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Model 8208
User's Manual 8-Channel Scanner

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Contents

1. INTRODUCTION:

Foreword

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

Notice

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

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

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Checking the Contents of the Package

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

Product Ordering Code:

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

Model	Suffix code	Optional code	Remarks

List of Accessories

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

No	Item name	Part number	Qty	Remarks

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2. INSTALLATION:

How to Install:

Mounting method: Panel mounting

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

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

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

External Dimensions and Panel Cutout Dimensions:

Unit: mm
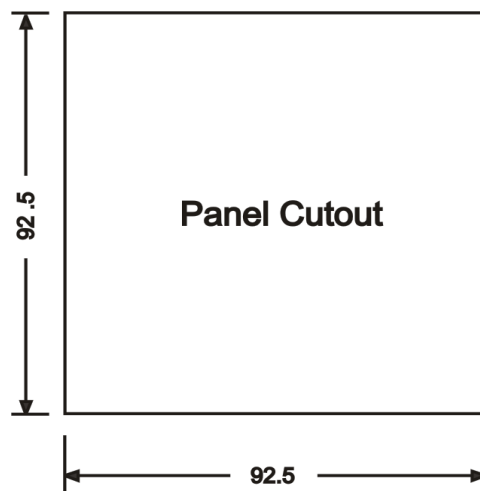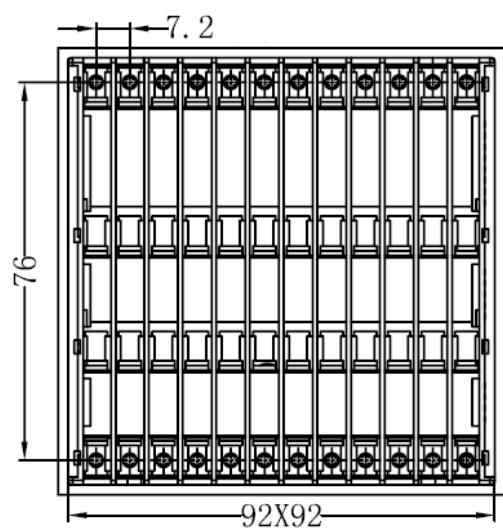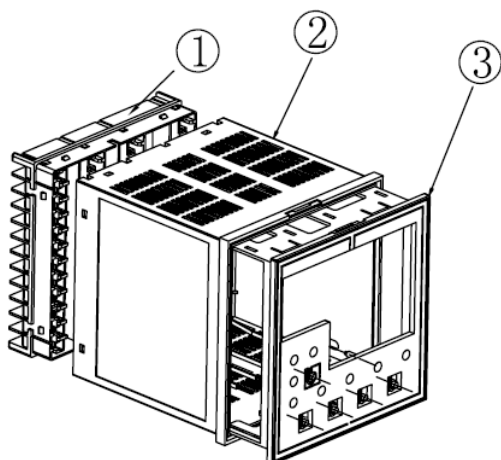
How to connect wires:

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

⚠ **NOTE:**

o 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.
o 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.
o For thermocouple input, use shielded compensating lead wires for wiring. For RTD input, use shielded wires that have low conductor resistance and cause no significant differences in resistance between the three wires. Do not connect **Terminal NO – 13, 16,19,22,37,40,43,46** when thermocouple or linear input is selected.
o Use repeater after each set of 32 instruments connected in RS-485 Communication.
o Unused terminals should not be used as jumper points as they may be internally connected, which may cause damage to the unit.

⚠ CAUTION:

High voltage transients may occur when switching inductive loads such as some contactors or solenoid valves. Through the internal contacts, these transients may introduce disturbances which could affect the performance of the instrument.

For this type of load it is highly recommended that a "sunbber" is connected across the normally open contact of the relay switching though load. The sunbber recommended consists of a series connected resistor/capacitor (typically **15nF/100 Ohms**). A sunbber will also prolong the life of the relay contacts. A sunbber should also be connected across the output of a tric output to prevent false triggering under line transient conditions

3. Hardware Specification Detail:

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

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

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

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

Resolution: 17-bit

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

Measurement current (RTD): 1milli Ampere

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

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

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

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

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

Digital Contact Outputs:
Number of outputs: 8
Output Type: Open Collector
Output Contact rating: 24 V DC, 50mA (with inbuilt current limit protection)

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

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

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

Power Supply Specifications:
Power supply: Rated AC voltage of 85 to 260V AC at 50/60 Hz (Rated Dc voltage 100 to 300VDC) / Rated voltage of 18 to 36V DC (Optional),

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

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

- Between secondary terminals at least 600V AC for 1 minute

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

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

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

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

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

4. Front and Back Panel Description:

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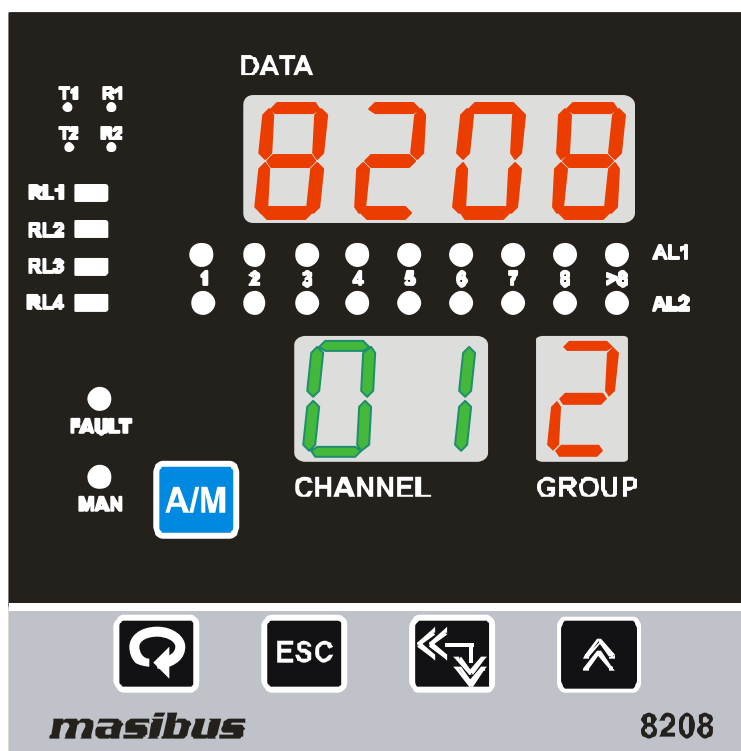
Name of Part	Function
Process Value Display**(DATA window)**	Displays Process Value. Display Parameter Name When You Set Parameter. Displays Error Message When An Error Occurs.
Channel No. Display **(CHANNEL)**	Displays Channel Number in run mode. Also it will display relay number (01 – 04) in set mode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

BACK PLATE CONNECTION DETAIL:
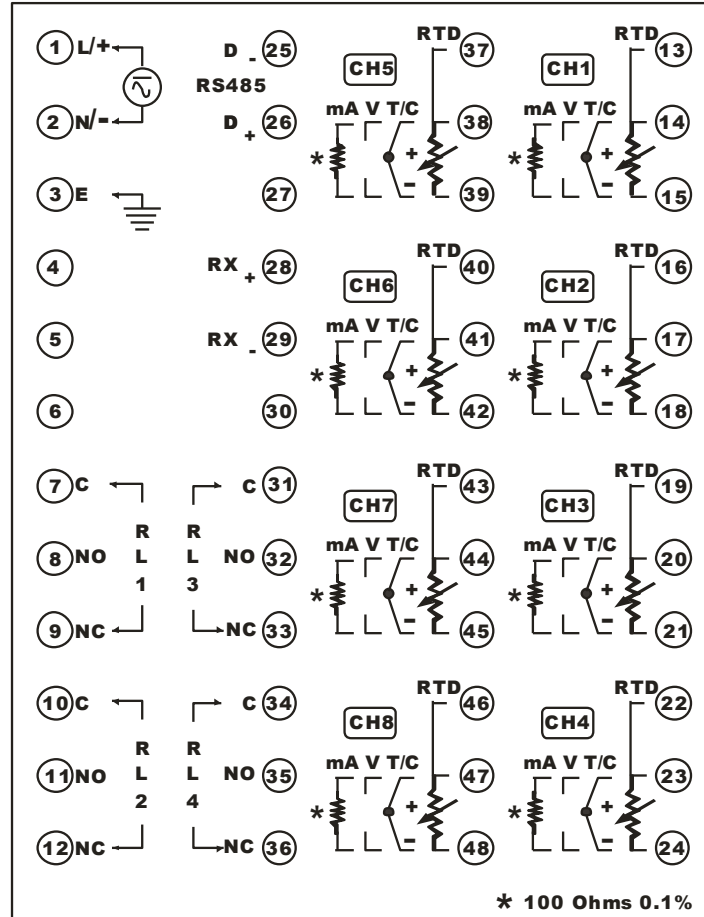
RECOMMENDED TERMINAL LUGS DETAIL:

DIMENSIONS:-

Length (b)	16 mm
Width (a)	5.7 mm
Length of insulation sleeve (c)	4.5 mm
Inner dimension of the insulating collar (d)	1.9 mm
Inner diameter (f)	3.2 mm
Inner diameter (f)	0.75 mm
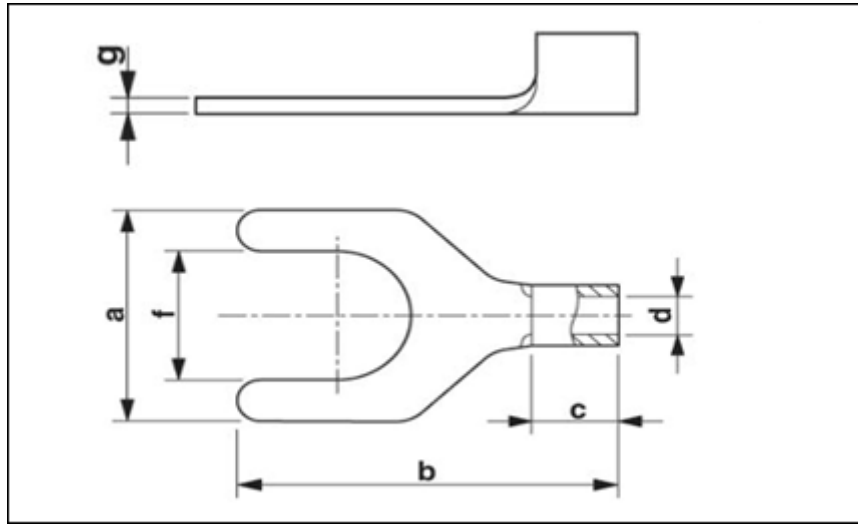
5. KEY FUNCTION Description:

MENU/ENTER KEY:

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

ESCAPE KEY:

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

INCREMENT KEY:

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

SHIFT KEY/DECREMENT KEY:

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

AUTO/MANUAL KEY:

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

6. Menu Layout:

RUN TIME INDICATION:

Following parameters can view or change during run time.

- Immediately after powering, unit will run in Auto Mode. In auto mode channel will scan automatically according to scan time selection (1-250 second).

- Press A/M Key in run mode, Channel no scanning on display is stopped. By pressing increment key, we can change channel number manually.

Level – 1:-

Pressing MENU key DATA window shows **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

LEVEL 1				
Parameter (DATA window)		Setting name and description	Default value	Shows only if
Symbol	Name			
P⁻d (PWD)	Level-1 Password	0 to 9999	0000	-
5P⁻1 (SP.1)	Target Set point-1	SetPoint-1 for Channel 1 to 8.	0100 (for all 8 channel)	-
5P⁻2 (SP.2)	Target Set point-2	SetPoint-2 for Channel 1 to 8.	0200(for all 8 channel)	Relay group is selected 2
HYS (HYS)	Hystresis	Hystresis for Channel 1 to 8.	0002(for all 8 channel)	-

LEVEL 2:-

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

LEVEL 2:				
Parameter (DATA Window)		Setting name and description	Default value	Shows only if
Symbol	Name			
P̲'d (PWD)	Level-2 Password	0 to 9999	0000	-
inPt (inP.t)	PV Input Type (E, J, K, T Etc.)	Follow Table 3(Input type for 1-8 channel)	K-TC(for all 8 channel)	-
Pu_h i (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_L9 (rL.LG)	Relay/OC Logic(Applicable for 4-RELAY)	**nrml** / **flsf** 0:Noraml 1:Fail Safe	Normal(for all 4 Relay)	-
rL_Fn (rL.Fn)	Relay/OC Function(Applicable for 4-RELAY)	**ALRM** / **TRiP** 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_o_S (rL.o.S)	Relay/OC Open sensor(Applicable for 4-RELAY)	**up** / **DoWn** 0:DOWN 1:UP	Up Scale(for all 4 Relay)	-
rL_m̄P (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	-

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

Relay Group - 2:
If **relay group – 2** is selected, there will be two group of relay. Each group has two relay. **(G-1 and G-2).**
G-1 means RELAY 1 and RELAY 3
G-2 means RELAY 2 and RELAY 4

Example:

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

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

Relay/OC Type can be selected as shown below:

Relay Group	Relay Type
G – 1	High/ Very High (**H-VH**) or Very Low /Low (**VL-L**) or Low/High (**L-H**)
G – 2	High/ Very High (**H-VH**) or Very Low /Low (**VL-L**) or Low/High (**L-H**)

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

Example:

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

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

Relay Type can be selected as shown below:

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

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

LEVEL – 3:

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

LEVEL 3:				
Parameter (DATA Window)		Setting name and description	Default value	Shows only if
Symbol	Name			
P̲'d (PWD)	Level-3 Password	0 to 9999	0000	-
SH iP (skip)	Channel skip/Unskip selection.	**yes** / **no** 0:NO 1:YES	0(for all 8 channel	-
rL_LH (rL.LH)	Relay/OC Latch	**on** / **off** 0:OFF 1:ON	0	-
rL_9P (rL.GP)	Relay/OC Group	**RGP.4** / **rGP.2** 0:Relay Group-4 1:Relay Group-2	1	-
SCAn (SCAn)	Scan Time	1 to 250 seconds	1	-
A.CJC (A.CJC)	Auto cold junction(Only applicable for TC input type	**yes** / **no** 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.nS.2** / **P.o.s1** / **P.ES.1** 0:(P.N.S.1)-parity	No parity /Stop bit - 2	

Symbol	Name	Setting	Default	Shows only if
		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		
t̲_oUt (t.out)	Timeout for display back to Run Mode	10 to 100 Seconds	60	-
rt̲_o̲5 (rt.o.s)*	Retrasmission Open sensor	**up / DoWn** 0:DOWN 1:UP	1	-
rt̲_tP (rt.tp)*	Retransmission Output Type	**0-20/4-20/ 0-5v/1-5v/ 0-10v** 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	-
rt̲_dr (rt.dr)*	Retransmission direction	**Dir / rev** 1:(dir) 0: (rev)	1	-
rt̲_CH (rt.CH)*	Retransmission Channel	1 to 8 channel	1	-
rt̲_rd (rt.rd)*	Retransmission Channel Value	**MAx / MIn** 1:(Max) 0: (Min)	1	-
5_Pⁱⁱd (S.PWD)	Password Set password to lock selected level	0 to 9999	0	-

NOTE:- When Digital Output is use * Parameter is not applicable.

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.

Calibration:				
Parameter (DATA Window)		Setting name and description	Default value	Shows only if
Symbol	Name			
Pⁱⁱd (PWD)	Password	0 to 9999	0000	-
Aⁱⁱb (Amb)	Ambient	Ambient adjustment	-	-

Symbol	Name	Setting name and description	Default value	Shows only if
CAL_2 (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_2 (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			
P_'d (Pwd)	Password	0 to 9999	-	-
L_dEF (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	-	-

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	H 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	5 tc	0 to 1750°C	
N	8	n tc	-200 to 1300°C	
RTD	9	rtd	-199.9 to 850.0°C	
-10 to 20mV	10	- 10_20	-1999 to 9999 Counts	1 Count
0 to 75mv	11	0-75		
0 to 100mV	12	0- 100		
0.4 to 2V	13	0_4-2		
0 to 2V	14	0-2u		
4 to 20mamp	15	4-20		
0 to 20mamp	16	0-20		
0 to 5V	17	0-5u		
1 to 5V	18	1-5u		
0 to 10V	19	0- 10u		

Table 3:

7. Relay/OC Outputs:

 Following function can be set for Relay/OC outputs.

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

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

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

Relay/OC Mapping:
 Refer Menu layout LEVEL - 2

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

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Relay/OC 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	FLASH	FLASH	OFF		FLASH	OFF
		RELAY	OFF	ON	ON	OFF		OFF	OFF
	ALARM LATCH NO	LAMP	OFF	FLASH	FLASH	OFF		OFF	OFF
		RELAY	OFF	ON	ON	OFF		OFF	OFF
	TRIP	LAMP	OFF	FLASH	OFF	OFF		FLASH	OFF
		RELAY	OFF	ON	OFF	OFF		ON	OFF
LOW	ALARM LATCH YES	LAMP	OFF	FLASH	OFF	FLASH		FLASH	OFF
		RELAY	OFF	ON	OFF	ON		OFF	OFF
	ALARM LATCH NO	LAMP	OFF	FLASH	OFF	FLASH		OFF	OFF
		RELAY	OFF	ON	OFF	ON		OFF	OFF
	TRIP	LAMP	OFF	FLASH	OFF	OFF		FLASH	OFF
		RELAY	OFF	ON	OFF	OFF		ON	OFF
VLOW	ALARM LATCH YES	LAMP	OFF	FLASH	OFF	FLASH		FLASH	OFF
		RELAY	OFF	ON	OFF	ON		OFF	OFF
	ALARM LATCH NO	LAMP	OFF	FLASH	OFF	FLASH		OFF	OFF
		RELAY	OFF	ON	OFF	ON		OFF	OFF
	TRIP	LAMP	OFF	FLASH	OFF	OFF		FLASH	OFF
		RELAY	OFF	ON	OFF	OFF		ON	OFF

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

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

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

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

Notes :

* means normal condition after abnormal has occurred

** means ack pressed in abnormal condition

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

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

Basic RELAY/OC Function:

RELAY Type: HIGH

RELAY Type: LOW

RELAY/OC GROUP - 4

RELAY Type: Very High-High

RELAY Type: Low-Very Low

RELAY Type: High - Low
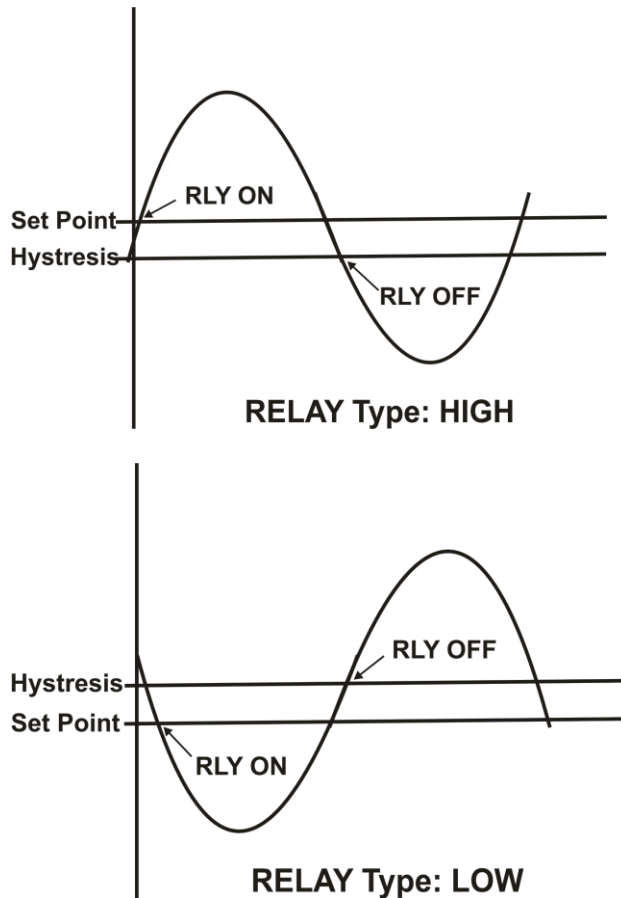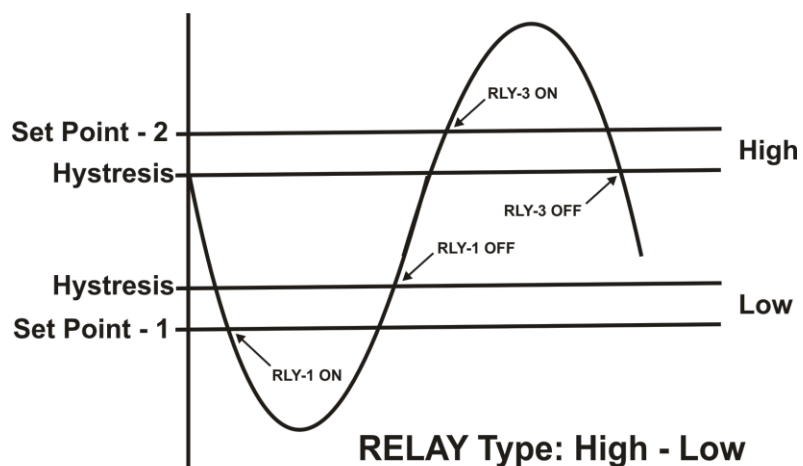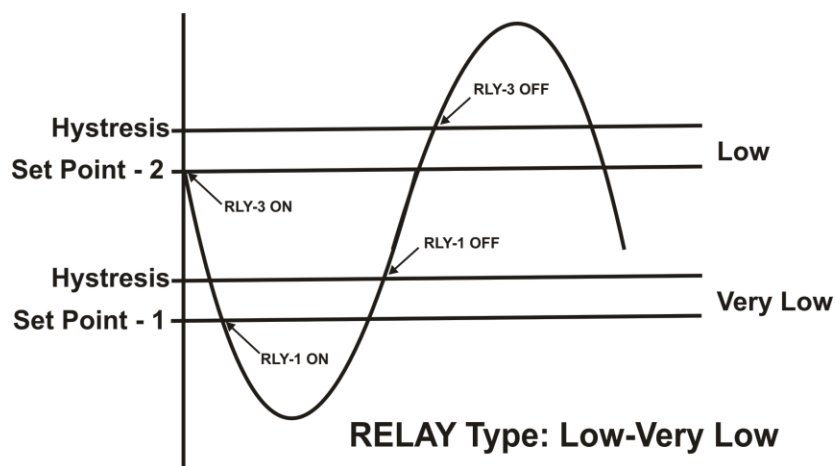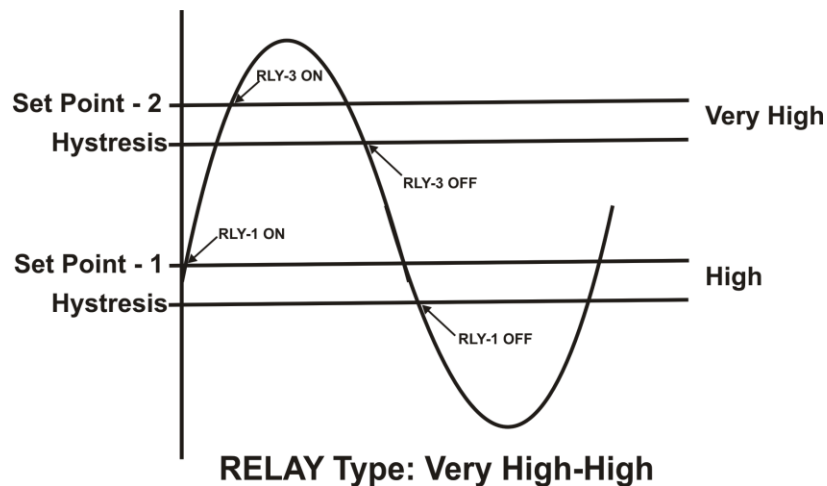
RELAY/OC GROUP – 2

8. Calibration Procedure:-

Calibration is provided for ambient temperature, PV sensor input, Retransmission output.

First select the calibration function as described below and then follow the procedure depending on the parameter to be calibrated. The sequences of parameters that will be available for calibration are listed below:

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

Ambient temperature adjustment:-

This menu will come up only if; the input sensor selected is Thermocouple type.

PV display shows `Amb` (Ambient temperature adjusts). PV display shows ambient temperature measured by the controller and by applying old calibration data.

DP of last digit will blink to indicate that the value can be changed. Use Inc/Shift key to adjust it to desired value. Once the desired value set and press MENU key, the blinking DP will go off to indicate that the value has been registered. The controller will automatically save all the new calculations. Ambient temperature adjustment is over.

Press MENU key to calibrate other parameters or press Escape key to come out to normal operation.

PV input sensor calibration:-

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

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

DP of last digit will blink to indicate that the value can be changed. Use Inc/Shift key to correct the displayed reading to the desired process value and press MENU key. The controller will display message `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):-

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.

Group Calibration Detail:-

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

NOTE:

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

9. Communication:

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

Function code use for Modbus:

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

Exception responses for Modbus:

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

Modbus Parameter Details for Holding Register:

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

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

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

Modbus Parameter Details for Holding Register:

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

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

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

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	49013	INT	-	-	W	

	Channel-3							
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	

Modbus Parameter Details for Read Output Status Register:

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

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

INPUT TYPE SELECTION TABLE:

Input Type	I/P no	Type Display	Zero	Span	Resolution
E	1	E tc	-200	1000	0.1°C
J	2	J tc	-200	1200	0.1°C
K	3	H 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	
0-75mV	11	0-75	-1999	9999	
0-100mV	12	0- 100	-1999	9999	
0 to 2V	13	0-2u	-1999	9999	1 Count
0.4 to 2V	14	0_4-2u	-1999	9999	
4 TO 20mAmp	15	4-20	-1999	9999	
0 to 20 mAmp	16	0-20	-1999	9999	
0-5V	17	0-5u	-1999	9999	
1-5V	18	1-5u	-1999	9999	
0-10V	19	0- 10u	-1999	9999	

Relay Direction:

Modbus Index	Parameter Value
0	Normal
1	Fail Safe

Relay Function:

Modbus Index	Parameter Value
0	Alarm
1	Trip

Relay Selection for Open sensor:

Modbus Index	Parameter Value
0	Down
1	Up

Relay Group 2 Channel selections:

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

Relay Group - 4 selections:

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

Relay Group - 4 Type selections:

Modbus Index	Parameter Value
0	Low ON
1	High ON

Relay Group -2 Type selection:

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

Relay Latch selection:

Modbus Index	Parameter Value
0	OFF
1	ON

Relay per Group Selection:

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

Baud Rate Selection for Communication:

Modbus Index	Parameter Value
0	9600bps
1	19.2kpbs

Parity/Stop Bit Selection:

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

Retransmission OPEN sensor Scale:

Modbus Index	Parameter Value
0	Down
1	Up

Retransmission Type selection:

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

Retransmission Direction:

Modbus Index	Parameter Value
0	Reverse
1	Direct

Retransmission Value:

Modbus Index	Parameter Value
0	Minimum
1	Maximum

10. MISCELLENIOUS

PV INPUT STATUS DISPLAY DURING BURNOUT CONDITION:

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

Table 1

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

OPEN COLLECTOR CARD TERMINAL DETAIL AND MODBUS ADDRESS:
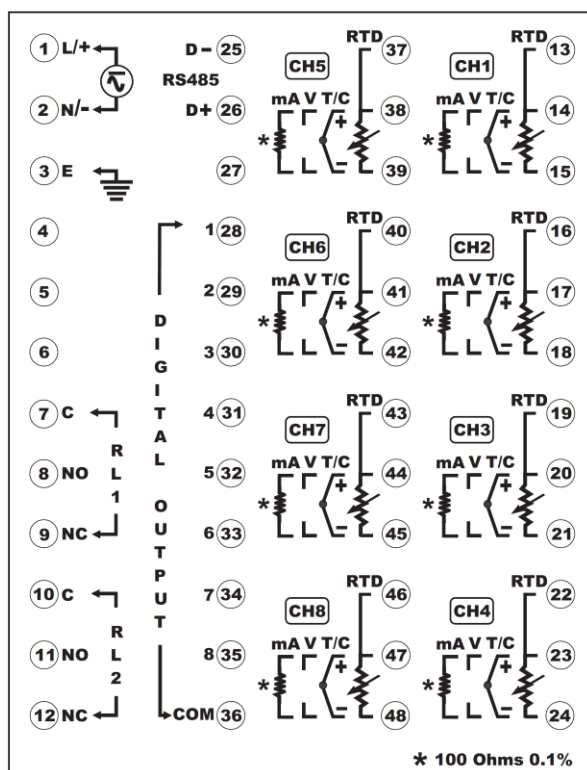
Relay/OC Configuration:

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

Relay Group - 2:

If **relay group – 2** is selected, there will be five group of relay/OC. Each group has two relay/OC. **(G-1, G-2, G-3, G-4 & G-5).**
G-1 means RELAY 1 and RELAY 2
G-2 means OC 1 and OC 2
G-3 means OC 3 and OC 4
G-4 means OC 5 and OC 6
G-5 means OC 7 and OC 8

Example:

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

Note:

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

Relay/OC Type can be selected as shown below:

Relay Group	Relay Type
G – 1, G – 2, G – 3, G – 4, G – 5	High/ Very High (**H–VH**) or Very Low /Low (**VL–L**) or Low/High (**L–H**)

Relay Group - 4:

If **relay group – 4** is selected, there will be ten group of relay/OC. Each group has one relay/OC. **(G-1, G-2, G-3, G-4, G-5, G-6, G-7, G-8, G-9 & G-10).**
G-1 means RELAY 1
G-2 means RELAY 2
G-3 means OC 1
G-4 means OC 2
G-5 means OC 3
G-6 means OC 4
G-7 means OC 5
G-8 means OC 6
G-9 means OC 7
G-10 means OC 8

Example:

CHANNEL NO	NONE	G-1	G-2	G-3	G-4	G-5	G-6	G-7	G-8	G-9	G-10
1		✓									
2	✓										
3			✓								
4					✓						
5				✓							
6						✓					

| 7 | ✓ | |
| 8 | | ✓ |

Note:

    1) More than **one Group** can not be selected for single Channel.

    2) None means no group is selected for particular Channel.

    3) When G -10 is selected in any channel it show $\textsf{A}$ on Group No. Display.

Relay Type can be selected as shown below:

Relay Group	Relay Type
G – 1, G – 2, G – 3, G – 4, G – 5, G – 6, G – 7, G – 8, G – 9, G - 10	Low ON (L) or High ON (H)

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

MODBUS ADDRESS FOR OC CARD:

1	RLY-Logic.1	40057	INT	0	1	R/W	
2	RLY-Logic.2	40058	INT	0	1	R/W	
3	OC-Logic.1	40059	INT	0	1	R/W	
4	OC-Logic.2	40060	INT	0	1	R/W	
5	OC-Logic.3	40120	INT	0	1	R/W	
6	OC-Logic.4	40121	INT	0	1	R/W	
7	OC-Logic.5	40122	INT	0	1	R/W	
8	OC-Logic.6	40123	INT	0	1	R/W	
9	OC-Logic.7	40124	INT	0	1	R/W	
10	OC-Logic.8	40125	INT	0	1	R/W	
11	RLY-Function.1	40061	INT	0	1	R/W	
12	RLY-Function.2	40062	INT	0	1	R/W	
13	OC-Function.1	40063	INT	0	1	R/W	
14	OC-Function.2	40064	INT	0	1	R/W	
15	OC-Function.3	40126	INT	0	1	R/W	
16	OC-Function.4	40127	INT	0	1	R/W	
17	OC-Function.5	40128	INT	0	1	R/W	
18	OC-Function.6	40129	INT	0	1	R/W	
19	OC-Function.7	40130	INT	0	1	R/W	
20	OC-Function.8	40131	INT	0	1	R/W	
21	RLY-Delay.1	40065	INT	1	99	R/W	
22	RLY-Delay.2	40066	INT	1	99	R/W	
23	OC-Delay.1	40067	INT	1	99	R/W	
24	OC-Delay.2	40068	INT	1	99	R/W	
25	OC-Delay.3	40132	INT	1	99	R/W	
26	OC-Delay.4	40133	INT	1	99	R/W	
27	OC-Delay.5	40134	INT	1	99	R/W	
28	OC-Delay.6	40135	INT	1	99	R/W	
29	OC-Delay.7	40136	INT	1	99	R/W	
30	OC-Delay.8	40137	INT	1	99	R/W	
31	RLY-OpenSensor.1	40069	INT	0	1	R/W	
32	RLY-OpenSensor.2	40070	INT	0	1	R/W	
33	OC-OpenSensor.1	40071	INT	0	1	R/W	
34	OC-OpenSensor.2	40072	INT	0	1	R/W	
35	OC-OpenSensor.3	40138	INT	0	1	R/W	
36	OC-OpenSensor.4	40139	INT	0	1	R/W	
37	OC-OpenSensor.5	40140	INT	0	1	R/W	
38	OC-OpenSensor.6	40141	INT	0	1	R/W	
39	OC-OpenSensor.7	40142	INT	0	1	R/W	
40	OC-OpenSensor.8	40143	INT	0	1	R/W	
41	RLY/OC-Map CH – 1	40073	INT	0	2/4	R/W	
42	RLY/OC-Map CH – 2	40074	INT	0	2/4	R/W	
43	RLY/OC-Map CH – 3	40075	INT	0	2/4	R/W	
44	RLY/OC-Map CH – 4	40076	INT	0	2/4	R/W	
45	RLY/OC-Map CH – 5	40077	INT	0	2/4	R/W	
46	RLY/OC-Map CH – 6	40078	INT	0	2/4	R/W	
47	RLY/OC-Map CH – 7	40079	INT	0	2/4	R/W	
48	RLY/OC-Map CH – 8	40080	INT	0	2/4	R/W	
49	RLY-Type.1	40081	INT	0	2/4	R/W	
50	RLY-Type.2	40082	INT	0	2/4	R/W	
51	OC-Type.1	40083	INT	0	2/4	R/W	
52	OC-Type.2	40084	INT	0	2/4	R/W	
53	OC-Type.3	40144	INT	0	2/4	R/W	

54	OC-Type.4	40145	INT	0	2/4	R/W	
55	OC-Type.5	40146	INT	0	2/4	R/W	
56	OC-Type.6	40147	INT	0	2/4	R/W	
57	OC-Type.7	40148	INT	0	2/4	R/W	
58	OC-Type.8	40149	INT	0	2/4	R/W	

NOTE:- When Digital Output is used Modbus Address 40102 to 40114 not Applicable.

Relay/OC Direction	
Modbus Index	**Parameter Value**
0	Normal
1	Fail Safe

Relay/OC Function	
Modbus Index	**Parameter Value**
0	Alarm
1	Trip

Relay/OC Open sensor Selection	
Modbus Index	**Parameter Value**
0	Down
1	Up

Relay/OC Type For Group – 2 Selection	
Modbus Index	**Parameter Value**
0	Low ON
1	High ON

Relay/OC Type For Group – 4 Selection	
Modbus Index	**Parameter Value**
0	High/Very High
1	Low/Very Low
2	High/LOW

Relay/OC Latch Selection	
Modbus Index	**Parameter Value**
0	OFF
1	ON

Relay/OC Group 2 Selection	
Modbus Index	**Parameter Value**
0	None
1	G – 1 (RELAY 1 & 2)
2	G – 2 (OC 1 & 2)
3	G – 3 (OC 3 & 4)
4	G – 4 (OC 5 & 6)
5	G – 5 (OC 7 & 8)

Relay/OC Group 4 Selection	
Modbus Index	**Parameter Value**
0	None
1	G - 1 (RELAY – 1)
2	G - 2 (RELAY – 2)
3	G – 3 (OC – 1)
4	G – 4 (OC – 2)
5	G – 5 (OC – 3)
6	G – 6 (OC – 4)
7	G – 7 (OC – 5)
8	G – 8 (OC – 6)
9	G – 9 (OC – 7)
10	G – 10 (OC – 8)

Relay/OC Group Selection	
Modbus Index	**Parameter Value**
0	Relay/OC Per Group – 1
1	Relay/OC Per Group – 2