



# CIRCULAR CHART RECORDER OPERATING MANUAL

## **SONICS CONTROL SYSTEMS**

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**B) FOR RESISTANCE THERMOMETER INPUT**

In order to simulate 3 wire PRT, two wires "C", "A" be taken from one terminal of the decade box and one wire "B" from the second terminal of decade box.

i) Connect the decade box "C", "A", "B" wires to the appropriate terminals on the back of the instrument. Adjust the resistance corresponding to start of scale. (usually it is 0°C.) by referring resistance standard table and with the help of ZERO potentiometer adjust start of the reading.

ii) Adjust the resistance corresponding to full scale of range and with the help of SPAN potentiometer, adjust the full scale of range reading.

iii) Once again carry out the step (i) and then (ii) till both the end gets adjusted.

For every instrument two potentiometers, identified as SPAN and ZERO are provided.

For C-100R and C-60R, these potentiometer are provided on front panel.

**SPECIFICATIONS**

- Inputs : Linear D.C mV / mA / Volts/ Amp. (5 mA/D.C. MIN. any thermocouple K, J, R, S, B. (5 mA/D.C. Mini) Resistance. Thermometer : Min. 25 ohms change in resistance anyone.
- Intrinsic error : Typical 0.5 % span max.
- Total response time : Less than one second.
- Dead Band : Typical 0.3 % span max.
- Chart writing width : 57 mm, Circular type dia152 mm. or 100 mm, Circular type dia 170 mm.
- Chart Speed : 1 Day / Rev. or 7 Days/ Rev.
- Operating Temperature : 0 to 55°C
- Operating Humidity : 0 to 80% RH
- Automatic cold junction compensation : Automatic on thermoelectric Instruments. Typical error 0.08% per ambient temperature.
- Zero error due to ambient temperature : + 0.05% span / °C. temp. variation.
- Maximum source resistance : 1 Kilo ohms without broken sensor protection. 100 E with broken sensor protection for Connection of RTD max of 5 ohms resistance per lead.

- Power supply voltage and frequency : 240 V @ 50 Hz or 115 V @ 60 Hz can be supplied.
- Power consumption : 24 VA
- Error due to supply variation : +0.2% of span max. for 10 % to 5% variation.
- Standard current through source : 100 mA typical.
- Chart Speed Variation : +2 % of 50 Hz for Synchronous type chart drive motor.  
0.5 % Stepper motor chart drive. (Optional)
- Disposable pens are available (Red and Green colour)
- Broken Sensor Protection (B. S. P.) up scale on thermoelectric instruments unless otherwise specified.
- Insulation Type Test :-
  - a) Mains input to earth 1000 V DC.
  - b) Relay contact to earth 1000 V DC.
  - c) Input to earth 1000 V DC.

- c) Decade resistance box with 5 decades, maximum resistance being 1111. 10 ohms with a resolution of 0.01 ohms.
- d) Reference table for resistance thermometer as per DIN 43760 with R at 0° C. to be 100 ohms. (It may please be noted that above mentioned things can also be supplied at extra cost if needed by the customer.)

## CALIBRATION PROCEDURE

### A) FOR THERMOCOUPLE INPUTS

- i) Feed the millivolts, corrected for cold junction temperature, corresponding to start of the range. (which usually is 0°C.) and with the help of ZERO potentiometer adjust the start of range reading (which usually is 0°C.)
- ii) Feed the millivolts corrected for cold junction temperature, corresponding to full scale of range & with the help of "SPAN" potentiometer adjust the full scale of range.
- iii) Once again carry out step (i) and then (ii) till both the ends get adjusted. For feeding the corrected millivolts, one has to refer to appropriate reference table of thermocouple.

**CALIBRATION**

Normally before dispatch, all the instruments are properly calibrated. In case there arises a need of calibration of the same, one can proceed as follows.

For every instrument, two potentiometers identified as "S" for SPAN and "Z" for ZERO are provided.

For those whose front panel pots are accessible from front side are dully identified. For carrying out calibration, the following things are required.

- a) 4 - 1/2 digit millivolts calibrator, capable of reading millivolts and feeding millivolts. (The resolution required is at least 10 microvolts.)
- b) For thermocouple input instrument,

Reference table for chromel/ alumel : IS 2054 - 1962.

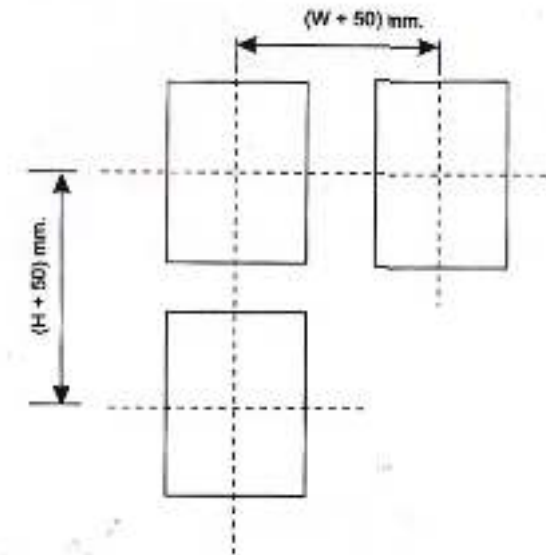
Reference table for Iron / constantant : IS 2057 - 1962.

Reference table for Platinum / Platinum 13% Rhodium : IS 2055 - 1962.

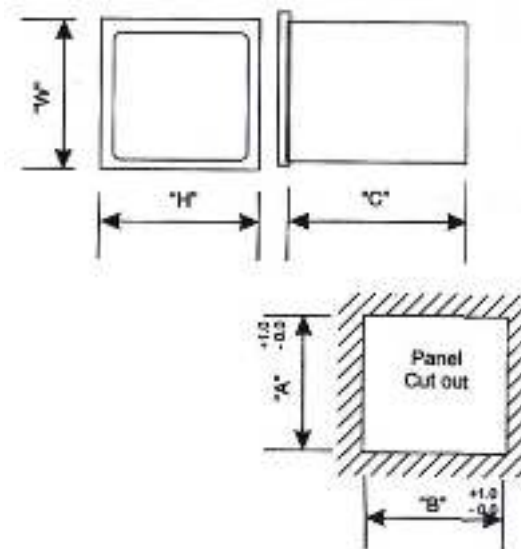
Reference table for Platinum / Platinum 10% Rhodium : IS 2055 - 1962.

Reference table for copper Constantant : IS 2050 - 1962.

**Fig. 2 Recommended Spacing between Recorder Cut outs**



**Fig. 3 Mounting and panel Cut-out Dimensions**

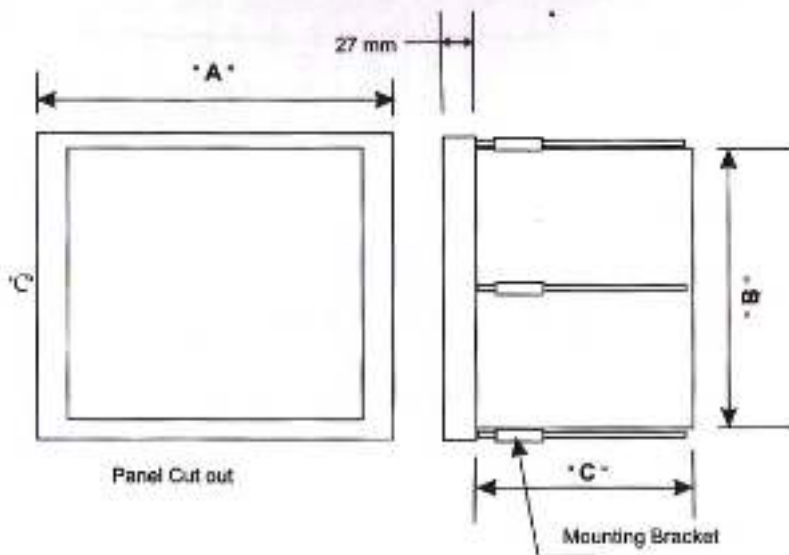




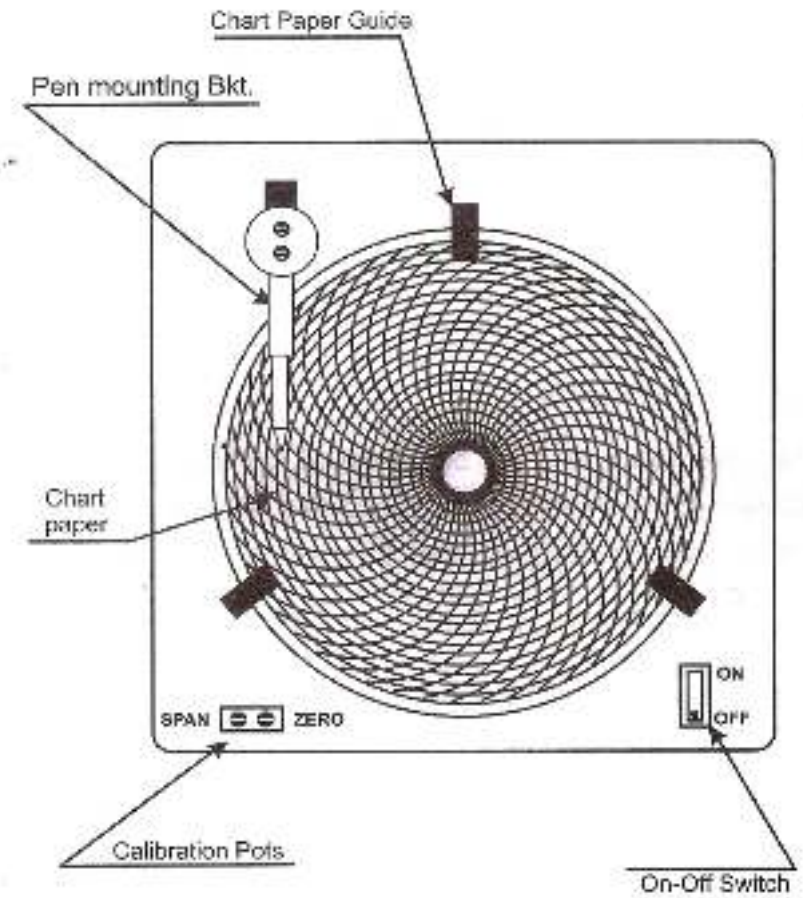
**Table 1 : Dimensional Details for various models**

Model No.	Panel Cut Out			Overall Size		Weight Kg.
	A(w)	B(h)	C(d)	W	H	
C - 40 - R	155	X 155	X 120	181	X 181	4
C - 60 - R	185	X 185	X 120	210	X 210	4
C - 100 - R	344	X 344	X 140	373	X 373	9
C - 100 - RTP	344	X 344	X 140	373	X 373	12

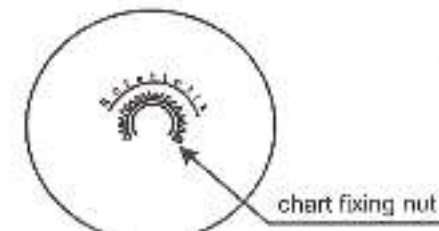
**Fig. 1 Overall dimensions of the recorder**



**Fig. 6 : Front view Recorder**



**Fig. 7 : Direction of Chart Fixing Nut**



**LOADING AND UNLOADING OF CIRCULAR CHART**

After opening the front door, lift up the pen, ( In case of single pen recorder. )

**A) UNLOADING OF CHARTS :**

The above action ensure that the pen does not remain in contact with the chart. After this, loosen the screw at the centre of the chart due to which the chart will become loose and come forward.

The chart then has to be removed carefully from the grooves at the three corners. Once this is done, the chart can be easily pulled out from the center of the shaft.

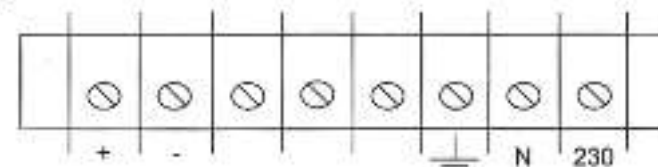
**B) LOADING OF THE CHART :**

First remove the pen, then carefully insert the chart below the pen holder and adjust in such a way that the centre hole of the chart fits over the centre shaft.

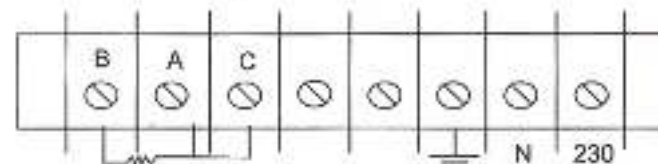
Once the screw is tightened, lift the chart at three corners to engage them in the grooves provided. This will ensure proper revolving of the chart without coming forward from the back surface.

Fig. 4 : Electrical Connections

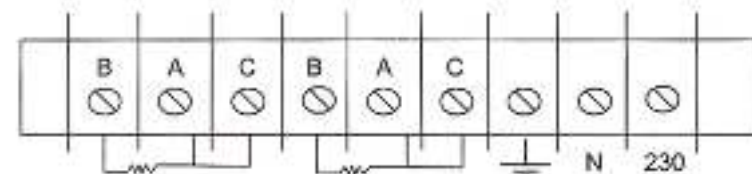
A) Only for DC, mV OR mA input



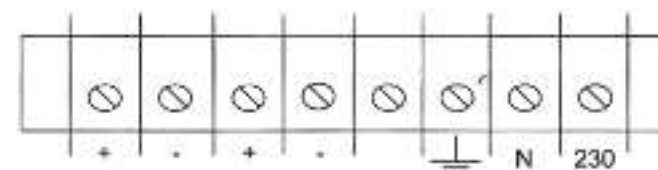
B) Only for PRT Bulb input ( Three Wire System)



C) Only for PRT Bulb input for 2 pen Recorder



D) Only for DC mV / mA Voltage Single pen for 2 pen Recorder



**INSTALLATION:****Unpacking :**

Inside the packing box a plastic bag contains the instrument. It also contains,

1. 25 Nos. of standard circular charts (0 to 100 linear)
2. Operating Manual (one which is being read now)
3. A pack containing disposable pens.
4. Guarantee Card
5. One set of mounting bar and brackets.
6. Calibration Certificate.

**ELECTRICAL CONNECTIONS**

All the connections to the instrument are provided at the back side of the instrument. Remove the cover provide at the back side and connect the mains cable and input cable to the respective connectors. Refer Fig 4 - A, B, C, D as the case may be.

**MOUNTING**

The instrument is meant for panel mounting. The panel should be provided with a cut out of the dimensions as shown in Fig 1.

Fig. 5 : Pen Mounting

