TEMPERATURE SCANNER

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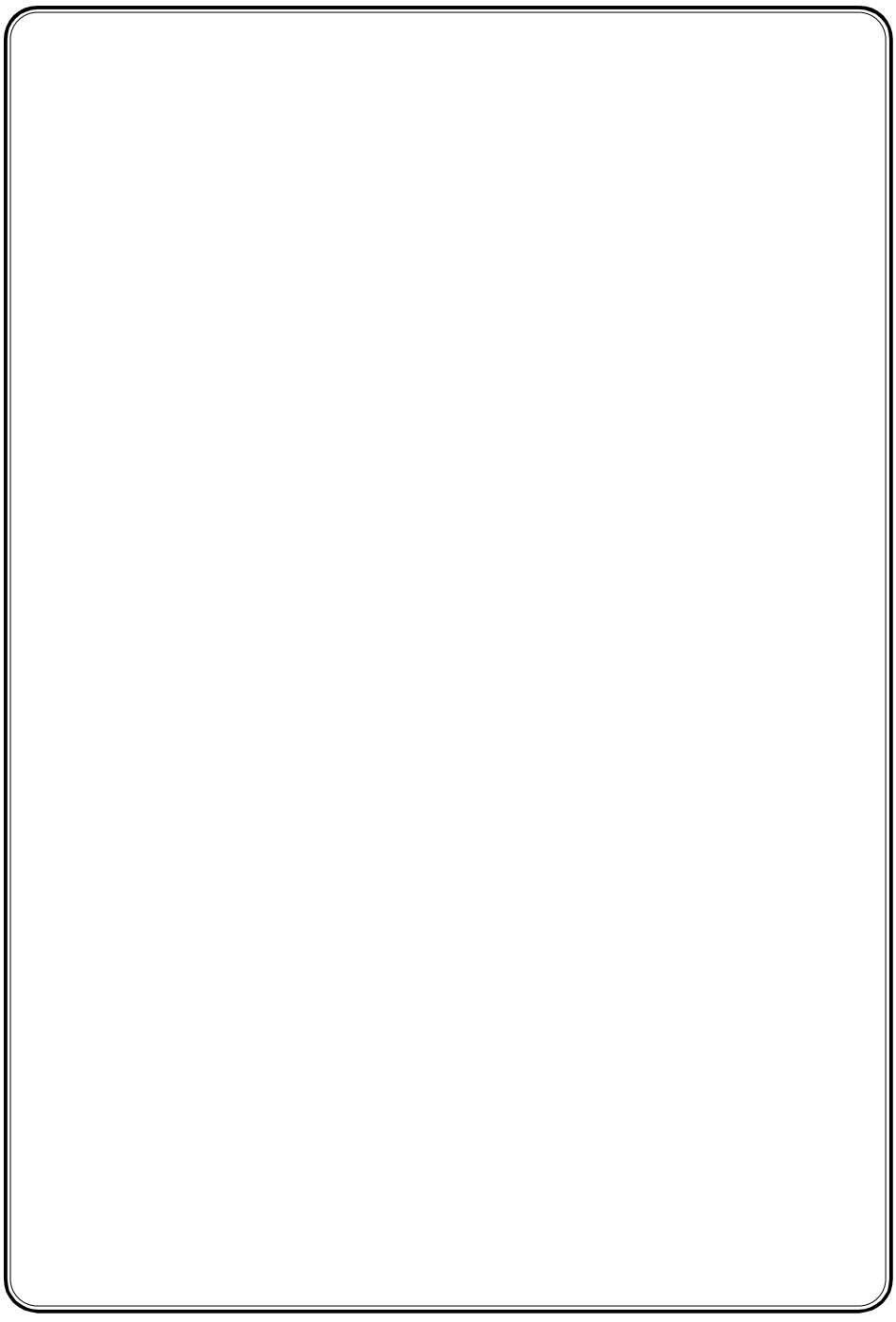
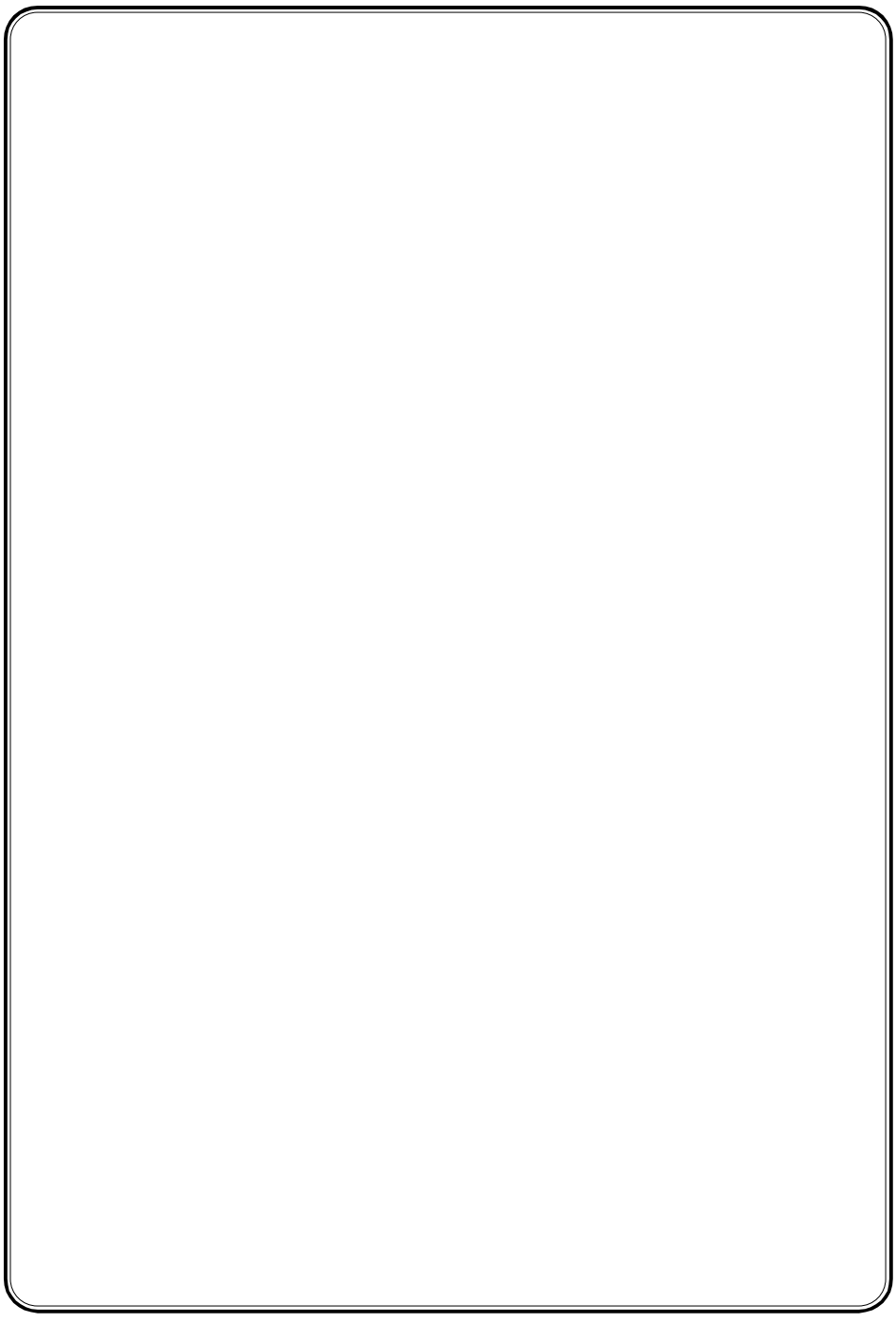


INDEX



TEMPERATURE SCANNER

1. General Description

ICD'S flash controller based Temperature Scanner is a compactly fabricated instrument to suit the required condition specified by the end user. The best quality components,highly reliable design (digital calibration , front key pad assembly) adds the scanner from angle of maintenance. The use of microcontroller gives the reliable trouble free and drift free operation with its supporting IC's. The RF noise filter used across the supply voltage protects the electronic circuitry from external surge.

The scanner has single printed circuit board assembled with required functional aspects such as A/D conversion, linearisation, control outputs and also the input / output leads are terminated in PCB form. The internal connections are made through FRC (Flat ribbon cable) connectors which gives good rugged contact and reduces excessive wiring.

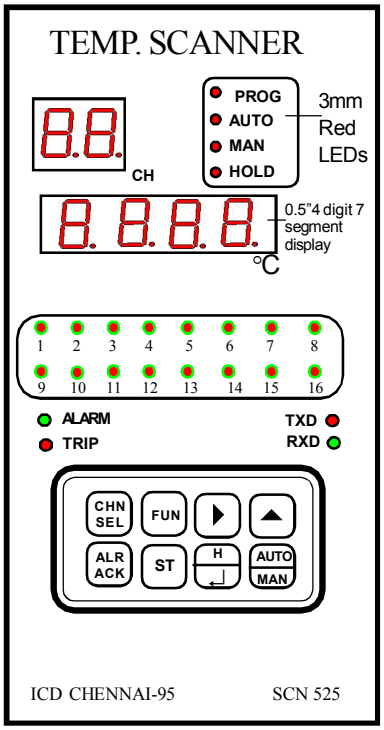
The front poly carbide sticker replaces metal engraving plates, ordinary PVC stickers and ensures longer life by unfading, easy washing and also protects dust entry inside the instrument. The front sticker is designed in such a way that almost all the operational sequence is read from the sticker and remaining is through the operating manual.

In display window, the first two digits display the channel number, which is a permanent display. The next four digit displays the process value (also displays the open sensor detection or over range indication).

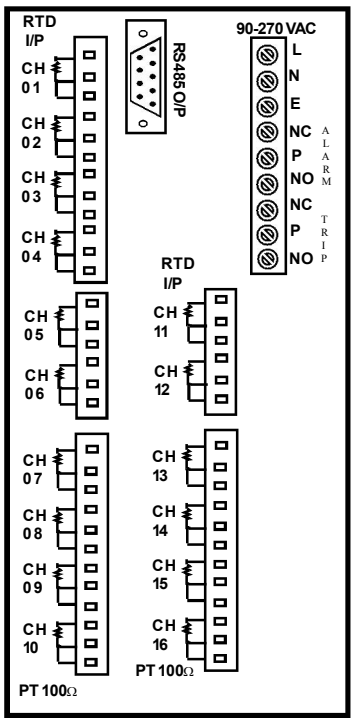
The entire electronic circuit is mounted in sheet metal casing of Box Dimension 192(H) x 96(W) x 250(D)mm

2.Front and Back Panel Details

FRONT PANEL:



BACK PANEL:



The Front facia of scanner is provided with

1. 2 digit, 0.5" 7 segment red LED to indicate Channel Number & 4 digit, 0.5" 7 segment red LED to indicate Process value or parameters depending on run mode or program mode.
2. 16 No's of 3mm bicolour LED to indicate Alarm and trip status(Green indication for Alarm, Red indication for Trip)
3. 4 Nos of 3 mm red LED to indicate mode status (Auto/manual, program & Hold modes)
4. 2x4 matrix keypad is used to view the parameters and to configure various items in the program mode. In Run mode, these keys are used to select the respective parameters as labelled on the key.

The Back Terminal of scanner is provided with

1. Ch1 to Ch16 terminals are assigned for RTD PT100Ω Input.
2. Two Relays provided one for alarm status and another one is trip status
3. Seperate terminals are provided for Auxiliary supply of 90-270VAC.
4. 9 pin D' Connector (female) is provided for Communication output.

2.1 Key Description :

Keys	Program mode	Normal operating mode
CHN SEL	Channel Selection	Channel Selection in Manual Mode
FUN	To select the parameter of selected channel	---
▶	Shift key to move between digits	---
▲	Increment key to change the selected digit	---
ALR ACK	---	To acknowledge the Alarm Relay
ST	To set the Scan Time	---
H ↵	Enter Key to store the changes	Hold Key to Hold the channel & its value in auto mode
AUTO MAN		To toggle between Auto and Manual mode

3. Programming Instructions

All meters are to be programmed properly to work in a particular Installation. The various items that are to be programmed are shown in the table below.

Configuration Item	**Range**
Low set	between Range Low & High
High set	between Range Low & High
Scan Time	00 - 99 sec
Channel	Select / Pause

3.1 Program Mode :

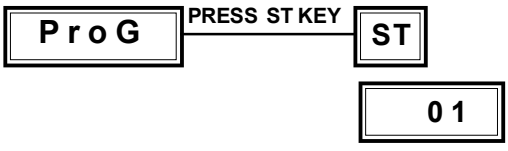
With power applied to the meter hold in the shift and Incr keys together for 3 seconds. The display Indicates Program mode. As

a. pressing 'ST' key enables user to set the scan time, (or)

b. Pressing 'CH SEL' key enables user to program the respective channel, by selecting the parameters using 'FUN' key.

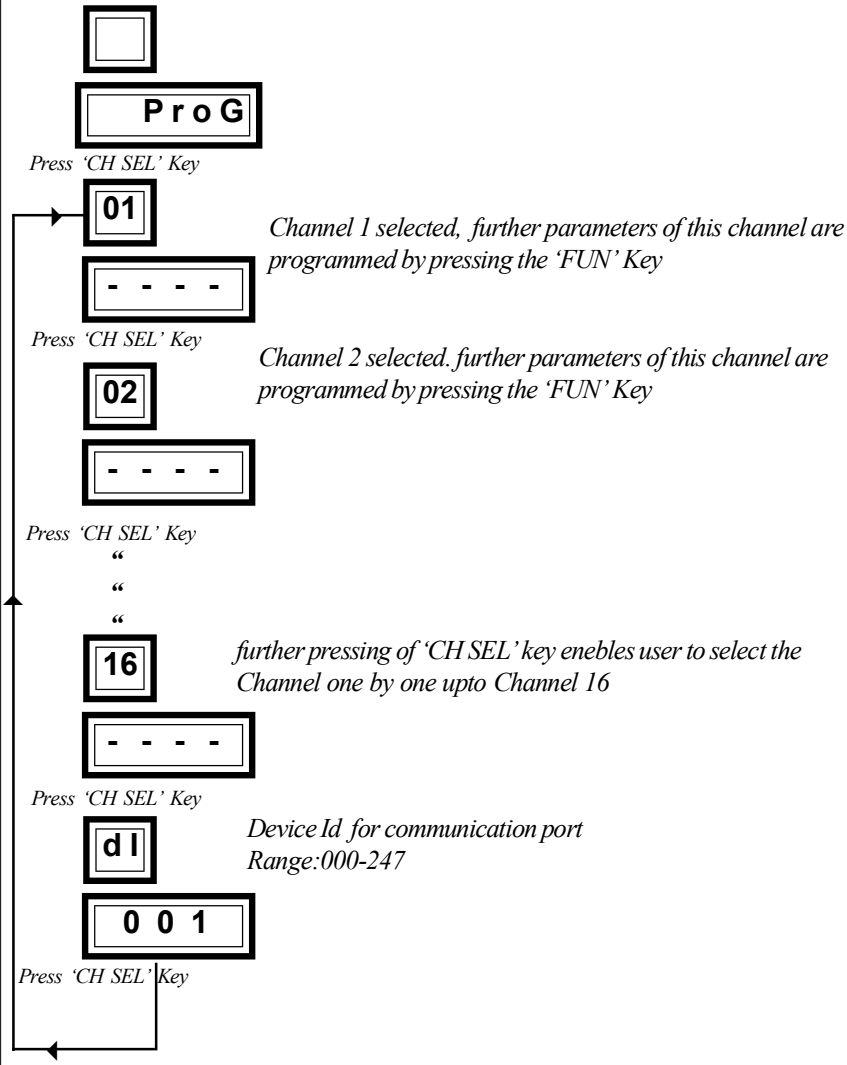
3.1.1. Scan Time Setting

Scan Interval : for continous scanning of the process value of the selected channel (automode) at the interval mentioned in the Scan Time menu. It can be programmed in the range of 00 - 99 seconds, by pressing 'ST' key in Program mode.



3.1.2 Programming the parameters

The configuration Items can be selected by pressing the 'CH SEL' key Heading displays are used to differentiate the various configuration items.



Further Parameters of the channels are selected using 'FUN' key. For example, the parameter programming of Channel 1 is shown as below

P r o G

PRESS FUN **KEY**

0.1 *Low setpoint for Alarm*

100.1 *Range 000.0-200.0*

PRESS FUN **KEY**

01. *High setpoint for Trip*

100.1 *Range 000.0-200.0*

PRESS FUN **KEY**

01 *first channel SEL/PAUSE*

S E L *SEL/PAU can be selected using Shift or Increment Key , Press Enter key to store the changes*

PRESS FUN **KEY**

E - A d **01** *first channel Error affustment*

Enter key is used to store the modification. Likewise the configuration items are programmed in all the channels as and when required. Changing configuration items is illustrated in the next topic

Note : 1. While selecting low set point decimal point appears in between the two digits of channel display window.

2. Similarly, for High set point the decimal point shifts next to the second digit.

4.Changing the configuration Items

After selecting the configuration item through Index key, It can be altered by using shift, Increment & Enter key. (Program mode)

The shift (▶) key is used to select the digit one by one. The selected digit is shown by flashing that digit.

The Increment (▲) key is used to increment the selected digit. The increment key Increments the digit from 0 to 9 (0 to 1 in MSD) and then wraps down to zero once again.

Once the required values are set in the configuration items press the Enter ↵ key to store it in memory. If the change is accepted the display Indicates 'E' otherwise an error message is displayed as 'Error'.

Once the configuration Items are programmed hold in the ▶ & ▲ keys together for 3 seconds to return back to normal operating mode.

5. Normal Operating Mode display pages

When power is applied to the instrument, it displays 'ICd-17' for few seconds and scrolls to indicate the Process of selected channel one by one. This is termed as run mode or normal operating mode. The auto mode is selected automatically when instrument is switched ON.

5.1 Auto/Manual Mode :

This can be selected by pressing 'MAN' key which toggles between auto mode and manual mode & are identified by means of LED indications too.

In auto mode, the selected channels are continously scanned at the scan rate & auto LED glows. Paused channels are not shown.

The manual mode, the selected channel & its process value are contiously indicated & Manual LED glows. Channel can be selected using 'CH SEL' key.

5.2 Hold Mode :

In auto mode, to hold the particular channel and its process value, 'H'(Hold) key is pressed & Hold LED glows. The same key is used for Holding & Releasing.

5.3 Program Mode :

Pressing Shift & Increment key together for few minutes enable the user to enter program mode & Program LED glows.

6. Functional Description

6.1.Control Function

Low set point
High set point

Below the set points no relay will be in energised condition ultimately no LED will be illuminated.

When the temperature exceeds the Low set point, Alarm relay energises with green colour flashing indication.

When the temperature exceeds the High set point, Trip relay energises with Red steady ON indication

When the temperature falls below the High set point minus **Hysteresisband*,** Trip relay de-energises and at the same time Red LED illumination goes OFF.

Alarm acknowledge key, de-energises the Alarm relay and at the same time Green flashing changes to green steady ON.

When the temperature falls below the Low set point Green LED illumination goes OFF.

Hysteresis band* is 5° C which is a factory set and cannot be alterable.

6.2. Open & Over Range :

Display shows open in the absence of Input. At open condition, all Status indicating LED goes OFF.

Display shows 'Or' Over range, when the ADC count excees the limits or the display exceeds 5 counts more than the Range High value

7. Communication Port Details

The **Temperature Scanner** is provided with a optically Isolated **RS 485** communication Port. It is an optional Feature and has to be specified at the time of ordering. The communication protocol used is **MOD BUS - RTU** Type. Using the communication Port, the meters can be connected in multi drop network and datas can be collected in a centralised control room using any standard **SCADA** Software.

The communication settings are,

Protocol	:	MOD BUS RTU
Baudrate	:	9600
Data bit	:	8
Stop bit	:	1
Parity	:	None
Communicating mode	:	Half Duplex

The address of the parameters are,

DATA		ADDRESS	ELEMENT
Process value	:	40001	16
Open Status	:	40017	08
Over Status	:	40025	08
Alarm Indication	:	40033	08
Alarm Ackowledge	:	40041	08
Trip	:	40049	08
Pause	:	40057	08
Low Set	:	40065	16
High Set	:	40081	16

EACH CHANNEL ONE ELEMENT 0.1 RESOLUTION

Data	Alarm	Trip
0	x	✓
1	x	✓
256	✓	x
257	✓	✓

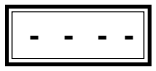
Note: ✓ Existing
x not Existing

8. Calibration Procedure

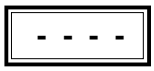
Calibration of the scanner is password protected, so as to protect from unauthorised entry. To select the calibration mode press shift & increment key together for few seconds .

The display shows

Enter the password 0486 using Shift, Increment &Enter keys. After entering the password 0486 which is a factory set password the display reads



which means Calibration Mode. Now press 'Ch SEL' key, so that the display reads



PRESS FUN **KEY**

Now feed 0° C from a standard source and wait for sometime till the ADC counts become stable & press enter key which complete the Zero scale calibration. Once again press 'FUN' key. The display reads

PRESS FUN **KEY**

Which means Full scale calibration. Now feed 200° C from a standard source and wait for sometime till the counts become stable & press enter key which completes the full scale calibration.

To calibrate further Channels, press 'CH SEL' key to select the channel and repeat the same procedure to perform calibration. After completion of calibration, to Exit from Calibration mode once again press Shift & Increment keys together to enter into Normal operating mode.

9.Technical Specification

Type	:	I**CD Microcontroller based Temperature Scanner**
No. of channels	:	16
Input	:	25 ohm to 40.6 ohm
Output	:	0 ° C to 150 ° C
Input	:	PT-100 ohm(RTD)
Indicating Resolution	:	0.1° C

Display

Display	:	a) 2 Digit 0.5" 7 segment red LED display for Channel No. indication b) 4 Digit 0.5" 7 segment red LED display for process Temperature indication
Open sensor detection	:	Provided
Over Range indication	:	Provided, display indicates **Or.**
Dwell Time	:	0 - 99 sec. Selectable thro' keypad (Scan time)
Data Entry	:	Thro' 2x4 matrix keypad available on the front facia

Functional Mode:

Function mode	:	Auto / Manual
Auto/Manual mode selection	:	Through keypad
Manual hold facility	:	Through keypad
Alarm acknowledge facility	:	Through keypad
Programmable Features	:	1. Alarm set point 2. Trip set point 3. Channel SEL/PAU 4. Scan Time

Control output

Output	:	Potential free contact
Contact rating	:	6 Amps, 230 VAC
Status indication	:	Available. Bicolour LED per channel for Alarm & Trip
Mains failure protection	:	A non- volatile memory chip is used to store all the data, which is undisturbed even under power failure conditions.
Aux. power supply	:	90-270V Ac 50 Hz
Box dimension	:	96(W) x 192(H) x 250(D) mm
Mounting	:	Panel

10. Commissioning Of Temperature Scanner

Before fixing the unit into the panel

* Thoroughly read the operating manual, if queries arised contact ICD's sales representative.
* Visualize the unit for any physical damage, which may caused during the transportation.
* If severely damaged, unpack the instrument and contact ICD's factory or its representative.
* After physical inspection, complete the external wiring and switch ON the unit for preliminary check (if necessary).
* The display page shows the Channel No & Process value.
* Program the required Setting parameters.
* After the complete satisfaction, fix the instrument into the panel and complete the external wiring.

Excess voltage can damage the instrument, lesser voltage can cause improper functioning.