximum Temperature Reset**

Modbus Index	Parameter Value
0	No
1	Yes

**Table 36. Relay Group 1 Channel Selection**

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

**Table 37. Relay Group 1 Type Selection**

Modbus Index	Parameter Value
0	Low ON
1	High ON

**Table 38. Relay Operation**

Modbus Index	Parameter Value
0	Alarm
1	Control Output

## 10. MISCELLANEOUS

**Table 39. PV Input Status Display During Burnout Condition**

Input type	Display Message
TC-E	OPEN( <b>oPEn</b> )
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 20mA	PV LOW
4 to 20mA	PV LOW
-10 to 20mV DC	OPEN
0-100mV DC	OPEN
0-75mV DC	OPEN

**Note:** If set PV\_low/PV\_high for input type is less than maximum value of zero and span for then process value will display readings above 5% of display range, then after it will show **oVER/UnDR** (OVER/UNDER) message until value crosses maximum value of Sensor range. Process value greater than 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 **oVER/UnDR** (OVER/UNDER).

**Table 40. Retramission Output Table For Open /Over /Under Condition**

RETRASMISSIO N	VARIABLE	SCALE	ACTION	OPEN	OVER	UNDER	ERROR
<b>4-20mamp</b>	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	-

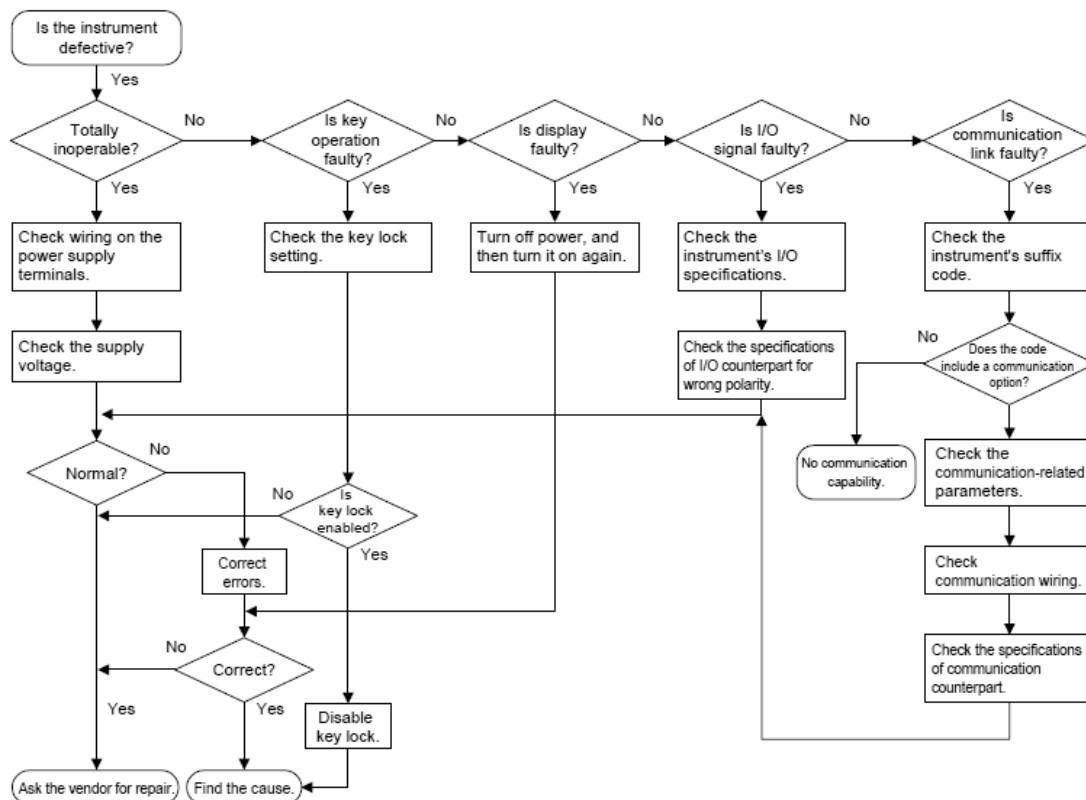
**NOTE:** - 1) For Retransmission output type 0-20mamp, 0-10v, 1-5v and 0-5v also applicable according to above table.

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

## 11. TROUBLESHOOTING

If the operating display does not appear after turning on the Scanner / DAQ's power, follow the measures in the procedure below.

If a problem appears complicated, contact our sales representative.



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