HIOKI

INSTRUCTION MANUAL

PRR-5000 Series

PRR-5011
PRR-5021
PRR-5031
PRR-5041

PERSONAL RECORDER

HIOKI E. E. CORPORATION

Contents

1. Operational Precautions

(1) When the chart block is extracted for recording chart replacement or when the chart block is installed, but not fully inserted up to the specified position, turning the power switch ON causes the buzzer to sound.
In this case, fully insert the chart block to the specified position. This stops the buzzer and the drum rotates for the specified time before it stops. Then, the PEN CALL indication LED starts flashing.
Pressing the PEN CALL switch returns the operation to normal.

(2) Do not install a capped pen in the pen holder.
When the power switch is turned OFF, the pens automatically enter the pen rest. If the pen cap is present, the cap will interfere with the sprockets and sponge.

(3) Maximum input voltage is 100 V in the mV range and 500 V in the V range. Do not apply voltage greater than the maximum input voltage.

2. Names and Functional Description of Parts

2.1 Front Panel

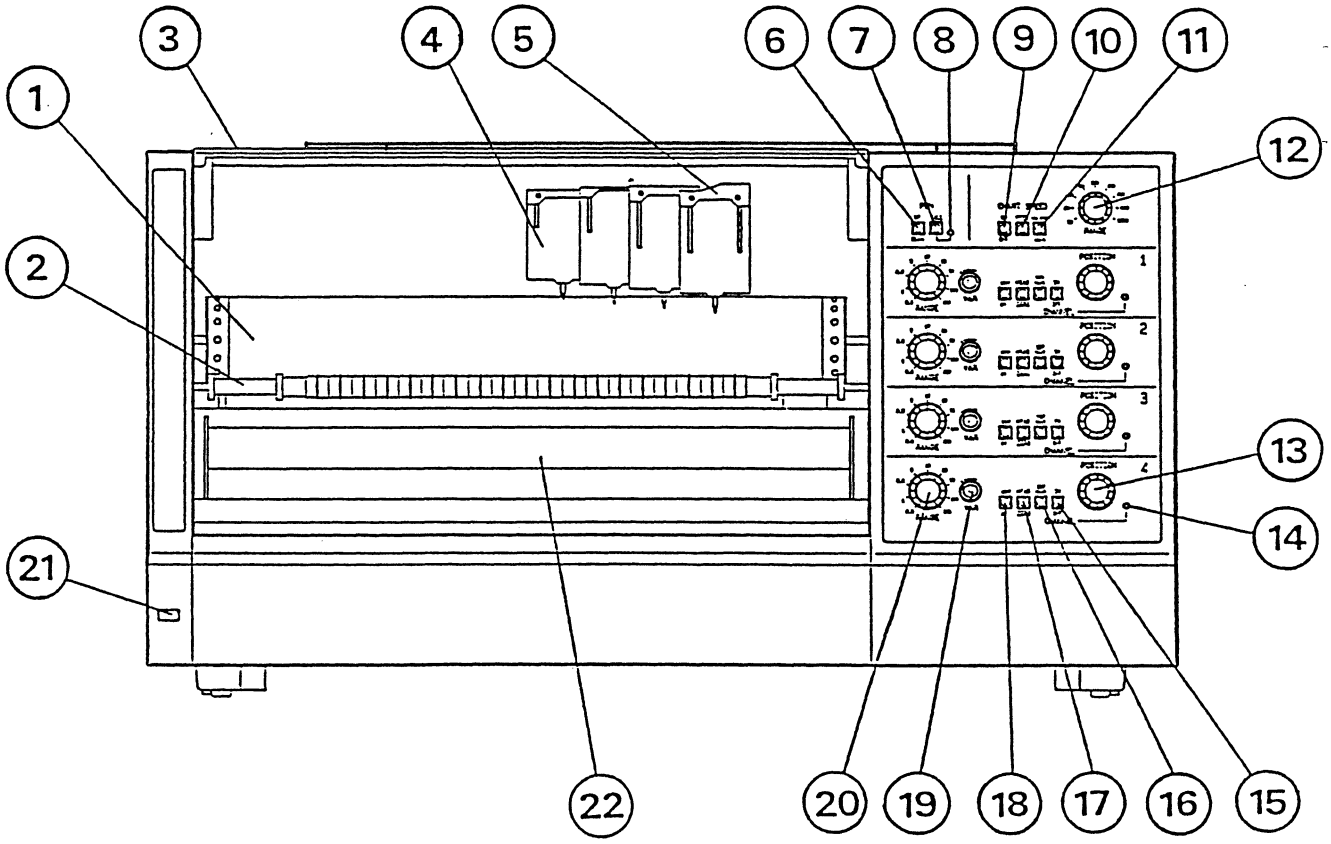


Figure 2.1

① Chart drum	: Rotates to feed recording chart.
② Chart holding roller	: Holds the recording chart on the chart drum. This achieves stabilized paper feed.
③ Acrylic cover	: Protects the recording section from dust. It opens downward when a pen or recording chart needs to be installed or replaced.
④ Pens	: Disposable cartridge ink pens
⑤ Pen holders	: The pens are attached to these holders.
⑥ PEN UP/DOWN switch	: Raises/lowers all pens simultaneously when this button is pressed.

⑦ PEN CALL switch : When the recording chart has been replaced, press this button. The pens then proceed to the recording area.

⑧ PEN CALL indication LED: When the chart block is extracted and then inserted in place, the drum automatically rotates for a specified time. When the drum stops rotating, this LED starts flashing. It is extinguished when the PEN CALL switch is pressed.
Also, the LED lights when all CHANNEL ON/OFF switches are OFF. The LED is extinguished in this case when any one of CHANNEL ON/OFF switches is set to ON.

⑨ CHART SPEED ON/OFF switch : The chart is fed when this button is pressed to ON and chart feeding stops when pressed to OFF.

⑩ FEED switch : When pressing this button recording chart is fed at the rate of approx. 600 mm/min regardless of chart speed ON/OFF.

⑪ mm/min. and mm/h selector switch : Pressing this button selects a chart feed speed in mm/min. or mm/h.

⑫ Chart feed range knob : Used to select chart feed speed.

⑬ POSITION knob : Used to determine the zero point when a channel is ON. When input is zero, full span applies and the pens can be moved.

⑭ ON channel indication LED : Lights when a channel is ON.

⑮ CHANNEL ON/OFF switch : Pressing this button causes the pens to move out of the pen rest to the recording area. This also lights the ON channel indication LED.

⑯ DIP MARK switch : When this button is pressed, the pens are shifted by about two scale divisions. This switch can be used to make a mark during recording.

⑰ MEAS./ZERO selector switch : Applies an input signal to the circuit when this button is pressed to MEAS. When ZERO is selected, the signal is disconnected.

⑱ mV/V selector switch : Specifies the unit of input range to mV or V when this button is pressed.

⑲ Range variable control : Decreases sensitivity in the range of 0 to 50% when this control is turned clockwise.

⑳ Voltage range knob : Used to select sensitivity in accordance with the intensity of input signals.

㉑ Power switch : Feeds power when this button is pressed, and the pens whose channels are ON move forward to the recording area. When the switch is turned OFF, the relevant pens retract to the pen rest and the power supply is shut off.

㉒ Chart block : Recording chart housing

2.2 Rear Panel

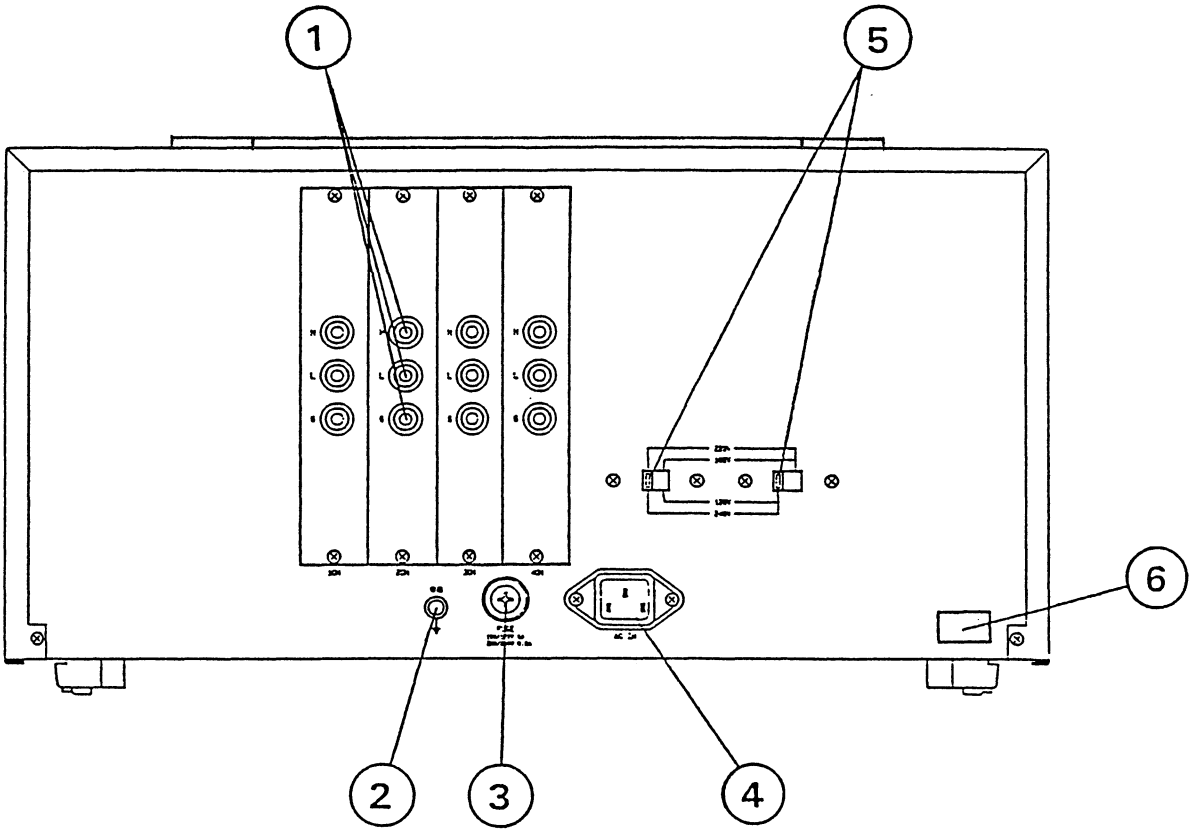


Figure 2.2

① Input terminal : Connect the provided input lead here so that the cord is located below.

② Grounding terminal: Used to ground the instrument.

③ Fuse holder : Contains a specified fuse.

④ Power connector : Used to connect the provided power cord.

⑤ Supply voltage selector switch : Used to select 100 V, 120 V, 220 V, or 240 V AC.

⑥ Nameplate : Indicates the model number of the recorder.

3. How to Operate the Recorder

3.1 Preparation for Measurement

3.1.1 Connection of the Power Cord and Power ON

(1) Confirm that the supply voltage selector switch on the rear agrees with the voltage of the service power and that the fuse matches the standard (1A for 100 V line or 0.5 A for 200 V line), then connect the power cord provided.

(2) Turn the power switch ON. This causes the pen holders whose channels have been set to ON by the channel ON/OFF switch to move out of the pen rest to the recording area. (Figure 3.1)

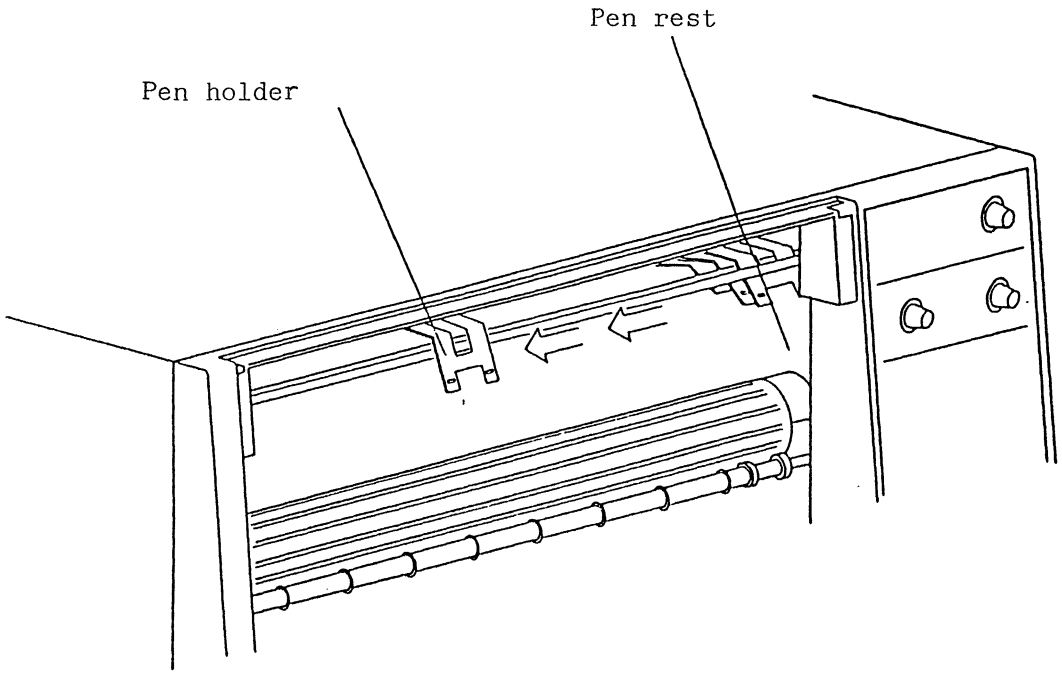


Figure 3.1

3.1.2 Pen Installation and Replacement

Install or replace a pen when the power supply is ON.

(1) Press the CHANNEL ON/OFF switch to set the relevant channels to ON. This causes the pen holders corresponding to the channels to move out to the recording area. (Figure 3.1)

(2) Press the PEN UP/DOWN switch to activate pen up condition.

(3) Open the acrylic cover to your side and turn the POSITION variable resistor to move the pen holder to approx. the center of the recording area. Then, attach uncapped new pens to the pen holders by pressing the pen in the direction of the arrow. (Figure 3.2)

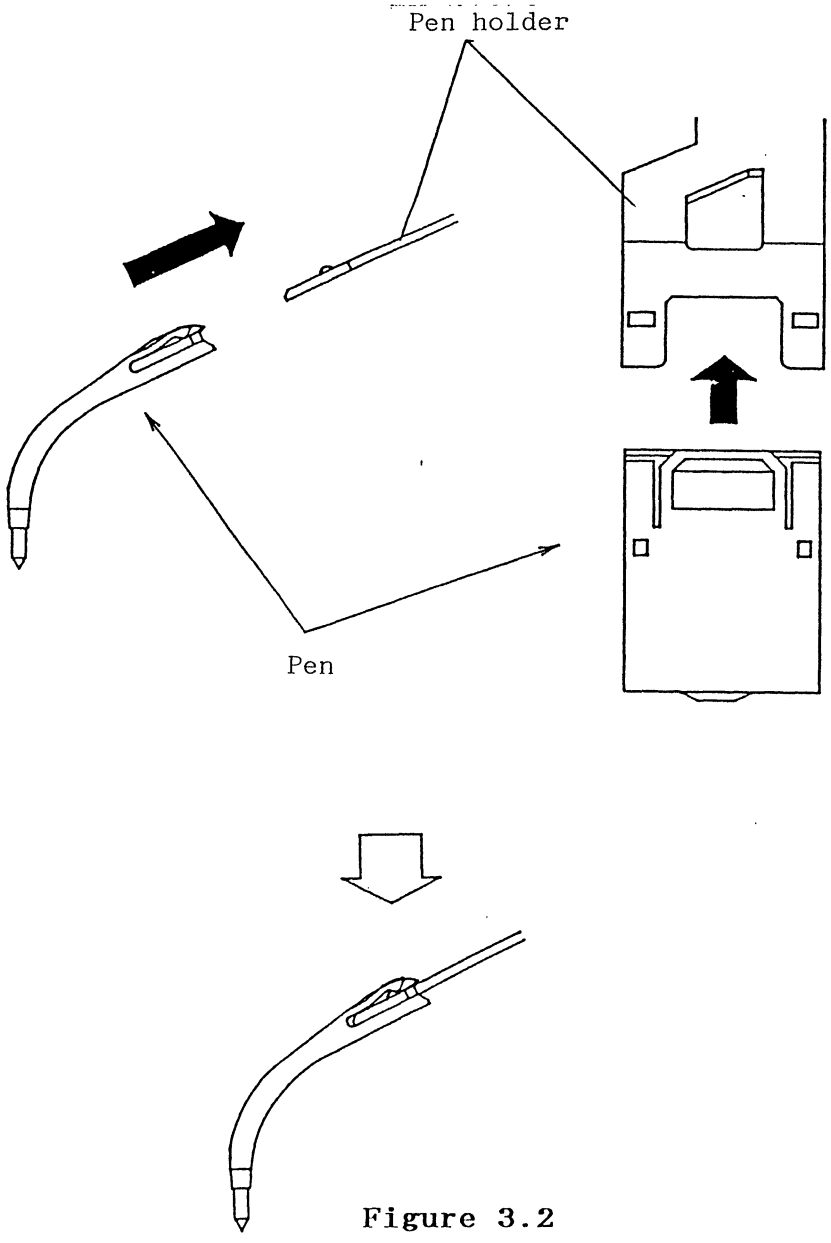


Figure 3.2

(4) To remove a pen, pull the pen to your side, which is opposite to pen attachment.

3.1.3 Installation and Replacement of Recording Chart

Install or replace recording chart when the power supply is ON.

(1) Before installing recording chart, shake both edges of the chart to prevent double sheet feed. (Figure 3.3)

(2) Open the acrylic cover to your side and press the chart block lock lever. This causes the chart block to move forward. In this case, the pens retract themselves to the pen rest. (Figure 3.4)

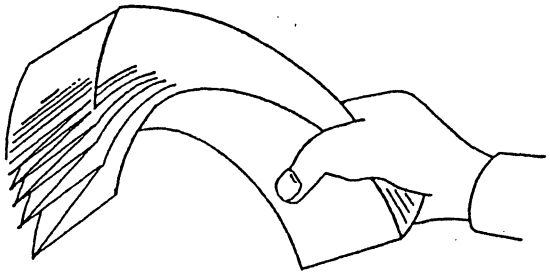


Figure 3.3

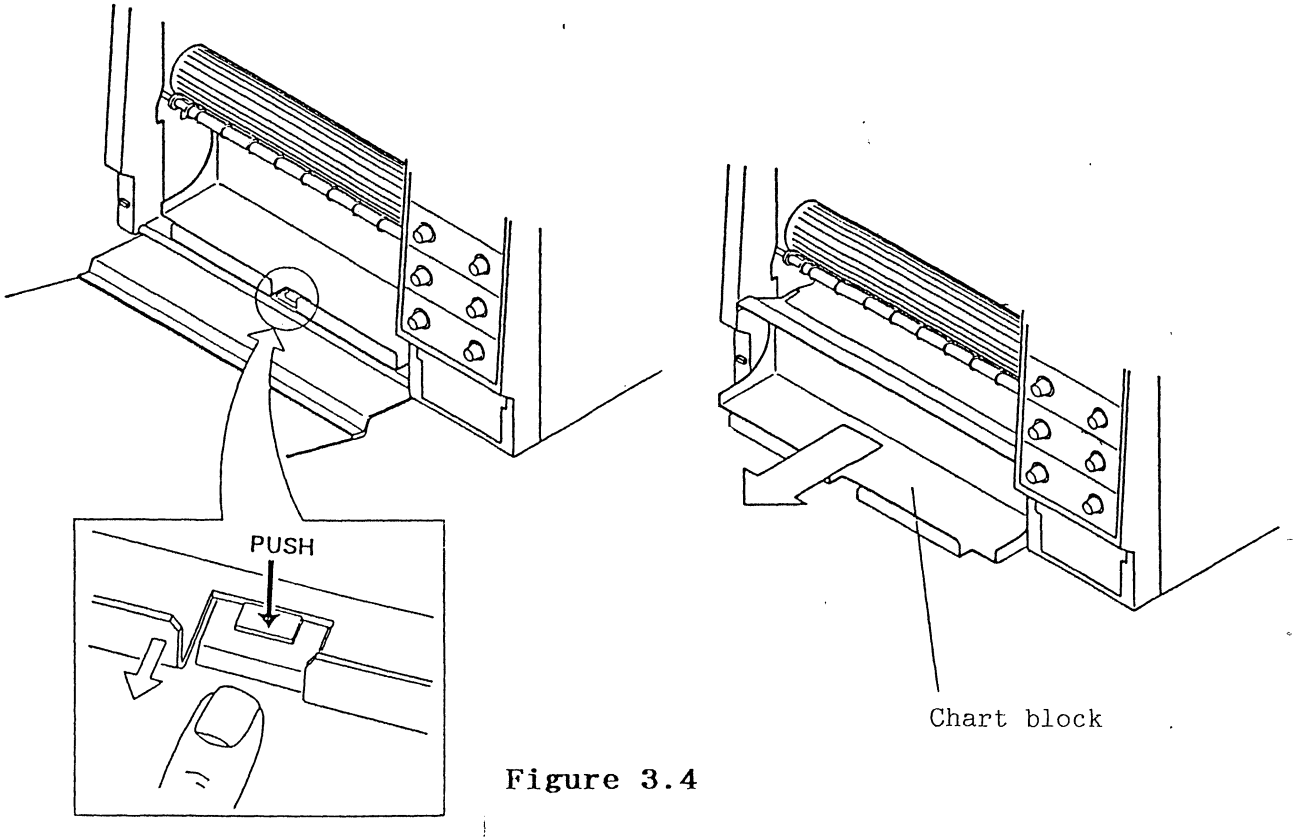


Figure 3.4

(3) Open the chart block cover and install recording chart so that the round holes in the chart are located at the left side and the chart start mark faces upwards.

(4) Pull the first sheet of the chart out of the chart block and contact the end of the chart to the chart setting guide. Then, close the chart block cover. (Figure 3.5)

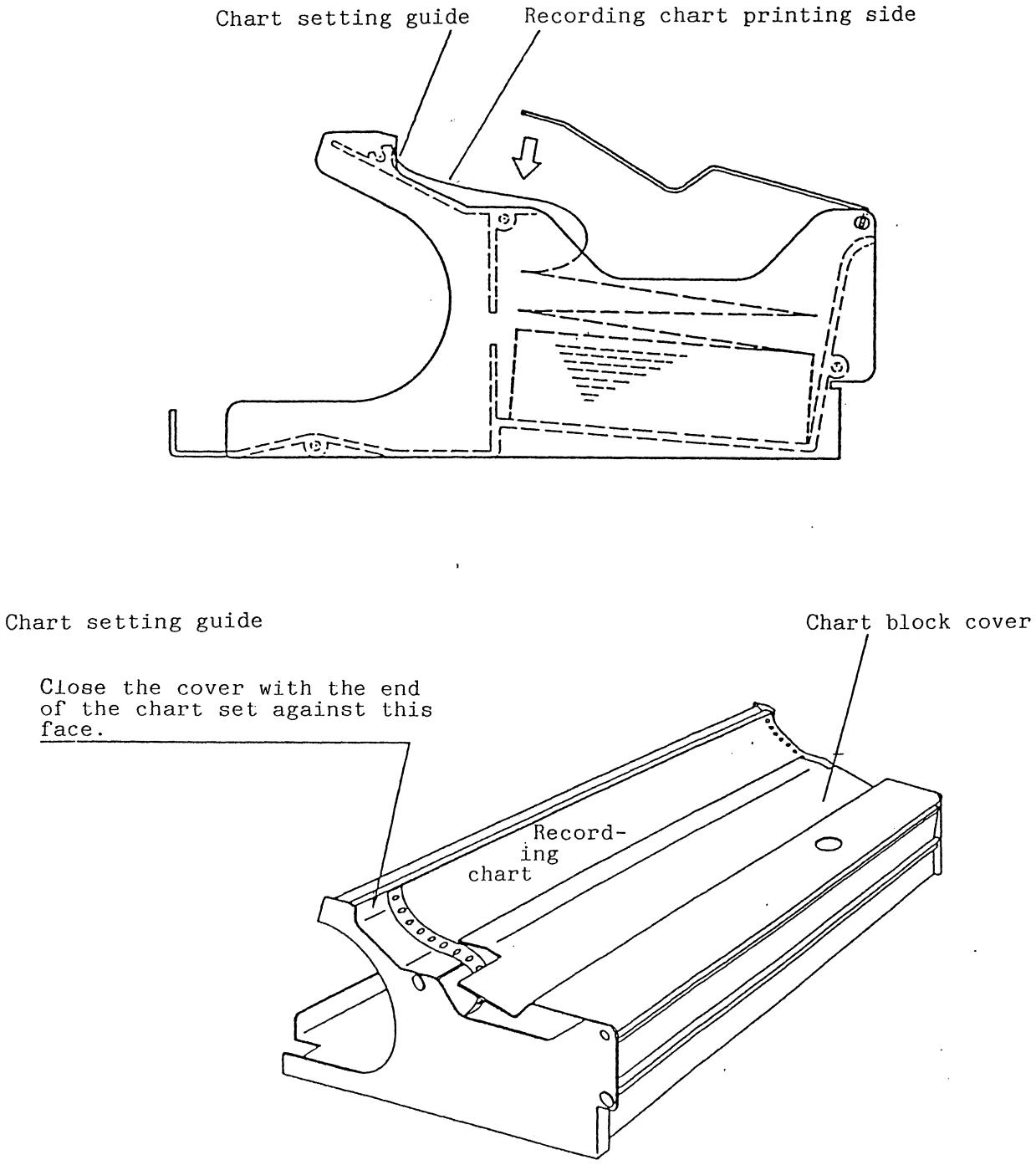


Figure 3.5

(5) Insert the chart block into the recorder mainframe. When the block is located in place, the chart is automatically fed by 4 to 5 cm, then it stops. This starts the PEN CALL indication LED on the panel to flash.

(6) Lower the chart holding roller, thread the chart between the chart drum and chart holding roller, and securely set the perforated holes into the sprockets. Then, return the roller to the original position. (Figure 3.6)

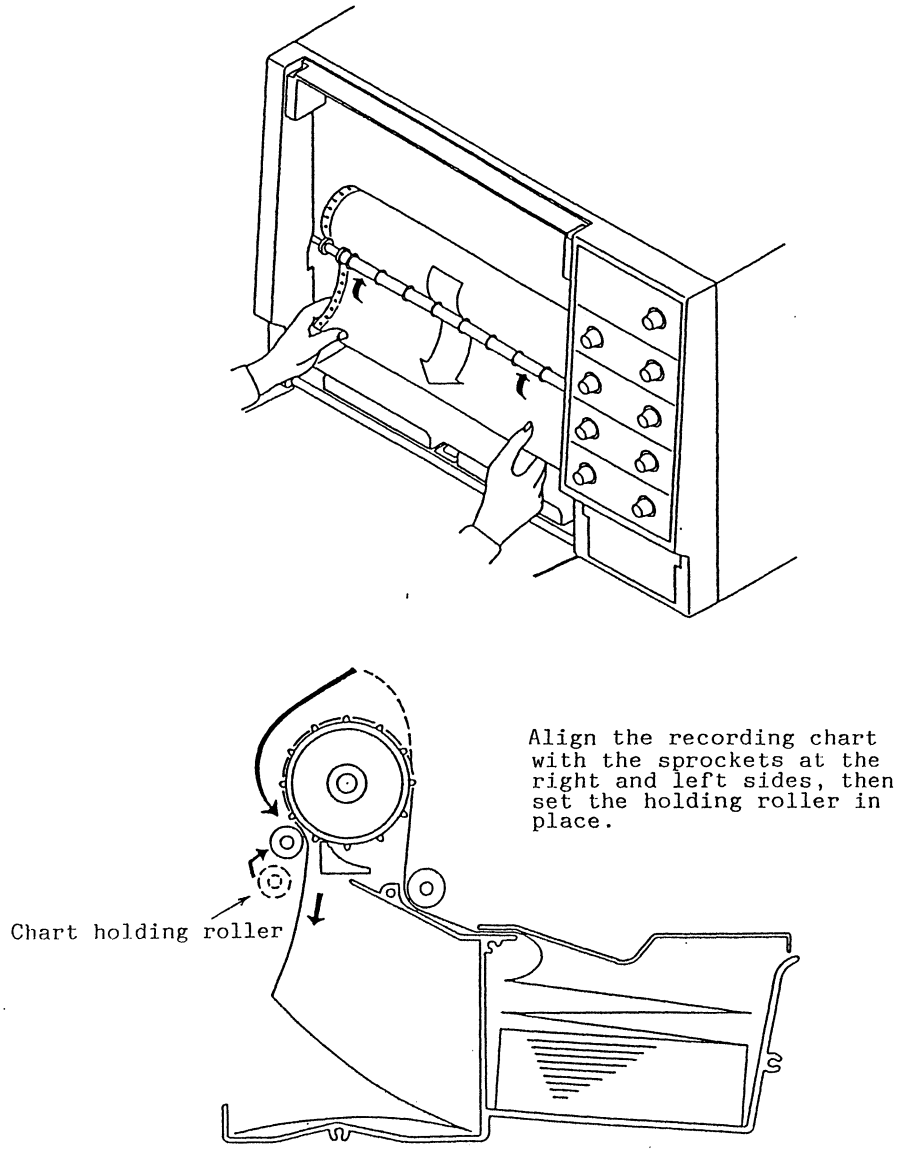


Figure 3.6

(7) Press the PEN CALL switch. This causes the pens whose channels have been set to ON to move out to the recording area.

3.2 Measurement

3.2.1 Connecting Input Lead

Connect the provided 3P-input lead to the input terminals on the rear face. Application of positive voltage to the red (H) terminal causes the pen to be deflected to the right. Terminals L to G are shorted using a short bar. To use the recorder at low sensitivity, apply voltage between red and black terminals without changing anything. To use the recorder at high sensitivity, loosen the black terminal and remove the short bar from the black terminal and use any one of the connections in Figures 3.7, 3.8, and 3.9 as a countermeasure against noise effects.

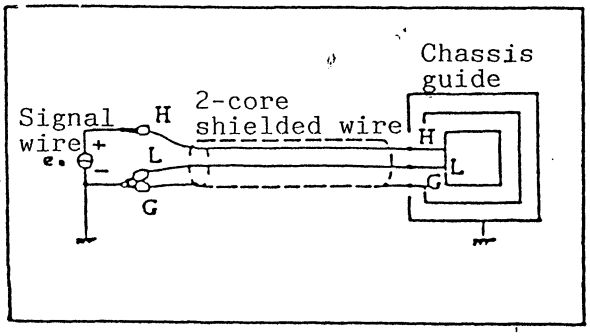


Figure 3.7

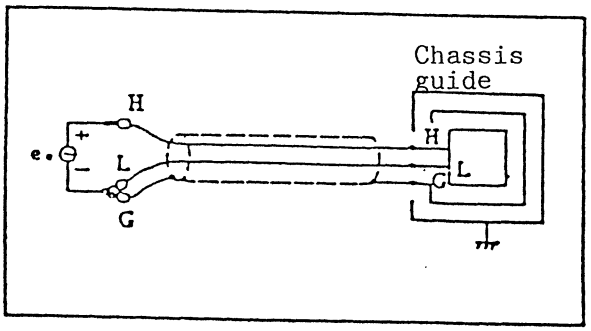


Figure 3.8

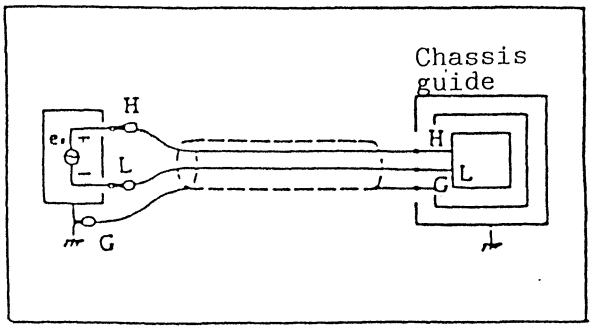


Figure 3.9

3.2.2 Specifying Channels To Be Used

Use the CHANNEL ON/OFF switch to set the channel to be used to ON. When the channels are set to ON, the pens corresponding to the channels move out of the pen rest.

3.2.3 Setting Range

To measure unpredicted signal voltage, always set the maximum voltage range and then lower sensitivity in turn. Maximum input voltage is 500 V DC in the V range and 100 V DC in the mV range.

3.2.4 Setting Zero Point

The input terminal shorted condition is equal, in the low sensitivity range, to the condition in which the MEAS./ZERO selector switch on the panel is set to ZERO. Therefore, set the zero point when the selector switch is set to ZERO. Since high-sensitivity range (0.5, 1 mV) is affected by thermal electromotive force, allow the instrument to warm up for 20 min. after power has been turned ON to achieve accurate measurement. Then, take the following steps for setting.

Short the input terminals, set the selector switch to MEAS., and then set the zero point.

3.2.5 Chart Speed Setting

Set chart speed in accordance with the movement of input signals.

3.2.6 Recording Start

(1) Lower the pens, use the POSITION knob to determine the position of the zero point, and press the FEED button to determine the start position.

(2) Set the CHART ON/OFF switch to ON and the ZERO/MEAS. switch to MEAS. This starts recording.

(3) To check the zero point during measurement, set the ZERO/MEAS. switch to ZERO. This returns the pens to the zero point.

(4) To provide a mark for recording waveform during recording, press the DIP MARK switch. This causes the pens to deflect to the right by about two scale divisions.

(5) If a pen needs to stop operation in the middle of recording, set the relevant channel to OFF. This causes all pens to lift simultaneously. Then, only the pen whose channel has been set to OFF returns to the pen rest, allowing the remaining pens to lower themselves to continue recording.

3.3 Steps To Be Taken After the End of Measurement

(1) When the necessary recording is complete, set the CHART ON/OFF switch to OFF to raise the pens, and press the FEED button to no-load feed recording chart by suitable length. Then, cut the chart with recorded data along with the perforated line.

(2) When the power supply is turned OFF, the pens automatically enter the pen rest and lower themselves, so that the tip of the pens contact sponge. This prevents the ink at the pen tips from drying.

4. Maintenance

4.1 Recording Chart

When the remaining length of the chart is less than 1 m, a red mark appears at the right edge of the chart to indicate the chart end. When this mark appears, prepare a new recording chart.

Guidance on the relationship between chart speed and usage time is as shown in Table 4.1 when folded recording chart is used.

Table 4.1

Chart speed	Usage time	Chart speed	Usage time
1200 mm/min.	About 37 min.	1200 mm/h	About 1.5 days
600 mm/min.	About 1.2 hr	600 mm/h	About 3.1 days
300 mm/min.	About 2.5 hr	300 mm/h	About 6.2 days
180 mm/min.	About 4.1 hr	180 mm/h	About 10.4 days
120 mm/min.	About 6.2 hr	120 mm/h	About 15.6 days
60 mm/min.	About 12.5 hr	60 mm/h	About 1 month
30 mm/min.	About 1.2 days	30 mm/h	About 2 months
20 mm/min.	About 1.5 days	20 mm/h	About 3 months
10 mm/min.	About 3.1 days	10 mm/h	About 6 months

4.2 Pens

The pens are capable of recording approx. 1600 m in a straight distance. Pen storage period is approx. one year. To store a pen, keep it in a polyethylene bag and store the bag in a cool, dark place.

4.3 Changing Supply Voltage

Supply voltage can be changed to any one of 100 V, 120 V, 220 V, and 240 V AC ± 10% after purchasing the recorder. When supply voltage is changed, also change the fuse at the same time.

For 100 or 120 V AC 1 A fuse

For 220 or 240 V AC 0.5 A fuse

5. Overview

5.1 Product Overview

The PHOENIX series is a highly sensitive, multirange, high performance line of general-purpose recorders with an effective recording width of 250 mm, and includes models with a single pen up to 4 pens.

This series has been designed to provide easy-to-use features such as an automatic pen rest function that prevents ink at the pen tips from drying when the pens are not in use and initializes long, folded 45 m recording chart.

Table 5.1 shows the number of pens and model numbers.

Table 5.1

No. of pans	Model
1	PRR-5011
2	PRR-5021
3	PRR-5031
4	PRR-5041

5.2 Features

(1) When the power switch is turned OFF, the pens automatically enter the pen rest. This hinders ink drying at the pen tips, allowing the pens to be used as soon as needed.

(2) Use of long, folded 45 m recording chart allows long-term recording a once recording chart is installed.

(3) Range-variable function allows the sensitivity of each range to be changed in the range of 0 to -50%.

(4) Since the recorder is provided with a supply voltage selector switch, any of 100 V, 120 V, 220 V, and 240 V AC is available.

(5) Semiautomatic loading function achieves simple recording chart installation.

(6) Dip mark function forcedly shifts recording waveform, providing the mark on the chart.

6. Specifications, Standard Attachments, and Options

Method	Automatic balanced continuous pen recording
Measuring range	18 Ranges of ± 0.5, 1, 2.5, 5, 10, 25, 50, 100, and 250 mV and V
Input resistance	About 1 MΩ
Allowable signal source resistance	1 KΩ
Accuracy	An effective recording width of ± 0.25% (including linearity at the reference range ± 50 mV)
Range-to-range error	± 0.25% of pen deflection width
Dead band	± 0.1% of effective recording width
Recording pen	Disposable felt pen CH1: Red CH2: Green CH3: Blue CH4: Brown
Maximum pen speed	About 1200 mm/sec.
Pen-to-pen distance	About 3.2 mm
Effective recording width	250 mm
Chart feed speed	18 Ranges of 10, 20, 30, 60, 120, 180, 300, 600, 1200 mm/min. and mm/h
Chart feed accuracy	± 0.25% (based on crystal oscillator)
Recording chart	Folded (SF-10PXZ-45), 45 m (75 mm)
Deflection direction	Deflection to the right when positive voltage applies
Pen up/down	All pens collectively
Channel ON/OFF	Provided for each channel
Zero position	Adjustable in all areas
Range variable	About 0 to -50% of each range
Dip mark	Shift to the right (About 2 scale divisions)
Chart feed speed	About 600 mm/min.
Overscale prevention	Electronic limiter

Recording chart semiauto loading mechanism provided

Maximum input voltage 100 V DC (mV range)
500 V DC (V range)

Dielectric strength At 1500 V AC for one minute between power supply and case

Insulation resistance 100 MΩ or more at 500 V DC between power supply and case and between input terminals and case

Power supply 100, 120, 220, and 240 V AC selectable, 50/60 Hz

Service temperature and humidity range 0 to 40℃ , 40 to 85% RH

Power consumption and weight

Model	Power consumption		Weight
	Balanced	Max.	
PRR-5011	About 14.0 VA	22.0 VA	About 10.5Kg
PRR-5021	About 16.0 VA	32.0 VA	About 11.5Kg
PRR-5031	About 18.0 VA	42.0 VA	About 12.0Kg
PRR-5041	About 20.0 VA	53.0 VA	About 13.0Kg

Size About 438(W) × 225(H) × 330(D) mm

Standard attachments

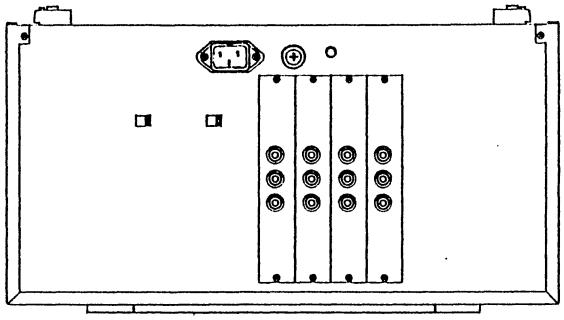
Model No.		PRR-5011	PRR-5021	PRR-5031	PRR-5041
Ink pen	Red (P1201A)	1	1	1	1
	Green (P1202A)		1	1	1
	Blue (P1203A)			1	1
	Brown (P1204A)				1
Input lead with 3-P plug		1	2	3	4
Recording chart (SF-10PXZ-45)		1			
Power cord		1			
Instruction manual		1			

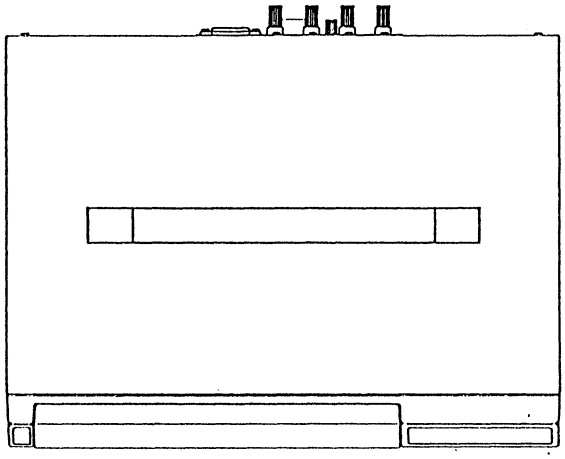
Options

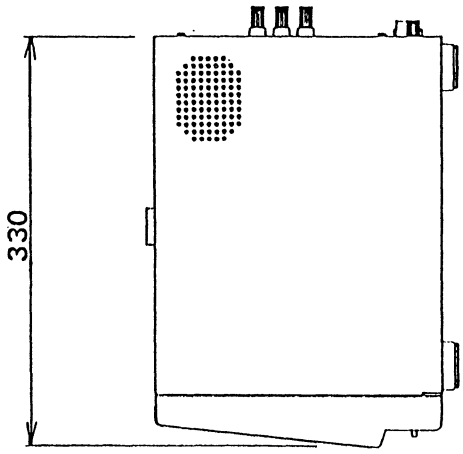
○ Winding roller (P1401) ... Including one rolled chart (SF-10PX)

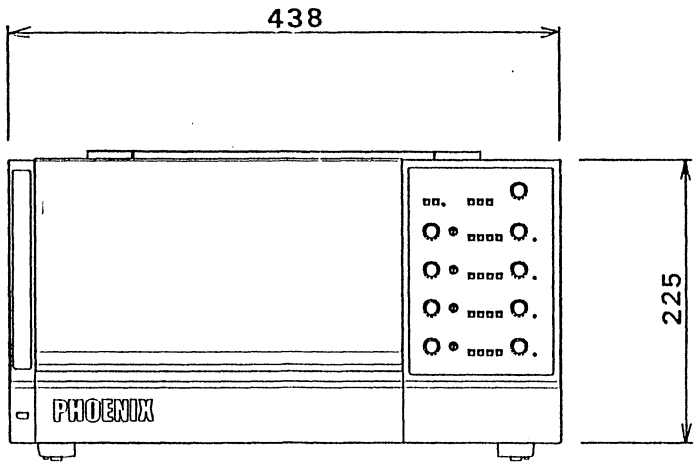
○ Rack (P1501)

7. Dimensions (PRR-5000 Series)









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