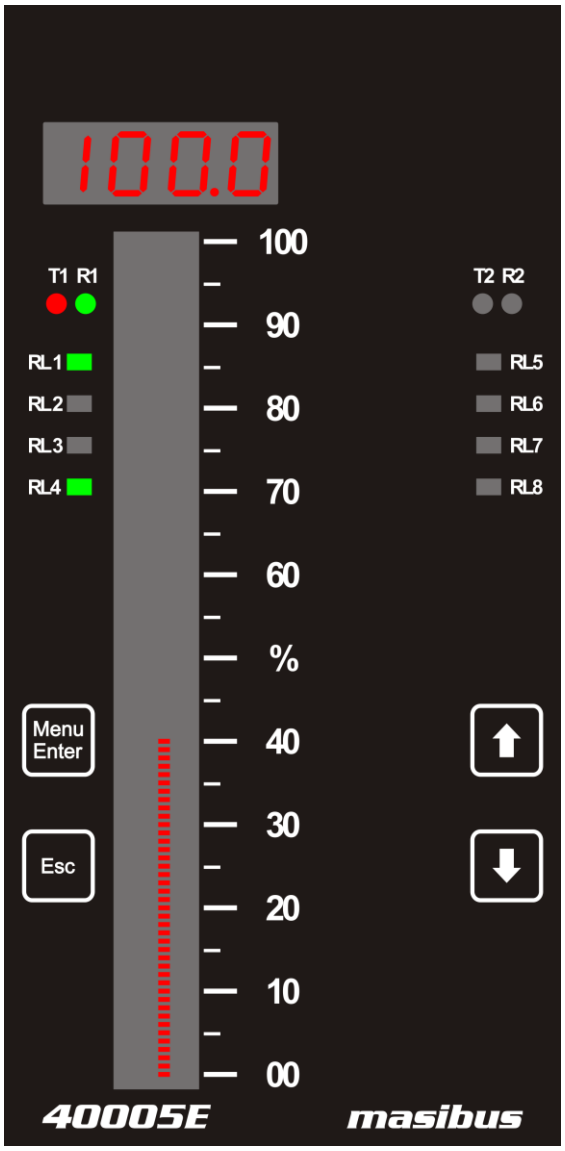
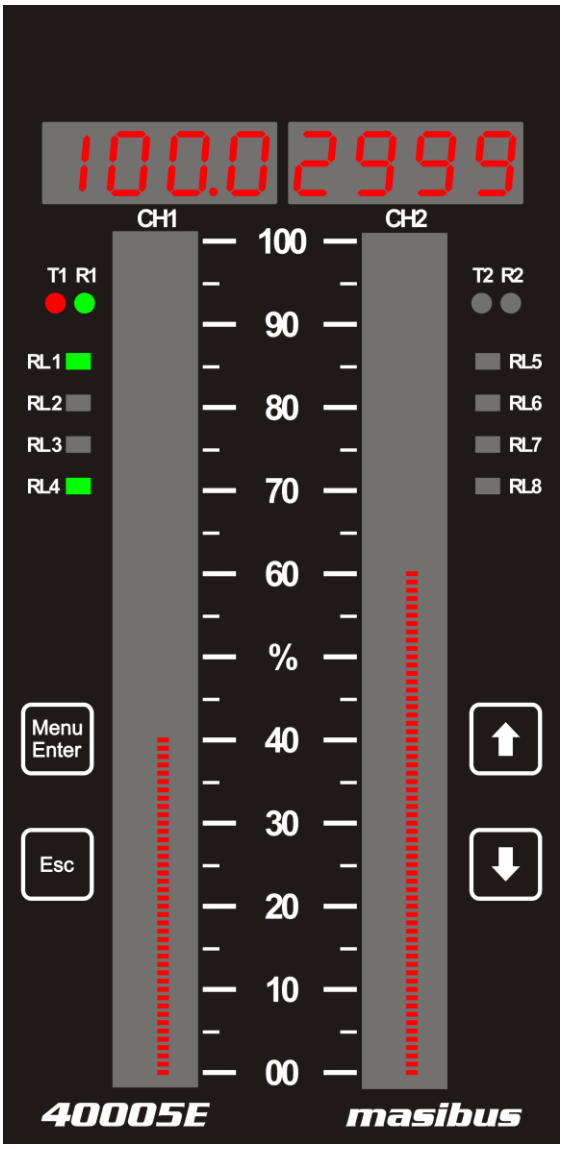
USER MANUAL

40005E
ENHANCED BARGRAPH INDICATOR



Single Channel



Dual Channel

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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

	***This indicates a danger that may result in death or serious injury if not avoided.***
	***This indicates a danger that may result in minor or moderate injury or only a physical damage if not avoided.***

1. INTRODUCTION

Foreword

Thank you for purchasing 40005E (Enhanced Bargraph Indicator). This manual describes the basic functions and operation methods of 40005E. 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 40005E 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 : 1.01, November 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.

1.1 Product Ordering Code

The 40005E (Enhanced Bargraph Indicator) unit has a nameplate affixed to the one side of the enclosure. Check the model and suffix codes inscribed on the nameplate to confirm that the product received is that which was ordered.

Table 1 Product Ordering code

ORDERING CODE																															
Model	No of I/p channel		Input Type		Ch 1 Display				Ch 2 Display				Aux Power Supply		Mounting		Communication		Retransmission o/p		Relay o/p	
					PV		Bar		PV		Bar											
40005E	X		X		X		X		X		X		XX		XX		XX		X		X	
	S	Single	1	E	R	Red	R	Red	N	Not Applicable	N	Not Applicable	U1	85-265VAC	P0	Panel	1X	1 x RS485	N	None	N	None
	D	Dual	2	J	G	Green	G	Green	R	Red	R	Red	U2	18-36VDC	W1	Wall-IP65	2X	2 x RS485	Y	Yes	Y	Yes
			3	K					G	Green	G	Green					1E	1 x RS485 + 1 x RJ45				
			4	T													2E	2 x RS485 + 1 x RJ45				
			5	B																		
			6	R																		
			7	S																		
			8	N																		
			9	Pt-100, 3W																		
			A	Cu53																		
			B	NI120																		
			C	4-20mA																		
			D	0-20mA																		
			E	1-5VDC																		
			F	0-5VDC																		
			G	-10 to 20 mV																		
			H	0 to 100 mV																		
			I	0 – 10 VDC																		

Table 2 Product Ordering Code description

40005E	Code	Description
Ch 1 PV Display	R	Red
	G	Green
Ch 1 Bar Display	R	Red
	G	Green
Ch 2 PV Display	N	Not Applicable
	R	Red
	G	Green
Ch 2 Bar Display	N	Not Applicable
	R	Red
	G	Green
Power Supply	U1	85-265 VAC
	U2	18-36 VDC
Mounting Method	P0	Panel Mounting
	W1	Wall Mounting
Communication	1X	1-RS485 Serial Port
	2X	2-RS485 Serial Port
	1E	1-RS485 Serial Port and 1-Ethernet RJ45
	2E	2-RS485 Serial Port and 1-Ethernet RJ45
Retransmission Output	N	None
	Y	Yes
Relay Output	N	None
	Y	Yes

Table 3 Cable Ordering Code and description

Ordering Code for Cable			
Connecting Cable Type		Cable length	
AIOC	Analog Input cable	1	1 meter
RLC	Relay Cable	2	2 meters
		3	3 meters

2. INSTALLATION

2.1 Safety Precautions in Installation

RISK OF ELECTRICAL SHOCK

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 40005E.
  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.

CAUTION

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 40005E

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

Unit: mm

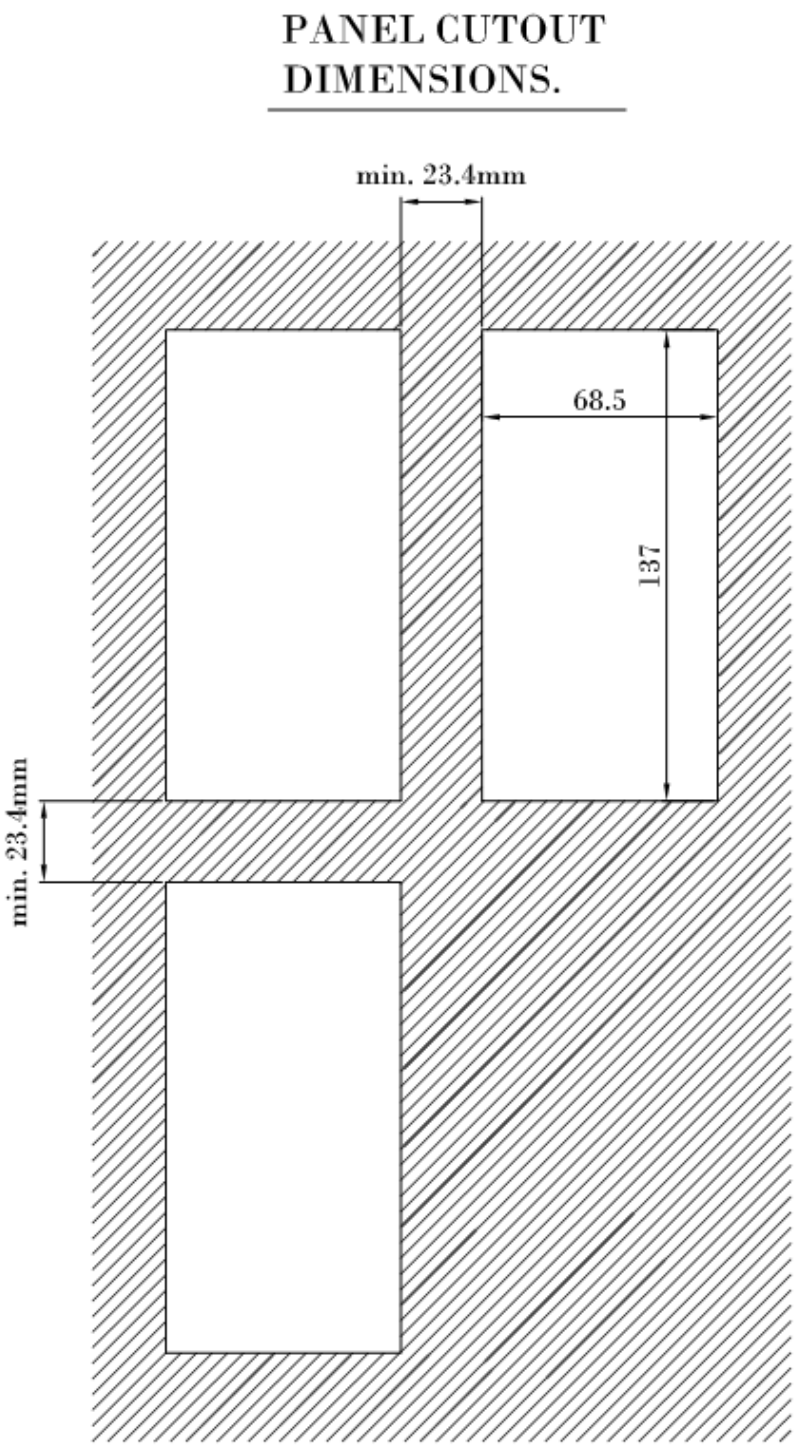


Figure 1 Panel Cutout Dimensions

- **Side View and Top View**

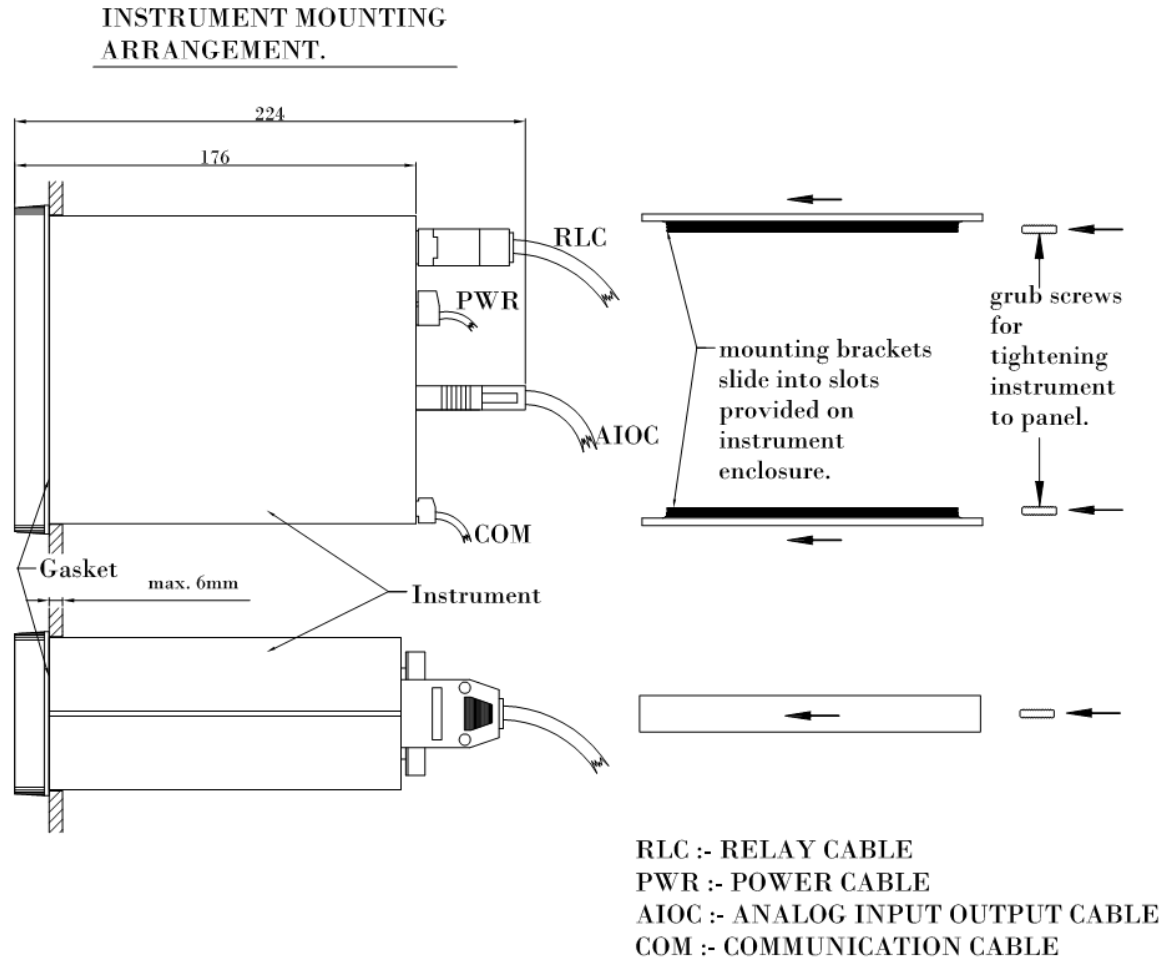


Figure 2 Side View and TOP view

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 (Red / Green): ON when unit is powered up. It displays number from -1999 to 9999.
- Bar (Red / Green): ON when unit is powered up and no error on Channel Display.

Check the front panel LEDs:

- Check the Relay Output (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	1 or 2
APPLICABLE STANDARDS	DIN (ITS-90) for Thermocouple and RTD
INPUT TYPE	As specified in Table 4.
SAMPLING PERIOD PER INPUT	50 ms for TC and Linear Input and 100 ms for RTD
RESOLUTION	17 bit
BURNOUT CURRENT	0.4 µA
MEASUREMENT CURRENT	250 µA
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).
LINEARIZATION FOR LINEAR INPUT	10 POINT Linearization applicable only for linear input

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

Table 4 Input types, their ranges, accuracy and resolution

Analog Input Type	Range	Accuracy	Resolution
E	-200 to 1000°C	± 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	± 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	± 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	± 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			

3.2 Output Specification

3.2.1 Digital Output- Relay

NUMBER OF OUTPUTS	5
PURPOSE	Alarm or trip or control or watchdog output
OUTPUT SIGNAL	Three terminals C , NO and NC

RELAY CONTACT RATING	250 VAC / 30 VDC @ 2A
NO. OF RELAY OPERATION	1 X 10^5 @ rated current

3.2.2 Analog Output- Retransmission Output(Optional)

NUMBER OF OUTPUTS	2 Max.
OUTPUT SIGNAL	0-20 mA, 4-20 mA, 0-5 V, 1-5 V or 0-10 V DC(Voltage or current output can be selected through software and internal jumper settings)
LOAD RESISTANCE	500 ohms Max. Or less for current output. 3k or higher for voltage output
OUTPUT ACCURACY	±0.25% of span

3.2.3 Isolated Transmit Power Supply

NUMBER OF OUTPUTS	1 or 2 (According to Total Number of Channels)
VOLTAGE RATING	24 VDC @ 30 mA
ISOLATION VOLTAGE	500VDC Isolated Output

3.3 Programming and Setting

KEYPAD	4-keys (Menu, Escape, Up and Down) 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 Network Connectivity (Optional)

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

3.6 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

3.7 Display Specification

CHANNEL DATA DISPLAY	Ch- 1 : 4-digits, 7-segment, Red / Green , 0.3'' character height Ch- 2 : 4-digits, 7-segment, Red / Green , 0.3'' character height
BAR DISPLAY	Ch- 1 : 101 Segment Red / Green bar for indicating PV in percentage Ch- 2 : 101 Segment Red / Green bar for indicating PV in percentage
STATUS LEDs	8-Green LEDs for Relay status2-Green(Rx) & 2-Red(Tx) for Communication

3.8 Power Supply Specification

RATED VOLTAGE	85-265VAC-50/60Hz[(1)] 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 110-370VDC Power Supply range however for this DC range it is not passed through compliance tests.

3.10 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 5
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 5 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

3.11 Construction, Installation, and Wiring Specification

MATERIAL	Aluminium extrusion
CONSTRUCTION	Panel Mount Top and Bottom mounting clamps (1 each) Or Wall Mount
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)

3.12 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

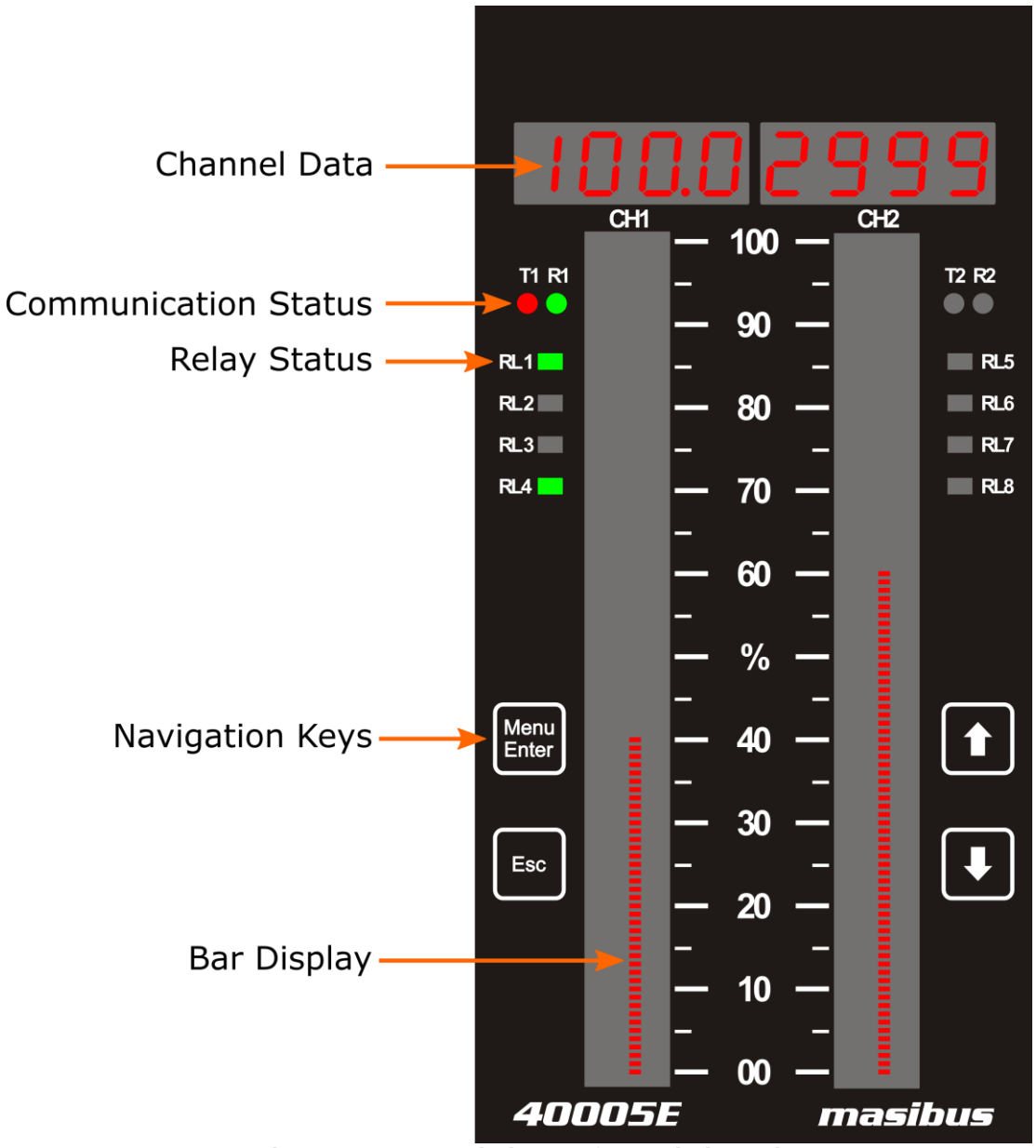


Figure 3 Front Panel Diagram for Dual Channel

Name of Part	Indication on Front Panel
Channel Data Display	Channel Data
Bar Display	101 LED segment for indicating Channel Data in percentage
COM-1 RS485 slave indicator LED	T1 and R1
COM-2 RS485 master indicator LED	T2 and R2
Relay indicator LED	Relay Status

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 to increment value in run mode and in other modes
DECREMENT KEY 	It is used for decrementing value when in 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) It can Acknowledge the Alarm During RUN Mode.

4.3 Rear Panel Diagram

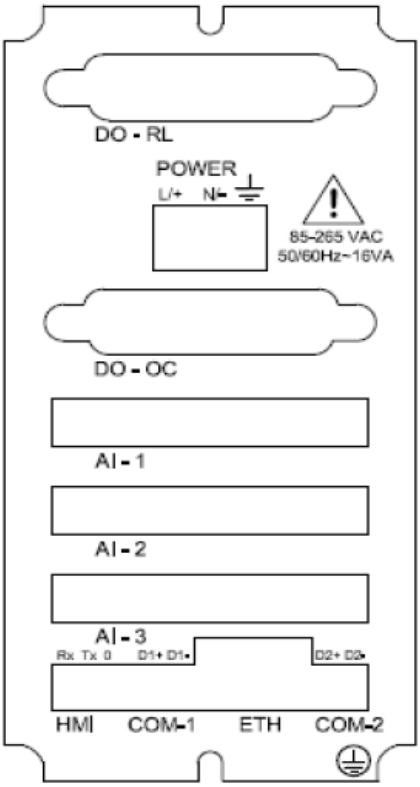


Figure 4 Rear Panel Diagram for AC Supply

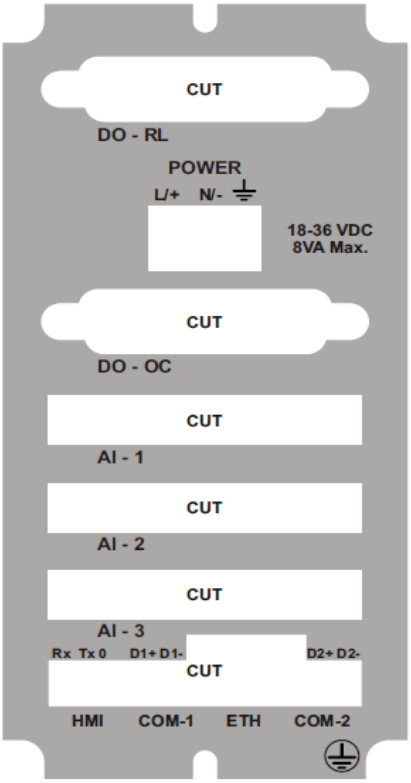


Figure 5 Rear Panel Diagram for DC Supply

5. CONNECTION DIAGRAM

5.1 Connection Terminal Details

- DO – RL Relay Terminals: 15
  - Pre-Feb. Cable
- Power Supply: Live (L/+), Neutral(N/-) and Earth (⏚)
  - Pre-Feb. Cable
- AI-1 Analog Input and Output: 12
  - Pre-Feb. Cable
- RS-485 Communication: 4
  - Wire Size: 26- 16AWG
  - Screw Size: M2.0 Steel Ni Plated
- Ethernet Communication: 1
  - RJ-45 Connector

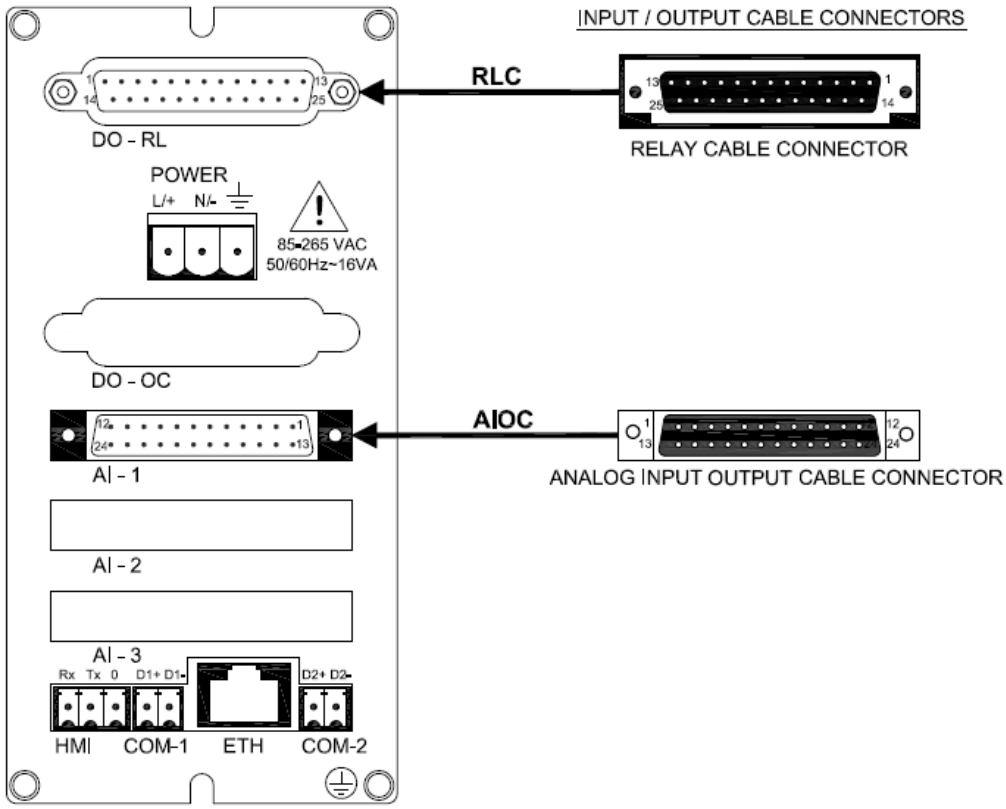


Figure 6 Connection Terminals

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.

Connect the protective conductor terminal to earth, Use a spade lug to make contact with the metal surface of the 40005E.

CAUTION

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:

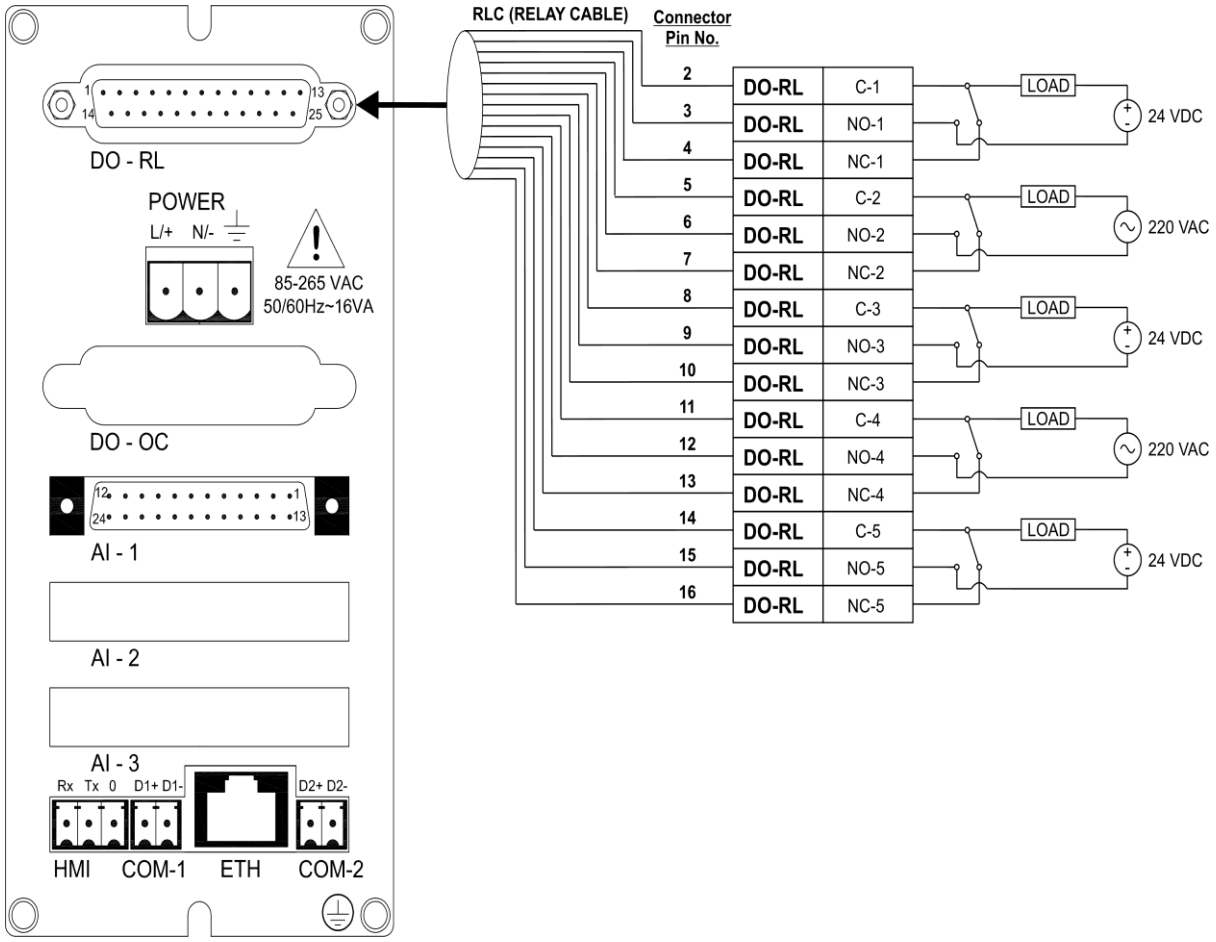


Figure 7 Relay Cable Connection

Table 6 Pin Details of Relay Cable

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

2) Analog Input Output Cable Details:

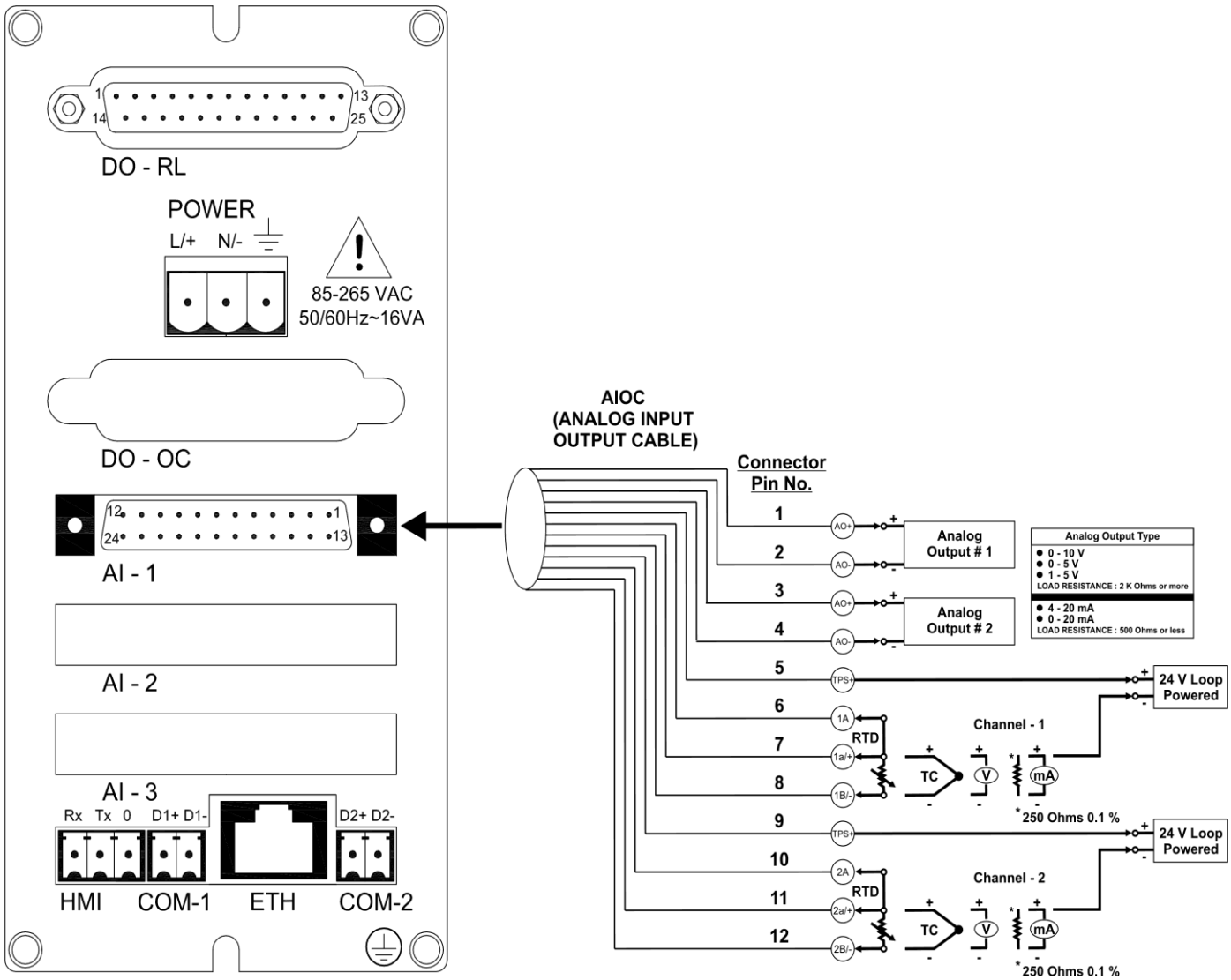


Figure 8 Analog Input Output Cable Connection

Table 7 Pin Details of Analog Input Output Cable

ANALOG INPUT OUTPUT (AI-1)			
Sr. No.	**Connector Pin No.**	**Pin Detail**	**Ferrule No.**
1	1	AO 1 +	1
2	2	AO 1 -	2
3	3	AO 2 +	3
4	4	AO 2 -	4
5	5	TPS 1 +	5
6	6	1A	6
7	7	1a/+	7
8	8	1B/-	8
9	9	TPS 2 +	9
10	10	2A	10
11	11	2a/+	11
12	12	2B/-	12

3) Back Plate Wiring Details:

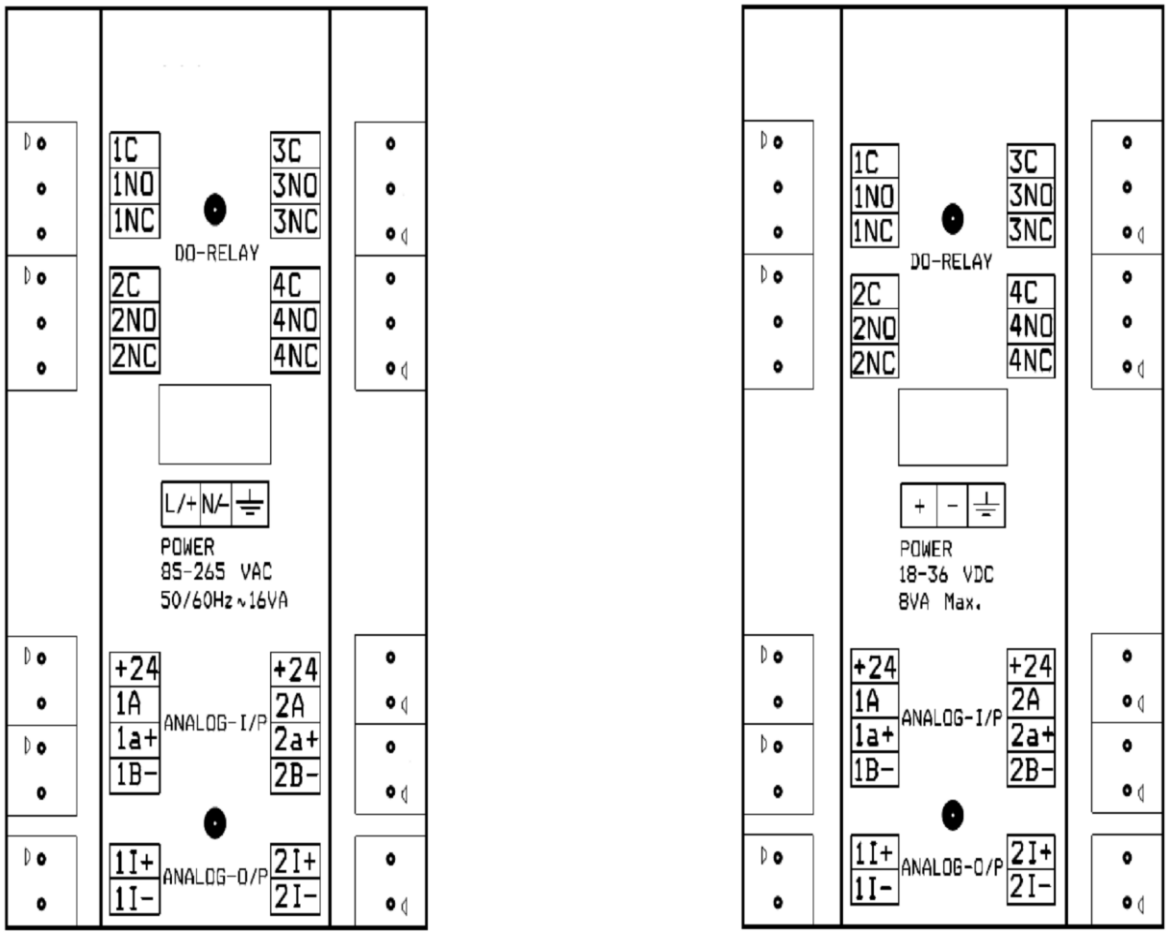


Figure 9 Back Plate Wiring Details

4) Communication Cable Details:

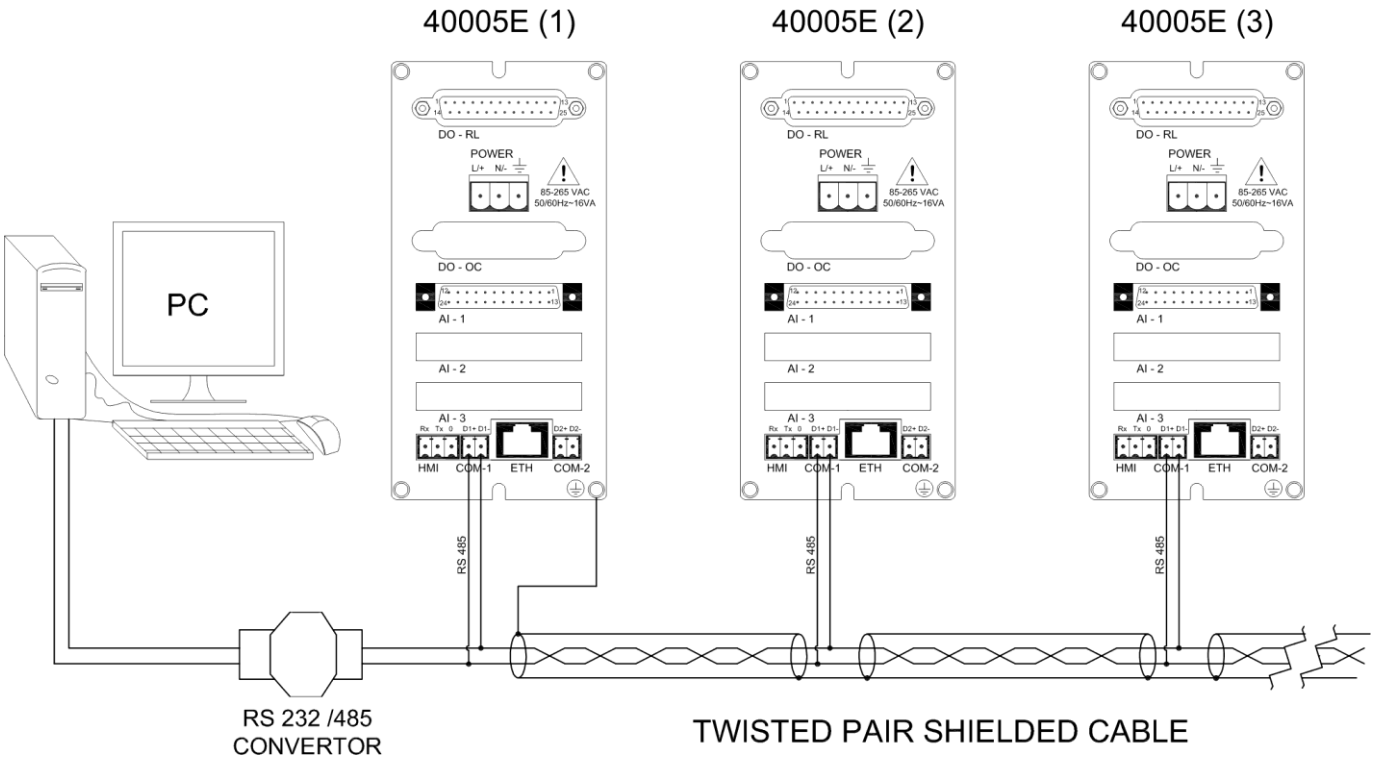


Figure 10 Communication Cable Connections

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.

6. BRIEF OPERATING PROCEDURE

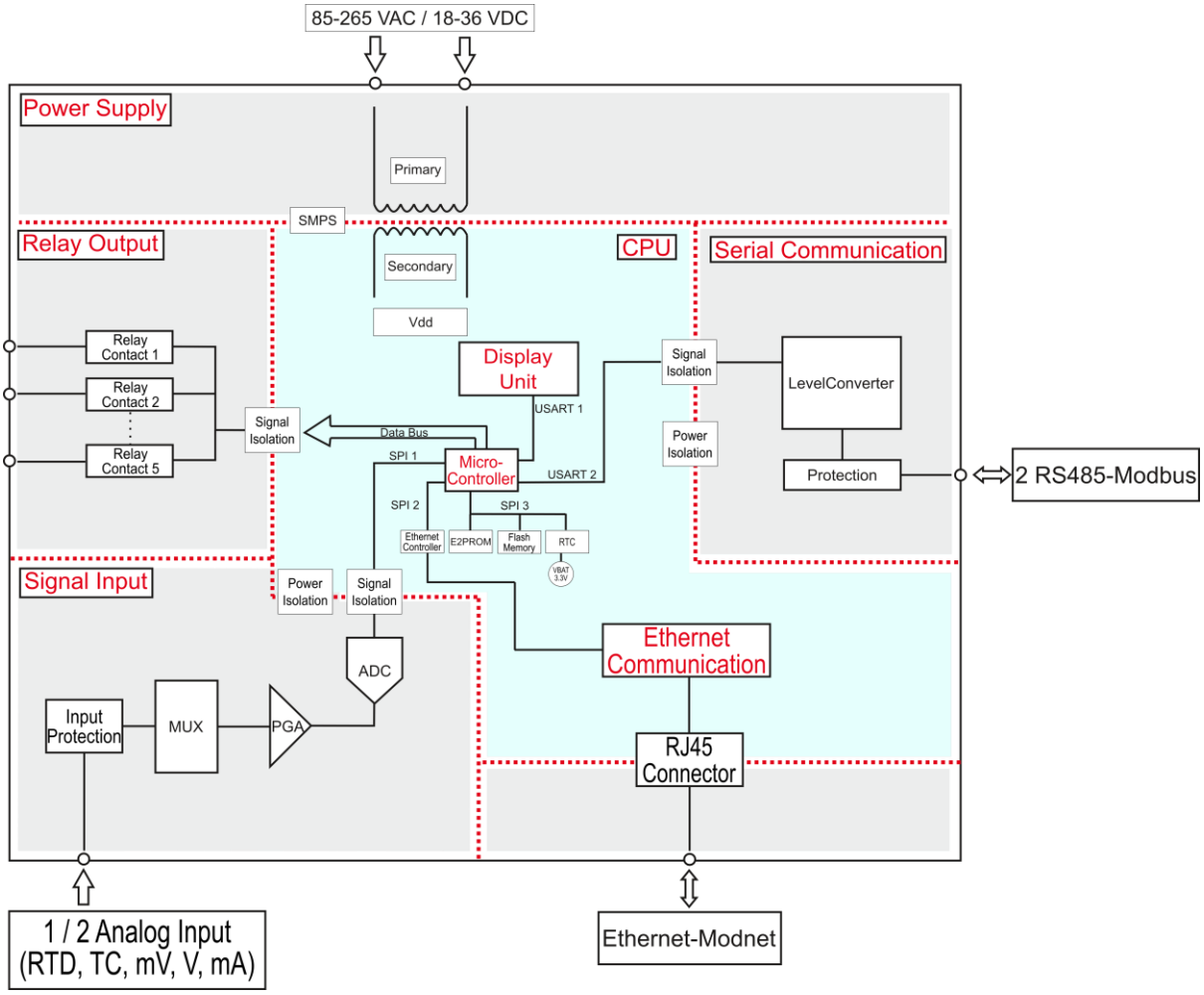


Figure 11 Functional Block Diagram of 40005E

- **Brief Operating Procedure :**

1) Connect Digital Output- Relay cable, Analog Input cable and Communication cable to 40005E as shown in figure 7,figure 8, figure 9 respectively.

2) Connect Power supply (Either 85-265 VAC or 18-36 VDC , as per the ordering code) to 40005E. The power on message on display will be “ ın ıt”.

3) According to the input type configuration and input sensor feed from field, the temperature / mV / V / mA will be displayed on Channel window .

4) For in depth parameter details, see following chapters.

7. MENU LAYOUT

7.1 Parameter Flow Diagram

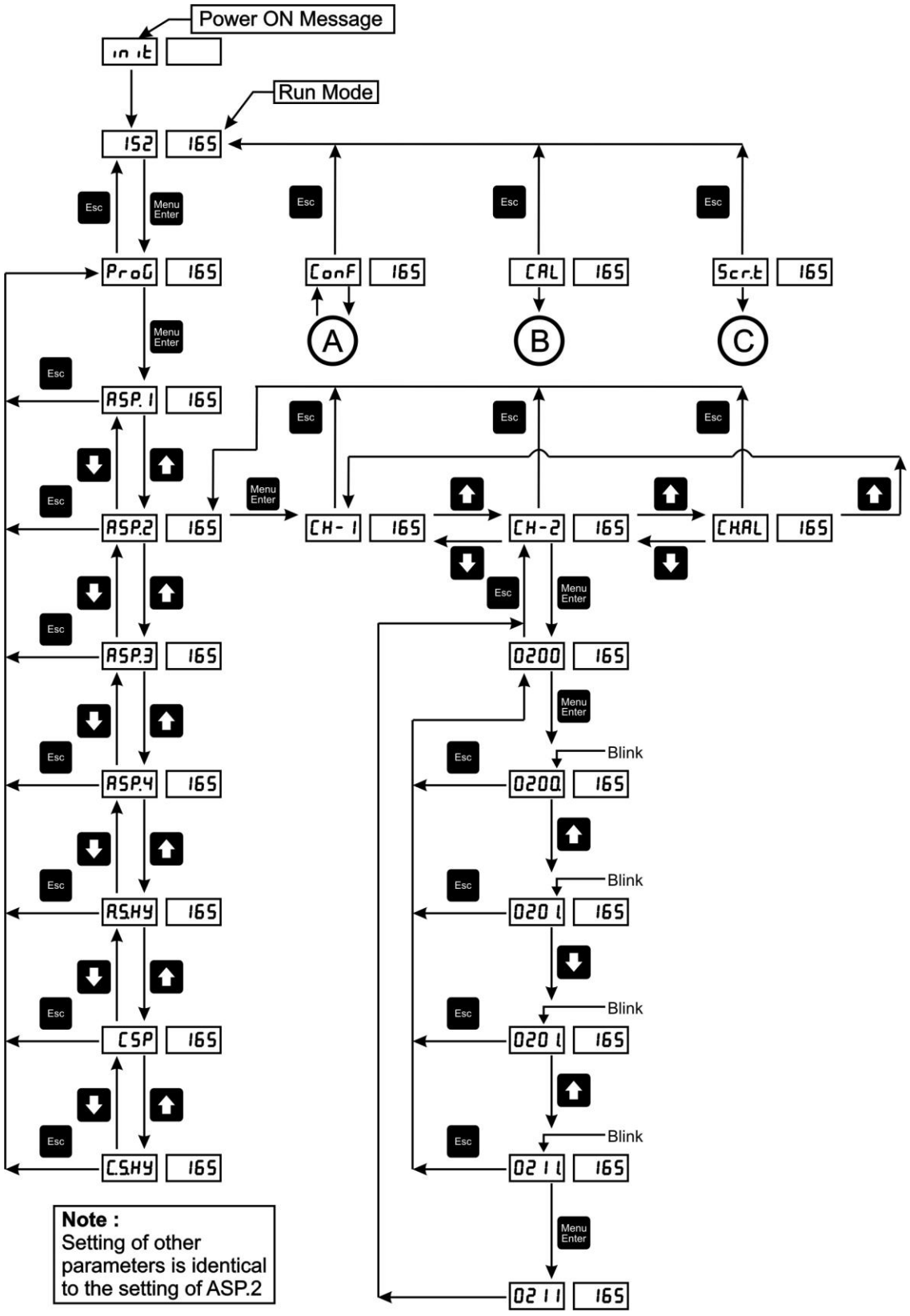


Figure 12 Program Mode Flow diagram

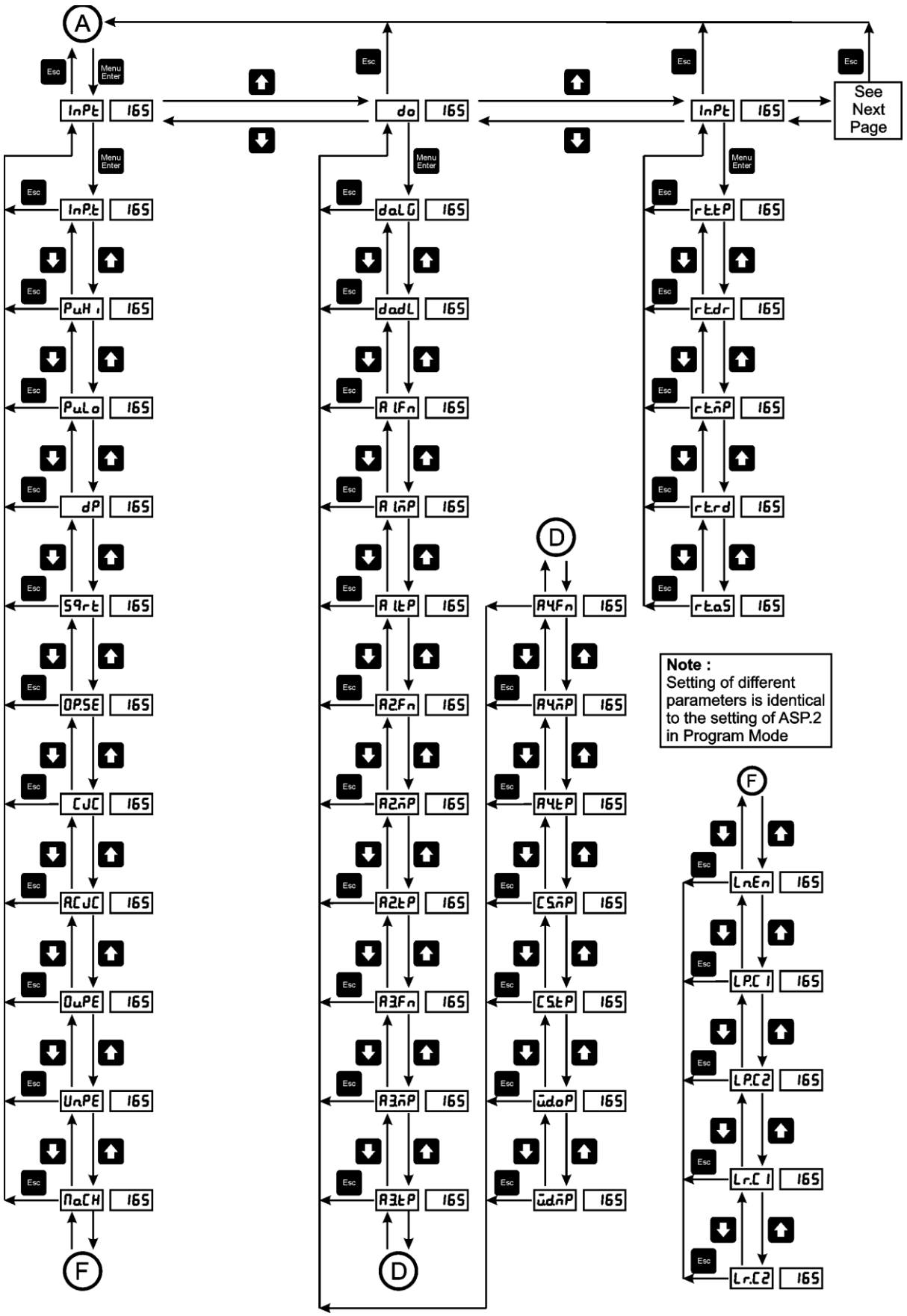


Figure 13 Configuration Mode Flow diagram

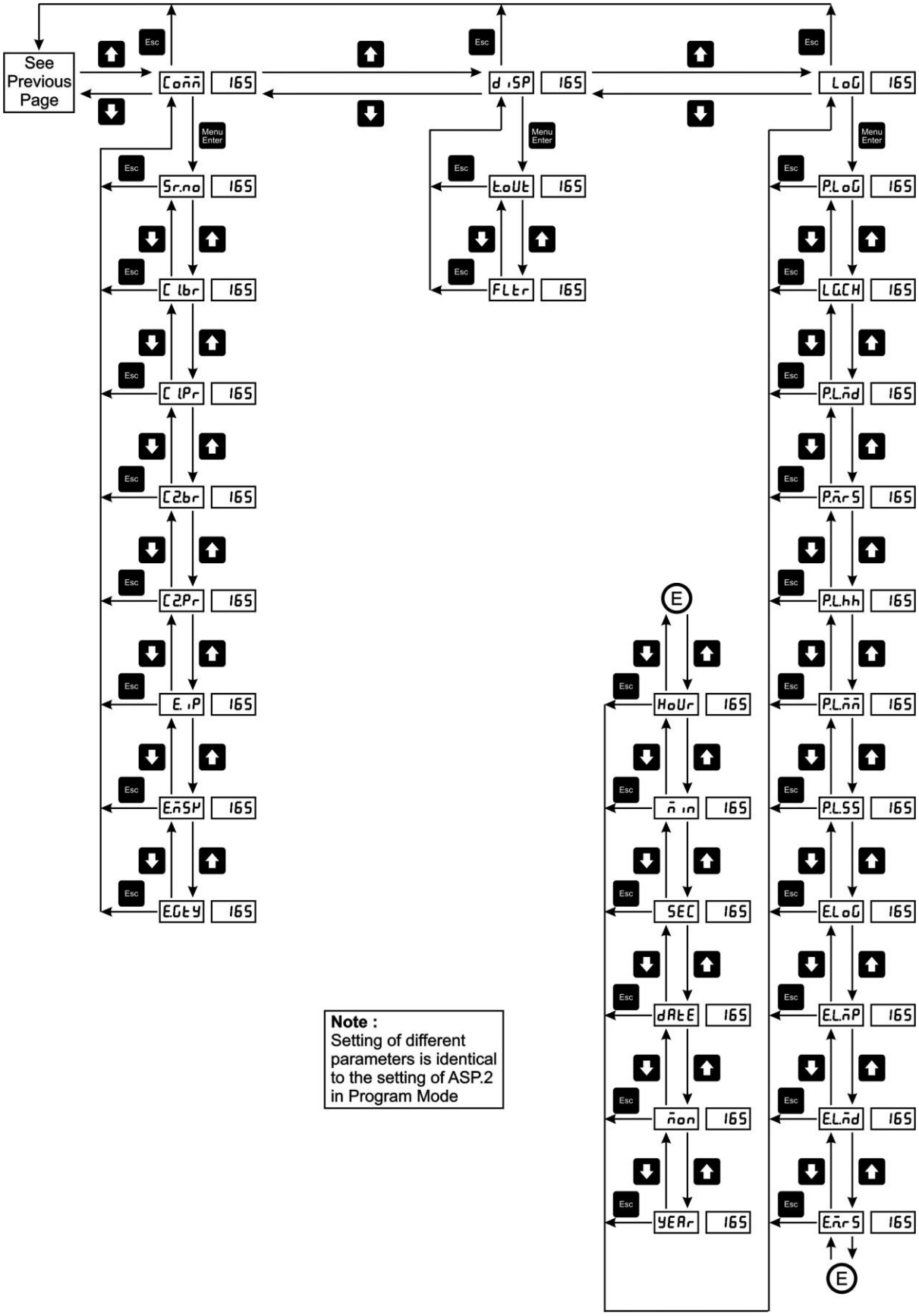


Figure 14 Configuration Mode Flow diagram

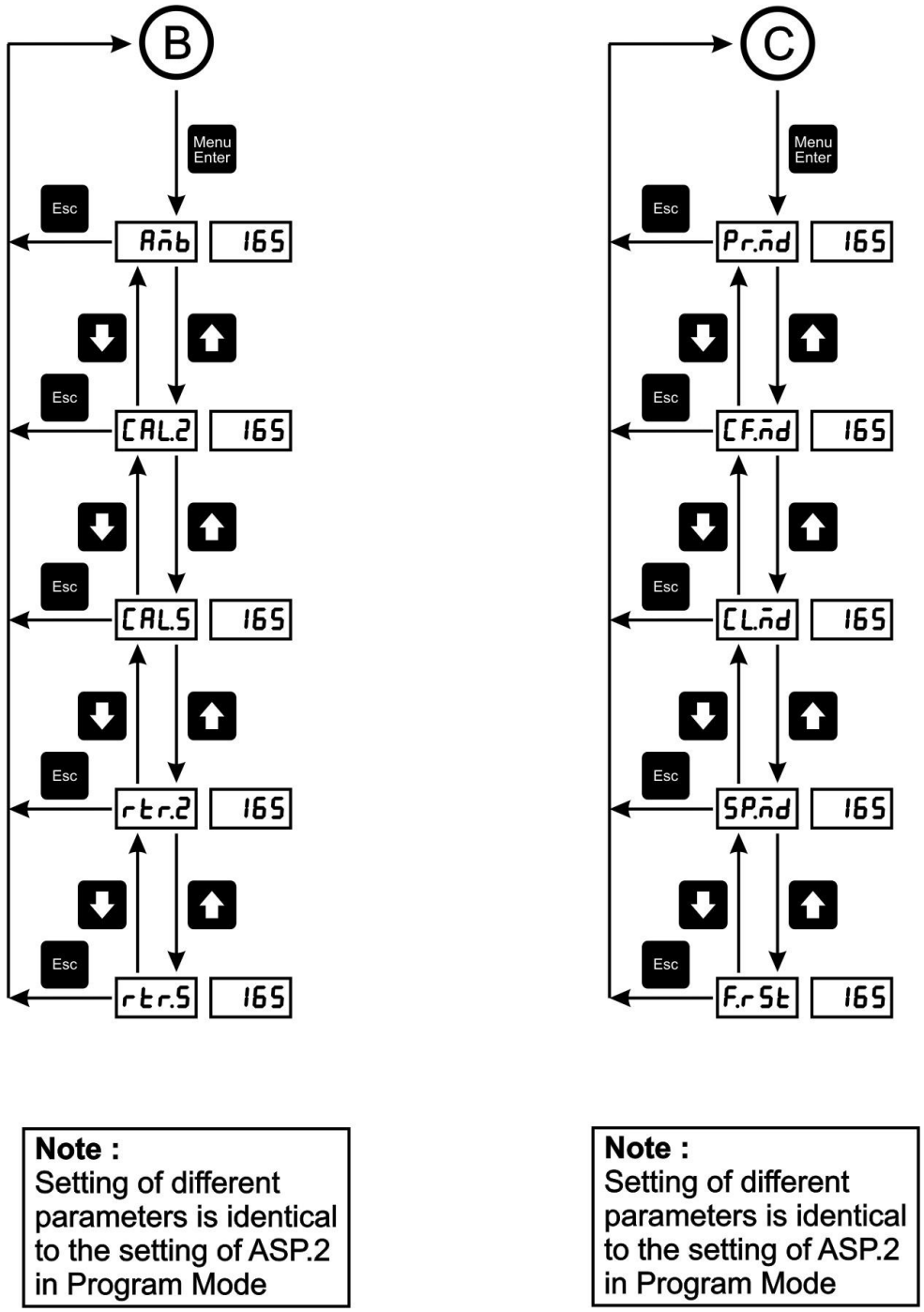


Figure 15 Calibration Mode and Security Mode Flow diagram

- **Note :**
  - **For All modes, Ch-2 and Ch-All will be displayed for Dual Channel Bargraph only.**
  - **For Single Channel Bargraph, the value will be stored for Channel-1 by default.**

7.2 Menu Parameters- In Detail

- **Note :**
  - **For All modes, Ch-2 and Ch-All will be displayed for Dual Channel Bargraph only.**
  - **For Single Channel Bargraph, the value will be stored for Channel-1 by default.**

- **Run Mode :**

  Following parameters can view or change during run time.
  - Immediately after powering, unit will run in Auto Mode
  - By pressing **Enter** in run mode, the menu goes into the settings of main menu.
  - By pressing and holding **Decrement Key** in run mode, relay acknowledgement can be done.

- **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 CHANNEL window shows ProG (Prog) message. Press MENU key again CHANNEL window shows PWd (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 Program Mode. CHANNEL window shows ASP .1 (ASP.1) message. By pressing MENU Key, CHANNEL window shows CH- 1 (CH-1) message. Means it is asking which channel value needs to be changed. By pressing MENU key again, CHANNEL window shows the ASP.1 value of channel number 1. Then use MENU Key to enter into editing mode and use INCREMENT and DECREMENT key to modify value for channel 1 . OR press ESCAPE key and then press INCREMENT key to change Set-point 1 for Channel 2. After pressing INC key many times, the message on Channel Window shows CH .AL,(CH. AL) which means user can modify parameters for all channels at once(AL = ALL). ESCAPE KEY is used to come out of ASP.1 setting.

Table 8 Program Mode Parameters

Program Mode				
Channel Window Symbol	Name	Setting name and description	Default value	Shows only if
PWD	Password	Asking for Password	0	Password is other than zero
0	Program Mode Password	0 to 9999	0	Password is other than zero
(ASP.1)	Alarm Set point-1	SetPoint-1 for Channel 1 and 2 (Where total Number of Channels=2).	0100 (for all 2 channels)	-
(ASP.2)	Alarm Set point-2	SetPoint-2 for Channel 1 and 2 (Where total Number of Channels=2).	0200 (for all 2 channels)	-
(ASP.3)	Alarm Set point-3	SetPoint-3 for Channel 1 and 2 (Where total Number of Channels=2).	0300 (for all 2 channels)	-
(ASP.4)	Alarm Set point-4	SetPoint-4 for Channel 1 and 2 (Where total Number of Channels=2).	0400 (for all 2 channels)	-
(A.S.Hy)	Alarm Set point Hysteresis	Alarm Set point Hysteresis for Channel 1 and 2 (Where total Number of Channels = 2)	0001(for all 2 channels)	-
(CSP)	Control Set Point	Control SetPoint for Channel 1 and 2 (Where total Number of Channels=2).	0070(for all 2 channels)	Control Output is required
(C.S.Hy)	Hystresis	Control Set point Hysteresis for Channel 1 and 2(Where total Number of Channels = 2)	0001(for all 2 channels)	Control Output is required

2) Configuration Mode :

By pressing MENU key, CHANNEL window shows ConF (Conf) message. Press MENU key again CHANNEL window shows PWd (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. CHANNEL window shows InPt (Inpt) message.Press MENU Key to enter into sub menu of Input configuration . CHANNEL window shows InP .t (Inp.t). Press MENU Key to enter into sub menu of parameter. By pressing MENU Key, CHANNEL window shows CH- 1 (CH-1) message. Means it is asking which channel value needs to be changed. Pressing MENU key again CHANNEL window shows H-tc (K-tc) . Then use MENU Key to enter into editing mode and use INCREMENT and DECREMENT key to modify value. OR press ESCAPE key then INCREMENT key to change Channel Number . After pressing INC key many times, the message on Channel Window shows CH .AL,(CH. AL) which means user can modify parameters for all channels at once(AL = ALL). ESCAPE KEY is used to come out INP.T .

Table 9 Configuration Mode Parameters

Configuration Mode				
Channel Window Symbol	Name	Setting name and description	Default value	Shows only if
PWD	Password	Asking for Password	0	Password is other than zero
0	Program Mode Password	0 to 9999	0	Password is other than zero
(Inpt)	Input Configuration	Different parameters for Input Configuration	-	-
(do)	DO(Digital Output) Configuration	Different parameters for DO (Digital Output) Configuration	-	Any of Digital Output is required
(Ao)	AO(Analog Output) Configuration	Different parameters for AO (Analog Output) Configuration	-	Analog Output is required
(Comm)	Communication Configuration	Different parameters for Communication Configuration	-	-
(diSP)	Display Configuration	Different parameters for Display Configuration	-	-
(LoG)	Logging Configuration	Different parameters for Logging Configuration	-	Logging is required

Table 10 Sub Parameters of Input Configuration Mode

Sub parameters of Input Configuration Mode				
Channel Window Symbol	Name	Setting name and description	Default value	Shows only if
(Inp.t)	PV Input Type (E, J, K, T Etc.)	Follow Table 11(Input type for 1-2 channel)	K-TC(for all 2 channels)	-
(Pv.Hi)	Process value range high setting (PV.Hi > PV. Lo)	Range of the sensor /-1999 to 9999 (for linear input types)(1-2 Channels)	1370(for all 2 channels)	-
(Pv.Lo)	Process value range lower setting	Range of the sensor /-1999 to 9999 (for linear input types)(1-2 Channels)	-200(for all 2 channels)	-
dP	Decimal Point Setting Only	0 to 3(1 – 2 Channel)	0(for all 2 channels)	-

(dP)	applicable for Linear input type			
SQrt (Sqrt)	Square root (Only applicable for Linear input types)	YES / no (YES/NO) 0 : NO 1: YES	0(for all 2 channels)	-
CJC (CJC)	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 - 2) (CJC is applicable to only TC type inputs) (Only RTD type input channel can be set as Channel CJC)	1 (FCJC = 000.0)	-
oP .SE (oP.SE)	Open Sensor	UP/doUn (UP/Down) 0: Down 1: UP	0 (for all 2 channels)	-
Ov .PE (Ov.PE)	Percentage Range for Over Value Display	0 to 10	0	-
Un .PE (Un.PE)	Percentage Range for Under Value Display	0 to 10	0	-
no .CH (no.CH)	Number of Channels	Total Number of Channels (from number 1 to 2)	2	-
Ln .En (Ln.En)	Linearization Enable Selection	Bit 0 for Channel 1 and Bit 1 for Channel 2	0	-
LP .C1 (LP.C1)	Linearization Percentage Steps – Channel 1	LP 01 to LP10 for 10 point linearization	0	-
LP .C2 (LP.C2)	Linearization Percentage Steps – Channel 2	LP 01 to LP10 for 10 point linearization	0	-
Lr .C1 (Lr.C1)	Linearization Range Steps – Channel 2	LR 01 to LR 10 for 10 point Linerization	0	-
Lr .C2 (Lr.C2)	Linearization Range Steps – Channel 2	LR 01 to LR 10 for 10 point Linerization	0	-

Table 11 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	n.120	-70.0 to 210.0°C	
-10 to 20mV	12	-10.20	-1999 to 9999 Counts	1 Count
0 to 100 mV	13	0-100		
4 to 20mAmp	14	4-20		
0 to 20mAmp	15	0-20		
0 to 5V	16	0-5u		
1 to 5V	17	1-5u		
0 to 10V	18	0.10u		

10 Point Linearization:

This instrument has feature of Ten-point linearization for each channel . User can define up-to ten different segments of the full-scale input (in percentage) with Full-scale engineering value for each segment. This linearization is only applicable to linear input types.

Here we are defining 10 Linearization percentage steps for the current input 4 mA to 20mA. Let's have one example to understand this concept.

For Example:
10 point Linearization:
Zero = 00000 and Span = 9999, Let us assume the Unit is 4-20 mA.

Table 12 10 – point Linearization

Step No.	Linearization Percent	Value	Linearization Range	Display Value	Input Current mA
1	LP01	10%	LR01	1000	5.6
2	LP02	20%	LR02	2000	7.2
3	LP03	30%	LR03	3000	8.8
4	LP04	40%	LR04	4000	10.4
5	LP05	50%	LR05	5000	12
6	LP06	60%	LR06	6000	13.6
7	LP07	70%	LR07	7000	15.2

8	LP08	80%	LR08	8000	16.8
9	LP09	90%	LR09	9000	18.4
10	LP10	100%	LR10	9999	20

In above example
Process Value on Display varies between:

1. 0 – 1000 for input of 0 % – 10%
2. 1000 – 2000 for input of 10% – 20%
3. 2000 – 3000 for input of 20 % – 30%
4. 3000 – 4000 for input of 30 % – 40%
5. 4000 – 5000 for input of 40 % – 50%
6. 5000 - 6000 for input of 50 % - 60 %
7. 6000 – 7000 for input of 60 % – 70%
8. 7000 – 8000 for input of 70 % – 80%
9. 8000 – 9000 for input of 80 % – 90%
10. 9000 – 9999 for input of 90 % – 100%

5 point Linearization:
Zero = 00000 and Span = 9999, Let us assume the Unit is 4-20 mA.

Table 13 5 - Point Linearization

Step No.	Linearization Percent	Value	Linearization Range	Display Value	Input Current mA
1	LP01	10%	LR01	2000	5.6
2	LP02	50%	LR02	4000	12.0
3	LP03	60%	LR03	4500	13.6
4	LP04	80%	LR04	7500	16.8
5	LP05	100%	LR05	10000	20
6	LP06	0	LR06	0	
7	LP07	0	LR07	0	
8	LP08	0	LR08	0	
9	LP09	0	LR09	0	
10	LP10	0	LR10	0	

In above example
Process Value on Display varies between:

1. 0 – 2000 for input of 0 % – 10%
2. 2000 – 4000 for input of 10% – 50%
3. 4000 – 4500 for input of 50 % – 60%
4. 4500 – 7500 for input of 60 % – 80%
5. 7500 – 9999 for input of 80 % – 100%

Similarly, the configuration of Linearization is done for 2,3,4,6,7,8,9 points.

To enable and Disable Linearization use the Ln.En parameter.

Configuration of linearization percent, range and Linearization Enable/Disable function is individual for both channels.

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

Sub parameters of DO(Digital Output) Configuration Mode				
Channel Window Symbol	Name	Setting name and description	Default value	Shows only if
do .LG (do.LG)	DO(Digital Output) Logic Applicable for 5 Relays **(Optional)**	nr / FS (Normal / Fail Safe) 0: NORMAL 1: FAIL SAFE (For all 5 DO(Digital Output))	0 (for all 5 DO(Digital Output)) (Relay 1-5)	Digital Output is required
do .dL (Pv.Lo)	DO(Digital Output)Delay Applicable for 5 Relays **(Optional)**	0 to 99 seconds (For all 5 DO(Digital Output))	0 (for all 5 DO(Digital Output)) (Relay 1-5)	Digital Output is required
A1 .Fn (A1.Fn)	Alarm 1 Function	ALrñ / tr IP (Alarm / Trip) 0: ALARM 1 : TRIP	0(for all 2 channels)	-
A1 .ñP (A1.mP)	Alarm 1 Mapping	See DO(Digital Output) Configuration	Refer Table 15and note 1	Digital Output is required
A1 .tP (A1.tP)	Alarm 1 Type	Lo/H ı 0 : LOW 1: HIGH	0 (for all 2 channels)	-
A2 .Fn (A2.Fn)	Alarm 2 Function	ALrñ / tr IP (Alarm / Trip) 0: ALARM 1 : TRIP	0(for all 2 channels)	-
A2 .ñP (A2.mP)	Alarm 2 Mapping	See DO(Digital Output) Configuration	Refer Table 15and note 1	Digital Output is required
A2 .tP (A2.tP)	Alarm 2 Type	Lo/H ı 0 : LOW 1: HIGH	0 (for all 2 channels)	
A3 .Fn (A3.Fn)	Alarm 3 Function	ALrñ / tr IP (Alarm / Trip) 0: ALARM 1 : TRIP	0(for all 2 channels)	-
A3 .ñP (A3.mP)	Alarm 3 Mapping	See DO(Digital Output) Configuration	Refer Table 15and note 1	Digital Output is required
A3 .tP (A3.tP)	Alarm 3 Type	Lo/H ı 0 : LOW 1: HIGH	0 (for all 2 channels)	-
A4 .Fn (A4.Fn)	Alarm 4 Function	ALrñ / tr IP (Alarm / Trip) 0: ALARM 1 : TRIP	0(for all 2 channels)	-
A4 .ñP (A4.mP)	Alarm 4 Mapping	See DO(Digital Output) Configuration	Refer Table 15and note 1	Digital Output is required

A4 .tP (A4.tP)	Alarm 4 Type	Lo/H i 0 : LOW 1: HIGH	0 (for all 2 channels)	
CS .nP (CS.mP)	Control Set point mapping	See DO(Digital Output) Configuration	Refer Table 15and note 1	Digital Output is required
CS .tP (CS.tP)	Control Set point type	Lo/H i 0 : LOW 1: HIGH	0 (for all 2 channel)	Control Output is required
U .d .oP (W.d.oP)	Watchdog Output	dSbL/EnbL 0 : Disable 1: Enable	Refer note 1	-
U .d .nP (W.d.mP)	Watchdog Mapping	See DO(Digital Output) Configuration	Refer note 1	Digital Output is required

DO(Digital Output) Configuration:

Total numbers of relays in 40005E are 5. For one channel maximum Five numbers of DOs can be assigned. Among them one DO can only be assigned for control operation and four remaining DOs can be assigned for Alarm/Trip operatoin. Below example shows different configuration and different mapping of different DOs to 2 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	AS3 . Mapping	DO number for ASP3	AS4 . Mapping	DO number for ASP4	CSP. Mapping	DO number for CSP	Watch - dog Mapping	DO number for W.D.MP
1	Relay 3	3	Relay 3	3	None	0	Relay 2	2	Relay 1	1	Relay 5	5
2	None	0	Relay 4	4	Relay 4	4	Relay 4	4	None	0		

Note 1:

1) None means no DO(Digital Output) is assigned to particular channel.

2) DO number = 0 represents "**None**" . DO Number = 1 to 5 represents "**Relay No. 1 to Relay No. 5**".For more details refer Table 16Table 15.

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) or** Alarm Set point 3 mapping **(A3.MP) or** Alarm Set point 4 Mapping**(A4.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 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)** , Alarm set point 2 mapping **(A2.MP) ,** Alarm set point 3 mapping **(A3.MP)** and Alarm set point 4 mapping **(A4.MP).** In above example, Relay 4 is assigned to channel 2 in **AS2. Mapping , AS3.**

Mapping and AS4. Mapping, Relay 3 is mapped to channel 1 in **AS1. Mapping and 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 other operation goes smoothly. When Watchdog Output is “enabled”, then based on faults, error messages will be displayed on CHANNEL window. For more detail on watchdog operation and error messages, please refer topic

8.4 Watchdog Timer(WDT) / Watchdog Output Operation**.**

7) 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 A3.MP or A4.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
0	0 x 00	nonE (None)(Default)
1	0 x 01	rL .01 (Relay-1)
2	0 x 02	rL .02 (Relay-2)
3	0 x 03	rL .03 (Relay-3)
4	0 x 04	rL .04 (Relay-4)
5	0 x 05	rL .05 (Relay-5)

- For relay functionality Refer Relay outputs (**Chapter - 8**).

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

Sub parameters of AO(Analog output) Configuration Mode (Optional)				
Channel Window Symbol	Name	Setting name and description	Default value	Shows only if
rt .tP (rt.tp)	Retransmission output type	0-20/4-20/ 0-5u/ 1-5u/0- 10u 0:(0-20) – 0-20mA 1:(4-20) – 4-20mA 2:(0 - 5) – 0 – 5volt 3:(1 - 5) – 1 – 5volt 4:(0 – 10) - 0 -10volt	1 (For all 2 retransmission outputs)	-
rt .dr (rt.dr)	Retransmission output direction	dir / rEu (Dir / rev) 0: REVERSE 1: DIRECT	0 (For all 2 retransmission outputs)	-
rt .nP (rt.mp)	Retransmission Mapping	Refer Note 2 and Refer Table 18	Refer Note 2 and Refer Table 18	-
rt .rd (rt.rd)	Retranmsission output reading	nAII/n in (MAX/MIN) 0: MINIMUM 1: MAXIMUM	1 (For all 2 retransmission outputs)	-
rt .o .S . (rt.o.S.)	Retransmission Open Sensor	UPIdoun (UP/Down) 0: Down 1: UP	0 (For all 2 retransmission outputs)	-

Note 2:

1) None means no AO(Analog Output)(Retransmission Output) is assigned to particular channel.
2) AO O/p number = 0 represents "**None**" . AO O/p Number = 1 to 2 represents "**Retransmission No. 1 to Retransmission No. 2**". For more details refer Table 18.

Table 18 AO(Analog Output)(Retransmission Output) description

Retransmission Output number (Decimal)	Retransmission Output number (Hex)	Setting Name and Description
0	0 x 00	nonE (None)(Default)
1	0 x 01	rt .01 (Retransmission Output-1)
2	0 x 02	rt .02 (Retransmission Output-2)

Table 19 Sub Parameters of Communication Configuration Mode

Sub parameters of Communication Configuration Mode				
Channel Window Symbol	Name	Setting name and description	Default value	Shows only if
Sr .no (Sr.no)	Unit ID	1 to 247	1	-
C1.b.r. (C1.b.r.)	Com Port 1 Baud rate	9600/ 19 .2P / 57 .6P (9600/19.2k) 0: 9600 1: 19.2 K 2: 57.6 K	1	-
C1.Pr (C1.Pr)	Com Port 1 Parity bits	P .nS .2/P .o .S1/P .ES .1 (P.n.S.2/P.o.S.1/P.o.S.2) **0:** PARITY NONE, STOP BIT 2 **1:**PARITY ODD, STOP BIT- 1 **2:**PARITY EVEN, STOP BIT- 1	1	-
C2.b.r. (C2.b.r.)	Com Port 2 Baud rate	9600/ 19 .2P / 57 .6P (9600/19.2k) 0: 9600 1: 19.2 K 2: 57.6 K	1	Com Port 2 is required
C2.Pr (C2.Pr)	Com Port 2 Parity bits	P .nS .2/P .o .S1/P .ES .1 (P.n.S.2/P.o.S.1/P.o.S.2) **0:** PARITY NONE, STOP BIT 2 **1:**PARITY ODD, STOP BIT- 1 **2:**PARITY EVEN, STOP BIT- 1	1	Com Port 2 is required
E .iP. (E.iP.)	Ethernet IP Address	Refer Note 3:	Refer Note 3:	Ethernet is required
E .mSk (E.mSk)	Ethenet masking	Refer Note 3:	Refer Note 3:	Ethernet is required
E .Gty (E.Gty)	Ethernet Gateway	Refer Note 3:	Refer Note 3:	Ethernet is required

Note 3:

1) CHANNEL Window shows sub parameter configuration name.
i.e. while setting Ethernet IP (E.Ip.), Ethenet IP 1(E.IP.1) will be shown on same 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 sequencially. 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				
Channel Window Symbol	Name	Setting name and description	Default value	Shows only if
t .oUt (t.oUt)	Timeout for display back to Run Mode	10 to 100 Seconds	60	-
FLtr (FLtr)	IIR Filter to get stable PV reading	0 to 10 (Refer Note : 4)	0	-

Note 4 :

1) 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 21Sub Parameters of Logging Configuration Mode

Sub parameters of Logging Configuration Mode (Optional)				
Channel Window Symbol	Name	Setting name and description	Default value	Shows only if
P .LoG (P.LOG)	Periodic Logging Enable	Strt/StoP (Strt/Stop) 0: STOP 1: START	0	-
P .L .nP (P.L.MP)	Periodic Log channel mapping (selection)	YES / no (YES/NO) 0 : NO 1: YES	0 (for all 2 channels) (Refer Note 5)	-
P .L .nd (P.L.md)	Periodic Logging Mode	hold/OvLP (HOLD/OVLP) 0: HOLD 1: OVERLAP	0 (Refer Note 5)	-
P .n .rS (P.M.rS)	Periodic Log Memory Reset(/Clear)	YES / no (YES/NO) 0 : NO	0 (Refer Note 5)	-

		1: YES		
P .L .HH (P.L.HH)	Periodic Log time - Hour	0 to 23	0 (Refer Note 5)	-
P .L .nn (P.L.MM)	Periodic Log time – Minute	0 to 59	0 (Refer Note 5)	-
P .L .SS (P.L.SS)	Periodic Log time – Second	0 to 59	1 (Refer Note 5)	-
E .LoG (E.LOG)	Event Logging Enable	Strt/StoP (Strt/Stop) 0: STOP 1: START	0	-
E .L .nP (E.L.MP)	Event Log channel mapping (selection)	YES / no (YES/NO) 0 : NO 1: YES	0 (for all 2 channels) (Refer Note 5)	-
E .L .nd (E.L.Md)	Event Logging Mode	hold/OvLP (HOLD/OVLP) 0: HOLD 1: OVERLAP	0	-
E .n .rS (E.M.rS)	Event Log Memory Reset(/Clear)	YES / no (YES/NO) 0 : NO 1: YES	0	-
HoUr (Hour)	RTC – Hour	0 to 23	0	-
n in (Min)	RTC – Minute	0 to 59	0	-
SEc (Sec)	RTC – Second	0 to 59	0	-
dAtE (date)	RTC – Date	1 to 31	0	-
non (Mon)	RTC – Month	1 to 12	0	-
YEAr (yEAr)	RTC – Year	1 to 255	0	-

Note 5:

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 stopped after memory is full. In Ovelap mode, datalogging will again start from 1st record after memory is full and Roll over count will increment. Roll over count will increment as per how many times memory was full.

3) Periodic (P .n .rS) and Event (E .n .rS) logging memory reset parameter is only applied 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.

3) Calibration Mode :

By Pressing MENU key, CHANNEL window shows CAL (CAL) message. By pressing MENU key again , CHANNEL window shows PWD (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 Calibration Mode. CHANNEL window shows Amb (Amb) message. By pressing MENU Key, CHANNEL 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 ESCAPE key and then INCREMENT key to go to next parameter CAL .Z (CAL.Z). Channelwise Calibration can be used here. However, there is no need of channelwise calibration. ESCAPE KEY is used to come out of CAL.Z(sub parameter of Calibration mode).

Table 22 Calibration Mode Parameters

Calibration Mode				
Channel Window Symbol	Name	Setting name and description	Default value	Shows only if
PWD	Password	Asking for Password	0	Password is other than zero
0	Calibration Mode Password	0 to 9999	0	Password is other than zero
Amb (Amb)	Ambient Calibration	Ambient Adjustment	-	-
CAL .Z (CAL.Z)	Thermocouple, Rtd and Linear Zero Calibtriaon	Depending on PV sensor type selected (1 and 2 Channels)	-	-
CAL .S (CAL.S)	Thermocouple, Rtd and Linear Span Calibtriaon	Depending on PV sensor type selected (1 and 2 Channels)	-	-
rtr .Z (rtr.Z)	Retransmission voltage and current Zero calibration	Depending on Retrasmission type selected (1 and 2 Retransmission Outputs) **(Optional)**	-	-
rtr .S (rtr.S)	Retransmission voltage and current Span calibration	Depending on Retrasmission type selected (1 and 2 Retransmission Outputs) **(Optional)**	-	-

4) Security Mode :

By Pressing MENU key, CHANNEL window shows SCr .t (SCr.t) message. By pressing MENU key again , CHANNEL window shows PWD (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 Security Mode. CHANNEL window shows Pr .md (Pr.md) message. By pressing MENU Key, CHANNEL window shows current password for Program mode menu. Then use MENU Key to enter into editing mode and use INCREMENT and

DECREMENT key to modify value if required. OR press ESCAPE key and then INCREMENT key to go to next parameter CF .md (CF.md). ESCAPE KEY is used to come out of CF.MD(sub parameter of Security mode).

Table 23 Security Mode Parameters

Security Mode				
Data Window Symbol	Name	Setting name and description	Default value	Shows only if
PWD	Password	Asking for Password	0	Password is other than zero
0	Security Mode Password	0 to 9999	0	Password of Secuirty mode is other than zero
Pr .md (Pr.md)	Set Password for Program Mode	0 to 9999	0	-
CF .md (CF.md)	Set Password for Configuration Mode	0 to 9999	0	-
CL .md (CL.md)	Set Password for Configuration Mode	0 to 9999	0	-
SP .md (SP.md)	Set Password for Security Mode	0 to 9999	0	-
F .rSt (F.rSt)	Factory reset	See Factory reset parameter menu	-	-

- **Factory Reset Parameter :**

By Pressing MENU key, CHANNEL window shows Pwd (Pwd) message. 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. CHANNEL window shows CAL (CAL) message. Then use MENU Key to enter into editing mode and use INCREMENT and DECREMENT key to modify which value you needs to be of default value . OR press ESCAPE key come out of F.rst(sub parameter of Factory reset mode).

Table 24 Factory Reset Menu

Factory Reset Parameter Menu				
Data Window Symbol	Name	Setting name and description	Default value	Shows only if
PWD	Password	Asking for Password	0	Password is other than zero
0	Factory reset Mode Password	0 to 9999	0	-
CAL (CAL)	CAL-Set Calibration values to factory default value	Only calibration set to default value (Refer Note 6)	-	F.RST = 0
PArA (PArA)	PARA-Set Parameter values to factory default value	All parameters excluding calibration will set to default value (Refer Note 6)	-	F.RST = 1

ALL (ALL)	ALL-Set ALL values to factory default value	Calibration and parameters will set to default value (Refer Note 6)	-	F.RST = 2

Note 6:

1) After resetting Calibration / Parameters / All values to factory reset values, the CHANNEL 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 5 set points. 4 for Alarm outputs(1 for Alarm 1 Set Point , 1 for Alarm 2 Set Point, 1 for Alarm 3 Set Point, 1 for Alarm 4 Set Point) and 1 for Control Set Point, totaling 8 alarm outputs and 2 control outputs for 2 number of channels. Control Outputs are **Optional.**
- 5 Relays can be used as DO(Digital Output). All Digital Outputs are **Optional**.
- Following tables shows Alarm Output , control output and digital output operation.

Table 25 Alarm 1 and Alarm 2 Momentary Alarm Logic

ALARM AL1

MOMEMTARY ALARM

(when in abnormal condition ack not pressed)

CONDITION			NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	ACK (2)	NORMAL(1)	ACK (3)
HIGH	ALARM	RELAY	OFF	ON	ON	OFF		OFF	OFF
ASP1	TRIP	RELAY	OFF	ON	OFF	OFF		ON	OFF
LOW	ALARM	RELAY	OFF	ON	OFF	ON		OFF	OFF
ASP1	TRIP	RELAY	OFF	ON	OFF	OFF		ON	OFF

ALARM AL2

MOMEMTARY ALARM

(when in abnormal condition ack not pressed)

CONDITION			NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	ACK (2)	NORMAL(1)	ACK (3)
HIGH	ALARM	RELAY	OFF	ON	ON	OFF		OFF	OFF
ASP2	TRIP	RELAY	OFF	ON	OFF	OFF		ON	OFF
LOW	ALARM	RELAY	OFF	ON	OFF	ON		OFF	OFF
ASP2	TRIP	RELAY	OFF	ON	OFF	OFF		ON	OFF

ALARM AL3

MOMEMTARY ALARM

(when in abnormal condition ack not pressed)

CONDITION			NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	ACK (2)	NORMAL(1)	ACK (3)
HIGH	ALARM	RELAY	OFF	ON	ON	OFF		OFF	OFF
ASP3	TRIP	RELAY	OFF	ON	OFF	OFF		ON	OFF
LOW	ALARM	RELAY	OFF	ON	OFF	ON		OFF	OFF
ASP3	TRIP	RELAY	OFF	ON	OFF	OFF		ON	OFF

ALARM AL4

MOMEMTARY ALARM

(when in abnormal condition ack not pressed)

CONDITION			NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	ACK (2)	NORMAL(1)	ACK (3)
HIGH	ALARM	RELAY	OFF	ON	ON	OFF		OFF	OFF
ASP4	TRIP	RELAY	OFF	ON	OFF	OFF		ON	OFF
LOW	ALARM	RELAY	OFF	ON	OFF	ON		OFF	OFF
ASP4	TRIP	RELAY	OFF	ON	OFF	OFF		ON	OFF

Table 26 Alarm 1 and Alarm 2 Maintained Alarm Logic

ALARM AL1

MAINTAINED ALARM

(when in abnormal condition ack not pressed)

CONDITION			NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	ACK (2)	NORMAL(1)	ACK (3)
HIGH	ALARM	RELAY	OFF	ON	ON	OFF	OFF	OFF	OFF
ASP1	TRIP	RELAY	OFF	ON	OFF	OFF	ON	ON	OFF
LOW	ALARM	RELAY	OFF	ON	OFF	ON	OFF	OFF	OFF
ASP1	TRIP	RELAY	OFF	ON	OFF	OFF	ON	ON	OFF

ALARM AL2

MAINTAINED ALARM

(when in abnormal condition ack not pressed)

CONDITION			NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	ACK (2)	NORMAL(1)	ACK (3)
HIGH	ALARM	RELAY	OFF	ON	ON	OFF	OFF	OFF	OFF
ASP2	TRIP	RELAY	OFF	ON	OFF	OFF	ON	ON	OFF
LOW	ALARM	RELAY	OFF	ON	OFF	ON	OFF	OFF	OFF
ASP2	TRIP	RELAY	OFF	ON	OFF	OFF	ON	ON	OFF

ALARM AL3

MAINTAINED ALARM

(when in abnormal condition ack not pressed)

CONDITION			NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	ACK (2)	NORMAL(1)	ACK (3)
HIGH	ALARM	RELAY	OFF	ON	ON	OFF	OFF	OFF	OFF
ASP3	TRIP	RELAY	OFF	ON	OFF	OFF	ON	ON	OFF
LOW	ALARM	RELAY	OFF	ON	OFF	ON	OFF	OFF	OFF
ASP3	TRIP	RELAY	OFF	ON	OFF	OFF	ON	ON	OFF

ALARM AL4

MAINTAINED ALARM

(when in abnormal condition ack not pressed)

CONDITION			NORMAL	ABNORMAL	UP (O/S)	DOWN (O/S)	ACK (2)	NORMAL(1)	ACK (3)
HIGH	ALARM	RELAY	OFF	ON	ON	OFF	OFF	OFF	OFF
ASP4	TRIP	RELAY	OFF	ON	OFF	OFF	ON	ON	OFF
LOW	ALARM	RELAY	OFF	ON	OFF	ON	OFF	OFF	OFF
ASP4	TRIP	RELAY	OFF	ON	OFF	OFF	ON	ON	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 27 Control Operation(Optional)

CONTROL OPERATION

(in abnormal condition ack will not work)

CONDITION			**NORMAL**	**ABNORMAL**	**UP (O/S)**	**DOWN (O/S)**	**NORMAL (1)**
HIGH CSP	CONTROL	RELAY	OFF	ON	ON	OFF	OFF
LOW CSP	CONTROL	RELAY	OFF	ON	OFF	ON	OFF

Notes :

(1) means normal condition after abnormal has occurred

Notes :

- **Upon pressing ACK key, acknowledgement will be given for ALARM/TRIP type set point in abnormal condition.**
- **Acknowledgement is not applicable for CONTROL operation.**

8.3 Basic DO(Digital Output) Function

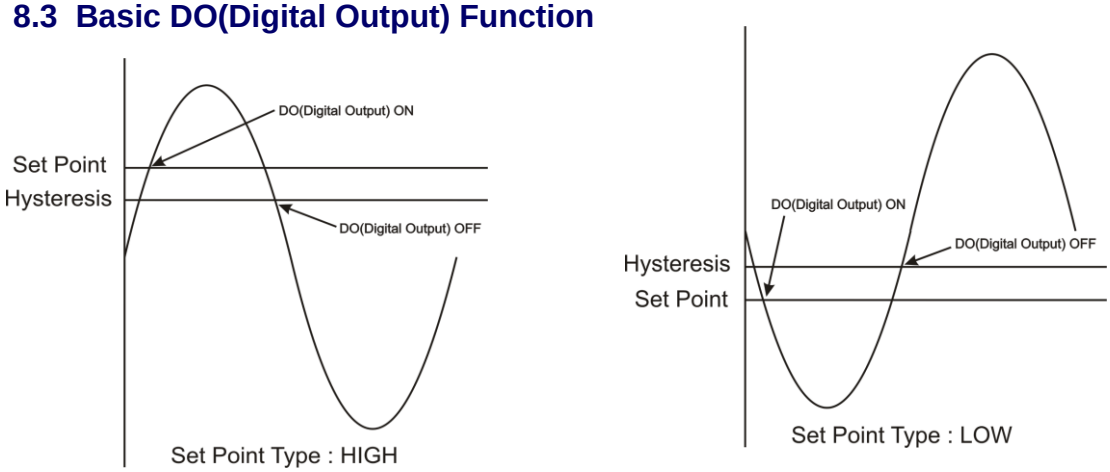


Figure 16 Basic DO(Digital Output) Function

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 28. 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 28 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 :** This relay 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 (Retransmission 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
- Retransmission output (calibration for voltage or current)

Ambient temperature adjustment:-

CHANNEL window shows Amb (Ambient temperature adjusts).Press MENU key to show the current Ambient value. CHANNEL window shows ambient temperature measured by the ENHANCED BARGRAPH INDICATOR and by applying old calibration data. 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 is set then press MENU key, the blinking DP will go off to indicate that the value has been registered. The ENHANCED BARGRAPH INDICATOR 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 29 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 zero menu, CHANNEL window shows CAL .2 (CAL.Z) message. Pressing MENU key again CHANNEL window shows CH- 1 (CH-1) message. Press MENU key, it shows the PV value of corresponding input for channel number 1. User can use any channel out of maximum number of channels(2) 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 ENHANCED BARGRAPH INDICATOR allows the user to calibrate sensor's input anywhere in the range, but it is recommended that it should 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 zero menu, CHANNEL window shows CAL .2 (CAL.Z) message. Pressing MENU key again CHANNEL window shows CH-1 (CH-1) message. Press MENU key, it shows the PV value of corresponding input for channel number 1. User can use any channel out of maximum number of channels(2) 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 CHANNEL window will show the calibrated value.

Zero and Span calibration is over

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

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

In Calibration mode, press INC key repeatedly, till CHANNEL window shows message rtr .2 (retransmission output zero calibration). By pressing MENU key, CHANNEL windows shows rtr .1 (rtr.1) . It indicates which Retransmission output needs to be calibrated. By pressing MENU key, CHANNEL window shows the value being outputted on Retransmission output terminals. In 40005E there are 2 number of Analog Output(Retransmission Output) are available. Now, measure the value using a highly accurate digital multi meter. 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 ENHANCED BARGRAPH INDICATOR will store zero calibration value. Press the ESC key and then INC key to calibrate value for other Retransmission Output. Now press ESC to come out of Retransmission Zero calibration and press INC key to calibrate retransmission output span calibration menu.

CHANNEL window shows the message rtr .5 (retransmission output span calibration)) By pressing MENU key, CHANNEL windows shows rtr .1 (rtr.1) . It indicates which Retransmission output needs to be calibrated. By pressing MENU key, CHANNEL window shows the value being outputted on Retransmission output terminals. In 40005E there are 2 number of Analog Output(Retransmission Output) are available. Now, measure the value using a highly accurate digital multi meter. 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 ENHANCED BARGRAPH INDICATOR will store zero calibration value. Press the ESC key and then INC key to calibrate value for other Retransmission Output. Now press ESC to come out of Retransmission Span calibration. Calibration for Retransmission output is over. Press MENU key to calibrate other parameters or press Escape key to come out to normal operation.

Note: Disable Linearization of Linear input type before doing calibration of linear input type.

10. MODBUS COMMUNICATION DETAIL

10.1 Overview

When ENHANCED BARGRAPH INDICATORs 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 30 Modbus Communication frame format

START	ADDRESS	FUNCTION	DATA	CRC CHECK	END
T1–T2–T3–T4	8 BITS	8 BITS	*n* x 8 BITS	16 BITS	T1–T2–T3–T4

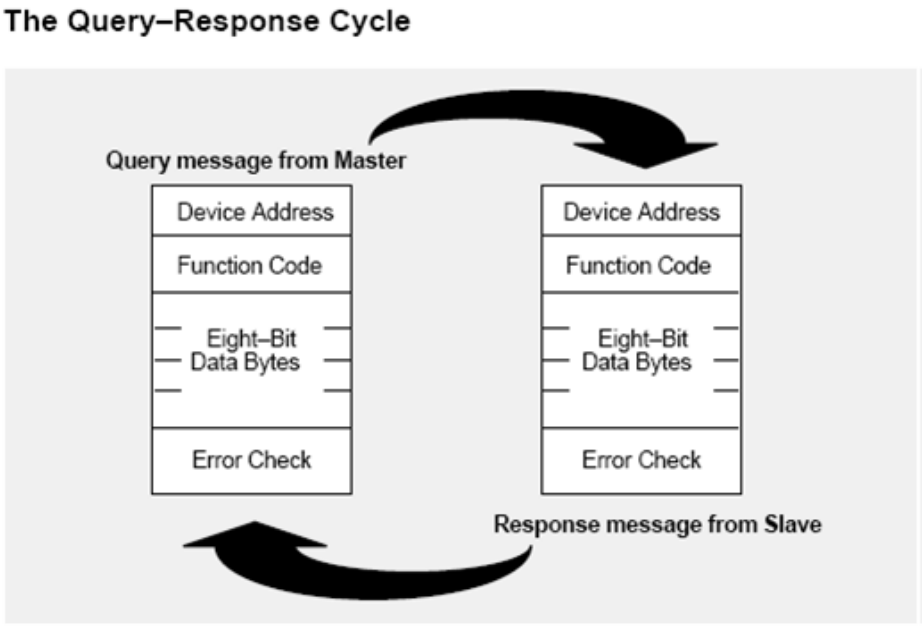


Figure 17 The Query-Response Cycle

- 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 31 Modbus Function code description

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

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 32 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 33 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 34 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 35 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	-
4	Ambient PV	30025	Integer	R	-
5	DO(Digital Output) Status– 32bit	30026	Bit	R	Refer Table 37
6	Alarm1 Status– 32bit	30028	Bit	R	Refer Table 38
7	Alarm2 Status – 32bit	30030	Bit	R	Refer Table 39
8	Control Status – 32bit	30032	Bit	R	Refer Table 40
9	Log Memory Percentage	30042	Integer	R	Higher Byte for Event log and Lower Byte for Periodic Log
10	Total Periodic Records	30043-44	Integer	R	30043 [Higher byte] 30044[Lower Byte]
11	Total Event Records	30045-46	Integer	R	30045 [Higher byte] 30046[Lower Byte]
12	Alarm3 Status– 32bit	30050	Bit	R	Refer Table 40
13	Alarm4 Status– 32bit	30052	Bit	R	Refer Table 40

Table 36 Details of abnormal Conditions of Process Value

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

Table 37 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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Relay-5	Relay-4	Relay-3	Relay-2	Relay-1

Table 38 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 – 2	Channel – 1

Table 39 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 – 2	Channel – 1

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

Table 40 Other Status Registers

Parameter	Control Status	Control Status
Modbus Address	30032	30033
Parameter	Alarm 3 Status	Alarm 3 Status
Modbus Address	30050	30051
Parameter	Alarm 4 Status	Alarm 4 Status
Modbus Address	30052	30053

Table 41 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 44
2	Ch – 2 – AL1 – SET	40002	Integer	-	-	R/W	
3	Ch – 1 – AL2 – SET	40025	Integer	-	-	R/W	
4	Ch – 2 – AL2 – SET	40026	Integer	-	-	R/W	
5	Ch – 1 – AL3 – SET	42501	Integer	-	-	R/W	
6	Ch – 2 – AL3 – SET	42502	Integer	-	-	R/W	
7	Ch – 1 – AL4 – SET	42525	Integer	-	-	R/W	
8	Ch – 2 – AL4 – SET	42526	Integer	-	-	R/W	
9	Ch – 1 - 2– ASP Hysteresis	40049	Integer	1	250	R/W	-
10	Ch – 1 – C – SET	40061	Integer	-	-	R/W	Refer Table 44
11	Ch – 2 – C – SET	40062	Integer	-	-	R/W	
12	Ch – 1 - 2– CSP Hysteresis	40085	Integer	1	250	R/W	-
13	Ch–1 - 2 – Input Type	40097	Integer	-	-	R/W	Refer Table 44
14	Ch –1 – USER - Z	40109	Integer	-	-	R/W	
15	Ch –2 – USER - Z	40110	Integer	-	-	R/W	
16	Ch –1 – USER – S	40133	Integer	-	-	R/W	
17	Ch –2 – USER – S	40134	Integer	-	-	R/W	
18	Ch – 1-2 – DP	40157	Integer	0	3	R/W	-
19	Ch – 1-2 – ASP1 MAP	40169	Integer	0	5	R/W	Refer Table 15
20	Ch – 1-2 – ASP2 MAP	40181	Integer	0	5	R/W	
21	Ch – 1-2 – ASP3 MAP	42549	Integer	0	5	R/W	
22	Ch – 1-2 – ASP4 MAP	42561	Integer	0	5	R/W	
23	Ch – 1-2 – CSP MAP	40193	Integer	0	5	R/W	

Table 42 Holding Registers Parameters – Part 2

Sr. No	Parameter Description	Modbus Address	Parameter Type	Min Value (Single Channel)	Max Value (Single Channel)	Access	Remarks
24	Square root for Channel 2 – 1 (MSB- LSB)	42002 - H	Bit	0	1	R/W	Refer Table 45
25	CJC	42004 - H	Integer	0	2	R/W	Refer Table 48
26	ACJC	42004 - L	Integer	0	1	R/W	-
27	FCJC	42005	Integer	-10.0	65.0	R/W	-
28	CCJC	42006 - H	Integer	1	24	R/W	-
29	Open Sensor for Channel 2 - 1 (MSB- LSB)	42007 - H	Bit	0	1	R/W	Refer Table 46 & Table 49
30	Percentage Range for Over Reading Display	42180	Integer	0	10	R/W	-
31	Percentage Range for Under Reading Display	42181	Integer	0	10	R/W	-
32	Number Of Channel	42009	Integer	1	24	R/W	-
33	Alarm Acknowledge	42011	Integer	-	-	W	-
34	DO Logic for Relay 5 – 1 (MSB- LSB)	42012 - H	Bit	0	1	R/W	Refer Table 51
35	Relay 1 - 2 - DO Delay	42014	Integer	1	99	R/W	-
36	ASP1 Function for Channel 2 - 1 (MSB- LSB)	42030 - H	Bit	0	1	R/W	Refer Table 46 &Table 52
37	ASP1 type for Channel 2 - 1 (MSB- LSB)	42032 - H	Bit	0	1	R/W	Refer Table 46 &Table 53
38	ASP2 Function for Channel 2 - 1 (MSB- LSB)	42034 - H	Bit	0	1	R/W	Refer Table 46 &Table 52

39	ASP2 type for Channel 2 - 1 (MSB- LSB)	42036 - H	Bit	0	1	R/W	Refer Table 46 &Table 53
40	ASP3 Function for Channel 2 - 1 (MSB- LSB)	42573 - H	Bit	0	1	R/W	Refer Table 46 &Table 52
41	ASP3 type for Channel 2 - 1 (MSB- LSB)	42575 - H	Bit	0	1	R/W	Refer Table 46 &Table 53
42	ASP4 Function for Channel 2 - 1 (MSB- LSB)	42577 - H	Bit	0	1	R/W	Refer Table 46 &Table 52
43	ASP4 type for Channel 2 - 1 (MSB- LSB)	42579 - H	Bit	0	1	R/W	Refer Table 46 &Table 53
44	CSP type for Channel 2 - 1 (MSB- LSB)	42038 - H	Bit	0	1	R/W	Refer Table 46 &Table 53
45	Retransmission Type 1- 2	42040	Integer	0	4	R/W	Refer Table 54
46	Retransmission Direction for Retransmission 2 - 1 (MSB- LSB)	42044	Bit	0	1	R/W	ReferTable 55
47	Retransmission 1 - 2 Mapping for Channel 2 - 1	42045	Integer	-	-	R/W	Refer Table 47
48	Retransmission Value for Retransmission 2 - 1 (MSB- LSB)	42057	Bit	0	1	R/W	Refer Table 56
49	Retransmission Open Sensor for Retransmission 2 - 1 (MSB- LSB)	42058	Bit	0	1	R/W	Refer Table 49
50	Machine ID	42059	Integer	1	247	R/W	
51	Baud Rate COM 1	42060	Integer	0	1	R/W	Refer Table 57
52	Parity COM1	42061	Integer	0	2	R/W	Refer Table 58
53	Baud Rate COM 2	42062	Integer	0	1	R/W	Refer Table 57
54	Parity COM2	42063	Integer	0	2	R/W	Refer Table 58
55	Ethernet IP address 1 - 2	42064	Integer	0	255	R/W	-
56	Ethernet IP address 3 - 4	42065	Integer	0	255	R/W	-
57	Subnet Mask for Ethernet 1 - 2	42066	Integer	0	255	R/W	-
58	Subnet Mask for Ethernet 3 - 4	42067	Integer	0	255	R/W	-
59	Gateway for Ethernet 1 - 2	42068	Integer	0	255	R/W	-
60	Gateway for Ethernet 3 - 4	42069	Integer	0	255	R/W	-
61	Time Out	42084	Integer	10	100	R/W	-
62	Filter	42085	Integer	0	9	R/W	-
63	Periodic Logging Enable	42086 – L	Integer	0	1	R/W	Refer Table 59
64	Event Logging Enable	42086 - H	Integer	0	1	R/W	
65	Event Log Channel mapping for Channel 2 - 1 (MSB- LSB)	42087 – H	Bit	0	1	R/W	Refer Table 47
66	Periodic Log Mode	42089 - L	Integer	0	1	R/W	Refer Table 60
67	Event Log Mode	42089 - H	Integer	0	1	R/W	
68	Periodic Memory Reset	42090 - L	Integer	0	1	R/W	Refer Table 47
69	Event Memory Reset	42090 - H	Integer	0	1	R/W	
70	RTC - Hour	42091	Integer	0	23	R/W	-
71	RTC - Minute	42092	Integer	0	59	R/W	-
72	RTC - Second	42093	Integer	0	59	R/W	-
73	RTC - Date	42094	Integer	1	31	R/W	-
74	RTC - Month	42095	Integer	1	12	R/W	-
75	RTC - Year	42096	Integer	1	255	R/W	-
76	Periodic Log time – Hour	42097	Integer	0	23	R/W	-
77	Periodic Log time – Minute	42098	Integer	0	59	R/W	-
78	Periodic Log time - Second	42099	Integer	0	59	R/W	-
79	Periodic Log Channel mapping for Channel 2 - 1 (MSB- LSB)	42177 – H	Bit	0	1	R/W	Refer Table 47

Table 43 Holding Registers Parameters – Part 3 and Calibration Registers Parameters

Sr. No	Parameter Description	Modbus Address	Parameter Type	Min Value	Max Value	Access	Remarks
80	Ambient calibration	42101	Integer	-10.0	65.0	W	-
81	Ch –1 – CALZ	42102	Integer	-	-	W	Refer Table 44
82	Ch –2 – CALZ	42103	Integer	-	-	W	
83	Ch –1 – CALS	42126	Integer	-	-	W	
84	Ch –2 – CALS	42127	Integer	-	-	W	
85	Retransmission 1 RTRZ	42150	Integer	-	-	W	-
86	Retransmission 2 RTRZ	42151	Integer	-	-	W	
87	Retransmission 1 RTRS	42158	Integer	-	-	W	-
88	Retransmission 2 RTRS	42159	Integer	-	-	W	
89	Password 1 for program mode	42166	Integer	0	9999	R/W	-
90	Password 2 for Configuration mode	42167	Integer	0	9999	R/W	-
91	Password 3 for Calibration mode	42168	Integer	0	9999	R/W	-
92	Password 4 for Security mode	42169	Integer	0	9999	R/W	-
93	Factory reset parameter	42170	Integer	0	2	R/W	Refer Table 61
94	Watchdog Mapping	42175	Integer	0	32	R/W	Refer Table 15
95	Watchdog Output	42176	Integer	0	1	R/W	Refer Table 62
96	Linearization Percent Step 1(LP01) – Channel 1	42581	Integer	0	100	R/W	-
97	Linearization Percent Step 2(LP02) – Channel 1	42582	Integer	0	100	R/W	-
98	Linearization Percent Step 3(LP03) – Channel 1	42583	Integer	0	100	R/W	-
99	Linearization Percent Step 4(LP04) – Channel 1	42584	Integer	0	100	R/W	-
100	Linearization Percent Step 5(LP05) – Channel 1	42585	Integer	0	100	R/W	-
101	Linearization Percent Step 6(LP06) – Channel 1	42586	Integer	0	100	R/W	-
102	Linearization Percent Step 7(LP07) – Channel 1	42587	Integer	0	100	R/W	-
103	Linearization Percent Step 8(LP08) – Channel 1	42588	Integer	0	100	R/W	-
104	Linearization Percent Step 9(LP09) – Channel 1	42589	Integer	0	100	R/W	-
105	Linearization Percent Step 10(LP10) – Channel 1	42590	Integer	0	100	R/W	-
106	Linearization Range Step 1(LR01) – Channel 1	42591	Integer	-1999	9999	R/W	-
107	Linearization Range Step 2(LR02) – Channel 1	42592	Integer	-1999	9999	R/W	-
108	Linearization Range Step 3(LR03) – Channel 1	42593	Integer	-1999	9999	R/W	-
109	Linearization Range Step 4(LR04) – Channel 1	42594	Integer	-1999	9999	R/W	-
110	Linearization Range Step 5(LR05) – Channel 1	42595	Integer	-1999	9999	R/W	-
111	Linearization Range Step 6(LR06) – Channel 1	42596	Integer	-1999	9999	R/W	-
112	Linearization Range Step 7(LR07) – Channel 1	42597	Integer	-1999	9999	R/W	-
113	Linearization Range Step 8(LR08)	42598	Integer	-1999	9999	R/W	-

	– Channel 1						
114	Linearization Range Step 9(LR09) – Channel 1	42599	Integer	-1999	9999	R/W	-
115	Linearization Range Step 10(LR10) – Channel 1	42600	Integer	-1999	9999	R/W	-
116	Linearization Percent Step 1(LP01) – Channel 2	42601	Integer	0	100	R/W	-
117	Linearization Percent Step 2(LP02) – Channel 2	42602	Integer	0	100	R/W	-
118	Linearization Percent Step 3(LP03) – Channel 2	42603	Integer	0	100	R/W	-
119	Linearization Percent Step 4(LP04) – Channel 2	42604	Integer	0	100	R/W	-
120	Linearization Percent Step 5(LP05) – Channel 2	42605	Integer	0	100	R/W	-
121	Linearization Percent Step 6(LP06) – Channel 2	42606	Integer	0	100	R/W	-
122	Linearization Percent Step 7(LP07) – Channel 2	42607	Integer	0	100	R/W	-
123	Linearization Percent Step 8(LP08) – Channel 2	42608	Integer	0	100	R/W	-
124	Linearization Percent Step 9(LP09) – Channel 2	42609	Integer	0	100	R/W	-
125	Linearization Percent Step 10(LP10) – Channel 2	42610	Integer	0	100	R/W	-
126	Linearization Range Step 1(LR01) – Channel 2	42611	Integer	-1999	9999	R/W	-
127	Linearization Range Step 2(LR02) – Channel 2	42612	Integer	-1999	9999	R/W	-
128	Linearization Range Step 3(LR03) – Channel 2	42613	Integer	-1999	9999	R/W	-
129	Linearization Range Step 4(LR04) – Channel 2	42614	Integer	-1999	9999	R/W	-
130	Linearization Range Step 5(LR05) – Channel 2	42615	Integer	-1999	9999	R/W	-
131	Linearization Range Step 6(LR06) – Channel 2	42616	Integer	-1999	9999	R/W	-
132	Linearization Range Step 7(LR07) – Channel 2	42617	Integer	-1999	9999	R/W	-
133	Linearization Range Step 8(LR08) – Channel 2	42618	Integer	-1999	9999	R/W	-
134	Linearization Range Step 9(LR09) – Channel 2	42619	Integer	-1999	9999	R/W	-
135	Linearization Range Step 10(LR10) – Channel 2	42620	Integer	-1999	9999	R/W	-
136	Linearization Enable	42621	Integer	0	3	R/W	Bit 0 for Channel 1 and Bit 1 for Channel 2

Table 44 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	J-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	n.120	-70.0	210.0	0.1°C
-10 TO 20 mV	12	0 x 0C	-10.20	-1999	9999	1 Count
0 to 100 mV	13	0 x 0D	0-100	-1999	9999	
4 to 20 mA	14	0 x 0E	4-20	-1999	9999	
0 to 20 mA	15	0 x 0F	0-20	-1999	9999	
0 to 5 V	16	0 x 10	0-5u	-1999	9999	
1 to 5 V	17	0 x 11	1-5u	-1999	9999	
0 to 10 V	18	0 x 12	0.10u	-1999	9999	

Table 45 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 – 2	Channel – 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

Table 46 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	ASP3 Function		ASP3 Function
Modbus Address	42573		42574
Parameter	ASP3 Type		ASP3 Type
Modbus Address	42575		42576
Parameter	ASP4 Function		ASP4 Function
Modbus Address	42577		42578
Parameter	ASP4 Type		ASP4 Type
Modbus Address	42579		42580
Parameter	CSP Type		CSP Type
Modbus Address	42038		42039
Parameter	Log Channel		Log Channel
Modbus Address	42087		42088

Table 47
Parameter Applicability Selection

Modbus Index	Parameter value
0	NO
1	YES

Table 48
CJC Selection

Modbus Index	Parameter value
0	ACJC
1	FCJC
2	CCJC

Table 49
Open Sensor Selection

Modbus Index	Parameter value
0	DOWN
1	UP

Table 50
Alarm Latch Selection

Modbus Index	Parameter value
0	OFF
1	ON

Table 51
DO (Digital Output) Logic Selection

Modbus Index	Parameter value
0	NORMAL
1	FAIL SAFE

Table 52
Set Point Function Selection

Modbus Index	Parameter value
0	ALARM
1	TRIP

Table 53
Set Point Type Selection

Modbus Index	Parameter value
0	LOW
1	HIGH

Table 54
Retransmission 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 55
Retransmission Direction Selection

Modbus Index	Parameter value
0	REVERSE
1	DIRECT

Table 56
Retransmission Value Selection

Modbus Index	Parameter value
0	MINIMUM
1	MAXIMUM

Table 57
COM Port Baud Rate Selection

Modbus Index	Parameter value
0	9600
1	19200
2	57600

Table 58
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

Table 59 Logging Enable Selection	
Modbus Index	**Parameter value**
0	STOP
1	START

Table 60 Log Mode Selection	
Modbus Index	**Parameter value**
0	HOLD
1	OVERLAP

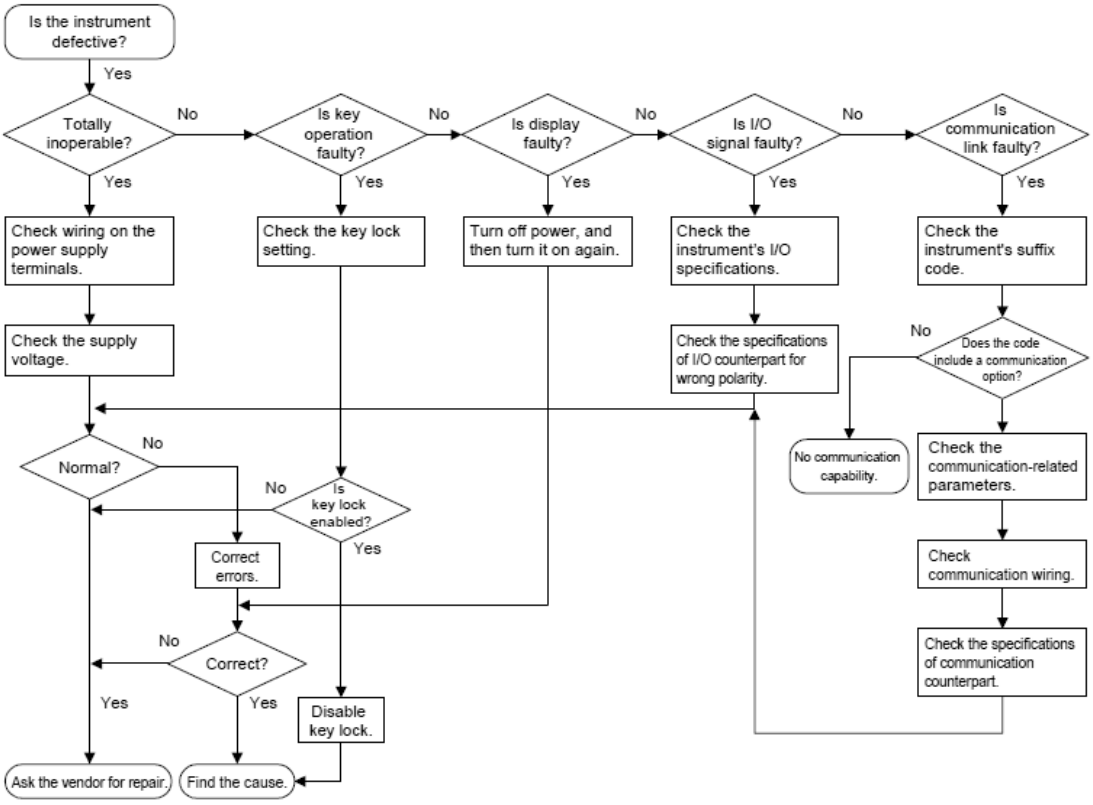
Table 61 Factory Reset Parameters	
Modbus Index	**Parameter value**
0	Calibration Values
1	Parameters Values
2	All Values

Table 62 WatchDog Output	
Modbus Index	**Parameter value**
0	Disable
1	Enable

11. TROUBLESHOOTING

If the operating display does not appear after turning on the ENHANCED BARGRAPH INDICATOR '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 63 PV Status during Burn Out Condition

Input type	Display Message	Bar Display
E	OPEN(oPEn)	1 to 100 LEDs will blink, 101st LED will be 'OFF'
J	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
K	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
T	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
B	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
R	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
S	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
N	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
RTD	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
CU53	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
NI120	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
-10 to 20mV	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
0 to 100 mV	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
4 to 20mAmp	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
0 to 20mAmp	PV LOW	No LED will blink **OR** 'ON' if PV value is greater or equal to 1 % of total range
0 to 5V	PV LOW	No LED will blink **OR** 'ON' if PV value is greater or equal to 1 % of total range
1 to 5V	OPEN	1 to 100 LEDs will blink, 101st LED will be 'OFF'
0 to 10V	PV LOW	No LED will blink **OR** 'ON' if PV value is greater or equal to 1 % of total range

Note: If set PV_low/PV_high for input type is less then maximum value of zero and span, then process value will display readings upto Over / Under % range(Over and Under % range is user settable) of display range(User set PV_High / PV_Low), then after it will show ouEr/Undr (OVER/UNDER) message until value crosses maximum value of Sensor range. **Note that** , for "over" message, 1 to 100 LEDs of bar display will blink and 101st LED will be "OFF". For "under" message, 1 to 100 LEDs of bar display will be "OFF" and 101st LED will be "ON". If process value is greater than maximum value of zero/span then display will show oPEn (OPEN) message. **Note that,** for PV readings below PV Low value and upto minimum possible range of zero, bar display will behave same as of "under" reading. And for PV readings above PV High value and upto maximum possible range of span, bar display will behave same as of "over" reading. Retransmission o/p (Optional) will follow Over / Under % range of display range. When PV value shows Over /Under message , retransmission o/p holds the same value of the last state which was occurred before Over / Under condition . When the process value is OPEN then retransmission o/p will be depends upon OPEN sensor selection . In case of linear inputs scaling is applied then during OPEN sensor condition it may not show oPEn (OPEN) message , instead it will show either ouEr/Undr (OVER/UNDER).

- **RETRAMISSION OUTPUT TABLE FOR OPEN /OVER /UNDER CONDITION (Optional):**

Table 64 Retransmission Output during Open/Over/Under Condition

RETRASMISSION	VARIABLE	SCALE	ACTION	OPEN	OVER	UNDER	ERROR
4-20mamp	PV	UP	DIR	20.8	Holds the last value of retransmisison o/p	Holds the last value of retransmisison o/p	-
	PV	DOWN	REV	20.8	Holds the last value of retransmisison o/p	Holds the last value of retransmisison o/p	-
	PV	UP	REV	3.2	Holds the last value of retransmisison o/p	Holds the last value of retransmisison o/p	-
	PV	DOWN	DIR	3.2	Holds the last value of retransmisison o/p	Holds the last value of retransmisison o/p	-

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

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

APPENDIX – B HOW TO FETCH HISTORICAL DATA?

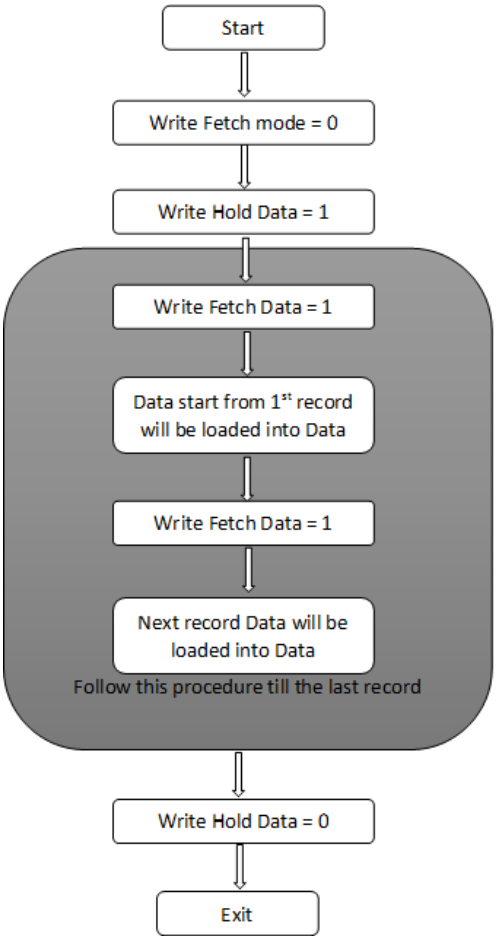
- **HOW TO FETCH HISTORICAL DATA :**

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.

Records per page = (Integer) (256 / Total Bytes in 1 record)

- Example for Fetching data :

Example 1 :

If we have selected 8 channels for periodic data logging so that
Total Bytes in 1 record = 12 + (2 * 8) = 28
Record Per page = 256 / 28 = 9(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
Total Bytes in 1 record = 12 + (2 * 24) = 60
Record Per page = 256 / 60 = 4(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.

2. <u>For Event Logging:</u>

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 Periodic Records	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 menner data registers will be filled with 7- 7records.
11. After all data fetch Write Hold Event Data = 0.

REVISION HISTORY :

1. **Version No. 01:**

   - Linearization Specification added.
   - Linearization parameter added in Menu parameters.
   - Linearization note added in calibration procedure.
   - Modbus parameters for Linearization added.

2. **Version No. 02:**

   - Back Plate Wiring Details are added.

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