OPERATING MANUAL
OF
ANALOG TO SERIAL CONVERTER
SMIT-1726

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CHAPTER 1

1.1 INTRODUCTION

- This is an Analog to Serial Converter Unit.
- It is used for Centralised Monitoring of plant parameters.
- It is based on a popular 8-bit Microcontroller.
- The unit has:
  - 0.56" 4 Digit 7-Segment Red LED Display
  - The unit has 2 Discrete LEDs for Analog Input status Indication.
  - The unit has 2 Discrete LEDs for Serial Communication Indication.
- The system is designed to have up to Four Channel Analog Inputs and RS-232/485 Serial (Modbus)

1.2 SPECIFICATIONS

1	Power Supply	110-230V AC +/- 10% or Single Phase, 50 Hz Nominal 24VDC (factory configured)
2	Key board	4 keys keypad
3	Display	0.56" 4 Digit 7-Segment Red LED Display
4	Analog Inputs	4-20 mA(Up to 4 Channels)
5	Serial Interface	RS-232/485 (Modbus)
6	Enclosure	General purpose, DIN Rail/Wall Mounting Made up of Plastic /Polycarbonate
7	Dimensions	70mm(W)*75mm(H)*110mm(D)

CHAPTER 2

2.1 SYSTEM DESCRIPTION

This is Microcontroller based unit with 4 Analog Inputs and 7-Segment Red Led Display. It is DIN Rail mount unit supplied in an industry standard size.

2.2 HARDWARE DESCRIPTION

Construction of the instrument is Modular. It consists of:

- CPU CARD
- POWER SUPPLY CARD
- ENCLOSURE
- FRONT PANEL (KB/DISPLAY)

2.2.1 CPU CARD

- It is based on microcontroller.
- The configuration data is stored in non-volatile RAM.
- Battery is not required for retention of data.
- Watch dog circuit is also incorporated on the CPU card to prevent malfunctioning of the system due to external noise thro' power supply or any other source. If the CPU starts malfunctioning, the watch dog circuit resets it and system will be brought to it's Power On status.
- The card is Connected With Power Supply Card and Display Card by FRC Cable and It is slide in enclosure
- This card accepts up to 4 Channel Analog Inputs.
- 16-bits ADCs are used for each channel

2.2.2 POWER SUPPLY CARD

- This is an SMPS.
- It accepts 110-230V AC as inputs.
- It provides regulated DC voltages to the system.
- The card is connected with CPU Card and Display Card by FRC Cable and It is slide in enclosure.

2.2.3 ENCLOSURE

- The unit is supplied in Plastic/Polycarbonate enclosure.
- It is DIN Rail mounting type DIN standard enclosure.
- Outer dimensions are: 70mm (W) x75mm (H) x 110 (D) mm.

2.2.4 FRONT PANEL

- Keypad with 4 keys is fixed on the front panel.
- On the Front there is window for 7-Segment LED Display and status Indication LEDs.

2.3 INSTALLATION GUIDE

- Unpack the instrument from the packing box carefully.
- Mount the instrument in the panel Using Din Rail.
- All the electrical connections to be done at the back panel of the unit using spade lugs. Refer the Appendix for back panel layout.
- Make sure that no wire is connected loosely to avoid generation of spark and RFI. Connect mains cord on the back panel on the Phase, Neutral and Earth terminals.
- Instrument is factory configured for power supply of 110-230VAC or 24VDC
- Earth the instrument properly.
- Some of the contacts are powered. Hence don't touch any terminal directly when power is applied to the instrument. Whenever any connection is to be made or removed from the unit, always switch off the power.

CHAPTER 3

3.1 OPERATING DETAILS

The following paragraphs give detailed description of how to operate the unit. For efficient use of the instrument one must study and understand this section.

3.2 DISPLAY & KEYBOARD

The unit has 4 digit 7-Segment LED Display. It has keypad with 4 keys organized as 4 x 1 Matrix.

List of keys and their functions:

KEYS	FUNCTION
INDEX	'INDEX' key: Use this key to view and Modify Parameters
→	'DIGIT SELECT' key: Use this key for Digit Select
↑	'INCREMENT' Key: Use this key to Increment Selected Digit Value
ENTER	'ENTER' key: Use this to save Parameter Value.

3.3 EDIT MODE

In this mode user can view and/or modify various parameters.
One can perform this mode only when the instrument is in 'STOP' mode.

3.3.1 LIST OF PARAMETERS:

User can set following parameter in the SMIT-1726 Unit:

INDEX	PARAMETER NAME	PASSWORD
1	Calibration Zero 1 (CLZ1)	1234
2	Calibration Span 1 (CLS1)	1234
3	Output Zero (OUTZ)	1234
4	Output Span (OUTS)	1234
5	Calibration Zero 2 (CLZ2)	1234
6	Calibration Span 2 (CLS2)	1234
7	Calibration Zero 3 (CLZ3)	1234

8	Calibration Span 3 (CLS3)	1234
9	Calibration Zero 4 (CLZ4)	1234
10	Calibration Span 4 (CLS4)	1234
11	Zero 1 (ZR1)	1234/0101
12	Full Scale 1 (FS1)	1234/0101
13	Zero 2 (ZR2)	1234/0101
14	Full Scale 2 (FS2)	1234/0101
15	Zero 3 (ZR3)	1234/0101
16	Full Scale 3 (FS3)	1234/0101
17	Zero 4 (ZR4)	1234/0101
18	Full Scale 4 (FS4)	1234/0101
19	Decimal Point (DP)	1234/0101
20	Unit No (U-NO)	1234/0101
21	Baud Rate (BAUD)	1234/0101
22	Full Scale Output (OP-FS)	1234/0101

To change any parameter value, Press ‘INDEX’ Key. The Password page will be displayed.

- Press ‘DIGIT SELECT’ key, First digit will flash.
- Set Password: 1234 Using ‘INCREMENT’ Key and ‘DIGIT SELECT’ Key.
- Once correct value is set, Press ‘ENTER’ Key.

User can go to Above Parameters one by one by pressing ‘INDEX’ key:

- User can set Zero Value For Channel 1 in ZR1 Parameter
- User can set Full Scale For Channel 1 in FS1 Parameter
- User can set Zero Value For Channel 2 in ZR2 Parameter
- User can set Full Scale For Channel 2 in FS2 Parameter
- User can set Zero Value For Channel 3 in ZR3 Parameter
- User can set Full Scale For Channel 3 in FS3 Parameter
- User can set Zero Value For Channel 4 in ZR4 Parameter
- User can set Full Scale For Channel 4 in FS4 Parameter
- User can set desired Decimal Point :0/0.1/0.01 in DP Parameter
- User can set desired Baud Rate :4800/9600/19200 in Baud Rate Parameter
- User can set desired Unit No : 1 to 32 in Unit No Parameter

HOW TO CHANGE PARAMETER VALUES?

To change set value of any of the above parameter, user needs to go to desired parameter after entering correct password.

- Once desired parameter is selected, press 'DIGIT SELECT' key to allow Edit. Digit will start flashing
- Set desired value of parameter by using 'DIGIT SELECT' key and 'INCREMENT' Key
- Once desired value is set, Press "ENTER" Key. New value will be saved against selected parameter.

NORMAL MODE OF OPERATION:

Whenever Mains is switched on to the unit,

It indicates Process Value.

Process Value = ((ADC Data – Cal Zero Value) / (Cal Span Value – Cal Zero Value)) *(Full Scale Value +Zero Value)

3.4 ANALOG INPUT CALIBRATION

The Instrument is calibrated at the factory. For any reason, if re-calibration is required follow the procedure as defined below.

The Zero and Full-scale values are stored in NVRAM. The calibration is allowed only in Engineer's Password mode.

- Switch on the instrument and allow 15 minutes of warm up time before starting calibration.

- Take a standard source. Apply output of the source to the input Terminals No.18 and Terminal No.19 of the Unit.

CHANNEL 1 ZERO CALIBRATION:

- Press'INDEX'Key So PASS Parameter will be Display
- Enter Engineers: Password '1234' Using 'DIGIT SELECT 'Key & 'INCREMENT 'Key
- Press 'INDEX' key After Entering this Password
- The Parameter 'CLZ1 ' for Zero will be displayed
- Now Apply 4 mA from External Source

- Actual row counts of ADC will be displayed
- Allow the reading to Settle, Press 'ENTER' Key
- This count will be stored as Zero/Offset reading

CHANNEL 1 SPAN CALIBRATION:

- Press'INDEX'Key So PASS Parameter will be Display
- Enter Engineers: Password '1234' Using 'DIGIT SELECT 'Key & 'INCREMENT 'Key
- Press 'INDEX' key two times After Entering this Password
- The Parameter 'CLS1' for Span will be displayed
- Now Apply 20 mA from External Source
- Actual row counts of ADC will be displayed
- Allow the reading to Settle, Press 'ENTER' Key
- This count will be stored as Span/ Full Scale

➢ Apply Same Procedure For Channel 2,Channel 3 & Channel 4 Calibration

➢ When Calibration is Complete Check linearity of the instrument by applying different Input.

➢ If ZR 1=000.0 & FS1=100.0 then Process Value is linearly vary from 000.0 to 100.0 Proportional to Analog Input 4-20Ma.

CHAPTER 4

4.1 TERMINAL DETAILS

PIN NO	DESCRIPTION	
1	RXD	SERIAL RS-232
2	TXD	
3	GND	
4	-----	NOT USE
5	-----	
6	-----	
7	-----	
8	-----	
9	-----	
10	PHASE	MAIN SUPPLY 230VAC
11	NEUTRAL	
12	EARTH	
13	-----	NOT USE
14	-----	
15	-----	
16	-----	
17	COMMON	ANALOG INPUT 4-20mA
18	CH 1 I/P+	
19	CH 2 I/P+	
20	CH 3 I/P+	
21	CH 4 I/P+	
22	-----	NOT USE
23	-----	
24	-----	

CHAPTER 5

5.1 SERIAL COMMUNICATION DETAILS

Refer Terminal Details for Serial Cable Connection.

How to Test:

To test serial interface, you may use MODSCAN32.EXE utility.

Settings:

- Set Device Address = 1
- Set Data type= Holding Register
- Set Start Address=1
- Set Length = 15
- BAUD RATE = 9600
- Set Proper COM Port
- Set Data Format= Decimal
- Now click on 'Connect' button.

5.2 MODBUS PARAMETER LIST:

Reg. No.	Parameter	Function
40001	Zero 1	Read/Write the Zero Value of channel 1
40002	SF 1	Read/Write the Full scale Value of channel 1
40003	Zero 2	Read/Write the Zero Value of channel 2
40004	SF 2	Read/Write the Full scale Value of channel 2
40005	Zero 3	Read/Write the Zero Value of channel 3
40006	SF 3	Read/Write the Full scale Value of channel 3
40007	Zero 4	Read/Write the Zero Value of channel 4
40008	SF 4	Read/Write the Full scale Value of channel 4
40009	DP	Read/Write the DP Value
40010	RL 1 SP	Not Used
40011	RL 2 SP	Not Used
40012	Process variable 1 (Flow 1)	Read the Process variable of channel 1
40013	Process variable 2 (Flow 2)	Read the Process variable of channel 2
40014	Process variable 3 (Flow 3)	Read the Process variable of channel 3
40015	Process variable 4 (Flow 4)	Read the Process variable of channel 4

CHAPTER 6

6.1 SALES & SERVICE

When you face any issue while installation, calibration or using the Indicator, you may contact:

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