

USER MANUAL

85XX⁺

SCANNER / DAQ



PANEL MOUNT

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EC Declaration of Conformity

The undersigned, representing the manufacturer

**Masibus Automation And Instrumentation Pvt. Ltd.
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Gujarat, India**

herewith declare that the Product **Scanner-Controller 85XX***

is in conformity with the essential requirements of the following EC Directive(s) when installed in accordance with the installation instructions contained in the product documentation:

2006/95/EC	Low Voltage Directive
2004/108/EC	EMC Directive

and that the standards and/or technical specifications referenced below have been applied:

EN 61010-1:2010	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements
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EN 61000-6-2:2005	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
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EN 61000-6-4:2007+A1:2011	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
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Year of CE Marking:	2014
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- **SAFETY PRECAUTIONS**

The product and the instruction manual describe important information to prevent possible harm to users and damage to the property and to use the product safely.

Understand the following description (signs and symbols), read the text and observe Descriptions.

- **DESCRIPTION OF SIGNS**

 RISK OF ELECTRICAL SHOCK	<i>This indicates a danger that may result in death or serious injury if not avoided.</i>
 CAUTION	<i>This indicates a danger that may result in minor or moderate injury or only a physical damage if not avoided.</i>

1. INTRODUCTION

Foreword

Thank you for purchasing 85XX⁺ Scanner / DAQ. This manual describes the basic functions and operation methods of 85XX⁺. Please read through this user's manual carefully before using the product.

This is a 32 bit controller based instrument designed for universal input type. This instrument is operated by eight user-friendly keys. These keys are used for operation and programming. The manual covers all aspects of operation of the instrument. Please read instructions carefully before altering any programming or configuration information.

The 85XX⁺ module operates independently and can also be connected to a data Highway for remote systems communication functions through a personal computer or a distributed control system (DCS) using RS 485 or Ethernet communication.

Notice

The contents of this manual are subject to change without notice as a result of continual 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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Version Number : 1.07, August 2015.

Checking the Contents of the Package

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

2. INSTALLATION

2.1 Safety Precautions in Installation



1. Before any other connection is made, the protective earth terminal shall be connected to a protective conductor. The mains (supply voltage) wiring must be terminated within the connector in such a way that, should it slip in the cable clamp, the Earth wire would be the last wire to become disconnected.

The protective conductor terminal is marked with a label on the product bearing the following Symbol:



- To connect the protective conductor terminal to earth, complete these steps:
 - 1) Use a spade lug to make contact with the metal surface of the 85XX*.
 - 2) Use a green and yellow wire to reliably earth the protective conductor terminal. Wire gauge must be no thinner than the current-carrying wire in the product's mains supply.
 - 3) Resistance between the protective conductor terminal and earth must be no greater than 0.1 ohms. Use thicker gauge wire if the resistance is too high.
- 2. Do not use this instrument in areas under hazardous conditions such as excessive shock, vibration, dirt, moisture, corrosive gases or oil. The ambient temperature of the areas should not exceed the maximum rating specified.
- 3. To minimize the possibility of fire or shock hazards, do not expose this instrument to rain or excessive moisture.



Be sure all personnel involved in installation, servicing, and programming are qualified and familiar with electrical equipment and their ratings.

Do not install, store, or use it in the place with a lot of dust, corrosive and flammable gases, vibrations and shocks exceeding the allowed values, place low or high temperature outside of the installation condition, direct sunlight and near equipment generating strong radio waves or magnetic fields, It may cause accidents.

2.2 Mounting of 85XX+

- **Mounting Method :** Panel Mounting
- **External Dimensions and Panel Cut Out Dimensions :**

Unit: mm

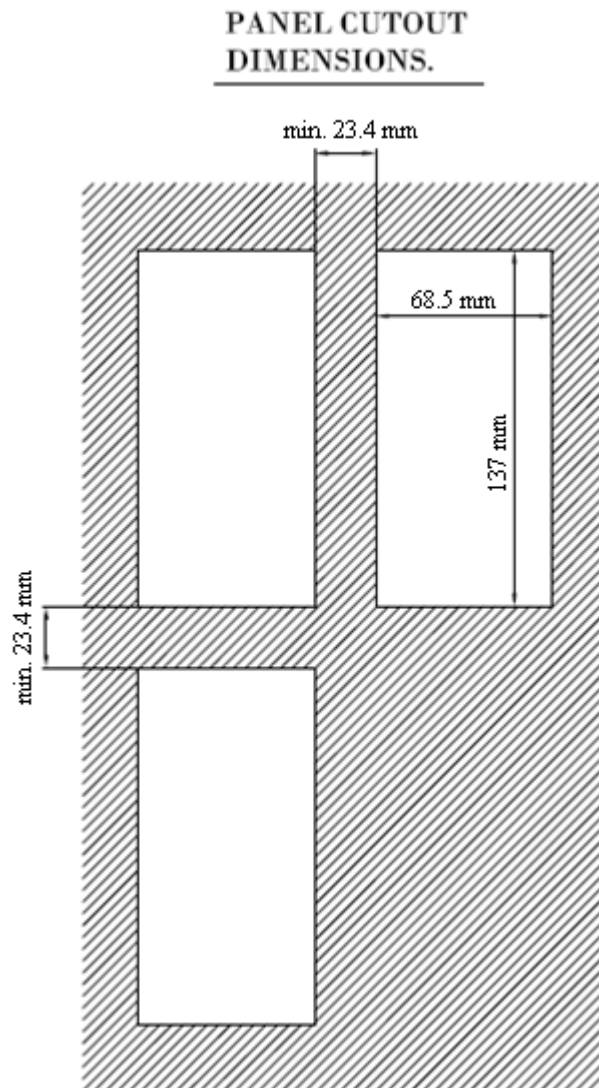


Figure 1 Panel Cutout Dimensions

- Side View and Top View

**INSTRUMENT MOUNTING
ARRANGEMENT.**

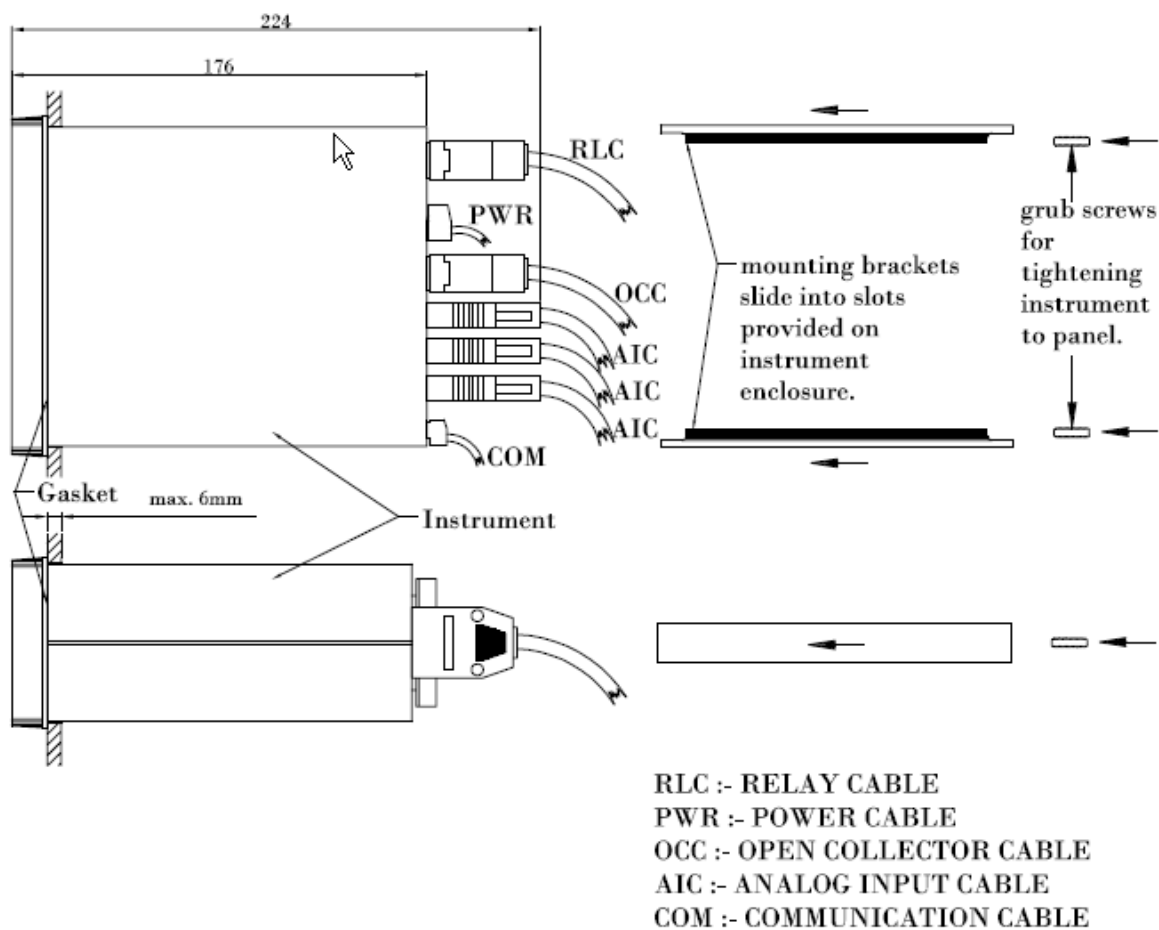


Figure 2 Side View and TOP view

Note : 1) DIC (Digital Input Cable) can be used in place of DOC(Digital Output Cable)
2) AOC (Analog Output Cable) can be used in place of DOC(Digital Output Cable)

2.3 Maintenance and Inspection

This Section describes maintenance and inspection such as daily inspection, periodical inspection, and cleaning.

Check the front panel 7-Segment Display:

- Channel (Green): ON when unit is powered up. It displays number from 1 to 24.
- Data (Red): ON when unit is powered up. It displays number from -1999 to 9999.
- Parameter (Orange): ON when unit is powered up. It displays Engineering Units.
- RUN (green): ON during normal operation.
- Fault (red): OFF when CPU is normal.

Check the front panel LEDs:

- Check the Control LED display Digital Output – Open collector (DO-OC). The corresponding LED illuminates when the external input signal (Analog Input) is above Control Set point.
- Check if the Open collector voltage and current is within the specified value.
- Check for looseness of the input prefab cable connector.
- Check if the unit is installed correctly.
- Check the Alarm LED display Digital Output – Relay (DO-RL). The corresponding LED illuminates when input signal (Analog Input) is above or below Alarm Set point.
- Check if the relay voltage and current is within the specified value.
- Check for looseness of the input prefab cable connector.
- Check if the unit is installed correctly.

Power supply related:

- AC Power voltage (measure at the power terminal block of the unit) 85-265VAC-50/60Hz⁽¹⁾
- DC Power voltage (measure at the power terminal block of the unit) 18-36VDC
- Check for looseness of the power terminal screw- No looseness.
- Check for damage of the wiring cable-No damage.

⁽¹⁾ Unit can also work on 110-370VDC Power Supply range however for this DC range it is not passed through compliance tests.

Installation state:

Check for looseness of the cable connector and damage of the cable-No looseness or damage.

Ambient environment:

Check if the temperature and humidity are within the specified values.

3. HARDWARE SPECIFICATION

3.1 Input Specification

NO. OF CHANNEL	8 or 16 or 24
APPLICABLE STANDARDS	DIN (ITS-90) for Thermocouple and RTD
INPUT TYPE	As specified in Error! Reference source not found..
SAMPLING PERIOD PER INPUT	50 ms for TC and Linear Input and 100 ms for RTD
RESOLUTION	17 bit
BURNOUT CURRENT	0.4 μ A
MEASUREMENT CURRENT	250 μ A
INPUT IMPEDANCE	>1 Mohm for RTD/Voltage inputs, 250ohms for current 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).

Input Range for RTD (PT-100, CU53 and NI120), TC and Linear input:

Table 1 Input types, their ranges, accuracy and resolution

Analog Input Type	Range	Accuracy	Resolution
E	-200 to 1000°C	$\pm 0.1\%$ of instrument range ± 1 digit	0.1°C
J	-200 to 1200°C		
K	-200 to 1370°C		
T	-200 to 400°C		
B	450 to 1800°C	$\pm 0.1\%$ of instrument range ± 1 digit	1°C
R	0 to 1750°C		
S	0 to 1750°C		
N	-200 to 1300°C		
RTD(PT100)	-199.9 to 850.0°C	$\pm 0.1\%$ of instrument range ± 1 digit	0.1°C
CU53	-210.0 to 210.0°C		
NI120	-70.0 to 210.0°C		
-10 to 20 mV	-1999 to 9999 counts	$\pm 0.1\%$ of instrument range ± 1 digit	1 Count
0 to 100 mV			
4-20mA			
0 to 20 mA			
0 – 5 V			
1 – 5 V			
0 – 10V			

3.1.1 Digital Input Specification(Optional)*

NUMBER OF INPUT CHANNELS	16
RATED INPUT VOLTAGE (FACTORY SETTABLE)	24 V DC
INPUT ON VOLTAGE	≥ 15 V DC
INPUT OFF VOLTAGE	≤ 5 V DC

INPUT CURRENT (AT RATED INPUT VOLTAGE)	3 mA $\pm$ 20% / Channel
MAXIMUM ALLOWABLE INPUT VOLTAGE	30 V DC
RESPONSE TIME	50 mSec

Note : * - With Digital Input, CE marking is not applicable/valid.

3.2 Output Specification

3.2.1 Digital Output- Relay

NUMBER OF OUTPUTS	8
PURPOSE	Alarm or trip or control or watchdog output
OUTPUT SIGNAL	Two terminals (C and NO) (Jumper selectable for NO or NC selection)
RELAY CONTACT RATING	250 VAC / 30 VDC @ 2A
NO. OF RELAY OPERATION	1 X 10 ⁵ @ rated current

3.2.2 Digital Output- Open Collector(Optional)

NUMBER OF OUTPUTS	24
PURPOSE	Alarm or trip or control or watchdog output
OUTPUT TYPE	transistor open collector output selection)
CONTACT RATING	30 V DC, 100 mA

3.2.3 Analog Output- Analog Output(Optional) *

NUMBER OF OUTPUTS	8
OUTPUT SIGNAL	0-20 mA, 4-20 mA or 0-5 V, 1-5 V, 0-10 V DC(Voltage or current outputs are factory settable)
LOAD RESISTANCE	For current output, 550 ohms Max. For Voltage output, Min. 3000 ohms.
OUTPUT ACCURACY	$\pm$ 0.25% of span

Note : * - With Analog Output, CE marking is not applicable/valid.

3.3 Programming and Setting

KEYPAD	8-keys (Menu, Escape, Up, Down, A/M, ACK, SET/OP and SET/AL) tactile membrane keypad provided for modification of all control and functional parameters.
CONFIGURATION SOFTWARE	All Configurable parameters can be set through PC Based software
MEMORY	Non volatile, restored after power loss

3.4 Communication Specification

NO. OF COMMUNICATION PORT	2-RS485(COM-1 and COM-2) . COM2 is Optional
COMMUNICATION TYPE	Half duplex/Asynchronous
COMMUNICATION PROTOCOL	MODBUS RTU (Baud rate and Parity bit are selectable). All parameters are Configurable through MODBUS Protocol.
MAXIMUM NO. OF UNITS	32
COMMUNICATION ERROR DETECTION	CRC Check

3.5 PROFIBUS Communication (Optional) *

MODE	Profibus DP Slave
BAUD RATE	9600, 19.2K, 44.45K, 93.75K, 187.5K, 500K, 1.5M, 12M bps(Auto Detected)
ADDRESS	Configurable through Configuration Software (0 to 125 Only)
NETWORK CAPACITY	- Multi-drop up to 31 modules, Plus a host, without a repeater - Up to 125 modules plus a host if four repeaters are used (i.e. one for every 31 nodes)
COMMUNICATION DISTANCE	Up to 1200 meters without a repeater using Type A wire (<30pF/m). 1200m @ 115Kbps or less 1000m @ 187.5Kbps 400m @ 500Kbps 200m @ 1.5Mbps 100m @ 12Mbps

Note : * - With Profibus communication , CE marking is not applicable/valid.

3.7 Network Connectivity (Optional)

NO. OF COMMUNICATION PORT	1(RJ-45)
TRANSMISSION SPEED	10 Mbps
NETWORK PROTOCOL	TCP/IP
APPLICATION PROTOCOL	MODNET

3.8 Data logging (Optional)

Data logging Memory Type	Flash Nonvolatile Memory (32 MB)
Data logging type	Periodic and Event(Alarm)
Periodic Memory Size	25 MB
Event Memory Size	7 MB
RTC Time format	DD/MM/YY – HH:MM:SS
Periodic Logging sampling time	1 Second minimum
Event polling time	1 second
USB Port *	1(USB mass storage device , USB 2.0)
USB Function	For retrieving logged data through Pen drive Only
Max. USB Mass storage device size	Upto 16 GB
USB Mass storage device format	- FAT16 (Recommended) - FAT32
USB fetched data file format	.xls (only)
USB data retrieving option	- Full Data Fetch (For Periodic and Event Records) - Fetch data by time(approximately) (For Periodic Records only)

Note : * - With USB port, CE marking is not applicable/valid. USB Port will work with Masibus Supplied Pen drive only.

3.9 Display Specification

CHANNEL NO. DISPLAY	2-digits, 7-segment, Green , 0.56" character height
DATA DISPLAY	4-digits, 7-segment, Red, 0.56" character height
PARAMETER DISPLAY	6-digits, 16-segment Alphanumeric, Orange LEDs, 0.3" character height
STATUS LEDs	24-Red LEDs for Alarm status, 24-Orange LEDs for Control Output, 8-Green LEDs for Relay status, 1-Red LED for Manual mode, 1- Green LED for Run mode,1-Red LED for Fault, 2-Green(Rx) & 2-Red(Tx) for Communication

3.10 Power Supply Specification

RATED VOLTAGE	85-265VAC-50/60Hz ⁽¹⁾ / 100-300VDC or 18-36VDC (Optional)
POWER CONSUMPTION	Max. 16 VA (85-265 VAC) and Max. 8 VA (18-36 VDC)

⁽¹⁾ Unit can also work on 100-300VDC Power Supply range however for this DC range it is not passed through compliance tests.

3.11 Signal Isolations And Insulation Specification

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

⁽¹⁾ Primary terminals indicate power terminals and relay output terminals

⁽²⁾ Secondary terminals indicate analog input signals, Digital Contact output terminals, communication terminals and Ethernet N/W terminal

Signal Isolation Specifications:

Table 2 Signal Isolation Specification

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

3.12 Construction, Installation, and Wiring Specification

MATERIAL	Aluminium extrusion
CONSTRUCTION	Panel Mount Top and Bottom mounting clamps (1 each)
CASE COLOR	Clear Anodized
WEIGHT	1.25 KG
ENCLOSURE DIMENSION	72mm (W) X 144mm (H) X 165mm (D)
PANEL CUTOUT	68.5mm (W) x 137mm (H)

3.13 Environmental Specification

AMBIENT TEMPERATURE	-10 to 55°C
HUMIDITY	30% to 95% RH (Non-Condensing)
TEMPERATURE COEFFICIENT	For All Analog input circuits < 100ppm
WEIGHT	1.25 KG
INSTRUMENT WARM-UP TIME	<15 minutes after power on
DEGREE OF PROTECTION	IP54 (From Front)

4. FRONT AND REAR PANEL DIAGRAM

4.1 Front Panel Diagram

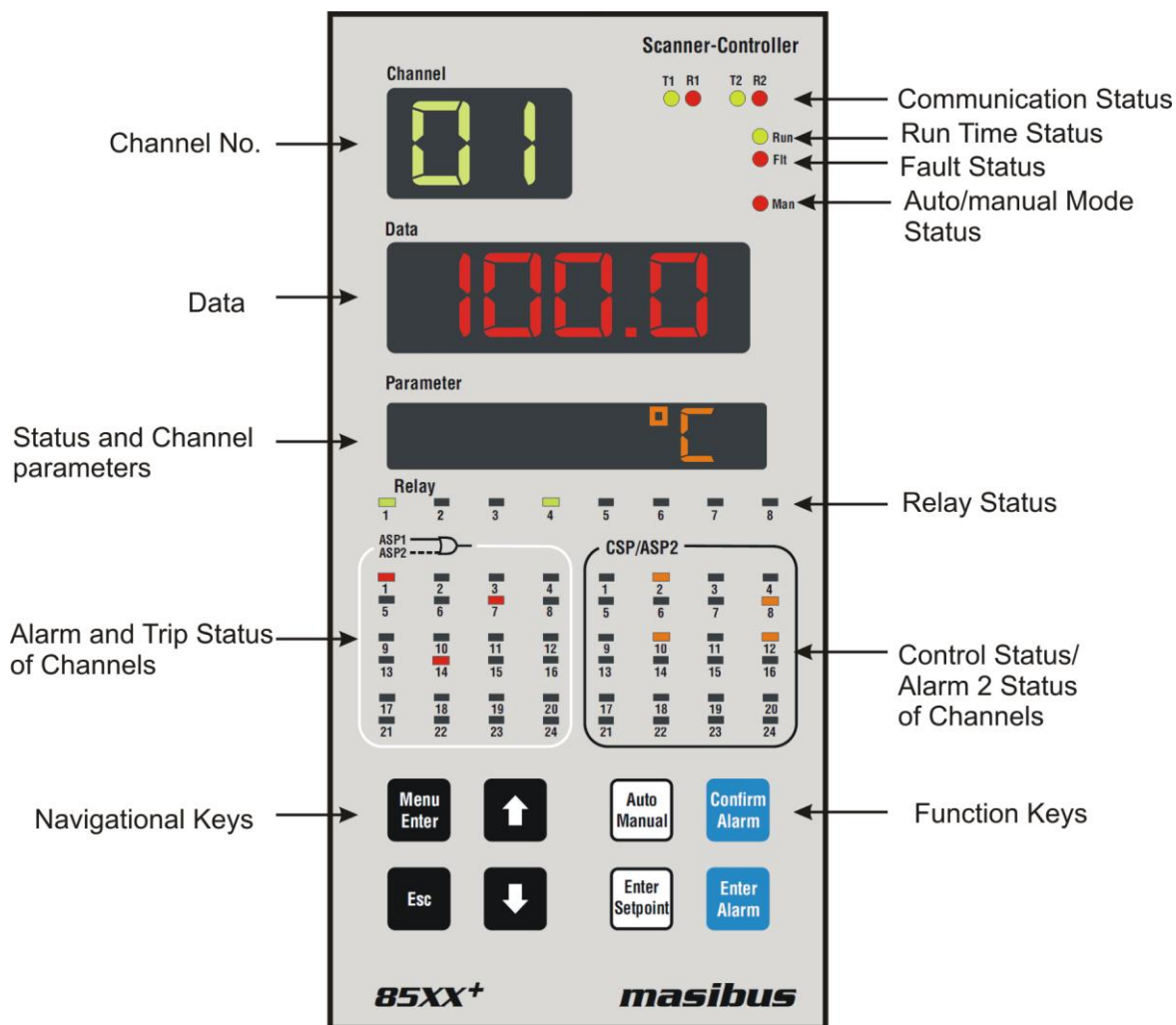


Figure 3 Front Panel Diagram

Name of Part	Indication on Front Panel
Channel Display	Channel
Data Display	Data
Parameter Display	Parameter
COM-1 RS485 slave indicator LED	T1 and R1
COM-2 RS485 master indicator LED	T2 and R2
Run indicator LED	Run
Auto/Manual Mode LED	MAN
Relay indicator LED	Relay
Control / Alarm-2 indicator LED	CSP/ASP2
Alarm-1+Alarm-2 indicator LED	ASP1+ASP2

4.2 Key Function Description

Keys		Operation
MENU/ENTER KEY		It allows Mode Selection when pressed during Run mode, while it allows saving value of a parameter inside a mode. When inside any mode, it allows to enter in sub-mode.
ESCAPE KEY		It is used to come out from mode/Sub-mode. It is also used to escape from edit mode without saving the respective parameter.
INCREMENT KEY		It is used in increment of value in run mode and other modes
DECREMENT KEY		It is used in decrementing value when run mode and other modes. It is also used for shifting a digit while editing of numeric value.(When user wants to edit numeric value, Decrement key will work as shift key)
AUTO/MANUAL KEY		It allows user to toggle between Auto Channel Display mode – Manual Channel Display Mode.
ACKNOWLEDGEMENT KEY		Acknowledge the Alarm During RUN Mode.
ALARM SETPOINT KEY		Enter into Set Alarm1 and Alarm2 mode during RUN Mode
CONTROL OUTPUT SETPOINT KEY		When pressed in run mode it will allow the user to enter into Control Set point Mode

4.3 Rear Panel Diagram

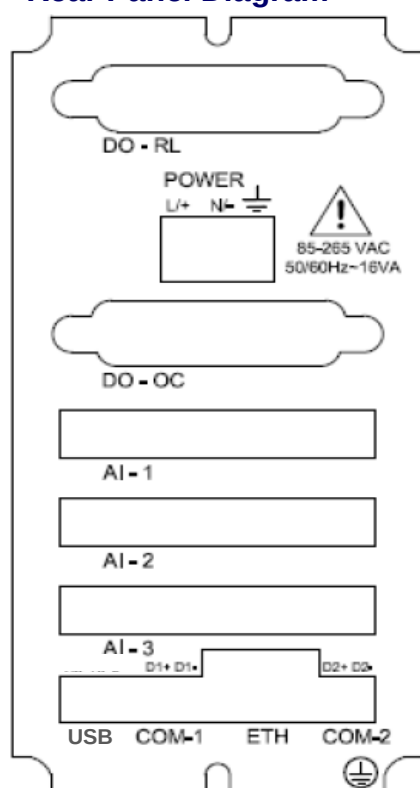


Figure 4 Rear Panel Diagram for AC Supply

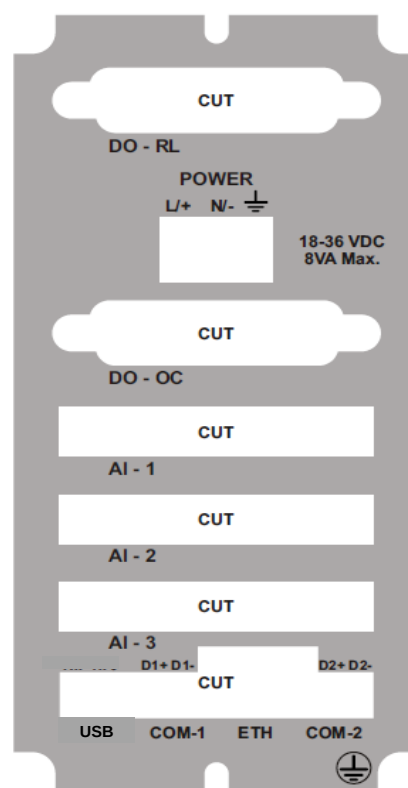


Figure 5 Rear Panel Diagram for DC Supply

- Rear Panel Diagram for Profibus Connectivity (Optional):

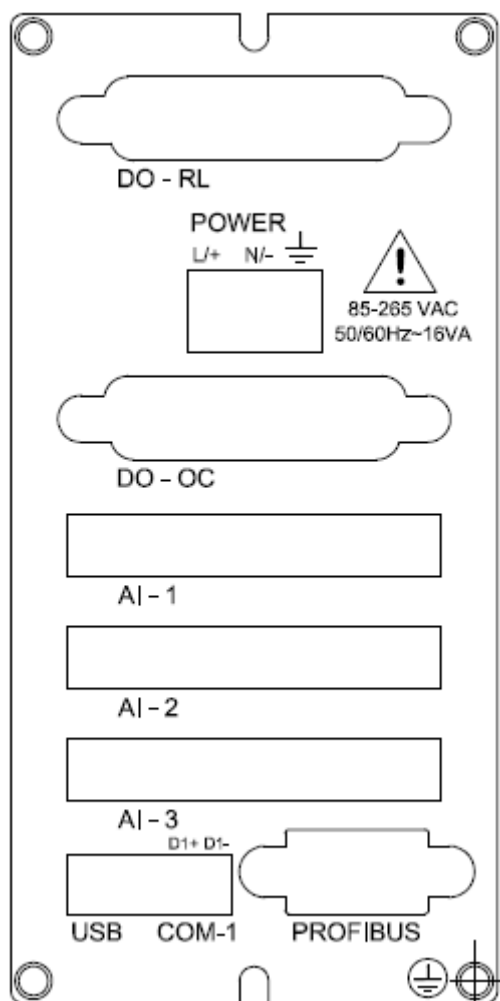


Figure 6 Rear Panel Diagram with AC Supply For Profibus Connectivity

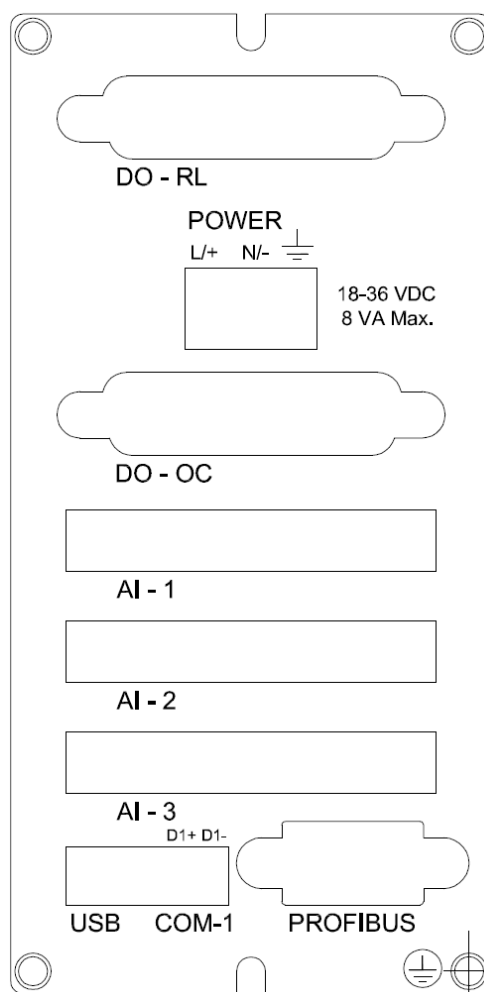


Figure 7 Rear Panel Diagram with DC Supply for Profibus Connectivity

5. CONNECTION DIAGRAM

5.1 Connection Terminal Details

- DO – RL Relay Terminals: 16
 - Pre-Feb. Cable
- Power Supply: Live (L/+), Neutral(N/-) and Earth ($\perp$)
 - Pre-Feb. Cable
- AI-1,2 and 3 Analog Input: 72 **or** AI-1 Analog Input: 8
 - Pre-Feb. Cable
- DO – OC Digital Contact Output: 25 **or** AO – Analog Contact Output: 16(Optional), DI-1 Digital Input: 16(Optional)
 - Pre-Feb. Cable
- RS-485 Communication: 4
 - Wire Size: 26- 16AWG
 - Screw Size: M2.0 Steel Ni Plated
- Ethernet Communication: 1
 - RJ-45 Connector

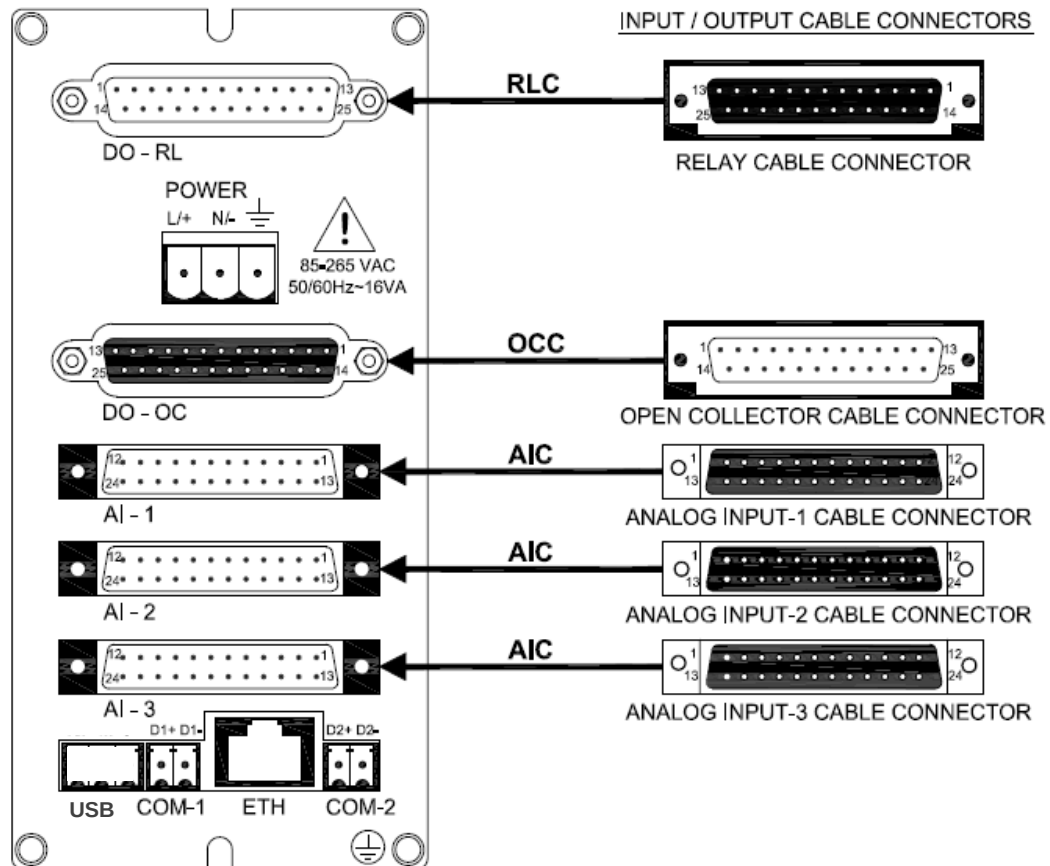
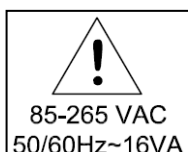


Figure 8 Connection Terminals



- 1 Do not touch the terminals of unit when power is ON. It may cause an electric shock.
- 2 Wire the power input terminal correctly, and avoid applying any voltage exceeding the specified voltage range. It may cause failure or damage.



Ground the device. Otherwise, it may cause an electric shock or fire.

COM-2

Connect the protective conductor terminal to earth, Use a spade lug to make contact with the metal surface of the 85XX⁺.



- 1 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.
- 2 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.
- 3 High voltage transients may occur when switching inductive loads such as some contactors. Through the internal contacts, these transients may introduce disturbances which could affect the performance of the instrument.
- 4 For this type of load it is highly recommended that a “snubber” is connected across the normally open contact of the relay switching through load. The recommended snubber consists of a series connected resistor/capacitor (typically 15nF/100Ohms). In addition a snubber will prolong the life of the relay contacts. A snubber should also be connected across a trick output to prevent false triggering under line transient conditions.

5.2 Cable Details

1) Digital Output – Relay Cable Details (For Two Output Terminals Only):

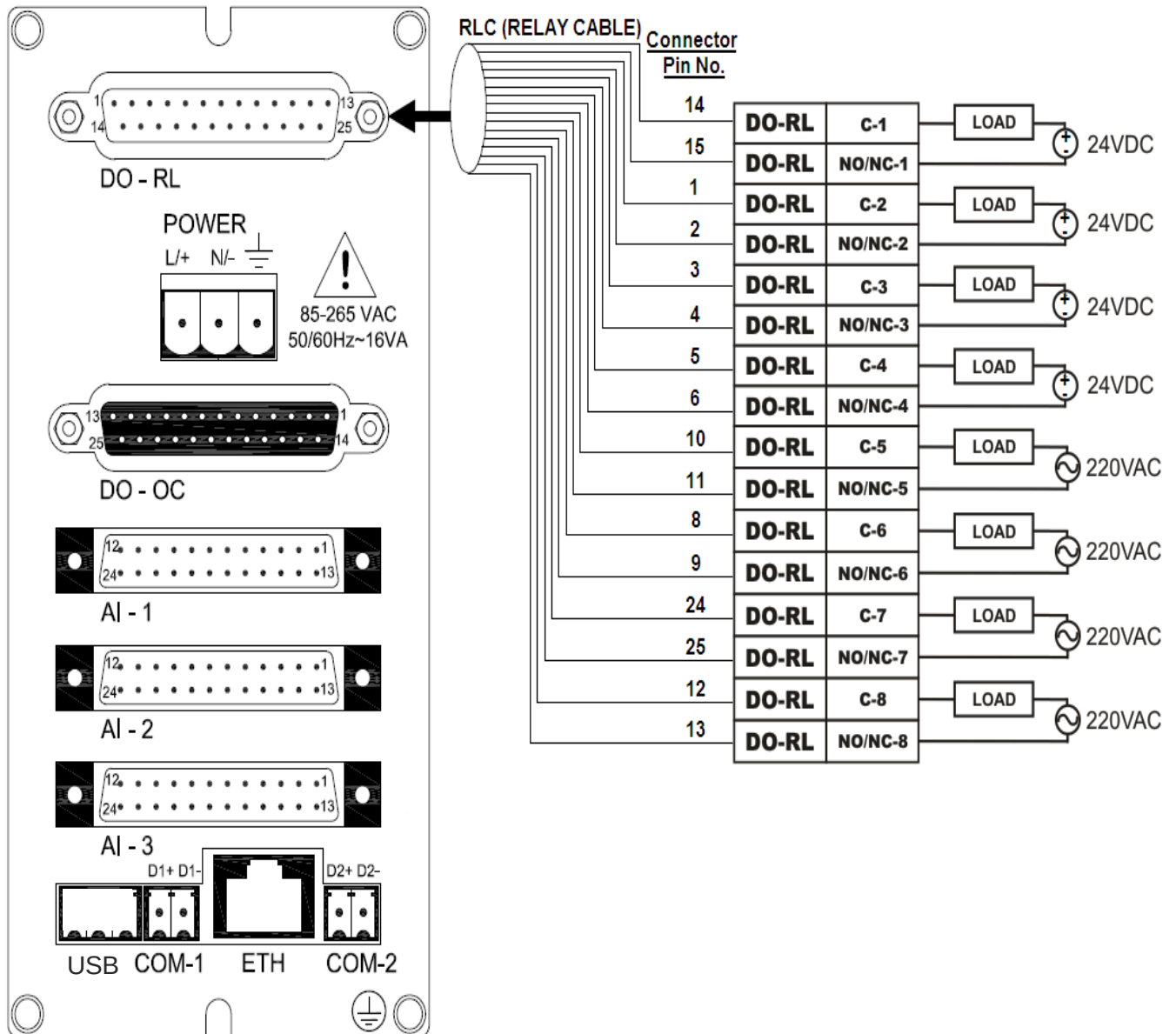


Figure 9 Relay Cable Connection (Two Output Terminals)

Table 3 Pin Details of Relay Cable (Two Output Terminals)

DIGITAL OUTPUT - RELAY (DO - RL) (Two Output Terminals)		
Sr. No.	Connector Pin No.	Ferrule Detail
1	14	COMMON 1
2	15	NO/NC -1
3	1	COMMON 2
4	2	NO/NC - 2
5	3	COMMON 3
6	4	NO/NC - 3
7	5	COMMON 4
8	6	NO/NC - 4
9	10	COMMON 5
10	11	NO/NC - 5
11	8	COMMON 6
12	9	NO/NC - 6
13	24	COMMON 7
14	25	NO/NC - 7
15	12	COMMON 8
16	13	NO/NC - 8
17 - 25	7 , 16-23	NOT CONNECTED

OR

1) Digital Output – Relay Cable Details (For Three Output Terminals Only)(Optional):

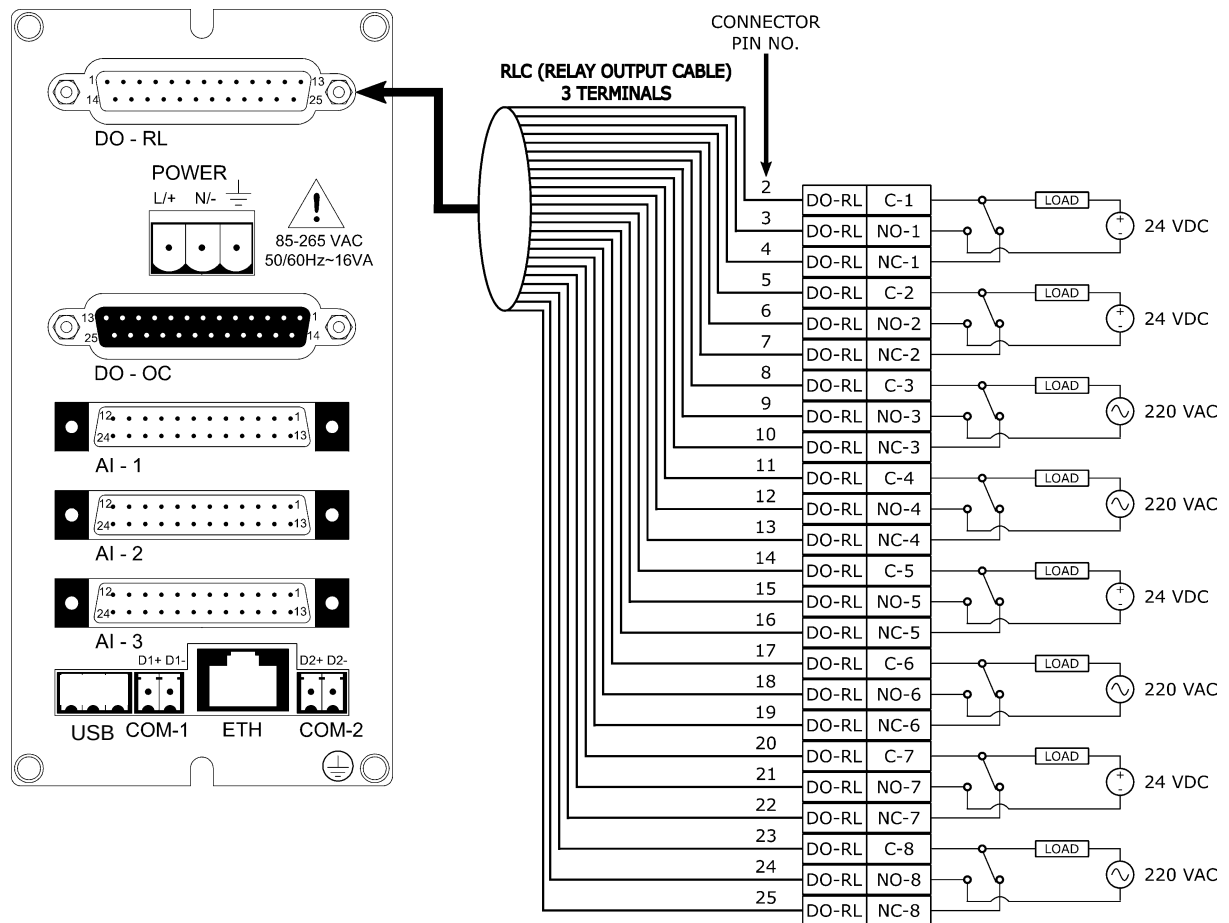


Figure 10 Relay Cable Connection (Three Output Terminals) (Optional)

Table 4 Pin Details of Relay Cable (Three Output Terminals) -(Optional)

DIGITAL OUTPUT - RELAY (DO - RL) (Three Output Terminals)		
Sr. No.	Connector Pin No.	Ferrule Detail
1	1	NOT CONNECTED
2	2	COMMON 1
3	3	NO -1
4	4	NC -1
5	5	COMMON 2
6	6	NO -2
7	7	NC -2
8	8	COMMON 3
9	9	NO -3
10	10	NC -3
11	11	COMMON 4
12	12	NO -4
13	13	NC -4
14	14	COMMON 5
15	15	NO -5
16	16	NC -5
17	17	COMMON 6
18	18	NO -6
19	19	NC -6
20	20	COMMON 7
21	21	NO -7
22	22	NC -7
23	23	COMMON 8
24	24	NO -8
25	25	NC -8

NOTE:- Low Profile Relay Card can be used in Open Collector output slot.

2) Digital Output – Open Collector Cable Details:

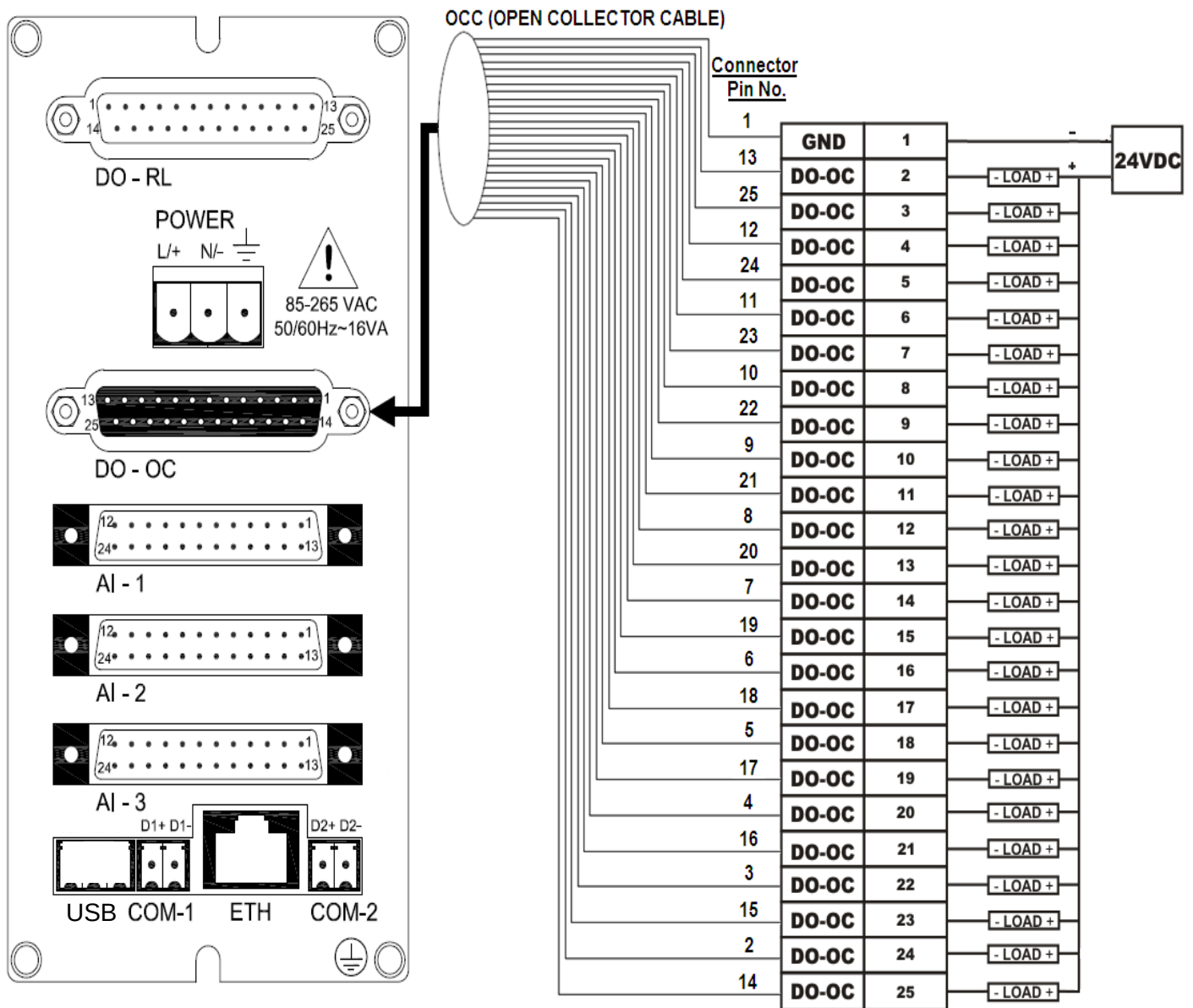


Figure 11 Open Collector Cable Connection

NOTE:- For External Relay Module with Internal Supply Connector Pin No. 1(GND) is use as +5VDC.

Table 5 Pin Details of Open Collector Cable

DIGITAL OUTPUT - OPEN COLLECTOR (DO - OC)		
Sr. No.	Connector Pin No.	Ferrule Detail
1	1	GROUND/+5VDC*
2	13	DO1
3	25	DO2
4	12	DO3
5	24	DO4
6	11	DO5
7	23	DO6
8	10	DO7
9	22	DO8
10	9	DO9
11	21	DO10
12	8	DO11
13	20	DO12
14	7	DO13
15	19	DO14
16	6	DO15
17	18	DO16
18	5	DO17
19	17	DO18
20	4	DO19
21	16	DO20
22	3	DO21
23	15	DO22
24	2	DO23
25	14	DO24

***NOTE:- For External Relay Module with Internal Supply Connector Pin No. 1(GND) is use as +5VDC.**

3) Analog Input Cable Details:

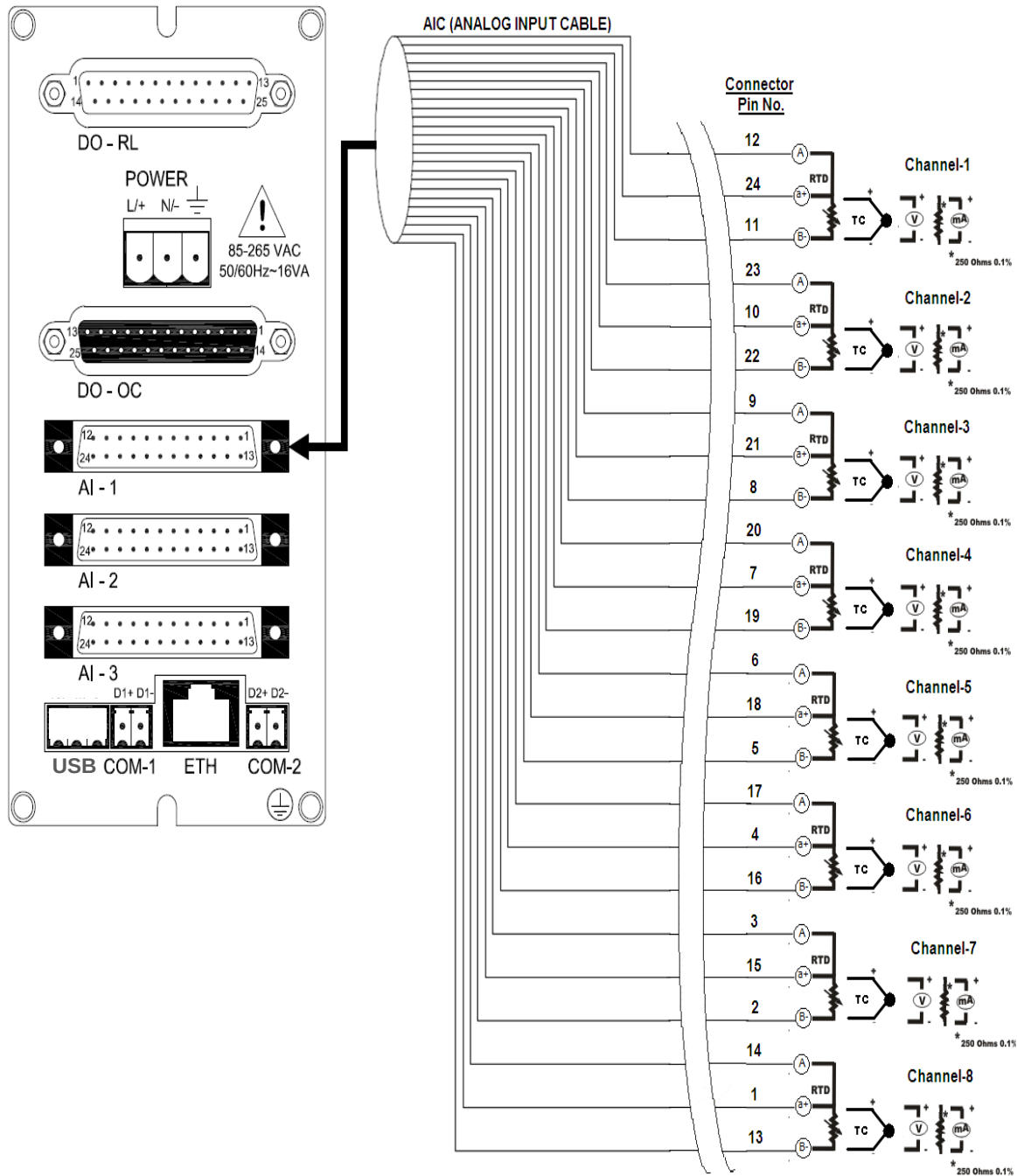


Figure 12 Analog Input Cable Connection

Table 6 Pin Details of Analog Input Cable

ANALOG INPUT (AI-1 , AI-2 , AI-3)		
Sr. No.	Connector Pin No.	Ferrule Detail
1	12	1A
2	24	1a/+
3	11	1B/-
4	23	2A
5	10	2a/+
6	22	2B/-
7	9	3A
8	21	3a/+
9	8	3B/-
10	20	4A
11	7	4a/+
12	19	4B/-
13	6	5A
14	18	5a/+
15	5	5B/-
16	17	6A
17	4	6a/+
18	16	6B/-
19	3	7A
20	15	7a/+
21	2	7B/-
22	14	8A
23	1	8a/+
24	13	8B/-

4) Analog Output Cable Details:

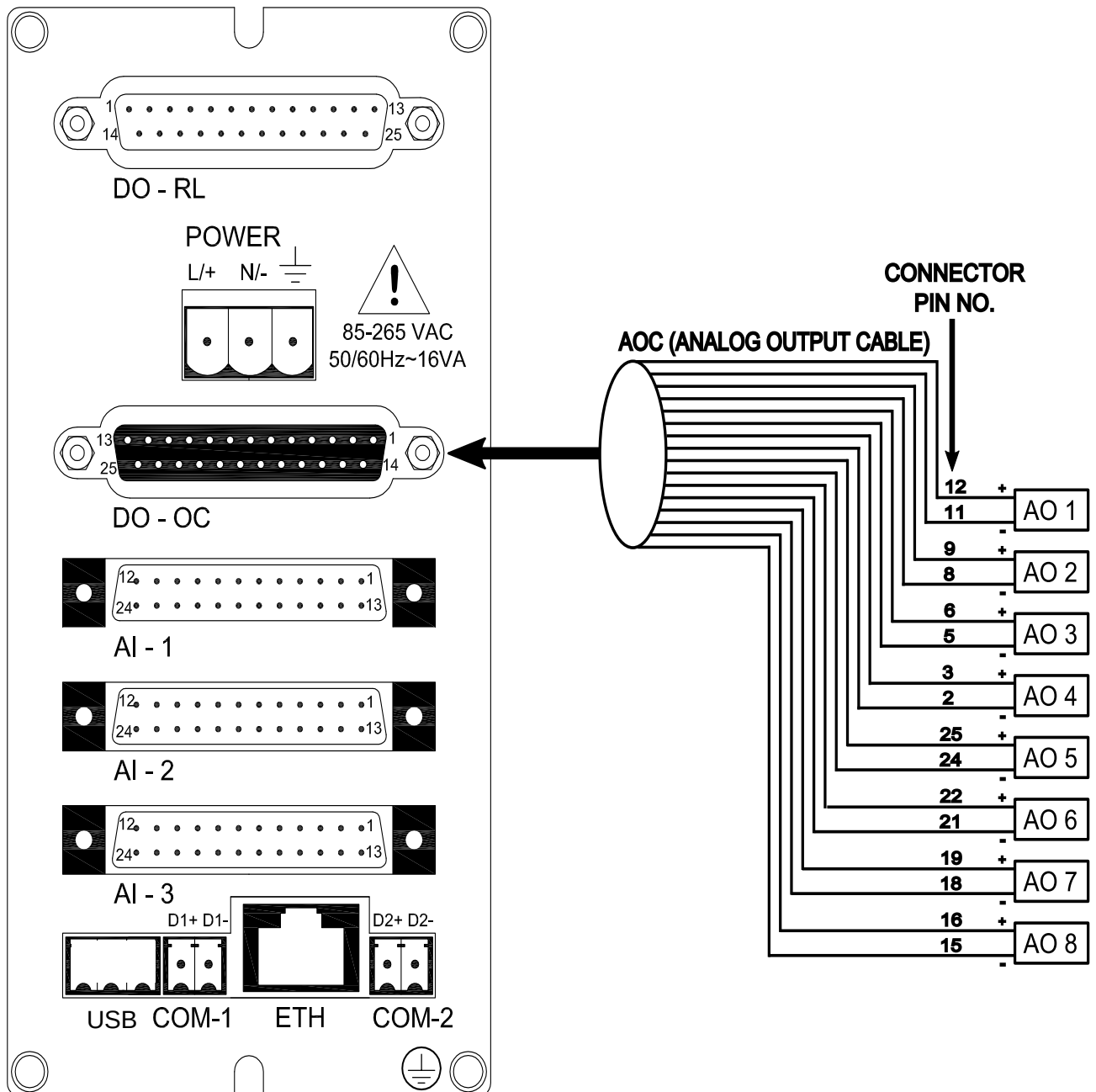


Figure 13 Analog Output Cable Connection

Table 7 Pin Details of Analog Output Cable

ANALOG OUTPUT (AO)		
Sr. No.	Connector Pin No.	Ferrule Detail
1	12	AO 1 +
2	11	AO 1 -
3	9	AO 2 +
4	8	AO 2 -
5	6	AO 3 +
6	5	AO 3 -
7	3	AO 4 +
8	2	AO 4 -
9	25	AO 5 +
10	24	AO 5 -
11	22	AO 6 +
12	21	AO 6 -
13	19	AO 7 +
14	18	AO 7 -
15	16	AO 8 +
16	15	AO 8 -
17 - 25	1,14,4,17,7,20,10,23,13	NOT CONNECTED

5) Digital Input Cable Details:

Refer following table for Digital Input Cable Pin detail (In Open Collector Card Slot).

Table 8 Pin Details of Digital Input Cable

DIGITAL INPUT (DI)		
Sr. No.	Connector Pin No.	Ferrule Detail
1	1	NOT CONNECTED
2	13	DI 1
3	25	DI 2
4	12	DI 3
5	24	DI 4
6	11	COMMON 1
7	23	DI 5
8	10	DI 6
9	22	DI 7
10	9	DI 8
11	21	COMMON 2
12	8	DI 9
13	20	DI 10
14	7	DI 11
15	19	DI 12
16	6	COMMON 3
17	18	DI 13
18	5	DI 14
19	17	DI 15
20	4	DI 16
21	16	COMMON 4
22	3	INTERNAL SUPPLY
23	15	+12 V / +24 V
24	2	0
25	14	NOT CONNECTED

6) Communication Cable Details:

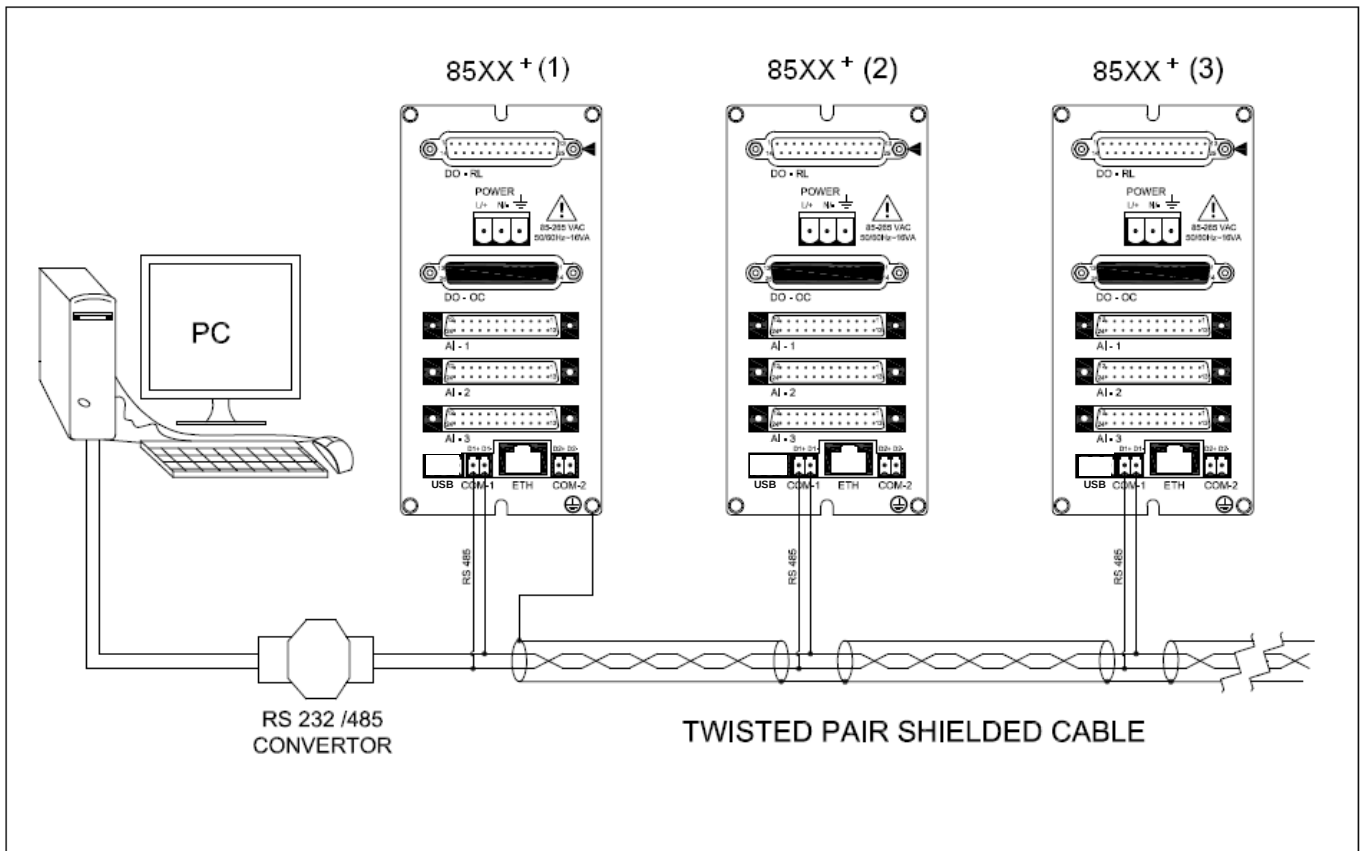


Figure 14 Communication Cable Connection

RS485 Cabling Methodology should be Shielded single twisted pair cable. RS485 is designed to be used with a single twisted pair cable. It would reduce noise induced through ground potential differences. This is the preferred option in areas where there is a potential for high electrical noise or if cabling lacks the cleanliness of conduit or wire trays.

Good installation practice for RS485 systems:

- Use RS485 shielded twisted cable to prevent electrical noise pickup.
- Use a screened cable to prevent electrical noise pickup. This screen must be earthed at one end only, UNIT-1.
- Do not carry RS485 and power supply in same cables.
- Do proper termination and/or shielding to provide isolation from high frequency interference, RFI, and transients.

7) PROFIBUS Connection Detail (DB 9 FEMALE at Instrument Side)

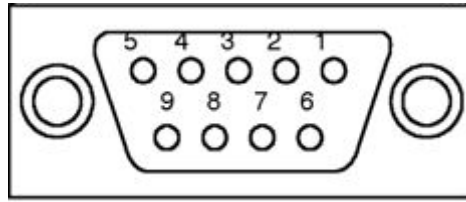


Table 9 Pin Details for Profibus Communication (DB 9 Female at Instrument Side)

Pin No.	Signals	Description
DATA AND POWER SIGNALS		
3	RxD/TxD-P	Receive/Transmit data; line B
4	CNTR-P	Control of repeater direction
5	DGND	Data ground (reference voltage to VP)
6	VP	Power supply +5v (e.g. for bus termination)
8	RxD/TxD-N	Receive/Transmit data; line A
CONFIGURATION SIGNALS		
1	RxD – CFG	Receive Data – Configuration
2	GND – CFG	Ground – Configuration
7	RTS – CFG	Request to Send - Configuration
9	TxD – CFG	Transmit Data – Configuration

Note : Make Profibus Configuration Cable as shown in below figure.

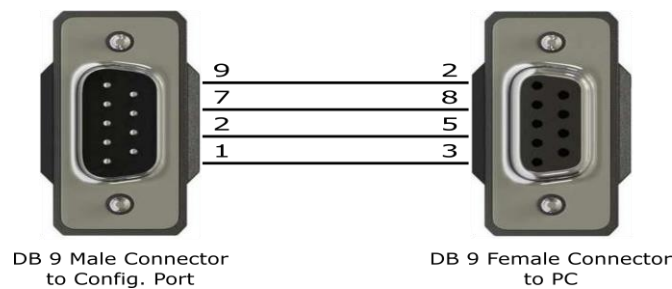


Figure 15 Profibus Configuration Cable

6. BRIEF OPERATING PROCEDURE

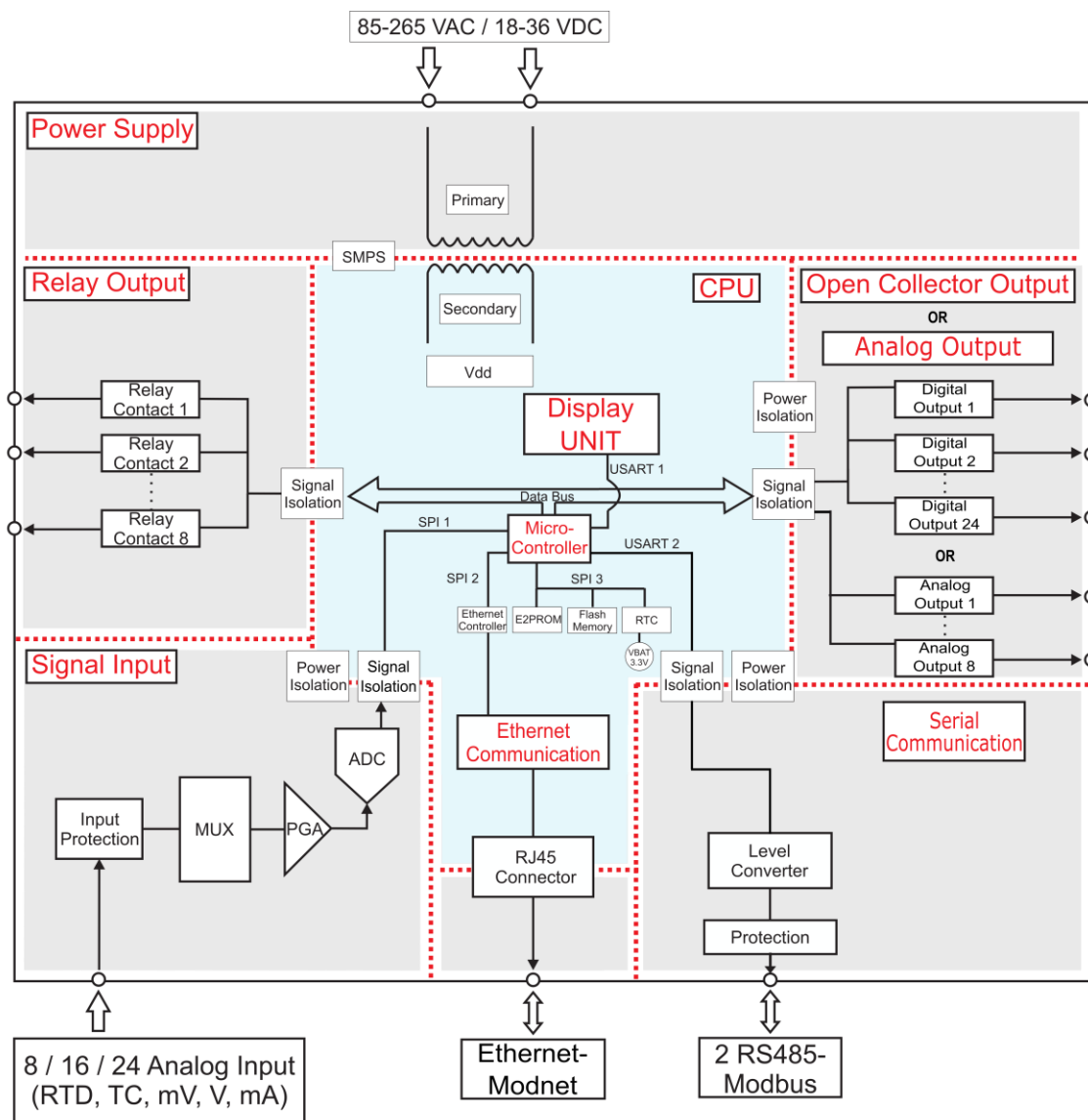


Figure 16 Functional Block Diagram of 85XX⁺

• Brief Operating Procedure :

- 1) Connect Digital Output- Relay cable and Open Collector / Analog Output cable , Analog Input cable and Communication cable to 85XX⁺ as shown in Figure 9, Figure 10, Figure 11 ,Figure 12, Figure 14 respectively.
- 2) Connect Power supply (Either 85-265 VAC or 18-36 VDC , as per the ordering code) to 85XX⁺. The power on message on display will be “disp Init..”.
- 3) According to the input type configuration and input sensor feed from field, the temperature / mV / V / mA will be displayed on DATA window and on PARAMETER window user can choose favorite display parameters like input type of particular channel or log memory percentage(**optional**) or engineering unit of particular channel or ambient temperature or serial number of 85XX⁺ . On LED status, user can set Alarm 1 Status – Alarm 2 Status or Alarm Status – Control Output Status or Alarm Status – Open Collector Status or Alarm Status – Digital Input Status.
- 4) For in depth parameter details, see following chapters.

7.1 Parameter Flow Diagram

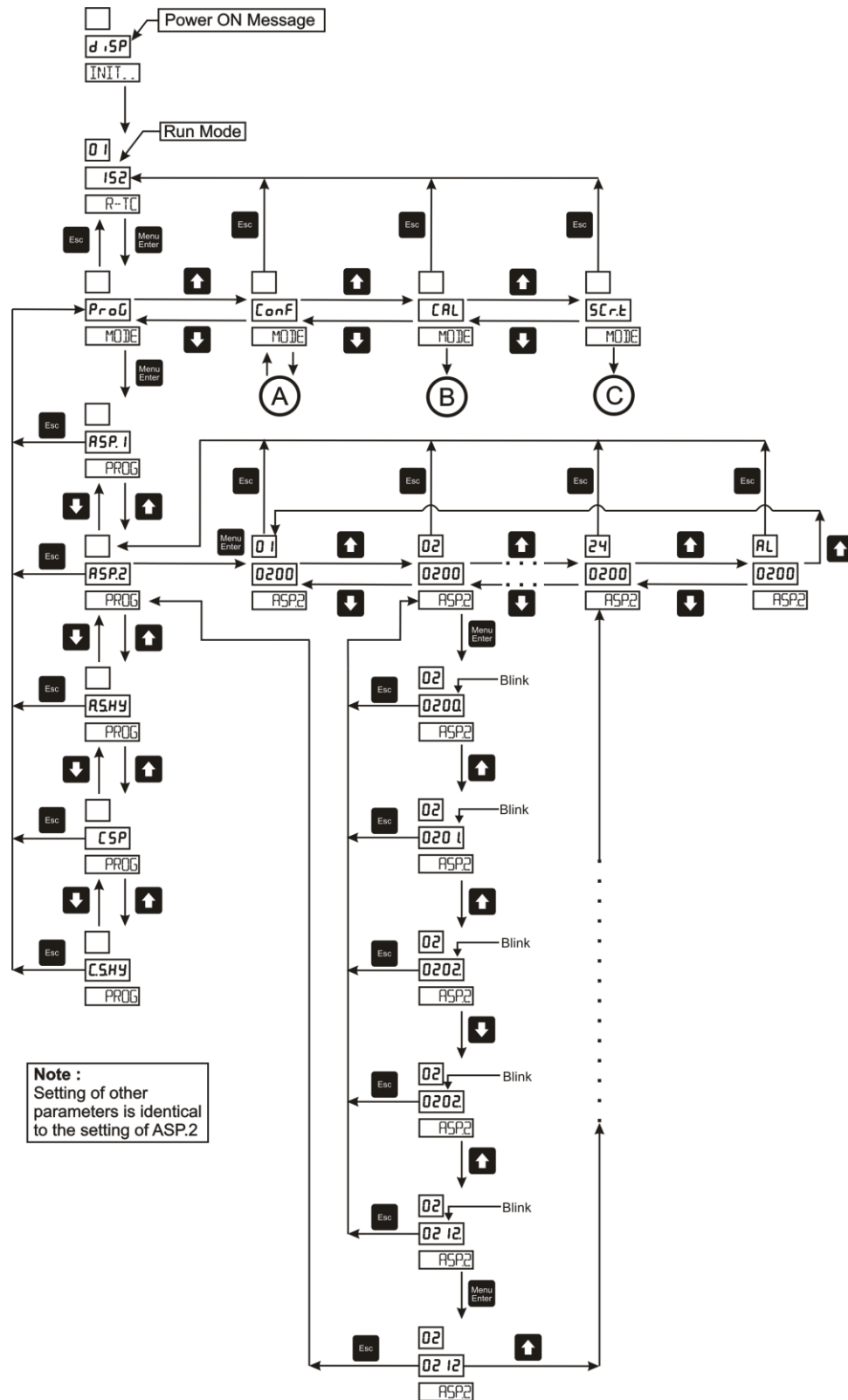


Figure 17 Program Mode Flow diagram

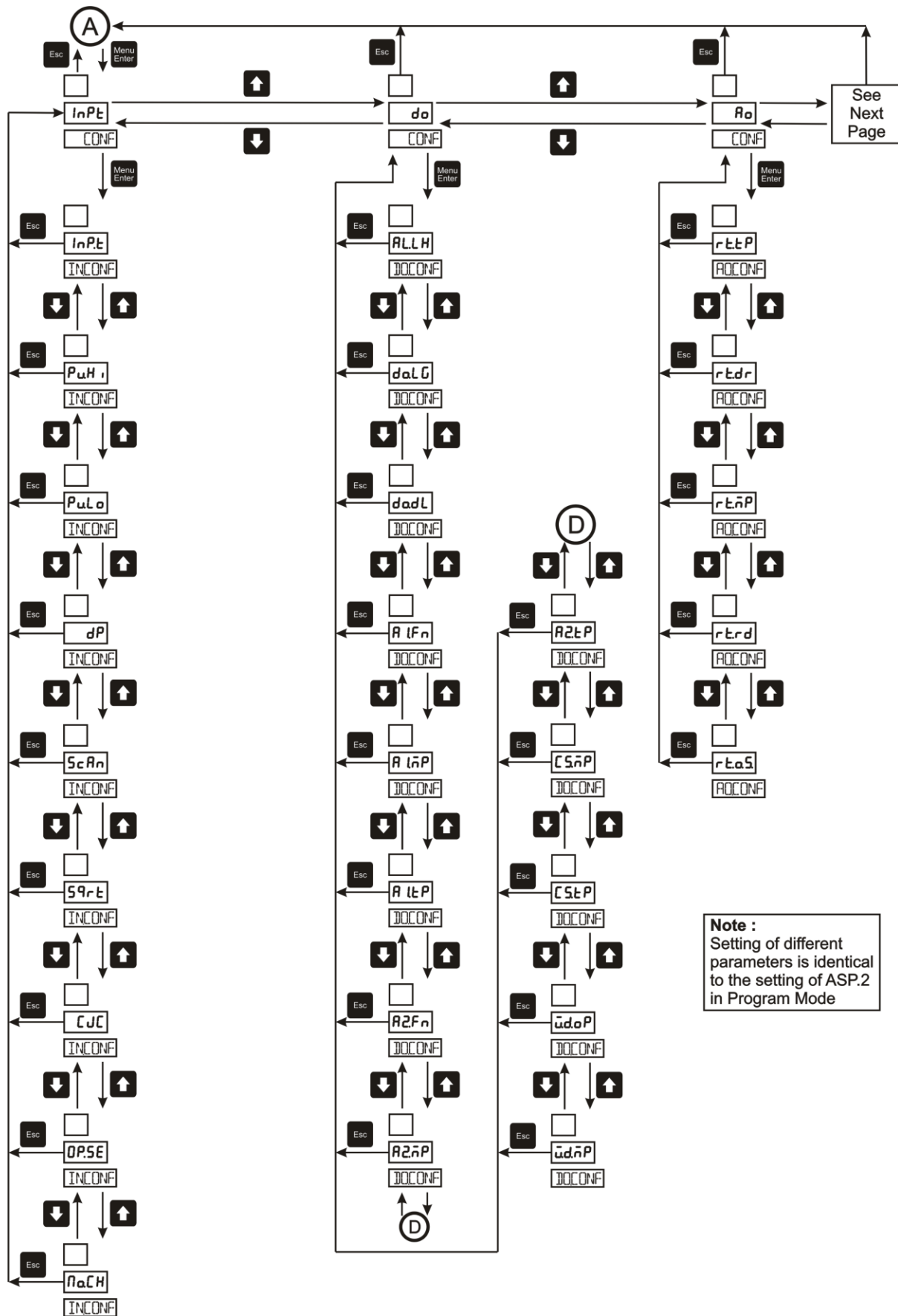


Figure 18 Configuration Mode Flow diagram

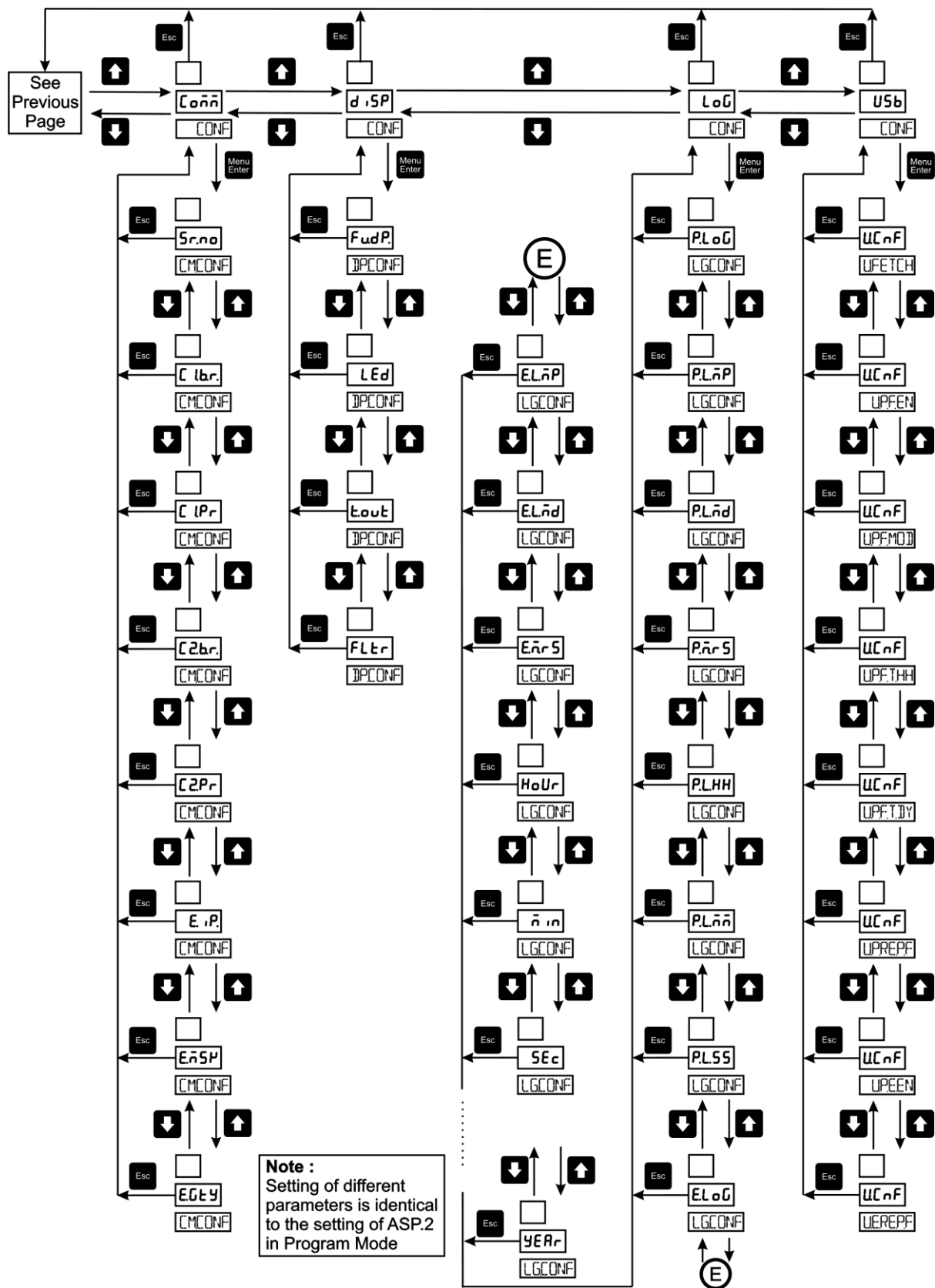


Figure 19 Configuration Mode Flow diagram

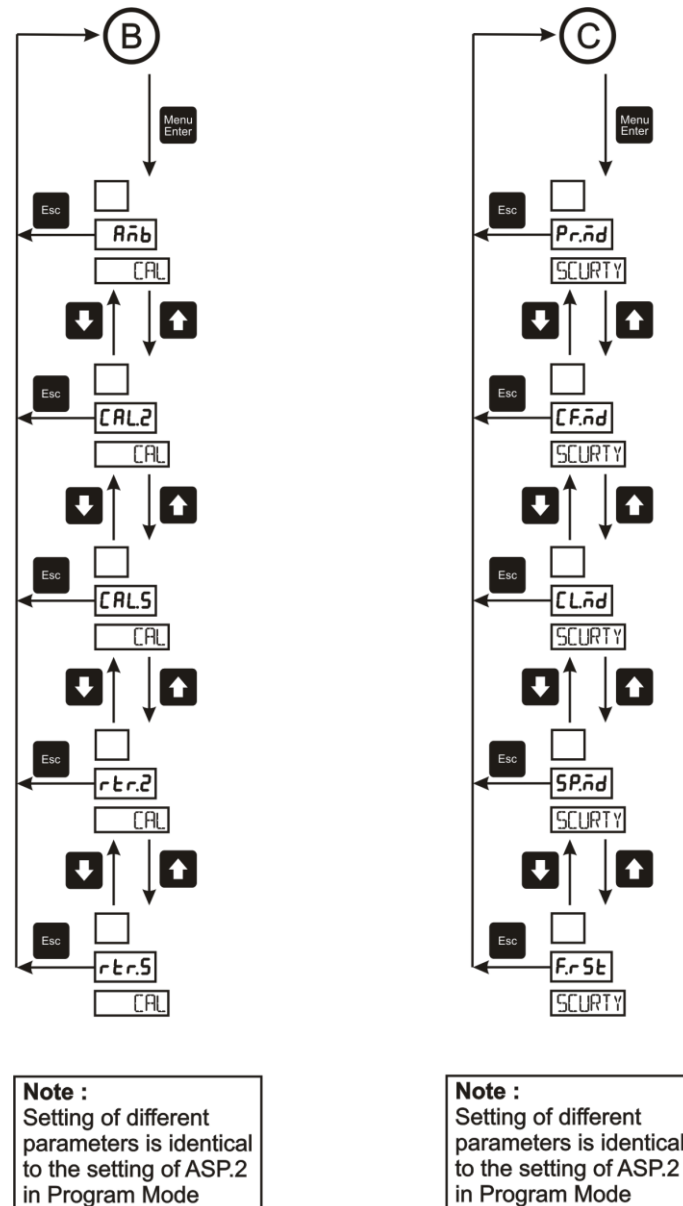


Figure 20 Calibration Mode and Security Mode Flow diagram

7.2 Menu Parameters- In Detail

• Run Mode :

Following parameters can view or change during run time.

- Immediately after powering, unit will run in Auto Mode. In auto mode channel will scan automatically according to scan time selection (1-250 second).
- By pressing **Auto / Manual Key** in run mode, Channel number scanning on display is stopped. By pressing increment key/decrement key , we can change channel number manually.
- By pressing **Confirm Alarm Key** in any mode, relay acknowledgement can be done.
- By pressing **Auto / Manual Key** after going into the Manual Mode unit comes back to run mode.

- By pressing **Enter Alarm Key** in run mode, the menu goes into the settings of alarm set point value.
- By pressing **Enter Setpoint Key** in run mode, the menu goes into the settings of control set point value (whenever Control Alarm is required). If Control alarm is not required then –n.A.– (not applicable) message will be displayed.

• **Other Modes :**

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

1. Program mode
2. Configuration mode
3. Calibration mode
4. Security Mode

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

1) Program Mode :

Pressing MENU key DATA window shows **Prog** (Prog) message and Parameter window shows **MODE** (Mode) message. Press MENU key again PARAMETER window shows **PWD** (PWD) message (if and only if password is set then only. Otherwise it will enter into sub menu), press MENU Key to enter into edit mode of password and then press INCREMENT key or DECREMENT key to modify the password and then press MENU Key to enter into Program Mode. DATA window shows **ASP .1** (ASP.1) message and PARAMETER window shows **PROG** (PROG) message. By pressing MENU Key, DATA window shows Set Point-1 Value. Then use MENU Key to enter into editing mode and use INCREMENT and DECREMENT key to modify value. OR press INCREMENT key again to change Set-point 1 for Channel 2. After pressing INC key many times, the message on Channel Window shows **AL** (AL) which means user can modify parameters for all channels at once (**AL** = ALL). ESCAPE KEY is used to come out ASP.1

Table 10 Program Mode Parameters

Program Mode					
Data Window	Parameter Window	Name	Setting name and description	Default value	Shows only if
Symbol	Symbol				
0 0	PWD (PWD)	Program Mode Password	0 to 9999	0	Password is other than zero
ASP .1 (ASP.1)	PROG (PROG)	Alarm Set point-1	SetPoint-1 for Channel 1 to 24 (Where total Number of Channels=24).	0090 (for all 24 channels)	-
ASP .2 (ASP.2)	PROG (PROG)	Alarm Set point-2	SetPoint-2 for Channel 1 to 24 (Where total Number of Channels=24).	0110 (for all 24 channels)	-
ASP .HY	PROG	Alarm Set	Alarm Set point Hysteresis for all 24	0001 (for all 24)	-

(A.S.Hy)	(PROG)	point Hysteresis	Channels(Where total Number of Channels = 24)	channels)	
[SP (CSP)	PROG (PROG)	Control Set Point	Control SetPoint for Channel 1 to 24 (Where total Number of Channels=24).	0100(for all 24 channels)	Control Output is required
[.S.HY (C.S.Hy)	PROG (PROG)	Hystresis	Control Set point Hysteresis for all 24 Channels(Where total Number of Channels = 24)	0001(for all 24 channels)	Control Output is required

2) Configuration Mode :

Pressing MENU key DATA window shows **[onF** (Conf) message and Parameter window shows **MODE**(Mode) message. Press MENU key again PARAMETER window shows **PW** (PWD) message(if and only if password is set other than zero. Otherwise it will enter into sub menu), press MENU Key to enter into edit mode of password and then press INCREMENT key or DECREMENT key to modify the password and then press MENU Key to enter into Configuration Mode. DATA window shows **InPt** (Inpt) message and PARAMETER window shows **CONF** (CONF) .Press MENU Key to enter into sub menu of Input configuration . DATA window shows **InP .t** (Inp.t) and PARAMETER window shows **IN.CONF** (IN.CONF). Press MENU Key to enter into sub menu of parameter . DATA window shows **P-tc** (K-tc) and PARAMETER window shows **INP.T** (INP.T) along with channel number . Then use MENU Key to enter into editing mode and use INCREMENT and DECREMENT key to modify value. OR press INCREMENT key again to change Input type for Channel 2 . After pressing INC key many times, the message on Channel Window shows **AL** (AL) which means user can modify parameters for all channels at once(**AL** = ALL). ESCAPE KEY is used to come out INP.T .

Table 11 Configuration Mode Parameters

Configuration Mode					
Data Window	Parameter Window	Name	Setting name and description	Default value	Shows only if
Symbol	Symbol				
0 0	PW (PWD)	Program Mode Password	0 to 9999	0	Password is other than zero
InPt (Inpt)	CONF (CONF)	Input Configuration	Different parameters for Input Configuration	-	-
do (do)	CONF (CONF)	DO(Digital Output) Configuration	Different parameters for DO (Digital Output) Configuration	-	Any of Digital Output is required
ao (Ao)	CONF (CONF)	AO(Analog Output) Configuration	Different parameters for AO (Analog Output) Configuration	-	Analog Output is required
[on (Comm)	CONF (CONF)	Communication Configuration	Different parameters for Communication Configuration	-	-
d,SP (diSP)	CONF (CONF)	Display Configuration	Different parameters for Display Configuration	-	-
LoG (LoG)	CONF (CONF)	Logging Configuration	Different parameters for Logging Configuration	-	Logging is required

Table 12 Sub Parameters of Input Configuration Mode

Sub parameters of Input Configuration Mode					
Data Window	Parameter Window	Name	Setting name and description	Default value	Shows only if
Symbol	Symbol				
InP .t (Inp.t)	IN. CONF (IN.CONF)	PV Input Type (E, J, K, T Etc.)	Follow Table 13 (Input type for 1-24 channel) Refer Note 1 for Digital Input)	K-TC(for all 24 channel)	-
Pv .Hi (Pv.Hi)	IN. CONF (IN.CONF)	Process value range high setting (PV.Hi > PV. Lo)	Range of the sensor /-1999 to 9999 (for linear input types)(1-24 Channel)	1370(for all 24 channel)	-
Pv .Lo (Pv.Lo)	IN. CONF (IN.CONF)	Process value range lower setting	Range of the sensor /-1999 to 9999 (for linear input types)(1-24 Channel)	-200(for all 24 channel)	-
dP (dP)	IN. CONF (IN.CONF)	Decimal Point Setting Only applicable for Linear input type	0 to 3(1 – 24 Channel)	0(for all 24 channel)	-
SCAN (SCAN)	IN. CONF (IN.CONF)	Scan Time	1 to 250 seconds	-	-
Sqrt (Sqrt)	IN. CONF (IN.CONF)	Square root (Only applicable for Linear input types)	YES / no (YES/NO) 0 : NO 1: YES	0(for all 24 channel)	-
CJC (CJC)	IN. CONF (IN.CONF)	Cold Junction Compensation	ACJC/FCJC/CCJC (ACJC/FCJC/CCJC) 0 : ACJC(Auto Cold Junction Compensation) 1 : FCJC (Fixed Cold Junction Compensation from -10.0 to 65.0 °C) 2 : CCJC(Channel Cold Junction Compensation from Channel number 1 - 24) (CJC is applicable to only TC type inputs) (Only RTD type input channel can be set as Channel CJC) Refer Note 1	1 (FCJC = 000.0)	-
oP .SE (oP.SE)	IN. CONF (IN.CONF)	Open Sensor	UP/down (UP/Down) 0: Down 1: UP	0 (for all 24 channel)	-
no .CH (no.CH)	IN. CONF (IN.CONF)	Number of Channels	Total Number of Channels (from number 1 to 24)	24	-

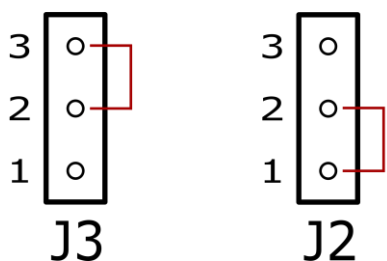
Table 13 Input Type Selection

Type	I/PNO	Type Display	Range	Resolution
NONE	0	NONE	-	-
E	1	E-TC	-200 to 1000°C	0.1°C
J	2	J-TC	-200 to 1200°C	
K	3	K-TC	-200 to 1370°C	
T	4	T-TC	-200 to 400°C	
B	5	B-TC	450 to 1800°C	1 °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	0.1°C
CU53	10	CU53	-210.0 to 210.0°C	
NI120	11	NI120	-70.0 to 210.0°C	
-10 to 20mV	12	-10.20mV	-1999 to 9999 Counts	1 Count
0 to 100 mV	13	0-100mV		
4 to 20mA	14	4-20mA		
0 to 20mA	15	0-20mA		
0 to 5V	16	0-5V		
1 to 5V	17	1-5V		
0 to 10V	18	0-10V		

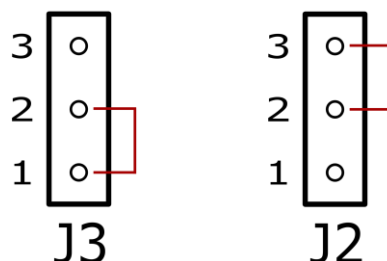
Note 1 (For Digital Input Type Only):

- 1) User can set common terminals as common anode (+Vcc) or common cathode (GND) on his own. For setting of these configurations refer jumper setting as shown in below image.

For Common Terminals as
Common Anode (+Vcc)



For Common Terminals as
Common Cathode (GND)



- 2) For Auto CJC and Fixed CJC User can use all Channels based on Analog Input Card (e.g. No. of Channel 8, 16, 24) but For Channel CJC User can use only No of Channels -1 Channel based on Analog Input Card (e.g. No. of Channel 7, 15, 23) and 1 channel is used for Channel CJC (RTD input channel can be set as CCJC).

Table 14 Sub Parameters of DO(Digital Output) Configuration Mode

Sub parameters of DO(Digital Output) Configuration Mode					
Data Window	Parameter Window	Name	Setting name and description	Default value	Shows only if
Symbol	Symbol				
AL.LH (AL.LH)	DO.CONF (DO.CONF)	Alarm Latch	on / OFF (ON/OFF) 0 : OFF 1: ON	0	-
do.LG (do.LG)	DO.CONF (DO.CONF)	DO(Digital Output) Logic Applicable for 8 Relays (Optional) , 24 Open Collectors (Optional)	nr / FS (Normal / Fail Safe) 0: NORMAL 1: FAIL SAFE (For all 32 DO(Digital Output))	0 (for all 32 DO(Digital Output)) (Relay 1-8 and Open Collector 1-24)	Any of Digital Output(Either Relay or Open Collector) is required
do.dL (Pv.Lo)	DO.CONF (DO.CONF)	DO(Digital Output)Delay Applicable for 8 Relays (Optional) , 24 Open Collectors (Optional)	0 to 99 seconds (For all 32 DO(Digital Output))	1 (for all 32 DO(Digital Output)) (Relay 1-8 and Open Collector 1-24)	Any of Digital Output(Either Relay or Open Collector) is required
A1.Fn (A1.Fn)	DO.CONF (DO.CONF)	Alarm 1 Function	ALrñ / tr IP (Alarm / Trip) 0: ALARM 1 : TRIP	0(for all 24 channel)	-
A1.mP (A1.mP)	DO.CONF (DO.CONF)	Alarm 1 Mapping	See DO(Digital Output) Configuration	Refer Table 15 and note 2	Any of Digital Output(Either Relay or Open Collector) is required
A1.tP (A1.tP)	DO.CONF (DO.CONF)	Alarm 1 Type	Lo/HI 0 : LOW 1: HIGH	0 (for all 24 channel)	-
A2.Fn (A2.Fn)	DO.CONF (DO.CONF)	Alarm 2 Function	ALrñ / tr IP (Alarm / Trip) 0: ALARM 1 : TRIP	0(for all 24 channel)	-
A2.mP (A2.mP)	DO.CONF (DO.CONF)	Alarm 2 Mapping	See DO(Digital Output) Configuration	Refer Table 15 and note 2	Any of Digital Output(Either Relay or Open Collector) is required
A2.tP (A2.tP)	DO.CONF (DO.CONF)	Alarm 2 Type	Lo/HI 0 : LOW 1: HIGH	0 (for all 24 channel)	
CS.mP (CS.mP)	DO.CONF (DO.CONF)	Control Set point mapping	See DO(Digital Output) Configuration	Refer Table 15 and note 2	Control Output is required and Any of Digital Output(Either Relay or Open Collector) is required
CS.tP (CS.tP)	DO.CONF (DO.CONF)	Control Set point type	Lo/HI 0 : LOW 1: HIGH	0 (for all 24 channel)	Control Output is required
W.d.oP	DO.CONF	Watchdog Output	dSbL/EnbL	Refer	-

(W.d.oP)	(DO.CONF)		0 : Disable 1: Enable	note 2	
(W.d.mP)	(DO.CONF)	Watchdog Mapping	See DO(Digital Output) Configuration	Refer note 2	Any of Digital Output(Either Relay or Open Collector) is required

DO(Digital Output) Configuration:

Total numbers of relays in 85XX+ are 8 and total number of Open collectors are 24(**Optional**) . For one channel maximum three numbers of DOs can be assigned. Among them one DO can only be assigned for control operation and two remaining DOs can be assigned for Alarm/Trip operation. Below example shows different configuration and different mapping of different DOs to 8 channels.

Table 15 DO(Digital Output) Mapping Number and its description

Channel Number	AS1 . Mapping	DO number for ASP1	AS2 . Mapping	DO number for ASP2	CSP. Mapping	DO number for CSP	Watchdog Mapping	DO number for W.D.MP
1	Relay 3	3	Relay 4	4	Relay 1	1	Open Collector 10	18
2	None	0	Relay 4	4	None	0		
3	Relay5	5	Relay6	6	None	0		
4	Relay5	5	None	0	None	0		
5	Open Collector 3	11	Open Collector 4	12	Open Collector 1	9		
6	None	0	None	0	None	0		
7	Open Collector 12	20	Open Collector 8	16	Open Collector 15	23		
8	Open Collector 20	28	Open Collector 12	20	None	0		

Note 2:

- 1) None means no DO(Digital Output) is assigned to particular channel.
- 2) DO number = 0 represents "**None**". DO Number = 1 to 8 represents "**Relay No. 1 to Relay No. 8**". DO number = 9 to 32 represents "**Open Collector No. 1 to Open Collector No. 24**". For more details refer Table 16.
- 3) If one particular DO is mapped to any channel in control set point mapping(**C.S.MP.**)configuration, it can not be mapped to any other channel in any type of mapping(In above example, Relay-1is mapped to channel number 1in control set point mapping configuration shown in Table 15. So it can not be assigned to any other channel in Control set point mapping (**C.S.mp.**) or Alarm Set point 1 mapping (**A1.MP**) or Alarm Set point 2 Mapping(**A2.MP**) as shown in Table 15.
- 4) Maximum one channel can be assigned to control set point mapping (**C.S.MP**) configuration. In above example, Relay-1 can not be assigned to any second channel.
- 5) Same number of DO (other than mapped to control set point mapping) can be mapped to multiple number of Channels in Alarm set point 1 mapping (**A1.MP**) and Alarm set point 2

mapping (**A2.MP**). In above example, Relay 4 is assigned to channel 1 and channel 2 in **AS2. Mapping**, Relay 5 is mapped to channel 3 and channel 4 in **AS1. Mapping**, Open collector 12 is mapped to channel 7 in **AS1. Mapping** and it is mapped to channel 8 in **AS2. Mapping**.

- 6) Based On Watchdog Output (Disable / Enable) selection , Error messages will be shown. i.e. if Watchdog Output is “disabled” , then no error message will be shown and only Fault LED will be ON and other operation goes smoothly. When Watchdog Output is “enabled”, then based on faults, error messages will be displayed and Fault LED will be ON. For more detail on watchdog operation and error messages, please refer topic
- 7)
- 8) **8.4 Watchdog Timer(WDT) / Watchdog Output** Operation.
- 9) Any DO can be mapped to **W.D.MP**(Watchdog Mapping) . Means, that particular DO is used as Watchdog Output. Note that, any DO which is assigned to A1.MP or A2.MP or C.S.MP cannot be mapped to W.D.MP and vice versa.

Table 16 DO(Digital Output) description

DO number (Decimal)	DO number (Hex)	Setting Name and Description	DO number (Decimal)	DO number (Hex)	Setting Name and Description
0	0 x 00	nonE (None)(Default)			
1	0 x 01	rL .01 (Relay-1)	9	0 x 09	oC .01 (Open Collector-1)
2	0 x 02	rL .02 (Relay-2)	10	0 x 0A	oC .02 (Open Collector-2)
3	0 x 03	rL .03 (Relay-3)	11	0 x 0B	oC .03 (Open Collector-3)
4	0 x 04	rL .04 (Relay-4)	12	0 x 0C	oC .04 (Open Collector-4)
5	0 x 05	rL .05 (Relay-5)	13	0 x 0D	oC .05 (Open Collector-5)
6	0 x 06	rL .06 (Relay-6)	14	0 x 0E	oC .06 (Open Collector-6)
7	0 x 07	rL .07 (Relay-7)	15	0 x 0F	oC .07 (Open Collector-7)
8	0 x 08	rL .08 (Relay-8)	16	0 x 10	oC .08 (Open Collector-8)

DO number (Decimal)	DO number (Hex)	Setting Name and Description	DO number (Decimal)	DO number (Hex)	Setting Name and Description
17	0 x 11	oC .09 (Open Collector-9)	25	0 x 19	oC .17 (Open Collector-17)
18	0 x 12	oC .10 (Open Collector-10)	26	0 x 1A	oC .18 (Open Collector-18)
19	0 x 13	oC .11 (Open Collector-11)	27	0 x 1B	oC .19 (Open Collector-19)
20	0 x 14	oC .12 (Open Collector-12)	28	0 x 1C	oC .20 (Open Collector-20)
21	0 x 15	oC .13 (Open Collector-13)	29	0 x 1D	oC .21 (Open Collector-21)
22	0 x 16	oC .14 (Open Collector-14)	30	0 x 1E	oC .22 (Open Collector-22)
23	0 x 17	oC .15 (Open Collector-15)	31	0 x 1F	oC .23 (Open Collector-23)

24	0 x 18	OC .16 (Open Collector-16)	32	0 x 20	OC .24 (Open Collector-24)
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- For relay functionality Refer Relay outputs (**Chapter - 8**).

Table 17 Sub Parameters of AO(Analog Output) Configuration Mode (Optional)

Sub parameters of AO(Analog output) Configuration Mode (Optional)					
Data Window	Parameter Window	Name	Setting name and description	Default value	Shows only if
Symbol	Symbol				
rt.tp (rt.tp)	AO.CONF (AO.CONF)	Analog 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 (For all eight analog outputs)	-
rt.dr (rt.dr)	AO.CONF (AO.CONF)	Analog output direction	dir / rev (Dir / rev) 0: REVERSE 1: DIRECT	0 (For all eight analog outputs)	-
rt.mp (rt.mp)	AO.CONF (AO.CONF)	Analog Mapping	For all channel 1 to 24 Refer Note 3 and Refer Table 18	For all channel 1 to 24 Refer Note 3 and Refer Table 18	-
rt.rd (rt.rd)	AO.CONF (AO.CONF)	Analog output reading	MAX/MIN (MAX/MIN) 0: MINIMUM 1: MAXIMUM	1 (For all eight analog outputs)	-
rt.o.S. (rt.o.S.)	AO.CONF (AO.CONF)	Analog Open Sensor	UP/Down (UP/Down) 0: Down 1: UP	0 (For all eight analog outputs)	-

Note 3:

- None means no AO(Analog Output)(Analog Output) is assigned to particular channel.
- AO O/p number = 0 represents “None”. AO O/p Number = 1 to 8 represents “Analog O/P No. 1 to Analog O/P No. 8”. For more details refer Table 18.
- In “Analog O/P mapping” parameter, maximum 2 numbers of Analog Outputs can be assigned to each channel. i.e. each channel can have maximum two number of analog outputs simultaneously. See the example below.
Example 1 : If Analog O/P mapping for channel 1 = 0102 H, it means Analog output number 1 and output number 2 are assigned to channel 1. And output of channel 1 can be taken on Analog Output number 1 and number 2.

Example 2 : If Analog O/P mapping for channel 3 = 0001 H, it means Analog Output number 1 is assigned to channel 3. And output of channel 3 can be taken on Analog Output number 1.

Table 18 AO(Analog Output) description

Analog Output number (Decimal)	Analog Output number (Hex)	Setting Name and Description
0	0 x 00	nonE (None)(Default)
1	0 x 01	rt.01

		(Analog Output-1)
2	0 x 02	rt .02 (Analog Output-2)
3	0 x 03	rt .03 (Analog Output-3)
4	0 x 04	rt .04 (Analog Output-4)
5	0 x 05	rt .05 (Analog Output-5)
6	0 x 06	rt .06 (Analog Output-6)
7	0 x 07	rt .07 (Analog Output-7)
8	0 x 08	rt .08 (Analog Output-8)

Table 19 Sub Parameters of Communication Configuration Mode

Sub parameters of Communication Configuration Mode					
Data Window	Parameter Window	Name	Setting name and description	Default value	Shows only if
Symbol	Symbol				
Sr .no (Sr.no)	CM.CONF (CM.CONF)	Unit ID	1 to 247	1	-
C1.b.r. (C1.b.r.)	CM.CONF (CM.CONF)	Com Port 1 Baud rate	9600 / 19.2K / 57.6K (9600/19.2k) 0: 9600 1: 19.2 K 2: 57.6 K	1	-
C1.Pr (C1.Pr)	CM.CONF (CM.CONF)	Com Port 1 Parity bits	P.n.S.2/P.o.S.1/P.e.S.1/ P.n.S.1/P.o.S.2/P.e.S.2 (P.n.S.2/P.o.S.1/P.e.S.1/ P.n.S.1/P.o.S.2/P.e.S.2) 0: PARITY NONE, STOP BIT 2 1: PARITY ODD, STOP BIT- 1 2: PARITY EVEN, STOP BIT- 1 3: PARITY NONE, STOP BIT 1 4: PARITY ODD, STOP BIT- 2 5: PARITY EVEN, STOP BIT- 2	1	-
C2.b.r. (C2.b.r.)	CM.CONF (CM.CONF)	Com Port 2 Baud rate	9600 / 19.2K / 57.6K (9600/19.2k) 0: 9600 1: 19.2 K 2: 57.6 K	1	Com Port 2 is required
C2.Pr (C2.Pr)	CM.CONF (CM.CONF)	Com Port 2 Parity bits	P.n.S.2/P.o.S.1/P.e.S.1/ P.n.S.1/P.o.S.2/P.e.S.2 (P.n.S.2/P.o.S.1/P.e.S.1/ P.n.S.1/P.o.S.2/P.e.S.2) 0: PARITY NONE, STOP BIT 2 1: PARITY ODD, STOP BIT- 1 2: PARITY EVEN, STOP BIT- 1 3: PARITY NONE, STOP BIT 1 4: PARITY ODD, STOP BIT- 2 5: PARITY EVEN, STOP BIT- 2	1	Com Port 2 is required
E .IP (E.IP.)	CM.CONF (CM.CONF)	Ethernet IP Address	Refer Note 4:	Refer Note 4:	Ethernet is required

E.mSk (E.mSk)	CM.CONF (CM.CONF)	Ethernet masking	Refer Note 4:	Refer Note 4:	Ethernet is required
E.Gty (E.Gty)	CM.CONF (CM.CONF)	Ethernet Gateway	Refer Note 4:	Refer Note 4:	Ethernet is required

Note 4:

- 1) PARAMETER Window shows sub parameter configuration name.
i.e. while setting Ethernet IP (E.IP.), Ethernet IP 1(E.IP.1) will be shown on parameter window.
And so on. All sub parameters of Ethernet configuration will be shown as explained.
- 2) E.IP.1 , E.IP.2, E.IP.3 and E.IP.4 is for setting Ethernet IP address. Value should be entered sequentially. i.e. if Ethernet IP address of 192.168.100.190 needs to be configured , then set value 192 to E.IP.1, set value 168 to E.IP.2, set value 100 to E.IP.3 and then set value 190 to E.IP.4.
- 3) E.msk is for setting Ethernet mask address and E. Gty is for setting Ethernet Gateway address . Both settings must be set as explained in above note.

Table 20 Sub Parameters of Display Configuration Mode

Sub parameters of Display Configuration Mode					
Data Window	Parameter Window	Name	Setting name and description	Default value	Shows only if
Symbol	Symbol				
Fv.dP. (Fv.dP.)	DP.CONF (DP.CONF)	Favorit Display type(After setting it,it will be shown on parameter window during run mode only)	INP.T/P.L.M.PER/E.L.M.PER/AMB/EN.UNIT/SR.NO/ PRG.DSP/P.L.REC.T/E.L.REC.T (INP.T/P.L.M.PER/E.L.M.PER/AMB/EN.UNIT/SR.NO/ PRG.DSP/P.L.REC.T/E.L.REC.T) 0: INPUT TYPE 1: Periodic Log Memory Percentage(Optional) 2: Event Log Memory Percentage (Optional) 3: Ambient 4: ENGINEERING UNIT(see Table 21) (1 to 24 Channels) 5: SERIAL NUMBER(Refer Note : 5) 6: PROGRAMMABLE DISPLAY(Refer Note : 5) 7: Periodic Log record Number(Optional) 8: Event Log Record Number(Optional)	0	-
Led (Led)	DP.CONF (DP.CONF)	Status LED Configuration	AS-CS / AS1-AS2 / AS-OS / AS-DIS (AS-CS / AS1-AS2 / AS-OS / AS-DIS) 0: ALARM STATUS - CONTROL STATUS 1: ALARM 1 STATUS- ALARM 2 STATUS 2: ALARM STATUS-OPEN COLLECTOR STATUS 3: ALARM STATUS-DIGITAL INPUT STATUS (Refer Note : 5)	1	-
t.oUt (t.oUt)	DP.CONF (DP.CONF)	Timeout for display back to Run Mode	10 to 100 Seconds	60	-
FLtr (FLtr)	DP.CONF (DP.CONF)	IIR Filter to get stable PV reading	0 to 9 (Refer Note : 4)	0	-

Note 5 :

- 1) During Run Mode user can see favorite display on PARAMETER Window. User can see Input type(of all channels) / Log memory percentage(**Optional**) / Ambient Temperature / Engineering Units(Assigned all channels) / Serial Number of the 85XX+ for communication purpose.
- 2) User can set the engineering unit to a particular channel. Also user can see the engineering unit of a particular channel during run mode on PARAMETER Window. Total 33 number of engineering units are provided with this Product. Different Engineering Units are shown in Table 21.
- 3) In programmable display mode, user can program 6 digit Alphanumeric display for channel name by giving ASCII value of characters “- , . , / , 0 to 9, < , > , A to Z , \ , space”. User can set different tag name to different channels. Note that, this programmable display can only be set by means of configuration software and not by front keypad. For more detail, refer Table 50 and Table 51.
- 4) LED configuration is for displaying different kind of status. It is explained below.
 - If user wants to see the status of Alarm Status and Control Output Status(**Optional**), user needs to set LED = 0 . Thus Alarm Status(here Alarm status is either of Alarm 1 Status or Alarm 2 Status) and Control Output Status will be displayed (24 LEDs on left side will indicate Alarm status and 24 LEDs on right side will indicate Control Output Status(**Optional**)).
 - If user wants Alarm 1 Status and Alarm Status 2 to be displayed then user must set LED =1. Thus Alarm 1 Status and Alarm 2 Status will be displayed (24 LEDs on left side will indicate Alarm 1 Status and 24 LEDs on right side will indicate Alarm 2 Status).
 - If user wants Alarm status and Open Collector Output Status(**Optional**) to be displayed then user needs to set LED = 2. Thus Alarm Status(here Alarm status is either of Alarm 1 Status or Alarm 2 Status) and Open Collector Output Status will be displayed (24 LEDs on left side will indicate Alarm status and 24 LEDs on right side will indicate Open Collector Output Status(**Optional**)).
 - If user wants Alarm status and Digital Input Status(**Optional**) to be displayed then user needs to set LED = 3. Thus Alarm Status(here Alarm status is either of Alarm 1 Status or Alarm 2 Status) and Digital Input Status will be displayed (24 LEDs on left side will indicate Alarm status and 16 LEDs on right side will indicate Digital Input Status(**Optional**)).
- 5) Filter is for Stability of PV data Whenever required. Filter = 0 means no filter is applied on PV data. While Filter = 1 to 10 means Filter of Low value to High value is applied on PV data.

Table 21 Different Engineering Units

Type	Unit NO (Decimal)	Unit NO (Hex)	Type Display
VOLT	0	0 x 00	VOLT
mV	1	0 x 01	mV
AMP	2	0 x 02	AMP
mA	3	0 x 03	mA
OHM	4	0 x 04	OHM
M.OHM	5	0 x 05	M.OHM
WATT	6	0 x 06	WATT
KW	7	0 x 07	KW
MW	8	0 x 08	MW

Type	Unit NO (Decimal)	Unit NO (Hex)	Type Display
mBAR	17	0 x 11	mBAR
GPM	18	0 x 12	GPM
GPS	19	0 x 13	GPS
mm	20	0 x 14	mm
METER	21	0 x 15	METER
CM	22	0 x 16	CM
mSEC	23	0 x 17	mSEC
SEC	24	0 x 18	SEC

DEG C	9	0 x 09	°C
DEG F	10	0 x 0A	°F
KG/CM2	11	0 x 0B	KG/CM2
PSI	12	0 x 0C	PSI
PSI<A>	13	0 x 0D	PSI<A>
PSI<G>	14	0 x 0E	PSI<G>
KPA	15	0 x 0F	KPA
BAR	16	0 x 10	BAR

MI	25	0 x 19	MI
HOUR	26	0 x 1A	HOUR
HZ	27	0 x 1B	HZ
RPM	28	0 x 1C	RPM
RPH	29	0 x 1D	RPH
PPM	30	0 x 1E	PPM
uS	31	0 x 1F	uS
PH	32	0 x 20	PH

Table 22 Sub Parameters of Logging Configuration Mode

Sub parameters of Logging Configuration Mode (Optional)					
Data Window	Parameter Window	Name	Setting name and description	Default value	Shows only if
Symbol	Symbol				
P .LOG (P.LOG)	LG.CONF (LG.CONF)	Periodic Logging Enable	Start/Stop (Strt/Stop) 0: STOP 1: START	0	-
P .L .n P (P.L.MP)	LG.CONF (LG.CONF)	Periodic Log channel mapping (selection)	YES / no (YES/NO) 0 : NO 1: YES	0 (for all 24 channel) (Refer Note 6)	-
P .L .n d (P.L.md)	LG.CONF (LG.CONF)	Periodic Logging Mode	hold/OVLP (HOLD/OVLP) 0: HOLD 1: OVERLAP	0 (Refer Note 6)	-
P .n .r S (P.M.rS)	LG.CONF (LG.CONF)	Periodic Log Memory Reset(/Clear)	YES / no (YES/NO) 0 : NO 1: YES	0 (Refer Note 6)	-
P .L .HH (P.L.HH)	LG.CONF (LG.CONF)	Periodic Log time - Hour	0 to 23	0 (Refer Note 6)	-
P .L .n n (P.L.MM)	LG.CONF (LG.CONF)	Periodic Log time – Minute	0 to 59	0 (Refer Note 6)	-
P .L .SS (P.L.SS)	LG.CONF (LG.CONF)	Periodic Log time – Second	0 to 59	1 (Refer Note 6)	-
E .LOG (E.LOG)	LG.CONF (LG.CONF)	Event Logging Enable	Start/Stop (Strt/Stop) 0: STOP 1: START	0	-
E .L .n P (E.L.MP)	LG.CONF (LG.CONF)	Event Log channel mapping (selection)	YES / no (YES/NO) 0 : NO 1: YES	0 (for all 24 channel) (Refer Note 6)	-
E .L .n d (E.L.Md)	LG.CONF (LG.CONF)	Event Logging Mode	hold/OVLP (HOLD/OVLP) 0: HOLD 1: OVERLAP	0	-
E .n .r S (E.M.rS)	LG.CONF (LG.CONF)	Event Log Memory Reset(/Clear)	YES / no (YES/NO) 0 : NO 1: YES	0	-

Hour (Hour)	LG.CONF (LG.CONF)	RTC – Hour	0 to 23	0	-
Min (Min)	LG.CONF (LG.CONF)	RTC – Minute	0 to 59	0	-
Sec (Sec)	LG.CONF (LG.CONF)	RTC – Second	0 to 59	0	-
DATE (date)	LG.CONF (LG.CONF)	RTC – Date	1 to 31	0	-
Mon (Mon)	LG.CONF (LG.CONF)	RTC – Month	1 to 12	0	-
YEAR (yEAR)	LG.CONF (LG.CONF)	RTC – Year	1 to 255	0	-

Note 6:

- 1) Periodic and Event Channel mapping (selection) parameter is used to select the channels for data logging. Mapping cannot be changed during Data logging is ON. For channel mapping first stop logging, retrieve records and reset memory.
- 2) In Hold mode Data logging will be stop after memory is full. In Overlap mode datalogging will again start from 1st record after memory is full record and Roll over count will increment. Roll over count will increment as per how many times memory was full.
- 3) Periodic (P .n .r 5) and Event (E .n .r 5) logging memory reset parameter is only apply if Periodic and Event logging is in stop condition.
- 4) Periodic Log time is settable in HH:MM:SS format. By default it is 00:00:01.
- 5) RTC related parameters are for setting date and time in Data logging.

Table 23 Sub parameters of USB Configuration Mode(Optional)

Sub parameters of USB Configuration Mode					
Data Window	Parameter Window	Name	Setting name and description	Default value	Shows only if
Symbol	Symbol				
U .CONF (U.Cnf)	U.FETCH (U.Fetch)	FETCH data from 85XX+ and store into USB	START (Start) 0: START (Refer Note 6)	0	-
U .CONF (U.Cnf)	U.P.F.EN (U.P.F.EN)	USB Periodic Fetching Enable	YES / NO (YES/NO) 0 : NO 1: YES (Refer Note 7)	0	-
U .CONF (U.Cnf)	U.P.F.MOD (U.P.F.MOD)	USB Periodic Fetch Mode Selection	U.F.FULL / U.F.TIME (U.F.FULL / U.F.TIME) 0 : U.F.FULL 1: U.F.TIME (Refer Note 7)	0	-

U .Cnf (U.Cnf)	U.P.F.T.HH (U.P.F.T.HH)	USB Periodic Fetching By last logged Hours	0 to 23 (Refer Note 7)	1	U.F.TIME is selected in U.P.F.MOD
U .Cnf (U.Cnf)	U.P.F.T.DY (U.P.F.T.DY)	USB Periodic Fetching By last logged Days	0 to 180 (Refer Note 7)	0	U.F.TIME is selected in U.P.F.MOD
U .Cnf (U.Cnf)	U.P.RE.P.F (U.P.RE.P.F)	USB Fetched Periodic records per file selection	10 to 6000 (x10) (Refer Note 7)	6000	-
U .Cnf (U.Cnf)	U.E.F.EN (U.E.F.EN)	USB Event Fetching Enable	YES / NO (YES/NO) 0 : NO 1: YES (Refer Note 7)	0	-
U .Cnf (U.Cnf)	U.E.RE.P.F (U.E.RE.P.F)	USB Fetched Event records per file selection	10 to 6000 (x10) (Refer Note 7)	6000	-

Note 7:

- 1) Before proceeding for setting of data fetching by USB Mass storage device (MSD),** make sure that USB Mass storage device follows the specification.
- Periodic and Event records can be fetched into USB MSD. All settings for data retrieval should be configured through USB menu.
- Through menu, first select what type of data user wants to fetch Periodic data / Event data / both.
- If user wants to fetch Periodic data then two possible fetching methods are there. Those are Periodic Fetch FULL and Periodic Fetch by TIME.
 - Periodic Fetch FULL : In this fetching method, all periodic logged data in 85XX+ will be fetched and stored into USB MSD.
 - Periodic Fetch by TIME : In this fetching method, last periodic logged data is fetched based on U.P.F.T.HH and U.P.F.T.DY selection. If user wants to fetch periodic data of last 3 hours , then user has to write U.P.F.T.HH = 3. If user wants to fetch periodic data of last 4 Days, then user has to write U.P.F.T.DY = 4. **Note that**, if user wants to fetch data of last 6 hours , but total logged data is of only 3 hours then, data fetched will be of 3 hours only. If Log time is set for 1 second and user wants to retrieve data of 1 hour, so total number of records will be approximately 3600 to 3609.
 - In periodic data fetching by time or full fetch, total number of records fetched will be vary from Total number of Records fetched minus 0 to 18.e.g. total number of fetched records are 1000 then in file records will be 982 to 1000 depending upon Number of log channels selected.
 - In fetch by time mode data will be fetched perfectly only when logging is continuously **ON** and no power **OFF** after logging is started.
- User can select "N" number of records to be stored in single file. In this manner, user can create multiple files based on number of records selected. i.e. a new file is automatically created if "N" number of records are fetched in one file. **Note that, user can set maximum 60000 records per file.** Refer following example .
 - If user wants to store Periodic data of only 1000 records in one file and another 1000 Periodic records should be stored in another file and so on, then user has to set U.P.RE.P.F = 100. **Note that, here value will be stored in multiple of 10.**
 - If user wants to store Event data of only 500 records in one file and another 500 Event records should be stored in another file and so on, then user has to set U.E.RE.P.F = 50. **Note that, here value will be stored in multiple of 10.**

- In Event data fetching, total number of records fetched will be vary from Total number of Records fetched minus 0 to 14.e.g. total number of fetched records are 1000 then in file records will be 986 to 1000.
- 6) After setting all parameters, user has to start fetching by going into the menu parameter “U.FETCH” and giving command “START”. Fetched data will be stored into USB Mass storage device into .xls format. Note that, USB fetching can not be started unless USB Mass storage device is not connected.
 - 7) When USB Mass storage device is connected, then different kinds of messages, based on USB Fetching condition, will be popped up on Parameter window of 85XX+. Refer Following USB messages.

Table 24 USB Messages and Description

USB Messages	Description	Condition of occurrence
USB.DET	USB Detected	When USB Mass storage device is connected
USB....	Data is being fetched from 85XX+ and is being stored into USB Mass storage device.	ENTER key is pressed when “USB.DET” is popped up. OR When “START” in “U.FETCH” parameter is given.
USB.F.OK	USB Fetching completed.	When All data is fetched and stored into USB Mass storage device.
USB.FUL	USB Mass storage device is full.	When USB Mass storage device has not enough space for storing data.
USB.ERR	USB Mass storage device format error.	When format of USB Mass storage device is other than FAT16 / FAT32 format.

- 8) When “USB.DET” is popped up in parameter window, user can either start fetching data by pressing ENTER key in run mode or user can come out of the “USB.DET” message by pressing ESC key. For later case, user can fetch data by going into the menu and giving “START” in “U.FETCH” parameter.
- 9) After completion of Fetching data, “USB.F.OK.” message will be popped up. After this message , user can fetch again by pressing ESC key first and then going into the menu and giving “START” in “U.FETCH” parameter.
- 10) If “USB.FUL” or “USB.ERR” message is popped up, then user has to disconnect the USB Mass storage device and connect the USB Mass storage device which is as per USB Specification.
- 11) File Name in USB Storage for Periodic Logging is DDHHMM-P and For Event Logging is DDHHMM-E. If successive fetching occur multiple time in same minute then it will over write File.

3) Calibration Mode :

Pressing MENU key DATA window shows **CAL** (CAL) message and Parameter window shows **MODE**(Mode) message. Press MENU key again PARAMETER window shows **pWd** (PWD) message(if and only if password is set then only. Otherwise it will enter into sub menu), press MENU Key to enter into edit mode of password and then press INCREMENT key or DECREMENT key to modify the password and then press MENU Key to enter into Calibration Mode. DATA window shows **Amb** (Amb) message and PARAMETER window shows **CAL** (CAL) message. By pressing MENU Key, DATA window shows current Ambient Value. Then use MENU Key to enter into editing mode and use INCREMENT and DECREMENT key to modify value if required. OR press INCREMENT key again to go to next parameter **CAL.Z** (CAL.Z).

Channelwise Calibration can be used here. However there is not need of calibration to be set channelwise. ESCAPE KEY is used to come out CAL.Z(sub parameter of Calibration mode).

Table 25 Calibration Mode Parameters

Calibration Mode					
Data Window	Parameter Window	Name	Setting name and description	Default value	Shows only if
Symbol	Symbol				
0 0	PW (PWD)	Calibration Mode Password	0 to 9999	0	Password is other than zero
Amb (Amb)	CAL (CAL)	Ambient Calibration	Ambient Adjustment	-	-
CAL .Z (CAL.Z)	CAL (CAL)	Thermocouple, Rtd and Linear Zero Calibration	Depending on PV sensor type selected (1 to 24 Channels)	-	-
CAL .S (CAL.S)	CAL (CAL)	Thermocouple, Rtd and Linear Span Calibration	Depending on PV sensor type selected (1 to 24 Channels)	-	-
rtr .Z (rtr.Z)	CAL (CAL)	Analog O/P voltage and current Zero calibration	Depending on Retransmission type selected (1 to 8 Analog Outputs) (Optional)	-	-
rtr .S (rtr.S)	CAL (CAL)	Analog O/P voltage and current Span calibration	Depending on Retransmission type selected (1 to 8 Analog Outputs) (Optional)	-	-

4) Security Mode :

Pressing MENU key DATA window shows **SCr.t** (SCr.t) message and Parameter window shows **MODE** (Mode) message. Press MENU key again PARAMETER window shows **pwd** (PWD) message(if and only if password is set then only. Otherwise it will enter into sub menu), press MENU Key to enter into edit mode of password and then press INCREMENT key or DECREMENT key to modify the password and then press MENU Key to enter into Security Mode. DATA window shows **Pr.md** (Pr.md) message and PARAMETER window shows **SCURTY** (SCURTY) message. By pressing MENU Key, DATA window shows current password of Program Mode. Then use MENU Key to enter into editing mode and use INCREMENT and DECREMENT key to modify value if required. OR press INCREMENT key again to go to next parameter **CF.md** (CF.md). ESCAPE KEY is used to come out CF.md (sub parameter of Security mode).

Table 26 Security Mode Parameters

Security Mode					
Data Window	Parameter Window	Name	Setting name and description	Default value	Shows only if
Symbol	Symbol				
0 0	PW (PWD)	Security Mode Password	0 to 9999	0	Password of Security mode is other than zero
Pr.md (Pr.md)	SCURTY (SCURTY)	Set Password for Program Mode	0 to 9999	0	-

CF .nd (CF.md)	SCURTY (SCURTY)	Set Password for Configuration Mode	0 to 9999	0	-
CL .nd (CL.md)	SCURTY (SCURTY)	Set Password for Configuration Mode	0 to 9999	0	-
SP .nd (SP.md)	SCURTY (SCURTY)	Set Password for Security Mode	0 to 9999	0	-
F .rSt (F.rSt)	SCURTY (SCURTY)	Factory reset	See Factory reset parameter menu	-	-

• **Factory Reset Parameter :**

By pressing MENU key again ,PARAMETER window shows **pWd** (PWD) message. Then press MENU Key to enter into edit mode of password and then press INCREMENT key or DECREMENT key to modify the password and then press MENU Key to enter into Factory Reset Menu. In the menu, DATA window shows **CAL** (CAL) message and PARAMETER window shows **F.RST** (F.RST) message. By pressing MENU Key, it enters into editing mode and use INCREMENT and DECREMENT key to modify which value you needs to be of default value OR press INCREMENT key again to go to next parameter **CF .nd** (CF.md). ESCAPE KEY is used to come out CF.md (sub parameter of Security mode).

Table 27 Factory Reset Menu

Factory Reset Parameter Menu					
Data Window	Parameter Window	Name	Setting name and description	Default value	Shows only if
Symbol	Symbol				
0 0	PWd (PWD)	Factory reset Mode Password	0 to 9999	0	-
CAL (CAL)	F.RST (F.RST)	CAL-Set Calibration values to factory default value	Only calibration set to default value (Refer Note 8)	-	F.RST = 0
PARA (PARA)	F.RST (F.RST)	PARA-Set Parameter values to factory default value	All parameters excluding calibration will set to default value (Refer Note 8)	-	F.RST = 1
ALL (ALL)	F.RST (F.RST)	ALL-Set ALL values to factory default value	Calibration and parameters will set to default value (Refer Note 8)	-	F.RST = 2

Note 8:

- 1) After resetting Calibration / Parameters / All values to factory reset values, the DATA window will display **Wait** (Wait) message for few seconds and then display will reset automatically with default factory values.

8. ALARM OUTPUT, CONTROL OUTPUT , DIGITAL OUTPUT AND WATCHDOG OUTPUT OPERATION

8.1 Alarm Output Operation

- Every single channel can have maximum 3 set points. 2 for Alarm outputs(1 for Alarm 1 Set Point and 1 for Alarm 2 Set Point) and 1 for Control Set Point, totaling 48 alarm outputs and 24 control outputs for 24 number of channels. Control Outputs are **Optional**.
- 8 Relays and/or 24 Open Collectors can be used as DO(Digital Output). All Digital Outputs are **Optional**.
- Following tables shows Alarm Output , control output and digital output operation.

Table 28 Alarm 1 and Alarm 2 Momentary Alarm Logic

ALARM AL1

MOMENTARY ALARM

(when in abnormal condition ack not pressed)

CONDITION				NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	ACK ⁽²⁾	NORMAL ⁽¹⁾	ACK ⁽³⁾
HIGH ASP1	ALARM	LATCH	LAMP	OFF	FLASH	FLASH	OFF		FLASH	OFF
		YES	RELAY / OPEN COLLECTOR	OFF	ON	ON	OFF		OFF	OFF
	ALARM	LATCH	LAMP	OFF	FLASH	FLASH	OFF		OFF	OFF
		NO	RELAY / OPEN COLLECTOR	OFF	ON	ON	OFF		OFF	OFF
LOW ASP1	TRIP		LAMP	OFF	FLASH	OFF	OFF		FLASH	OFF
			RELAY / OPEN COLLECTOR	OFF	ON	OFF	OFF		ON	OFF
	ALARM	LATCH	LAMP	OFF	FLASH	OFF	FLASH		FLASH	OFF
		YES	RELAY / OPEN COLLECTOR	OFF	ON	OFF	ON		OFF	OFF
LOW ASP1	ALARM	LATCH	LAMP	OFF	FLASH	OFF	FLASH		OFF	OFF
		NO	RELAY / OPEN COLLECTOR	OFF	ON	OFF	ON		OFF	OFF
	TRIP		LAMP	OFF	FLASH	OFF	OFF		FLASH	OFF
			RELAY / OPEN COLLECTOR	OFF	ON	OFF	OFF		ON	OFF

ALARM AL2

MOMENTARY ALARM

(when in abnormal condition ack not pressed)

CONDITION				NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	ACK ⁽²⁾	NORMAL ⁽¹⁾	ACK ⁽³⁾
HIGH AISP2	ALARM	LATCH	LAMP	OFF	FLASH	FLASH	OFF		FLASH	OFF
		YES	RELAY / OPEN COLLECTOR	OFF	ON	ON	OFF		OFF	OFF
	ALARM	LATCH	LAMP	OFF	FLASH	FLASH	OFF		OFF	OFF
		NO	RELAY / OPEN COLLECTOR	OFF	ON	ON	OFF		OFF	OFF
LOW ASP2	TRIP		LAMP	OFF	FLASH	OFF	OFF		FLASH	OFF
			RELAY / OPEN COLLECTOR	OFF	ON	OFF	OFF		ON	OFF
	ALARM	LATCH	LAMP	OFF	FLASH	OFF	FLASH		FLASH	OFF
		YES	RELAY / OPEN COLLECTOR	OFF	ON	OFF	ON		OFF	OFF
LOW ASP2	ALARM	LATCH	LAMP	OFF	FLASH	OFF	FLASH		OFF	OFF
		NO	RELAY / OPEN COLLECTOR	OFF	ON	OFF	ON		OFF	OFF
	TRIP		LAMP	OFF	FLASH	OFF	OFF		FLASH	OFF
			RELAY / OPEN COLLECTOR	OFF	ON	OFF	OFF		ON	OFF

Table 29 Alarm 1 and Alarm 2 Maintained Alarm Logic

ALARM AL1

MAINTAINED ALARM

(when in abnormal condition ack is pressed)

CONDITION				NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	ACK ⁽²⁾	NORMAL ⁽¹⁾	ACK ⁽³⁾
HIGH SP1	ALARM	LATCH	LAMP	OFF	FLASH	FLASH	OFF	STEADY	STEADY	OFF
		YES	RELAY / OPEN COLLECTOR	OFF	ON	ON	OFF	OFF	OFF	OFF
	ALARM	LATCH	LAMP	OFF	FLASH	FLASH	OFF	STEADY	OFF	OFF
		NO	RELAY / OPEN COLLECTOR	OFF	ON	ON	OFF	OFF	OFF	OFF
LOW SP1	TRIP		LAMP	OFF	FLASH	OFF	OFF	STEADY	STEADY	OFF
			RELAY / OPEN COLLECTOR	OFF	ON	OFF	OFF	ON	ON	OFF
	ALARM	LATCH	LAMP	OFF	FLASH	OFF	FLASH	STEADY	OFF	OFF
		NO	RELAY / OPEN COLLECTOR	OFF	ON	OFF	ON	OFF	OFF	OFF
LOW SP2	TRIP		LAMP	OFF	FLASH	OFF	OFF	STEADY	STEADY	OFF
			RELAY / OPEN COLLECTOR	OFF	ON	OFF	OFF	ON	ON	OFF
	ALARM	LATCH	LAMP	OFF	FLASH	OFF	FLASH	STEADY	OFF	OFF
		NO	RELAY / OPEN COLLECTOR	OFF	ON	OFF	ON	OFF	OFF	OFF

ALARM AL2

MAINTAINED ALARM

(when in abnormal condition ack is pressed)

CONDITION				NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	ACK ⁽²⁾	NORMAL ⁽¹⁾	ACK ⁽³⁾
HIGH SP2	ALARM	LATCH	LAMP	OFF	FLASH	FLASH	OFF	STEADY	STEADY	OFF
		YES	RELAY / OPEN COLLECTOR	OFF	ON	ON	OFF	OFF	OFF	OFF
	ALARM	LATCH	LAMP	OFF	FLASH	FLASH	OFF	STEADY	OFF	OFF
		NO	RELAY / OPEN COLLECTOR	OFF	ON	ON	OFF	OFF	OFF	OFF
LOW SP2	TRIP		LAMP	OFF	FLASH	OFF	OFF	STEADY	STEADY	OFF
			RELAY / OPEN COLLECTOR	OFF	ON	OFF	OFF	ON	ON	OFF
	ALARM	LATCH	LAMP	OFF	FLASH	OFF	FLASH	STEADY	OFF	OFF
		NO	RELAY / OPEN COLLECTOR	OFF	ON	OFF	ON	OFF	OFF	OFF
LOW SP2	TRIP		LAMP	OFF	FLASH	OFF	OFF	STEADY	STEADY	OFF
			RELAY / OPEN COLLECTOR	OFF	ON	OFF	OFF	ON	ON	OFF
	ALARM	LATCH	LAMP	OFF	FLASH	OFF	FLASH	STEADY	OFF	OFF
		NO	RELAY / OPEN COLLECTOR	OFF	ON	OFF	ON	OFF	OFF	OFF

Notes :

⁽¹⁾ means normal condition after abnormal has occurred

⁽²⁾ means ack pressed in abnormal condition

⁽³⁾ means ack pressed in normal condition after abnormal has already occurred.

8.2 Control Output Operation

Control Output is the simplest form of temperature control. The output from the device is either on or off, with no middle state. 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 above set point to below, and back above. 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 control operations. This Hysteresis assures, if temperature goes below 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.

Once process value reaches down to set point–Hysteresis value relay will be energized and it will be ON until process value goes up towards Set point.

Table 30 Control Operation(Optional)

CONTROL OPERATION

(in abnormal condition ack will not work)

CONDITION		NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	NORMAL ⁽¹⁾
HIGH	CONTROL LAMP ⁽²⁾	OFF	ON	ON	OFF	OFF
CSP	RELAY / OPEN COLLECTOR	OFF	ON	ON	OFF	OFF
LOW	CONTROL LAMP ⁽²⁾	OFF	ON	OFF	ON	OFF
CSP	RELAY / OPEN COLLECTOR	OFF	ON	OFF	ON	OFF

Upon pressing ACK key, acknowledgement will be given for ALARM/TRIP type set point in abnormal condition.

Notes :

(1) means normal condition after abnormal has occurred

(2) means lamp can only be applicable on the 24 LEDs at right side if LED is set to AS-CS .(i.e. LED =0) in Display Configuration.

Note that acknowledgement is not applicable for CONTROL operation.

Alarm Latch function applicable only for ALARM type set point, there is no effect when TRIP or CTRL type set points are in use.

8.3 Basic DO(Digital Output) Function

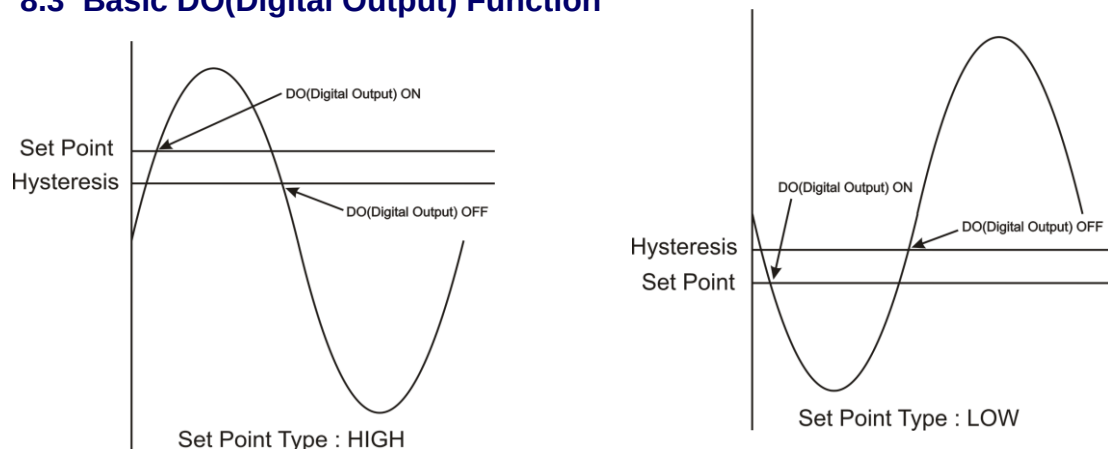


Figure 21 Basic DO(Digital Output) Function

8.4 Watchdog Timer(WDT) / Watchdog Output Operation

The WDT, when enabled, operates from the internal Low-Power RC (LPRC) Oscillator clock source. The WDT can be used to detect system software malfunctions by resetting the device if the WDT is not cleared periodically in software. If malfunctioning of device persist even after watchdog reset device will go into shutdown mode followed by error messages on display as per Table 31. Device Fault can be monitored by a failsafe relay output which is mapped for watchdog output.

When WDT is disable device will continue to work with fault. The Fault LED will be on in this condition.

Table 31 Error Messages and its Description

Error Messages	Fault
Error 1	CPU card EEPROM failure
Error 2	SC 1 card ADC failure
Error 3	SC 1 card EEPROM failure
Error 4	SC 2 card ADC failure
Error 5	SC 2 card EEPROM failure
Error 6	SC 3 card ADC failure
Error 7	SC 3 card EEPROM failure
Error 8	CPU card Controller Hang – failure
Error 9	Communication between CPU and Display card Failure

- **Watchdog Relay / Open Collector:** This relay/Open Collector is normally in ON condition and it will be OFF when any problem occurs with Device.

9. CALIBRATION PROCEDURE

Calibration is provided for ambient temperature, PV sensor input, Analog Output (Analog Output)(Optional).

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
- Analog Output (calibration for voltage or current)

Ambient temperature adjustment:-

DATA window shows $\bar{A}mb$ (Ambient temperature adjusts) and PARAMETER window shows message $\bar{C}AL$ (CAL). Press MENU key to edit the Ambient value. DATA window shows ambient temperature measured by the Scanner / DAQ and by applying old calibration data and PARAMETER window shows $\bar{A}MB$ (AMB). Press MENU key again to edit the displayed value. DP of last digit and last digit itself will blink to indicate that the value can be changed. Use Inc/Dec (Here Decrement key is used to shift the digit in editing mode) 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 Scanner / DAQ will automatically save all the new calculations. Ambient temperature adjustment is over. Press ESC key and then press Inc key to calibrate other parameters or press Escape key to come out to normal operation.

PV input sensor calibration:-

Note that all signal cards and all input type group must be calibrated before proceeding further. There is no need to calibrate all input types. Just calibrate only one input type from one group and all other input types from the same group will be calibrated automatically. Group calibration detail is given in following table.

Table 32 Group Calibration Detail

Group NO	Input type	Calibration for input
1	E,J,K,T,N,0-100mv	Either of any input
2	B,R,S,-10 to 20mv	Either of any input
3	Pt-100(RTD), CU53, NI120	Either of any input
4	0-5v,1-5V, 0-10V, 4-20mamp,0-20mamp	Either of any input

Note : Kindly Calibrate following input type for gaining better accuracy.

- 1) For Group Number 1, calibrate 0-100 mV input type.
- 2) For Group Number 2, calibrate -10 to 20 mV input type.
- 3) For Group Number 3, calibrate Pt-100(RTD) input type and
- 4) For Group Number 4, calibrate 0 to 10 V input type.

When user enters in calibration menu, DATA window shows PV value of corresponding input and PARAMETER window shows message $\bar{C}AL. 1$ (Zero Calibration) and Channel Window shows $\bar{C}AL. 1$ which indicate that zero calibration is for channel number 1. User can use any channel out of maximum number of channels(24) to calibrate input type for lower reading. Feed sensor input using a calibrator, such that process value is close to lower range value.

Note: The Scanner / DAQ 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.

By pressing MENU key, DP of last digit and last digit itself will blink to indicate that the value can be changed. Use Inc/Dec(Here Decrement key is used for shifting a digit) key to correct the displayed reading to the desired process value and press MENU key. When the calculations are over, the new calibration values are stored automatically and DATA window will show the calibrated value.

When user enters in calibration menu, DATA window shows PV value of corresponding input and PARAMETER window shows message CAL.S (Span Calibration) and Channel Window shows 01 which indicate that zero calibration is for channel number 1. User can use any channel out of maximum number of channels to calibrate input type for span reading. 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. Press MENU key to edit the value. Use Inc/Dec(Here Decrement key is used for shifting a digit in editing mode) key to arrive at the desired process value. Press MENU key to register the changes. When the calculations are over, the new calibration values are stored automatically and DATA window will show the calibrated value.

Zero and Span calibration is over.

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

Analog Output calibration (Voltage/current output)(Optional):-

In 85XX+, maximum 8 numbers of Analog Output(Analog Output) are available. Analog output should be measured using a highly accurate digital multi meter. If user wants Current output then Output current value needs to be calibrated. For Current output calibration, set output type as 4-20 mA. If user wants Voltage output, then Output Voltage value needs to be calibrated. For Voltage output calibration, set output type as 0-10 V.

In Calibration mode, press Inc key repeatedly, till DATA window shows message RTR.2 (Analog Output zero calibration) and PARAMETER window shows message CAL (CAL). By pressing MENU key, DATA window shows 4.000 for current input and 0.000 for voltage input. PARAMETER window shows message RTR.Z (RTR.Z) and channel window shows message 01 (01). Here Channel window displays the Analog O/P Number. Press MENU key to enter into editing mode. Use INC/DEC(Here Decrement key is used for shifting a digit in editing mode) key to correct the displayed reading to the measured value. The Scanner / DAQ will store zero calibration value. Press the INC key to calibrate value for other Analog Output Number. Now press ESC to come out of Analog O/P Zero calibration and press INC key to calibrate Analog Output span calibration menu.

DATA window shows the message RTR.5 (Analog Output span calibration)) and PARAMETER window shows message CAL (CAL). By pressing MENU key, DATA window shows 20.000 for current input and 8.000 for voltage input. PARAMETER window shows message RTR.S (RTR.S) and channel window shows message 01 (01). Here Channel window displays the Analog O/P Number. Press MENU key to enter into editing mode. Use INC/DEC(Here Decrement key is used for shifting a digit in editing mode) key to correct the displayed reading to the measured value. The Scanner / DAQ will store span calibration value. Press the INC key to calibrate value for other Analog Output Number. Now press ESC to come out of Analog O/P Span calibration. Calibration for Analog Output is over. Press MENU key to calibrate other parameters or press Escape key to come out to normal operation.

10. MODBUS COMMUNICATION DETAIL

10.1 Overview

When Scanner / DAQs are setup to communicate on a Modbus network using RTU (Remote Terminal Unit) mode, each 8-bit byte in a message contains two 4-bit Hexadecimal characters. The main advantage of this mode is that it's greater Character density allows better data throughput than ASCII for the same baud rate.

Each message must be transmitted in a continuous stream. The format for each byte in RTU mode is:

Coding System: 8-bit binary, hexadecimal 0–9, A–F
Two hexadecimal characters contained in each 8-bit field of the message

Bits per Byte: 1 start bit
8 data bits, least significant bit sent first
1 bit for even/odd parity; no bit for no parity
1 Stop bit if parity is used; 2 bits if no parity

Error Check Field: Cyclical Redundancy Check (CRC)

- In RTU mode, messages start with a silent interval of at least 3.5 character times.
- If a silent interval of more than 1.5 character times occurs before completion of the frame, the receiving device flushes the incomplete message and assumes that the next byte will be the address field of a new message.

Table 33 Modbus Communication frame format

START	ADDRESS	FUNCTION	DATA	CRC CHECK	END
T1–T2–T3–T4	8 BITS	8 BITS	$n \times 8$ BITS	16 BITS	T1–T2–T3–T4

The Query–Response Cycle

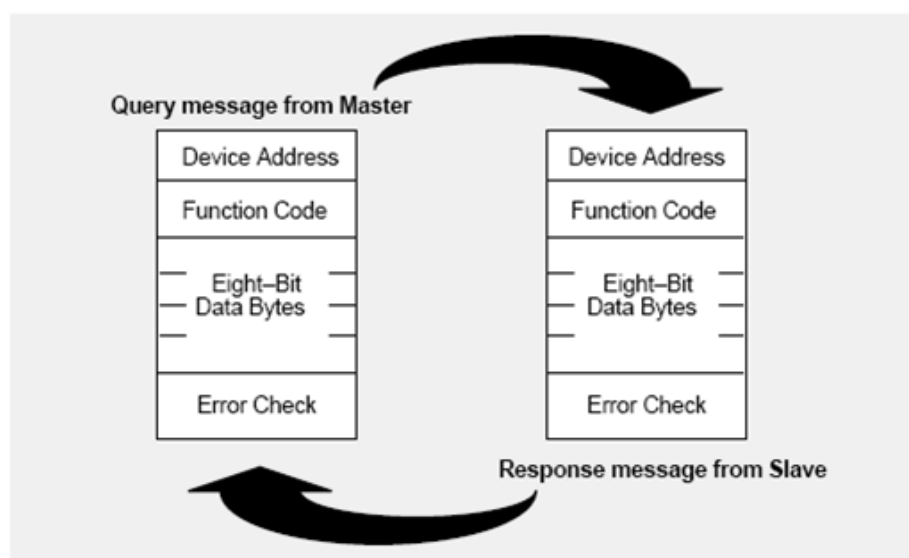


Figure 22 The Query-Response Cycle

- Valid slave device addresses are in the range of 0 – 247 decimal.
 - The individual slave devices are assigned addresses in the range of 1 – 247.
 - Address 0 is used for the broadcast address, which all slave devices recognize.
 - The data field is constructed using sets of two hexadecimal digits, in the range of 00 to FF hexadecimal.
 - In RTU mode, messages include an error-checking field that is based on a Cyclical Redundancy Check (CRC) method
 - The CRC field is two bytes, containing a 16-bit binary value. The CRC value is Calculated by the transmitting device, which appends the CRC to the message
- **Use only following function codes for data read/write purpose**

Table 34 Modbus Function code description

Function Code	Description
01	NA
02	Read Input Status
03	Read Holding Registers
04	Read Input Registers
05	NA
06	Force Single Register
15	NA
16	Force Multiple Registers

- ❖ **Note: To write Programmable Tag Display Parameters use Function Code 16 only but for Other Configuration Parameters use Function Code 6 only.**

10.2 Exception Responses

- ❖ Except for broadcast messages, when a master device sends a query to a slave Device it expects a normal response. One of four possible events can occur from The master's query:
 - If the slave device receives the query without a communication error, and can handle the query normally, it returns a normal response.
 - If the slave does not receive the query due to a communication error, no Response is returned. The master program will eventually process a timeout Condition for the query.
 - If the slave receives the query, but detects a communication error (parity, LRC, or CRC), no response is returned. The master program will eventually process a timeout condition for the query.
 - If the slave receives the query without a communication error, but cannot Handle it (for example, if the request is to read a non-existent coil or register), The slave will return an exception response informing the master of the nature of the error.
 - The exception response message has two fields that differentiate it from a normal Response:

Query:

Table 35 Modbus Query frame format

Byte	Contents	Example
1	Slave Address	0A
2	Function	01
3	Starting Address Hi	04
4	Starting Address Lo	A1
5	No Of Coils Hi	01
6	No Of Coils Lo	01
7	CRC Hi	XX
8	CRC Lo	XX

Exceptional Response:

Table 36 Exceptional Response

Byte	Contents	Example
1	Slave Address	0A
2	Function	81 (80 + Function Code From Query)
3	Exceptional Code	02
4	CRC Hi	XX
5	CRC Lo	XX

- Exception Codes**

Table 37 Exception codes

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.

10.3 Modbus Addresses

Table 38 Read Input Status Parameters

Sr. No	Parameter Description	Modbus Address	Parameter Type	Access	Remarks
1	Channel – 1 – DI Status	10001	Bit	R	-
2	Channel – 2 – DI Status	10002	Bit	R	-
3	Channel – 3 – DI Status	10003	Bit	R	-
4	Channel – 4 – DI Status	10004	Bit	R	-
5	Channel – 5 – DI Status	10005	Bit	R	-
6	Channel – 6 – DI Status	10006	Bit	R	-
7	Channel – 7 – DI Status	10007	Bit	R	-
8	Channel – 8 – DI Status	10008	Bit	R	-
9	Channel – 9 – DI Status	10009	Bit	R	-
10	Channel – 10 – DI Status	10010	Bit	R	-
11	Channel – 11 – DI Status	10011	Bit	R	-
12	Channel – 12 – DI Status	10012	Bit	R	-
13	Channel – 13 – DI Status	10013	Bit	R	-
14	Channel – 14 – DI Status	10014	Bit	R	-
15	Channel – 15 – DI Status	10015	Bit	R	-
16	Channel – 16 – DI Status	10016	Bit	R	-

Table 39 Process Value and Status Read Parameters

Sr. No	Parameter Description	Modbus Address	Parameter Type	Access	Remarks
1	Channel – 1 – PV	30001	Integer	R	-
2	Channel – 2 – PV	30002	Integer	R	-
3	Channel – 3 - PV	30003	Integer	R	-
4	Channel – 4 - PV	30004	Integer	R	-
5	Channel – 5 – PV	30005	Integer	R	-
6	Channel – 6 – PV	30006	Integer	R	-
7	Channel – 7 – PV	30007	Integer	R	-
8	Channel – 8 – PV	30008	Integer	R	-
9	Channel – 9 – PV	30009	Integer	R	-
10	Channel – 10 – PV	30010	Integer	R	-
11	Channel – 11 – PV	30011	Integer	R	-
12	Channel – 12 – PV	30012	Integer	R	-
13	Channel – 13 – PV	30013	Integer	R	-
14	Channel – 14 – PV	30014	Integer	R	-
15	Channel – 15 – PV	30015	Integer	R	-
16	Channel – 16 – PV	30016	Integer	R	-
17	Channel – 17 – PV	30017	Integer	R	-
18	Channel – 18 – PV	30018	Integer	R	-
19	Channel – 19 – PV	30019	Integer	R	-
20	Channel – 20 – PV	30020	Integer	R	-
21	Channel – 21 – PV	30021	Integer	R	-
22	Channel – 22 – PV	30022	Integer	R	-
23	Channel – 23 – PV	30023	Integer	R	-
24	Channel – 24 – PV	30024	Integer	R	-
25	Ambient PV	30025	Integer	R	-
26	DO(Digital Output) Status– 32bit	30026	Bit	R	Refer Table 41
27	Alarm1 Status– 32bit	30028	Bit	R	Refer Table 43
28	Alarm2 Status – 32bit	30030	Bit	R	Refer Table 44
29	Control Status – 32bit	30032	Bit	R	Refer Table 45
30	Alarm1 Blink Status – 32bit	30034	Bit	R	Refer Table 45
31	Alarm2 Blink Status- 32 bit	30036	Bit	R	Refer Table 45
32	Alarm1 LED status - 32 bit	30038	Bit	R	Refer Table 45
33	Alarm2 LED status - 32 bit	30040	Bit	R	Refer Table 45
34	Log Memory Percentage	30042	Integer	R	Higher Byte for Event log and Lower Byte for Periodic Log
35	Total Periodic Records	30043-44	Integer	R	30043 [Higher byte] 30044[Lower Byte]
36	Total Event Records	30045-46	Integer	R	30045 [Higher byte] 30046[Lower Byte]
37	DI Status – 16 bit	30051	Integer	R	Refer Table 42
38	Channel – 1 – PV	32001-02	Swap Float	R	-
39	Channel – 2 – PV	32003-04	Swap Float	R	-
40	Channel – 3 - PV	32005-06	Swap Float	R	-
41	Channel – 4 - PV	32007-08	Swap Float	R	-
42	Channel – 5 – PV	32009-10	Swap Float	R	-
43	Channel – 6 – PV	32011-12	Swap Float	R	-

44	Channel – 7 – PV	32013-14	Swap Float	R	-
45	Channel – 8 – PV	32015-16	Swap Float	R	-
46	Channel – 9 – PV	32017-18	Swap Float	R	-
47	Channel – 10 – PV	32019-20	Swap Float	R	-
48	Channel – 11 – PV	32021-22	Swap Float	R	-
49	Channel – 12 – PV	32023-24	Swap Float	R	-
50	Channel – 13 – PV	32025-26	Swap Float	R	-
51	Channel – 14 – PV	32027-28	Swap Float	R	-
52	Channel – 15 – PV	32029-30	Swap Float	R	-
53	Channel – 16 – PV	32031-32	Swap Float	R	-
54	Channel – 17 – PV	32033-34	Swap Float	R	-
55	Channel – 18 – PV	32035-36	Swap Float	R	-
56	Channel – 19 – PV	32037-38	Swap Float	R	-
57	Channel – 20 – PV	32039-40	Swap Float	R	-
58	Channel – 21 – PV	32041-42	Swap Float	R	-
59	Channel – 22 – PV	32043-44	Swap Float	R	-
60	Channel – 23 – PV	32045-46	Swap Float	R	-
61	Channel – 24 – PV	32047-48	Swap Float	R	-

Table 40 Details of abnormal Conditions of Process Value ⁽¹⁾

Abnormal Value (Integer)	Description
32762	Reserved
32764	Channel Skip
32765	UNDER Value
32766	OVER Value
32767	Channel OPEN Indication

Table 41 DO (Digital Output) Status Register and its bits arrangement

Parameter	DO(Digital Output) Status																DO(Digital Output) Status																	
Modbus Address	30026																30027																	
Bit No.	15	14	13	12	11	10	9	8		7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8		7	6	5	4	3	2	1	0
Description	Open Collector-24	Open Collector-23	Open Collector-22	Open Collector-21	Open Collector-20	Open Collector-19	Open Collector-18	Open Collector-17	-	Open Collector-16	Open Collector-15	Open Collector-14	Open Collector-13	Open Collector-12	Open Collector-11	Open Collector-10	Open Collector-9	Open Collector-8	Open Collector-7	Open Collector-6	Open Collector-5	Open Collector-4	Open Collector-3	Open Collector-2	Open Collector-1	-	Relay-8	Relay-7	Relay-6	Relay-5	Relay-4	Relay-3	Relay-2	Relay-1

Note:- (1) Refer Appendix- A and **Table 75**.

Table 42 DI (Digital Input) Status Register and its bits arrangement

Parameter	DI(Digital Input) Status																
Modbus Address	30051																
Bit No.	15	14	13	12	11	10	9	8		7	6	5	4	3	2	1	0
Description	Digital Input-16	Digital Input-15	Digital Input-14	Digital Input-13	Digital Input-12	Digital Input-11	Digital Input-10	Digital Input-9	.	Digital Input-8	Digital Input-7	Digital Input-6	Digital Input-5	Digital Input-4	Digital Input-3	Digital Input-2	Digital Input-1

Table 43 Alarm 1 Status Register and its bits arrangement

Parameter	Alarm 1 Status																Alarm 1 Status																			
Modbus Address	30028																30029																			
Bit No.	15	14	13	12	11	10	9	8		7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8		7	6	5	4	3	2	1	0		
Description	-	-	-	-	-	-	-	-	-		Channel – 24	Channel – 23	Channel – 22	Channel – 21	Channel – 20	Channel – 19	Channel – 18	Channel – 17		Channel – 16	Channel – 15	Channel – 14	Channel – 13	Channel – 12	Channel – 11	Channel – 10	Channel – 9		Channel – 8	Channel – 7	Channel – 6	Channel – 5	Channel – 4	Channel – 3	Channel – 2	Channel – 1

Table 44 Alarm 2 Status Register and its bits arrangement

Parameter	Alarm 2 Status																Alarm 2 Status																				
Modbus Address	30030																30031																				
Bit No.	15	14	13	12	11	10	9	8		7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8		7	6	5	4	3	2	1	0			
Description	-	-	-	-	-	-	-	-	-		Channel – 24	Channel – 23	Channel – 22	Channel – 21	Channel – 20	Channel – 19	Channel – 18	Channel – 17		Channel – 16	Channel – 15	Channel – 14	Channel – 13	Channel – 12	Channel – 11	Channel – 10	Channel – 9		-	Channel – 8	Channel – 7	Channel – 6	Channel – 5	Channel – 4	Channel – 3	Channel – 2	Channel – 1

- Above mentioned bit arrangement is applicable to other parameters as explained below.

Table 45 Other Status Registers

Parameter	Control Status	Control Status
Modbus Address	30032	30033
Parameter	Alarm 1 Blink Status	Alarm 1 Blink Status
Modbus Address	30034	30035
Parameter	Alarm 2 Blink Status	Alarm 2 Blink Status
Modbus Address	30036	30037
Parameter	Alarm 1 LED Status	Alarm 1 LED Status
Modbus Address	30038	30039
Parameter	Alarm 2 LED Status	Alarm 2 LED Status
Modbus Address	30040	30041

Table 46 Holding Registers Parameters – Part 1

Sr. No	Parameter Description	Modbus Address	Parameter Type	Min Value (Single Channel)	Max Value (Single Channel)	Access	Remarks
1	Ch – 1 – AL1 – SET	40001	Integer	-	-	R/W	Refer Table 52
2	Ch – 2 – AL1 – SET	40002	Integer	-	-	R/W	
3	Ch – 3 – AL1 – SET	40003	Integer	-	-	R/W	
4	Ch – 4 – AL1 – SET	40004	Integer	-	-	R/W	
5	Ch – 5 – AL1 – SET	40005	Integer	-	-	R/W	
6	Ch – 6 – AL1 – SET	40006	Integer	-	-	R/W	
7	Ch – 7 – AL1 – SET	40007	Integer	-	-	R/W	
8	Ch – 8 – AL1 – SET	40008	Integer	-	-	R/W	
9	Ch – 9 – AL1 – SET	40009	Integer	-	-	R/W	
10	Ch –10 – AL1 – SET	40010	Integer	-	-	R/W	
11	Ch –11 – AL1 – SET	40011	Integer	-	-	R/W	
12	Ch –12 – AL1 – SET	40012	Integer	-	-	R/W	
13	Ch –13 – AL1 – SET	40013	Integer	-	-	R/W	
14	Ch –14 – AL1 – SET	40014	Integer	-	-	R/W	
15	Ch –15 – AL1 – SET	40015	Integer	-	-	R/W	
16	Ch –16 – AL1 – SET	40016	Integer	-	-	R/W	
17	Ch –17 – AL1 – SET	40017	Integer	-	-	R/W	
18	Ch –18 – AL1 – SET	40018	Integer	-	-	R/W	
19	Ch –19 – AL1 – SET	40019	Integer	-	-	R/W	
20	Ch –20 – AL1 – SET	40020	Integer	-	-	R/W	
21	Ch –21 – AL1 – SET	40021	Integer	-	-	R/W	Refer Table 52
22	Ch –22 – AL1 – SET	40022	Integer	-	-	R/W	
23	Ch –23 – AL1 – SET	40023	Integer	-	-	R/W	
24	Ch –24 – AL1 – SET	40024	Integer	-	-	R/W	
25	Ch – 1 – AL2 – SET	40025	Integer	-	-	R/W	
26	Ch – 2 – AL2 – SET	40026	Integer	-	-	R/W	
27	Ch – 3 – AL2 – SET	40027	Integer	-	-	R/W	
28	Ch – 4 – AL2 – SET	40028	Integer	-	-	R/W	
29	Ch – 5 – AL2 – SET	40029	Integer	-	-	R/W	
30	Ch – 6 – AL2 – SET	40030	Integer	-	-	R/W	
31	Ch – 7 – AL2 – SET	40031	Integer	-	-	R/W	
32	Ch – 8 – AL2 – SET	40032	Integer	-	-	R/W	
33	Ch – 9 – AL2 – SET	40033	Integer	-	-	R/W	
34	Ch –10 – AL2 – SET	40034	Integer	-	-	R/W	

35	Ch –11 – AL2 – SET	40035	Integer	-	-	R/W	
36	Ch –12 – AL2 – SET	40036	Integer	-	-	R/W	
37	Ch –13 – AL2 – SET	40037	Integer	-	-	R/W	
38	Ch –14 – AL2 – SET	40038	Integer	-	-	R/W	
39	Ch –15 – AL2 – SET	40039	Integer	-	-	R/W	
40	Ch –16 – AL2 – SET	40040	Integer	-	-	R/W	
41	Ch –17 – AL2 – SET	40041	Integer	-	-	R/W	
42	Ch –18 – AL2 – SET	40042	Integer	-	-	R/W	
43	Ch –19 – AL2 – SET	40043	Integer	-	-	R/W	
44	Ch –20 – AL2 – SET	40044	Integer	-	-	R/W	
45	Ch –21 – AL2 – SET	40045	Integer	-	-	R/W	
46	Ch –22 – AL2 – SET	40046	Integer	-	-	R/W	
47	Ch –23 – AL2 – SET	40047	Integer	-	-	R/W	
48	Ch –24 – AL2 – SET	40048	Integer	-	-	R/W	
49	Ch – 1 - 2– ASP Hysteresis	40049	Integer	1	250	R/W	
50	Ch – 3 - 4– ASP Hysteresis	40050	Integer	1	250	R/W	
51	Ch – 5 - 6– ASP Hysteresis	40051	Integer	1	250	R/W	
52	Ch – 7 - 8– ASP Hysteresis	40052	Integer	1	250	R/W	
53	Ch – 9 - 10– ASP Hysteresis	40053	Integer	1	250	R/W	
54	Ch – 11 - 12– ASP Hysteresis	40054	Integer	1	250	R/W	
55	Ch – 13 - 14– ASP Hysteresis	40055	Integer	1	250	R/W	
56	Ch – 15 - 16– ASP Hysteresis	40056	Integer	1	250	R/W	
57	Ch – 17 - 18– ASP Hysteresis	40057	Integer	1	250	R/W	
58	Ch – 19 - 20– ASP Hysteresis	40058	Integer	1	250	R/W	
59	Ch – 21 - 22– ASP Hysteresis	40059	Integer	1	250	R/W	
60	Ch – 23 - 24– ASP Hysteresis	40060	Integer	1	250	R/W	
61	Ch – 1 – C – SET	40061	Integer	-	-	R/W	Refer Table 52
62	Ch – 2 – C – SET	40062	Integer	-	-	R/W	
63	Ch – 3 – C – SET	40063	Integer	-	-	R/W	
64	Ch – 4 – C – SET	40064	Integer	-	-	R/W	
65	Ch – 5 – C – SET	40065	Integer	-	-	R/W	
66	Ch – 6 – C – SET	40066	Integer	-	-	R/W	
67	Ch – 7 – C – SET	40067	Integer	-	-	R/W	
68	Ch – 8 – C – SET	40068	Integer	-	-	R/W	
69	Ch – 9 – C – SET	40069	Integer	-	-	R/W	
70	Ch –10 – C – SET	40070	Integer	-	-	R/W	
71	Ch –11 – C – SET	40071	Integer	-	-	R/W	
72	Ch –12 – C – SET	40072	Integer	-	-	R/W	
73	Ch –13 – C – SET	40073	Integer	-	-	R/W	
74	Ch –14 – C – SET	40074	Integer	-	-	R/W	
75	Ch –15 – C – SET	40075	Integer	-	-	R/W	
76	Ch –16 – C – SET	40076	Integer	-	-	R/W	
77	Ch –17 – C – SET	40077	Integer	-	-	R/W	
78	Ch –18 – C – SET	40078	Integer	-	-	R/W	
79	Ch –19 – C – SET	40079	Integer	-	-	R/W	
80	Ch –20 – C – SET	40080	Integer	-	-	R/W	
81	Ch –21 – C – SET	40081	Integer	-	-	R/W	
82	Ch –22 – C – SET	40082	Integer	-	-	R/W	
83	Ch –23 – C – SET	40083	Integer	-	-	R/W	
84	Ch –24 – C – SET	40084	Integer	-	-	R/W	
85	Ch – 1 - 2– CSP Hysteresis	40085	Integer	1	250	R/W	
86	Ch – 3 - 4– CSP Hysteresis	40086	Integer	1	250	R/W	
87	Ch – 5 - 6– CSP Hysteresis	40087	Integer	1	250	R/W	
88	Ch – 7 - 8– CSP Hysteresis	40088	Integer	1	250	R/W	
89	Ch – 9 - 10– CSP Hysteresis	40089	Integer	1	250	R/W	
90	Ch – 11 - 12– CSP Hysteresis	40090	Integer	1	250	R/W	

91	Ch – 13 - 14– CSP Hysteresis	40091	Integer	1	250	R/W	
92	Ch – 15 - 16– CSP Hysteresis	40092	Integer	1	250	R/W	
93	Ch – 17 - 18– CSP Hysteresis	40093	Integer	1	250	R/W	
94	Ch – 19 - 20– CSP Hysteresis	40094	Integer	1	250	R/W	
95	Ch – 21 - 22– CSP Hysteresis	40095	Integer	1	250	R/W	
96	Ch – 23 - 24– CSP Hysteresis	40096	Integer	1	250	R/W	
97	Ch–1 - 2 – Input Type	40097	Integer	-	-	R/W	Refer Table 52
98	Ch –3 - 4 – Input Type	40098	Integer	-	-	R/W	
99	Ch –5 - 6 – Input Type	40099	Integer	-	-	R/W	
100	Ch –7 - 8 – Input Type	40100	Integer	-	-	R/W	
101	Ch –9 - 10 – Input Type	40101	Integer	-	-	R/W	
102	Ch –11 - 12 – Input Type	40102	Integer	-	-	R/W	
103	Ch –13 - 14 – Input Type	40103	Integer	-	-	R/W	
104	Ch –15 - 16 – Input Type	40104	Integer	-	-	R/W	
105	Ch –17 - 18 – Input Type	40105	Integer	-	-	R/W	
106	Ch –19 - 20 – Input Type	40106	Integer	-	-	R/W	
107	Ch –21 - 22– Input Type	40107	Integer	-	-	R/W	
108	Ch –23 - 24 – Input Type	40108	Integer	-	-	R/W	
109	Ch –1 – USER - Z	40109	Integer	-	-	R/W	Refer Table 52
110	Ch –2 – USER - Z	40110	Integer	-	-	R/W	
111	Ch –3 – USER - Z	40111	Integer	-	-	R/W	
112	Ch –4 – USER - Z	40112	Integer	-	-	R/W	
113	Ch –5 – USER - Z	40113	Integer	-	-	R/W	
114	Ch –6 – USER - Z	40114	Integer	-	-	R/W	
115	Ch –7 – USER - Z	40115	Integer	-	-	R/W	
116	Ch –8 – USER - Z	40116	Integer	-	-	R/W	
117	Ch –9 – USER - Z	40117	Integer	-	-	R/W	
118	Ch –10 – USER - Z	40118	Integer	-	-	R/W	
119	Ch –11 – USER - Z	40119	Integer	-	-	R/W	
120	Ch –12 – USER - Z	40120	Integer	-	-	R/W	
121	Ch –13 – USER - Z	40121	Integer	-	-	R/W	
122	Ch –14 – USER - Z	40122	Integer	-	-	R/W	
123	Ch –15 – USER - Z	40123	Integer	-	-	R/W	
124	Ch –16 – USER - Z	40124	Integer	-	-	R/W	
125	Ch –17 – USER - Z	40125	Integer	-	-	R/W	
126	Ch –18 – USER - Z	40126	Integer	-	-	R/W	
127	Ch –19 – USER - Z	40127	Integer	-	-	R/W	
128	Ch –20 – USER - Z	40128	Integer	-	-	R/W	
129	Ch –21 – USER - Z	40129	Integer	-	-	R/W	
130	Ch –22 – USER - Z	40130	Integer	-	-	R/W	
131	Ch –23 – USER - Z	40131	Integer	-	-	R/W	
132	Ch –24 – USER - Z	40132	Integer	-	-	R/W	
133	Ch –1 – USER – S	40133	Integer	-	-	R/W	Refer Table 52
134	Ch –2 – USER – S	40134	Integer	-	-	R/W	
135	Ch –3 – USER – S	40135	Integer	-	-	R/W	
136	Ch –4 – USER – S	40136	Integer	-	-	R/W	
137	Ch –5 – USER – S	40137	Integer	-	-	R/W	
138	Ch –6 – USER – S	40138	Integer	-	-	R/W	
139	Ch –7 – USER – S	40139	Integer	-	-	R/W	
140	Ch –8 – USER – S	40140	Integer	-	-	R/W	
141	Ch –9 – USER – S	40141	Integer	-	-	R/W	
142	Ch –10 – USER – S	40142	Integer	-	-	R/W	
143	Ch –11 – USER – S	40143	Integer	-	-	R/W	
144	Ch –12 – USER – S	40144	Integer	-	-	R/W	
145	Ch –13 – USER – S	40145	Integer	-	-	R/W	

146	Ch -14 – USER – S	40146	Integer	-	-	R/W	
147	Ch -15 – USER – S	40147	Integer	-	-	R/W	
148	Ch -16 – USER – S	40148	Integer	-	-	R/W	
149	Ch -17 – USER – S	40149	Integer	-	-	R/W	
150	Ch -18 – USER – S	40150	Integer	-	-	R/W	
151	Ch -19 – USER – S	40151	Integer	-	-	R/W	
152	Ch -20 – USER – S	40152	Integer	-	-	R/W	
153	Ch -21 – USER – S	40153	Integer	-	-	R/W	
154	Ch -22 – USER – S	40154	Integer	-	-	R/W	
155	Ch -23 – USER – S	40155	Integer	-	-	R/W	
156	Ch -24 – USER – S	40156	Integer	-	-	R/W	
157	Ch - 1-2 – DP	40157	Integer	0	3	R/W	
158	Ch - 3-4 – DP	40158	Integer	0	3	R/W	
159	Ch - 5-6 – DP	40159	Integer	0	3	R/W	
160	Ch - 7-8 – DP	40160	Integer	0	3	R/W	
161	Ch - 9-10 – DP	40161	Integer	0	3	R/W	
162	Ch - 11-12 – DP	40162	Integer	0	3	R/W	
163	Ch - 13-14 – DP	40163	Integer	0	3	R/W	
164	Ch - 15-16 – DP	40164	Integer	0	3	R/W	
165	Ch - 17-18 – DP	40165	Integer	0	3	R/W	
166	Ch -19-20 – DP	40166	Integer	0	3	R/W	Refer Table 15
167	Ch -21-22 – DP	40167	Integer	0	3	R/W	
168	Ch -23-24 – DP	40168	Integer	0	3	R/W	
169	Ch - 1-2 – ASP1 MAP	40169	Integer	0	32	R/W	
170	Ch - 3-4 – ASP1 MAP	40170	Integer	0	32	R/W	
171	Ch - 5-6 – ASP1 MAP	40171	Integer	0	32	R/W	
172	Ch - 7-8 – ASP1 MAP	40172	Integer	0	32	R/W	
173	Ch - 9-10 – ASP1 MAP	40173	Integer	0	32	R/W	
174	Ch - 11-12 – ASP1 MAP	40174	Integer	0	32	R/W	
175	Ch - 13-14 – ASP1 MAP	40175	Integer	0	32	R/W	
176	Ch - 15-16 – ASP1 MAP	40176	Integer	0	32	R/W	
177	Ch - 17-18 – ASP1 MAP	40177	Integer	0	32	R/W	
178	Ch -19-20 – ASP1 MAP	40178	Integer	0	32	R/W	
179	Ch -21-22 – ASP1 MAP	40179	Integer	0	32	R/W	
180	Ch -23-24 – ASP1 MAP	40180	Integer	0	32	R/W	
181	Ch - 1-2 – ASP2 MAP	40181	Integer	0	32	R/W	
182	Ch - 3-4 – ASP2 MAP	40182	Integer	0	32	R/W	
183	Ch - 5-6 – ASP2 MAP	40183	Integer	0	32	R/W	
184	Ch - 7-8 – ASP2 MAP	40184	Integer	0	32	R/W	
185	Ch - 9-10 – ASP2 MAP	40185	Integer	0	32	R/W	
186	Ch - 11-12 – ASP2 MAP	40186	Integer	0	32	R/W	
187	Ch - 13-14 – ASP2 MAP	40187	Integer	0	32	R/W	
188	Ch - 15-16 – ASP2 MAP	40188	Integer	0	32	R/W	
189	Ch - 17-18 – ASP2 MAP	40189	Integer	0	32	R/W	
190	Ch -19-20 – ASP2 MAP	40190	Integer	0	32	R/W	
191	Ch -21-22 – ASP2 MAP	40191	Integer	0	32	R/W	
192	Ch -23-24 – ASP2 MAP	40192	Integer	0	32	R/W	
193	Ch - 1-2 – CSP MAP	40193	Integer	0	32	R/W	
194	Ch - 3-4 – CSP MAP	40194	Integer	0	32	R/W	
195	Ch - 5-6 – CSP MAP	40195	Integer	0	32	R/W	
196	Ch - 7-8 – CSP MAP	40196	Integer	0	32	R/W	
197	Ch - 9-10 – CSP MAP	40197	Integer	0	32	R/W	
198	Ch - 11-12 – CSP MAP	40198	Integer	0	32	R/W	
199	Ch - 13-14 – CSP MAP	40199	Integer	0	32	R/W	
200	Ch - 15-16 – CSP MAP	40200	Integer	0	32	R/W	
201	Ch - 17-18 – CSP MAP	40201	Integer	0	32	R/W	

202	Ch -19-20 – CSP MAP	40202	Integer	0	32	R/W	
203	Ch -21-22 – CSP MAP	40203	Integer	0	32	R/W	
204	Ch -23-24 – CSP MAP	40204	Integer	0	32	R/W	

Table 47 Holding Registers Parameters – Part 2

Sr. No	Parameter Description	Modbus Address	Parameter Type	Min Value (Single Channel)	Max Value (Single Channel)	Access	Remarks
205	Scan rate	42001	Integer	1	250	R/W	-
206	Square root for Channel 8 – 1 (MSB- LSB)	42002 - H	Bit	0	1	R/W	Refer Table 53 and refer Table 55
207	Square root for Channel 16 - 9 (MSB- LSB)	42002 - L	Bit	0	1	R/W	
208	Square root for Channel 24-17 (MSB- LSB)	42003 - H	Bit	0	1	R/W	
209	CJC	42004 - H	Integer	0	2	R/W	Refer Table 56
210	FCJC	42005	Integer	-10.0	65.0	R/W	-
211	CCJC	42006 - H	Integer	1	24	R/W	-
212	Open Sensor for Channel 8 - 1 (MSB- LSB)	42007 - H	Bit	0	1	R/W	Refer Table 57
213	Open Sensor for Channel 16 - 9 (MSB- LSB)	42007 - L	Bit	0	1	R/W	
214	Open Sensor for Channel 24 - 17 (MSB- LSB)	42008 - H	Bit	0	1	R/W	
215	Percentage Range for Over Reading Display	42180	Integer	0	10	R/W	-
216	Percentage Range for Under Reading Display	42181	Integer	0	10	R/W	-
217	Number Of Channel	42009	Integer	1	24	R/W	-
218	Alarm Latch	42010	Integer	0	1	R/W	Refer Table 58
219	Alarm Acknowledge	42011	Integer	-	-	W	-
220	DO Logic for Relay 8 – 1 (MSB- LSB)	42012 - H	Bit	0	1	R/W	Refer Table 59
221	DO Logic for Open Collector 8 - 1 (MSB- LSB)	42012 - L	Bit	0	1	R/W	
222	DO Logic for Open Collector 16 - 9 (MSB- LSB)	42013 - H	Bit	0	1	R/W	
223	DO Logic for Open Collector 24 - 17 (MSB- LSB)	42013 - L	Bit	0	1	R/W	
224	Relay 1 - 2 - DO Delay	42014	Integer	1	99	R/W	-
225	Relay 3 - 4 - DO Delay	42015	Integer	1	99	R/W	
226	Relay 5 - 6 - DO Delay	42016	Integer	1	99	R/W	
227	Relay 7 - 8 - DO Delay	42017	Integer	1	99	R/W	
228	Open Collector 1 - 2 - DO Delay	42018	Integer	1	99	R/W	
229	Open Collector 3- 4 - DO Delay	42019	Integer	1	99	R/W	
230	Open Collector 5 - 6 - DO Delay	42020	Integer	1	99	R/W	
231	Open Collector 7 - 8 - DO Delay	42021	Integer	1	99	R/W	
232	Open Collector 9 - 10 - DO Delay	42022	Integer	1	99	R/W	
233	Open Collector 11 - 12 - DO Delay	42023	Integer	1	99	R/W	
234	Open Collector 13 - 14 - DO Delay	42024	Integer	1	99	R/W	
235	Open Collector 15 - 16 - DO Delay	42025	Integer	1	99	R/W	
236	Open Collector 17 - 18 - DO Delay	42026	Integer	1	99	R/W	
237	Open Collector 19 - 20 - DO Delay	42027	Integer	1	99	R/W	

238	Open Collector 21 - 22 - DO Delay	42028	Integer	1	99	R/W	
239	Open Collector 23 - 24 - DO Delay	42029	Integer	1	99	R/W	
240	ASP1 Function for Channel 8 - 1 (MSB- LSB)	42030 - H	Bit	0	1	R/W	
241	ASP1 Function for Channel 16 - 8 (MSB- LSB)	42030 - L	Bit	0	1	R/W	Refer Table 60
242	ASP1 Function for Channel 24 - 17 (MSB- LSB)	42031 - H	Bit	0	1	R/W	
243	ASP1 type for Channel 8 - 1 (MSB- LSB)	42032 - H	Bit	0	1	R/W	
244	ASP1 type for Channel 16 - 9 (MSB- LSB)	42032 - L	Bit	0	1	R/W	Refer Table 61
245	ASP1 type for Channel 24 - 17 (MSB- LSB)	42033 - H	Bit	0	1	R/W	
246	ASP2 Function for Channel 8 - 1 (MSB- LSB)	42034 - H	Bit	0	1	R/W	
247	ASP2 Function for Channel 16 - 9 (MSB- LSB)	42034 - L	Bit	0	1	R/W	Refer Table 60
248	ASP2 Function for Channel 24 - 17 (MSB- LSB)	42035 - H	Bit	0	1	R/W	
249	ASP2 type for Channel 8 - 1 (MSB- LSB)	42036 - H	Bit	0	1	R/W	
250	ASP2 type for Channel 16 - 9 (MSB- LSB)	42036 - L	Bit	0	1	R/W	Refer Table 61
251	ASP2 type for Channel 24 - 17 (MSB- LSB)	42037 - H	Bit	0	1	R/W	
252	CSP type for Channel 8 - 1 (MSB- LSB)	42038 - H	Bit	0	1	R/W	
253	CSP type for Channel 16 - 9 (MSB- LSB)	42038 - L	Bit	0	1	R/W	Refer Table 61
254	CSP type for Channel 24 - 17 (MSB- LSB)	42039 - H	Bit	0	1	R/W	
255	Analog O/P Type 1- 2	42040	Integer	0	4	R/W	
256	Analog O/P Type 3 - 4	42041	Integer	0	4	R/W	Refer Table 62
257	Analog O/P Type 5 - 6	42042	Integer	0	4	R/W	
258	Analog O/P Type 7 - 8	42043	Integer	0	4	R/W	
259	Analog O/P Direction for Analog O/P 8 - 1 (MSB- LSB)	42044	Bit	0	1	R/W	Refer Table 63
260	Ch - 1 Analog O/P Mapping	42501	Integer	0	8	R/W	Refer Table 18
261	Ch - 2 Analog O/P Mapping	42502	Integer	0	8	R/W	
262	Ch - 3 Analog O/P Mapping	42503	Integer	0	8	R/W	
263	Ch - 4 Analog O/P Mapping	42504	Integer	0	8	R/W	
264	Ch - 5 Analog O/P Mapping	42505	Integer	0	8	R/W	
265	Ch - 6 Analog O/P Mapping	42506	Integer	0	8	R/W	
266	Ch - 7 Analog O/P Mapping	42507	Integer	0	8	R/W	
267	Ch - 8 Analog O/P Mapping	42508	Integer	0	8	R/W	
268	Ch - 9 Analog O/P Mapping	42509	Integer	0	8	R/W	
269	Ch - 10 Analog O/P Mapping	42510	Integer	0	8	R/W	
270	Ch - 11 Analog O/P Mapping	42511	Integer	0	8	R/W	
271	Ch - 12 Analog O/P Mapping	42512	Integer	0	8	R/W	
272	Ch - 13 Analog O/P Mapping	42513	Integer	0	8	R/W	
273	Ch - 14 Analog O/P Mapping	42514	Integer	0	8	R/W	
274	Ch - 15 Analog O/P Mapping	42515	Integer	0	8	R/W	
275	Ch - 16 Analog O/P Mapping	42516	Integer	0	8	R/W	
276	Ch - 17 Analog O/P Mapping	42517	Integer	0	8	R/W	
277	Ch - 18 Analog O/P Mapping	42518	Integer	0	8	R/W	

278	Ch - 19 Analog O/P Mapping	42519	Integer	0	8	R/W	
279	Ch - 20 Analog O/P Mapping	42520	Integer	0	8	R/W	
280	Ch - 21 Analog O/P Mapping	42521	Integer	0	8	R/W	
281	Ch - 22 Analog O/P Mapping	42522	Integer	0	8	R/W	
282	Ch - 23 Analog O/P Mapping	42523	Integer	0	8	R/W	
283	Ch - 24 Analog O/P Mapping	42524	Integer	0	8	R/W	
284	Analog O/P Value for Analog O/P 8 - 1 (MSB- LSB)	42057	Bit	0	1	R/W	Refer Table 64
285	Analog O/P Open Sensor for Analog O/P 8 - 1 (MSB- LSB)	42058	Bit	0	1	R/W	Refer Table 57
286	Machine ID	42059	Integer	1	247	R/W	-
287	Baud Rate COM 1	42060	Integer	0	1	R/W	Refer Table 65
288	Parity COM1	42061	Integer	0	5	R/W	Refer Table 66
289	Baud Rate COM 2	42062	Integer	0	1	R/W	Refer Table 65
290	Parity COM2	42063	Integer	0	5	R/W	Refer Table 66
291	Ethernet IP address 1 - 2	42064	Integer	0	255	R/W	-
292	Ethernet IP address 3 - 4	42065	Integer	0	255	R/W	-
293	Subnet Mask for Ethernet 1 - 2	42066	Integer	0	255	R/W	-
294	Subnet Mask for Ethernet 3 - 4	42067	Integer	0	255	R/W	-
295	Gateway for Ethernet 1 - 2	42068	Integer	0	255	R/W	-
296	Gateway for Ethernet 3 - 4	42069	Integer	0	255	R/W	-
297	Favorite Display Parameter	42070	Integer	0	4	R/W	Refer Table 67
298	Ch - 1- 2 - Engineering Unit	42071	Integer	0	32	R/W	Refer Table 21
299	Ch - 3- 4 - Engineering Unit	42072	Integer	0	32	R/W	
300	Ch - 5- 6 - Engineering Unit	42073	Integer	0	32	R/W	
301	Ch - 7- 8 - Engineering Unit	42074	Integer	0	32	R/W	
302	Ch - 9- 10 - Engineering Unit	42075	Integer	0	32	R/W	
303	Ch - 11- 12 - Engineering Unit	42076	Integer	0	32	R/W	
304	Ch - 13- 14 - Engineering Unit	42077	Integer	0	32	R/W	
305	Ch - 15- 16 - Engineering Unit	42078	Integer	0	32	R/W	
306	Ch - 17- 18 - Engineering Unit	42079	Integer	0	32	R/W	
307	Ch - 19- 20 - Engineering Unit	42080	Integer	0	32	R/W	
308	Ch - 21- 22 - Engineering Unit	42081	Integer	0	32	R/W	
309	Ch - 23- 24 - Engineering Unit	42082	Integer	0	32	R/W	
310	LED Configuration	42083	Integer	0	3	R/W	Refer Table 68
311	Time Out	42084	Integer	10	100	R/W	-
312	Filter	42085	Integer	0	9	R/W	-
313	Periodic Logging Enable	42086 - L	Integer	0	1	R/W	Refer Table 69
314	Event Logging Enable	42086 - H	Integer	0	1	R/W	
315	Event Log Channel mapping for Channel 8 - 1 (MSB- LSB)	42087 - H	Bit	0	1	R/W	Refer Table 55
316	Event Log Channel mapping for Channel 16 - 9 (MSB- LSB)	42087 - L	Bit			R/W	
317	Event Log Channel mapping for Channel 24 - 17 (MSB- LSB)	42088 - H	Bit			R/W	
318	Periodic Log Mode	42089 - L	Integer	0	1	R/W	Refer Table 70
319	Event Log Mode	42089 - H	Integer	0	1	R/W	
320	Periodic Memory Reset	42090 - L	Integer	0	1	R/W	Refer Table 55
321	Event Memory Reset	42090 - H	Integer	0	1	R/W	

322	RTC - Hour	42091	Integer	0	23	R/W	-
323	RTC - Minute	42092	Integer	0	59	R/W	-
324	RTC - Second	42093	Integer	0	59	R/W	-
325	RTC - Date	42094	Integer	1	31	R/W	-
326	RTC - Month	42095	Integer	1	12	R/W	-
327	RTC - Year	42096	Integer	1	255	R/W	-
328	Periodic Log time – Hour	42097	Integer	0	23	R/W	-
329	Periodic Log time – Minute	42098	Integer	0	59	R/W	-
330	Periodic Log time - Second	42099	Integer	0	59	R/W	-
331	Periodic Log Channel mapping for Channel 8 - 1 (MSB- LSB)	42177 – H	Bit	0	1	R/W	Refer Table 55
332	Periodic Log Channel mapping for Channel 16 - 9 (MSB- LSB)	42177 - L	Bit	0	1	R/W	
333	Periodic Log Channel mapping for Channel 24 - 17 (MSB- LSB)	42178 - H	Bit	0	1	R/W	
334	USB fetched records per file(Periodic Records)	42185	Integer	100	60000	R/W	
335	USB fetched records per file(Event Records)	42186	Integer	100	60000	R/W	
336	USB Periodic Fetch Mode	42187	Integer	0	1	R/W	
337	USB Periodic Fetch by Last logged Hours	42188	Integer	0	23	R/W	
338	USB Periodic Fetch by Last logged Days	42189	Integer	0	180	R/W	
339	USB Periodic Fetching Enable	42190	Integer	0	1	R/W	
340	USB Event Fetching Enable	42191	Integer	0	1	R/W	
341	USB Fetching Start	42192	Integer	1	1	W	

Table 48 Holding Registers Parameters – Part 3 and Calibration Registers Parameters

Sr. No	Parameter Description	Modbus Address	Parameter Type	Min Value	Max Value	Access	Remarks
342	Ambient calibration	42101	Integer	-10.0	65.0	W	Refer Table 52
343	Ch –1 – CALZ	42102	Integer	-	-	W	
344	Ch –2 – CALZ	42103	Integer	-	-	W	
345	Ch –3 – CALZ	42104	Integer	-	-	W	
346	Ch –4 – CALZ	42105	Integer	-	-	W	
347	Ch –5 – CALZ	42106	Integer	-	-	W	
348	Ch –6 – CALZ	42107	Integer	-	-	W	
349	Ch –7 – CALZ	42108	Integer	-	-	W	
350	Ch –8 – CALZ	42109	Integer	-	-	W	
351	Ch –9 – CALZ	42110	Integer	-	-	W	
352	Ch –10 – CALZ	42111	Integer	-	-	W	
353	Ch –11 – CALZ	42112	Integer	-	-	W	
354	Ch –12 – CALZ	42113	Integer	-	-	W	
355	Ch –13 – CALZ	42114	Integer	-	-	W	
356	Ch –14 – CALZ	42115	Integer	-	-	W	
357	Ch –15 – CALZ	42116	Integer	-	-	W	

358	Ch -16 – CALZ	42117	Integer	-	-	W	
359	Ch -17 – CALZ	42118	Integer	-	-	W	
360	Ch -18 – CALZ	42119	Integer	-	-	W	
361	Ch -19 – CALZ	42120	Integer	-	-	W	
362	Ch -20 – CALZ	42121	Integer	-	-	W	
363	Ch -21 – CALZ	42122	Integer	-	-	W	
364	Ch -22 – CALZ	42123	Integer	-	-	W	
365	Ch -23 – CALZ	42124	Integer	-	-	W	
366	Ch -24 – CALZ	42125	Integer	-	-	W	Refer Table 52
367	Ch -1 – CALS	42126	Integer	-	-	W	
368	Ch -2 – CALS	42127	Integer	-	-	W	
369	Ch -3 – CALS	42128	Integer	-	-	W	
370	Ch -4 – CALS	42129	Integer	-	-	W	
371	Ch -5 – CALS	42130	Integer	-	-	W	
372	Ch -6 – CALS	42131	Integer	-	-	W	
373	Ch -7 – CALS	42132	Integer	-	-	W	
374	Ch -8 – CALS	42133	Integer	-	-	W	
375	Ch -9 – CALS	42134	Integer	-	-	W	
376	Ch -10 – CALS	42135	Integer	-	-	W	
377	Ch -11 – CALS	42136	Integer	-	-	W	
378	Ch -12 – CALS	42137	Integer	-	-	W	
379	Ch -13 – CALS	42138	Integer	-	-	W	
380	Ch -14 – CALS	42139	Integer	-	-	W	
381	Ch -15 – CALS	42140	Integer	-	-	W	
382	Ch -16 – CALS	42141	Integer	-	-	W	
383	Ch -17 – CALS	42142	Integer	-	-	W	
384	Ch -18 – CALS	42143	Integer	-	-	W	
385	Ch -19 – CALS	42144	Integer	-	-	W	
386	Ch -20 – CALS	42145	Integer	-	-	W	
387	Ch -21 – CALS	42146	Integer	-	-	W	
388	Ch -22 – CALS	42147	Integer	-	-	W	
389	Ch -23 – CALS	42148	Integer	-	-	W	
390	Ch -24 – CALS	42149	Integer	-	-	W	
391	Analog O/P 1 RTRZ	42150	Integer	-	-	W	-
392	Analog O/P 2 RTRZ	42151	Integer	-	-	W	
393	Analog O/P 3 RTRZ	42152	Integer	-	-	W	
394	Analog O/P 4 RTRZ	42153	Integer	-	-	W	
395	Analog O/P 5 RTRZ	42154	Integer	-	-	W	
396	Analog O/P 6 RTRZ	42155	Integer	-	-	W	
397	Analog O/P 7 RTRZ	42156	Integer	-	-	W	
398	Analog O/P 8 RTRZ	42157	Integer	-	-	W	
399	Analog O/P 1 RTRS	42158	Integer	-	-	W	-
400	Analog O/P 2 RTRS	42159	Integer	-	-	W	

401	Analog O/P 3 RTRS	42160	Integer	-	-	W	
402	Analog O/P 4 RTRS	42161	Integer	-	-	W	
403	Analog O/P 5 RTRS	42162	Integer	-	-	W	
404	Analog O/P 6 RTRS	42163	Integer	-	-	W	
405	Analog O/P 7 RTRS	42164	Integer	-	-	W	
406	Analog O/P 8 RTRS	42165	Integer	-	-	W	
407	Password 1 for program mode	42166	Integer	0	9999	R/W	-
408	Password 2 for Configuration mode	42167	Integer	0	9999	R/W	-
409	Password 3 for Calibration mode	42168	Integer	0	9999	R/W	-
410	Password 4 for Security mode	42169	Integer	0	9999	R/W	-
411	Factory reset parameter	42170	Integer	0	2	R/W	Refer Table 71
412	Watchdog Mapping	42175	Integer	0	32	R/W	Refer Table 15
413	Watchdog Output	42176	Integer	0	1	R/W	Refer Table 72

Table 49 Holding Registers Parameters – Part 4

Sr. No	Parameter Description	Modbus Address	Parameter Type	Min Value	Max Value	Access	Remarks
1	Channel – 1 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42201 42202 42203	Integer	-	-	R / W	Refer Table 50 and Table 51 and note.
2	Channel – 2 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42204 42205 42206	Integer	-	-	R / W	
3	Channel – 3 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42207 42208 42209	Integer	-	-	R / W	
4	Channel – 4 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42210 42211 42212	Integer	-	-	R / W	
5	Channel – 5 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42213 42214 42215	Integer	-	-	R / W	
6	Channel – 6 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42216 42217 42218	Integer	-	-	R / W	
7	Channel – 7 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42219 42220 42221	Integer	-	-	R / W	
8	Channel – 8 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42222 42223 42224	Integer	-	-	R / W	
9	Channel – 9 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42225 42226 42227	Integer	-	-	R / W	
10	Channel – 10 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42228 42229	Integer	-	-	R / W	

	Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42230					Refer Table 50 and Table 51 and note.
11	Channel – 11 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42231 42232 42233	Integer	-	-	R / W	
12	Channel – 12 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42234 42235 42236	Integer	-	-	R / W	
13	Channel – 13 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42237 42238 42239	Integer	-	-	R / W	
14	Channel – 14 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42240 42241 42242	Integer	-	-	R / W	
15	Channel – 15 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42243 42244 42245	Integer	-	-	R / W	
16	Channel – 16 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42246 42247 42248	Integer	-	-	R / W	
17	Channel – 17 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42249 42250 42251	Integer	-	-	R / W	
18	Channel – 18 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42252 42253 42254	Integer	-	-	R / W	
19	Channel – 19 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42255 42256 42257	Integer	-	-	R / W	
20	Channel – 20 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42258 42259 42260	Integer	-	-	R / W	
21	Channel – 21 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42261 42262 42263	Integer	-	-	R / W	
22	Channel – 22 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42264 42265 42266	Integer	-	-	R / W	
23	Channel – 23 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42267 42268 42269	Integer	-	-	R / W	
24	Channel – 24 ASCII code for Digit -1 (Left Most Alpha Numeric Digit) to Digit -6 (Right Most Alpha Numeric Digit)	42270 42271 42272	Integer	-	-	R / W	

Table 50 Byte arrangement for Programmable Display

Parameter	Programmable Display for Channel No. 1		Programmable Display for Channel No. 1		Programmable Display for Channel No. 1	
Modbus Address	42201		42202		42203	
Bit No.	Bit No. 15- 8	Bit No. 7- 0	Bit No. 15- 8	Bit No. 7- 0	Bit No. 15- 8	Bit No. 7- 0
Description	ASCII Code for Left Most Digit (Digit No. 1)	ASCII Code for Digit No. 2	ASCII Code for Digit No. 3	ASCII Code for Digit No. 4	ASCII Code for Digit No. 5	ASCII Code for Right Most Digit (Digit No. 6)

- Above mentioned bit arrangement is applicable to other channels as explained next.

Table 51 Parameters for Programmable Display for other channels

Channel No.	Modbus Address for Digit 1 and Digit 2	Modbus Address for Digit 3 and Digit 4	Modbus Address for Digit 5 and Digit 6
2	42204	42205	42206
3	42207	42208	42209
4	42210	42211	42212
5	42213	42214	42215
6	42216	42217	42218
7	42219	42220	42221
8	42222	42223	42224
9	42225	42226	42227
10	42228	42229	42230
11	42231	42232	42233
12	42234	42235	42236
13	42237	42238	42239
14	42240	42241	42242
15	42243	42244	42245
16	42246	42247	42248
17	42249	42250	42251
18	42252	42253	42254
19	42255	42256	42257
20	42258	42259	42260
21	42261	42262	42263
22	42264	42265	42266
23	42267	42268	42269
24	42270	42271	42272

Note : In programmable display mode, user can program 6 digit Alphanumeric display for channel name by giving ASCII value of characters “- , . , / , 0 to 9 , < , > , A to Z , \ , space”. User can set different tag name to different channels. Note that, this programmable display can only be set by means of configuration software and not by front keypad.

Table 52 Input Type Selection Table

Input Type	I/P no (Decimal)	I/P No. (Hex)	Type Display	Zero	Span	Resolution
None	0	0 x 00	NONE	-	-	-
E	1	0 x 01	E-TC	-200	1000	0.1°C
J	2	0 x 02	J-TC	-200	1200	0.1°C

K	3	0 x 03	K-TC	-200	1370	0.1°C
T	4	0 x 04	T-TC	-200	400	0.1°C
B	5	0 x 05	B-TC	450	1800	1°C
R	6	0 x 06	R-TC	0	1750	1°C
S	7	0 x 07	S-TC	0	1750	1°C
N	8	0 x 08	N-TC	0	1300	0.1°C
RTD	9	0 x 09	RTD	-199.9	850.0	0.1°C
CU53	10	0 x 0A	CU53	-210.0	210.0	0.1°C
NI120	11	0 x 0B	NI120	-70.0	210.0	0.1°C
-10 TO 20 mV	12	0 x 0C	-10.20mV	-1999	9999	1 Count
0 to 100 mV	13	0 x 0D	0-100mV	-1999	9999	
4 to 20 mA	14	0 x 0E	4-20mA	-1999	9999	
0 to 20 mA	15	0 x 0F	0-20mA	-1999	9999	
0 to 5 V	16	0 x 10	0-5V	-1999	9999	
1 to 5 V	17	0 x 11	1-5V	-1999	9999	
0 to 10 V	18	0 x 12	0-10V	-1999	9999	
Digital Input	19	0x13	DIG. INP	-	-	

Table 53 Bit accessible Holding Register Parameter – Square Root

Parameter	Square root																Square root																	
Modbus Address	42002																42003																	
Bit No.	15	14	13	12	11	10	9	8		7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8		7	6	5	4	3	2	1	0
Description	Channel – 8	Channel – 7	Channel – 6	Channel – 5	Channel – 4	Channel – 3	Channel – 2	Channel – 1	-	Channel – 16	Channel – 15	Channel – 14	Channel – 13	Channel – 12	Channel – 11	Channel – 10	Channel – 9	Channel – 24	Channel – 23	Channel – 22	Channel – 21	Channel – 20	Channel – 19	Channel – 18	Channel – 17	-	-	-	-	-	-	-	-	

- Above mentioned bit arrangement is applicable to other parameters as explained next .

Table 54 Bit accessible Holding Register Parameter – Others

Parameter	Open Sensor	Open Sensor
Modbus Address	42007	42008
Parameter	ASP1 Function	ASP1 Function
Modbus Address	42030	42031
Parameter	ASP1 Type	ASP1 Type
Modbus Address	42032	42033
Parameter	ASP2 Function	ASP2 Function
Modbus Address	42034	42035

Parameter	ASP2 Type	ASP2 Type
Modbus Address	42036	42037
Parameter	CSP Type	CSP Type
Modbus Address	42038	42039
Parameter	Log Channel	Log Channel
Modbus Address	42087	42088

Table 55 Parameter Applicability Selection	
Modbus Index	Parameter value
0	NO
1	YES

Table 56 CJC Selection	
Modbus Index	Parameter value
0	ACJC
1	FCJC
2	CCJC

Table 57 Open Sensor Selection	
Modbus Index	Parameter value
0	DOWN
1	UP

Table 58 Alarm Latch Selection	
Modbus Index	Parameter value
0	OFF
1	ON

Table 59 DO (Digital Output) Logic Selection	
Modbus Index	Parameter value
0	NORMAL
1	FAIL SAFE

Table 60 Set Point Function Selection	
Modbus Index	Parameter value
0	ALARM
1	TRIP

Table 61 Set Point Type Selection	
Modbus Index	Parameter value
0	LOW
1	HIGH

Table 62 Analog O/P Type Selection	
Modbus Index	Parameter value
0	0 - 20 mA
1	4 - 20 mA
2	0-5 V
3	1- 5 v
4	0 - 10 V

Table 63 Analog O/P Direction Selection	
Modbus Index	Parameter value
0	REVERSE
1	DIRECT

Table 64 Analog O/P Value Selection	
Modbus Index	Parameter value
0	MINIMUM
1	MAXIMUM

Table 65 COM Port Baud Rate Selection	
Modbus Index	Parameter value
0	9600
1	19200
2	57600

Table 66 COM Parity Selection	
Modbus Index	Parameter value
0	Parity None Stop Bit 2
1	Parity Odd Stop Bit 1
2	Parity Even Stop Bit 1
3	Parity None Stop Bit 1
4	Parity Odd Stop Bit 2
5	Parity Even Stop Bit 2

Table 67 Favorite Display Selection	
Modbus Index	Parameter value
0	INPUT TYPE
1	Periodic Mem. %
2	Event Mem. %
3	Ambient
4	Engg. Unit
5	Serial No.
6	Programmable Display
7	Periodic Record No.
8	Event Record No.

Table 68 LED Configuration Selection	
Modbus Index	Parameter value
0	ALARM STATUS - CONTROL STATUS
1	ALARM 1 STATUS-ALARM 2 STATUS
2	ALARM STATUS - OPEN COLLECTOR STATUS
3	ALARM STATUS – DIGITAL INPUT STATUS

Table 69 Logging Enable Selection	
Modbus Index	Parameter value
0	STOP
1	START

Table 70 Log Mode Selection	
Modbus Index	Parameter value
0	HOLD
1	OVERLAP

Table 71 Factory Reset Parameters	
Modbus Index	Parameter value
0	Calibration Values
1	Parameters Values
2	All Values

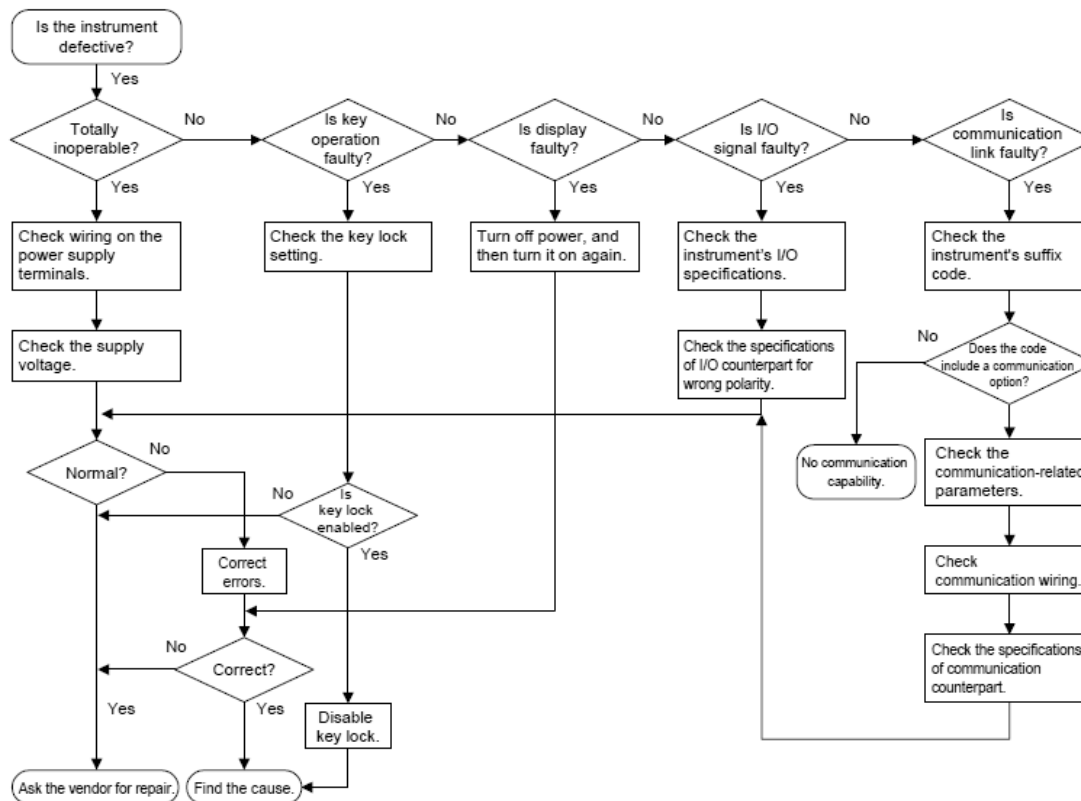
Table 72 WatchDog Output	
Modbus Index	Parameter value
0	Disable
1	Enable

Table 73 USB Periodic Fetch Mode	
Modbus Index	Parameter value
0	USB. Periodic Fetch Full
1	USB. Periodic Fetch by Time

11. TROUBLESHOOTING

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

If a problem appears complicated, contact our sales representative.



APPENDIX – A PV STATUS DURING SENSOR BURN OUT CONDITIONS

- PV INPUT STATUS DISPLAY DURING BURNOUT CONDITION:**

Table 74 PV Status during Burn Out Condition

Input type	Display Message
E	OPEN(oPEn)
J	OPEN
K	OPEN
T	OPEN
B	OPEN
R	OPEN
S	OPEN
N	OPEN
RTD	OPEN
CU53	OPEN
NI120	OPEN
-10 to 20mV	OPEN
0 to 100 mV	OPEN
4 to 20mAmp	OPEN
0 to 20mAmp	PV LOW
0 to 5V	PV LOW
1 to 5V	OPEN
0 to 10V	PV LOW

Note: For TC/RTD Inputs with scaling (eg. 0 – 500 °C) then display will show reading up to -5% (-25° C) and 105% (525° C). Below -5% (-25° C) and above 105% (525 C) display will show **Under&over** (UNDER & OVER) respectively until reading crosses Sensor range. If reading is out of sensor range then display will show **oPEn** (OPEN).

Linear inputs (1 to 5V) with scaling 0-1000 are applied then display will show reading up to -5% (0.8V) and 105% (5.2V). Below -5% (0.8V) and above 105% (5.2V) display will show **oPEn** (OPEN).

Analog O/P o/p (Optional) will follow 5% of display range and then it will give fixed o/p depending up on OPEN sensor selection.

Table 75 Input Types for OPEN/OVER/UNDER Condition

INPUT TYPE (PV DISPLAY)	RANGE	I/P (0.8V) (-5%)	I/P (5.2V) (+105%)	I/P (<0.8V) (< -5%)	I/P (>5.2V) (> +105%)	I/P (-1999<I/P> 9999)
LINEAR INPUT (1-5V)	0 to 1000	-50	1050	OPEN	OPEN	OPEN

INPUT TYPE (PV DISPLAY)	RANGE	I/P (- 25°C) (-5%)	I/P (525°C) (+105%)	I/P -200°C>I/P< -25°C	I/P 525°C>I/P< 1370°C	I/P (-200°C <I/P> 1370°C)
TC (K - TYPE)	0°C to 500°C	-25°C	525°C	UNDER	OVER	OPEN

INPUT TYPE (PV DISPLAY)	RANGE	I/P (- 25°C) (-5%)	I/P (525°C) (+105%)	I/P -199.9°C>I/P< -25°C	I/P 525°C>I/P< 850°C	I/P (-199.9°C <I/P> 850°C)
RTD	0°C to 500°C	-25°C	525°C	UNDER	OVER	OPEN

• **ANALOG OUTPUT TABLE FOR OPEN /OVER /UNDER CONDITION (Optional):**

Table 76 Analog Output during Open/Over/Under Condition

RETRASMISSIO N	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	-

NOTE: - 1) For Analog 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.

APPENDIX – B HOW TO FETCH HISTORICAL DATA?

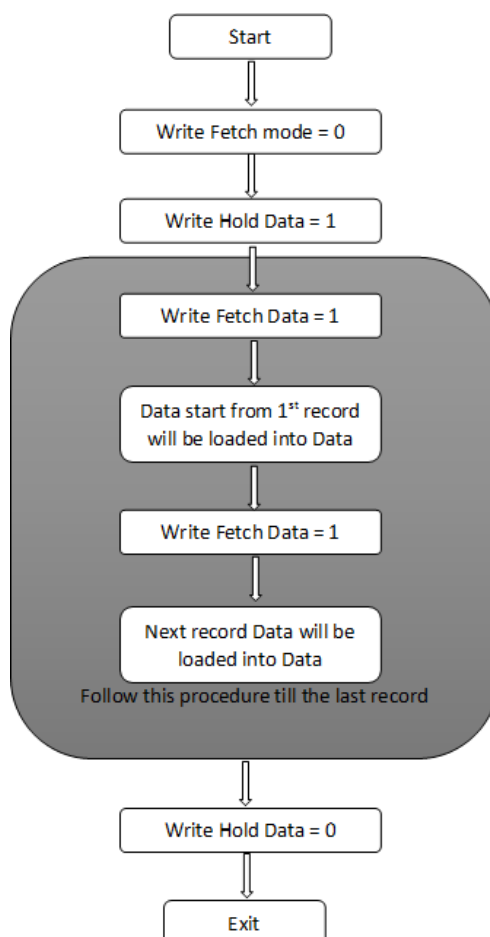
- **HOW TO FETCH HISTORICAL DATA :**

1. **For Periodic Logging:**

Periodic Data logging Record Frame Detail:

Parameter Detail	Bytes
Log Frame detection (101,102)	2
Record Number	4
Time Stamp	6
No of Bytes for PV	(2* Channels Selected for logging)
Total Bytes in 1 record =	12 + (2* Channels Selected for logging)

Data Fetching Method:



Modbus Address for Periodic Data fetching:

Sr. No	Parameter Description	Modbus Address	Parameter Type	Access	Remarks
1	Data Fetched Periodic Log	42301-42375	Integer	R	-
2	Hold Data	42377	Integer	R/W	-
3	Fetch Data	42376	Integer	R/W	-
4	Total Periodic Records	42378-42379	Integer	R	42378 [Higher byte] 42379 [Lower Byte]
5	Log Roll Over counter for Overlap Mode	42380	Integer	R	-
6	Fetch mode	42381	Integer	R/W	

Description :

- For Data logging Flash memory is used so data will be fetched in the form of multiple records. Flash page size is of 256 bytes.
- The record length is based on Channel number for log selection
- So in from below equation we can get how many records we can get from 1 page i.e.

$$\text{Records per page} = (\text{Integer}) (256 / \text{Total Bytes in 1 record})$$

- Example for Fetching data :

Example 1 :

If we have selected 8 channels for periodic data logging so that

$$\text{Total Bytes in 1 record} = 12 + (2 * 8) = 28$$

$$\text{Record Per page} = 256 / 28 = 9(\text{Odd Number})$$

So in this case for fetching data, follow below procedure:

1. Write Hold Data = 1
2. Write Fetch Data = 1
3. Data for first 4 records are loaded into data registers
4. Write Fetch Data = 1
5. Data for record number 5 to 9 will be loaded into data registers
6. Write Fetch data = 1
7. Data for record number 10 to 13 will be loaded into data registers
8. Write Fetch data = 1
9. Data for record number 14 to 18 will be loaded into data registers
10. So in same manner data registers will be filled with 4 records first and then 5 records.
11. After all data fetch Write Hold Data = 0.

Example 2 :

If we have selected 24 channels for periodic data logging so that

$$\text{Total Bytes in 1 record} = 12 + (2 * 24) = 60$$

$$\text{Record Per page} = 256 / 60 = 4(\text{Even Number})$$

So in this case for fetching data follow below procedure:

1. Write Hold Data = 1
2. Write Fetch Data = 1
3. Data for first 2 records are loaded into data registers
4. Write Fetch Data = 1
5. Data for record number 3 - 4 will be loaded into data registers
6. Write Fetch data = 1
7. Data for record number 5 - 6 will be loaded into data registers

8. Write Fetch data = 1
9. Data for record number 7 - 8 will be loaded into data registers
10. So in same manner data registers will be filled with 2 – 2 records.
11. After all data fetch Write Hold Data = 0.

Note :

- In Overlap Mode if data is overlapped then fetch by time feature is not applicable.

2. For Event Logging:

Event Data logging Record Frame Detail:

Parameter Detail	Bytes
Log Frame detection (101,102)	2
Record Number	4
Time Stamp	6
Channel Number	1
Process Value	2
Alarm-1/2[Bit 0 and Bit 1], Alarm Status[Bit 2], LED Status[Bit 3], DO Status[Bit 4]	1
Total Bytes in 1 record =	16

Data Fetching method is same as periodic logging.

Modbus Address for Event Data fetching:

Sr. No	Parameter Description	Modbus Address	Parameter Type	Access	Remarks
1	Data Fetched Event Log	42401-42356	Integer	R	-
2	Hold Event Data	42460	Integer	R/W	-
3	Fetch Event Data	42459	Integer	R/W	-
4	Total Events	42457-42458	Integer	R	42457[Higher byte] 42458[Lower Byte]
5	Log Roll Over counter for Overlap Mode	42461	Integer	R	-

Description:

- Here we have used Flash Memory so that data will be fetched in the form of multiple records. Flash page size is of 256 bytes.
- The record length is fixed as 16 bytes.
- Record per page = 14
- Not required to set fetch mode
- Example for Fetching data :

Example 1 :

1. Write Hold Event Data = 1
2. Write Fetch Event Data = 1
3. Data for first 7 records are loaded into data registers
4. Write Fetch Data = 1
5. Data for record number 7 to 14 will be loaded into data registers
6. Write Fetch data = 1
7. Data for record number 15 to 21 will be loaded into data registers
8. Write Fetch data = 1

9. Data for record number 22 to 28 will be loaded into data registers
10. So in same manner data registers will be filled with 7- 7records.
11. After all data fetch Write Hold Event Data = 0.

Note :

- In Event data fetching, total number of records fetched will be vary from Total number of Records fetched minus 0 to 14.e.g. total number of fetched records are 1000 then in file records will be 986 to 1000.

APPENDIX C - PROFIBUS DETAIL

C.1 Introduction

The PROFIBUS Option supports the PROFIBUS-DP variant of the PROFIBUS protocol which is designed especially for communication between automatic control systems and distributed I/O at the device level. It is most often used to allow a central Programmable Logic Controller or PC based control system to use external 'slave' devices for I/O or specialized functions. The principal advantage is that these devices may be distributed around a machine, thereby saving on the cost of point to point wiring. The 'open' nature of the network also permits equipment from different manufacturers to be mixed on the same bus.

C.2 Communication Protocol

PROFIBUS is a vendor independent, open field bus standard for a wide range of applications in manufacturing, process and building automation. Vendor independence and openness are guaranteed by the PROFIBUS standard. With PROFIBUS, devices from different manufacturers can inter-communicate. Suitable interfaces exist for PLCs, which include the Siemens, Mitsubishi and Allen Bradley range.

The PROFIBUS-DP network uses a high speed version of the RS485 standard, permitting baud rates of up to 12Mbaud. A maximum of 32 PROFIBUS-DP stations (nodes) may be contained within a single network segment. Use of RS485 repeaters allows a total of up to 126 stations. PROFIBUS-DP is a multimaster, master-slave, token passing network. More detailed information, including a detailed guide to products available, may be obtained from the various world-wide PROFIBUS user organizations. You will find contact information in trade magazines or by reference to <http://www.profibus.com> on the World Wide Web.

PROFIBUS is available in two other types, aimed at different application areas, as follows:

1. PROFIBUS-PA is designed especially for process automation. It permits sensors and actuators to be connected on one common bus line even in intrinsically safe areas. PROFIBUS PA permits data communication and power over the bus, using intrinsically safe, 2-wire technology according to the international standard IEC 1158-2, but may also be used on the standard RS485 cabling for non-intrinsically safe applications.
2. PROFIBUS-FMS is the general purpose solution for communication tasks at the cell level.

- Refer following Addresses of different parameters for Profibus Communication

Table 77 Addresses for Profibus Communication

Process Value Addresses						
Sr. No.	Analog Parameters	Absolute Address (word)	Absolute Address (Byte)	Type of Access	Parameter Type	Values Applicable
1	CH1	1	1 (higher Byte)	Read only	Int	NA
			2 (lower Byte)			
2	CH2	2	3 (higher Byte)	Read only	Int	NA
			4 (lower Byte)			
3	CH3	3	5 (higher Byte)	Read only	Int	NA
			6 (lower Byte)			
4	CH4	4	7 (higher Byte)	Read only	Int	NA
			8 (lower Byte)			

5	CH5	5	9 (higher Byte)	Read only	Integer	NA
			10 (lower Byte)			
6	CH6	6	11 (higher Byte)	Read only	Integer	NA
			12 (lower Byte)			
7	CH7	7	13 (higher Byte)	Read only	Integer	NA
			14 (lower Byte)			
8	CH8	8	15 (higher Byte)	Read only	Integer	NA
			16 (lower Byte)			
9	CH9	9	17 (higher Byte)	Read only	Integer	NA
			18 (lower Byte)			
10	CH10	10	19 (higher Byte)	Read only	Integer	NA
			20 (lower Byte)			
11	CH11	11	21 (higher Byte)	Read only	Integer	NA
			22 (lower Byte)			
12	CH12	12	23 (higher Byte)	Read only	Integer	NA
			24 (lower Byte)			
13	CH13	13	25 (higher Byte)	Read only	Integer	NA
			26 (lower Byte)			
14	CH14	14	27 (higher Byte)	Read only	Integer	NA
			28 (lower Byte)			
15	CH15	15	29 (higher Byte)	Read only	Integer	NA
			30 (lower Byte)			
16	CH16	16	31 (higher Byte)	Read only	Integer	NA
			32 (lower Byte)			
17	CH17	17	33 (higher Byte)	Read only	Integer	NA
			34 (lower Byte)			
18	CH18	18	35 (higher Byte)	Read only	Integer	NA
			36 (lower Byte)			
19	CH19	19	37 (higher Byte)	Read only	Integer	NA
			38 (lower Byte)			
20	CH20	20	39 (higher Byte)	Read only	Integer	NA
			40 (lower Byte)			
21	CH21	21	41 (higher Byte)	Read only	Integer	NA
			42 (lower Byte)			
22	CH22	22	43 (higher Byte)	Read only	Integer	NA
			44 (lower Byte)			
23	CH23	23	45 (higher Byte)	Read only	Integer	NA
			46 (lower Byte)			
24	CH24	24	47 (higher Byte)	Read only	Integer	NA
			48 (lower Byte)			

Set Point 1 read addresses (ASP1)

Sr. No.	Analog Parameters	Absolute Address (word)	Absolute Address (Byte)	Type of Access	Parameter Type	Values Applicable
25	ASP1 for Ch-1	25	49 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			50 (lower Byte)			
26	ASP1 for Ch-2	26	51 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			52 (lower Byte)			
27	ASP1 for Ch-3	27	53 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			54 (lower Byte)			

28	ASP1 for Ch-4	28	55 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			56 (lower Byte)			
29	ASP1 for Ch-5	29	57 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			58 (lower Byte)			
30	ASP1 for Ch-6	30	59 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			60 (lower Byte)			
31	ASP1 for Ch-7	31	61 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			62 (lower Byte)			
32	ASP1 for Ch-8	32	63 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			64 (lower Byte)			
33	ASP1 for Ch-9	33	65 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			66 (lower Byte)			
34	ASP1 for Ch-10	34	67 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			68 (lower Byte)			
35	ASP1 for Ch-11	35	69 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			70 (lower Byte)			
36	ASP1 for Ch-12	36	71 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			72 (lower Byte)			
37	ASP1 for Ch-13	37	73 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			74 (lower Byte)			
38	ASP1 for Ch-14	38	75 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			76 (lower Byte)			
39	ASP1 for Ch-15	39	77 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			78 (lower Byte)			
40	ASP1 for Ch-16	40	79 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			80 (lower Byte)			
41	ASP1 for Ch-17	41	81 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			82 (lower Byte)			
42	ASP1 for Ch-18	42	83 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			84 (lower Byte)			
43	ASP1 for Ch-19	43	85 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			86 (lower Byte)			
44	ASP1 for Ch-20	44	87 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			88 (lower Byte)			
45	ASP1 for Ch-21	45	89 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			90 (lower Byte)			
46	ASP1 for Ch-22	46	91 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			92 (lower Byte)			
47	ASP1 for Ch-23	47	93 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			94 (lower Byte)			
48	ASP1 for Ch-24	48	95 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			96 (lower Byte)			

Set Point 1 write addresses (ASP1)

Sr. No.	Analog Parameters	Absolute Address (word)	Absolute Address (Byte)	Type of Access	Parameter Type	Values Applicable
49	ASP1 for Ch-1	1	1 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			2 (lower Byte)			

50	ASP1 for Ch-2	2	3 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			4 (lower Byte)			
51	ASP1 for Ch-3	3	5 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			6 (lower Byte)			
52	ASP1 for Ch-4	4	7 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			8 (lower Byte)			
53	ASP1 for Ch-5	5	9 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			10 (lower Byte)			
54	ASP1 for Ch-6	6	11 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			12 (lower Byte)			
55	ASP1 for Ch-7	7	13 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			14 (lower Byte)			
56	ASP1 for Ch-8	8	15 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			16 (lower Byte)			
57	ASP1 for Ch-9	9	17 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			18 (lower Byte)			
58	ASP1 for Ch-10	10	19 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			20 (lower Byte)			
59	ASP1 for Ch-11	11	21 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			22 (lower Byte)			
60	ASP1 for Ch-12	12	23 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			24 (lower Byte)			
61	ASP1 for Ch-13	13	25 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			26 (lower Byte)			
62	ASP1 for Ch-14	14	27 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			28 (lower Byte)			
63	ASP1 for Ch-15	15	29 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			30 (lower Byte)			
64	ASP1 for Ch-16	16	31 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			32 (lower Byte)			
65	ASP1 for Ch-17	17	33 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			34 (lower Byte)			
66	ASP1 for Ch-18	18	35 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			36 (lower Byte)			
67	ASP1 for Ch-19	19	37 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			38 (lower Byte)			
68	ASP1 for Ch-20	20	39 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			40 (lower Byte)			
69	ASP1 for Ch-21	21	41 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			42 (lower Byte)			
70	ASP1 for Ch-22	22	43 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			44 (lower Byte)			
71	ASP1 for Ch-23	23	45 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			46 (lower Byte)			
72	ASP1 for Ch-24	24	47 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			48 (lower Byte)			

Set Point 2 read addresses (ASP2)						
Sr. No.	Analog Parameters	Absolute Address (word)	Absolute Address (Byte)	Type of Access	Parameter Type	Values Applicable
73	ASP2 for Ch-1	49	97 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			98 (lower Byte)			
74	ASP2 for Ch-2	50	99 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			100 (lower Byte)			
75	ASP2 for Ch-3	51	101 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			102 (lower Byte)			
76	ASP2 for Ch-4	52	103 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			104 (lower Byte)			
77	ASP2 for Ch-5	53	105 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			106 (lower Byte)			
78	ASP2 for Ch-6	54	107 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			108 (lower Byte)			
79	ASP2 for Ch-7	55	109 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			110 (lower Byte)			
80	ASP2 for Ch-8	56	111 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			112 (lower Byte)			
81	ASP2 for Ch-9	57	113 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			114 (lower Byte)			
82	ASP2 for Ch-10	58	115 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			116 (lower Byte)			
83	ASP2 for Ch-11	59	117 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			118 (lower Byte)			
84	ASP2 for Ch-12	60	119 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			120 (lower Byte)			
85	ASP2 for Ch-13	61	121 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			122 (lower Byte)			
86	ASP2 for Ch-14	62	123 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			124 (lower Byte)			
87	ASP2 for Ch-15	63	125 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			126 (lower Byte)			
88	ASP2 for Ch-16	64	127 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			128 (lower Byte)			
89	ASP2 for Ch-17	65	129 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			130 (lower Byte)			
90	ASP2 for Ch-18	66	131 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			132 (lower Byte)			
91	ASP2 for Ch-19	67	133 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			134 (lower Byte)			
92	ASP2 for Ch-20	68	135 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			136 (lower Byte)			
93	ASP2 for Ch-21	69	137 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			138 (lower Byte)			
94	ASP2 for Ch-22	70	139 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			140 (lower Byte)			
95	ASP2 for Ch-23	71	141 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			142 (lower Byte)			

96	ASP2 for Ch-24	72	143 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			144 (lower Byte)			

Set Point 2 write addresses (ASP2)

Sr. No.	Analog Parameters	Absolute Address (word)	Absolute Address (Byte)	Type of Access	Parameter Type	Values Applicable
97	ASP2 for Ch-1	25	49 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			50 (lower Byte)			
98	ASP2 for Ch-2	26	51 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			52 (lower Byte)			
99	ASP2 for Ch-3	27	53 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			54 (lower Byte)			
100	ASP2 for Ch-4	28	55 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			56 (lower Byte)			
101	ASP2 for Ch-5	29	57 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			58 (lower Byte)			
102	ASP2 for Ch-6	30	59 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			60 (lower Byte)			
103	ASP2 for Ch-7	31	61 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			62 (lower Byte)			
104	ASP2 for Ch-8	32	63 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			64 (lower Byte)			
105	ASP2 for Ch-9	33	65 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			66 (lower Byte)			
106	ASP2 for Ch-10	34	67 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			68 (lower Byte)			
107	ASP2 for Ch-11	35	69 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			70 (lower Byte)			
108	ASP2 for Ch-12	36	71 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			72 (lower Byte)			
109	ASP2 for Ch-13	37	73 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			74 (lower Byte)			
110	ASP2 for Ch-14	38	75 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			76 (lower Byte)			
111	ASP2 for Ch-15	39	77 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			78 (lower Byte)			
112	ASP2 for Ch-16	40	79 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			80 (lower Byte)			
113	ASP2 for Ch-17	41	81 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			82 (lower Byte)			
114	ASP2 for Ch-18	42	83 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			84 (lower Byte)			
115	ASP2 for Ch-19	43	85 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			86 (lower Byte)			
116	ASP2 for Ch-20	44	87 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			88 (lower Byte)			
117	ASP2 for Ch-21	45	89 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			90 (lower Byte)			
118	ASP2 for Ch-22	46	91 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			92 (lower Byte)			
119	ASP2 for Ch-23	47	93 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			94 (lower Byte)			
120	ASP2 for Ch-24	48	95 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			96 (lower Byte)			

Control Set Point read addresses (CSP)						
Sr. No.	Analog Parameters	Absolute Address (word)	Absolute Address (Byte)	Type of Access	Parameter Type	Values Applicable
121	CSP for Ch-1	73	145 (Higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			146 (Lower Byte)			
122	CSP for Ch-2	74	147 (Higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			148 (Lower Byte)			
123	CSP for Ch-3	75	149 (Higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			150 (Lower Byte)			
124	CSP for Ch-4	76	151 (Higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			152 (Lower Byte)			
125	CSP for Ch-5	77	153 (Higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			154 (Lower Byte)			
126	CSP for Ch-6	78	155 (Higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			156 (Lower Byte)			
127	CSP for Ch-7	79	157 (Higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			158 (Lower Byte)			
128	CSP for Ch-8	80	159 (Higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			160 (Lower Byte)			
129	CSP for Ch-9	81	161 (Higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			162 (Lower Byte)			
130	CSP for Ch-10	82	163 (Higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			164 (Lower Byte)			
131	CSP for Ch-11	83	165 (Higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			166 (Lower Byte)			
132	CSP for Ch-12	84	167 (Higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			168 (Lower Byte)			
133	CSP for Ch-13	85	169 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			170 (lower Byte)			
134	CSP for Ch-14	86	171 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			172 (lower Byte)			
135	CSP for Ch-15	87	173 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			174 (lower Byte)			
136	CSP for Ch-16	88	175 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			176 (lower Byte)			
137	CSP for Ch-17	89	177 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			178 (lower Byte)			
138	CSP for Ch-18	90	179 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			180 (lower Byte)			
139	CSP for Ch-19	91	181 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			182 (lower Byte)			
140	CSP for Ch-20	92	183 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			184 (lower Byte)			
141	CSP for Ch-21	93	185 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			186 (lower Byte)			
142	CSP for Ch-22	94	187 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			188 (lower Byte)			
143	CSP for Ch-23	95	189 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			190 (lower Byte)			
144	CSP for Ch-24	96	191 (higher Byte)	Read only	Integer	Ind. zero to Ind. Span
			192 (lower Byte)			

Control Set Point write addresses (CSP)						
Sr. No.	Analog Parameters	Absolute Address (word)	Absolute Address (Byte)	Type of Access	Parameter Type	Values Applicable
145	CSP for Ch-1	49	97 (Higher Byte)	write only	Integer	Ind. zero to Ind. Span
			98 (Lower Byte)			
146	CSP for Ch-2	50	99 (Higher Byte)	write only	Integer	Ind. zero to Ind. Span
			100 (Lower Byte)			
147	CSP for Ch-3	51	101 (Higher Byte)	write only	Integer	Ind. zero to Ind. Span
			102 (Lower Byte)			
148	CSP for Ch-4	52	103 (Higher Byte)	write only	Integer	Ind. zero to Ind. Span
			104 (Lower Byte)			
149	CSP for Ch-5	53	105 (Higher Byte)	write only	Integer	Ind. zero to Ind. Span
			106 (Lower Byte)			
150	CSP for Ch-6	54	107 (Higher Byte)	write only	Integer	Ind. zero to Ind. Span
			108 (Lower Byte)			
151	CSP for Ch-7	55	109 (Higher Byte)	write only	Integer	Ind. zero to Ind. Span
			110 (Lower Byte)			
152	CSP for Ch-8	56	111 (Higher Byte)	write only	Integer	Ind. zero to Ind. Span
			112 (Lower Byte)			
153	CSP for Ch-9	57	113 (Higher Byte)	write only	Integer	Ind. zero to Ind. Span
			114 (Lower Byte)			
154	CSP for Ch-10	58	115 (Higher Byte)	write only	Integer	Ind. zero to Ind. Span
			116 (Lower Byte)			
155	CSP for Ch-11	59	117 (Higher Byte)	write only	Integer	Ind. zero to Ind. Span
			118 (Lower Byte)			
156	CSP for Ch-12	60	119 (Higher Byte)	write only	Integer	Ind. zero to Ind. Span
			120 (Lower Byte)			
157	CSP for Ch-13	61	121 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			122 (lower Byte)			
158	CSP for Ch-14	62	123 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			124 (lower Byte)			
159	CSP for Ch-15	63	125 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			126 (lower Byte)			
160	CSP for Ch-16	64	127 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			128 (lower Byte)			
161	CSP for Ch-17	65	129 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			130 (lower Byte)			
162	CSP for Ch-18	66	131 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			132 (lower Byte)			
163	CSP for Ch-19	67	133 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			134 (lower Byte)			
164	CSP for Ch-20	68	135 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			136 (lower Byte)			
165	CSP for Ch-21	69	137 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			138 (lower Byte)			
166	CSP for Ch-22	70	139 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			140 (lower Byte)			
167	CSP for Ch-23	71	141 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			142 (lower Byte)			
168	CSP for Ch-24	72	143 (higher Byte)	write only	Integer	Ind. zero to Ind. Span
			144 (lower Byte)			

Input Type read address (0 = SKIP, 1 to 18 = OTHER INPUT TYPES)

Sr. No.	Digital Parameters	Absolute Address (word)	Absolute Address (byte)	Type of Access	Parameter Type	Values Applicable
169	Input Type for Ch-1	97	193 (Higher Byte)	Read only	byte	0 - 18
170	Input Type for Ch-2	97	194 (Lower Byte)	Read only	byte	0 - 18
171	Input Type for Ch-3	98	195 (Higher Byte)	Read only	byte	0 - 18
172	Input Type for Ch-4	98	196 (Lower Byte)	Read only	byte	0 - 18
173	Input Type for Ch-5	99	197 (Higher Byte)	Read only	byte	0 - 18
174	Input Type for Ch-6	99	198 (Lower Byte)	Read only	byte	0 - 18
175	Input Type for Ch-7	100	199 (Higher Byte)	Read only	byte	0 - 18
176	Input Type for Ch-8	100	200 (Lower Byte)	Read only	byte	0 - 18
177	Input Type for Ch-9	101	201 (Higher Byte)	Read only	byte	0 - 18
178	Input Type for Ch-10	101	202 (Lower Byte)	Read only	byte	0 - 18
179	Input Type for Ch-11	102	203 (Higher Byte)	Read only	byte	0 - 18
180	Input Type for Ch-12	102	204 (Lower Byte)	Read only	byte	0 - 18
181	Input Type for Ch-13	103	205 (Higher Byte)	Read only	byte	0 - 18
182	Input Type for Ch-14	103	206 (Lower Byte)	Read only	byte	0 - 18
183	Input Type for Ch-15	104	207 (Higher Byte)	Read only	byte	0 - 18
184	Input Type for Ch-16	104	208 (Lower Byte)	Read only	byte	0 - 18
185	Input Type for Ch-17	105	209 (Higher Byte)	Read only	byte	0 - 18
186	Input Type for Ch-18	105	210 (Lower Byte)	Read only	byte	0 - 18
187	Input Type for Ch-19	106	211 (Higher Byte)	Read only	byte	0 - 18
188	Input Type for Ch-20	106	212 (Lower Byte)	Read only	byte	0 - 18
189	Input Type for Ch-21	107	213 (Higher Byte)	Read only	byte	0 - 18
190	Input Type for Ch-22	107	214 (Lower Byte)	Read only	byte	0 - 18
191	Input Type for Ch-23	108	215 (Higher Byte)	Read only	byte	0 - 18
192	Input Type for Ch-24	108	216 (Lower Byte)	Read only	byte	0 - 18

Input Type write address (0 = SKIP, 1 to 18 = OTHER INPUT TYPES)

Sr. No.	Digital Parameters	Absolute Address (word)	Absolute Address (byte)	Type of Access	Parameter Type	Values Applicable
193	Input Type for Ch-1	73	145 (Higher Byte)	write only	byte	0 - 18
194	Input Type for Ch-2	73	146 (Lower Byte)	write only	byte	0 - 18
195	Input Type for Ch-3	74	147 (Higher Byte)	write only	byte	0 - 18
196	Input Type for Ch-4	74	148 (Lower Byte)	write only	byte	0 - 18
197	Input Type for Ch-5	75	149 (Higher Byte)	write only	byte	0 - 18
198	Input Type for Ch-6	75	150 (Lower Byte)	write only	byte	0 - 18
199	Input Type for Ch-7	76	151 (Higher Byte)	write only	byte	0 - 18
200	Input Type for Ch-8	76	152 (Lower Byte)	write only	byte	0 - 18
201	Input Type for Ch-9	77	153 (Higher Byte)	write only	byte	0 - 18
202	Input Type for Ch-10	77	154 (Lower Byte)	write only	byte	0 - 18
203	Input Type for Ch-11	78	155 (Higher Byte)	write only	byte	0 - 18
204	Input Type for Ch-12	78	156 (Lower Byte)	write only	byte	0 - 18
205	Input Type for Ch-13	79	157 (Higher Byte)	write only	byte	0 - 18

206	Input Type for Ch-14	79	158 (Lower Byte)	write only	byte	0 - 18
207	Input Type for Ch-15	80	159 (Higher Byte)	write only	byte	0 - 18
208	Input Type for Ch-16	80	160 (Lower Byte)	write only	byte	0 - 18
209	Input Type for Ch-17	81	161 (Higher Byte)	write only	byte	0 - 18
210	Input Type for Ch-18	81	162 (Lower Byte)	write only	byte	0 - 18
211	Input Type for Ch-19	82	163 (Higher Byte)	write only	byte	0 - 18
212	Input Type for Ch-20	82	164 (Lower Byte)	write only	byte	0 - 18
213	Input Type for Ch-21	83	165 (Higher Byte)	write only	byte	0 - 18
214	Input Type for Ch-22	83	166 (Lower Byte)	write only	byte	0 - 18
215	Input Type for Ch-23	84	167 (Higher Byte)	write only	byte	0 - 18
216	Input Type for Ch-24	84	168 (Lower Byte)	write only	byte	0 - 18

Alarm Set Point 1 (ASP1) Status of individual channel (0 = LED OFF, 1 = LED ON)

Sr. No.	Digital Parameters	Absolute Address (word)	Absolute Address (byte)	Type of Access	Parameter Type	Values Applicable
217	ASP1 Status for Ch-1	110. BIT 0	220. BIT 0	Read only	byte	0 - 1
218	ASP1 Status for Ch-2	110. BIT 1	220. BIT 1			0 - 1
219	ASP1 Status for Ch-3	110. BIT 2	220. BIT 2			0 - 1
220	ASP1 Status for Ch-4	110. BIT 3	220. BIT 3			0 - 1
221	ASP1 Status for Ch-5	110. BIT 4	220. BIT 4			0 - 1
222	ASP1 Status for Ch-6	110. BIT 5	220. BIT 5			0 - 1
223	ASP1 Status for Ch-7	110. BIT 6	220. BIT 6			0 - 1
224	ASP1 Status for Ch-8	110. BIT 7	220. BIT 7			0 - 1
225	ASP1 Status for Ch-9	110. BIT 8	219. BIT 0	Read only	byte	0 - 1
226	ASP1 Status for Ch-10	110. BIT 9	219. BIT 1			0 - 1
227	ASP1 Status for Ch-11	110. BIT 10	219. BIT 2			0 - 1
228	ASP1 Status for Ch-12	110. BIT 11	219. BIT 3			0 - 1
229	ASP1 Status for Ch-13	110. BIT 12	219. BIT 4			0 - 1
230	ASP1 Status for Ch-14	110. BIT 13	219. BIT 5			0 - 1
231	ASP1 Status for Ch-15	110. BIT 14	219. BIT 6			0 - 1
232	ASP1 Status for Ch-16	110. BIT 15	219. BIT 7			0 - 1
233	ASP1 Status for Ch-17	109. BIT 0	218. BIT 0	Read only	byte	0 - 1
234	ASP1 Status for Ch-18	109. BIT 1	218. BIT 1			0 - 1
235	ASP1 Status for Ch-19	109. BIT 2	218. BIT 2			0 - 1
236	ASP1 Status for Ch-20	109. BIT 3	218. BIT 3			0 - 1
237	ASP1 Status for Ch-21	109. BIT 4	218. BIT 4			0 - 1
238	ASP1 Status for Ch-22	109. BIT 5	218. BIT 5			0 - 1
239	ASP1 Status for Ch-23	109. BIT 6	218. BIT 6			0 - 1

240	ASP1 Status for Ch-24	109. BIT 7	218. BIT 7			0 – 1
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Alarm Set Point 2 (ASP2) Status of individual channel (0 = LED OFF, 1 = LED ON)

Sr. No.	Digital Parameters	Absolute Address (word)	Absolute Address (byte)	Type of Access	Parameter Type	Values Applicable
241	ASP2 Status for Ch-1	112. BIT 0	224. BIT 0	Read only	byte	0 - 1
242	ASP2 Status for Ch-2	112. BIT 1	224. BIT 1			0 – 1
243	ASP2 Status for Ch-3	112. BIT 2	224. BIT 2			0 – 1
244	ASP2 Status for Ch-4	112. BIT 3	224. BIT 3			0 – 1
245	ASP2 Status for Ch-5	112. BIT 4	224. BIT 4			0 – 1
246	ASP2 Status for Ch-6	112. BIT 5	224. BIT 5			0 – 1
247	ASP2 Status for Ch-7	112. BIT 6	224. BIT 6			0 – 1
248	ASP2 Status for Ch-8	112. BIT 7	224. BIT 7			0 – 1
249	ASP2 Status for Ch-9	112. BIT 8	223. BIT 0	Read only	byte	0 – 1
250	ASP2 Status for Ch-10	112. BIT 9	223. BIT 1			0 – 1
251	ASP2 Status for Ch-11	112. BIT 10	223. BIT 2			0 – 1
252	ASP2 Status for Ch-12	112. BIT 11	223. BIT 3			0 – 1
253	ASP2 Status for Ch-13	112. BIT 12	223. BIT 4			0 – 1
254	ASP2 Status for Ch-14	112. BIT 13	223. BIT 5			0 – 1
255	ASP2 Status for Ch-15	112. BIT 14	223. BIT 6			0 – 1
256	ASP2 Status for Ch-16	112. BIT 15	223. BIT 7			0 – 1
257	ASP2 Status for Ch-17	111. BIT 0	222. BIT 0	Read only	byte	0 – 1
258	ASP2 Status for Ch-18	111. BIT 1	222. BIT 1			0 – 1
259	ASP2 Status for Ch-19	111. BIT 2	222. BIT 2			0 – 1
260	ASP2 Status for Ch-20	111. BIT 3	222. BIT 3			0 – 1
261	ASP2 Status for Ch-21	111. BIT 4	222. BIT 4			0 – 1
262	ASP2 Status for Ch-22	111. BIT 5	222. BIT 5			0 – 1
263	ASP2 Status for Ch-23	111. BIT 6	222. BIT 6			0 – 1
264	ASP2 Status for Ch-24	111. BIT 7	222. BIT 7			0 – 1

Control Set Point (CSP) Status of individual channel (0 = LED OFF, 1 = LED ON)

Sr. No.	Digital Parameters	Absolute Address (word)	Absolute Address (byte)	Type of Access	Parameter Type	Values Applicable
265	CSP Status for Ch-1	114. BIT 0	228. BIT 0	Read only	byte	0 - 1
266	CSP Status for Ch-2	114. BIT 1	228. BIT 1			0 – 1
267	CSP Status for Ch-3	114. BIT 2	228. BIT 2			0 – 1
268	CSP Status for Ch-4	114. BIT 3	228. BIT 3			0 – 1
269	CSP Status for Ch-5	114. BIT 4	228. BIT 4			0 – 1

270	CSP Status for Ch-6	114. BIT 5	228. BIT 5	Read only	byte	0 – 1
271	CSP Status for Ch-7	114. BIT 6	228. BIT 6			0 – 1
272	CSP Status for Ch-8	114. BIT 7	228. BIT 7			0 – 1
273	CSP Status for Ch-9	114. BIT 8	227. BIT 0			0 – 1
274	CSP Status for Ch-10	114. BIT 9	227. BIT 1			0 – 1
275	CSP Status for Ch-11	114. BIT 10	227. BIT 2			0 – 1
276	CSP Status for Ch-12	114. BIT 11	227. BIT 3			0 – 1
277	CSP Status for Ch-13	114. BIT 12	227. BIT 4			0 – 1
278	CSP Status for Ch-14	114. BIT 13	227. BIT 5	Read only	byte	0 – 1
279	CSP Status for Ch-15	114. BIT 14	227. BIT 6			0 – 1
280	CSP Status for Ch-16	114. BIT 15	227. BIT 7			0 – 1
281	CSP Status for Ch-17	113. BIT 0	226. BIT 0			0 – 1
282	CSP Status for Ch-18	113. BIT 1	226. BIT 1			0 – 1
283	CSP Status for Ch-19	113. BIT 2	226. BIT 2			0 – 1
284	CSP Status for Ch-20	113. BIT 3	226. BIT 3			0 – 1
285	CSP Status for Ch-21	113. BIT 4	226. BIT 4			0 – 1
286	CSP Status for Ch-22	113. BIT 5	226. BIT 5	Read only	byte	0 – 1
287	CSP Status for Ch-23	113. BIT 6	226. BIT 6			0 – 1
288	CSP Status for Ch-24	113. BIT 7	226. BIT 7			0 – 1

Relay Status (0 = OFF, 1 = ON)

Sr. No.	Digital Parameters	Absolute Address (word)	Absolute Address (byte)	Type of Access	Parameter Type	Values Applicable
289	Relay Status for Relay - 1	116. BIT 0	232. BIT 0	Read only	byte	0 - 1
290	Relay Status for Relay - 2	116. BIT 1	232. BIT 1			0 – 1
291	Relay Status for Relay - 3	116. BIT 2	232. BIT 2			0 – 1
292	Relay Status for Relay - 4	116. BIT 3	232. BIT 3			0 – 1
293	Relay Status for Relay - 5	116. BIT 4	232. BIT 4			0 – 1
294	Relay Status for Relay - 6	116. BIT 5	232. BIT 5			0 – 1
295	Relay Status for Relay - 7	116. BIT 6	232. BIT 6			0 – 1
296	Relay Status for Relay - 8	116. BIT 7	232. BIT 7			0 – 1

Open Collector Status (0 = OFF, 1 = ON)

Sr. No.	Digital Parameters	Absolute Address (word)	Absolute Address (byte)	Type of Access	Parameter Type	Values Applicable
297	Open Collector Status for Open Collector - 1	116. BIT 8	231. BIT 0	Read only	byte	0 - 1
298	Open Collector Status for Open Collector - 2	116. BIT 9	231. BIT 1			0 – 1
299	Open Collector Status for Open Collector - 3	116. BIT 10	231. BIT 2			0 – 1

300	Open Collector Status for Open Collector - 4	116. BIT 11	231. BIT 3			0 – 1
301	Open Collector Status for Open Collector - 5	116. BIT 12	231. BIT 4			0 – 1
302	Open Collector Status for Open Collector - 6	116. BIT 13	231. BIT 5			0 – 1
303	Open Collector Status for Open Collector - 7	116. BIT 14	231. BIT 6			0 – 1
304	Open Collector Status for Open Collector - 8	116. BIT 15	231. BIT 7			0 – 1
305	Open Collector Status for Open Collector - 9	115. BIT 0	230. BIT 0	Read only	byte	0 - 1
306	Open Collector Status for Open Collector - 10	115. BIT 1	230. BIT 1			0 – 1
307	Open Collector Status for Open Collector - 11	115. BIT 2	230. BIT 2			0 – 1
308	Open Collector Status for Open Collector - 12	115. BIT 3	230. BIT 3			0 – 1
309	Open Collector Status for Open Collector - 13	115. BIT 4	230. BIT 4			0 – 1
310	Open Collector Status for Open Collector - 14	115. BIT 5	230. BIT 5			0 – 1
311	Open Collector Status for Open Collector - 15	115. BIT 6	230. BIT 6			0 – 1
312	Open Collector Status for Open Collector - 16	115. BIT 7	230. BIT 7			0 – 1
313	Open Collector Status for Open Collector - 17	115. BIT 8	229. BIT 16	Read only	byte	0 - 1
314	Open Collector Status for Open Collector - 18	115. BIT 9	229. BIT 17			0 – 1
315	Open Collector Status for Open Collector - 19	115. BIT 10	229. BIT 18			0 – 1
316	Open Collector Status for Open Collector - 20	115. BIT 11	229. BIT 19			0 – 1
317	Open Collector Status for Open Collector - 21	115. BIT 12	229. BIT 20			0 – 1
318	Open Collector Status for Open Collector - 22	115. BIT 13	229. BIT 21			0 – 1
319	Open Collector Status for Open Collector - 23	115. BIT 14	229. BIT 22			0 – 1
320	Open Collector Status for Open Collector - 24	115. BIT 15	229. BIT 23			0 – 1

Note : For more information on Parameters values or its bit arrangement, kindly refer Table 13, Table 41, Table 43, Table 44 and Table 45.

C.3 mPC Tool (masibus Profibus Configuration Tool) V1.X.X.X

C.3.1 Preconditions

Make connection by Configuration/Diagnostic cable between RS-232 port of PC and 85XX+ Serial port (RS-485 – DB9).

C.3.2 Short Description of mPC Configuration Tool Installation & Uninstallation

The installation itself is then performed as follows:

1. Start the mPC setup program to install the mPC Tool.
2. Close all application programs on the PC.
3. Insert the CD delivered with the masibus Scanner device to the local CD ROM drive of the PC.
4. The GUI of the CD starts
5. Start in the menu mPC Tool setup Program and follow the installation steps according to the instructions on the screen **Or** Refer Help document from the CD itself.
6. The mPC Tool is now installed.

- **Uninstalling the mPC Tool**

To uninstall the mPC Configuration Tool follow the steps as below.

1. Select Start > Control Panel > Software
2. Press the button Remove in the list beside the entry mPC Tool.
3. Answer the following question with yes.

C.3.3 Overview mPC Configuration Tool

The section mPC Tool provides information on how to configure the device parameters of a Profibus & Modbus. Serial IO or Data Mapping and which information can be gained from the diagnostic pane of the mPC Tool.

Note: The scope of functions of the mPC Tool depends from the installation setup used. This description includes a broad range of functional options, which are not necessarily included in every single installation setup.

C.3.3.1 Starting mPC Tool

1. Make sure the device is correctly supplied with power and is Operational.
2. Start the mPC Tool.
3. Select Start > Programs > Masibus Products > mPC Tool > mPC Tool.exe
4. Or it can be start by Desktop Shortcuts.

C.3.3.2 Introduction to the Dialog Structure

The graphical user interface of the mPC Tool is composed of different areas and elements listed hereafter:

Refer Screenshots available in next section.

- **Default Project Load :**

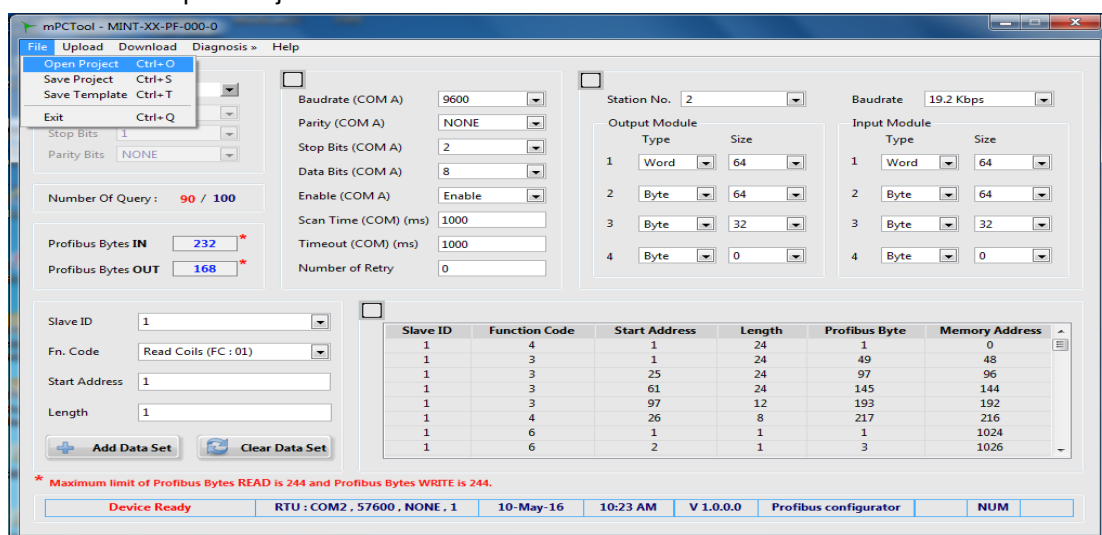
1. Copy "Scanner-85xx+.mnt" Project from CD to the given path in User's windows OS (Directory:C:\Programfiles\Masibus Products\mPCTool\Data).
2. Connect Configuration cable between Scanner Profibus port (DB9-Female connector) and User's PC serial communication comport.
3. Open mPCTool.exe
4. Select Open Project from Menu and select the template as **scanner-85xx+.mnt**

C.3.4 How to Configure Profibus Scanner:

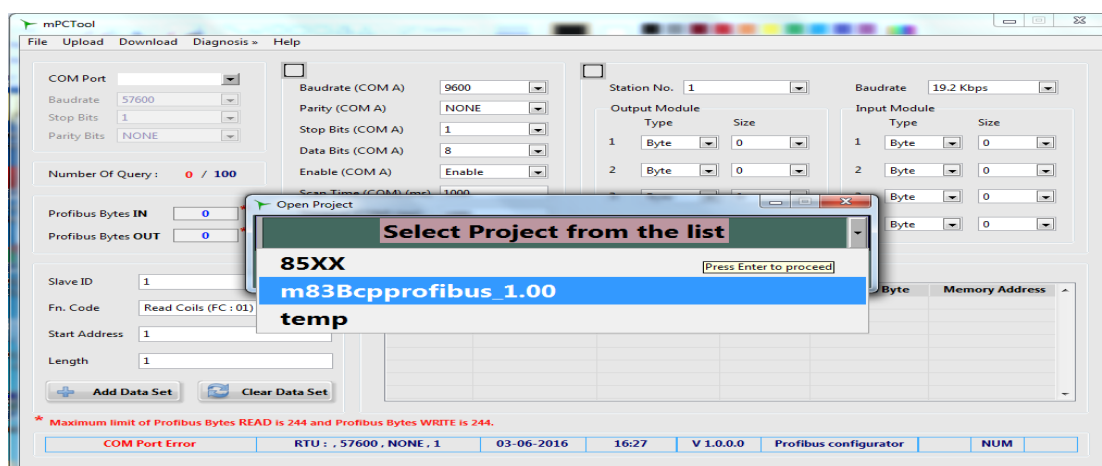
1. Start the Application mPCTool.Exe from Program Files
2. At the End of Loading Application software itself will detect the Scanner automatically. And start uploading all the stored Parameters of the scanner.



3. Open Project.



4. Load Project File.



5. If error not occurs then below screen shows the automatic uploaded parameters from the scanner.

The screenshot shows the mPCTool - MINT-XX-PF-000-0 interface. It includes a menu bar (File, Upload, Download, Help) and several configuration sections:

- COM Port:** COM1, Baudrate: 57600, Stop Bits: 1, Parity Bits: NONE.
- Number Of Query:** 50 / 100.
- Profibus Bytes IN:** 155, **Profibus Bytes OUT:** 96.
- Slave ID:** 1, **Fn. Code:** Read Coils (FC: 01), **Start Address:** 1, **Length:** 1.
- Buttons:** Add Data Set, Clear Data Set.
- COM A Parameters:** Baudrate (COM A): 9600, Parity (COM A): NONE, Stop Bits (COM A): 1, Data Bits (COM A): 8, Enable (COM A): Enable, Scan Time (COM) (ms): 1000, Timeout (COM) (ms): 1000.
- Station No.:** 3, **Baudrate:** 19.2 Kbps.
- Output Module:** Type, Size (1: Word, 20; 2: Word, 4; 3: Word, 1; 4: Byte, 0).
- Input Module:** Type, Size (1: Word, 32; 2: Word, 20; 3: Byte, 0; 4: Byte, 0).
- Table:** A table with columns: Slave ID, Function Code, Start Address, Length, Profibus Byte, Memory Address. It lists 8 rows of data.
- Footer:** * Maximum limit of Profibus Bytes READ is 244 and Profibus Bytes WRITE is 244. Device Ready, RTU: COM1, 57600, NONE, 1, 7/25/2014, 2:31 PM, V 1.0.0.0, Profibus configurator, NUM.

6. Now user can change the Profibus Parameters as per the below Images

The screenshot shows the mPCTool interface with a dropdown menu open for the Baudrate parameter. The menu lists the following options: 1.5 Mbps, 500 Kbps, 187.5 Kbps, 937.5 Kbps, 45.45 Kbps, 31.25 Kbps, 19.2 Kbps (highlighted), 9.6 Kbps, and AUTO. Other parameters visible include Station No. 1, Output Mod Type 1, Input Modul Type 1, Baudrate (COM A) 57600, Parity (COM A) NONE, Stop Bits (COM A) 1, Data Bits (COM A) 8, Enable (COM A) Enable, Scan Time (COM) (ms) 1000, and Timeout (COM) (ms) 1000.

7. User can Add Modbus Mapping through add dataset and can delete also by right click on the selected cell from the table as per the shown below image.

The screenshot shows the mPCTool interface with the 'Add Data Set' button highlighted. Below it is a table with columns: Slave ID, Function Code, Start Address, Length, Profibus Byte, and Memory Address. The table contains three rows of data. A 'Delete' button is visible over the second row of the table.

8. Now user can download any changed parameters by selecting the checkboxes shown in below image to download into scanner. After downloading the configuration the successful message displays.

Slave ID	Function Code	Start Address	Length	Profibus Byte	Mer
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C.3.5 GSD FILE CONFIGUEATION

- **Configuration Setting of GSD File at Profibus Master Side:**

1. Select "m85XX+.GSD" file by locating on CD.
2. Select **64 words out** from module list.
3. Select **32 words out** from module list.
4. Select **64 words in** from module list.
5. Select **32 words in** from module list.
6. Select **20 words in** from module list.

REVISION HISTORY

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision 16 to Revision 17

- Digital Input Details (e.g. Digital Input Status in LED Configuration, Modbus Addresses) is added.
- Floating Point addresses For Process Value is added.
- Communication Parameter Details is modified.

Changes from Revision 15 to Revision 16

- As per Standard Catalog General Information is modified.

Changes from Revision 14 to Revision 15

- USB Detail is modified .

Changes from Revision 13 to Revision 14

- Provision of stop bit is added.

Changes from Revision 12 to Revision 13

- Periodic data fetching details are modified.

Changes from Revision 11 to Revision 12

- Power Supply Specification is modified.

Changes from Revision 10 to Revision 11

- Ferrule Details of Cable, AI Cable Details, USB Specification, Ordering Code Details are modified.
Appendix A is modified for Input types.

Changes from Revision 09 to Revision 10

- Note added in Open Collector cable connection & Pin Details of Open Collector Cable for External Relay Module connection.

Changes from Revision 08 to Revision 09

- Appendix C "Profibus Details" are modified.

Changes from Revision 07 to Revision 08

- Din Rail Mounting details are added.

Changes from Revision 06 to Revision 07

- Note added in "Appendix A" for periodic data logging time wise fetching and events fetching.
- Data fetching through USB description added.

Changes from Revision 05 to Revision 06

- "Digital Input Specification" is added as topic number 3.1.1.
- "Analog Output- Analog Output" Specification is modified in topic 3.2.3.
- "Profibus Communication Specification" is added as topic number 3.5.
- "USB Mass Storage Device Specifications" are amended in topic 3.8.
- Figure-6 and Figure-7 as Rear panel Diagram with AC supply and DC supply for Profibus Connectivity are added respectively.
- Digital Input and Analog Output details are added in topic 5.1.
- Figure-10 "Relay Cable Detail for three output terminals" is added.
- Table-7 "Pin Details for Relay cable for three output terminals" is added.
- Figure-13 "Analog Output Cable connection" is added
- Table-10 "Pin Details of Analog Output Cable" is added.
- Table-11 "Digital Input Pin Details" is added.
- Table-12 "Pin Details for Profibus communication" is added
- Figure-15 "Cable for Profibus Configuration" is added

- Figure-16 “Functional Block Diagram of 85XX+” is modified due to the addition of Analog Output.
- Note for Digital Input is added on page 44 and page 45.
- USB Configuration parameters are added in Figure-19.
- Table-26 “Sub parameters for USB Configuration” is added.
- Note for USB Fetching is added on after table-26.
- Table-27 “USB Message and its description” is added.
- Modbus addresses are added for “Percentage range for Over Display”, “Percentage range for Under Display”, “Analog O/P Mapping” and “USB Fetching parameters” are added.
- Appendix C “Profibus Detail” is added.

Changes from Revision 04 to Revision 05

- Data logging specification added in specification section.
- Logging parameters added in Figure 14.
- Logging parameters description added in Table 21.
- Logging parameters Modbus detail updated
- Appendix B added : How to fetch historical data.

Changes from Revision 03 to Revision 04

- For input type NI 120 open sensor message change 0 to OPEN in Table 68.
- Ethernet Parameters limit changed 0 to 255 in Table 42.

Changes from Revision 02 to Revision 03

- Content of “Safety Precaution in Installation” is modified on page 8.
- Figure No. 1 “Panel Cut Out dimension” is changed.
- Figure No. 8 “Open Collector Cable Connection” is modified.
- Figure No. 9 “Analog Input Cable Connection” is modified.
- Figure No. 11 “Functional Block Diagram of 85XX+” is modified.
- Figure No. 13 “Configuration Mode Flow diagram” is modified.
- In Table No. 13 “Watchdog parameters” are added.
- In Table No. 19 “Programmable Display” parameter is added.
- In Table No. 43 “Watchdog” parameters are added.
- Table no. 44,45,46 are added.
- Topic No. 8.4 “Watchdog Timer(WDT) / Watchdog Output Operation” is added.
- Revision History is added on last page.

Changes from Revision 01 to Revision 02

- Operation manual title has been changed from “Scanner / Controller” to “Scanner / DAQ “.
- Warning sign is removed and Risk Of Electrical Shock sign is added on page 5.
- Appendix-A is added .

Changes from Revision 00 to Revision 01

- Input types(E type TC, J type TC , K type TC, T type TC , B type TC, R type TC , S type TC, N type TC , CU53, NI120, -10 to 20 mV, 0 to 100 mV, 0 to 20 mA, 0 to 5V, 1 to 5 V, 0 to 10 V are added.
- Modbus addresses of different parameters are changed.

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