

OPERATING MANUAL

CR-2010 BBR ^{Pro}

**Circular Chart Recorder
CR-2010 BBR
Model No.: 27xx...**



Manufacturers of :

- Circular Chart Recorders
- Inkless Recorders
- Paperless Recorders
- Scanners & Data Loggers
- Networked Data Loggers
- Application Software
- WHO PQS Qualified Data Loggers
- Vaccine Series Data Loggers

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3 LIST OF ABBREVIATIONS

Abbreviation	Description
SR	Set RTC
DD	Date
MM	Month
YY	Year
HR	Hour
MN	Minute
SAV	Save
NBT	No Battery
BAT	ON Battery
BAL	Battery Low
OFS	Offset Menu
MC	Mechanical Calibration Menu
PEZ	Pen zero scale position
PEF	Pen full scale position
CAL	Calibration in progress
ZET	Zero scale position test
FUT	Full scale position test

4 SAFETY AND THE ENVIRONMENT

4.1 ABOUT THIS DOCUMENT

- This instruction manual is an essential component of the product.
- Please read this documentation through carefully and attention to the safety instructions and warning notices to prevent injuries and damage to the product.
- This manual is written specific for one pen recorder with display.
- Keep this document handy so that you can refer to it when necessary.

4.2 ENSURE SAFETY

- Operate the product properly, for its intended purpose and within the parameter specified in the technical data. Using it beyond the specified limit can cause the damage to the product and personnel also.
- Do not use the product if there are signs of damage to the housing.
- Carry out only the maintenance and repair work on this instrument that is described in the documentation. Follow the prescribed steps exactly. Use only original spare parts from Gtek.

4.3 PROTECTING THE ENVIRONMENT

- Dispose of faulty rechargeable batteries/spent batteries in accordance with the valid legal specifications.
- At the end of its useful life, send the product to the separate collection for electric and electronics devices (observe local regulations) or return the product to Gtek for disposal.

5 SPECIFICATIONS

5.1 Use

- This recorder is specially tailored to monitor the blood bank refrigerator temperature data.
- This recorder also has an input for door open switch. The door opening and closing is very frequent during the removal of the stored blood, it is easy to monitor how often and for how much time the door was left open with this recorder.
- This recorder uses pressure sensitive chart paper so there is no need to replace the pen. Since the pressure sensitive chart is used instead of thermal, the life of the recording is high.
- Main's failure and return is also logged. Recorder comes with built in battery backup to ensure the proper working in case of power failure.
- The recorder comes with single channel, single pen for continuous marking of temperature data and 3½ digit LCD display.
- This chart recorder also has 3 multipurpose keys which enables user to easy programming/configure the unit.

5.2 FEATURES

- 6" Chart Width
- Inkless chart recorder
- LCD Display
- Real Time Clock
- Data Storage 64KB of memory
- Event Logging like Power Fail / Door Open / Power Restore
- storage of 14 days of data at 5 minute store interval
- USB port to communicate with PC
- BBR-Chart Application to download data
- Generate Reports from BBR-Chart
- Single Analog Input channel
- Direct Input standard PT-100 sensor
- Chart Speed of 7D/Rev
- Universal Power Supply 85-264 V AC, 47-63 Hz
- Battery Backup up to 72 hours

5.3 TECHNICAL DATA

Table 1 Technical data

Model No	CR2010 Series; BBR Chart Recorder
Product Code*	27x03
Recording System	
No. of Pens	1 – Suitable for marking on Pressure Sensitive Paper
Pen Marking	Continuous
Pen Response Time	<5Sec (Full Scale)
Pen Resolution	Stepper Motor Controlled better than 0.1% FSD
Overshoot	None
Chart	
Chart Speed	7D/Rev
Chart Calibrated Radius	2.3" (approx. 59mm)
Chart Ranges	Programmable
Display, Operator Panels and Input	
Display Type	3½ digit LCD
Status Indicator	RTC, Batch Status, Battery Status
Panel Keys	Front panel KB consisting of 3 keys for programming (configuration) and calibration
Analog Input	RTD PT-100
Sensor Type and Range	Refer to Table 1
Scan Rate	Continuous 1 reading per second
Memory	
Memory Size	64KB
Data Storage	Up to 14 days at 5min Store Interval
Alarm Records	Yes (Going out of limit and coming back to limit is considered as one alarm record)
Record for Door Open / Close	Yes
Mains Failure Record	Yes
Memory Type	Cyclical – Most recent data is always available
User Settable Parameters for Recording	
Alarm Condition Occurrence Time Delay	1 to 99 mins; user settable (through PC) When the temperature remains out of limit for more than set time then only the alarm condition is assumed.
Real Time Clock (RTC)	Settable from Keyboard in DD/MM/YY/HR/MN format
Door Open/Close	Input through Potential Free contact.
Communication	

Communication Type	USB 2.0
PC Application	BBR-Chart™ to download data; Configure recorder and generate report.
Protection	
Input Impedance	> 20 MΩ
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	5 V AC
Isolation Channel – Earth	1.5KV 1 minute
Isolation Channel – Channel	NA
Input Protection	30 V AC/DC max
Termination	Non interchangeable, Removable Plugs
Environmental	
Temperature	<i>(Operation)</i> 5°C to 45°C
	<i>(Limiting)</i> 0°C to 50°C
	<i>(Storage)</i> -20°C to 60°C
Humidity	<i>(Operation)</i> 10 to 80 % RH Non-Condensing
	<i>(Storage)</i> 5 to 90 % RH Non-Condensing
Altitude	<2000 meter
Power Requirement	
Supply Voltage (Mains Operated)	85-264 V AC 47-63Hz
Battery backup	Yes
DC Adapter Operated	Yes
Power	15 W Max with Maximum Configuration
Fuse Type	None
Battery Backup	
Battery	7 Ah 12 V, 1.4 A External Lead Acid Battery
Battery Charger	Yes
Battery Reverse Polarity	Protected
Minimum Back up	>72 Hours
Safety	
Safety	IEC 61010-1
EMI-EMC	EN 61326-1 Class A
Pollution Degree	II
Installation Category	III
Vibration	2g Peak (10 Hz-150Hz)
Shock	IEC61010-1
IP Rating	IP50 (Door and Bezel only)
Overall Dimensions	
Dimension (L x W x D) mm	232x205x117
Panel Cutout (L x W) mm	198x169
Bezel (L x W) mm	232x205

*Actual specification may vary depending on the optional features installed.

**Refer to the back panel of recorder for exact rating.

Table 2 Chart type of Chart Recorder

Sr. No.	Range**	Speed	Size	Part No.	Part Description
21	0 to +100	24H	6"	304001	D60100
22	0 to +150	24H	6"	304002	D60150
23	0 to +200	24H	6"	304005	D60200
24	0 to +300	24H	6"	304008	D60300
25	-50 to +50	24H	6"	304016	D6-50+50
26	0 to +160 & -1 to 3	24H	6"	304004	D60160&-1+3
27	+90 to +140	4H	6"	305001	4H90140
28	0 to +100	7 Day	6"	307001	W60100
29	-50 to +50	7 Day	6"	307010	W6-50+50
30	+50 to -50	7 Day	6"	307009	W650-50
31	-100 to +50	7 Day	6"	307005	W6-100+50
32	+50 to -100	7 Day	6"	307008	W650-100
33	+40 to -10	7 Day	6"	307007	W640-10
34	0 to +50	7 Day	6"	307004	W6050
35	0 to +10	7 Day	6"	307012	W6010
36	+20 to -10 (PS)	7D	6"	308009	W620-10PS
37	+50 to -100 (PS)	7D	6"	308008	W650-100PS
39	+40 to -10 (PS)	7D	6"	308003	W640-10PS
40	-50 to + 50 (PS)	7D	6"	210042	W6-5050PS
50	Other Please Specify				

** First value in the chart is at the center of the Chart.

** Chart range low and chart speed are fixed as per the order code.

PS: Pressure Sensitive Chart

6 UNPACKING AND INSPECTION OF RECORDER

- If the outer box shows sign of damage, it should be opened immediately, and the recorder be examined.
- If there is evidence of damage, the instrument should not be operated, and the local representative contacted for instructions. Ensure that all accessories and documentation is removed from the box.
- Open the door of the recorder by rotating the knob Figure 1.
- Open the chart plate by opening the captive screw and inspect the recorder for mechanical integrity. Close the chart plate and door. If the recorder is not for an immediate use, re-pack the recorder in its original packing.
- If the recorder is for immediate use, you can start installing it now as per following instructions.
- **Please preserve the original packing along with all internal packing for future transport requirements.**

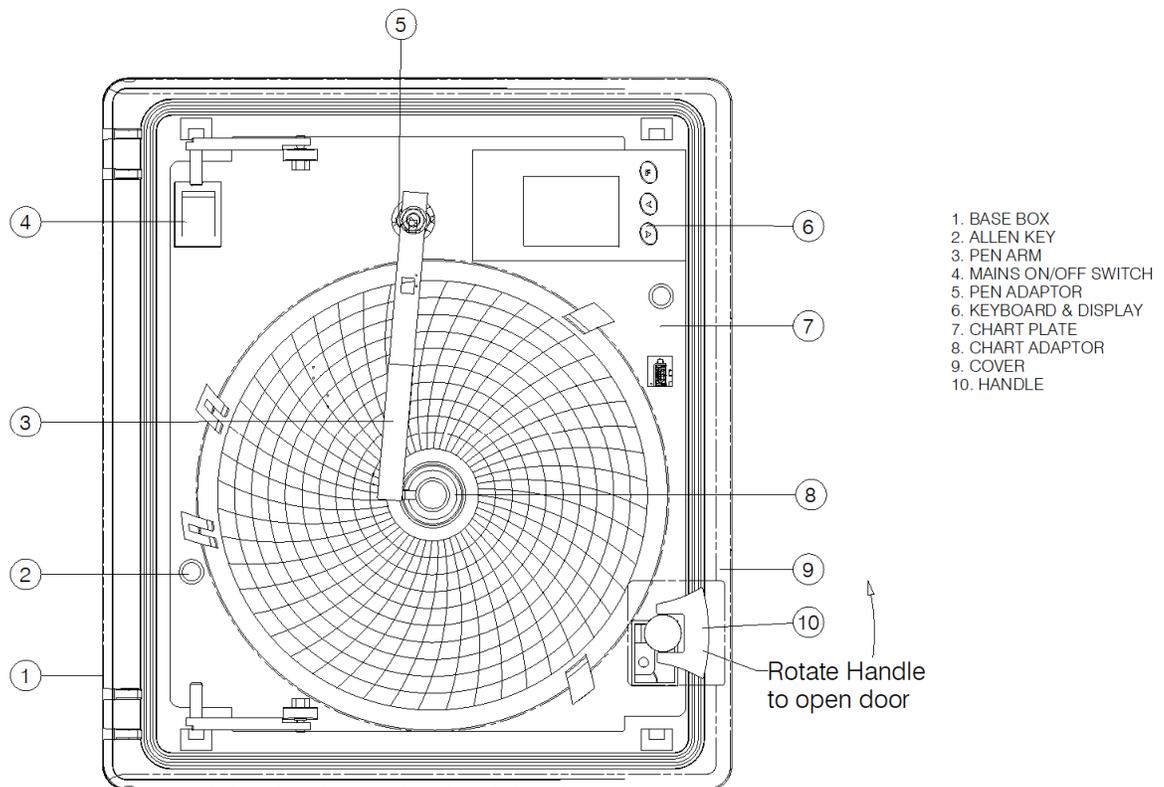


Figure 1 Front View of Recorder

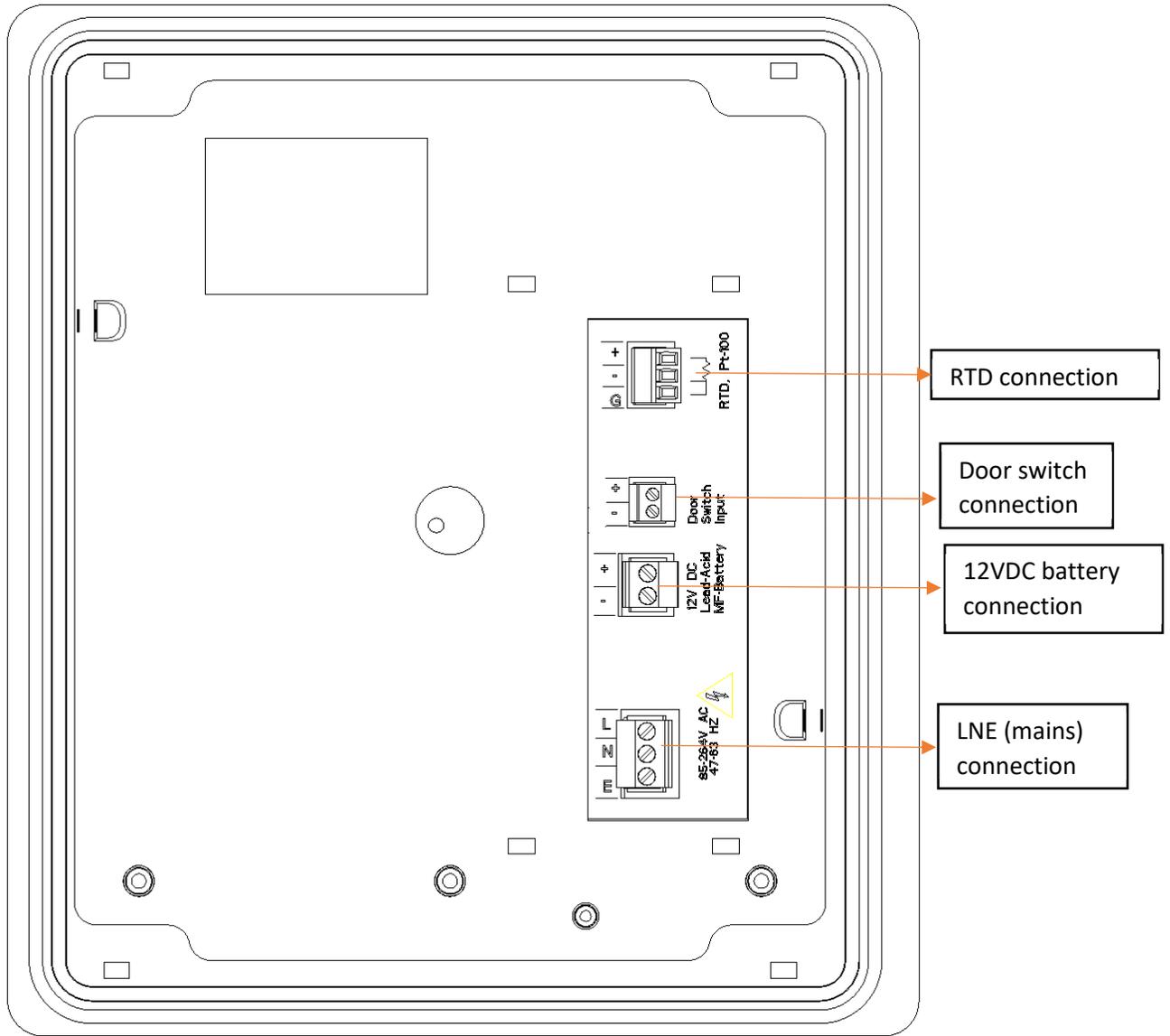


Figure 2 Back view of Recorder

6.1 INSTALLATION

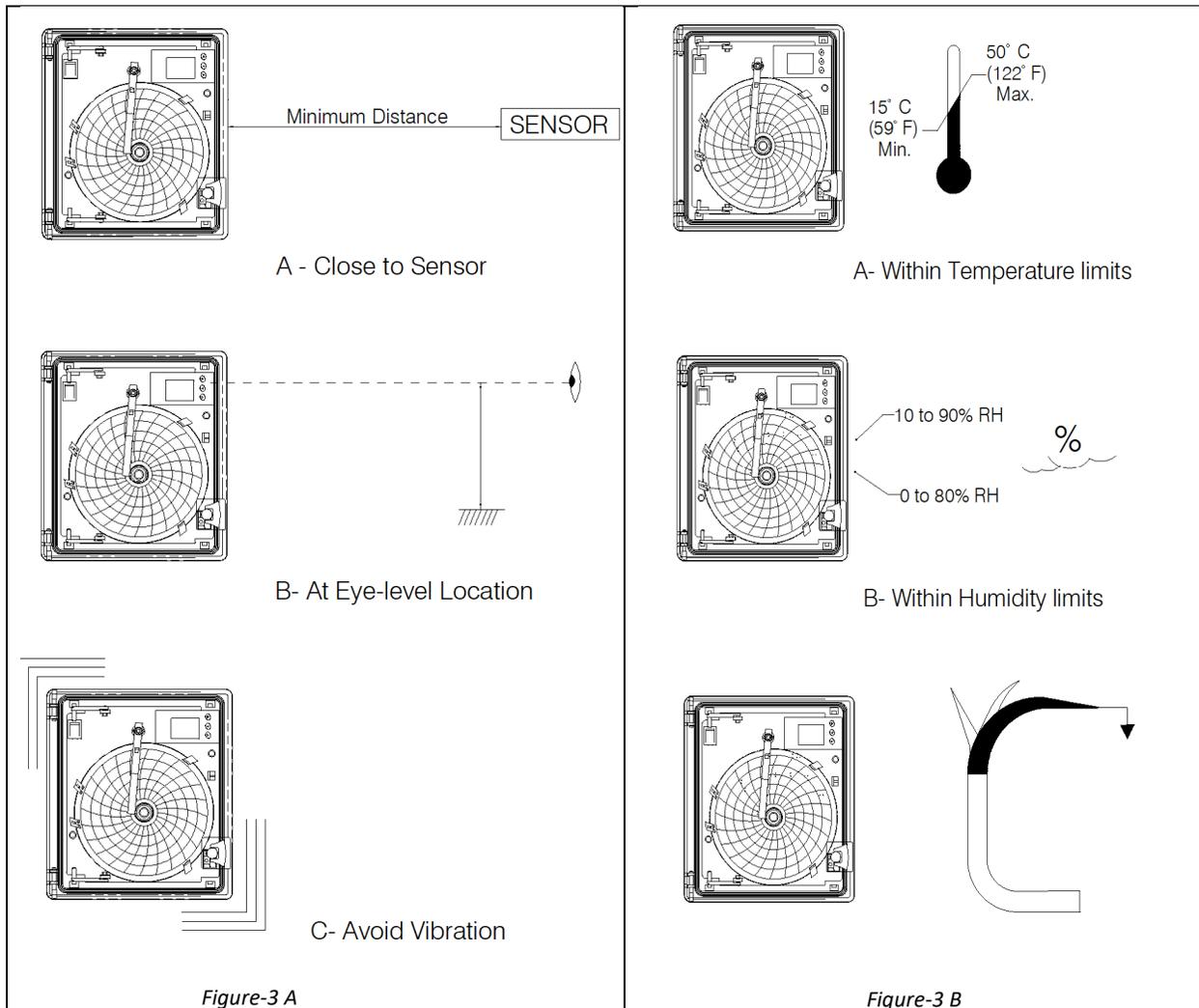


Figure 3 Environmental Conditions

Environmental Conditions:

Recorder should be used with proper environmental conditions for better operation. The environmental conditions are shown in Figure 3.

Attention

Select a location away from strong electrical and magnetic field. If this is not possible, particularly in application where mobile communication device is expected to be used, screened cables within earthed (grounded) metal contact must be used as shown in above figure 3B.

6.2 OVERALL MECHANICAL DIMENSIONS:

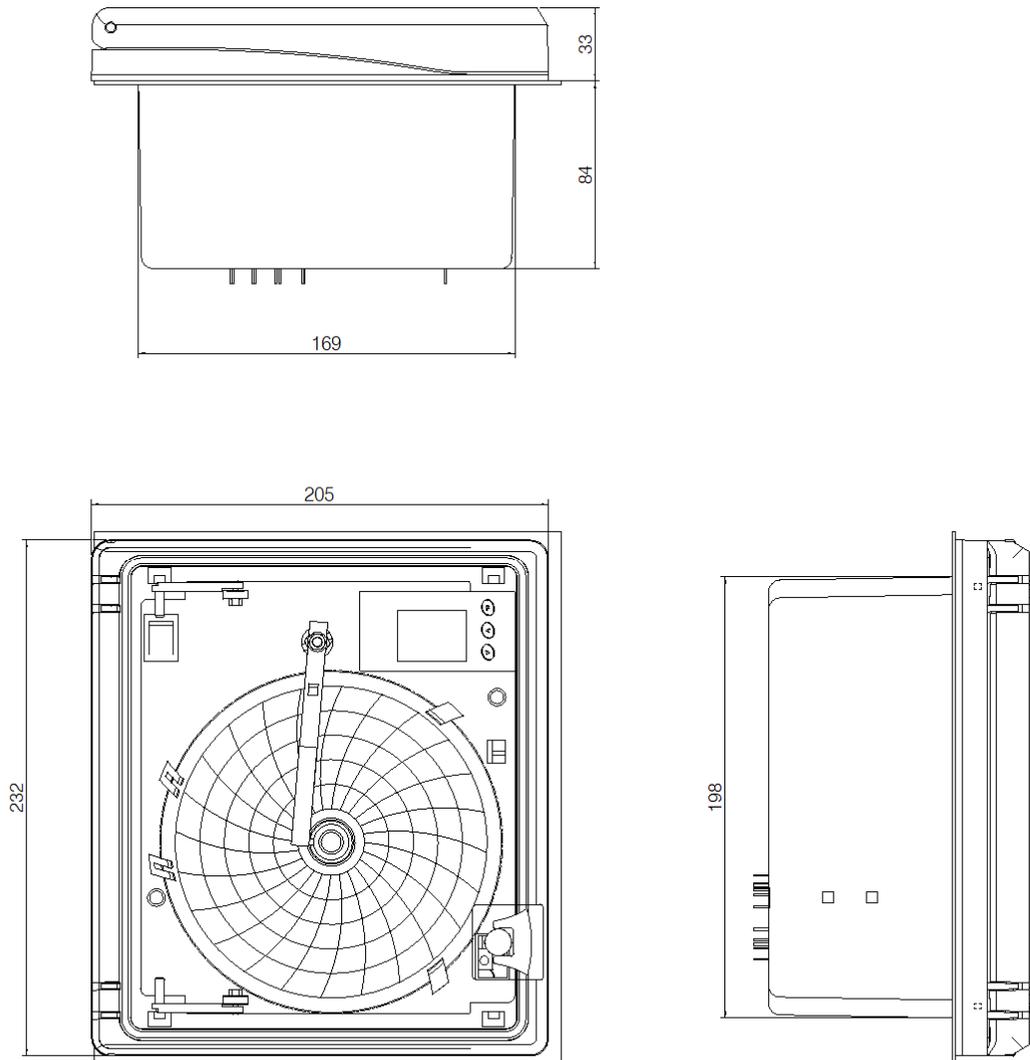


Figure 4 Overall Mechanical Dimensions

Table 3 Overall Mechanical Dimensions

Overall Dimensions(approx.)	
Dimensions L x W x D (mm)	232 x 205 x 117
Panel Cutout L X W (mm)	198 x 169
Bezel L x W (mm)	232 x 205

The panel mounting of recorder is shown in figure 5.

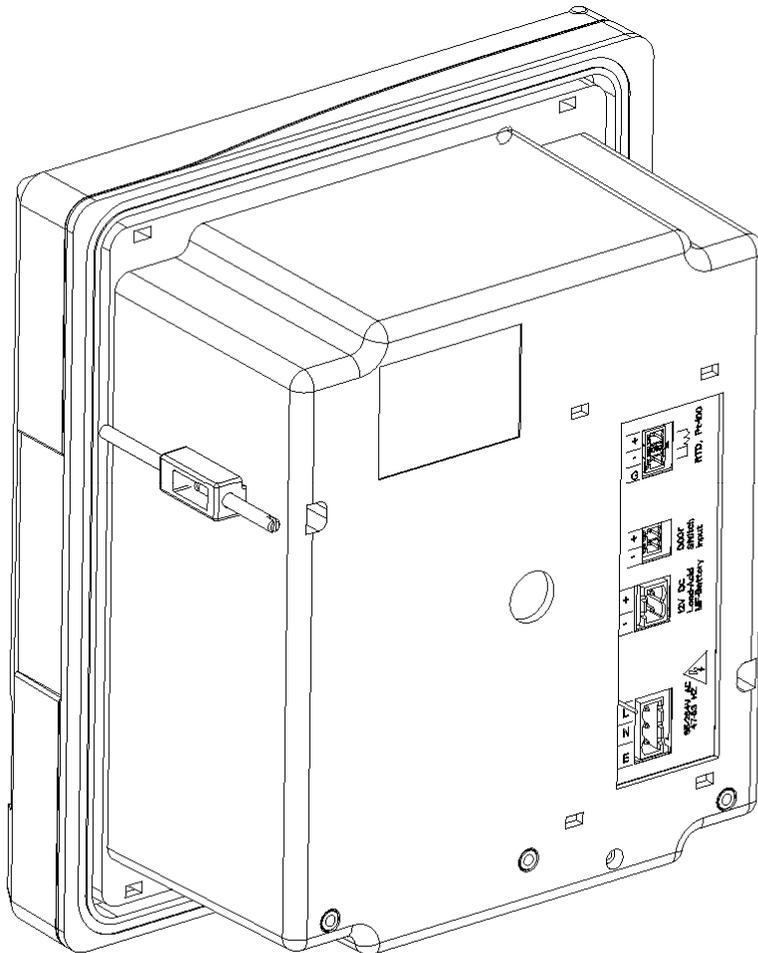


Figure 5 Panel Mounting

7 ELECTRICAL INSTALLATION

7.1 WIRING DIAGRAM FOR RECORDER

- Refer the figure 6, to connect AC mains, 12V DC Input, door switch input and sensor to the recorder.

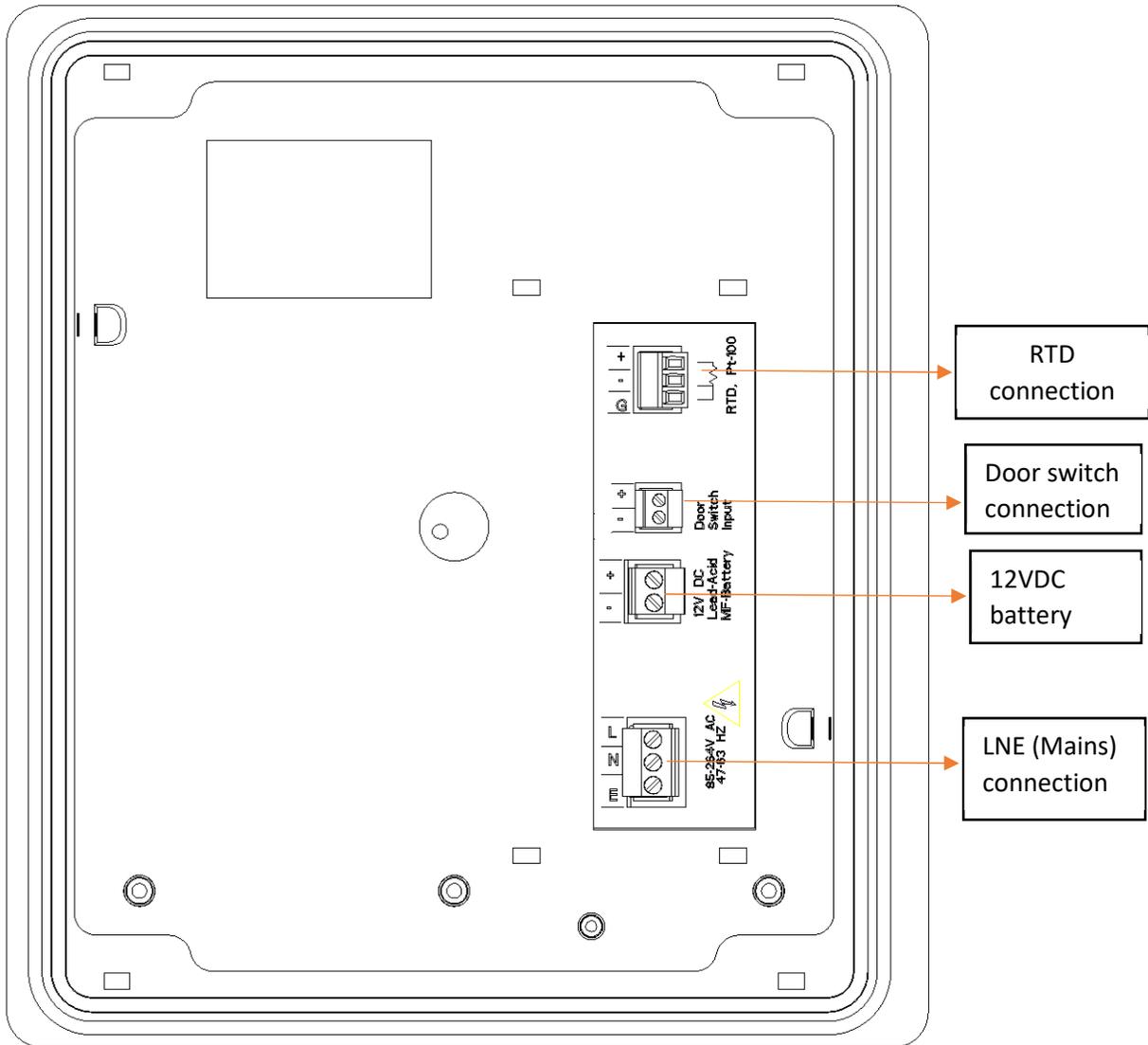


Figure 6 Back panel view with notation

Table 4 Connection Notations

Code	Connector Name	Pin Number of connectors		
		1	2	3
Sensor input	RTD (PT-100) 3-Wire	(+)	(-)	(G)
Door Switch	Door switch input	(+)	(-)	
Battery	12 V DC Battery	(+)	(-)	
AC supply	85 – 264 V AC supply 47 – 63 Hz	Line (L)	Neutral(N)	Earth (E)

- The connections for Main’s supply, Door switch input, 12VDC battery connection and sensor input are shown in Figure 6. As per the figure the live, neutral & earth from the mains cord are connected to L, N & E respectively.
- Ensure that the bared ends of the mains cord are fully inserted into the mains connector and no loose/poor connection.
- Also connect the Earth wire of the cable to the Earthing terminal given on body of the recorder.
- Table 4 shows the connection notations for Main’s supply, Door switch input and sensor input.

Sensor Wiring:

- The connection of the recorder to a proper safety earth ground is essential. Such connection not only reduces the possibility of electric shock, but also provides the required return for the recorder line power filters.
- All local electrical codes of practice must be followed when installing any instrumentation. Please refer to the back panel of recorder to know the type of sensor input.
- When wiring RTDs, lead length and diameter must be chosen such that lead length are equal and that each lead exhibits no more than resistance of 10 Ω between the recorder and the RTD (Pt-100).
- For Input connections, high quality, low resistance contacts must be used which are suitable for dry operations.

7.2 FITTING THE CHART

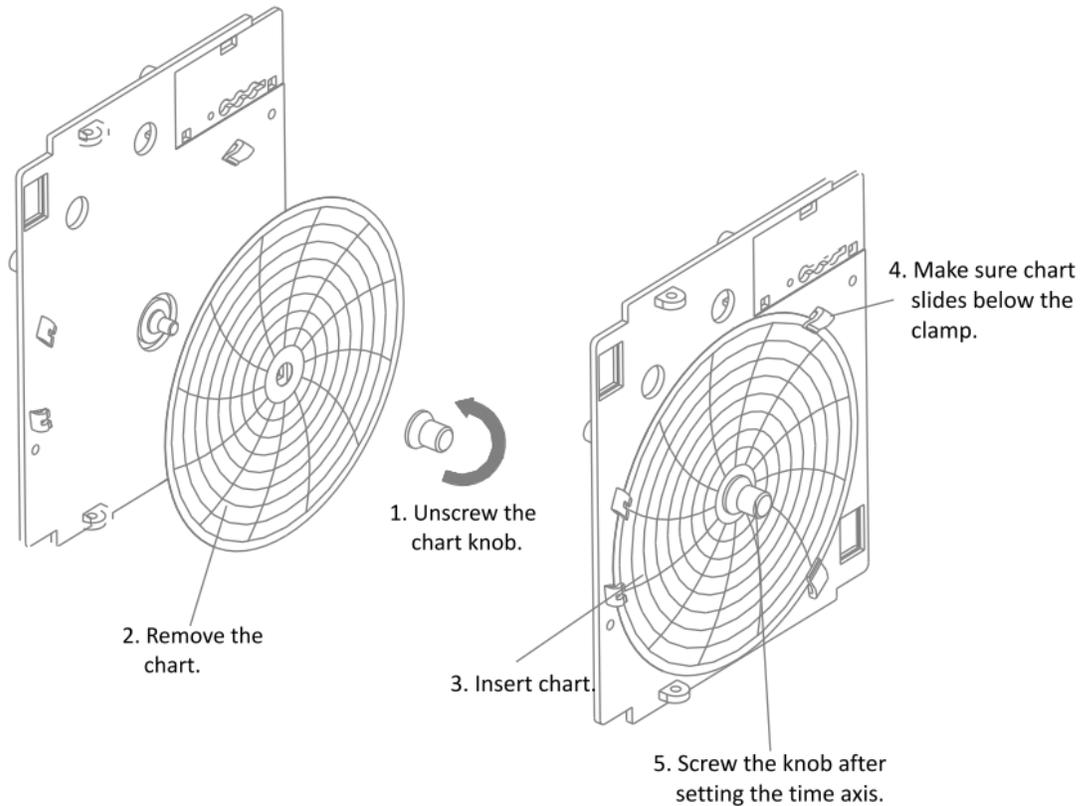


Figure 7 Chart Fitting

To replace the chart, follow the steps:

1. Open the door of the recorder.
2. Park the pen on full scale position.
3. Unscrew the chart knob as shown in figure 7.
4. Remove the chart.
5. Insert the new chart.
6. Screw the knob after setting time axis. Make sure that chart slides below the clamp as shown in Figure 7.

8 OPERATION

8.1 FRONT PANEL OF RECORDER

After the proper wiring is done, pen and chart fitted properly, Power ON the recorder. The pen will move towards the center of the chart. After it reaches the center of the chart, it stops there. After a while pen will move to the position on the charts 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 arrived as under.

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 +50 to -100 with +50 marked at the center of the chart,

Range low = +50

Span = 150

Full range = 50 – 150 = -100

For the recorder in example, when the parameter value is equal or less than -100, the pen will remain at the full scale of the chart. When the parameter value is equal or more than +50, pen will remain at the center of the chart.

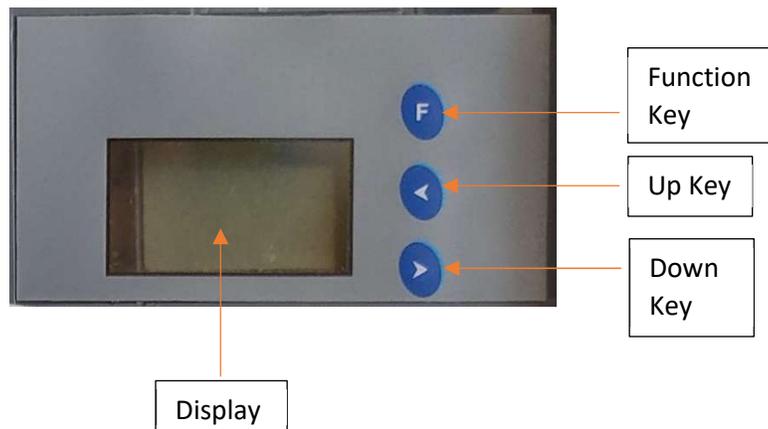


Figure 8 Recorder Front Panel

KEYS:

There are three multifunction keys available on the front panel of the chart recorder to configure the different parameters. The names of these keys are described as below:

-  Function key.
-  Up key.
-  Down key.
-  &  Enter key.

9 SET RTC MENU

9.1 SET RTC MENU SEQUENCE

- In normal condition the display is off, by pressing function key user can enter to the Set RTC (Sr) menu as shown in figure 9.
- Once you enter in the Sr menu, you must set the RTC otherwise the default value will be set for DD, MM, YY, HR & MN.
- If no activity is observed on keyboard, after 2 minutes the display will automatically turn off.

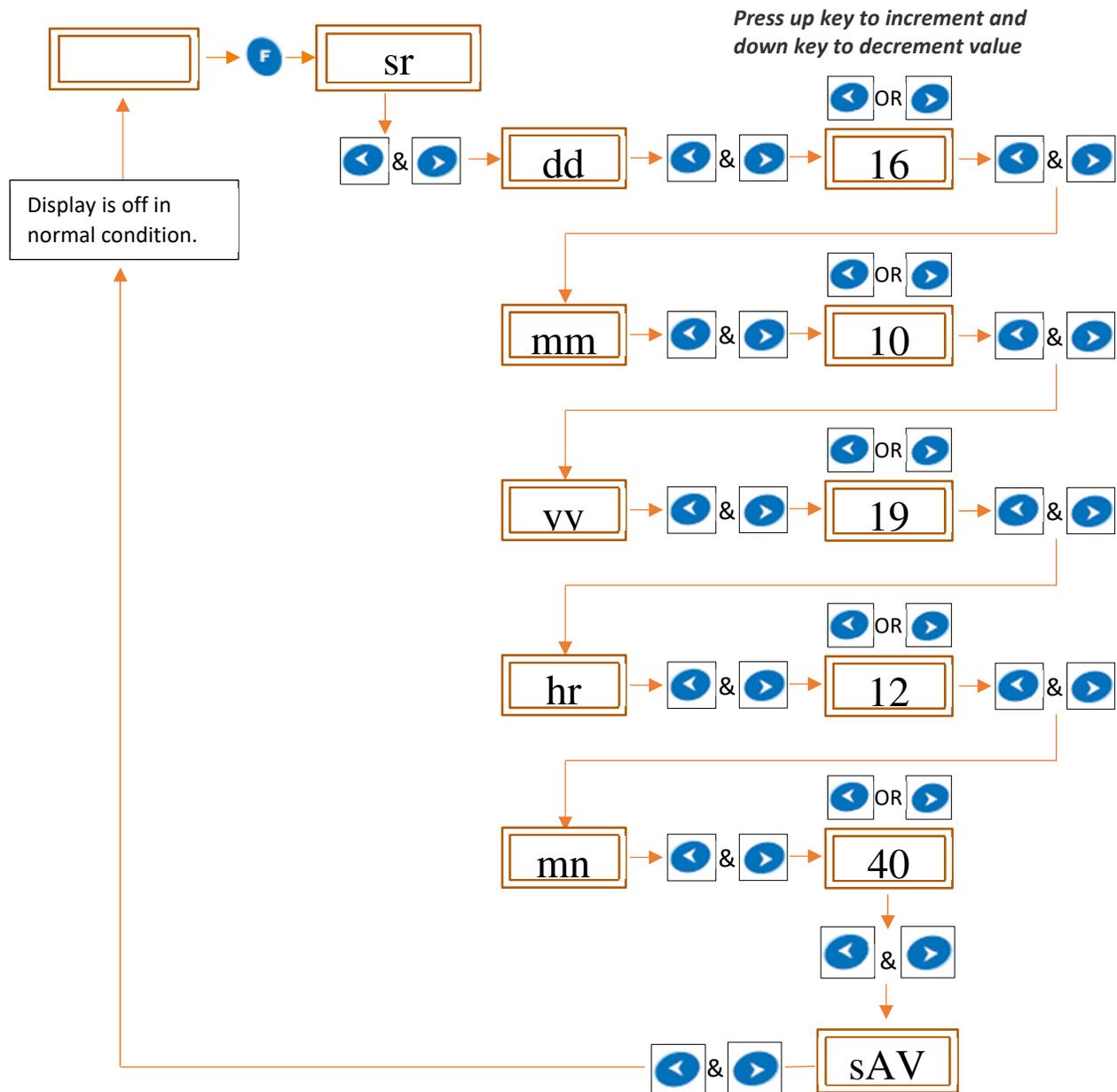


Figure 9 set RTC menu

Note: Pressing both (UP & DOWN) keys at a time works as enter key. Ensure that the DD, MM, YY, HR and MN values are set properly.

Keys:

-  To increment the value.
-  To decrement the value.
-  &  To save the value & go to next step.

9.2 VIEW CURRENT TIME & BATTERY STATUS INDICATION.

View Current time

- To see the current RTC, press UP or DOWN  OR  key.
- User can see the current time in DD/MM/YY/HR/MN format, while the recorder is running in normal mode. First it shows the DATE for approx. 3sec, then it will show the MONTH for 3 seconds, likewise it will show other parameters one by one for 3 seconds and after that the display will be off.
- After showing the current time, the display shows battery status on the display for 3 seconds and then come back to its normal condition.
- Display shows only one status from these three (refer figure 10), as per the connection on the device. Also refer the below description for more understanding.

Battery status indication

- If the device is on battery, then display shows “bat” status and the battery symbol  on left corner of the display. Note that, when battery is voltage level goes below 10.5 V, the display will show “BAL” status and battery symbol  indicating the battery low level.
- If it is only on mains, then it will show “nbt” on status.
- If Device is connected on Mains and battery is connected then display will simply turn off.
- **While batch is in running condition display shows “rec” on top left corner of the display with view time indication.**

Note: Battery status: sufficient  ; part empty  ; low  ; Empty 

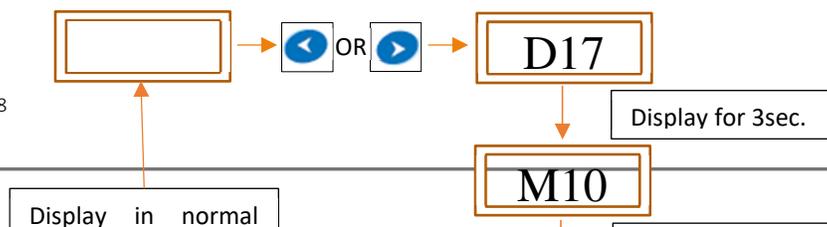


Figure 10 View current time

- **“Display shows only one status out of these four as per the connection to the device”.**
- Currently it shows the nbt on status, it indicates that the display is currently connected to the mains power supply.

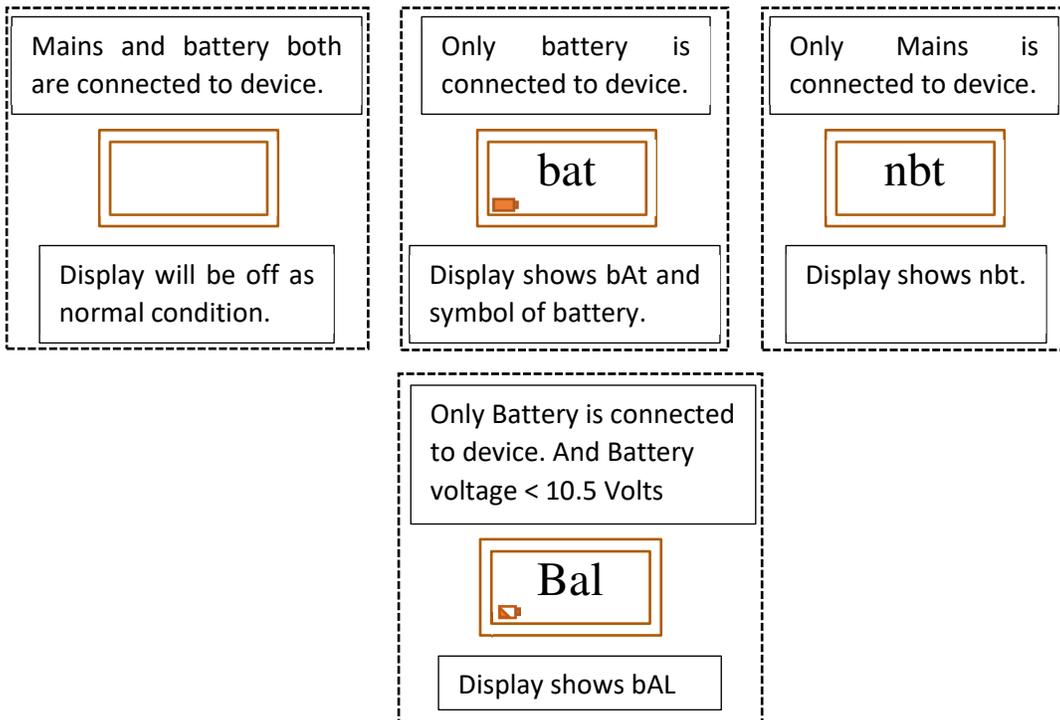


Figure 11 battery status indication

10 OFFSET MENU

- If the user wants to add positive/negative offset to the reading, it can be applied by accessing the Offset menu.
- This menu involves application of an offset in current reading, through the front panel keyboard. User can give an offset in current reading by the sequence shown in figure 12.
- The time-out for Offset menu of display is 2 minutes, after that the display will be off.
- An offset can be given in the range of **-99.9 to 99.9**.

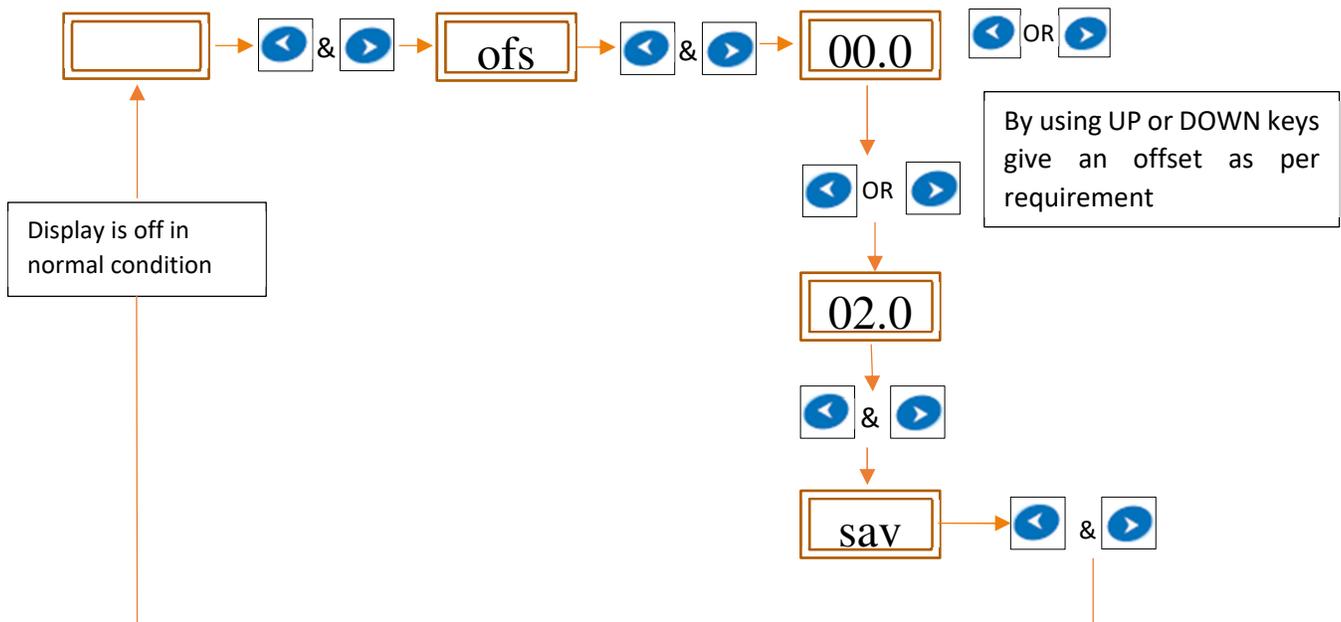


Figure 12 Offset Menu Operation

Note: In between the menu execution, if the user wants to abort the operation, by pressing



function key, the menu will be terminated.

11 CALIBRATION MENU

11.1 MECHANICAL CALIBRATION

- This involves setting of Pen zero and Pen full scale on chart, through the front panel keyboard. User can calibrate the Recorder by following the sequence shown in figure 13.
- The time-out for mechanical calibration for display is 10 minutes, after that the display will be off.
- **On Power up**, Press **Up and Down Key simultaneously** to access the **Mechanical Calibration Menu**.

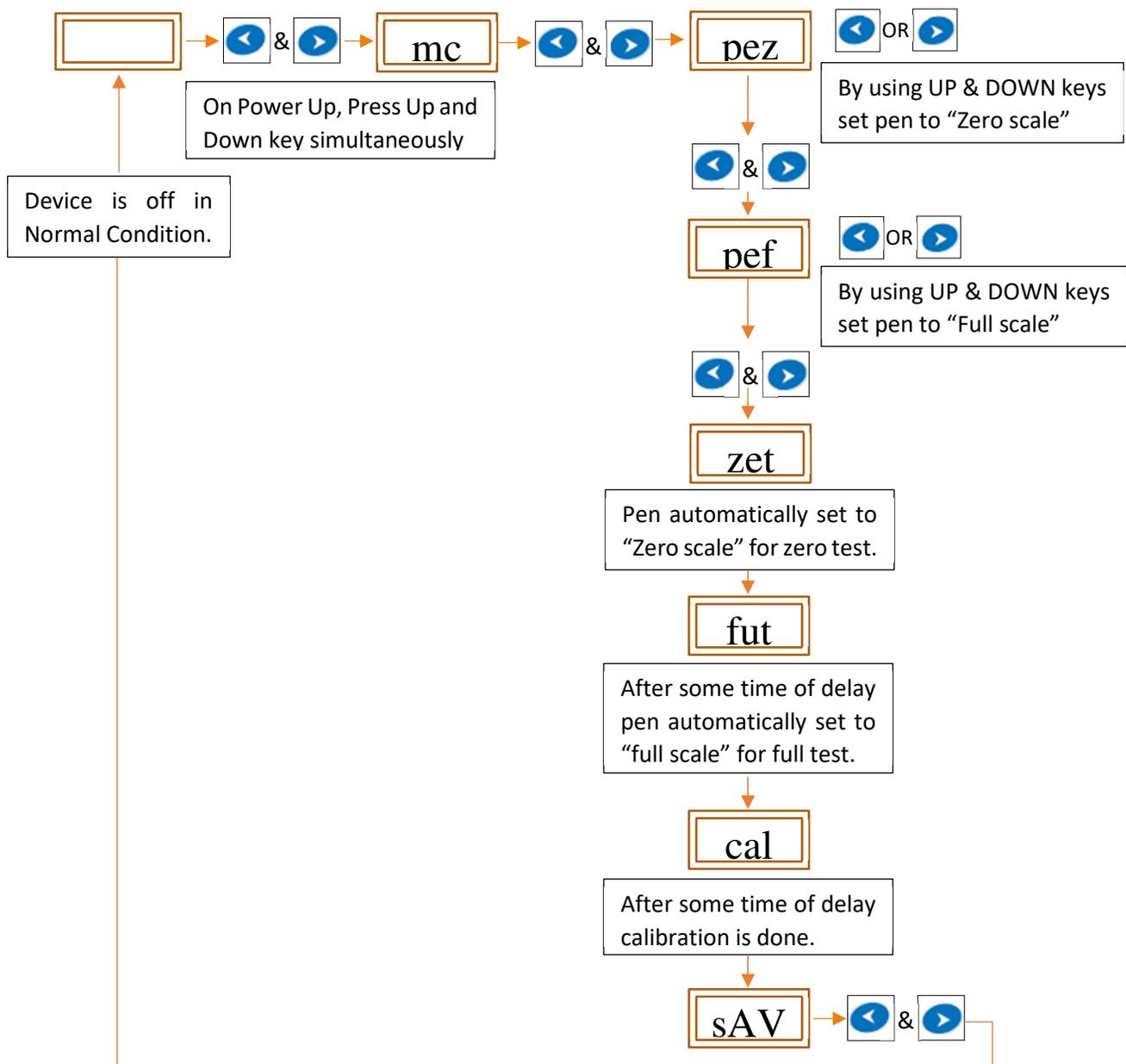


Figure 13 Mechanical calibration

Note: If the error is large, you may need to carry out same exercise twice or thrice to set the value properly. "cal" Status is blinking during the calibration process on display.

Keys:



Pen is moved away from the center of the chart



Pen is moved towards the center of the chart

12 TROUBLESHOOTING GUIDE

Table 5 Troubleshooting Guide

Problem	Corrective Action
Power is On but pen does not move.	<ul style="list-style-type: none"> • Check the sensor input. If the input is within the range, carryout the mechanical calibration. • Pen motor is faulty – Replace it. • If the problem persists, contact factory.
Reading is not stable.	<ul style="list-style-type: none"> • Replace the sensor with fixed known input. If the problem is solved, check and replace the sensor if required. • If problem persists, contact factory.
Pen does not respond to input.	<ul style="list-style-type: none"> • Check whether the input value is within the range of the recorder or not. • If the input is within the range, carryout the mechanical calibration. • If problem persists, contact factory.
Pen movement is jerky.	<ul style="list-style-type: none"> • Contact factory.
Pen is positioned properly but it is not marking.	<ul style="list-style-type: none"> • In case of pressure pen, ensure that pressure sensitive chart paper is used, and the pen tip is touching the paper properly. • In case of normal ink pen, pen may be dried. Replace the pen.
Pen ink blotting.	<ul style="list-style-type: none"> • Remove the excess ink with blotting paper. • Pen arm pressure may be more, adjust it. • Check if Chart knob is tightened properly.
Chart does not move.	<ul style="list-style-type: none"> • Check if Chart knob is tightened properly. • If chart does not move still, then contact factory.
Calibration settings cannot be performed.	<ul style="list-style-type: none"> • Contact factory.

NOTE: if you face any other problem, please contact G-Tek Corporation Pvt. Ltd.

13 STANDARD ACCESSORIES

Charts Pack of 30

Panel Mounting Clamps: - 2 numbers

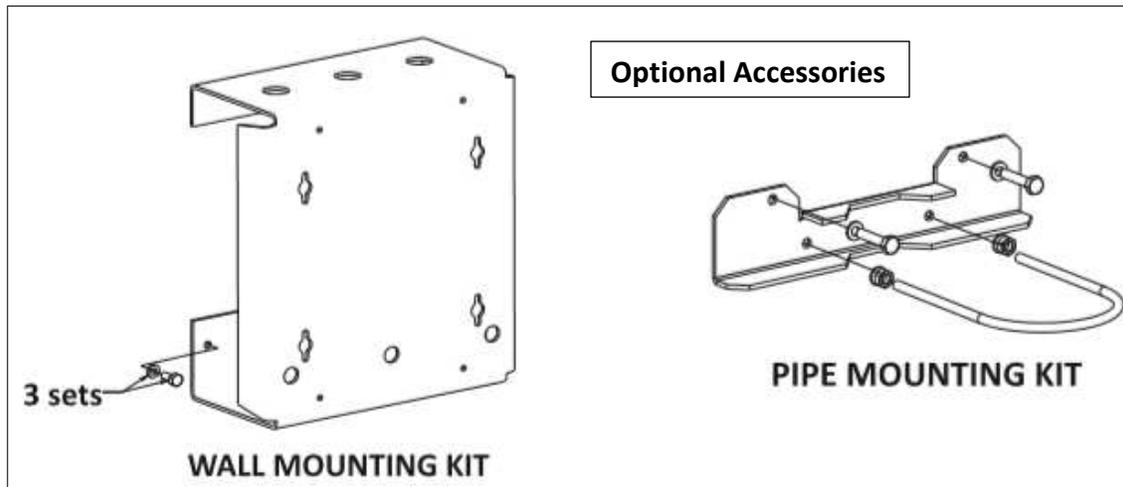
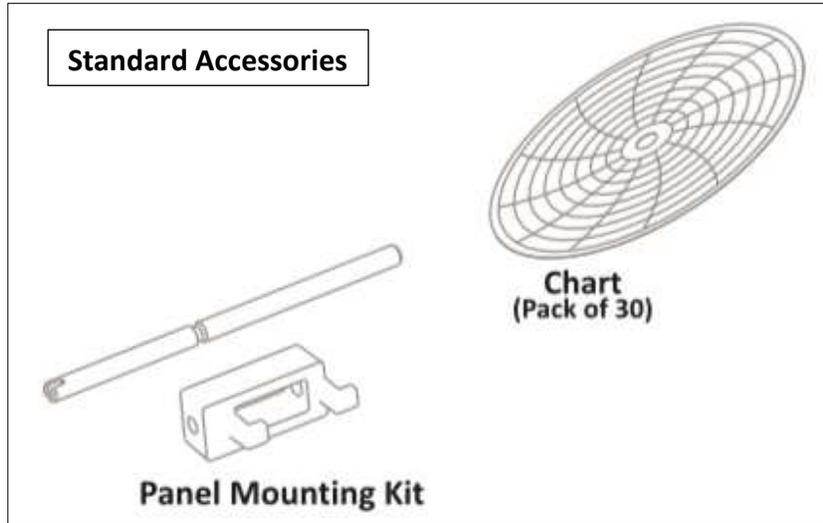


Figure 14 Accessories

14 ORDER CODE

The Order code for the chart recorder is as below:

Table 6 Order code

CR		PD		PS		RE		PI		-	CT		R		CS		S	
C=Chart Width R=Recorder type		P= Pen, TP= Thermal-Pen, D= Display, ND=No Display		PS = Power Supply TS - Transmitter Supply		RE = Relay		PI = PC Interface			CT - Chart Type		R=Range		CS=Chart Speed		S=Sensor Type	
CR		PD		PS		RE		PI			x	x	R		CS		S	
1	CR4-NU	0	1P ND	0	85-264 V CE	0	None	0	None				0	PG	0	P. G	0	Uni.
2	CR6-NU	1	1P D	1	12-15V DC	1	1	1	RS-232				1	Fixed, Specify	1	4H	1	RTD
3	CR11-NU	2	2P D	4	85-264V CE BB	2	2	2	RS-485				2		2	8H	2	4-20mA
4	STC	3	3P D	5	85-264V CE with 2x1.5AA battery	3	3	3	USB				3		3	24h	3	0-20mA
		4	4P D	6	4x1.5V AA battery	4	4	4	TCP/IP				4		4	7D	4	0-1 Volt
		5	1PS ND	8	24 V	5	5	6	Wi-Fi				5		5	20mm/HR	5	TC-J
		6	1P LCD			6	6						6		6		6	TC-K
		7	1PS LCD										7		7		7	TC-R
		8	1P D BBR										8		8		8	TC-S
													9	Other	9		9	TC-T
																	A	0-10V DC
																	B	0-5V DC