

# MANUAL

## CR-2010 SERIES 6" RECORDER Model No.: 20xx..., 25xx...

Manufacturers of :

- Circular Chart Recorders
- Strip Chart Recorders
- Hygro-Thermographs
- Inkless Recorders
- Scanners & Data Loggers



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## ► Congratulations

Thank you for choosing G-Tek Recorders for your recording needs.

The all new updated CR2010 series of recorders owes much to the user feedback. While maintaining the ease of operation of CR2010, the efforts have been made to further simplify the operation and improve overall look and feel. The recording range, chart speed, and calibration factors are all user programmable from the front panel key-board. Polynomial based linearization for most of the known inputs, along with high resolution a/d makes it one of the high accuracy recorders in its category. A universal input version offers field selection of sensor types. The mechanical and electrical designs have been optimized for ruggedness and ease of operation. These instruments will undoubtedly prove to be a valuable asset at your plant.

Before installing and operating the instrument, please take time to go through the manual, which will enable you to get the most out of your recorder.

Our new series owes much to the feedback received from our customers, and we shall always welcome your suggestions and comments on any aspect of our products.

**g-tek corporation**

vadodara

## ► Calibration Accuracy

This product was thoroughly tested to ensure compliance with the published specifications. G-Tek further certifies that all instruments used in production and final test are regularly inspected to maintain accuracy of calibration and are traceable to the National or International standards, to the extent allowed by that organization's calibration facility, and to the calibration facilities of other International Standards Organization members. The user should be satisfied that the performance of the product as received meets expectations and, as part of a program of planned maintenance, should periodically check calibration accuracy against reliable standards.

## ► Warranty

This product is warranted against defects in materials and workmanship for a period of one year from the date of shipment. During the warranty period, G-Tek will, at its option, either repair or replace products which prove to be defective.

### ► Warranty Service

Warranty service at the buyer's facility can be provided only under prior agreement by the manufacturer or its representative, and the buyer may be required to pay round-trip travel expenses. In all cases, the buyer has the option of returning the product for Warranty service to a facility designated by the G-Tek or its representatives. The buyer shall prepay shipping charges for products returned to a service facility, and the G-Tek or its representative shall pay for the return of the product to the buyer. However the Buyer shall pay all the shipping charges, duties and taxes for products returned to G-Tek from outside of Vadodara, India.

### ► Limitation of Warranty

The foregoing warranty shall not apply to defects arising from: Improper or inadequate maintenance by the buyer, Improper or inadequate site preparation, Unauthorized modification or misuse, Operation of the product in unfavorable environments, especially, high temperature, high humidity, corrosive or other damaging atmospheres. In addition, G-Tek does not warrant any damage that occurs as a result of the Buyer's circuit or any defects that result from Buyer-supplied products.

### ► Exclusive Remedies

The remedies provided are herein the buyer's sole and exclusive remedies. G-Tek shall not be liable for any direct, indirect, special incidental or consequential damages (including lost profits) whether based on warranty, contract, tort, or any other legal theory.

### ► Disclaimer

G-Tek makes no other warranty expressed or implied, whether written or oral with respect to this product and specifically disclaims any implied warranty or condition of merchantability, fitness for a particular purpose or satisfactory quality.






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## ► Symbol Definitions

The following table lists those symbols used in this document to denote certain conditions.

	This caution symbol on the equipment refers to the user to the Product Manual for additional information. This symbol appears next to the required information in the manual.
	<b>Warning</b> Personal Injury : Risk of electrical shock. This symbol warns the user of a potential shock hazard where HAZARDOUS LIVE voltage greater than 30 Vrms, 42.4Vpeak or 50Vdc may be accessible. Failure to comply with these instructions could result in death or serious injury.
	<b>Attention</b> Electrostatic Discharge (ESD) hazards. Observe precautions for handling electrostatic sensitive devices.
	Protective Earth Terminal. Used for non-safety purpose such as noise immunity improvement. <b>NOTE</b> : This connection shall be bonded to protective earth at the source of supply in accordance with national local electrical code requirements.
	Earth Ground. Functional earth connection. <b>NOTE</b> : This connection shall be bonded to protective earth at the source of supply in accordance with national and local electrical code requirement.

## ► Safety Notes

### **WARNING**

*Any interruption of the protective conductor inside or outside the apparatus, or disconnection of the protective earth terminal is likely to make the apparatus dangerous under some fault conditions. Intentional interruption is prohibited.*

**Note:** in order to comply with the requirements of safety standard BS EN61010, the recorder shall have one of the following as a disconnecting device, fitted within easy reach of the operator, and labeled as the disconnecting device.

- a. A switch or circuit breaker which complies with the requirements of IEC947-1 and IEC947-3
  - b. A separable coupler which can be disconnected without the use of a tool
  - c. A separable plug, without a locking device, to mate with a socket outlet in the building.
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.
  2. Before switching on the apparatus, ensure that the connected supply voltage is compatible with the apparatus. Ensure that only fuses with the required rated current and of the specified type are used for replacement. The use of makeshift fuses and the short-circuiting of fuse holders is prohibited.

3. Any adjustment, maintenance and repair of the opened apparatus under voltage, should be avoided as far as possible and, if inevitable, shall be carried out only by a skilled person who is aware of the hazard involved. When the apparatus is connected to its supply, terminals may be live, and the opening of covers or internal assemblies (except for those designed for access to be gained by hand) is likely to expose live parts. The capacitors and other components on the circuit board may temporarily retain a hazardous charge after the supply voltage has been disconnected. These capacitors and other parts must not be touched for at least 10 seconds after supply voltage disconnection.
4. Where conductive pollution (e.g. condensation, carbon dust) is likely, adequate air conditioning / filtering / sealing etc. must be installed in the recorder enclosure.
5. Signal and supply voltage wiring should be kept separate from one another. Where this is impractical, shielded cables should be used for the signal wiring.
6. This apparatus has been designed and tested in accordance with applicable safety standards, and is supplied in a safe condition. This instruction manual contains some information and warnings which have to be followed by the user to ensure safe operation and to retain the apparatus in safe condition. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment might be impaired. Whenever it is likely that protection has been impaired, the unit shall be made inoperative, and secured against accidental operation. The manufacturer's nearest service centre should be contacted for advice.

\* A full definition of 'Hazardous' voltages appears under 'Hazardous live' in BS EN61010. Briefly, under normal operating conditions, hazardous voltages are defined as being > 30V RMS (42.2V peak) or > 60V dc.

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### 3 INTRODUCTION

This manual is written to help the user to familiarize with the installation and operation of the Smart Chart series of circular chart recorder. These recorders are capable of plotting up to 4 individual channels using different color ink cartridges.

#### 3.1 MANUAL LAYOUT

This manual is divided into a number of sections for quick and easy reference.

*Table 1 Manual Layout*

Section 1 Introduction	Contains outline of the manual, brief description about the recorder, Optional features available and information about unpacking of the product.
Section 2 Installation	Contains details about installation of the product vis-a- vis mechanical and electrical aspects
Section 3 Operation	Contains details of the front panel display and key-board.
Section 4 Recorder Configuration	Contains details about various parameters that user can set for configuration of recorder
Section 5 Calibration	Description of the mechanical calibration procedure for the recorder.
Section 6 FAQ	Details of most frequently encountered questions and their answers
Section 7 Accessories	Contains the list of standard accessories for the recorder along with their part nos.
Section 8 Specifications	Contains detailed specification of the recorder.
Section 9 Ordering Code	Contains details of order code to enable the user to find out the installed options by comparison with the code on recorder.

\*Features and capabilities may vary depending upon the product purchased.

#### 3.2 RECORDER DESCRIPTION

The CR 2010 series of the recorders come as either 1, 2, 3 or 4 pen continuous marking circular chart recorder. The digital display is an optional feature. Recorder that does not have any display can have a maximum of one channel. **This manual is written specifically for single pen recorder without display.**

#### 3.3 OPTIONAL FEATURES

Following optional features are available for this series of recorders.

- ◆ Battery Back up
- ◆ Transmitter power supply
- ◆ Thermal(Inkless) recorder
- ◆ RS232-C/ RS485 – 4 wire/ USB connectivity
- ◆ Pipe Mount/ Wall Mount
- ◆ IP Protection

It is possible that the recorder you have received is fitted with some of the optional features. Please refer to the product code to know about the installed options in your recorder.

### 3.4 UNPACKING AND INSPECTION OF RECORDER

G-Tek recorders are dispatched in a recyclable, environment friendly package, specially designed to give adequate protection to the recorder against likely transit damage. If the outer box shows any sign of damage, it should be opened immediately for inspection of the contents. If there is an evidence of damage, please do not operate the equipment. Contact our local representative for further information. If no apparent damage to the product is seen, Please remove all accessories and documentation from the box. Open the door of the recorder (Figure 1). Inspect the recorder for mechanical integrity. Close the door. If recorder is not to be used immediately, please re-pack it in its original packing. If the recorder is to be used immediately, please use it as per following instructions. Please preserve the original packing along with all internal material for future transport requirements.

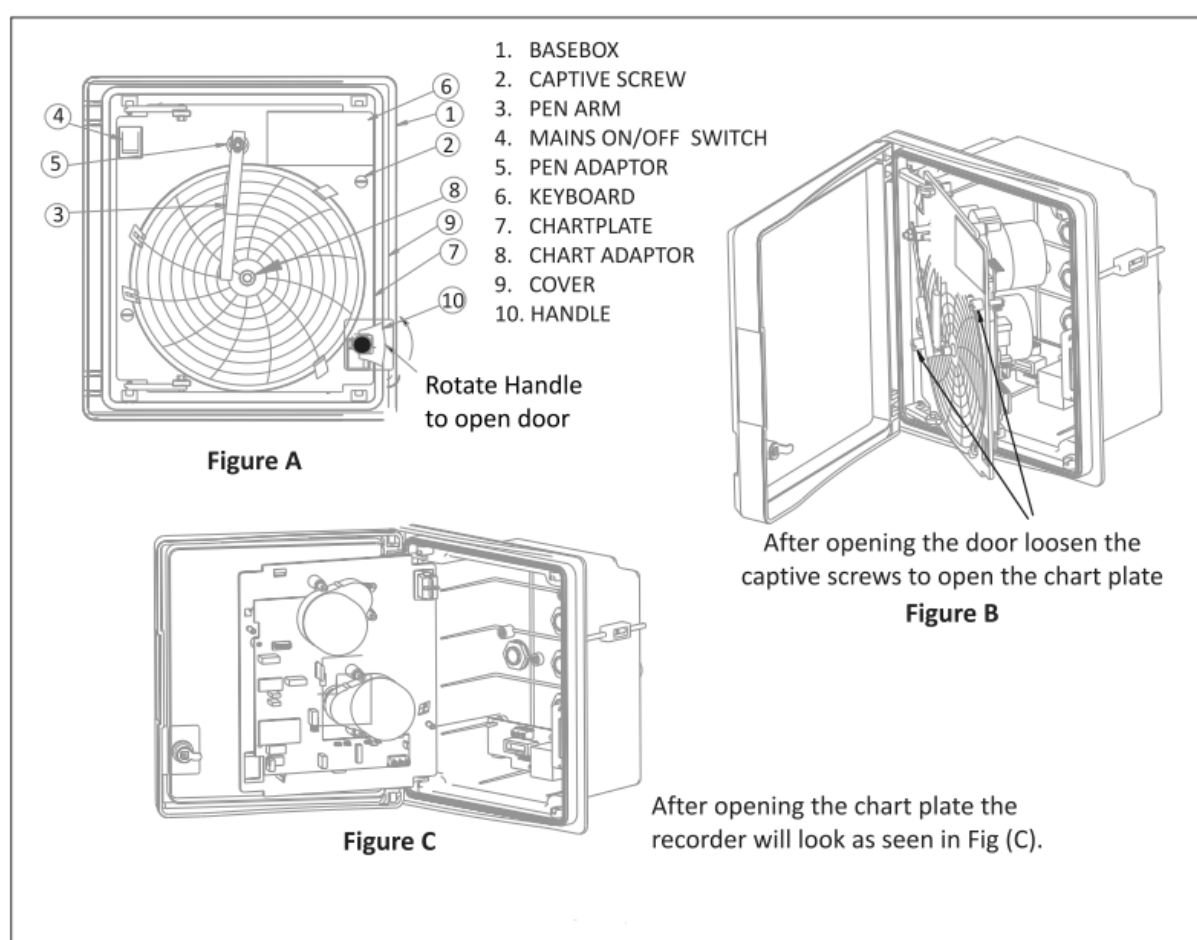


Figure 1 Unpacking the Recorder

4 MECHANICAL INSTALLATION

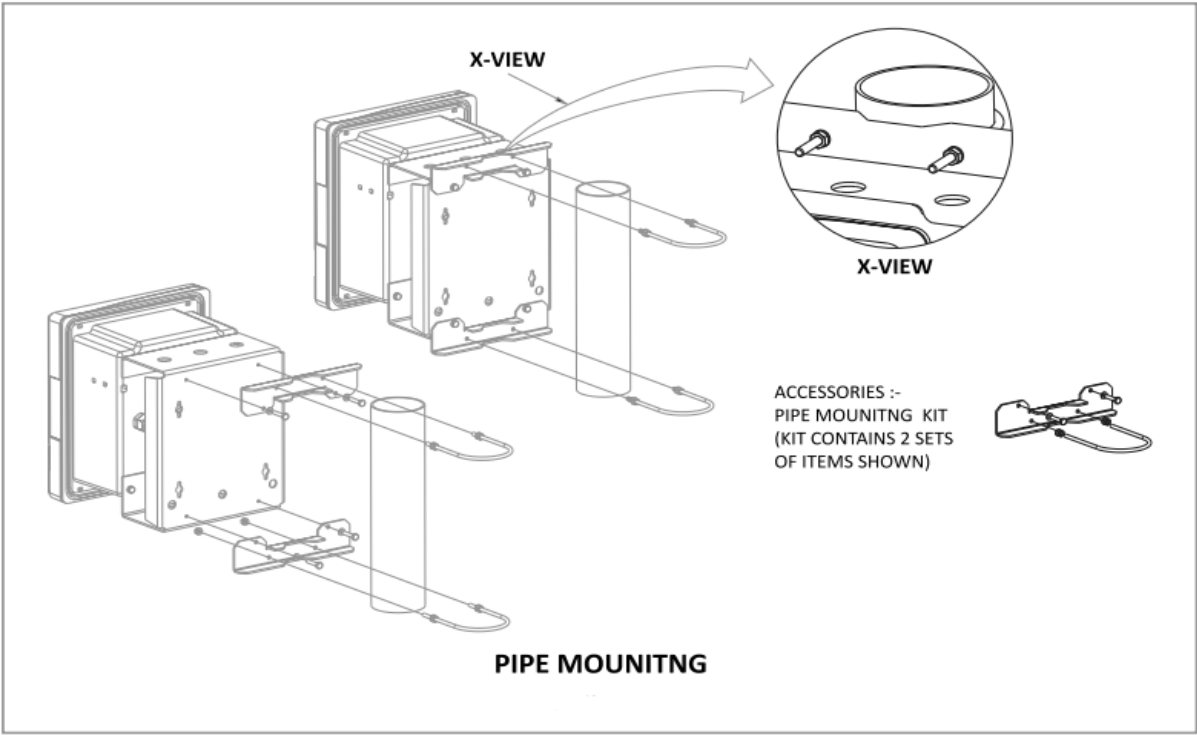


Figure 4 Pipe Mounting

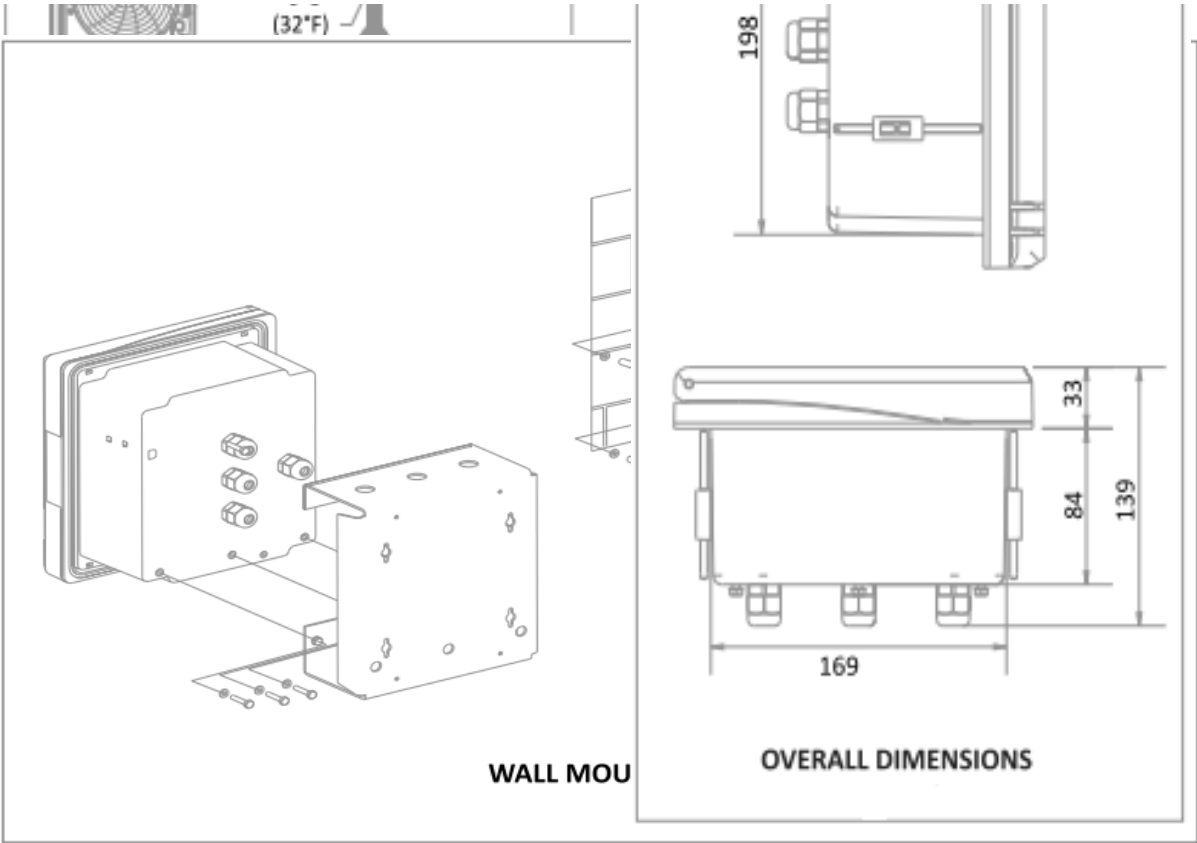


Figure 5 Wall Mounting

Figure 5 Wall Mounting

Figure 3 Mechanical Dimensions

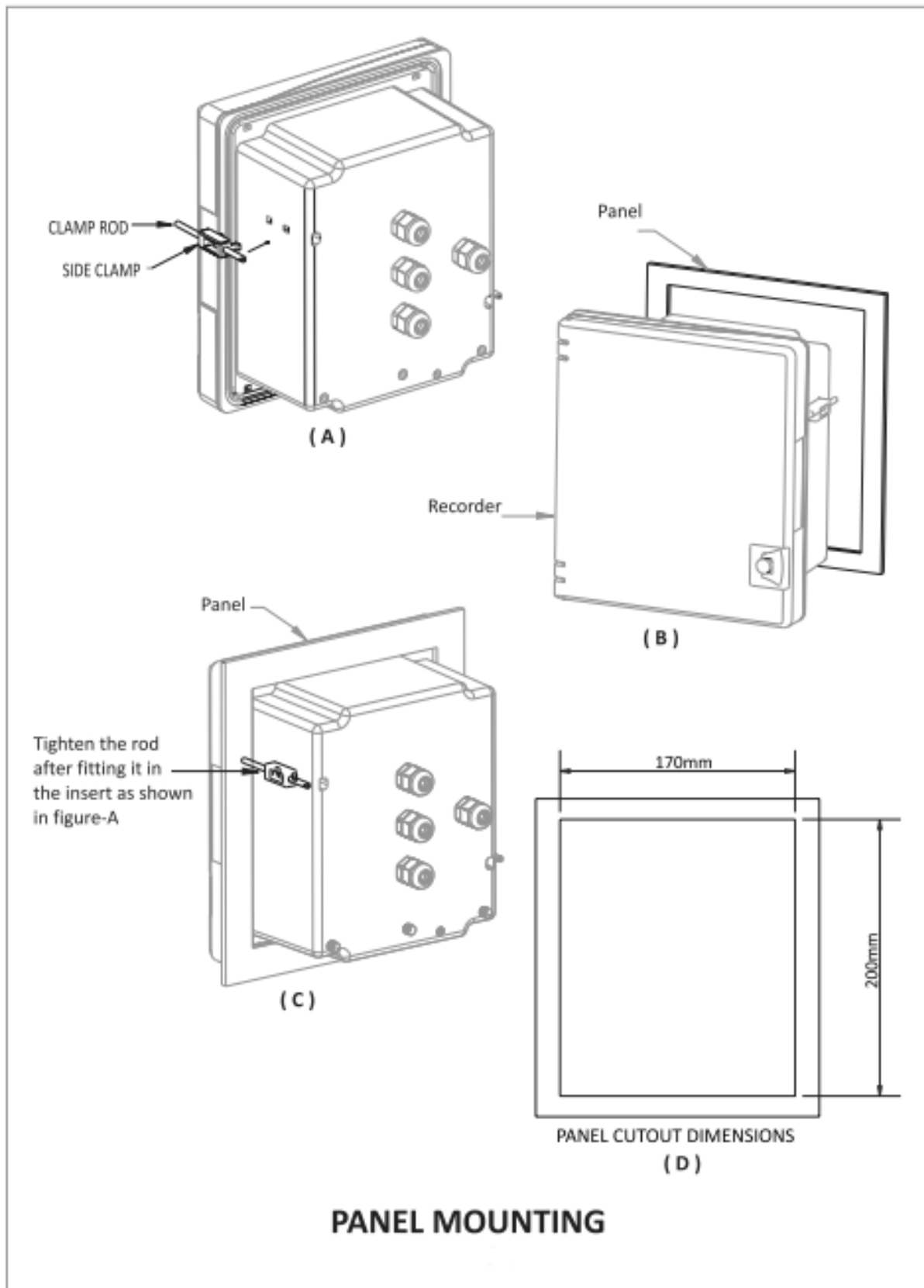


Figure 6 Panel Mounting



## 5 ELECTRICAL INSTALLATION

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### 5.1 WARNINGS

To comply with Underwriter Laboratories (UL) and Canadian Standards Association (CSA) certification, please route signal leads and power cables in the earthed (grounded), flexible metal conduit. Use the protective ground stud at the back of the recorder (NOT the terminal  $\frac{1}{\text{module}}$  ground connection) to ground the flexible metal conduit.

- ◆ Instruments not fitted with the optional internal ON/OFF switch and fuse must have a disconnecting device such as a switch or circuit breaker conforming to local safety standards fitted to the final installation. It must be fitted in close proximity to the instrument within easy reach of the operator and must be marked clearly as the disconnection device for the instrument.
- ◆ Remove all power from supply, relay and any power controlled circuits and high common mode voltages before accessing or making any connections.
- ◆ Use cable appropriate for load currents. The terminal accept cables up to 14AWG (2.5mm<sup>2</sup>).
- ◆ The instrument and all inputs and outputs conforms to Mains Power Input Insulation Category II.
- ◆ All connections to secondary circuits must have basic information.
- ◆ After installation, there must be no access to the live parts e.g. terminals.
- ◆ Terminals for external circuits are for use only with equipment with no accessible live parts.
- ◆ If the instrument is used in a manner not specified by the Company, the protection provided by the equipment may be impaired.
- ◆ All equipment connected to the instrument's terminals must comply with local safety standards (IEC 60950, EN601010-1)

### 5.2 NOTES

In order to ensure optimum performance of the recorder, practice of proper installation of wiring should be followed strictly. Failure to do so can result in problems such as, but not limited to, loss of configuration to component failure, caused by transmitted or radiated electrical noise. Proper consideration must be given to local noise sources and appropriate steps taken to suppress the noise and minimize any potential problems. Among the most common sources of noise are: Relays, SCRs, valve solenoids, electric motors, power line disturbance, wire-to-wire coupling, electrostatic discharge (ESD) and radio-frequency interference (RFI).

**To achieve the optimum results, please consider the following:**

1. Low level signal wiring such as that associated with thermocouples, RTDs and current loops should always be kept separate from power and control output wiring.
2. Signal input wiring should be twisted pairs/triplets etc. the conductors should be stranded rather than solid in construction. All signal wiring should use ground-shielded wires, or be routed through grounded conduit to minimize the effects of RFI and ESD.
3. Special care should be taken when wiring to relay or solenoid coils, as large transient are produced when coil (or any other inductive loads like motors or arc welding equipment etc.) are switched. This problem can be eliminated by the use of suitable suppression devices across the coil. Coil transients can also be transmitted through the air, so the recorder should be mounted as far as possible from the power control devices and/or wiring.

4. When the line power is poorly regulated and/or subject to voltage surges or transients, consideration should be given to the use of line conditioning/transient suppressing line power regulator. Process control motors, valves, relays and heaters should not be connected to the same power line that are used for the instrumentation.
5. The connection of the recorder to a proper safety earth ground is essential. Such a connection not only reduces the possibility of electric shock, but also provides the required return for the recorder line power filters.
6. All local electrical codes of practice must be followed when installing any instrumentation.
7. If wall- or pipe-mounting to NEMA 4X (IP65) hose down standard is required, suitable cable glands must be used to prevent water ingress.

### 5.3 WIRING DIAGRAM

Please loosen the captive screw on the chart plate fully and open the chart plate. It will open more than 160°. Ensure that the pen assembly does not get damaged. You will find two PCBs in the recorder. One PCB (power supply) is fitted at the bottom of the box as indicated. Other (sensor PCB) is fitted on the chart plate as shown in the figure 5.6A. Refer to the following diagrams to connect mains, battery and sensor to the recorder. If IP protection is opted for, please ensure that all the cables are passed through the glands and glands are tightened fully after completing the wiring.

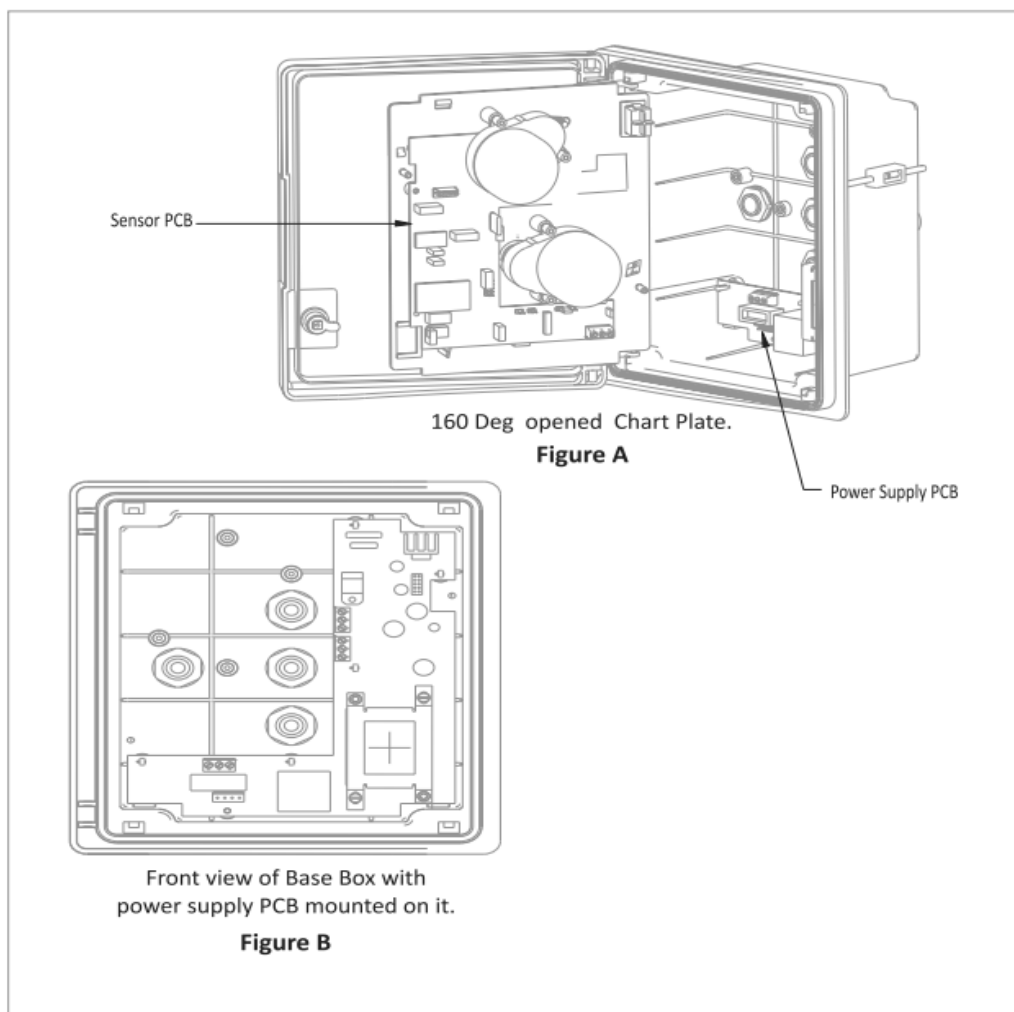


Figure 7 Wiring Diagram

### 5.3.1 Mains supply connection without battery backup

The connection for Mains supply is shown in figure 8. As per the figure, the live, neutral & earth from the mains cord are connected to L, N & E respectively. Ensure that the exposed ends of the mains cord are fully inserted into respective terminals and there is no loose/poor connection. Also connect the earth wire of the cable to the earthing terminal given on body of the recorder as **shown in figure 11**.

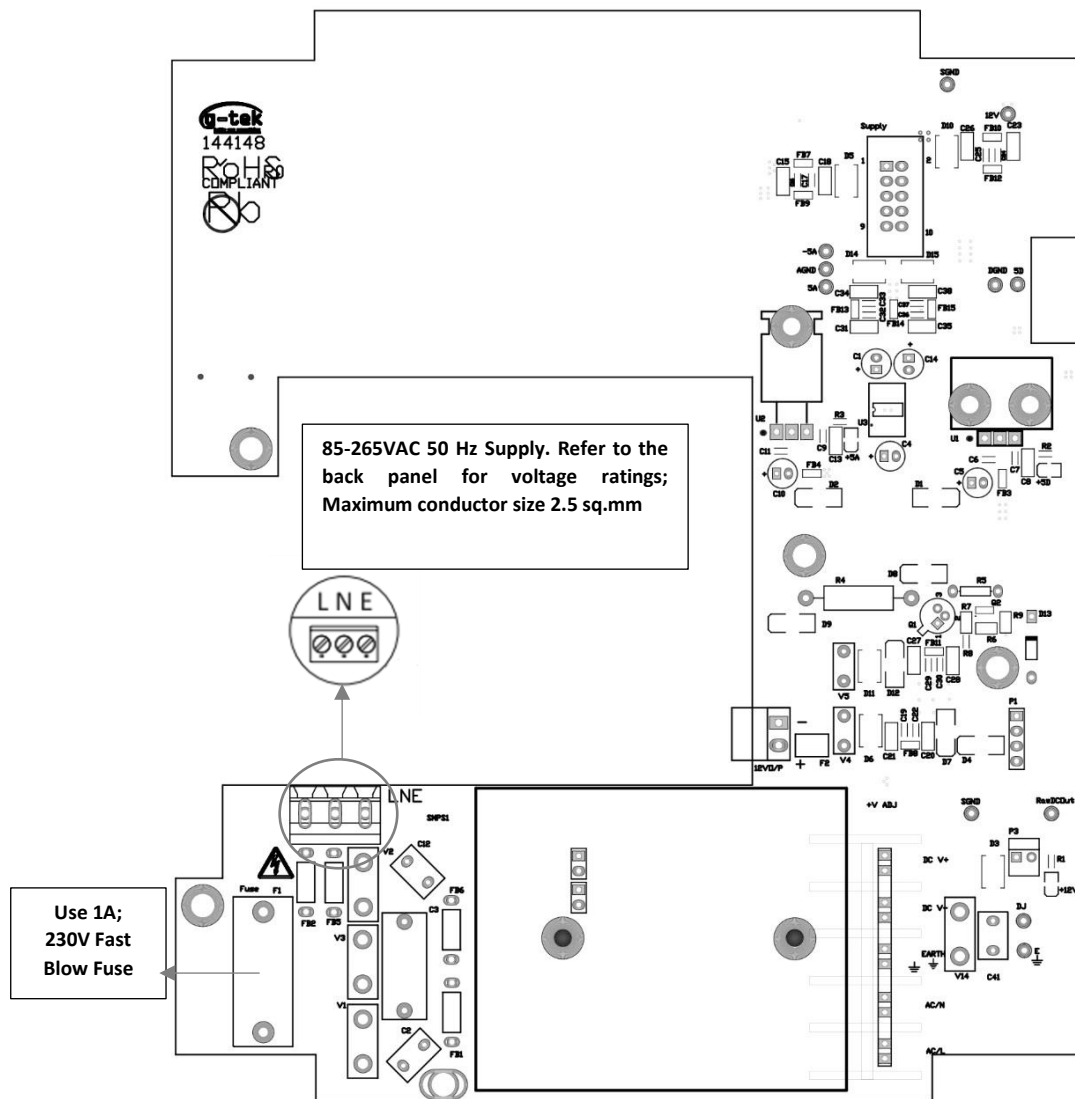
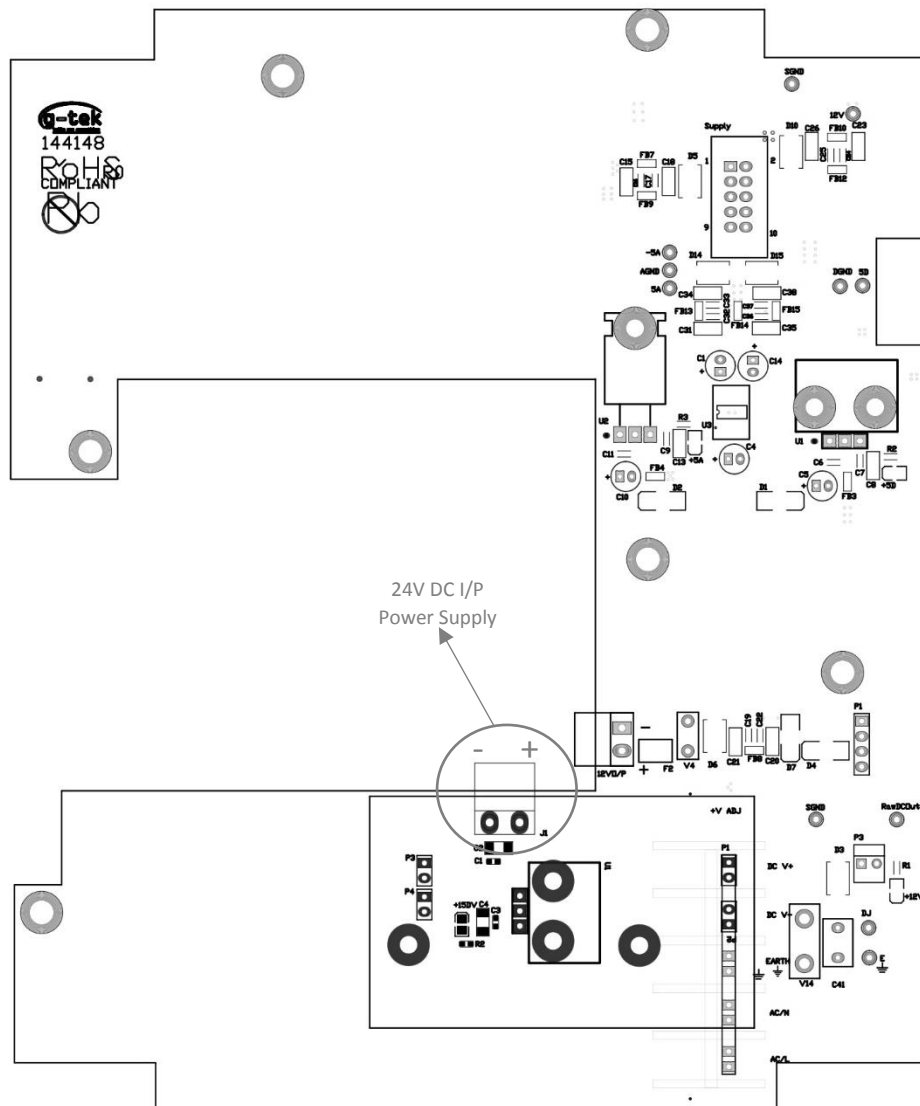


Figure 8 Mains Supply Connection without Battery Backup

## 5.3.2 24V DC power supply connection without battery backup



### 5.3.3 Battery terminal connection details for recorder with battery backup

Connect the L, N and E of mains cord to the power supply connector as shown in the figure 8.

The connection of 12V DC battery is shown in figure 10 Connect the '+' and '-' of 12V battery to the '+' and 'G' terminal of the connector respectively.

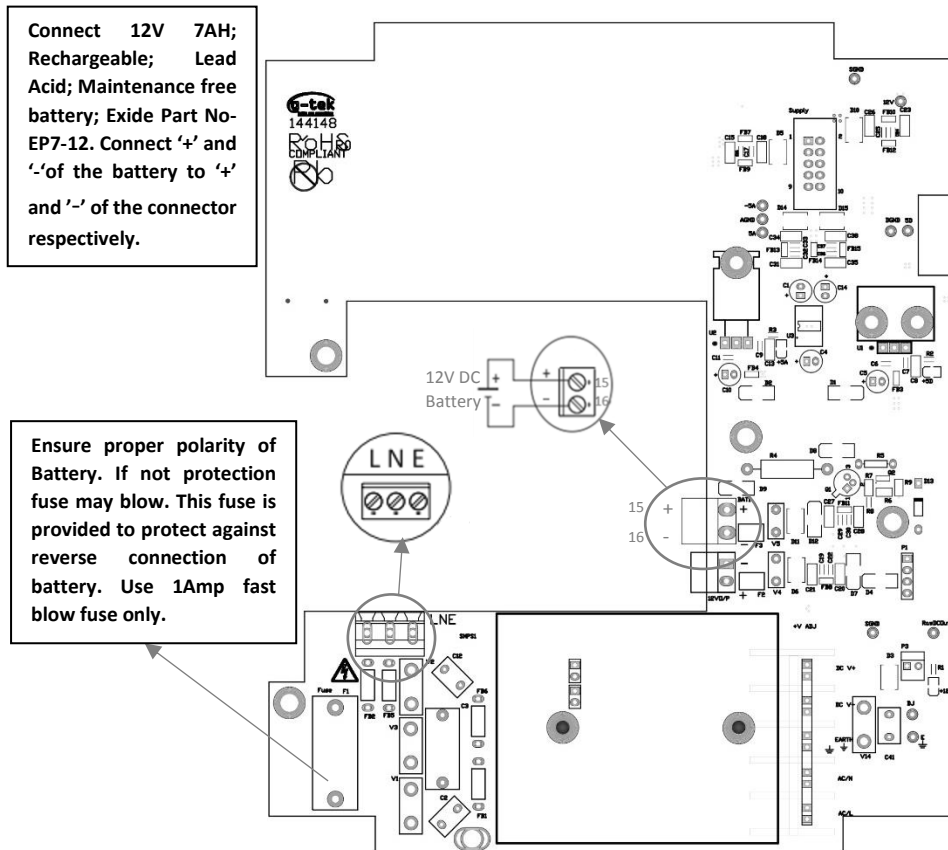


Figure 10 Battery Connection Details of Recorder



### 5.3.4 Wiring of sensor

Please refer to the back panel of recorder to know the type of sensor input. Sensor inputs are not configurable at site, by user. For sensor wiring follow the steps mentioned below.

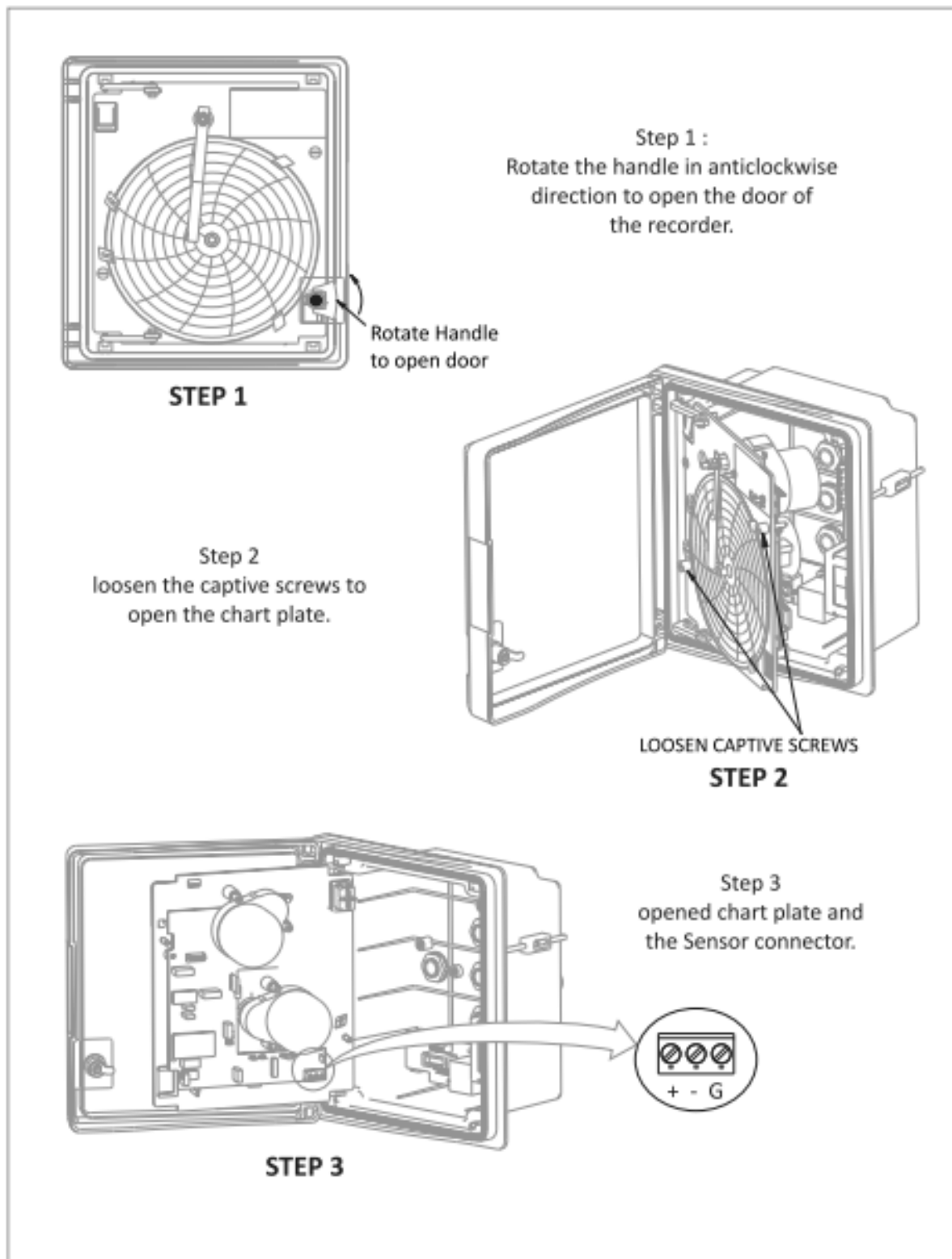


Figure 11 Sensor Wiring

(a) 3-Wire RTD (Pt-100) Input:

The wiring of RTD (Pt-100) sensor is shown in figure 12.

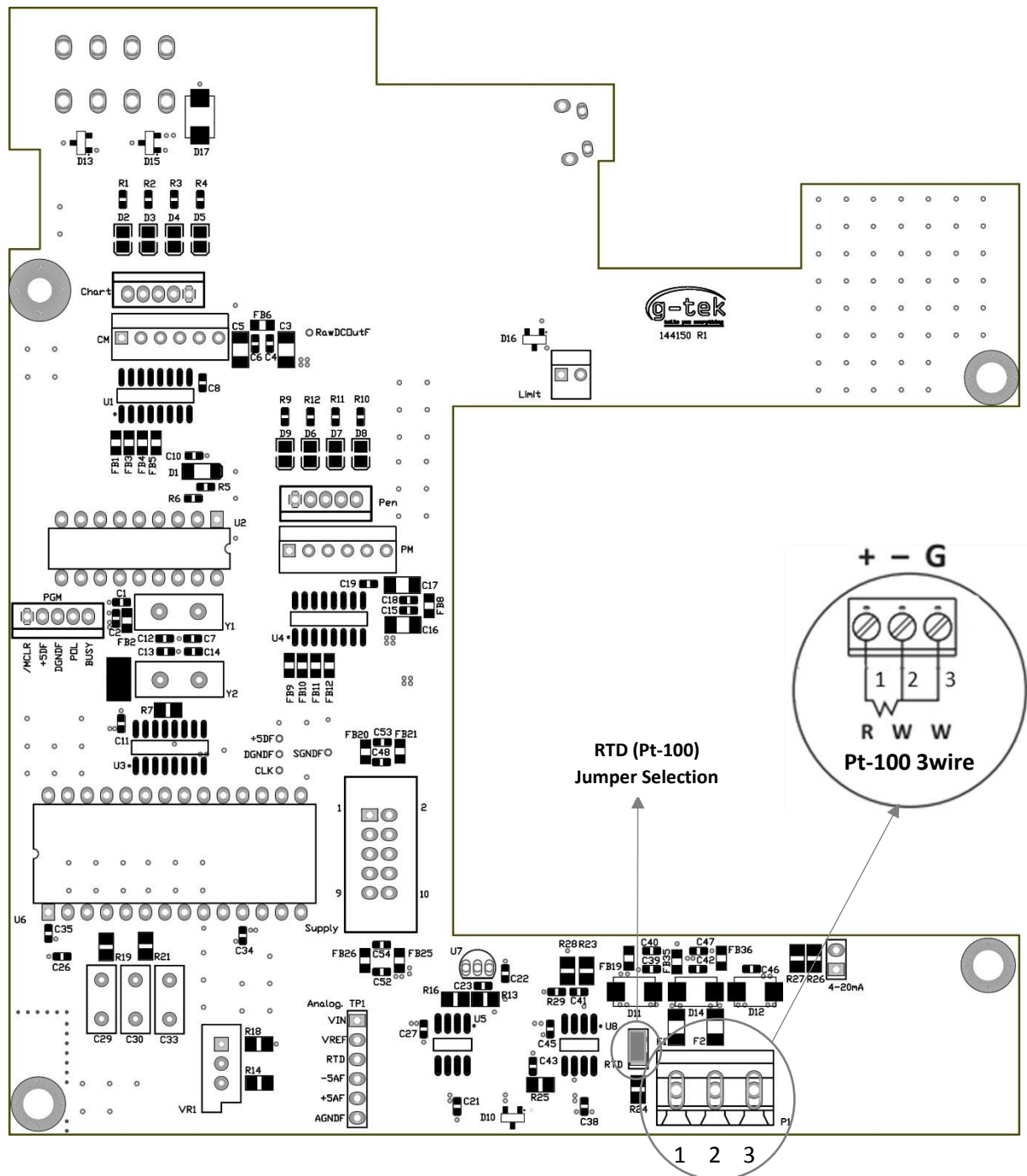


Figure 12 3-Wire RTD (Pt-100) Input

\*In case of 2 wire RTD (Pt-100) put a link between “-” and “G”.

(b) For 4-20 / 0-20\*\* mA Input:

The sensor wiring for 4-20mA input is shown in Figure-13. Follow the symbol

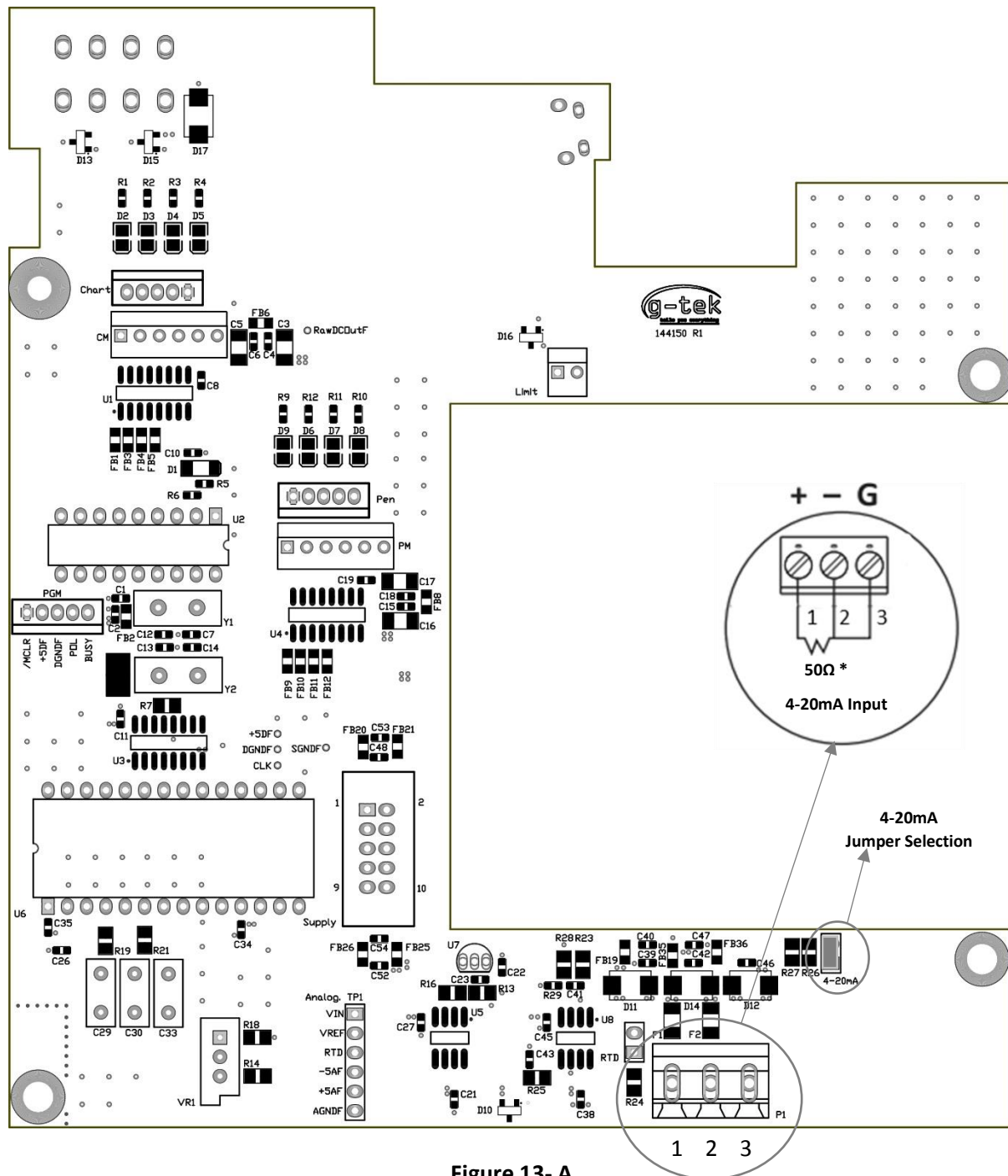
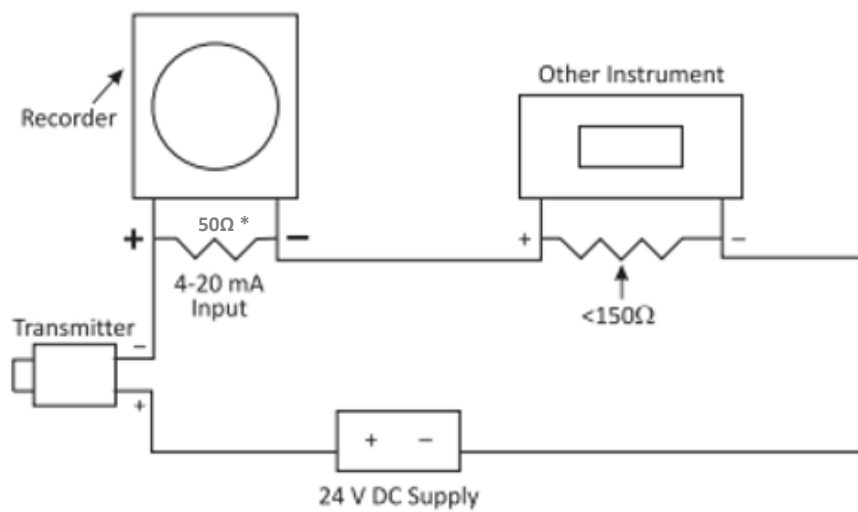


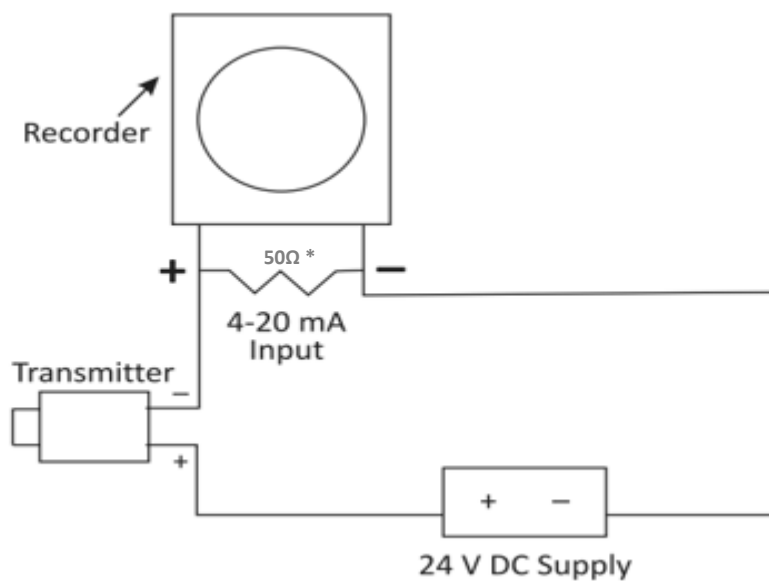
Figure 13- A

\*Internal shunt 50Ω

\*\*Sensor wiring for 0-20 mA input will be same as 4-20 mA input.

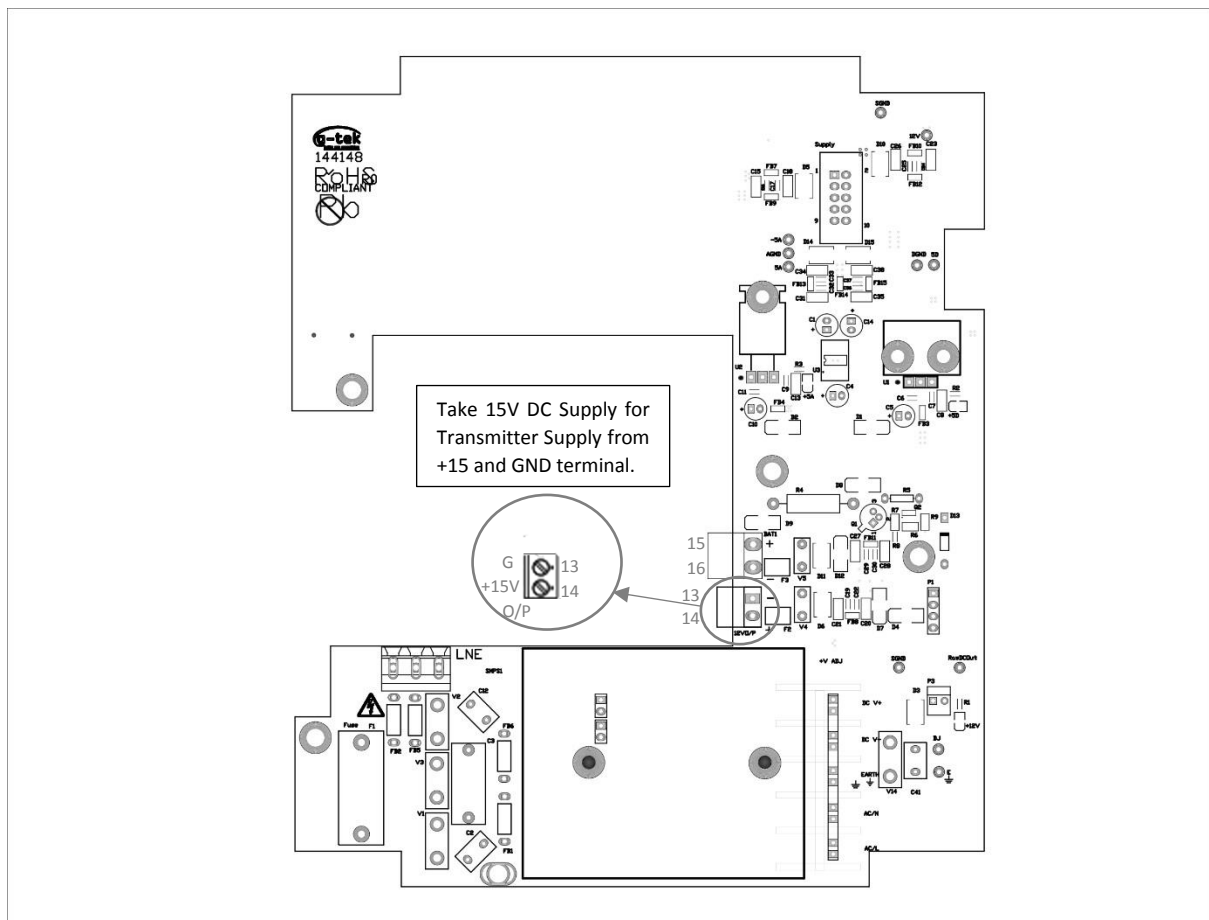
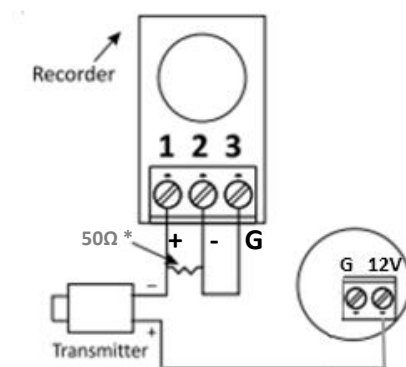
**Connecting Recorder and other instrument in Series with Transmitter and External Power Supply:****Figure 13-B**

\*Internal shunt 50Ω

*Figure 13 Sensor Wiring for 4-20mA Input***Connecting Recorder with Transmitter and External Power Supply:**

\*Internal shunt 50Ω

*Figure 14 Connecting Recorder with Transmitter and External Power Supply*

**Connecting Recorder with Transmitter and Internal Power Supply:****Location for Internal Power Supply****Internal Transmitter Supply**

\*Internal shunt 50Ω

Figure 15 Connecting Recorder with Transmitter and Internal Power Supply

**Caution:**

A transmitter in a current loop should never be shorted. If it is, the transmitter power supply is directly connected across the input shunt. In such a case the shunt will almost certainly be damaged.



## 5.4 INSTALLATION

### 5.4.1 Fitting the pen

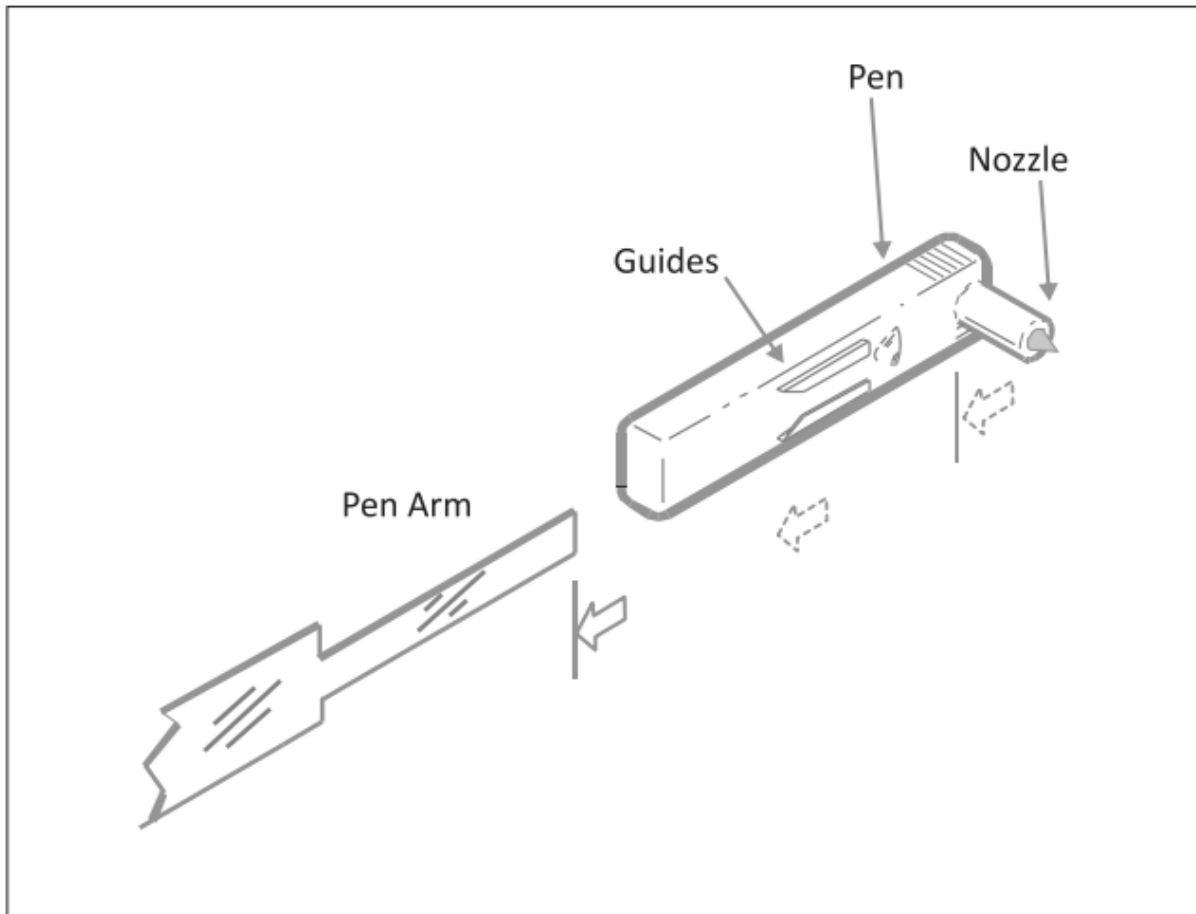


Figure 16 Fitting the Pen

***While Fitting/ replacing the Pen, please carry out the following procedure***

**Step-1:** Slide the pen over pen arm until the tip of the arm passes through the guides and touches the nozzle.

**Step-2:** A new pen may have burrs or obstructions in the guides. Apply sufficient force to clear the guides, or use sharp knife to clean the guide beforehand.

**Caution:**

- ◆ Improper fitting of the pen may result in incorrect recording.
- ◆ An attempt to change the pen in Power On condition may result in damage to the recorder.

### 5.4.2 Fitting the chart

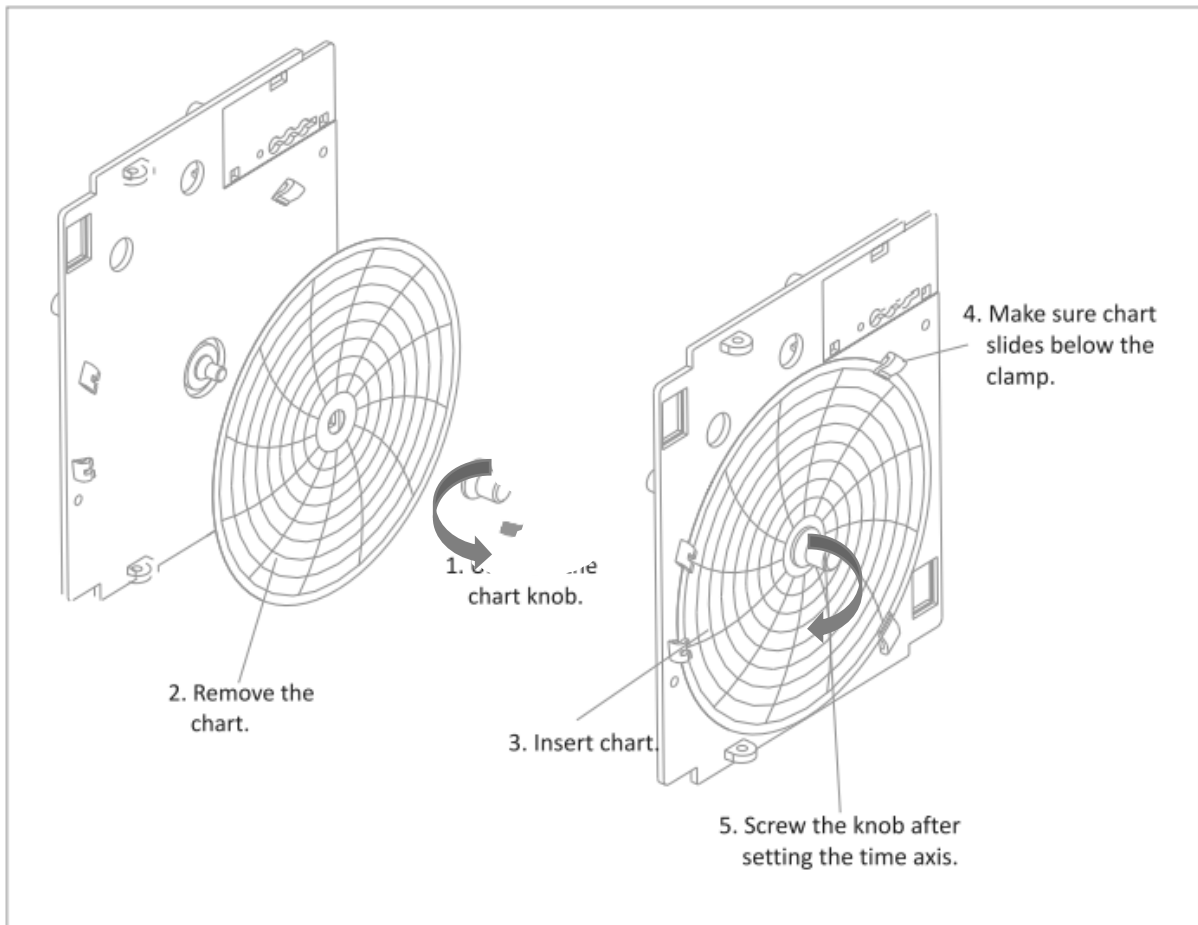



Figure 17 Fitting the Chart

To replace the chart please carry out the following procedure

**Step-1:** Open the door of the recorder.

**Step-2:** Park the pen using Pen Park feature\*.

**\*Pen Park:**

Settable from front panel keyboard through  or F, this feature will allow you to replace the chart without having to bother about pen marking or damage. On activating Pen Park, the pen goes to full scale, parks itself allowing you to replace the chart. Once chart is replaced, again press Pen Park and the pen resumes its normal operating position.

**Step-3:** Unscrew the chart knob as shown in figure.

**Step-4:** Remove the chart.

**Step-5:** Insert the new chart.

**Step-6:** Screw the knob after setting time axis. Make sure that chart slides below the clamp as shown in figure.

*\*Optional Features*

### 5.4.3 Replacing the fuse

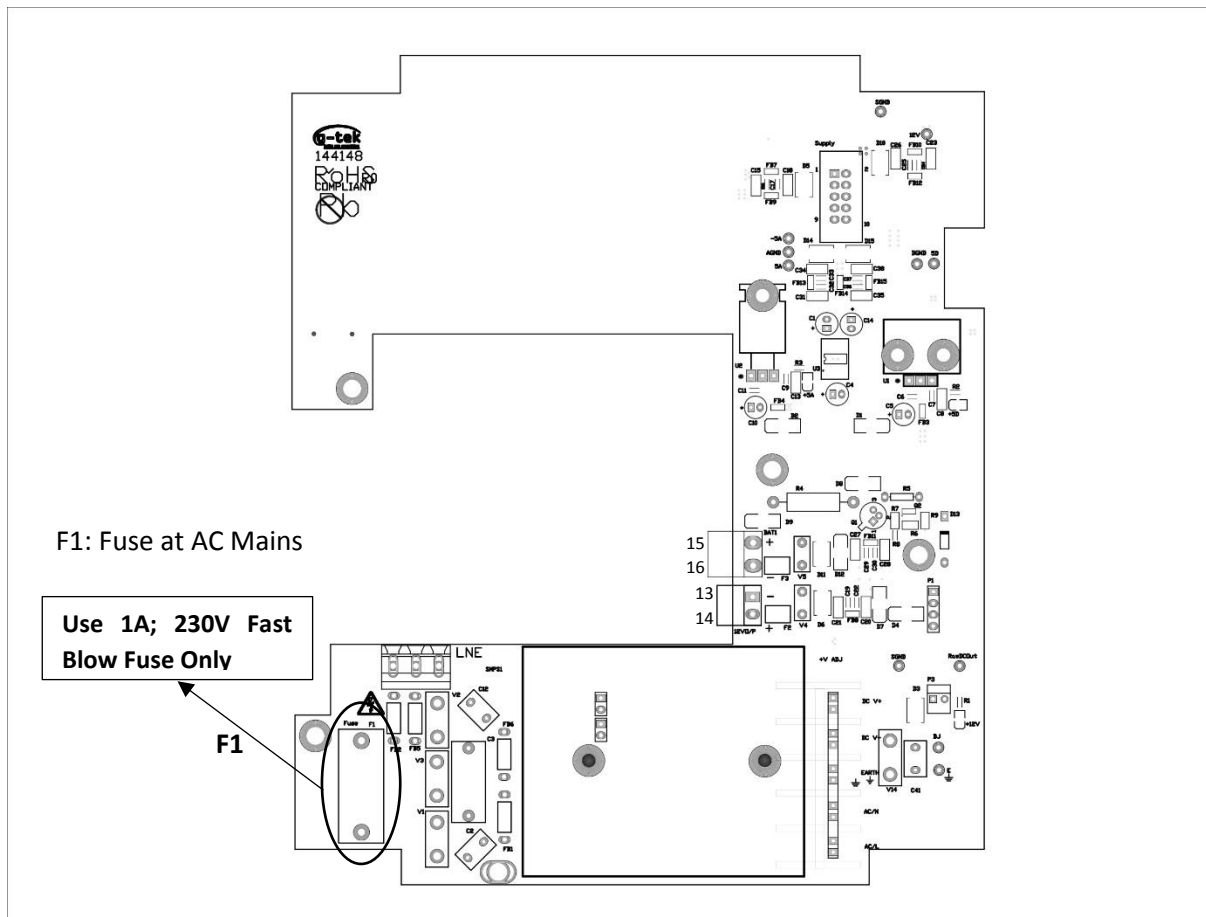


Figure 18 Replacing the Fuse

**Please carry out the following procedure to replace the fuses F1:**

- ◆ Disconnect the recorder from the mains. This is very important to avoid shock hazard
- ◆ Open the door of the recorder.
- ◆ Open the Chart plate.
- ◆ Use screwdriver to lever out the fuse holder.
- ◆ Replace the fuse with a new one of the proper rating (20mm, glass fuse, fast blow, 250mA; 230V).
- ◆ Press the holder firmly back into place.

## 6 OPERATION

After ensuring that the wiring is proper and the pen and chart are fitted correctly, power on the recorder. The pen will move towards the center of the chart. After reaching the center of the chart, it will stop. After a while pen will move to the position on the chart as per the parameter value. The center of the chart is designated as range low of the recording. Whenever the measured value is less than the range low of the recorder, pen moves till zero and stops there. The full range of the chart is computed as follows.

Full range (100% of the chart) Value = Range low of the chart + Span of the chart.

e.g.: for the chart with the marking of -10 to +40 with +40 marked at the center of the chart,

Range Low = +40

Span = -50

Full range = 40 -50 = -10

For the recorder in example, when the parameter value is equal or less than -10, the pen will remain at full scale of the chart. When the parameter values is equal or more than +40, pen will remain at center of the chart.

### 6.1 FRONT PANEL

#### WITHOUT DISPLAY RECORDER'S FRONT PANEL

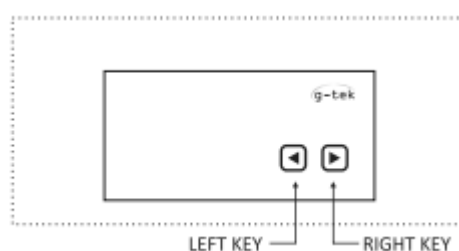


Figure 19 Front Panel of Without Display Recorder

For recorders without display, two keys [ $\leftarrow$ ] and [ $\rightarrow$ ] are used to set various parameters like offset in the measurement and the mechanical calibration. The operator menu is entered using the two keys given on the front side. In this recorder, changing of Range low, Span and type of Sensor is not possible. The Blind recorder has only two keys and the various calibration parameters are set using these keys. The [ $\leftarrow$ ] key is used to move the pen away from the center of chart whereas [ $\rightarrow$ ] is used to move the pen towards the center of chart.

### 6.2 RECORDER CONFIGURATION

There are no configuration parameters settable except mechanical and electrical calibrations.

## 7 CALIBRATION

**Mechanical calibration** involves setting of pen zero and pen full scale on chart, through the front panel key board. User can calibrate the Recorder by following the sequence

**Electrical calibration** involves aligning the pen to the known parameter value on chart, through the front panel key board. User can calibrate the Recorder by following the sequence

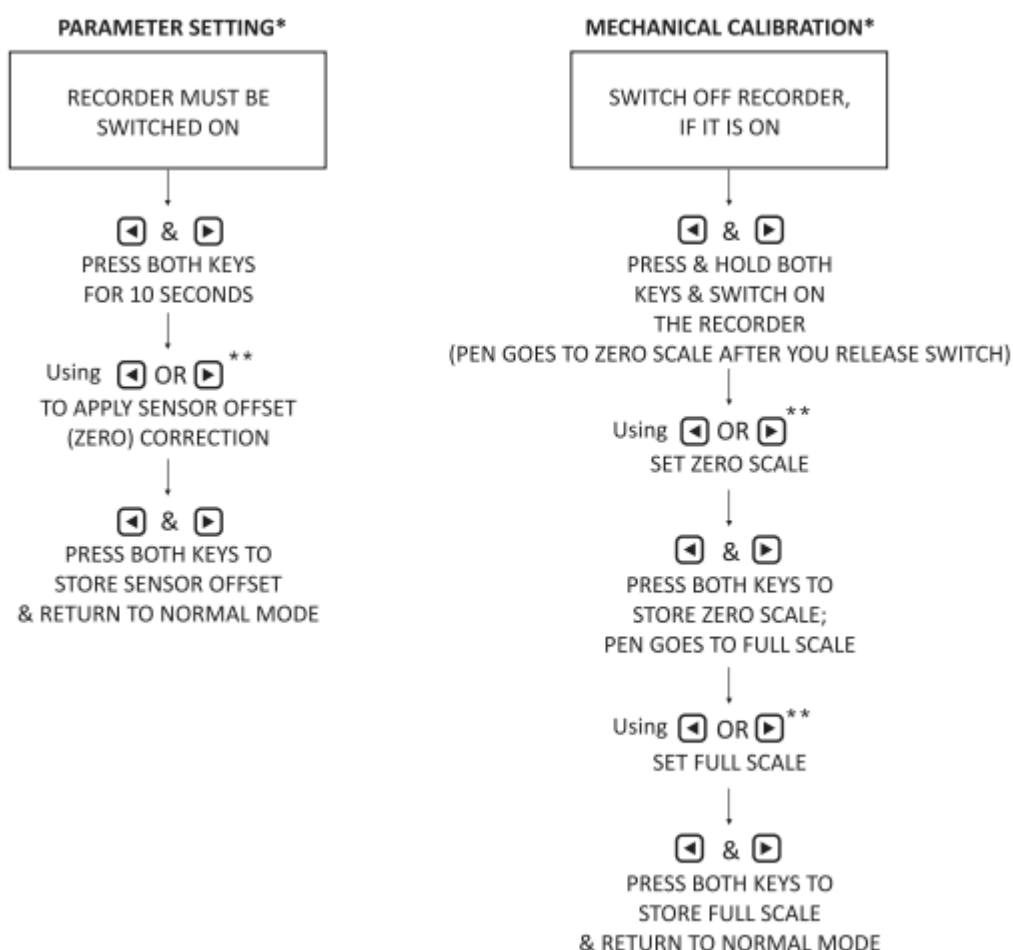


Figure 20 Parameter Setting and Mechanical Calibration

**Note:**

\* If the error is large, you may need to carry out same exercise twice or thrice to set the value properly.

\*\* [<] Pen is moved away from the center of chart.

[>] Pen is moved towards the center of chart.

## 8 TROUBLESHOOTING GUIDE

Table 2 Troubleshooting Guide

Problem	Corrective Action
Chart does not move	<ul style="list-style-type: none"> <li>* Chart knob is loose</li> <li>* Check "PEX Τιμή"</li> <li>* Chart motor is having problem, contact G-Tek</li> </ul>
Recorder RESETS- Γ-TEK keeps flashing	Contact G-Tek
Menu does not come	One of the keys are not working properly. Contact G-Tek
Frequent blowing of Fuse kept in line with mains supply.	Line Filter problem – replace. If problem persists, contact G-Tek
Ink is blotting on the paper	Remove the Pen, put on the blotting paper for about 15 minutes
Power is ON but no display	Replace Fuse (Refer to section Replacing fuse)
Display does not change	Switch OFF the recorder. Replace the sensor and check. If the problem is still there, check it with calibrator. If the problem persist, contact G-Tek.
Difference between display and scale	Carry out mechanical calibration as chart reading per manual
Chart reading is different from some	<ul style="list-style-type: none"> <li>* Carry out mechanical calibration as reference per manual, especially(ζερο) setting</li> <li>* Check sensor</li> </ul>
Reading is not stable	Check the calibrator. If reading is stable replace sensor. If reading is not stable and problem persists, contact G-Tek
Display is proper but pen goes to zero	Check ρανγέ Λο and σπαν and correct using manual
Pen is not marking	Pen is dry- replace pen
Pen does not respond	<ul style="list-style-type: none"> <li>* Reading may be out of range- change ρανγέ Λο and σπαν using manual</li> <li>* Pen motor not working properly, contact G-Tek</li> </ul>
Pen movement is jerky	Contact G-Tek

If you still need any assistance, we request you to send us the "Check list for trouble shooting" provided, filled in with necessary details.

## 9 ACCESSORIES

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### 9.1 STANDARD ACCESSORIES

Charts pack of 30

Pens pack of 5; Part No. - 217006

Panel Mounting Clamps: 2 numbers; Part No. - 210034

### 9.2 OPTIONAL ACCESSORIES

Pipe Mounting Kit

Wall Mounting Kit

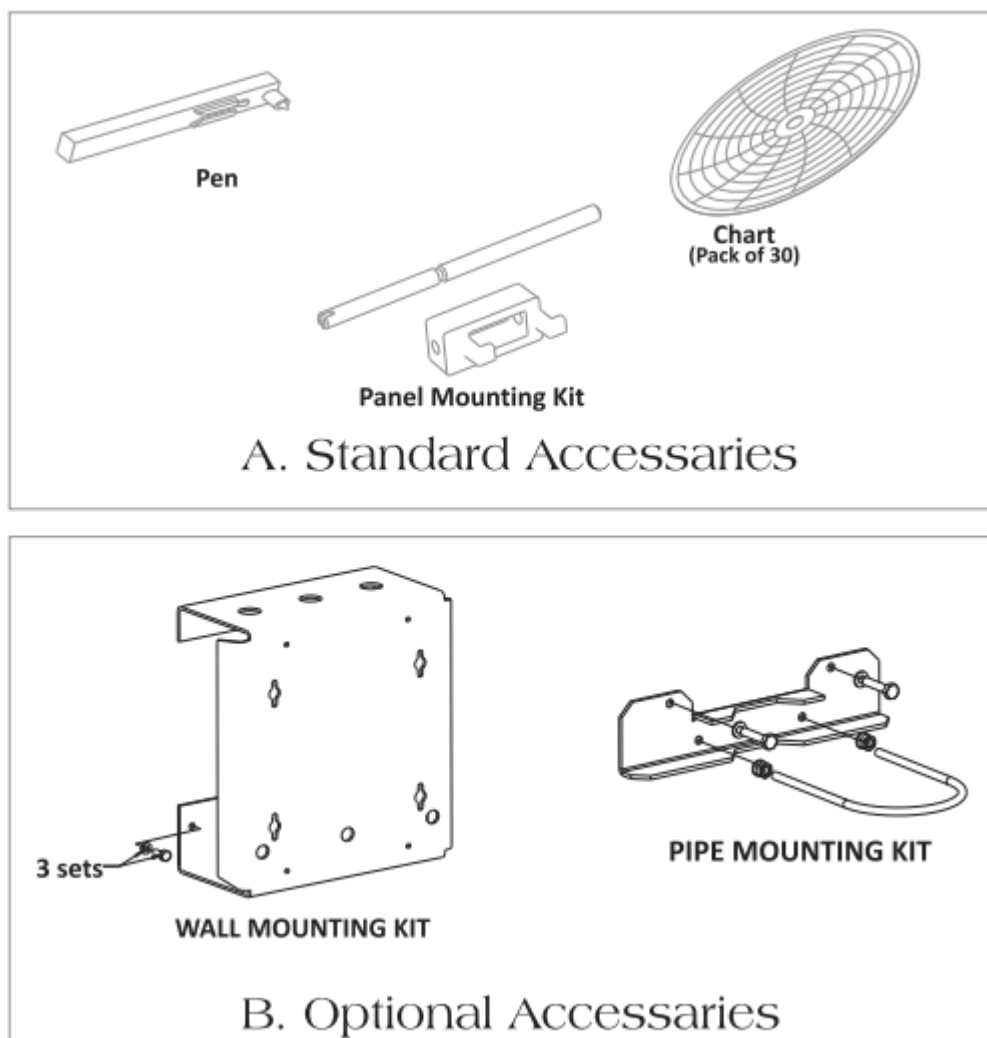


Figure 21 Standard and Optional Accessories

### 9.3 CHARTS (REFER TABLE BELOW)

Table 3 Charts (Refer Table)

Sr. No.	Circular Chart			Part Number	Part Description
	Range	Speed	Size		
21	0 to +100	24hrs/rev	6"	304001	D60100
22	0 to +150	24hrs/rev	6"	304002	D60150
23	0 to +200	24hrs/rev	6"	304005	D60200
24	0 to +300	24hrs/rev	6"	304008	D60300
25	-50 to +50	24hrs/rev	6"	304016	D6-50+50
26	0 to +160 / -1 to +3	24hrs/rev	6"	304004	D60160/-1+3 Dual range
27	+90 to +140	4hrs/rev	6"	305001	4H690140
28	0 to +100	7days/rev	6"	307001	W60100
29	-50 to +50	7days/rev	6"	307010	W6-50+50
30	+50 to -50	7days/rev	6"	307009	W650-50
31	-100 to +50	7days/rev	6"	307005	W6-100+50
32	+50 to -100	7days/rev	6"	307008	W650-100
33	+40 to -10	7days/rev	6"	307007	W640-10
34	0 to +50	7days/rev	6"	307004	W6050
35	0 to +10	7days/rev	6"	307012	W6010
36	+20 to -10	7days/rev	6"	308009	W6+20-10 PS
37	+50 to -100	7days/rev	6"	308004	W650-100 Thermal
38	-50 to +50	7days/rev	6"	308005	W6-50+50 Thermal
39	+40 to -10	7days/rev	6"	308003	W640-10 Thermal
40	-50 to +50	7days/rev	6"	210042	W6-50+50 PS
50	Other				



## 10 SPECIFICATION\*

The full specification for the Blind Recorder is given in the below table

Table 4 Specifications

<b>Model No</b>	<b>CR2010 Series; 6" recorder</b>
<b>Product Code</b>	<b>20xxx / 25xxx</b>
<b>Recording System:</b>	
<b>Pens</b>	
No. of Pens	1
Pen Marking	Continuous
Pen Response Time	<5Sec (Full Scale)
Pen Resolution	Stepper Motor Controlled better than 0.1% FSD
Overshoot	None
<b>Chart</b>	
Chart Speed	1 hour/rev to 255 hours/rev
User setting	User Configurable
Chart Calibrated Radius	2.3" (107) (approx. 59mm)
Chart Ranges	Standard / Customized*
Chart Size	Circular 6" (approx.150mm)
Overshoot	None
<b>Display and Operator Panels</b>	
Display Type	NA
Display Height	NA
Status Indicator	LED
Panel Keys	Front panel KB consisting of 2 keys for programming and configuration setting
Analog Input	RTD (Pt-100)/ 4-20mA (External Shunt Resistance of 50Ω 0.1%) / 0-1V
Sensor Type and Range	Refer Table 5
Scan Rate	Continuous 1reading per Second
<b>Protection</b>	
Input Impedance RTD/Volt	> 20 MΩ
Input Impedance mA	50 / 2.7Ω Shunt External
CMRR	>100 dB@ 50, 60 Hz at 3 Sample per Second
NMRR	>50 dB@ 50, 60 Hz at 3 Samples per Second
Maximum Common Mode Voltage	5V AC
Isolation Channel – Earth	1.5KV 1 Minute
Input Protection	30V AC / DC Max
Termination	Non Interchangeable, Removable Plugs for each input
Transmitter Power Supply	Non Isolated 15V DC; 30Ma Max; Unprotected

Environmental	
Temperature	(Operation) 5°C to 45°C
	(Limiting) 0°C to 50°C
	(Storage) -20°C to 60°C
Humidity	(Operation) 10 to 80 % RH Non Condensing
	(Storage) 5 to 90 % RH Non Condensing
Altitude	<2000 meter
Power Requirement	
Supply Voltage (Mains Operated)	85-264VAC 47-63Hz
Battery backup	Yes
DC Adapter Operated	Yes
Power	10W Max With Maximum Configuration
Fuse Type	None
Battery Backup	
Battery	12V 7Ah External Lead Acid battery
Battery Charger	Yes
Battery Reverse Polarity	Protected
Minimum Back up	> 12 Hrs.
Safety	
Safety	IEC 61010-1
EMI-EMC	EN 61326 Class A
Pollution Degree	II
Installation Category	IV
Vibration	2g Peak (10Hz-150Hz)
Shock	IEC 61010-1
IP Rating	IP50 Door And Bezel
Details	
No Of Inputs Per Module	Max. 2
TC	Types J,K,R,S,T
RTD	PT-100
Vdc	0-1V
mA	4-20mA; 0-20mA (External Shunt Resistance Of 50 $\Omega$ 0.1%)
Sensor Type and Range	Refer to the Table 2
Accuracy	
Accuracy	$\pm 0.5\%$ FSR
Linearization Error	$\pm 0.7^\circ\text{C}$ Max
RTD Resolution	NA
TC Resolution	NA
mV/mA	NA
CJC Accuracy	NA
Step Response	<5 sec (10-90%)
Scan Rate	Continuous 1 reading per second

Overall Dimension	
Dimension L x W x D (mm)	222x187x110
Panel Cutout (mm) (L x W)	200x171
Bezel (mm)	222x187

\*Actual Specification may vary depending upon optional features

*Table 5 ACCURACY AND MEASURING RANGE TABLE FOR SENSORS*

Input Type	Valid Input Range	Resolution Chart	Accuracy	Linearization Error
RTD (Pt-100) DIN 43760 $\alpha = 0.00385$	-100 to 600°C	2%	±0.5%	±0.7°C Max
mA (milli Amperes)	4-20mA / 0-20mA	2%	±0.5% FSD	±0.1% Max
mV (milli Volts)	-1000.0 to +1000.0	2%	±0.5% FSD	±0.1% Max

# 11 ORDERING CODE

Order Code for CR6-NU 1P ND

Table 6 Order Code Format

Recorder type		P= Pen , PS= Pressure Sensitive ,		Power Supply		Relay		PC Interface	
CR		PD		PS		RE		PI	
2	CR4-NU	0	1P ND	0	85-264 V AC; 47-63 Hz	0	None	0	None
		5	1PS ND	1	12V				
				4	85-264 V AC; 47-63 Hz; BB				
				5	85-264 V AC; 47-63 Hz; With TS				
				7	85-264 V AC; 47-63 Hz; BB With TS				
				8	24V DC 1A				

CT - Chart Type (Table 7)		R=Range		CS=Chart Speed		S=Sensor Type	
x	x	R		CS		S	
		1	Fixed	1	4 Hr/Rev	1	RTD
				2	8 Hr /Rev	2	4-20mA
				3	24 Hr/Rev	3	0-20mA
				4	7 Day/Rev	4	0-1 V DC
				9	Other Please Specify		

TS = Transmitter Supply

BB = Battery Backup

Table 7 Chart Type - CT

xx	Description			IN SIDE	OUT SIDE	IN SIDE	OUT SIDE	Part No.	
21	Chart	D	6	0	+100			304001	
22	Chart	D	6	0	+150			304002	
23	Chart	D	6	0	+200			304005	
24	Chart	D	6	0	+300			304008	
25	Chart	D	6	-50	+50			304016	
27	Chart	4H	6	+90	+140			305001	
28	Chart	W	6	0	+100			307001	
29	Chart	W	6	-50	+50			307010	
30	Chart	W	6	+50	-50			307009	
31	Chart	W	6	-100	+50			307005	
32	Chart	W	6	+50	-100			307008	
33	Chart	W	6	+40	-10			307007	
34	Chart	W	6	0	+50			307004	
35	Chart	W	6	0	+10			307012	
36	Chart	W	6	+20	-10			308009	PS
37	Chart	W	6	+50	-100			308004	T
38	Chart	W	6	-50	+50			308005	T
39	Chart	W	6	+40	-10			308003	T
40	Chart	W	6	-50	+50			210042	PS
50	Other								

Note: -

<b>T</b>	Thermal Chart
<b>PS</b>	Pressure Sensitive Chart
<b>W</b>	Weekly Chart
<b>D</b>	Daily Chart
<b>6</b>	6" Recorder
<b>4H</b>	4 Hour Chart
<b>DR</b>	Dual Range Chart

## RANGE OF PRODUCTS:



### Circular Chart Recorder:

- New Improved international look
- Available in 4"; 6"; and 11" format
- Up to 4 Pen recording
- Wide variety of inputs
- Various options and configurations
- User friendly

### Strip Chart Recorder

- X-Y recording format
- Up to 3 Pen recording
- Wide variety of inputs
- Various Chart Speeds to suit any application
- Various options and configurations
- User friendly



### Scanner

- Up to 24 Channels
- 4x20 Character blue over white LCD display
- Individual High and Low alarm setting
- Up to 8 individually configurable relays
- High resolution and faster data rate
- PC and Printer connectivity
- AqWire1.2 - 21 CFR Part II compliant software

### Little Master Series

- For Temperature and % RH measurement
- Data storage up to 32000 readings
- User programmable storage time
- High battery life
- EN12830 Compliant
- One time use data logger also available



CE



| Circular Chart Recorders | Strip Chart Recorders | Hygro-Thermographs | Scanners & Data Loggers  
| Temperature & % RH Data Loggers | Transit Series One-Time use Temperature Data Loggers

