

Warranty Certificate

This instrument is warranted against any manufacturing defects for a period of twelve months from the date of installation, or eighteen months from the date of supply, whichever is early.

Kindly note that:

1. *The warranty is limited to repairing the instrument and no responsibility is taken for any other damage resulted*
2. *The warranty will be void if the instrument is opened or tampered in any way*
3. *The faulty instrument has to be returned to our factory, carriage prepaid & duly insured.*

Product Category : Bar graph Indicator

Model No. : Sleek 9225BGI

Serial number : _____

Date of despatch : _____

Authorized signatory : _____

Company seal

BAR GRAPH INDICATOR

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Kindly forward this product manual to the end user. The user is requested to read the manual thoroughly before operating the instrument.

As you unpack

*Congratulations
on buying a
Programmable Temperature Controller!*

As you unpack kindly ensure that

1. The material received is in good condition
2. You have received the following material:
 - a) Programmable Temperature Controller as per your order
 - b) Mounting bracket pair
 - d) This manual along with Warranty certificate

In case of any discrepancies contact our customer support department immediately.

*We are sure you will get long and trouble free service
from our system.*

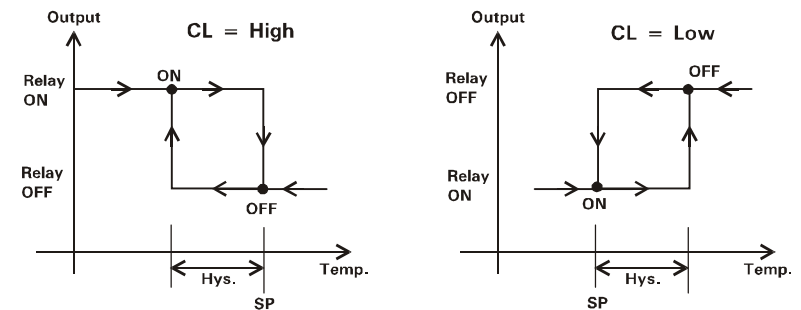


We need your feedback :

Every attempt is made to make this manual clear and easy to understand, so that the user can install, take care of and feel confident in using our product. We welcome your valued suggestions to help us improve this product as well as the document and make it more user friendly.

Important Terms

- 1) **Control Logic (CL) :** The logic for relay actuation, i.e.
 - a) *CL = High Control Action.* The control action is such that the process temperature must not go above the setpoint. Process value < Setpoint Relay ON
This is generally used in heating applications.
 - b) *CL = Low Control Action.* The control action is such that the process temperature must not go below the setpoint. Process value > Setpoint Relay ON
This is generally used in cooling applications.
- 2) **Hysteresis :** The On / Off differential gap for an On / Off controller. Figures below show the hysteresis for both high and low control logic.



Arrows indicate Process temperature trajectory.

SP = Setpoint

HYS = Hysteresis

- 3) **On Delay Time :** The minimum time duration which has to elapse before a relay status can change over again. This delay time overrides the hysteresis settings for the setpoints.

Fault diagnosis

1 *Erroneous / Irrelevant indication*

Improper sensor / improper sensor connection
/ improper sensor location.
Calibration error.
System Hang (Restart the system).

2 *No indication on display*

No Supply .
Supply voltage not as per specifications.
Loose PCB interconnections.
System Hang (Restart the system).

3 *'OPEN' indication on display*

Improper sensor connection.
Sensor open.

4. *No relay output*

Relay faulty.
Incorrect Relay logic.
Improper Set point.
Change over tracks on PCB burnt due to overload.

5. *Fluctuations in Readings*

Supply voltage not within specified limit.
Sensor faulty / improper sensor connection.
Noise pick-up on sensor / sensor cable (use proper shielding / isolation).
Excessive ambient temperature.

If a problem persists please contact our customer service department immediately.

Bar graph Indicator

Introduction

Bargraph Indicators and Controllers play an important part in any process industry. Quick and accurate measurement and control of a process parameter will improve the final product quality, reliability and reduce rejection. Bar graph indication and control is therefore one of the prime considerations in any process industry

The Sleek 92 series is a Microcontroller based Linearised Indicator cum Controller with user friendly programming facility. The Sleek 92 has been designed for fast and accurate measurement and control of temperature. Linearisation of signals provides high accuracy even for most nonlinear sensors. The instrument is designed using highly reliable electronic components. Process temperature is displayed directly in digits, giving better resolution.

The Sleek 92 accepts all types of Thermocouples, Pt - 100, 0 to 20 mA as well as 4 - 20 mA as input. Wide ranges of measurements are available depending on the sensor used.



The instrument is immune to mechanical vibrations. Even the mounting position will not affect the measurement accuracy. Use of highly reliable electronic components with low temperature coefficient ensures long and trouble free service. The instrument is tested for its performance under various climatic conditions.

Principle of Operation :

Sleek 92 series is based on the principle high input impedance amplifier feeding an analog to digital convertor. The input signal generated by the transducer is fed to a signal conditioning amplifier, output of which is digitised by the ADC. This digital signal is linearised by software, displayed and compared to the set value by the microcontroller which initiates the programmed relay action. The linearisation, display and relays are controlled by the microcontroller by virtue of the system software.

Features :

- Microcontroller based logic
- Linearisation of controlled variable achieved through software giving high accuracy
- Highly compact
- Dust and vermin proof enclosure with epoxy powder coating.
- User selectable Control Logic
- Programming through tactile membrane keys
- NVRAM enables data storage even in events of prolonged power failure
- Fast response time
- Fail safe relay logic
- Maximum MTBF and minimum MTTR

Precautions

Taking care of your equipment is just as important as buying the best equipment. So simply take the following precautions and ensure a long, trouble-free service from your temperature measurement and control system.

Use

- Three wire system for connecting Pt-100 sensor to the instrument.
- Same area of cross section for all the three wires.
- Appropriate compensating cables for connecting T/C to an instrument
- Appropriate Thermally conductive media between Thermowell & sensor sheath.
- Proper sheathing material as per application and environment.
- Proper size crimped wire termination lugs with insulated sleeves & ferrule no's.
- Proper size screw driver for making connections to the terminations and also while adjusting calibration and set points.
- Fuses of correct ratings for mains and relay outputs.

Do's

- Sensor cables must be isolated from power cables.
- Insert minimum required sensitive length in the measurement object.
- Operating temperature should be 80 % of the maximum specified temperature.
- Check that all the wiring is firm and as per wiring diagram.
- Recalibrate instruments only when errors are confirmed with the help of certified calibrators.
- Output loads connected should be within specified limits.
- Select a Sensor / Instruments / Instrumentation Panel manufacturer who has the required technical knowledge and infrastructure inhouse.

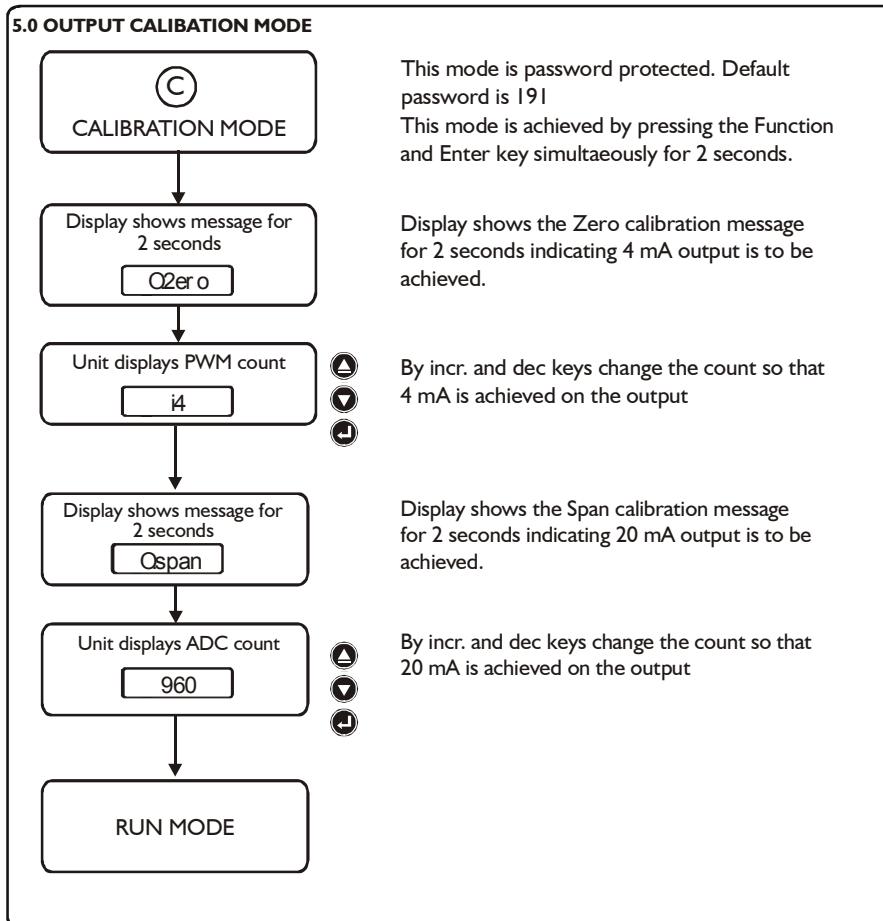
Avoid

- Terminal joints or junction boxes. Only firm soldered joints must be made if necessary.
- Exposure of thermocouple head to temperatures greater than 90°C.
- Too large sheath diameter as this may introduce time lag.
- Mechanical stresses and vibrations.
- Sharp objects for operating front panel membrane keys.
- Excessive relative humidity.
- Magnetic field / inductive pick up / noise.
- Excessive Ambient temperature variations.
- Direct radiant heat.
- Corrosive gasses in the surroundings.
- Chemicals or pressure wash for cleaning instruments.
- Excessive tightening of mounting accessories.
- Excessive light from being incident on displays.

Calibration procedure

Warning : This procedure is to be carried out strictly by technically qualified personnel only.

The instrument is calibrated at the factory using 0.05 % accurate calibrating instruments. No calibration should be required in normal case, however if the instrument requires re-calibration, the procedure to be followed is given below.

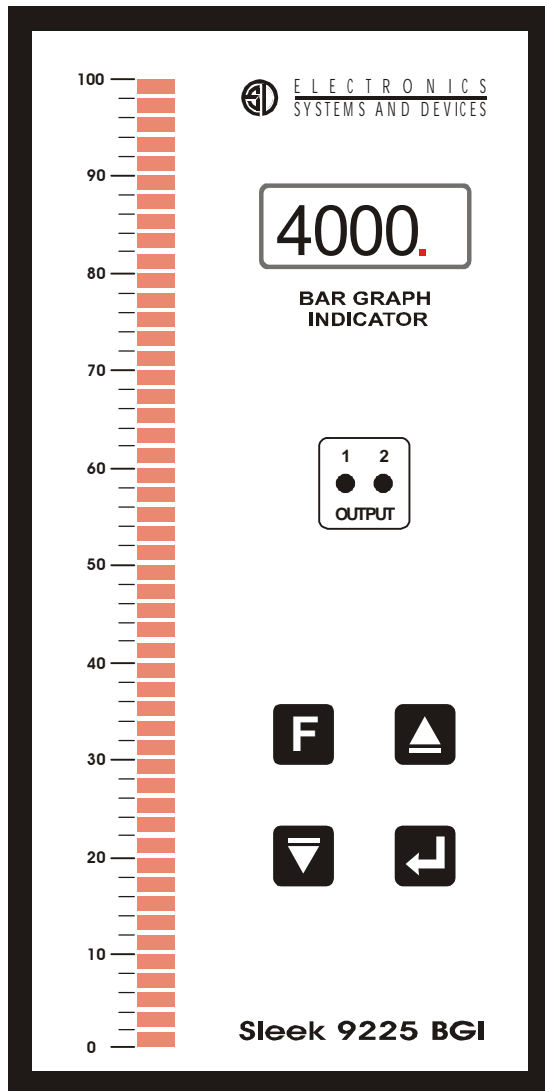


Specifications


Model	: Sleek 9225 BGI
Bar graph indication	: 50 nos. of RED LED
LED dimensions	: 2 x 5 mm
Ranges	: Programmable from -999 to 9999.
Input	: 4 - 20 mA
Decimal point	: Selectable
Indication accuracy	: +/- 0.2 % of FS, +/- 1 digit
Least count	: 0.1 °C upto 400.0 °C, 1°C above 400 °C
Accuracy deviation due to	
a) Temperature change	: +/- 0.02 % / °C , ref at 25 °C
b) Supply Variation	: +/- 0.01 % /V
No. of Setpoints	: Two
Setpoint Adjust and Read:	Through Flat Membrane key pads and 4 digit display respectively on front panel
Outputs	: 1 set of potential free Relay change over contacts rated 5 Amp resistive at 230 V AC per setpoint
Control action	: On / Off
Relay logic	: User selectable High or Low logic. High Logic : Actual temp. < Set point - Relay ON for heating application Low Logic : Actual temp. > Set point - Relay ON for cooling
Relay ON indication	: By Red LED per setpoint
On / Off hysteresis	: Programmable from 0.1 to 9.9 °C
Display	: 4 digit seven segment 10 mm RED LED
Ambient Temp. range	: 0 to 55 °C
Sensor break indication	: Up scale [\square P E n]
Sensor break protection	: Relay 'Off' (Relay 'On' by demand)
Power supply	: 230 VAC, +/- 10 % , 50 Hz
Transmitter supply	: 24VDC, +/- 1V @30 mA
Relative Humidity	: 90 % Non Condensing
Power consumption	: 6 VA
Weight	: 1200 gms Approx.
Mounting	: Flush panel mounting
Dimensions	: 144 (H) x 72 (W) x 100 (D) mm
Cut out	: 138 (H) x 68 (W) mm
Keypad Lock	: Unit is password protected. Default password 134.

Illustrations

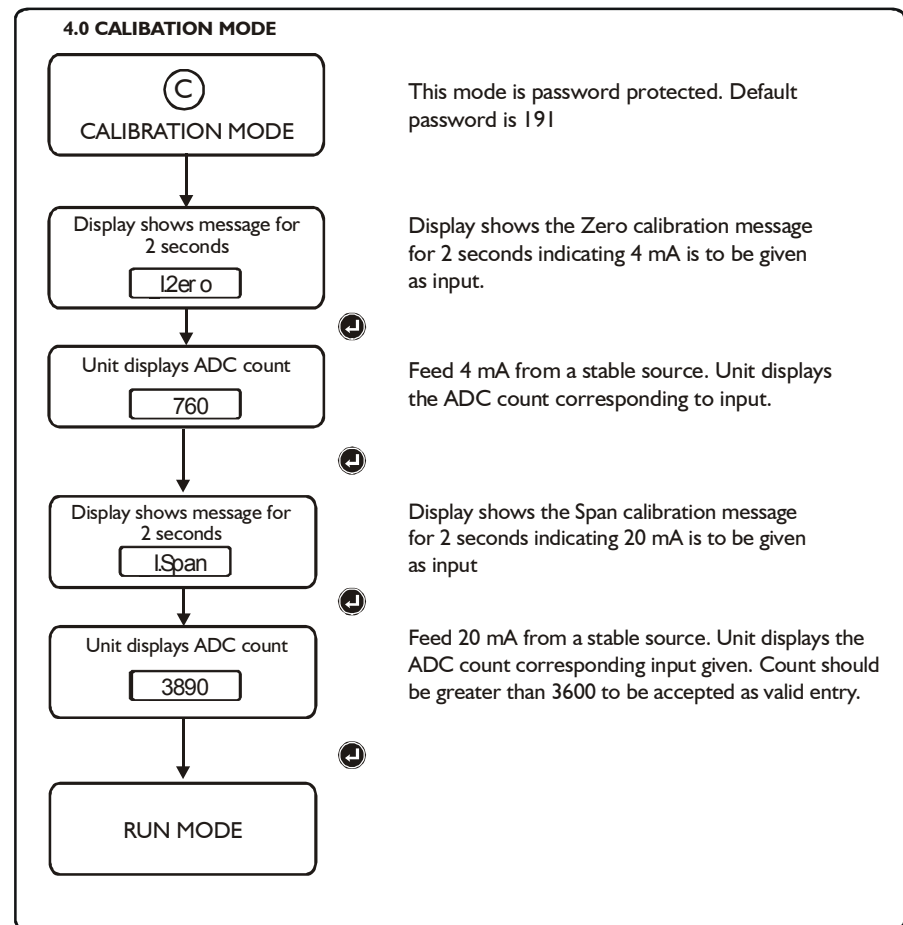
A) Front view

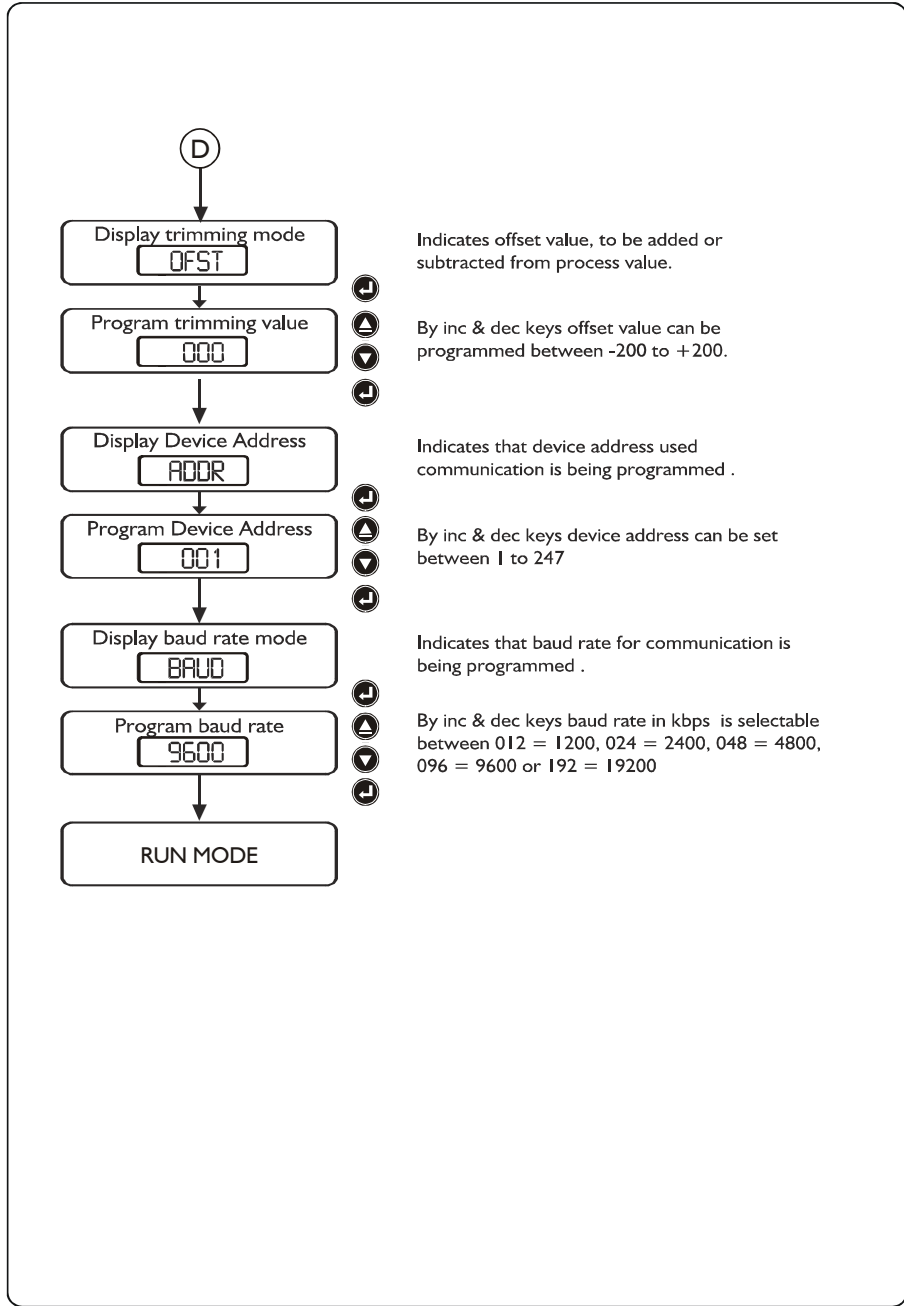


Calibration procedure

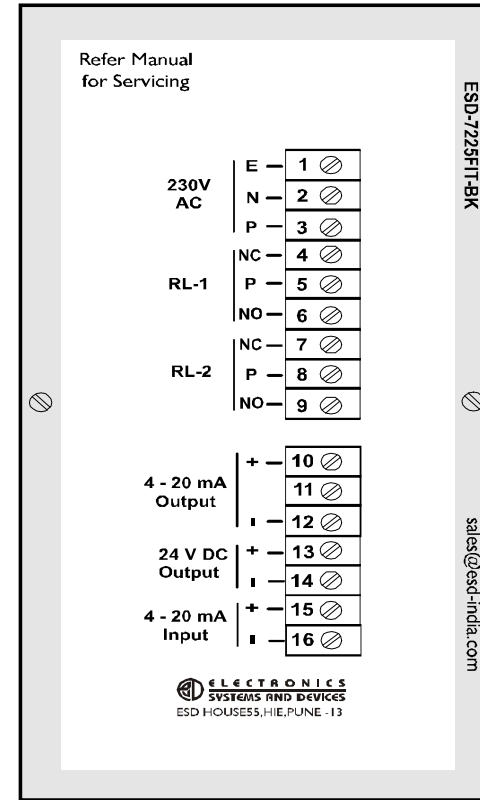
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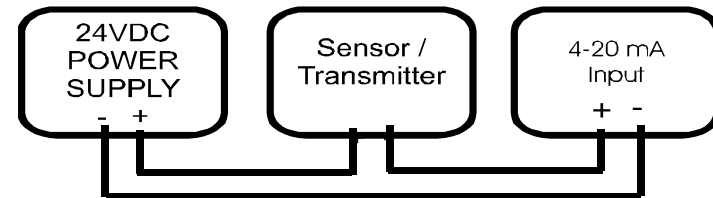




B) Rear View

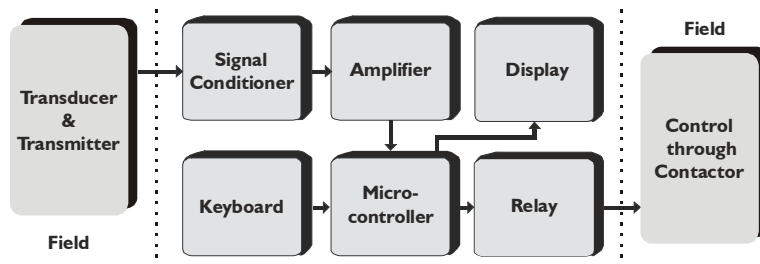


Input mA connection details:

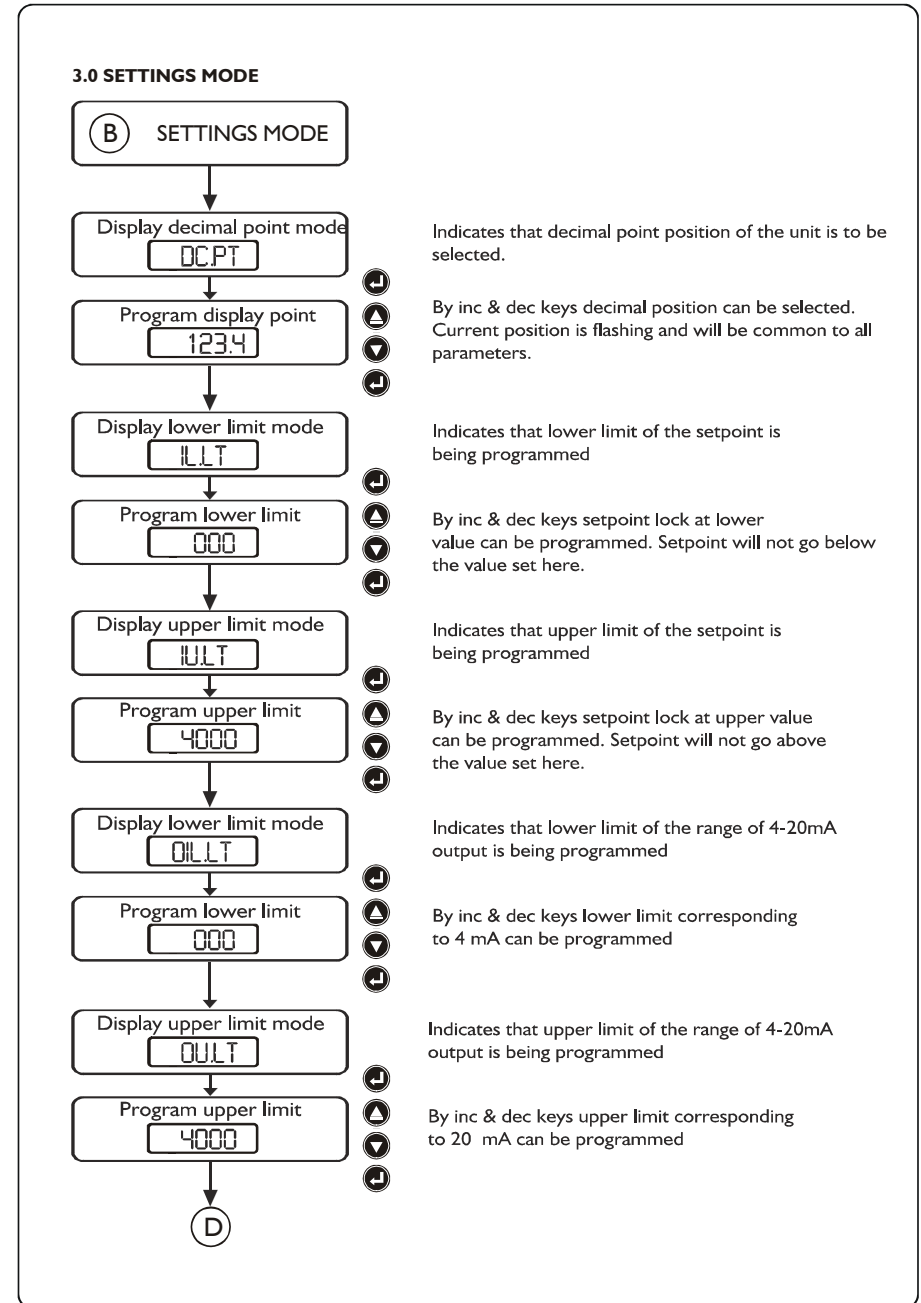


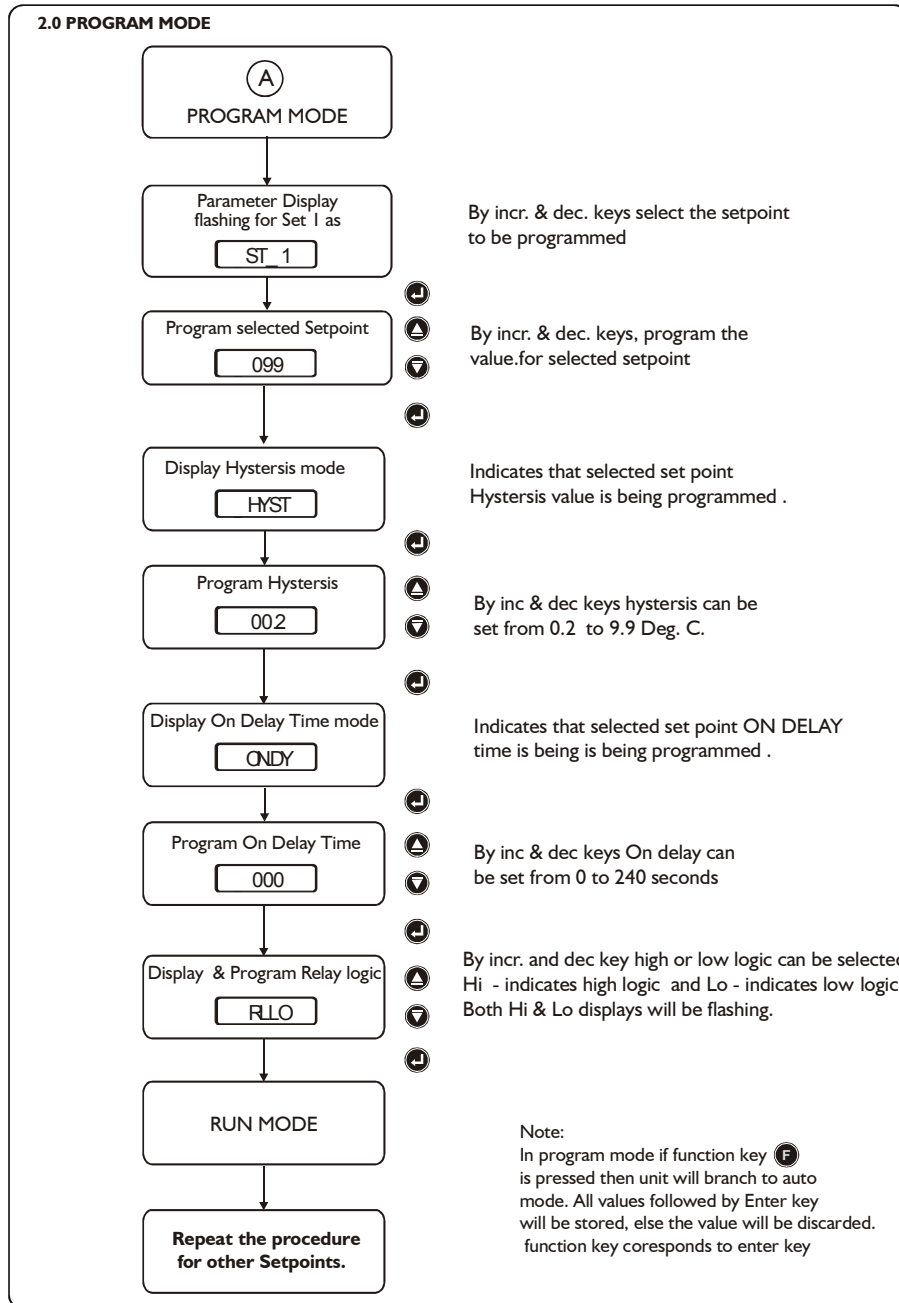
Operation

Block Diagram



1. **Transducer :** This is externally connected to the instrument. Types available are Pt - 100, Thermocouple, 4-20 / 0-20 mA current signal
2. **Signal conditioner:** This circuit accepts the process signal from the sensor performs the necessary compensation (Ambient compensation for T/C and lead wire compensation for PT- 100) and converts it into suitable signal level for ADC.
3. **ADC:** This is a 12 bit Successive Approximation type ADC inbuilt the microcontroller. It accepts the analog input signal, converts it into digital data and feeds it to the processor for further action.
4. **Microcontroller:** This is the heart of the unit and is interfaced to all other peripherals. The transducers, membrane keypad, display, memory and output relays function under the command of the microcontroller.
5. **Memory :** There are two memory elements provided in the circuit. One is the EPROM for monitor (main) program storage and the other is the NVRAM for storage of various user





programmed parameters and process variables (even in events of prolonged power failure).

6. **Keypad** : Feather touch membrane keys are provided on the front panel for user programming. These keys have features like long life, negligible contact bounce, ease of operation.
7. **Display** : The front panel carries all the indications. These are controlled by the CPU. There are five digits on the front panel for indicating various messages and parameter values. 4 LED's indicate the relay status of 4 corresponding setpoints. This acts as an interface between user and CPU.
8. **Output relays** : There are four relays, one for each setpoint.

Modes of Operations :

1. **Program Mode** :
In this mode the user can program all the setpoints, control action etc.
2. **Run Mode** :
In this mode the display shows the process value.

For programming sequence please refer program flow chart.

Installation procedure :

 Also observe "**Precautions**" as given in this manual

The instrument should be mounted in a place where it is clearly visible and accessible.

1. Insert the instrument in a suitable cut out and fix it using the bracket pair provided on the sides.
2. Make the connections as shown in Rear View diagram.
3. All connections should be firm.
4. In case of Platinum Resistance bulb connect Red wire to the terminal with small resistance shown, Green wire to the next terminal & Black wire to the third terminal. The Black and Green wires are shorted and connected together at one end of the bulb inside the bulb head.
5. In case of Thermocouple connect the positive of the sensor to '+' terminal and negative of the sensor to '-' terminal.
6. Ensure proper earthing to the instrument.
7. Ensure all the connections are as per System connection diagram.

Program Flow Chart

