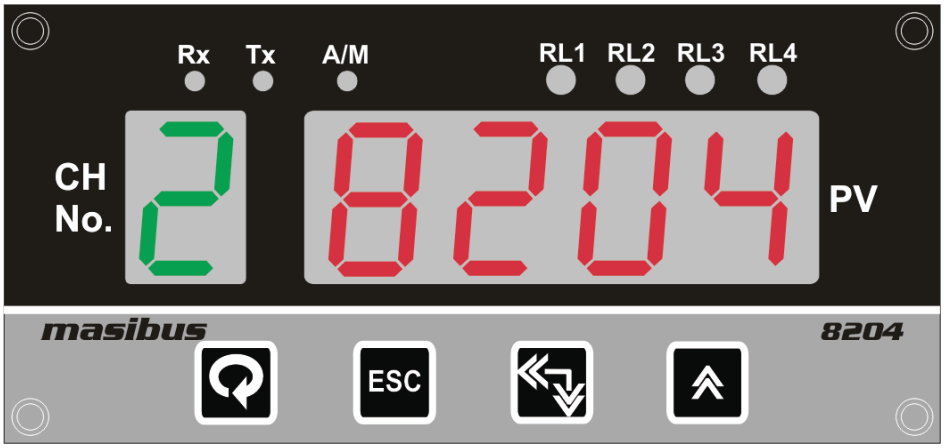
USER MANUAL

8204
4 - CHANNEL SCANNER



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Contents

1. INTRODUCTION:

Foreword

Thank you for purchasing 8204 universal Scanner. This manual describes the basic functions and operation methods of 8204.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

8th Edition: SEPT 2014.

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 8204 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:

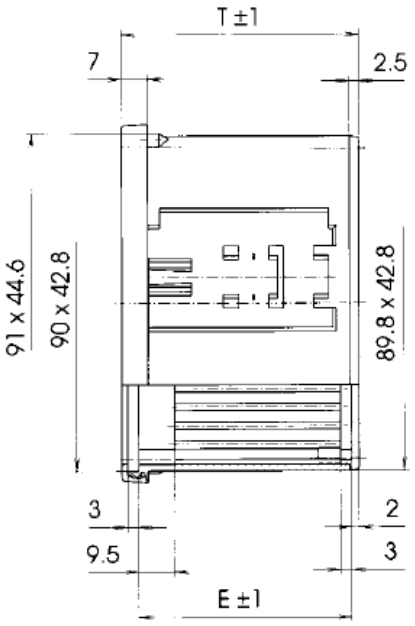
Mounting method: Panel mounting

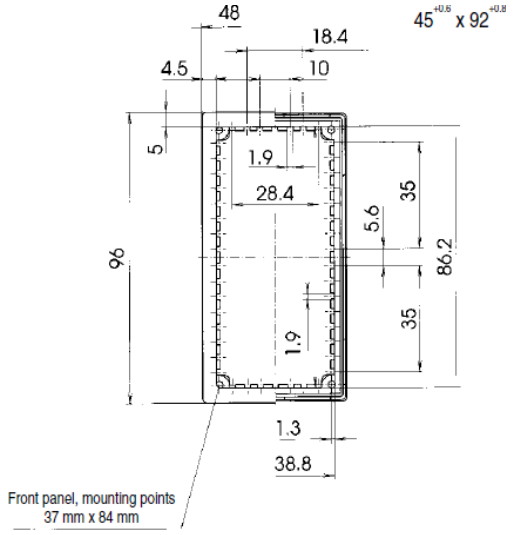
To install the controller select a location where:

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





FRONT BEZEL: 48 x 96 mm
PANEL CUTOUT: 45+0.8(H) x 92+0.8(W) mm
DEPTH BEHIND THE PENAL: 130 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 Number – 3, 6,9,12** 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 "snubber" is connected across the normally open contact of the relay switching though load. The snubber recommended consists of a series connected resistor/capacitor (typically **15nF/100 Ohms**). A snubber will also prolong the life of the relay contacts. A snubber should also be connected across the output of a trip 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 0º C ± 0.25% of instrument range ± 1 digit for temperature below 0º 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(B,R,S TYPE TC)	(1°C B,R,S TYPE TC)
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 instrument 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

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: (Optional)
Number of outputs: 1
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 span

Relay Contact Outputs:
Number of outputs: 4
Output signal: Two terminals (NC/NO and C) (NC/NO is selectable by jumper setting)
Relay Contact rating: 250 V AC or 30 V DC, 2A (resistive load)

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: 1-digit, 7-segment, Green LEDs, character height of 0.56'
Status indicating lamps: 4-Red LEDs for Relay status ,1-Red LED Manual mode status, 2-Red LEDS for Communication.

Power Supply Specifications:
Power supply: Rated voltage of 85 to 260V AC at 50/60 Hz, Rated Dc voltage 100 to 300VDC / Rated Voltage of 18V to 36V DC(Optional)
Power consumption: Max. <10 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 500V 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, Communication Signals.

Signal Isolations Specifications:

PV input terminals (4 Channel input): Not isolated input terminals and from the internal circuit. But 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: 0.4 kg or less

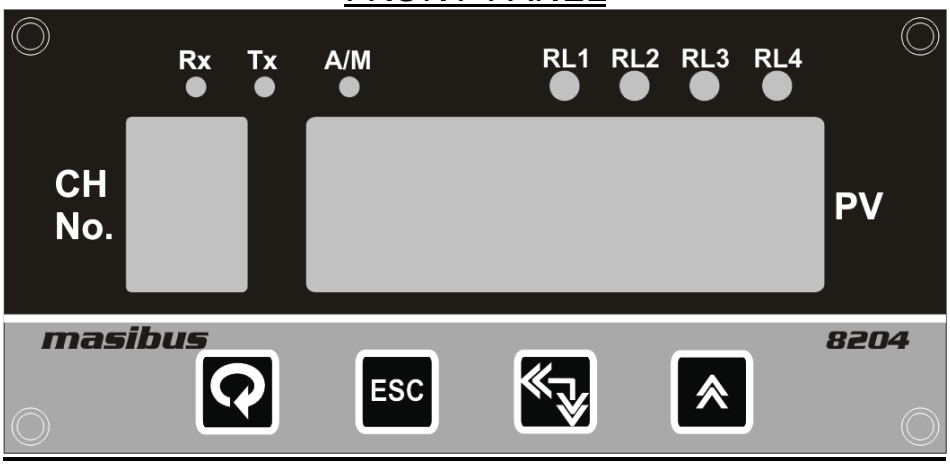
Dimensions: 48 (W) x 96 (H) x 130 (depth from panel face) mm.
Installation: Panel-mounting type. With Top and Bottom mounting hardware (1 each)
Panel cutout dimensions: 46 x 92 mm
FRONT BEZEL**:** 48 x 96 mm

Environmental Conditions:

TEMPCO: FOR DATA (4-channel input) less than 100ppm. FOR Retransmission(Optional) less than 150ppm.
Humidity: 30% to 95% RH (Non-Condensing)
Instrument Warm-up Time: 30 minutes or more after power on
Ambient temperature: 0 to 55°C

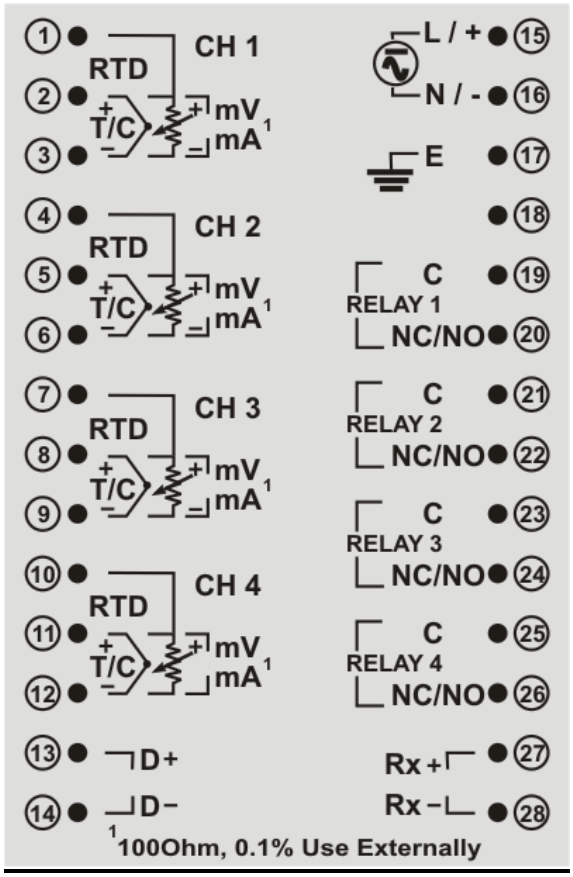
4. Front and Back Panel Description:

FRONT PANEL



Name of Part	Function
Process Value Display**(DATA window)**	Displays Process Value. Display Parameter Name When You Set Parameter. Displays Error Message When An Error Occurs.
Channel No. Display **(CHANNEL window)**	Displays Channel Number in run mode. Also it will display relay number (01 – 04) in set mode (i.e.R.1,R.2,R.3,R.4) It will also display Group no(GP 1,GP 2/GP 1,GP 2,GP 3,GP 4) in set mode
Relay Indicator LED **(RL1, RL2, RL3, & RL4)** **OR** Open Sensor Indicator LED	When Respective Relay LED Lits (In Red). OR When Channel is OPEN(Channel no. is corresponding to Relay no.)
Auto/Manual Indicator LED **(A/M)**	If LED is on, it indicates Manual mode and if LED is off Auto Mode.
Communication Indicator LEDs**(Rx,Tx)**	When Communication on, two LEDs (In Red) 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. It is used for come out of the manual mode to auto mode too.

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 is pressed, DP (decimal point) in PV 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'. The function Auto/Manual is integrated with this key. This key is used to enter into manual mode while the unit is in run mode.

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.

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).
- By pressing **INCREMENT Key** in run mode, Channel number scanning on display is stopped. By pressing increment key again, we can change channel number manually.
- By pressing **SHIFT/DECREMENT Key** in run mode, relay acknowledgement can be done.
- By pressing **ESCAPE Key** after going into the Manual Mode unit comes back to run mode.

Level – 1:-

Pressing MENU key DATA window shows LvL 1 (LvL1) 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-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 is used 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 4.	0100 (for all 4 channels)	-
SP.2 (SP.2)	Target Set point-2	SetPoint-2 for Channel 1 to 4.	0150(for all 4 channels)	Relay group 2 is selected
SP.3 (SP.3)	Target Set point-3	SetPoint-3 for Channel 1 to 4.	0200(for all 4 channels)	Relay group 1 is selected
SP.4 (SP.4)	Target Set point-4	SetPoint-4 for Channel 1 to 4.	0250(for all 4 channels)	Relay group 1 is selected
HYS (HYS)	Hystresis	Hystresis for Channel 1 to 4.	0002(for all 4 channels)	-

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 1-4 channel)	K-TC(for all 4 channel)	-
PuH (PV.HI)	Process value range high setting (PV high > PV low)	Range of the sensor /-1999 to 9999 (for linear input types)(1-4 Channel)	1370(for all 4 channel)	-
PuLo (PV.LO)	Process value range lower setting	Range of the sensor /-1999 to 9999 (for linear input types)(1-4 Channel)	-200(for all 4 channel)	-
dP (dP)	Decimal Point Setting Only applicable for Linear input type is selected	0 to 3(1 – 4 Channel)	0(for all 4 channel)	-
rLLG (rL.LG)	Relay Logic(Applicable for 4-RELAY)	nL / FS (Normal / Fail Safe) 0:Noraml 1:Fail Safe	Normal(for all 4 Relay)	-
rLoP (rL.oP)	Relay Operation	AL / Co (Alarm / Control Output) 0:Alarm 1: Control Output	Alarm	-
rLFn (rL.Fn)	Relay Function(Applicable for 4-RELAY)	AL / tr (Alarm / Trip) 0:ALARM 1:TRIP	Alarm(for all 4 Relay)	rLoP is set to AL
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 / dn (UP / Down) 0:DOWN 1:UP	Up Scale(for all 4 Relay)	-

rL.mP (rl.mp)	Relay mapping (Applicable for 1 -4 Channel)	See Relay Configuration	Refer Note:3	rLoP is set to AL
rL.tP (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 1 or Relay 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		✓

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 relays. **(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		✓	

Note 2:

2) All Groups can not be selected for single Channel .
3) 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 all 4 relays. 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					✓

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)

Note 3:

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 channelwise.

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 – 8).

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	-
SP iP (skip)	Channel skip/Unskip selection.	YES / no 0:NO 1:YES	0(for all 4 channel	-
rL.LH (rL.LH)	Relay Latch	on / oFF 0:OFF 1:ON	0	rL.oP is set to AL
rL.GP (rL.GP)	Relay Group	rGP.4 / rGP.2 0:Relay Group-4 1:Relay Group-2 2:Relay Group-1	1	rL.oP is set to AL
SCAn (SCAn)	Scan Time	1 to 250 seconds	1	-
A .CJC (A.CJC)	Auto cold junction(Only applicable for TC input type	YES / no 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 (baud)	Communication Baud rate	9600 / 19.2K 0:(9600) – 9600 bps 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 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	UP / doun 0:DOWN 1:UP	1	-
rtTP (rt.tp)	Retransmission Output Type	0-20/4-20/ 0-5u/ 1-5u/ 0- 10u 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	-
rtdr (rt.dr)	Retransmission direction	dir / rEu 0: (rev) 1:(dir)	1	-
rtCH (rt.CH)	Retransmission Channel	1 to 4 channel	1	-
rtrd (rt.rd)	Retransmission Channel Value	nAll / n in / AuG 0: (Min) 1: (Max) 2: (Avg)	1	-
SPud (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 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) **CAL-** Only calibration set to default value **PARA-** All parameters excluding calibration will set to default value **ALL-**Calibration and parameters will set to default value	-	-

Note: - Factory reset will load default parameters, as mention in MENU LAYOT (Default value). Once this function applies, user has to switch off the instrument and again switch on the instrument to work according to Default value.

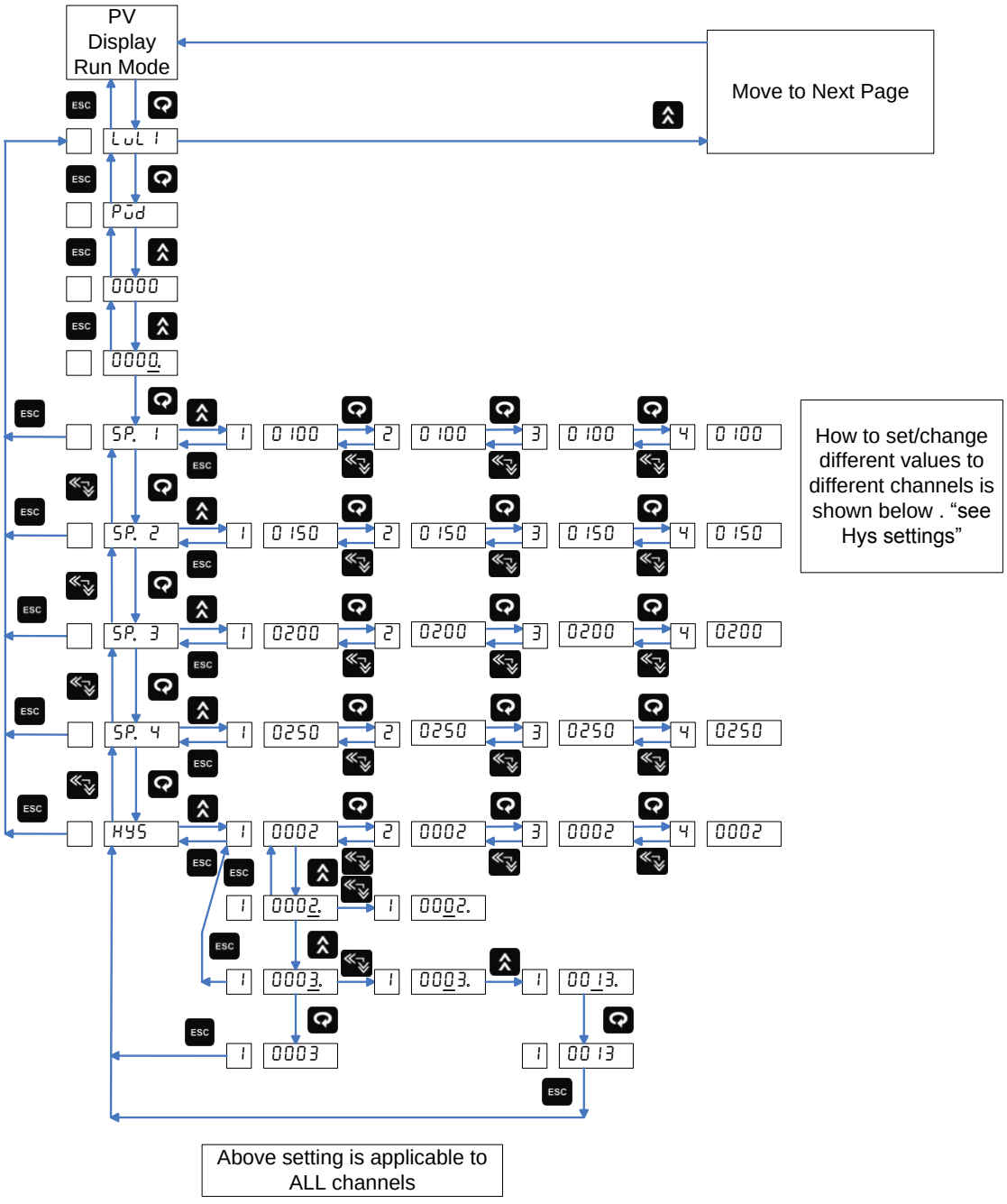
INPUT TYPE SELECTION TABLE:

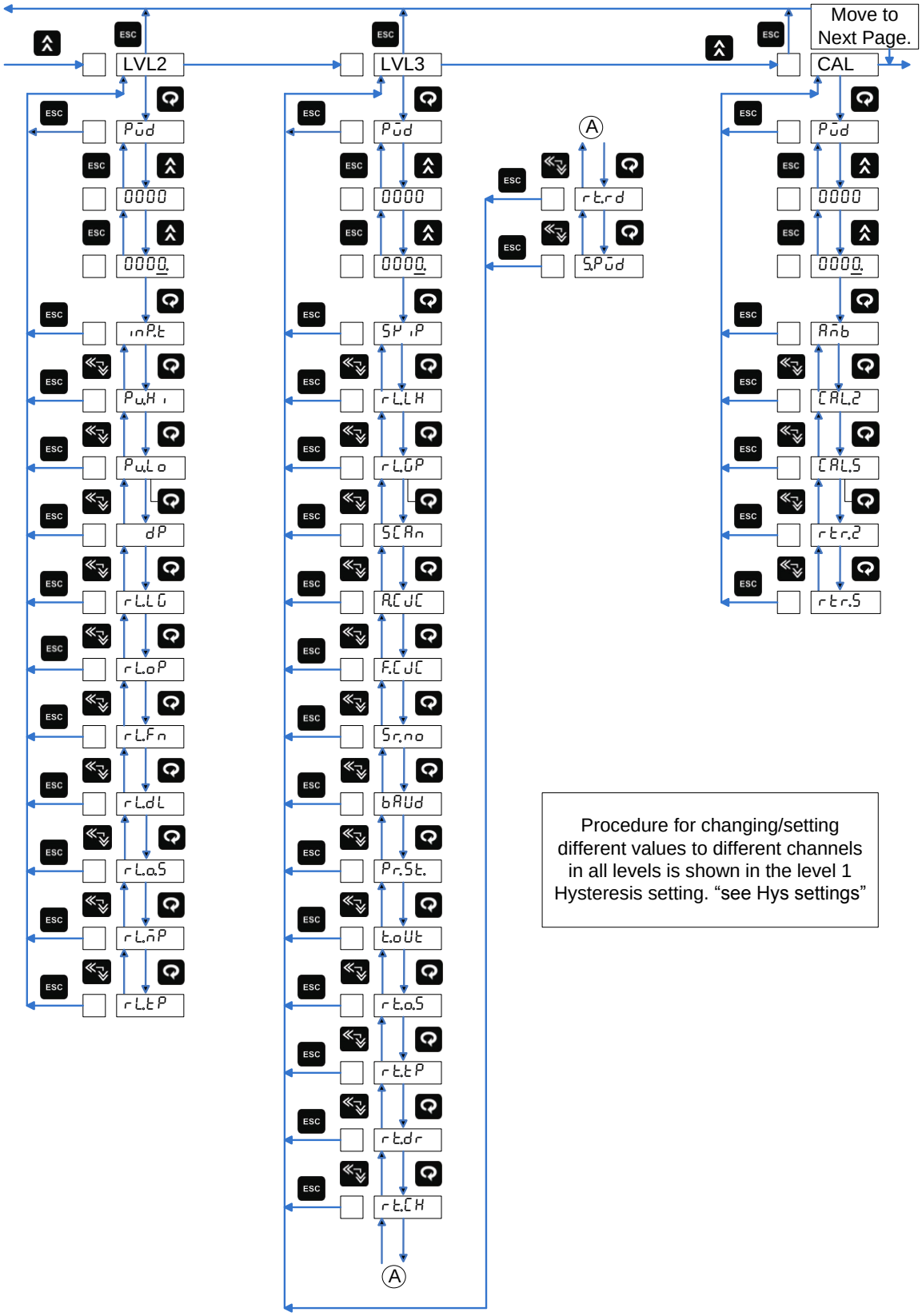
Type	I/P NO	Type Display	Range	Resolution
E	1	E tc	-200 to 1000°C	0.1°C
J	2	J tc	-200 to 1200°C	
K	3	P tc	-200 to 1370°C	
T	4	t tc	-200 to 400°C	
B	5	b tc	450 to 1800°C	
R	6	r tc	0 to 1750°C	
S	7	S tc	0 to 1750°C	
N	8	n tc	-200 to 1300°C	
RTD	9	rtd	-199.9 to 850.0°C	
-10 to 20mV	10	-10.20	-1999 to 9999 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:

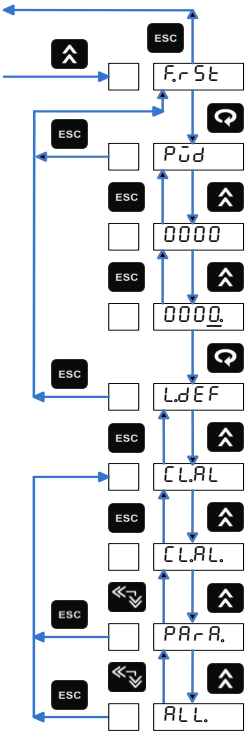
7. Parameter FLOW CHART:

4 Channel Scanner-8204 has a number of software parameters which may or may not be required depending on your particular applications.





Procedure for changing/setting different values to different channels in all levels is shown in the level 1 Hysteresis setting. “see Hys settings”



Procedure for changing/setting different values to different channels in all levels is shown in the level 1 Hysteresis setting. “see Hys settings”

8. Relay Outputs:

Following function can be set for Relay outputs.

Relay Logic (Direction):

Relay Logic means Relay contact can be changed from Open to Close OR Close to Open. If relay logic is selected Normal, when Fault occur Relay contact will change from Close to Open. If relay logic is selected Fail Safe, when Fault occur Relay contact will change from Open to Close.

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

If relay is selected as ALARM, when abnormal condition occur Relay will ON, once normal condition after abnormal condition occur Relay will OFF.

If relay is selected as TRIP, when abnormal condition occur Relay will ON, once normal condition after abnormal condition occur Relay will ON. Relay will be off through Acknowledge.

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 relay 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 ***
HIGH	ALARM	LATCH YES	LAMP	OFF	STEADY	STEADY	OFF		STEADY	OFF
			RELAY	OFF	ON	ON	OFF		OFF	OFF
	ALARM	LATCH NO	LAMP	OFF	STEADY	STEADY	OFF		OFF	OFF
			RELAY	OFF	ON	ON	OFF		OFF	OFF
	TRIP		LAMP	OFF	STEADY	OFF****	OFF****		STEADY	OFF
			RELAY	OFF	ON	OFF****	OFF****		ON	OFF
LOW	ALARM	LATCH YES	LAMP	OFF	STEADY	OFF	STEADY		STEADY	OFF
			RELAY	OFF	ON	OFF	ON		OFF	OFF
	ALARM	LATCH NO	LAMP	OFF	STEADY	OFF	STEADY		OFF	OFF
			RELAY	OFF	ON	OFF	ON		OFF	OFF
	TRIP		LAMP	OFF	STEADY	OFF****	OFF****		STEADY	OFF
			RELAY	OFF	ON	OFF****	OFF****		ON	OFF
VLOW	ALARM	LATCH YES	LAMP	OFF	STEADY	OFF	STEADY		STEADY	OFF
			RELAY	OFF	ON	OFF	ON		OFF	OFF
	ALARM	LATCH NO	LAMP	OFF	STEADY	OFF	STEADY		OFF	OFF
			RELAY	OFF	ON	OFF	ON		OFF	OFF
	TRIP		LAMP	OFF	STEADY	OFF****	OFF****		STEADY	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 ***
VHIGH	ALARM	LATCH YES	LAMP	OFF	STEADY	STEADY	OFF		STEADY	OFF
			RELAY	OFF	ON	ON	OFF		OFF	OFF
	ALARM	LATCH NO	LAMP	OFF	STEADY	STEADY	OFF		OFF	OFF
			RELAY	OFF	ON	ON	OFF		OFF	OFF
	TRIP		LAMP	OFF	STEADY	OFF****	OFF****		STEADY	OFF
			RELAY	OFF	ON	OFF****	OFF****		ON	OFF
HIGH	ALARM	LATCH YES	LAMP	OFF	STEADY	STEADY	OFF		STEADY	OFF
			RELAY	OFF	ON	ON	OFF		OFF	OFF
	ALARM	LATCH NO	LAMP	OFF	STEADY	STEADY	OFF		OFF	OFF
			RELAY	OFF	ON	ON	OFF		OFF	OFF
	TRIP		LAMP	OFF	STEADY	OFF****	OFF****		STEADY	OFF
			RELAY	OFF	ON	OFF****	OFF****		ON	OFF
LOW	ALARM	LATCH YES	LAMP	OFF	STEADY	OFF	STEADY		STEADY	OFF
			RELAY	OFF	ON	OFF	ON		OFF	OFF
	ALARM	LATCH NO	LAMP	OFF	STEADY	OFF	STEADY		OFF	OFF
			RELAY	OFF	ON	OFF	ON		OFF	OFF
	TRIP		LAMP	OFF	STEADY	OFF****	OFF****		STEADY	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 ***
HIGH	ALARM	LATCH YES	LAMP	OFF	STEADY	STEADY	OFF	STEADY	STEADY	OFF
			RELAY	OFF	ON	ON	OFF	OFF	OFF	OFF
	ALARM	LATCH NO	LAMP	OFF	STEADY	STEADY	OFF	STEADY	OFF	OFF
			RELAY	OFF	ON	ON	OFF	OFF	OFF	OFF
	TRIP		LAMP	OFF	STEADY	OFF****	OFF****	STEADY	STEADY	OFF
			RELAY	OFF	ON	OFF****	OFF****	ON	ON	OFF
LOW	ALARM	LATCH YES	LAMP	OFF	STEADY	OFF	STEADY	STEADY	STEADY	OFF
			RELAY	OFF	ON	OFF	ON	OFF	OFF	OFF
	ALARM	LATCH NO	LAMP	OFF	STEADY	OFF	STEADY	STEADY	OFF	OFF
			RELAY	OFF	ON	OFF	ON	OFF	OFF	OFF
	TRIP		LAMP	OFF	STEADY	OFF****	OFF****	STEADY	STEADY	OFF
			RELAY	OFF	ON	OFF****	OFF****	ON	ON	OFF
VLOW	ALARM	LATCH YES	LAMP	OFF	STEADY	OFF	STEADY	STEADY	STEADY	OFF
			RELAY	OFF	ON	OFF	ON	OFF	OFF	OFF
	ALARM	LATCH NO	LAMP	OFF	STEADY	OFF	STEADY	STEADY	OFF	OFF
			RELAY	OFF	ON	OFF	ON	OFF	OFF	OFF
	TRIP		LAMP	OFF	STEADY	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	OFF	STEADY	STEADY	OFF	STEADY	STEADY	OFF
			RELAY	OFF	ON	ON	OFF	OFF	OFF	OFF
	ALARM	LATCH NO	LAMP	OFF	STEADY	STEADY	OFF	STEADY	OFF	OFF
			RELAY	OFF	ON	ON	OFF	OFF	OFF	OFF
	TRIP		LAMP	OFF	STEADY	OFF****	OFF****	STEADY	STEADY	OFF
			RELAY	OFF	ON	OFF****	OFF****	ON	ON	OFF
HIGH	ALARM	LATCH YES	LAMP	OFF	STEADY	STEADY	OFF	STEADY	STEADY	OFF
			RELAY	OFF	ON	ON	OFF	OFF	OFF	OFF
	ALARM	LATCH NO	LAMP	OFF	STEADY	STEADY	OFF	STEADY	OFF	OFF
			RELAY	OFF	ON	ON	OFF	OFF	OFF	OFF
	TRIP		LAMP	OFF	STEADY	OFF****	OFF****	STEADY	STEADY	OFF
			RELAY	OFF	ON	OFF****	OFF****	ON	ON	OFF
LOW	ALARM	LATCH YES	LAMP	OFF	STEADY	OFF	STEADY	STEADY	STEADY	OFF
			RELAY	OFF	ON	OFF	ON	OFF	OFF	OFF
	ALARM	LATCH NO	LAMP	OFF	STEADY	OFF	STEADY	STEADY	OFF	OFF
			RELAY	OFF	ON	OFF	ON	OFF	OFF	OFF
	TRIP		LAMP	OFF	STEADY	OFF****	OFF****	STEADY	STEADY	OFF
			RELAY	OFF	ON	OFF****	OFF****	ON	ON	OFF

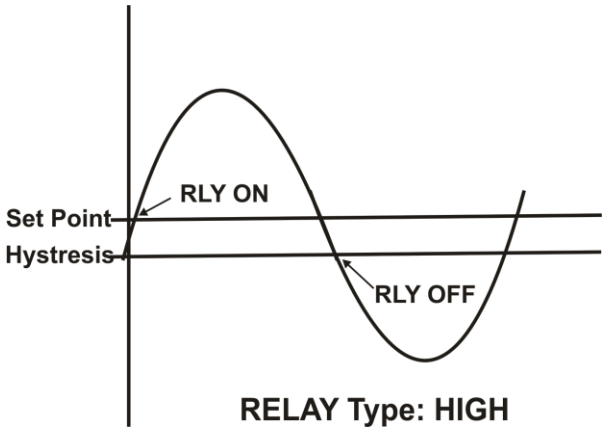
NOTE:

* means normal condition after abnormal has occurred
** means ack pressed in abnormal condition
*** means ack pressed in normal condition after abnormal has already occurred.
******** means it remains in the previous state. If previous state is ON then it will remain ON and the same case for OFF condition.

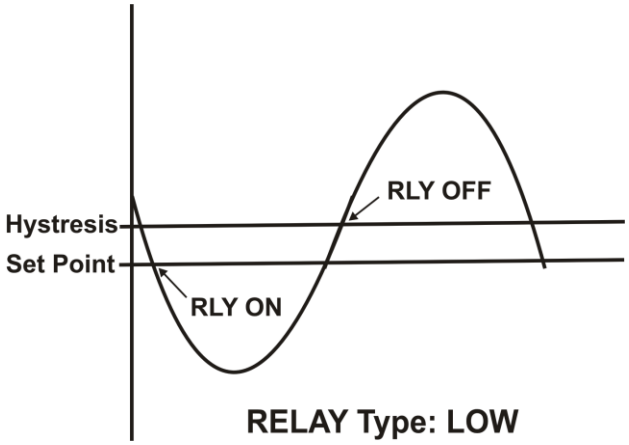
- **All Lamp status can only be viewed into PC software.**

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:

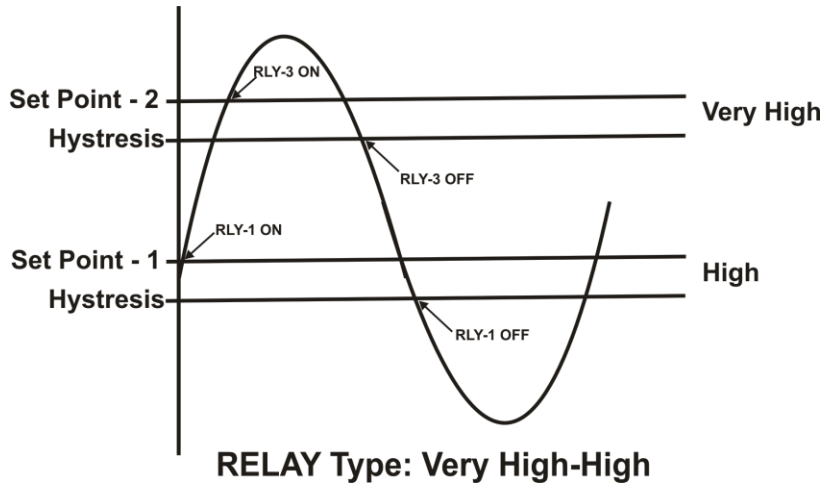


RELAY Type: HIGH

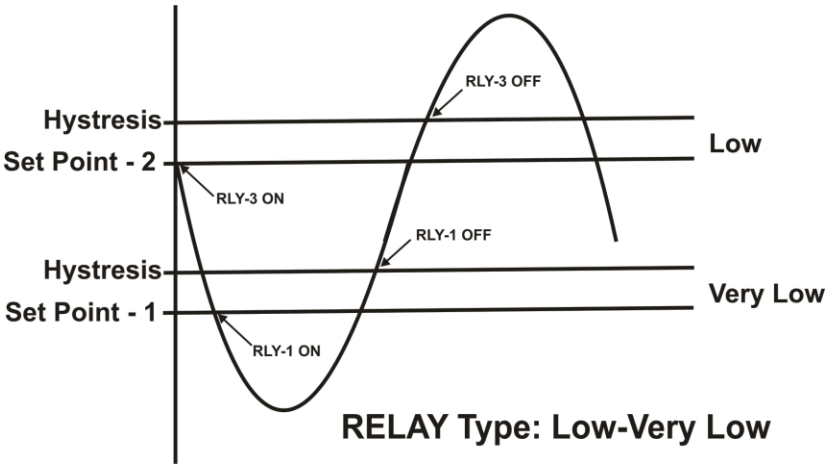


RELAY Type: LOW

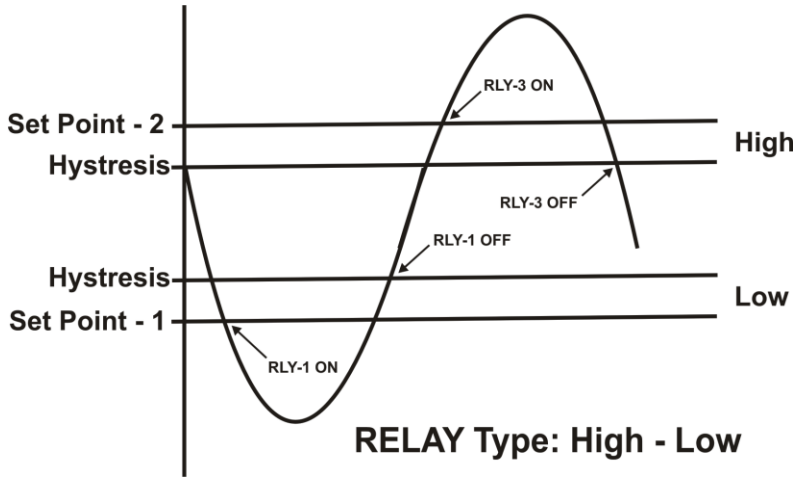
RELAY GROUP - 4



RELAY Type: Very High-High

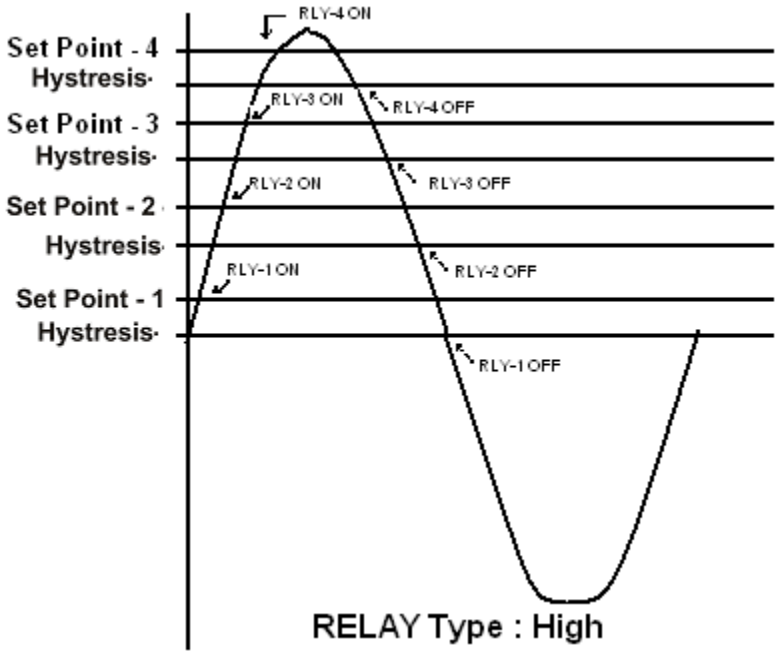


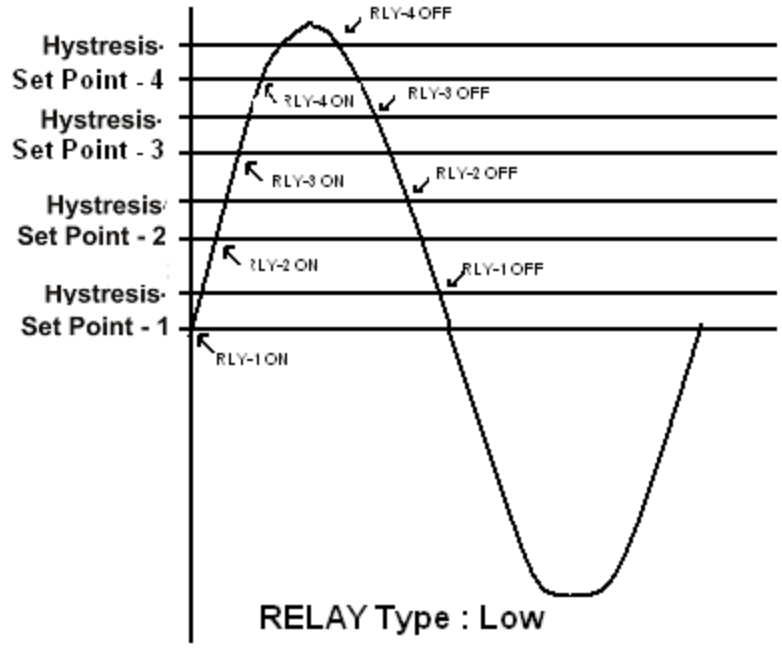
RELAY Type: Low-Very Low



RELAY Type: High - Low

RELAY GROUP - 2





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:-
8204 has both Control Logic (ON-OFF) & Alarm Logic. If Control Logic (ON-OFF) is required, rLoP in LuL2 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. In this logic, user cannot change relay mapping, relay latch and relay group and user cannot acknowledge relays.

9. 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:-
DATA window shows Amb (Ambient temperature adjusts). If Increment Key is pressed, DATA window shows, 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, DATA window shows CAL .2 (Calibration ZERO) for sensor input zero calibration for Thermocouple Linear input and RTD type. Press Increment Key, DATA window shows as per the Input feed. 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 DATA window to indicate that it is doing the necessary calculations.
When the calculations are over, the new calibration values are stored automatically.
So, Zero calibration is over.
Press MENU key to calibrate other parameters or press Escape key to come out to normal operation.

DATA window shows the CAL .5 (calibration SPAN) for sensor input span calibration for Thermocouple Linear input and RTD type. Press Increment Key, DATA window shows as per the Input feed. 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 DATA window 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 MENU key repeatedly, till DATA window shows message rtr .2 (retransmission output zero calibration).
DATA window shows the value being outputted on Retransmission output terminals. Measure the value using a highly accurate digital multi meter. Use Inc/Shift key to change measured value observed in multi meter on DATA window. Press MENU key. The controller will store zero calibration value. Press MENU key to calibrate retransmission output span calibration menu.
DATA window shows the message rtr .5 (retransmission output span calibration). DATA window shows the value being outputted on retransmission output terminals. Measure the value using a highly accurate digital multi meter. Use Inc/Shift key to change measured value observed in multi meter on DATA window. Press MENU key. When the calculations are over, the new calibration values are stored automatically. Calibration for Retransmission output is over.
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.

10. Communication:

The MODBUS Communications protocol as RS-485 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 4-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	Function
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	Ambient	30005	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 Input Register:

SR. NO.	Parameter	Absolute Address	Parameter Type	Min Value	Max Value	Access Type	Refer Table
1	SP.1 CH – 1	40001	INT	-	-	R/W	T-1
2	SP.1 CH – 2	40002	INT	-	-	R/W	T-1
3	SP.1 CH – 3	40003	INT	-	-	R/W	T-1
4	SP.1 CH – 4	40004	INT	-	-	R/W	T-1
5	SP.2 CH- 1	40005	INT	-	-	R/W	T-1
6	SP.2 CH- 2	40006	INT	-	-	R/W	T-1
7	SP.2 CH- 3	40007	INT	-	-	R/W	T-1
8	SP.2 CH- 4	40008	INT	-	-	R/W	T-1
9	SP.3 CH- 1	40009	INT	-	-	R/W	T-1
10	SP.3 CH- 2	40010	INT	-	-	R/W	T-1
11	SP.3 CH- 3	40011	INT	-	-	R/W	T-1
12	SP.3 CH- 4	40012	INT	-	-	R/W	T-1
13	SP.4 CH- 1	40013	INT	-	-	R/W	T-1
14	SP.4 CH- 2	40014	INT	-	-	R/W	T-1
15	SP.4 CH- 3	40015	INT	-	-	R/W	T-1
16	SP.4 CH- 4	40016	INT	-	-	R/W	T-1
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	INPUT TYPE CH - 1	40021	INT	-	-	R/W	T-1
22	INPUT TYPE CH - 2	40022	INT	-	-	R/W	T-1
23	INPUT TYPE CH - 3	40023	INT	-	-	R/W	T-1
24	INPUT TYPE CH - 4	40024	INT	-	-	R/W	T-1
25	Range High CH - 1	40025	INT	-	-	R/W	T-1
26	Range High CH - 2	40026	INT	-	-	R/W	T-1
27	Range High CH - 3	40027	INT	-	-	R/W	T-1
28	Range High CH - 4	40028	INT	-	-	R/W	T-1
29	Range Low CH - 1	40029	INT	-	-	R/W	T-1
30	Range Low CH - 2	40030	INT	-	-	R/W	T-1
31	Range Low CH - 3	40031	INT	-	-	R/W	T-1
32	Range Low CH - 4	40032	INT	-	-	R/W	T-1
33	Decimal Point CH - 1	40033	INT	0	3	R/W	
34	Decimal Point CH - 2	40034	INT	0	3	R/W	
35	Decimal Point CH - 3	40035	INT	0	3	R/W	
36	Decimal Point CH - 4	40036	INT	0	3	R/W	
37	RLY-Logic.1	40037	INT	0	1	R/W	T-2
38	RLY-Logic.2	40038	INT	0	1	R/W	T-2
39	RLY-Logic.3	40039	INT	0	1	R/W	T-2
40	RLY-Logic.4	40040	INT	0	1	R/W	T-2
41	RLY-Operation	40041	INT	0	1	R/W	T-3
42	RLY-Function.1	40042	INT	0	1	R/W	T-4
43	RLY-Function.2	40043	INT	0	1	R/W	T-4
44	RLY-Function.3	40044	INT	0	1	R/W	T-4
45	RLY-Function.4	40045	INT	0	1	R/W	T-4
46	RLY-Delay.1	40046	INT	1	99	R/W	
47	RLY-Delay.2	40047	INT	1	99	R/W	
48	RLY-Delay.3	40048	INT	1	99	R/W	
49	RLY-Delay.4	40049	INT	1	99	R/W	
50	RLY-OpenSensor.1	40050	INT	0	1	R/W	T-5
51	RLY-OpenSensor.2	40051	INT	0	1	R/W	T-5

52	RLY-OpenSensor.3	40052	INT	0	1	R/W	T-5
53	RLY-OpenSensor.4	40053	INT	0	1	R/W	T-5
54	RLY-Map CH - 1	40054	INT	0	2/4	R/W	T-6/7/8
55	RLY-Map CH - 2	40055	INT	0	2/4	R/W	T-6/7/8
56	RLY-Map CH - 3	40056	INT	0	2/4	R/W	T-6/7/8
57	RLY-Map CH - 4	40057	INT	0	2/4	R/W	T-6/7/8
58	RLY-Type.1	40058	INT	0	2/4	R/W	T-9/10
59	RLY-Type.2	40059	INT	0	2/4	R/W	T-9/10
60	RLY-Type.3	40060	INT	0	2/4	R/W	T-9/10
61	RLY-Type.4	40061	INT	0	2/4	R/W	T-9/10
62	SKIP-Channel CH - 1	40062	INT	0	1	R/W	
63	SKIP-Channel CH - 2	40063	INT	0	1	R/W	
64	SKIP-Channel CH - 3	40064	INT	0	1	R/W	
65	SKIP-Channel CH - 4	40065	INT	0	1	R/W	
66	RLY Latch	40066	INT	0	1	R/W	T – 11
67	RLY Group	40067	INT	0	1	R/W	T – 12
68	Scan Rate	40068	INT	1	250	R/W	
69	Auto CJC	40069	INT	0	1	R/W	
70	Fix CJC	40070	INT	0	60.0	R/W	
71	Machine ID	40071	INT	1	247	R/W	
72	Baud Rate	40072	INT	0	1	R/W	T- 13
73	Parity/Stop Bit	40073	INT	0	3	R/W	T -14
74	Timeout	40074	INT	10	60	R/W	
75	PV Scale Retransmission	40075	INT	0	1	R/W	T -15
76	Retransmission Type	40076	INT	0	4	R/W	T-16
77	Retransmission Direction	40077	INT	0	1	R/W	T-17
78	Retransmission CH - 1	40078	INT	0	1	R/W	
79	Retransmission CH - 2	40079	INT	0	1	R/W	
80	Retransmission CH - 3	40080	INT	0	1	R/W	
81	Retransmission CH - 4	40081	INT	0	1	R/W	
82	Retransmission Value	40082	INT	0	2	R/W	T-18
83	Unused	40083	INT	1	4	R/W	
84	Password	40084	INT	0	9999	R/W	

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	Unused	49007	INT	-	-	-	
8	Unused	49008	INT	-	-	-	
9	Unused	49009	INT	-	-	-	
10	Unused	49010	INT	-	-	-	
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	Unused	49015	INT	-	-	-	
16	Unused	49016	INT	-	-	-	
17	Unused	49017	INT	-	-	-	
18	Unused	49018	INT	-	-	-	

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.2 Channel-1	5	BIT	R
6	Alarm.2 Channel-2	6	BIT	R
7	Alarm.2 Channel-3	7	BIT	R
8	Alarm.2 Channel-4	8	BIT	R
9	Alarm.3 Channel-1	9	BIT	R
10	Alarm.3 Channel-2	10	BIT	R
11	Alarm.3 Channel-3	11	BIT	R
12	Alarm.3 Channel-4	12	BIT	R
13	Alarm.4 Channel-1	13	BIT	R
14	Alarm.4 Channel-2	14	BIT	R
15	Alarm.4 Channel-3	15	BIT	R
16	Alarm.4 Channel-4	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 Status	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.

INPUT TYPE SELECTION TABLE :(T – 1)

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 Logic (T – 2):

Modbus Index	Parameter Value
0	Normal
1	Fail Safe

Relay Operation (T – 3):

Modbus Index	Parameter Value
0	Alarm
1	Control Output

Relay Function (T – 4):

Modbus Index	Parameter Value
0	Alarm
1	Trip

Relay Open sensor (T – 5):

Modbus Index	Parameter Value
0	Down
1	Up

Relay Group 1 selections(T-8):

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

Relay Group - 4 selections (T – 6):

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 selections (T – 7):

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

Relay Type for Group – 2(T – 10):

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

Relay Type for Group – 4 and 1 (T - 9):

Modbus Index	Parameter Value
0	Low ON
1	High ON

Relay Latch selection (T – 11):

Modbus Index	Parameter Value
0	OFF
1	ON

Relay Group Selection (T – 12):

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

Baud Rate for Communication (T – 13):

Modbus Index	Parameter Value
0	9600bps
1	19.2kpbs

Parity/Stop Bit Selection (T – 14):

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 (T – 15):

Modbus Index	Parameter Value
0	Down
1	Up

Retransmission Type (T – 16):

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

Retransmission Direction (T – 17):

Modbus Index	Parameter Value
0	Reverse
1	Direct

Retransmission Value (T – 18):

Modbus Index	Parameter Value
0	Minimum
1	Maximum
2	Average

11. MISCELLANEOUS

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. **OVER/UNDER condition is applicable for TC and RTD input types only**. Process value greater then maximum value of zero/span then display will show oPEn (OPEN) message. Retransmission o/p(Retransmission is optional) 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) More than one channel can be selected for Retrasmission, but output depends on Maximum reading or Minimum reading or Average reading from the no of channel. Retrasmission output Maximum, Minimum and Average can be selected from Level-3.