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**Operation  
Guide**

**Models SR10001/SR10002/SR10003/  
SR10004/SR10006  
SR10000 Recorder**

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**vigilantplant.™**



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## SR10000 Recorder User's Manual (IM04P03B01E-01) Contents

Chapter 1 Functional Description	Chapter 5 Troubleshooting
Chapter 2 Frequently Used Setup Operations	Chapter 6 Maintenance
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## Foreword

Thank you for purchasing the YOKOGAWA SR10000 Recorder. This manual describes concisely the operating procedures of the SR10000 Recorder. To ensure correct use, please read this manual thoroughly before beginning operation.

The following two manuals, in addition to this one, are provided as manuals for the SR10000 Recorder. Please read all of them.

### Electronic Manuals Provided on the Accompanying CD-ROM

Manual Title	Manual No.
<b>SR10000 Recorder User's Manual</b> Explains all the functions and procedures of the recorder excluding the communication functions.	<b>IM 04P03B01-01E</b>
<b>SR10000 Communication Interface User's Manual</b> Explains the communication functions using Ethernet interface and the RS-422A/485 communication interface.	<b>IM 04P03B01-17E</b>

### Opening the Electronic Manuals

The PDF files of the manuals are provided on the accompanying CD-ROM. When the CD-ROM is inserted in the PC's CD-ROM drive, a list of manuals on the CD-ROM is displayed. Click a manual title to open the manual.

If the list of manuals is not displayed automatically, open the manual in the My Computer > SR\_manual > English directory.

## Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
- Copying or reproducing all or any part of the contents of this manual without the permission of Yokogawa Electric Corporation is strictly prohibited.
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## Revisions

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## Safety Precautions

The general safety precautions described here must be observed during all phases of operation.

- **Safety Standards and EMC Standards**  
This recorder conforms to IEC safety class I (provided with terminal for protective grounding), Installation Category II, Measurement category II (CAT II), and EN61326-1 (EMC standard), class A (use in a commercial, industrial, or business environment). This recorder is designed for indoor use.
- **About This Manual**
  - This manual should be read by the end user.
  - Read this manual thoroughly and have a clear understanding of the product before operation.
  - This manual explains the functions of the product. YOKOGAWA does not guarantee that the product will suit a particular purpose of the user.
  - Under absolutely no circumstances may the contents of this manual be transcribed or copied, in part or in whole, without permission.
  - The contents of this manual are subject to change without prior notice.
  - Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors or omissions, please contact your nearest YOKOGAWA dealer.
- **Precautions Related to the Protection, Safety, and Alteration of the Product**
  - The following safety symbols are used on the product and in this manual.
    -  **"Handle with care." To avoid injury and damage to the instrument, the operator must refer to the explanation in the manual.**
    -  **Protective ground terminal**
    -  **AC**
    -  **"High temperature." To avoid injury caused by hot surface, do not touch locations where this symbol appears.**
  - For the protection and safe use of the product and the system controlled by it, be sure to follow the instructions and precautions on safety that are stated in this manual whenever you handle the product. Take special note that if you handle the product in a manner that violate these instructions, the protection functionality of the product may be damaged or impaired. In such cases, YOKOGAWA does not guarantee the quality, performance, function, and safety of the product.
  - When installing protection and/or safety circuits such as lightning protection devices and equipment for the product and control system or designing or installing separate protection and/or safety circuits for fool-proof design and fail-safe design of the processes and lines that use the product and the control system, the user should implement these using additional devices and equipment.
  - If you are replacing parts or consumable items of the product, make sure to use parts specified by YOKOGAWA.
  - This product is not designed or manufactured to be used in critical applications that directly affect or threaten human lives. Such applications include nuclear power equipment, devices using radioactivity, railway facilities, aviation equipment, air navigation facilities, aviation facilities, and medical equipment. If so used, it is the user's responsibility to include in the system additional equipment and devices that ensure personnel safety.
  - Do not modify this product.

## WARNING

- **Power Supply**  
Ensure that the source voltage matches the voltage of the power supply before turning ON the power.
- **Protective Grounding**  
Make sure to connect the protective grounding to prevent electric shock before turning ON the power.
- **Necessity of Protective Grounding**  
Never cut off the internal or external protective earth wire or disconnect the wiring of the protective earth terminal. Doing so invalidates the protective functions of the instrument and poses a potential shock hazard.
- **Defect of Protective Grounding**  
Do not operate the instrument if the protective earth or fuse might be defective. Make sure to check them before operation.
- **Do Not Operate in an Explosive Atmosphere**  
Do not operate the instrument in the presence of flammable liquids or vapors. Operation in such environments constitutes a safety hazard.
- **Do Not Remove Covers**  
The cover should be removed by YOKOGAWA's qualified personnel only. Opening the cover is dangerous, because some areas inside the instrument have high voltages.
- **External Connection**  
Connect the protective grounding before connecting to the item under measurement or to an external control unit.
- **Damage to the Protective Structure**  
Operating the recorder in a manner not described in this manual may damage its protective structure.

- **Exemption from Responsibility**

- YOKOGAWA makes no warranties regarding the product except those stated in the WARRANTY that is provided separately.
- YOKOGAWA assumes no liability to any party for any loss or damage, direct or indirect, caused by the user or any unpredictable defect of the product.

## Handling Precautions

- Use care when cleaning the recorder, especially any plastic parts. When cleaning, wipe using a dry soft cloth. Do not use chemicals such as benzene or thinner, since these may cause discoloring and deformation.
- Keep electrically charged objects away from the signal terminals. This may damage the recorder.
- Do not apply volatile chemicals to the door glass, display, panel keys, etc. Do not allow rubber and vinyl products to remain in contact with the recorder for long periods of time. This may damage the recorder.
- When not in use, make sure to turn OFF the power switch.
- If there are any symptoms of trouble such as strange odors or smoke coming from the recorder, immediately turn OFF the power switch and the power supply source. Then, contact your nearest YOKOGAWA dealer.

## How to Use This Manual

This manual covers information regarding the recorders with English as the printout font (suffix code "2").  
The following markings are used in this manual.



*Improper handling or use can lead to injury to the user or damage to the instrument.* This symbol appears on the instrument to indicate that the user must refer to the user's manual for special instructions. The same symbol appears in the corresponding place in the user's manual to identify those instructions. In the manual, the symbol is used in conjunction with the word "WARNING" or "CAUTION."

## WARNING

Calls attention to actions or conditions that could cause serious or fatal injury to the user, and precautions that can be taken to prevent such occurrences.

## CAUTION

Calls attentions to actions or conditions that could cause light injury to the user or damage to the instrument or user's data, and precautions that can be taken to prevent such occurrences.

## Note

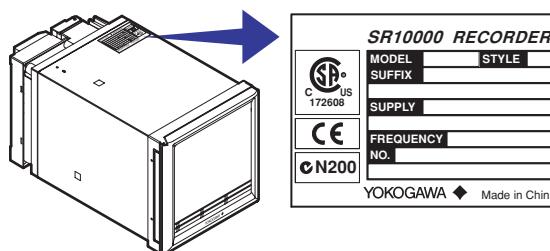
Calls attention to information that is important for proper operation of the instrument.

## Checking the Contents of the Package

Unpack the box and check the contents before operating the instrument. If some of the contents are not correct or missing or if there is physical damage, contact the dealer from which you purchased them.

### SR10000 Recorder

A name plate is affixed to the case. Check that the model name and suffix code given on the name plate on the rear panel match those on your order.



### NO. (Instrument Number)

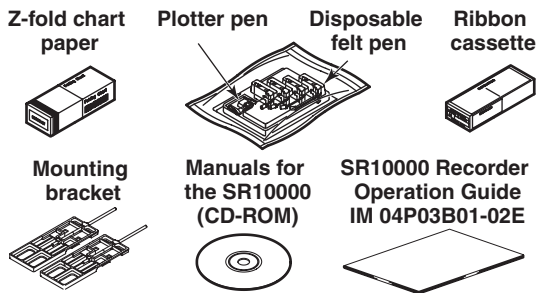
When contacting the dealer from which you purchased the instrument, please give them the instrument number.

**MODEL and SUFFIX Code**

Model	Suffix Code	Optional Code	Description
SR10001			SR10000 1 pen recorder
SR10002			SR10000 2 pen recorder
SR10003			SR10000 3 pen recorder
SR10004			SR10000 4 pen recorder
SR10006			SR10000 6 dot recorder
	-2		English & deg F / DST
	/A1		Alarm output relay 2 points <sup>1</sup>
	/A2		Alarm output relay 4 points <sup>1</sup>
	/A3		Alarm output relay 6 points <sup>1</sup>
	/C3		RS-422A/485 interface <sup>2</sup>
	/C7		Ethernet (10BASE-T) interface <sup>2</sup>
	/N1		Cu10, Cu25 RTD input
	/N3		Expansion inputs <sup>3</sup>
	/P1		24 VDC/AC power supply <sup>4</sup>
	/R1		Remote control 5 points
	/D6		Green display
	/CC1		Calibration correction

- 1 /A1, /A2, and /A3 cannot be specified simultaneously.
- 2 /C3 and /C7 cannot be specified simultaneously.
- 3 14 types of input including Pt50 RTD, PR40-20, and Platinel TC
- 4 Planned to be available in April 2006.

**Standard Accessories**



Item	1-Pen	2-Pen	3-Pen	4-Pen	Dot	
Z-fold chart paper	1	1	1	1	1	
Ribbon cassette	-	-	-	-	1	
Disposable felt pen	Red	1	1	1	1	
	Green	-	1	1	1	
	Blue	-	-	1	1	-
	Violet	-	-	-	1	-
Plotter pen	1	1	1	1	-	
Mounting bracket	2	2	2	2	2	
Manuals for the SR10000 (CD-ROM)	1	1	1	1	1	
SR10000 Recorder Operation Guide IM 04P03B01-02E	1	1	1	1	1	

**Software (Sold Separately, see next page)**

Item	Model	Note
Configuration software	RXA10-01	
	RXA10-02	With interface unit

**Optional Accessories (Sold Separately)**

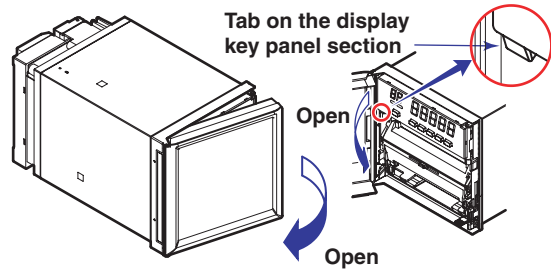
The optional accessories below are available for purchase separately. If you make an order, make sure that all contents are present and undamaged.

For information about ordering accessories, contact the dealer from which you purchased the recorder.

Item	Model	Quantity	Note	
Z-fold chart paper	B9565AW	1	10 pcs.	
Ribbon cassette	B9901AX	1		
Disposable felt pen	Red	B9902AM	1	3 pcs.
	Green	B9902AN	1	3 pcs.
	Blue	B9902AP	1	3 pcs.
	Violet	B9902AQ	1	3 pcs.
Plotter pen	Purple	B9902AR	1	3 pcs.
Mounting bracket	B9900BX	2		
Shunt resistor for the screw terminal (standard)	415920	1	250 Ω ± 0.1%	
	415921	1	100 Ω ± 0.1%	
	415922	1	10 Ω ± 0.1%	

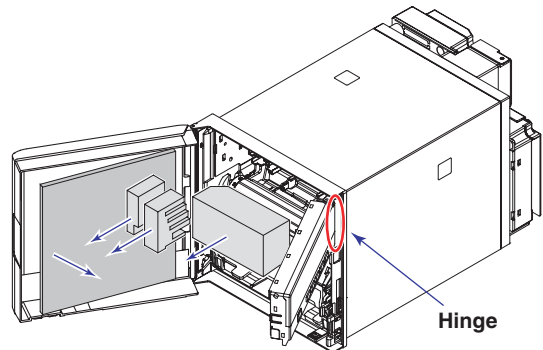
**Removing the Packing Materials**

Open the door, put your finger on the tab at the lower left of the display and key panel section, and open the display and key panel section.

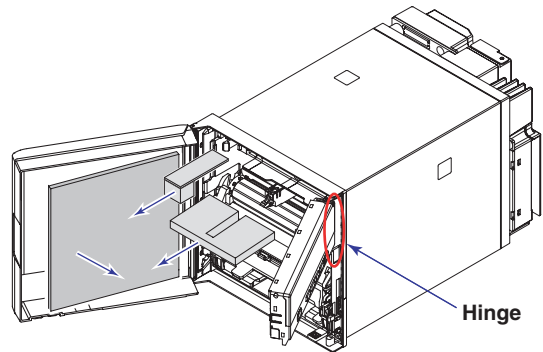


Remove all packing materials.

- Pen Model



- Dot Model



**CAUTION**

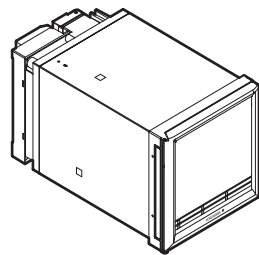
To protect the hinges, do not apply vertical force on the display and key panel section.

# Function Introduction/Names of Parts

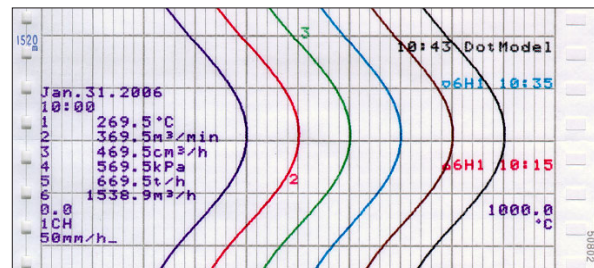
## Function Introduction

The SR10000 Recorder (hereafter referred to as the recorder) can be used to assign DC voltage, 1-5V, thermocouple, RTD, and contact or voltage ON/OFF signal to channels for measurement. The measured results are recorded with pens or dots on a chart paper that is fed at a constant speed. The pen model can record up to 4 channels; the dot model can record up to 6 channels.

SR10000 Recorder



Recording example (dot model)



## Alarms

For each channel, various alarms such as high limit alarm and low limit alarm can be assigned to monitor the measured values. Alarm output relays can be used to output contact signals when alarms occur (/A1, /A2, and /A3 options).

## Recording

The measured results are recorded with pens or dots on a chart paper (trend recording). The chart speed can be selected from 10 to 12000 mm/h on the pen model and 10 to 1500 mm/h on the dot model.

In addition to trend recording, various types of information can be printed on the chart paper such as numeric measured values, alarm occurrence/release, and predefined messages.

Also, the recorder settings can be printed.

## Display

The large 7-segment display shows measured values and alarm status.

## Communication Functions

Using the Ethernet communication interface (/C7 option) or the RS-422A/485 communication interface (/C3 option), the measured values on the recorder can be output to a computer or a computer can be used to control the recorder.

For details on communication functions, see the *SR10000 Communication Interface User's Manual* (IM 04P03B01-17E) on the CD-ROM.

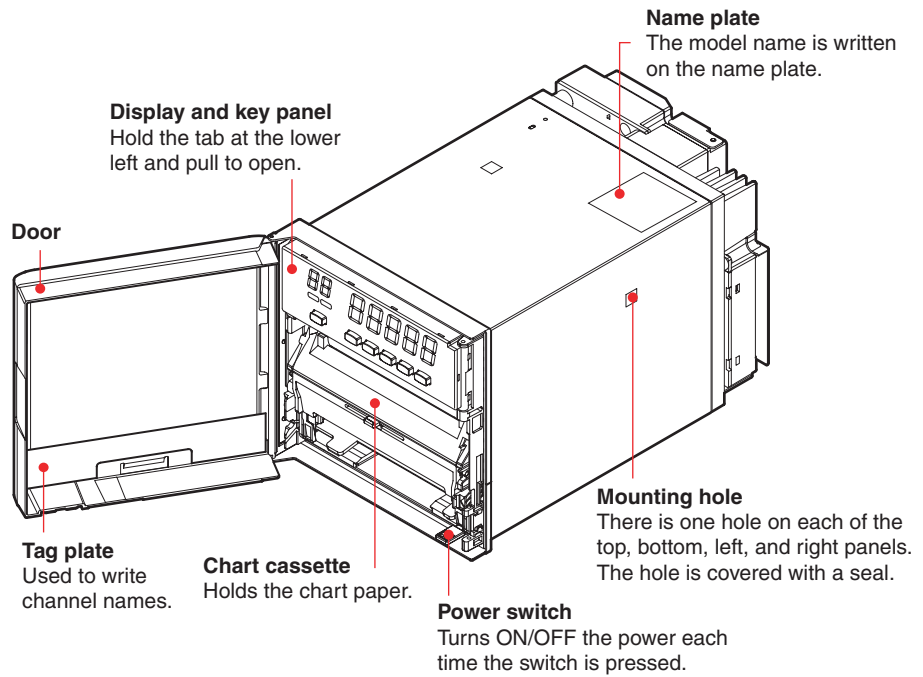
## Other Main Functions

The remote control function (/R1 option) can be used to control the recording start/stop and other operations of the recorder by applying contact signals to the dedicated terminals.

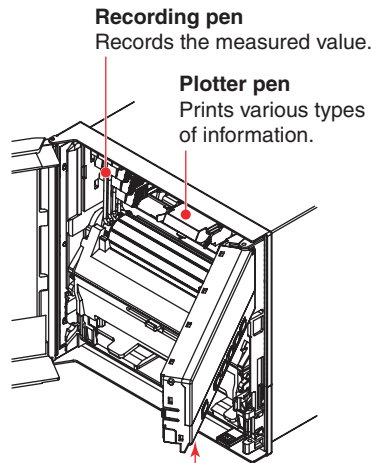
The key lock function allows keys such as the RCD or MENU key to be locked to prevent inadvertent key operation.

The menu selection function allows items that you usually do not use to be hidden from the menu.

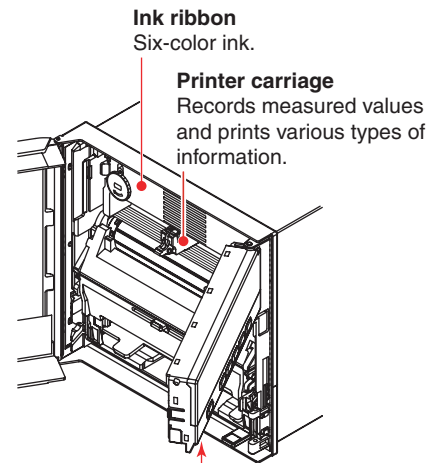
**Names of Parts  
Front**



**Pen model**

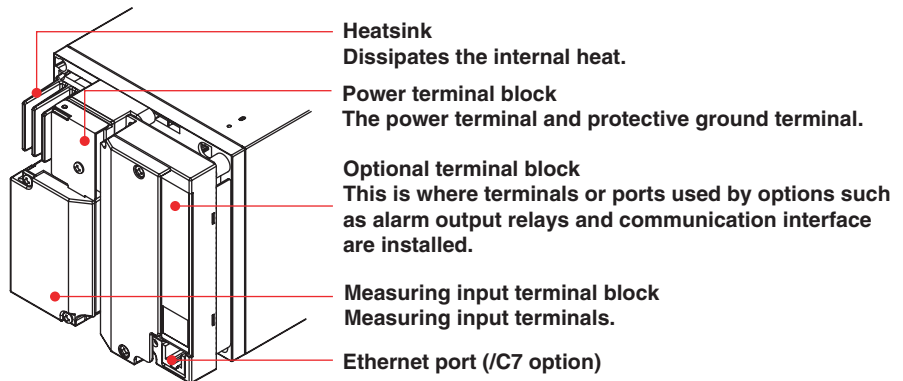


**Dot model**



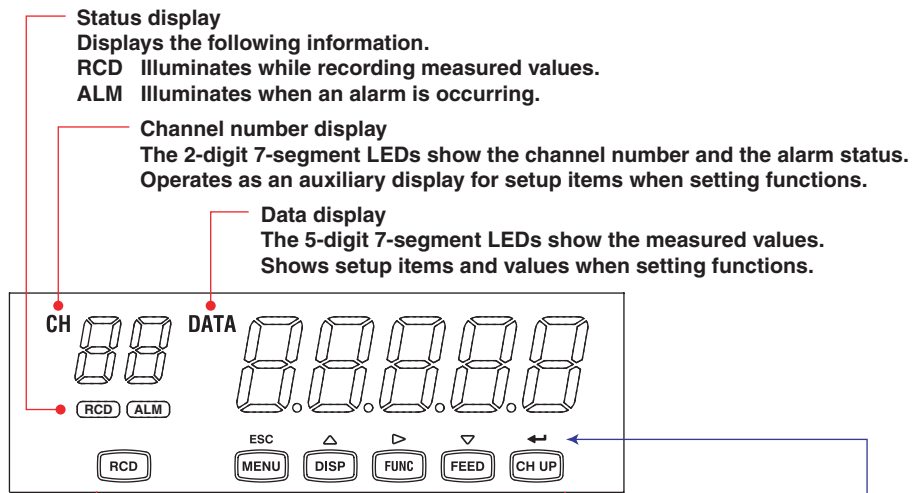
Display and key panel (see the next page)

**Rear Panel**



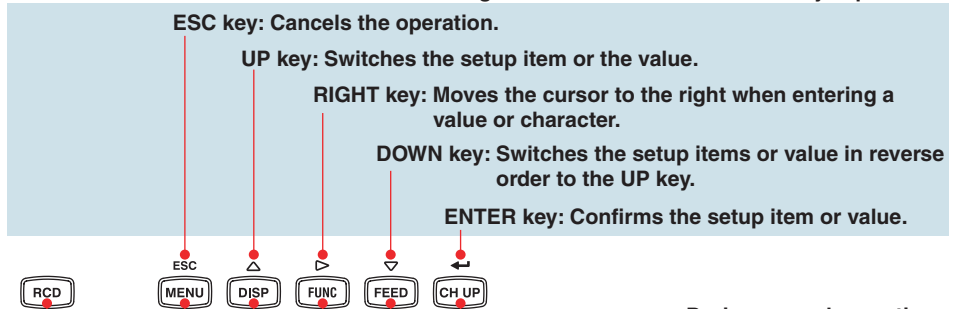


## Display and Key Panel

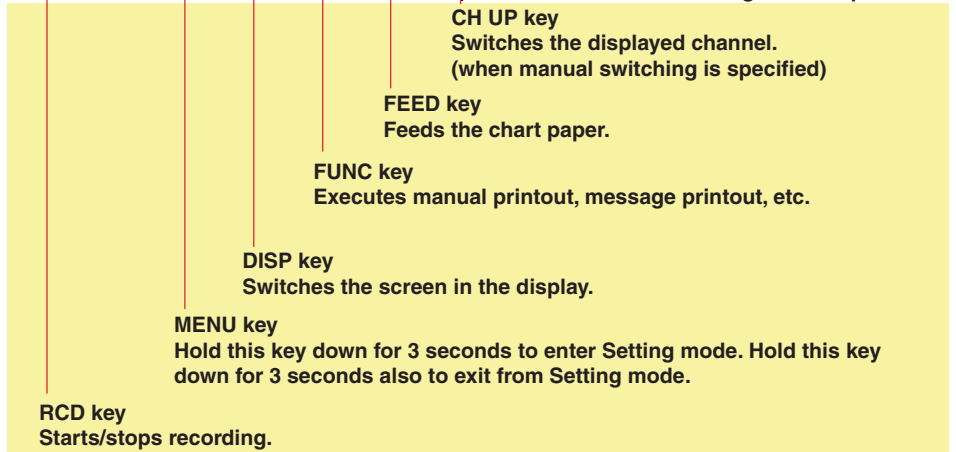


Six keys are available.  
For all keys except RCD, functions marked above the keys are enabled when setting functions or when the FUNC key is pressed.

<When setting functions or when the FUNC key is pressed>



<During normal operation>





# Installing/Wiring the Recorder

## Installation Location

Install the recorder indoors in a location that meets the following conditions.

- **Instrument Panel**  
The recorder is designed for panel mounting.
- **Well-Ventilated Location**  
To prevent overheating, install the recorder in a well-ventilated location.  
For the panel cut dimensions when arranging multiple recorders, see the next page.  
Follow the panel cut dimensions providing adequate space between instruments when other instruments are arranged on the panel.
- **Minimum Mechanical Vibrations**  
Choose an installation location with the minimum mechanical vibration.  
Installing the recorder in a location with large mechanical vibration not only causes adverse effects on the mechanism but also may hinder normal recording.
- **Horizontal**  
Install the recorder horizontally (However, the recorder can be inclined up to 30 degrees backwards for panel mounting).

### Note

- Condensation may occur if the recorder is moved to another place where both the ambient temperature and humidity are higher, or if the temperature changes rapidly. In addition, measurement errors will result when using thermocouples. In this case, let the recorder adjust to the new environment for at least one hour before using it.
- The chart paper may be adversely affected by a rapid change in the ambient temperature and humidity.

Do not install the recorder in the following places.

- **Outdoors**
- **In Direct Sunlight or Near Heat Sources**  
Install the recorder in a place with small temperature fluctuations near room temperature (23°C). Placing the recorder in direct sunlight or near heat appliances can cause adverse effects on the internal circuitry.
- **Where an Excessive Amount of Soot, Steam, Moisture, Dust, or Corrosive Gases Are Present**  
Soot, steam, moisture, dust, and corrosive gases will adversely affect the recorder. Avoid such locations.
- **Near Strong Magnetic Field Sources**  
Do not bring magnets or instruments that produce electromagnetic fields close to the recorder. Operating the recorder in strong magnetic fields can cause errors in the measurements.

## Installation Procedure

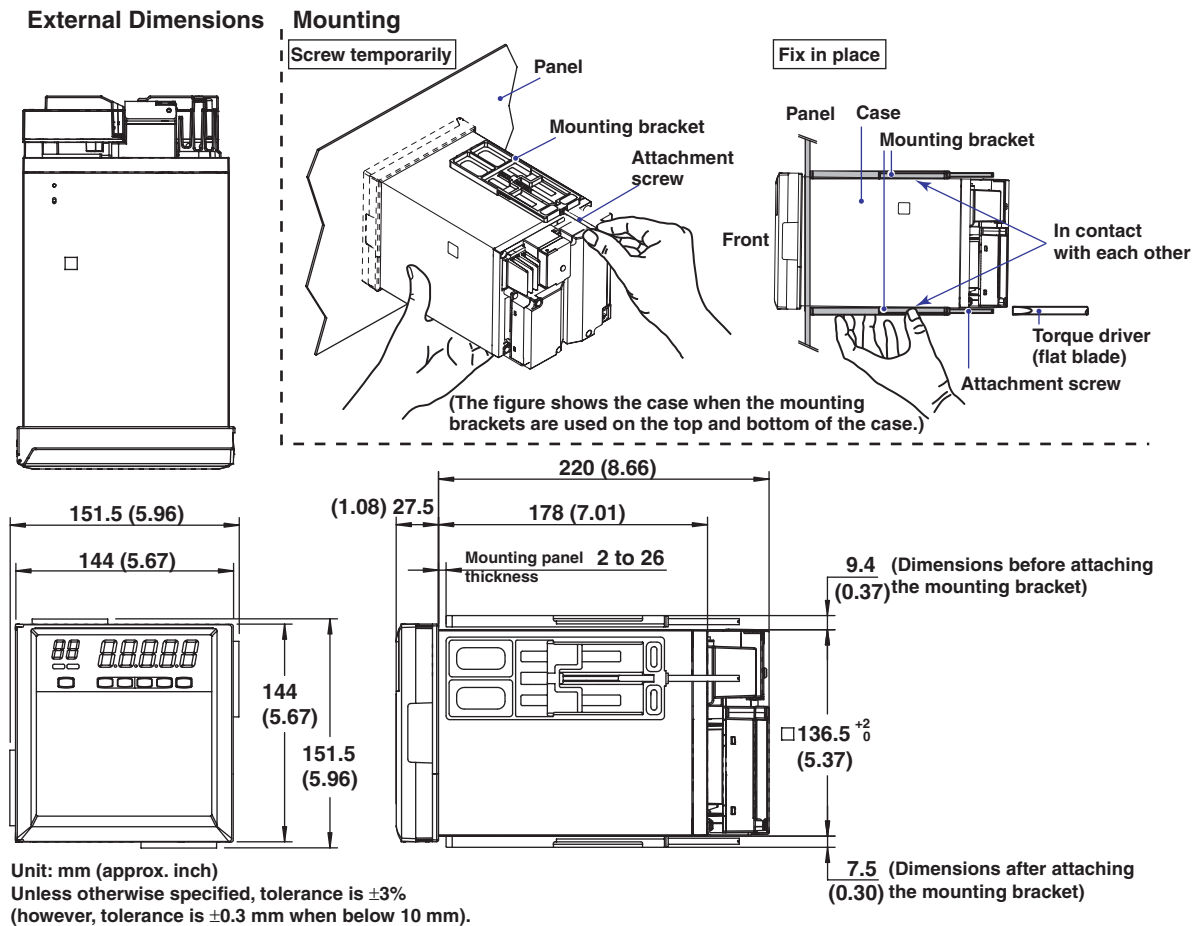
The recorder should be mounted on a steel panel of thickness 2 mm to 26 mm.

1. Insert the recorder from the front side of the panel (see the mounting diagram on the next page).
2. Mount the recorder to the panel using the mounting brackets that come with the package.
  - Use two brackets to support the top and bottom or the left and right sides of the case (remove the seal that is covering the holes for the mounting brackets beforehand).
  - The proper torque for tightening the mounting screws is 0.7 to 0.9 Nm.
  - Mount the recorder to the panel according to the procedure below.
    - First, attach the two mounting brackets and temporarily fasten the attachment screws.
    - Next, fix the recorder in place by tightening the attachment screws with the appropriate torque. When the recorder is approximately perpendicular to the panel as you fasten the screws, press the mounting bracket against the case so that they are in contact with each other.

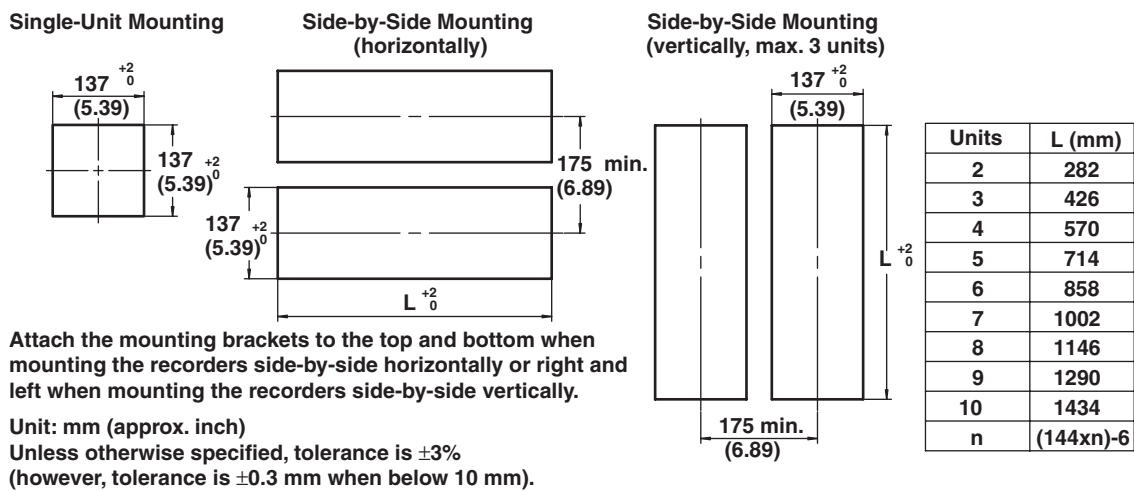
**CAUTION**

- Tightening the screws too much can deform the case or damage the bracket.
- Be careful not to insert foreign objects or tools through the holes for the mounting brackets in the case.

**Panel Mounting Diagram**



**Panel Cutout**



## Input Signal Wiring



### WARNING

- To prevent electric shock while wiring, ensure that the power supply source is turned OFF.

### CAUTION

- If a strong tension is applied to the cable wired to the recorder, the terminals of the recorder and/or the cable can be damaged. In order to prevent tension from being applied directly on the terminals, fasten all wiring cables to the rear of the mounting panel.
- Do not apply a voltage exceeding the following value to the input terminals as this may damage the recorder.
  - Maximum input voltage  
Voltage range less than or equal to 200 mVDC, TC, RTD, and DI:  $\pm 10$  VDC  
Ranges other than those listed above:  $\pm 60$  VDC
  - Maximum common-mode voltage  
 $\pm 60$  VDC (under measurement category II conditions)
- The recorder is an INSTALLATION CATEGORY II product.

### Precautions to Be Taken While Wiring

Take the following precautions when wiring the input signal cables.

**It is recommended that crimp-on lug with insulation sleeves (designed for 4-mm screws) be used when connecting the input/output signal wires to the terminals.**



Crimp-on lug with insulation sleeves (for 4 mm screws)

### Take measures to prevent noise from entering the measurement circuit.

- Move the measurement circuit away from the power cable (power circuit) and ground circuit.
- It is desirable that the object being measured does not generate noise. However, if this is unavoidable, isolate the measurement circuit from the object. Also, ground the object being measured.
- Shielded wires should be used to minimize noise caused by electrostatic induction. Connect the shield to the ground terminal of the recorder as necessary (make sure you are not grounding at two points).
- To minimize noise caused by electromagnetic induction, twist the measurement circuit wires at short, equal intervals.
- Make sure to earth ground the protective ground terminal through minimum resistance (less than  $100 \Omega$ ).

### When using internal reference junction compensation on the thermocouple input, take measures to stabilize the temperature at the input terminal.

- Always use the terminal cover.
- Do not use thick wires which may cause large heat dissipation (cross sectional area of  $0.5 \text{ mm}^2$  or less recommended).
- Make sure that the ambient temperature remains reasonably stable. Large temperature fluctuations can occur if a nearby fan turns ON or OFF.

### Connecting the input wires in parallel with other devices can cause signal degradation, affecting all connected devices.

If you need to make a parallel connection, then

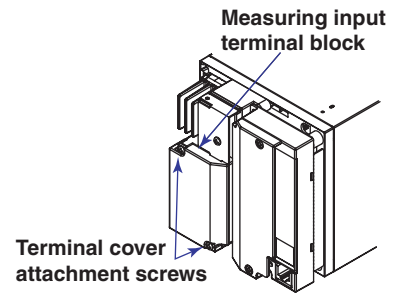
- Turn the burnout detection function OFF.
- Ground the instruments to the same point.
- Do not turn ON or OFF another instrument during operation. This can have adverse effects on the other instruments.
- RTDs cannot be wired in parallel.

## Installing/Wiring the Recorder

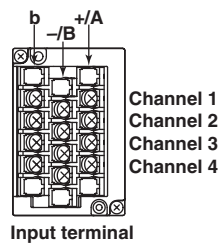
### Wiring Procedure

A terminal cover is screwed in place on the measuring input terminal block on the rear panel. A label indicating the terminal arrangement is affixed to the cover.

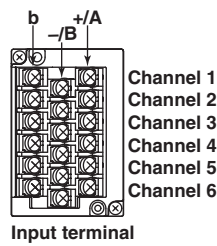
1. Turn OFF the recorder and remove the terminal cover.
2. Connect the signal wires to the terminals.
3. Replace the terminal cover and fasten it with screws. The proper torque for tightening the screws is 0.6 N-m.



### Pen Model

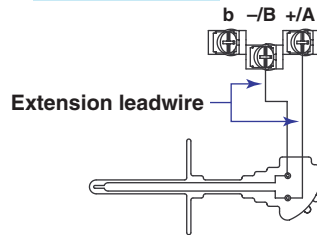


### Dot Model

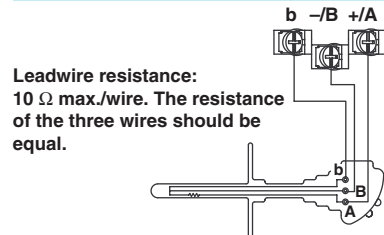


### Measuring Input Wiring

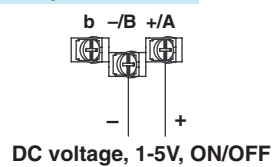
#### Thermocouple input



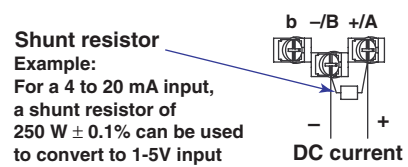
#### Resistance temperature detector input



#### DC voltage input, 1-5V input, and ON/OFF input



#### DC current input



### Note

RTD input terminals A and B on the dot model are isolated on each channel. Terminal b is shorted internally across all channels.

## Optional Terminal Wiring



### WARNING

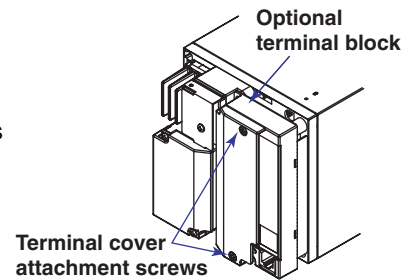
- To prevent electric shock while wiring, ensure that the power supply source is turned OFF.
- If a voltage of more than 30 VAC or 60 VDC is to be applied to the output terminals, use ring-tongue crimp-on lugs with insulation sleeves on all terminals to prevent the wires from slipping out when the screws become loose. Furthermore, use double-insulated wires (dielectric strength of 2300 VAC or more) for the signal wires on which a voltage of more than 30 VAC or 60 VDC is to be applied. For all other wires, use basic insulated wires (dielectric strength of 1390 VAC). To prevent electric shock, attach the terminal cover after wiring and make sure not to touch the terminals.

### CAUTION

- To prevent fire, use signal wires having a temperature rating of 70°C or more.
- If a strong tension is applied to the cable wired to the recorder, the terminals of the recorder and/or the cable can be damaged. In order to prevent tension from being applied directly on the terminals, fasten all wiring cables to the rear of the mounting panel.

### Wiring Procedure

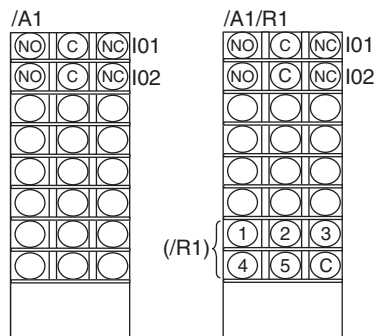
As shown in the figure below, the optional terminal block is located on the rear panel. The optional terminal block is provided on the recorder when an option that requires input/output is installed such as the alarm output relay (/A1, /A2, or /A3 option), and remote control function (/R1 option). A terminal cover is screwed in place on the measuring input terminal block. A label indicating the terminal arrangement is affixed to the terminal block.

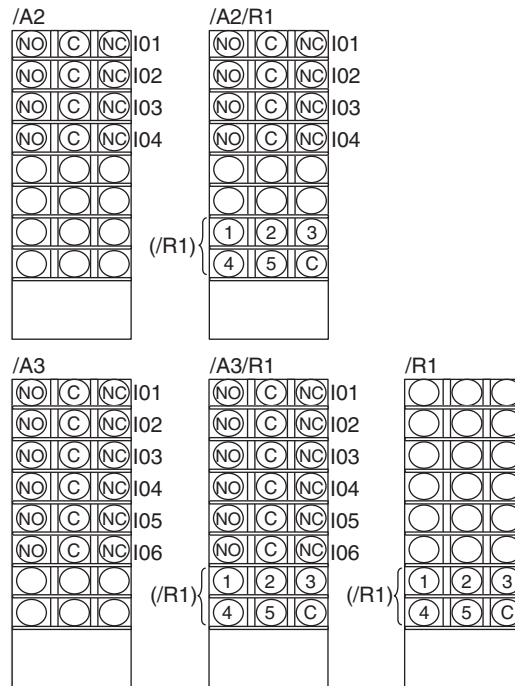


1. Turn OFF the recorder and remove the terminal cover.
2. Connect the input signal wires to the terminals.
3. Replace the terminal cover and fasten it with screws.  
The proper torque for tightening the screws is 0.6 N-m.

### Note

To reduce noise, use a shielded cable for the wiring of the remote control input terminals. Connect the shield to the ground terminal of the recorder.





**Alarm Output Relay Terminals**

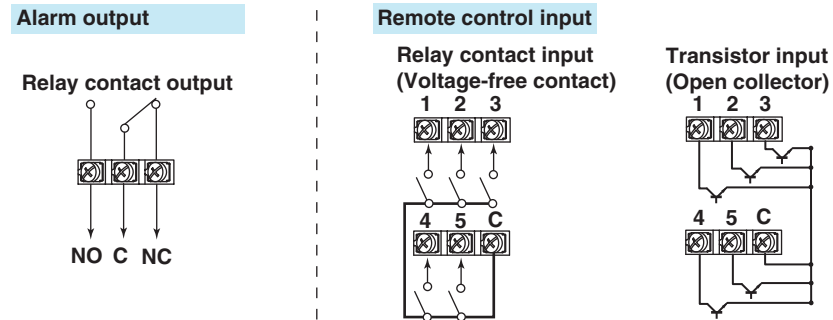
NC (Normally Closed), C (Common), NO (Normally Opened)

Alarm output terminals 01 to 06 are expressed as I01 to I06 in the alarm output relay settings.

**Remote Control Input Terminals**

1 to 5 (Remote control input terminals), C (Common)

Remote control input terminals 1 to 5 are expressed as numbers 1 to 5 in the remote control input settings.



**Relay Contact Output Specifications**

- Output format: Relay contact
- Contact rating: 250 VAC (50/60 Hz)/3 A, 250 VDC/0.1 A (for resistor load)
- Dielectric strength: 1500 VAC at 50/60 Hz for one minute (between output terminals and the ground terminal)

**Relay Contact Input/Transistor Input Specifications**

- Voltage-free contact: Contact closed at 200 Ω or less and contact open at 100 kΩ or greater
- Open collector: 0.5 V or less (30 mADC) when turned ON, leakage current of 0.25 mA or less when turned OFF

Input format: Photocoupler isolation (shared common)

Dielectric strength: 500 VDC for one minute between input terminals and the ground terminal

## Power Supply Wiring



### WARNING

- To prevent electric shock when wiring, ensure the main power supply is turned OFF.
- To prevent the possibility of fire, use 600 V PVC insulated wire (AWG20 to 16) or an equivalent wire for power wiring.
- Make sure to earth ground the protective earth terminal through a grounding resistance less than 100 Ω before turning ON the power.
- Use crimp-on lugs (designed for 4 mm screws) for power and ground wiring termination.
- To prevent electric shock, make sure to close the transparent cover for the power supply wires.
- Make sure to provide a power switch (double-pole type) on the power supply line in order to separate the recorder from the main power supply. Put an indication on this switch as the breaker on the power supply line for the recorder and indications of ON and OFF.  
Switch specifications  
Rated power current: 1 A or more (other than /P1), 3 A or more (/P1 option)  
Rated rush current: 60 A or more (other than /P1), 70 A or more (/P1 option)  
Complies with IEC 60947-1, 3.
- Connect a fuse in the power supply line.  
Between 2 A and 15 A (other than /P1), Between 4 A and 15 A (/P1 option)  
Use a fuse approved by CSA (for the use in North America) or VDE (for the use in Europe).
- Do not add a switch or fuse to the ground line.

Use a power supply that meets the following specifications:

Item	Specifications (Other Than /P1)	Specifications (/P1 Option)
Rated supply voltage	100 to 240 VAC	24 VDC/AC
Allowable power supply voltage range	90 to 132/180 to 264 VAC	21.6 to 26.4 VDC/AC
Rated power supply frequency	50/60 Hz	50/60 Hz (for AC)
Allowable power supply frequency range	50/60 Hz ± 2%	50/60 Hz ± 2% (for AC)
Maximum power consumption	40 VA	25 VA (for DC), 35 VA (for AC)

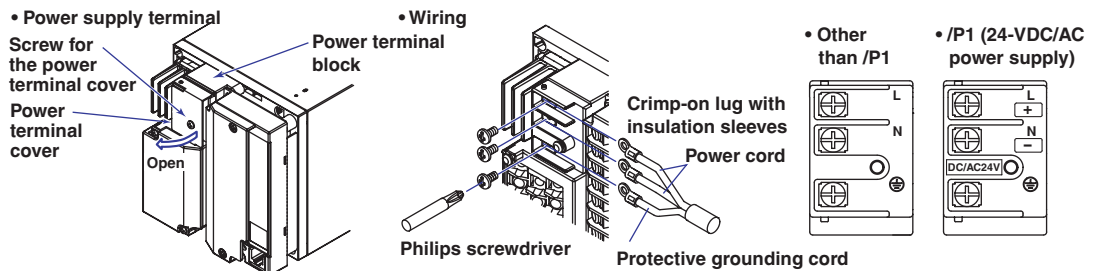
### Note

Do not use a supply voltage in the range 132 to 180 VAC, as this may have adverse effects on the measurement accuracy.

### Wiring Procedure

The power supply terminals and protective ground terminals are located on the rear panel.

1. Turn OFF the power switch on the recorder and open the power terminal cover.
2. Wire the power cord and the protective ground cord to the power supply terminals. Use ring-tongue crimp-on lugs (designed for 4 mm screws).
3. Close the power supply terminal cover and secure it with the screw. The proper torque for tightening the screws is 0.6 N-m.



### Turning ON/OFF the Power Switch

The power switch is located inside the door at the lower right. When the power switch is turned ON, a self-diagnosis program runs for a few seconds, and the recorder is ready for operation.



# Common Operations and Menu Structure

## Execution Modes

The recorder has three execution modes.

### Operation Mode

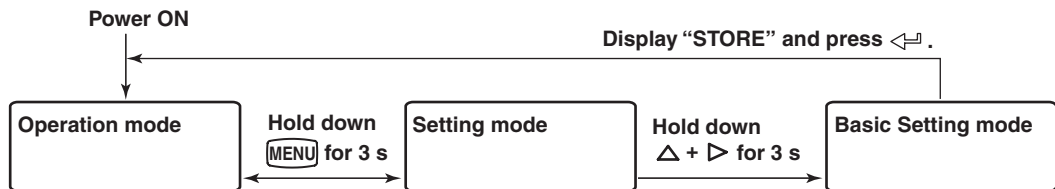
This mode is used for normal recording operation. The recorder enters this mode when the power is turned ON.

### Setting Mode

This mode is used to set the input range, alarms, chart speed, and other parameters. These settings can be changed while recording is in progress (excluding some functions).

### Basic Setting mode

This mode is used to set the basic specifications of the recorder such as the thermocouple burnout detection function and the alarm output relay operation. This mode cannot be entered while the recorder is recording. Measurement, recording, and alarm detection cannot be carried out in this mode.



## Operation Sequence

This section explains the operations that need to be carried out when using the recorder for the first time.

### • Preparing to Record

Load the chart paper and pens (pen model) or ribbon cassette (dot model). Change the date/time if necessary.

For the operating procedure, see page 25.

### • Setting the Channel Input Range and Other Parameters

Set the measurement conditions suitable for the object being measured. This manual explains the following operations.

- Setting the input range and alarm (see page 31 for the procedure)
- Changing the chart speed (see page 38 for the procedure)

### • Recording/Displaying Data

Start/Stop the recording operation and carry out various types of printouts. Also, switch the display screen and change the displayed contents.

For the operating procedure, see page 37.

## Key Operation

### Entering Setting Mode

Hold down the **MENU** key for 3 seconds.

The setup item is displayed blinking.



In Setting mode, the panel keys are set to the functions marked above the keys.



### Exiting from Setting Mode (Returning to Operation Mode)

Hold down the **MENU** key for 3 seconds.

The recorder returns to operation mode.

### Entering Basic Setting Mode

Hold down the **MENU** key for 3 seconds to enter Setting mode. Next, hold down both the

**Δ (DISP)** key and the **▷ (FUNC)** key for 3 seconds.

The channel number display shows **BS**.

The setup item is displayed blinking.



### Exiting from Basic Setting Mode (Returning to Operation Mode)

Press the **ESC (MENU)** key several times to return to the **BS ALARM** screen.

Press the **Δ (DISP)** or **▽ (FEED)** key to select **END** and then press the **← (CH UP)** key.

The setup save screen appears.



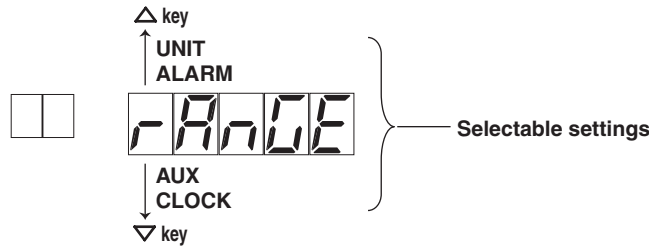
Press the **Δ (DISP)** or **▽ (FEED)** key to select **STORE** and then press the **← (CH UP)** key. The setting is applied, and the screen returns to Operation mode. If you select

**ABORT** and press the **← (CH UP)** key, the setting is discarded, and the screen returns to Operation mode.



### Changing the Settings

The selected item change each time you press the  $\Delta$  (DISP) key. The selected item change in reverse order if you press the  $\nabla$  (FEED) key.



After you make a selection, press the  $\leftarrow$  (CH UP) key. The next screen appears. When OK is displayed, the changed item is applied.



### Using the ESC Key

If you press the ESC (MENU) key, the operation is cancelled, and the display returns to a higher level menu. In other words, if you do not show OK, the changes you made up to that point are discarded.

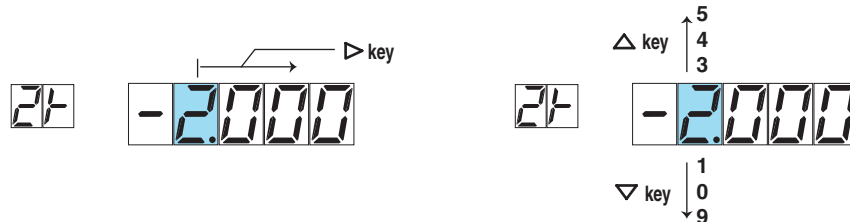
### Entering Values

Press the  $\triangleright$  (FUNC) key to move the cursor to the right. If you press the  $\triangleright$  (FUNC) key at the right most digit, the cursor returns to the beginning.

Press the  $\Delta$  (DISP) key to increment the value. Press the  $\nabla$  (FEED) key to decrement the value.

You repeat these steps to enter the value.

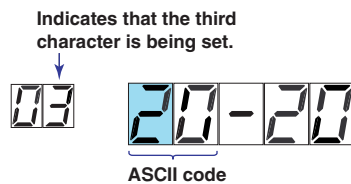
To change the sign, press the  $\Delta$  (DISP) key or  $\nabla$  (FEED) key at the leftmost digit in the data display section.



When you press the  $\leftarrow$  (CH UP) key, the change is applied and the next screen is displayed.

### Entering Characters

A character is set by entering the ASCII code (2-digit value). For the procedure to enter values, see “Entering Values.” For a description of ASCII codes, see “ASCII Codes” on the next page.



## Alphabet Mapping and ASCII Codes

### Alphabet Display

The alphabet characters that are displayed on the channel number display or data display are as shown below.

- Alphabet Display

A	B	C	D	E	F	G	H	I	J	K	L	M	N
a	b	c	d	e	f	g	h	i	j	k	l	m	n

Symbols other than alphabet characters that are displayed are as follows:

- Symbols on the channel display

Span left	Span right	Scale left	Scale right	Difference high limit alarm	Difference low limit alarm

- Special numeric display on the data display

-1

### ASCII Codes

You set the units or messages that are recorded on the chart paper using ASCII codes.

- When the Font Is Set to English

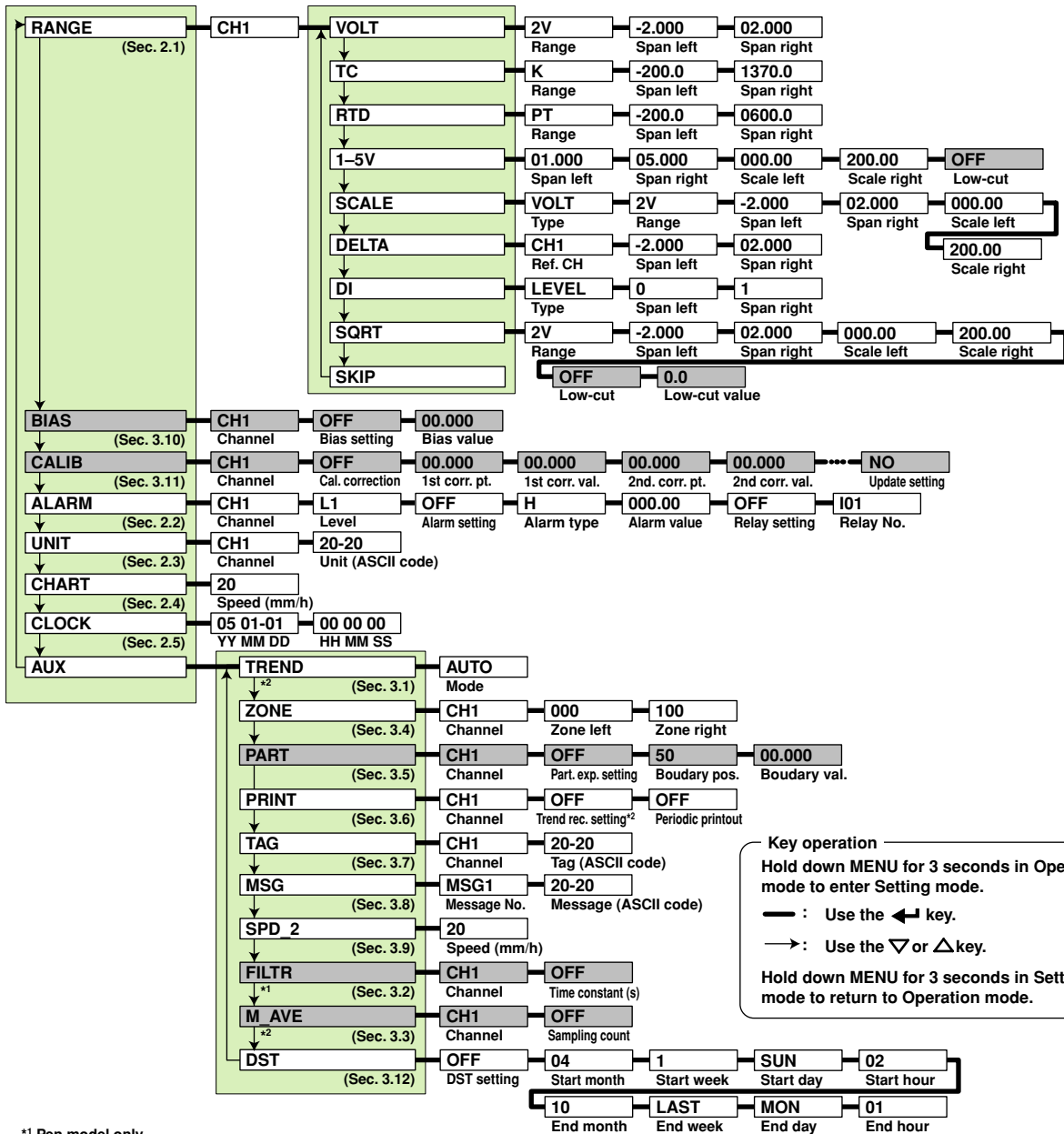
Lower Upper	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	SP		#	%				(	)	*	+		-	.	/	
30	0	1	2	3	4	5	6	7	8	9						
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z				°	
60		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	μ	Ω	²	³	

- When the Font Is Set to German or French

Lower Upper	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	SP		#	%				(	)	*	+		-	.	/	
30	0	1	2	3	4	5	6	7	8	9						
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z				\	
60		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z		Ω			
A0																
B0	°		²	³		μ										
C0				Ä			Ç				Ë					Ï
D0						Ö						Ü				ß
E0	à	â	ä			ç	è	é	ê	ë				î	ï	
F0			ô		ö			ù		û	ü					

- Only German
- Only French

Menu Structure of Setting Mode



**Key operation**  
 Hold down MENU for 3 seconds in Operation mode to enter Setting mode.  
 ← : Use the ← key.  
 → : Use the ∇ or △ key.  
 Hold down MENU for 3 seconds in Setting mode to return to Operation mode.

\*1 Pen model only  
 \*2 Dot model only

- The items in    are not displayed by default. To display these items, settings must be changed in Basic Setting mode.
- References in parentheses are those in the *SR10000 Recorder User's Manual (IM04P03B01-01E)*.
- For the selectable settings and range, see the next page.

• Alphabet mapping

A	B	C	D	E	F	G	H	I	J	K	L	M	N
a	p	q	r	s	t	u	v	w	x	y	z	h	i

## Setup Items in Setting Mode and Their Default Values

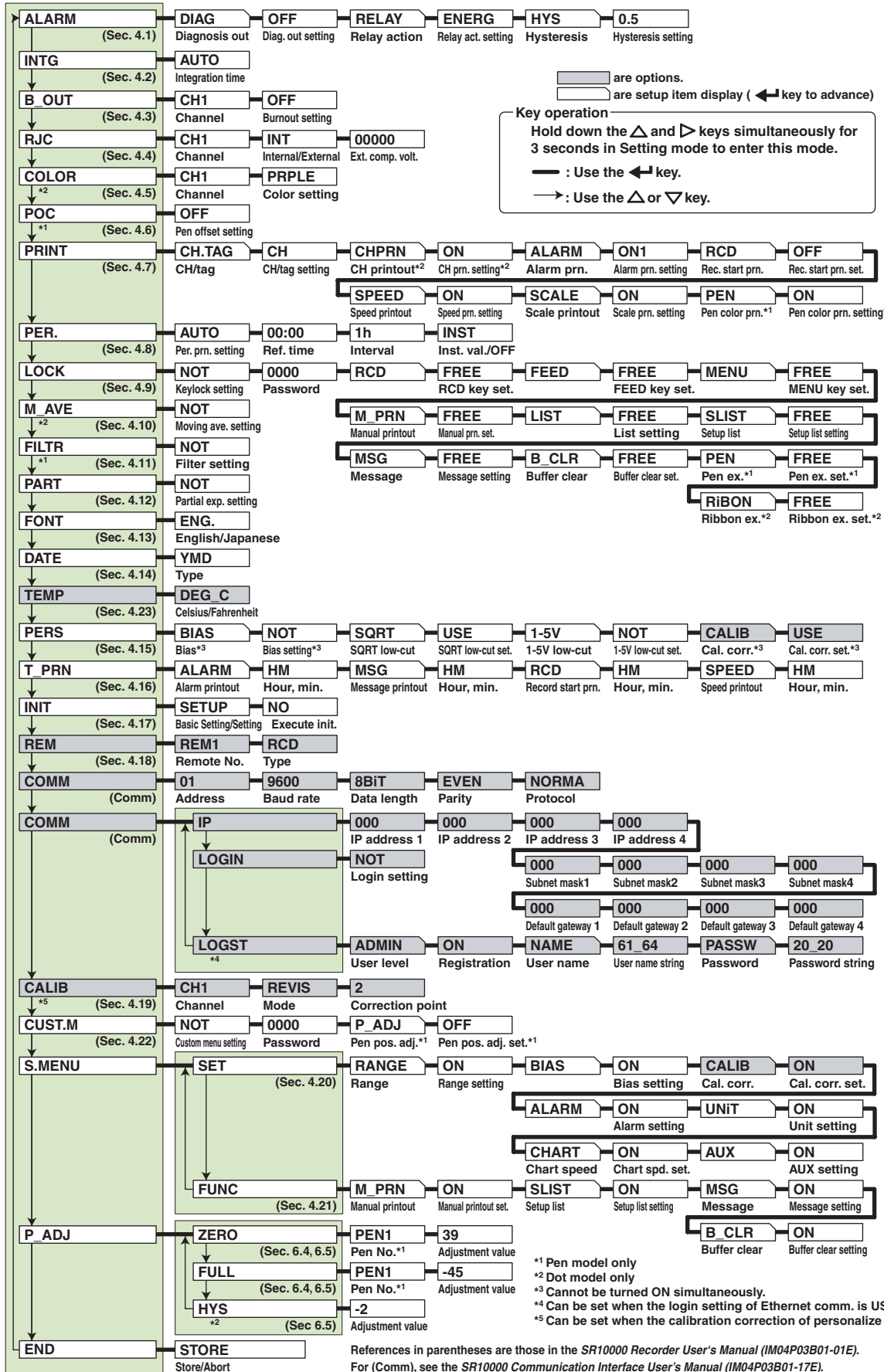
## Common Setup Items/Selectable Settings

Setup Item	Selectable Range or Settings	Default Value
Channel	CH1 to CH6	CH1
Relay number	I01 to I06	I01
Setting (function disable/enable)	OFF(disable)/ON(enable)	OFF

## Setup Items and Selectable Settings by Function

Setup Item	Pen/Dot	Selectable Range or Settings	Default Value
RANGE > VOLT > Range > SCALE > Type > Range > SQRT > RANGE > TC > RANGE	-	<b>20MV</b> (20 mV)/ <b>60MV</b> (60 mV)/ <b>200MV</b> (200 mV)/ <b>2V/6V/20V/50V</b> <b>R/S/B/K/E/J/T/N/W/L/U/WRE</b> (WRe) <b>KP</b> (Kp vsAu7Fe)/ <b>PLATI</b> (PLATINEL)/ <b>PR</b> (PR40-20)/ <b>NiMO</b> (NiNiMo)/ <b>W WRE</b> (W/WRe)/ <b>N2</b> (Type N(AWG14))	<b>2V</b> <b>R</b> (/N3 Option)
> RTD > Range	-	<b>PT</b> (Pt)/ <b>JPT</b> (JPt) <b>PT</b> <b>PT3</b> (Pt50)/ <b>Ni1</b> (Ni100(SAWA))/ <b>Ni2</b> (Ni100(DIN))/ <b>Ni3</b> (Ni120)/ <b>J263</b> (J263*B)/ <b>CU8</b> (Cu53)/ <b>Qy9</b> (Cu100 a=0.00425 at 0°C)/ <b>PT4</b> (Pt25) <b>CU1</b> (GE)/ <b>CU2</b> (L&N)/ <b>CU3</b> (WEED)/ <b>CU4</b> (BAILEY)/ <b>CU5</b> (Cu10 a=0.00392 at 20°C)/ <b>CU6</b> (Cu10 a=0.00393 at 20°C)/ <b>CU25</b> (Cu25 a=0.00425 at 0°C)	(/N3 Option) (/N1 option)
> DI > Type	-	<b>LEVEL/CONT</b>	<b>LEVEL</b>
BIAS > Bias value	-	±10% of the measurable range width or scaling width	<b>00.000</b>
CALIB > Correction point	-	<b>00.000</b> to <b>00.000</b>	<b>00.000</b>
> Correction value	-	<b>00.000</b> to <b>00.000</b>	<b>00.000</b>
> Update setting	-	<b>NO</b> (not execute)/ <b>YES</b> (execute)	<b>NO</b>
ALARM > Level	-	<b>L1</b> (level 1)/ <b>L2</b> (level 2)/ <b>L3</b> (level 3)/ <b>L4</b> (level 4)	<b>L1</b>
> Alarm type	-	<b>H</b> (high limit)/ <b>L</b> (low limit)/ <b>h</b> (difference high limit)/ <b>l</b> (difference low limit)	<b>H</b>
> Alarm value	-	Depends on the alarm type	<b>000.00</b>
UNIT > Unit	-	6 characters or less	Space
CHART	Pen model Dot model	<b>10</b> to <b>12000</b> mm/h (40 levels) <b>10</b> to <b>1500</b> mm/h (28 levels)	<b>20</b> <b>20</b>
AUX > TREND > Mode	Dot model	<b>AUTO/FIX</b> (fastest)	<b>AUTO</b>
> ZONE > Zone left, right	-	Within the recording span range (mm)	Left: <b>000</b> , Right: <b>100</b>
> PART > Boundary position	-	<b>1</b> to <b>99%</b>	<b>50</b>
> Boundary value	-	Within the recording span range	<b>000.00</b>
> TAG > Tag	-	7 characters or less	<b>1</b>
> MSG > Message No.	-	<b>MSG1</b> (message 1) to <b>MSG5</b> (message 5)	<b>MSG1</b>
> Message	-	16 characters or less	Space
> SPD_2 > Speed	Pen model Dot model	<b>10</b> to <b>12000</b> mm/h (40 levels) <b>10</b> to <b>1500</b> mm/h (28 levels)	<b>20</b> <b>20</b>
> FILTR > Time constant	Pen model	<b>OFF/2s/5s/10s</b>	<b>OFF</b>
> M_AVE > Sampling count	Dot model	<b>OFF/2</b> to <b>16</b>	<b>OFF</b>
> DST > Start/End month	-	<b>01</b> to <b>12</b>	<b>04</b> (start), <b>10</b> (end)
> Start/End week	-	<b>LAST/1</b> to <b>4</b> (1 <sup>st</sup> to 4 <sup>th</sup> )	<b>1</b> (start), <b>LAST</b> (end)
> Start/End day	-	<b>SUN/MON/TUE/WED/THU/FRY/SAT</b>	<b>SUN</b> (start), <b>MON</b> (end)
> Start/End hour	-	<b>01</b> to <b>12</b>	<b>02</b> (start), <b>01</b> (end)

Menu Structure of Basic Setting Mode





## Setup Items in Basic Setting Mode and Their Default Values

## Common Setup Items/Selectable Settings

Setup Item	Selectable Range or Settings	Default Value
Channel	CH1 to CH6	CH1
Setting (function disable/enable)	OFF(disable)/ON(enable)	OFF
Setting (not use or use the function)	NOT/USE	NOT

## Setup Items and Selectable Settings by Function

Setup Item	Pen/Dot	Selectable Range or Settings	Default Value	
ALARM	> Relay action setting	-	ENERG (energize)/DE-EN (de-energize)	ENERG
	> Hysteresis setting	-	OFF/0.1% to 1.0%	0.5
INTG	> Integration time	Pen model Dot model	AUTO/50Hz/60Hz AUTO/50Hz/60Hz/100ms Fixed to 50Hz (using 24 VDC on the /P1 option)	AUTO 50Hz (/P1)
B_OUT	> Burnout setting	-	OFF/UP/DOWN	OFF
RJC	> Internal/External	-	INT/EXT	INT
	> External compensation voltage	-	-19999 to 20000 $\mu$ V	00000
COLOR	> Color setting	Dot model	PRPLE/RED/GREEN/ BLUE/BROWN/BLACK	CH1: PRPLE, CH2: RED, CH3: GREEN, CH4: BLUE, CH5: BROWN, CH6: BLACK
PRINT	> Channel/tag setting	-	CH/TAG	CH
	> Channel printout setting	Dot model	ON/OFF	ON
	> Alarm printout setting	-	ON1 (activate/release)/ON2(activate only)/OFF	ON1
	> New chart speed printout setting	-	ON/OFF	ON
	> Scale printout setting	-	ON/OFF	ON
	> Pen color printout setting	Pen model	ON/OFF	ON
PER.	> Periodic printout setting	-	AUTO/MAN	AUTO
	> Reference time	-	Hour 0 to 23 (every hour)	00:00
	> Interval	-	10MiN/12MiN/15MiN/20MiN/30MiN/ 1h/2h/3h/4h/6h/8h/12h/24h	1h
	> Instantaneous value/OFF	-	INST (instantaneous value)/OFF	INST
LOCK	> Password	-	Up to 4-digit number and space	Space
	> Setting	-	FREE (not lock)/LOCK	FREE
FONT	> English/Japanese	-	ENG. (English)/JPN. (Japanese)/GER. (German)/FRE. (French)	ENG.
DATE	> Type	-	YMD (YY/MM/DD)/MDY_1 (MM/DD/YY)/ DMY_1 (DD/MM/YY)/DMY_2 (DD.MM.YY)/ MDY_2 (MM.DD.YY)	YMD
TEMP	> Celsius/Fahrenheit	-	DEG_C (Celsius)/DEG_F (Fahrenheit)	DEG_C
PERS	> SQRT low-cut setting	-	USE/NOT	USE
	> Calibration correction setting	-	USE/NOT	USE
T_PRN	> Hour, minute	-	HMS (hr, min, s)/MDHM (mon, day, hr, min)/ MDHMS(mon, day, hr, min, s)/ Y-S (yr, mon, day, hr, min, s)/ NONE (only message printout can be set)	HMS
INIT	> Basic Setting/Setting	-	SETUP (Setting + Basic Setting)/SET (Setting)	SETUP
	> Execute initialization	-	NO/YES	NO
CUST.M	> Password	-	4-digit number	0000
S.MENU	> (SET menu settings)	-	ON/OFF	ON
	> (FUNC menu settings)	-	ON/OFF	ON
P_ADJ	> ZERO > Adjustment value	Pen model Dot model	00 to 70 00 to 15	39 07
	FULL > Adjustment value	Pen model Dot model	-45 to 15 -30 to 30	000 000
	HYS > Adjustment value	Dot model	-7 to 7	-2

## Common Operations and Menu Structure

### Remote Control Function (/R1 option)

Setup Items	Pen/Dot	Selectable Range or Settings	Default Value
REM > Remote No.	-	<b>REM1</b> (remote 1) to <b>REM5</b> (remote 5)	<b>REM1</b>
> Type	-	<b>RCD</b> (record start/stop)/ <b>C_SPD</b> (new chart speed)/ <b>T_ADJ</b> (time adjust)/ <b>M_PRN</b> (manual printout)/ <b>MSG1</b> (message 1) to <b>MSG5</b> (message 5)/ <b>NONE</b>	<b>RCD</b>

### RS-422A/485 Communication Interface Function (/C3 Option)

Setup Items	Pen/Dot	Selectable Range or Settings	Default Value
COMM > Address	-	<b>1</b> to <b>32</b>	<b>1</b>
> Baud rate	-	<b>1200/2400/4800/9600/19200/38400</b> bps	<b>9600</b>
> Data length	-	<b>7/8</b> bit	<b>8</b>
> Parity	-	<b>EVEN/ODD/NONE</b>	<b>EVEN</b>
> Protocol	-	<b>NORMA</b> (normal)/ <b>M_BUS</b> (Modbus communication)	<b>NORMA</b>

### Ethernet Communication Interface Function (/C7 Option)

Setup Items	Pen/Dot	Selectable Range or Settings	Default Value
COMM > IP > IP address 1 to 4	-	<b>000</b> to <b>255</b>	<b>000</b>
> IP > Subnet mask 1 to 4	-		
> IP > Default gateway 1 to 4	-		
> LOGST > User level	-	<b>ADMIN/USER1</b> to <b>USER6</b>	<b>ADMIN</b>
> LOGST > Registration	-	<b>ON/OFF</b>	<b>ON</b> (for ADMIN)
> LOGST > User name string	-	16 characters or less	ADMIN
> LOGST > Password string	-	4 characters or less	Space

### Calibration Correction Function (/CC1 Option)

Setup Items	Pen/Dot	Selectable Range or Settings	Default Value
CALIB > Mode	-	<b>REVIS</b> (revise value)/ <b>ABSOL</b> (absolute value)	<b>REVIS</b>
> Correction point	-	<b>2</b> to <b>16</b>	<b>2</b>

# Preparing to Record

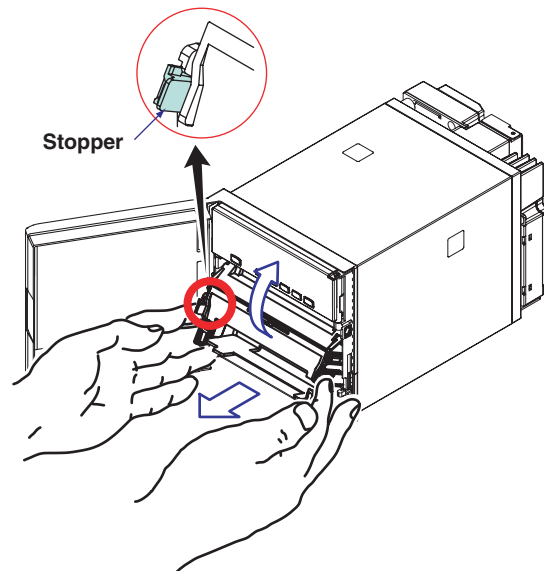
## Loading or Replacing the Chart Paper

### CAUTION

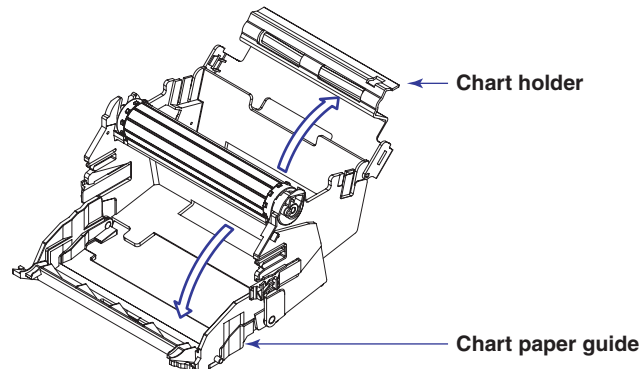
- Do not install or remove the chart cassette with the chart paper guide open. This may damage the stopper.
- Continuing to record or print without the chart paper on the dot model can cause damage to the chart cassette platen (the cylindrical section that holds the paper during the recording operation). Be sure to replace the chart paper ahead of time.

### Loading the Chart Paper

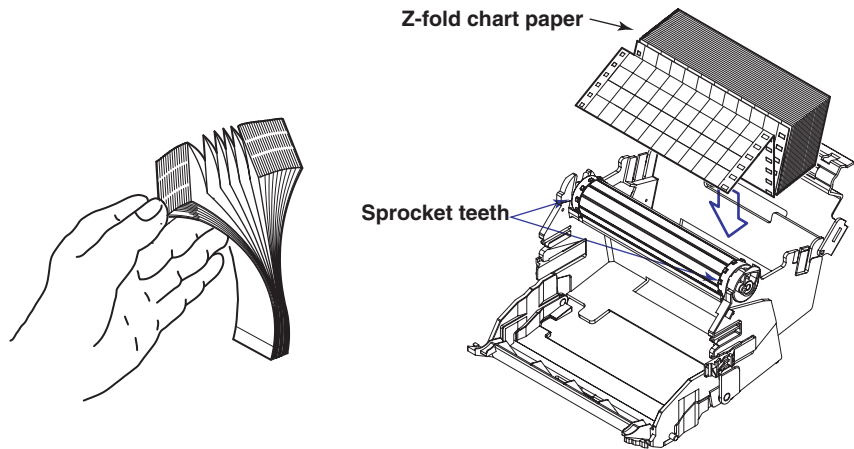
1. Open the door.  
If recording is in progress, press the **RCD** key to stop the recording.
2. Remove the chart cassette.  
Gently pressing the left and right stoppers inward. The bottom section of the chart cassette comes out. Gently lift the chart cassette and pull it out from the recorder case.



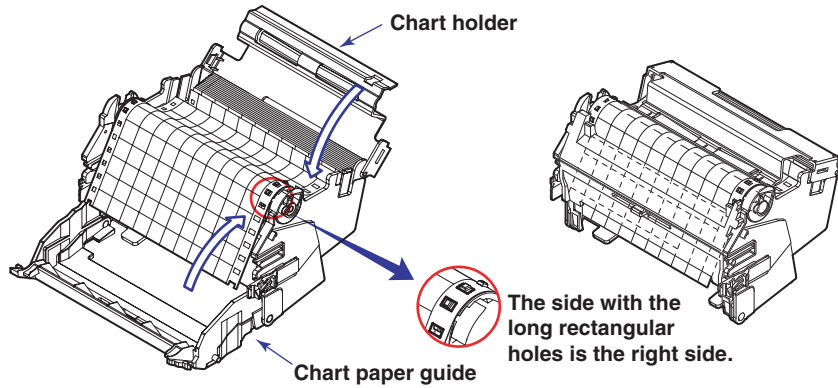
3. Open the chart holder and the chart paper guide.



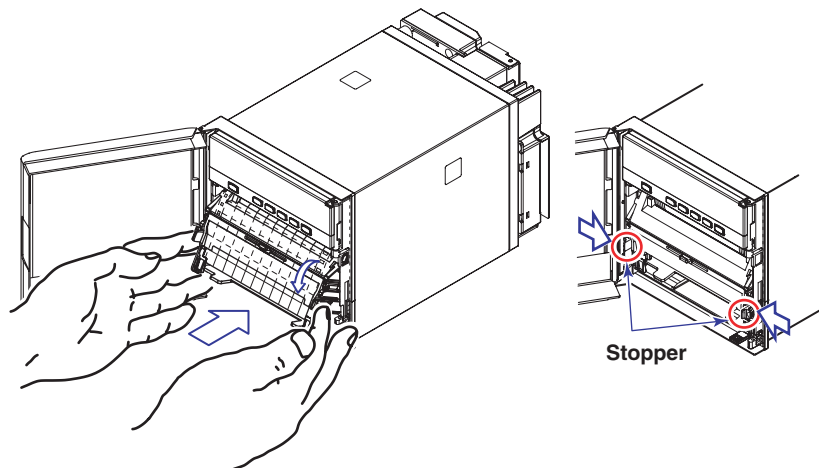
4. Load the chart paper.  
Riffle the chart thoroughly before loading. Make sure that the sprocket teeth of the chart drives are properly engaged in the chart paper perforations. Make sure not to load the chart paper backwards.



5. Close the chart holder and close the chart paper guide.



6. Replace the chart cassette back into the recorder.  
Align the left and right projections with the guide grooves of the recorder and press the entire chart cassette into the recorder case. The chart cassette is fixed in place with the stoppers.



### Feeding the Chart Paper

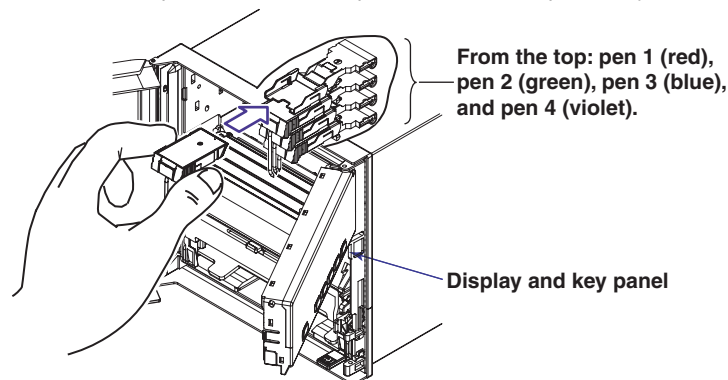
7. Press the **FEED** key to assure that the chart moves two or more folds smoothly into the chart receiver.  
If it moves unsteadily, do the installing procedure again.

## Installing/Replacing Felt Pens (Pen Model)

### CAUTION

- Do not press or pinch the felt tip to prevent deformation.
- Do not move the penholder left or right by force to protect the driving mechanism.
- Make sure to remove the pen cap before installation.
- Use pen caps of the same ink color. If a pen cap of a different ink color is used on the pen, the remaining ink in the cap may be absorbed through the pen tip, and the ink may change its color.

1. Open the door.  
If recording is in progress, press the **RCD** key to stop the recording.
2. Open the display and key panel section.  
You can open the display and key panel section by holding the tab at the lower left and pulling it toward you.
3. Hold the felt pen cartridge and pull it out from the pen holder.  
If the pen (pen holder) is at a position that is not easily accessible, see “When the Pen (Pen Holder) Is at a Position That Is Not Easily Accessible” below.
4. Remove the cap from the new felt pen and insert the pen firmly into the pen holder.



5. Return the display and key panel section to its original position.

### When the Pen (Pen Holder) Is at a Position That Is Not Easily Accessible

If the pen (pen holder) is at a position that is not easily accessible, carry out the procedure below to move it near the center position.

1. Press the **FUNC** key.
2. Press the **△** or **▽** key several times to display **PEN**.



3. Press the **←** key.  
The pen (pen holder) moves near the center position, and **END** appears.

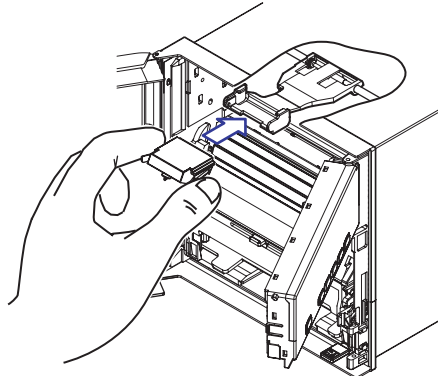
### Note

When the pen moves, a line is drawn on the chart paper.

4. Replace the pen.
5. Return the display and key panel section to its original position, and press the **←** key.  
The screen returns to the data display screen.

### Installing/Replacing the Plotter Pen (Pen Model)

1. Open the door.  
If recording is in progress, press the **RCD** key to stop the recording.
2. Open the display and key panel section.
3. Hold the plotter pen cartridge and pull it out from the pen holder.
4. Remove the cap from the new plotter pen and insert the pen firmly into the pen holder.



5. Return the display and key panel section to its original position.

### Installing/Replacing the Ribbon Cassette (Dot Model)

---

#### CAUTION

- Improper cassette insertion may cause the color to change or damage the ribbon.
- Do not apply upward force to the printer carriage. If you do, the carriage position may be offset, and the recorder may not print correctly.

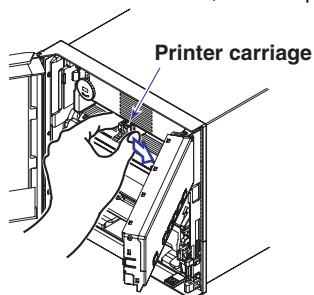
1. Open the door.  
If recording is in progress, press the **RCD** key to stop the recording.
2. Press the **FUNC** key.
3. Press the  $\Delta$  or  $\nabla$  key several times to display **RIBON**.



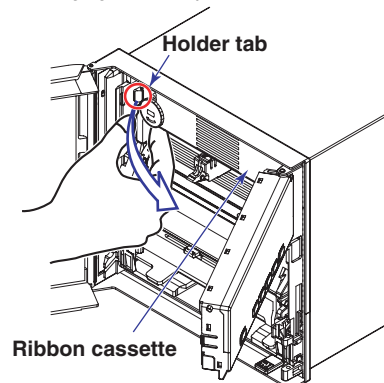
4. Press the  $\leftarrow$  key.  
The printer carriage moves near the center position, and **END** is displayed.
5. Open the display and key panel section.  
You can open the display and key panel section by holding the tab at the lower left and pulling it toward you.

#### Note

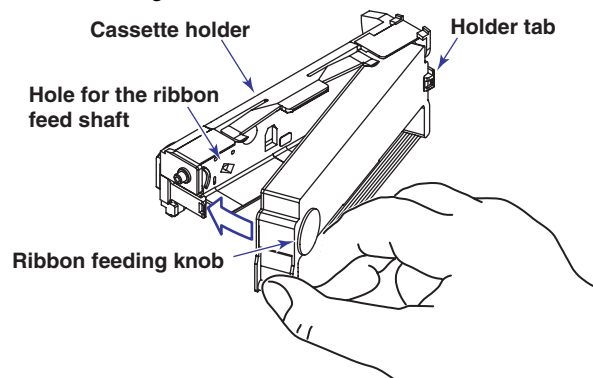
If the recorder is OFF, hold the printer carriage and move it near the center position.




6. Remove the ribbon cassette.  
Pull the left-hand part of the ribbon cassette so that the cassette holder tab disengages, and pull the ribbon cassette out from the recorder case.



7. Install a new ribbon cassette.  
First, insert the right-hand part and then the left-hand part into the cassette holder.  
Check that the cassette is properly engaged with the cassette holder tab.  
If inserting the ribbon cassette is difficult, turn the ribbon feeding knob in the direction of the arrow to align the ribbon feeding shaft of the cassette with the ribbon feeding shaft of the holder.



8. Turn the ribbon feeding knob in the direction of the arrow a half turn or more to check that the ribbon is feeding properly. If the ribbon is loose, turn the knob in the direction of the arrow to tighten it.
9. Return the display and key panel section to its original position, and press the  key.  
The screen returns to the data display screen.



## Checking or Setting the Date/Time

### Checking the Date/Time

The date/time is shown on the display when the power switch is turned ON and the **DISP** key is pressed several times.

### Setting the Date/Time

1. Hold down the **MENU** key for 3 seconds to enter Setting mode..
2. Press the  $\Delta$  or  $\nabla$  key to display **CLOCK**, and press the  $\leftarrow$  key.



3. Set the date, and press the  $\leftarrow$  key.



Press the  $\triangleright$  key to select the desired digit. Press the  $\Delta$  or  $\nabla$  key to change the value.

When all digits have been set, press the  $\leftarrow$  key.

4. Set the time, and press the  $\leftarrow$  key.



Press the  $\triangleright$  key to select the desired digit. Press the  $\Delta$  or  $\nabla$  key to change the value.

When all digits have been set, press the  $\leftarrow$  key.

Example: Changing from January to May in the figure below

Press the  $\triangleright$  key three times to move the cursor to the month position. Next, press the  $\Delta$  key four times to change the value from 1 to 5.



5. When **OK** appears, press the **ESC** key.



6. Hold down the **MENU** key for 3 seconds to return to Operation mode.

### Explanation

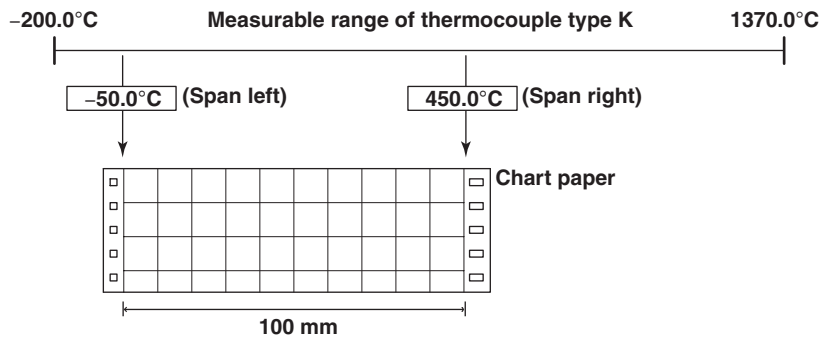
The data format can be changed with **DATE** (date format) in Basic Setting mode.

# Setting the Input Range and Alarm on Measurement Channels

## Setting the Input Range

### Setup Example (1) of Thermocouple Input

Set channel 02 to thermocouple type K and measure temperatures in the range  $-50.0$  to  $450.0^{\circ}\text{C}$ . The measurable range for thermocouple type K is  $-200.0$  to  $1370.0^{\circ}\text{C}$ . The measured values in the range of  $-50.0$  to  $450.0^{\circ}\text{C}$  are recorded in a width of 100 mm on the chart paper. This recording range is called a *recording span*, and the leftmost and rightmost values of the recording span are called *span left* and *span right*, respectively.

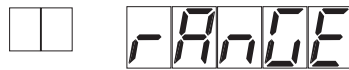


### Entering Setting Mode

1. Hold down the **MENU** key for 3 seconds to enter Setting mode..

### Selecting the Channel

2. Press the **←** key with **RANGE** shown on the screen.



3. Press the **△** or **▽** key to select **CH2**, and press the **←** key.



### Selecting the Input Type

4. Press the **△** or **▽** key to select **TC**, and press the **←** key (for the selectable settings, see "Explanation").



5. Press the **△** or **▽** key to select **K**, and press the **←** key.



### Setting Span Left

6. Set span left to  $-50.0$ , and press the **←** key.  
Press the **▷** key to select the desired digit. Press the **△** or **▽** key to change the value.



## Setting the Input Range and Alarm on Measurement Channels

### Setting Span Right

- Likewise, set span right to **450.0**, and press the **←** key.



When **OK** is displayed, the settings entered up to then are applied.

### Finishing the Settings

- When **OK** is displayed, do either of the following:  
Press the **←** key to set other channels.  
To finish setting the input range, press the **ESC** key.

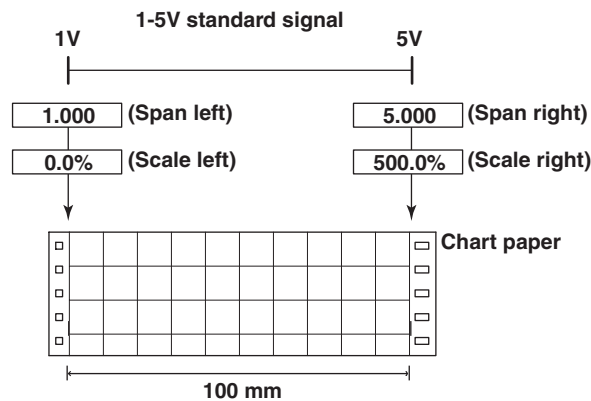


- Hold down the **(MENU)** key for 3 seconds to return to Operation mode.

### Setup Example (2) of 1-5V Input and unit

Set channel 03 to 1 to 5V standard signal input and 0.0 to 500.0% scale. The scaling range is -19999 to 30000.

The measured values in the range of 0.0 to 500.0% are recorded in a width of 100 mm on the chart paper.



### Entering Setting Mode

- Hold down the **(MENU)** key for 3 seconds to enter Setting mode..

### Selecting the Channel

- Press the **←** key with **RANGE** shown on the screen.

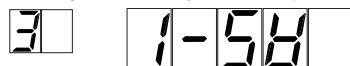


- Press the **△** or **▽** key to select **CH3**, and press the **←** key.



### Selecting the Input Type

- Press the **△** or **▽** key to select **1-5V**, and press the **←** key (for the selectable settings, see "Explanation").



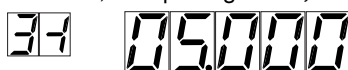
**Setting Span Left**

- Set span left to **1.000**, and press the **←** key.  
Press the **▷** key to select the desired digit. Press the **△** or **▽** key to change the value.



**Setting Span Right**

- Likewise, set span right to **5,000**, and press the **←** key.



**Setting Scale Left**

- Move the decimal point so that the number of digits to the right of the decimal is 1.  
Press the **▷** key to select **.**. Press the **△** or **▽** key to move the decimal point.



- Set scale left to **0.0**, and press the **←** key.  
Press the **▷** key to select the desired digit. Press the **△** or **▽** key to change the value.



**Setting Scale Right**

- Likewise, set scale right to **500.0**, and press the **←** key.



When **OK** is displayed, the settings entered up to then are applied.

**Finishing the Range Settings**

- When **OK** appears, press the **ESC** key.  
The **RANGE** screen is displayed.

**Setting the Unit**

- Press the **△** or **▽** key to select **UNIT**, and press the **←** key.

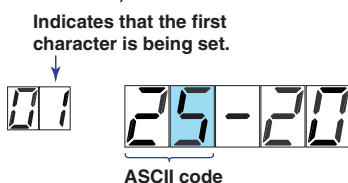


- Press the **△** or **▽** key to select **CH3**, and press the **←** key.



**Selecting the Unit**

- Press the **△** or **▽** key to select **25**(% corresponds to ASCII code 25), and press the **←** key.  
(For a description of the ASCII codes, see “Common Operations and Menu Structure.”)



## Setting the Input Range and Alarm on Measurement Channels

### Finishing the Unit Settings

14. When **OK** appears, press the **ESC** key.



15. Hold down the **MENU** key for 3 seconds to return to Operation mode.

### Explanation

#### Note

If the range is changed after setting the alarm, the alarm setting becomes invalid. When you change the range, check the alarm setting.

In step 5 of setup examples (1) and (2), you can select an input type or a computation type on the table below.

Mode	Description
VOLT	DC voltage
TC	Thermocouple
RTD	Resistance temperature detector
1-5V	1-5VDC: 1-5V is scaled to values in the appropriate unit to be used as measured values.
SCALE	The input values are scaled to values in the appropriate unit to be used as measured values.
DELTA	The value obtained by subtracting the measured value of another channel (called the <i>reference channel</i> ) from the input value of the channel set to delta computation is used as the measured value of that channel.
DI	ON/OFF input
SQRT	The square root of the input value is calculated, the result is scaled to a value in the appropriate unit, and used as the measured value of the channel. Also, the low-cut function (input less than a given measured value is fixed to 0) can be used.
SKIP	Not measured.

### • Input Type and Measurable Range

#### Thermocouple (Mode: TC)

Range Type	Measurable Range
R	0.0 to 1760.0°C
S	0.0 to 1760.0°C
B	0.0 to 1820.0°C
K	-200.0 to 1370.0°C
E	-200.0 to 800.0°C
J	-200.0 to 1100.0°C
T	-200.0 to 400.0°C
N	0.0 to 1300.0°C
W	0.0 to 2315.0°C
L	-200.0 to 900.0°C
U	-200.0 to 400.0°C
WRE(WRe)	0.0 to 2400.0°C

#### RTD (Mode: RTD)

Range Type	Measurable Range
PT(Pt100)	-200.0 to 600.0°C
JPT(JPt100)	-200.0 to 550.0°C

#### DC voltage (Mode: VOLT)

Range Type	Measurable Range
20mV	-20.00 to 20.00 mV
60mV	-60.00 to 60.00 mV
200mV	-200.0 to 200.0 mV
2V	-2.000 to 2.000 V
6V	-6.000 to 6.000 V
20V	-20.00 to 20.00 V
50V	-50.00 to 50.00 V

#### ON/OFF Input (Mode: DI)

Range Type	Measurable Range
Level	0, 1
Cont	0, 1

### Characters That Can Be Used for Units

A unit is set using up to six characters. The characters that can be used are alphabet, numbers, symbols (% , # , ° , @ , + , - , \* , / , ( , ) , μ , Ω , <sup>2</sup> , <sup>3</sup> , .), and space.

## Setting the Alarm

### Setup Example

Set a high limit alarm at 400.0°C on channel 2. The relay output (option) is not available.

### Entering Setting Mode

1. Hold down the **MENU** key for 3 seconds to display the Setting mode screen.

### Selecting the Channel

2. Press the **←** key with **ALARM** shown on the screen.

3. Press the **△** or **▽** key to select **CH2**, and press the **←** key.

### Setting the Alarm Condition

4. Press the **△** or **▽** key to select **L1**, and press the **←** key.  
Up to four alarms can be set on a single channel. Each alarm is distinguished by its level: L1 (alarm level 1) to L4 (alarm level 4).. In this example, L1 is used.

5. Press the **△** or **▽** key to select **ON**, and press the **←** key.  
ON: Enables the alarm of the selected alarm level.

6. Press the **△** or **▽** key to select **H**, and press the **←** key.  
The letter "H" represents the high limit alarm (see "Explanation").

7. Set the alarm value to **400.0** by carrying out the key operations below.  
Press the **▷** key to select the desired digit. Press the **△** or **▽** key to change the value.

When all digits have been set, press the **←** key.

### Setting the Relay Output

8. Since the relay output is not used, press the **←** key with **OFF** selected.

When **OK** is displayed, the settings entered up to then are applied.

## Setting the Input Range and Alarm on Measurement Channels

---

### Finishing the Settings

- 10.** When **OK** is displayed, do either of the following:  
Press the **←** key to set other alarms.

To finish setting the alarm, press the **ESC** key.



- 11.** Hold down the **MENU** key for 3 seconds to return to Operation mode.

### Explanation

In step 6, you can select an alarm type on the table below.

Type	Description
H	High Limit Alarm: An alarm occurs when the input value exceeds the alarm value.
L	Low Limit Alarm: An alarm occurs when the input value falls below the alarm value.
h	Difference High Limit Alarm*: An alarm occurs when the difference in the input values of two channels is greater than or equal to the specified value.
l	Difference Low Limit Alarm*: An alarm occurs when the difference in the input values of two channels is less than or equal to the specified value.

\* Can be specified on channels set to delta computation. For a description of the display, see "Alphabet Mapping and ASCII Codes."

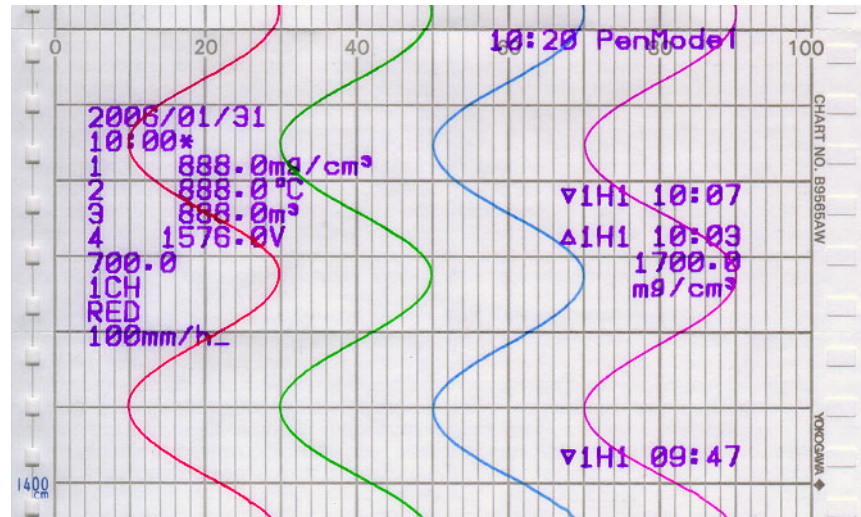
# Recording/Displaying Data

## Starting the Recording

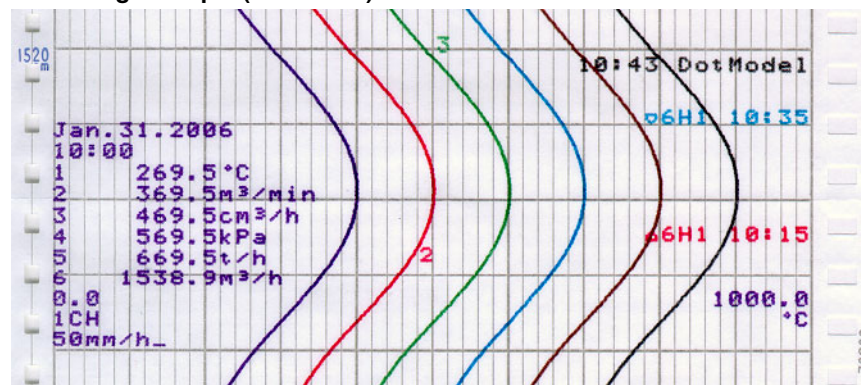
Press the **RCD** key to start recording.

The "RCD" lamp in the status display illuminates.

### Recording Example (Pen Model)



### Recording Example (Dot Model)



The recording examples may appear differently from the actual recording as a result of functional improvements made on the recorder after this manual was written.

## Stopping the Recording

While recording is in progress, press the **RCD** key to stop recording.

The "RCD" lamp in the status display turns OFF.

## Feeding the Chart Paper

The chart paper is fed while the **FEED** key is held down.



### Changing the Chart Speed

1. Hold down the **MENU** key for 3 seconds to enter Setting mode..
2. Press the **△** or **▽** key to display **CHART**, and press the **←** key.



3. Set the chart speed and press the **←** key.



See the table below for the chart speeds. The selectable chart speeds vary between the pen model and the dot model.

Chart speed (unit: mm/h)

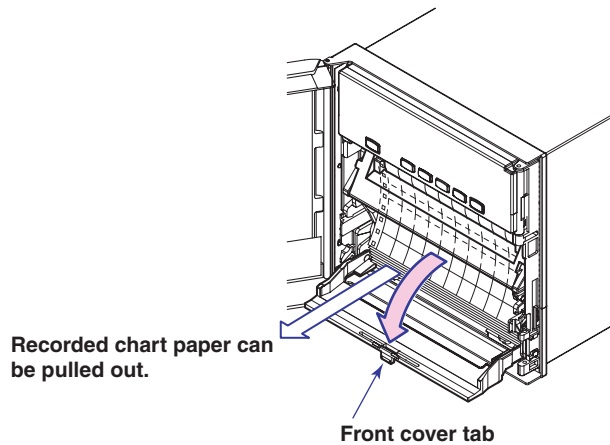
10	15	20	25	30	40	50	60	75	80
90	100	120	150	160	180	200	240	300	360
375	450	600	720	750	900	1200	1500	1800	2400
3000	3600	4500	4800	5400	6000	7200	9000	10800	12000

\* The shaded section applies only to the pen model.

4. When **OK** is displayed, the new chart speed is applied.  
Press the **ESC** key to change the chart speed again.  
Hold down the **MENU** key for 3 seconds to return to Operation mode.

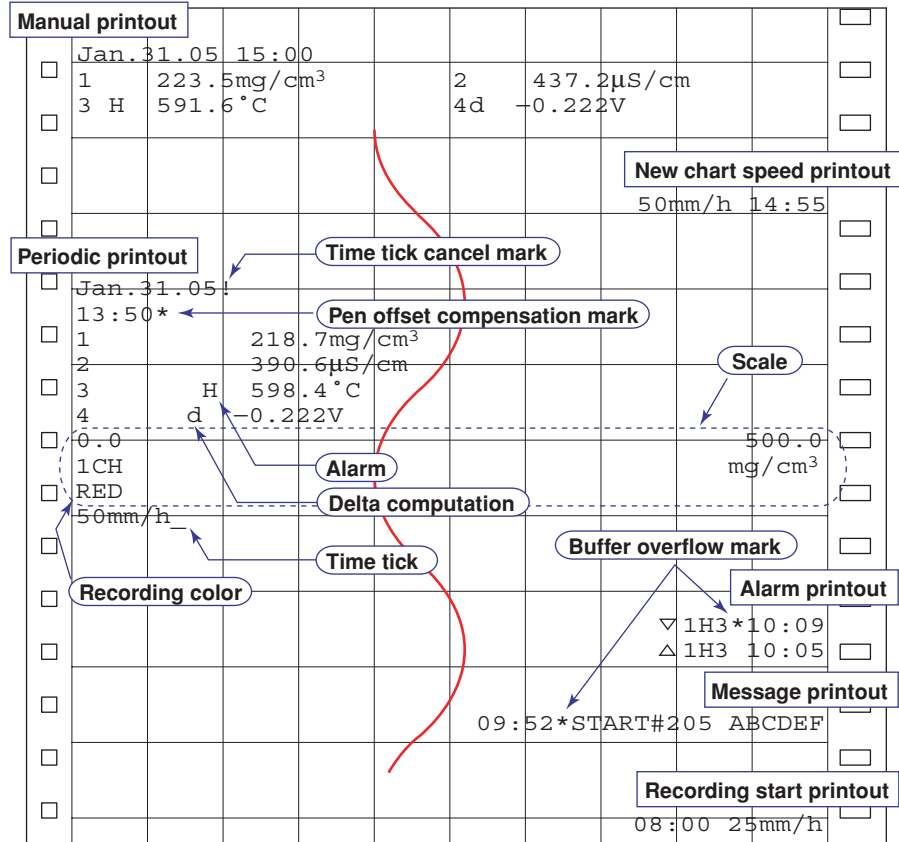
### Viewing the Recorded Results

Pull the front cover tab of the chart cassette to open the front cover. The recorded chart paper can be pulled out for viewing.

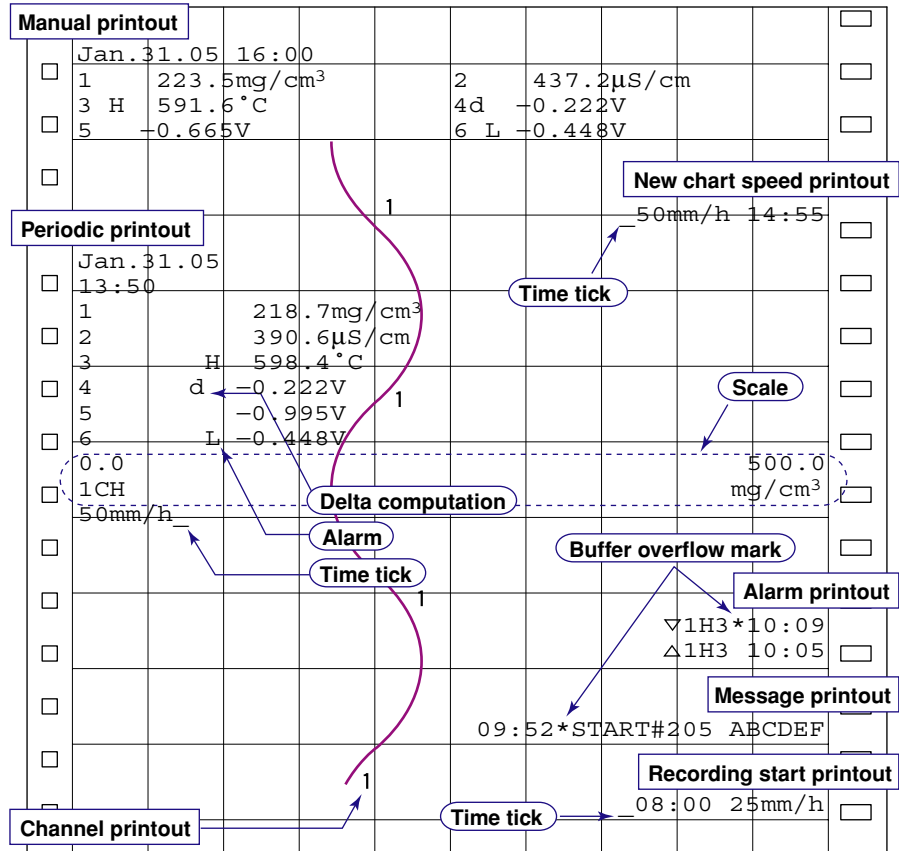


Description of the Printout Contents

Printout Description Figure (Pen Model)



Printout Description Figure (Dot Model)

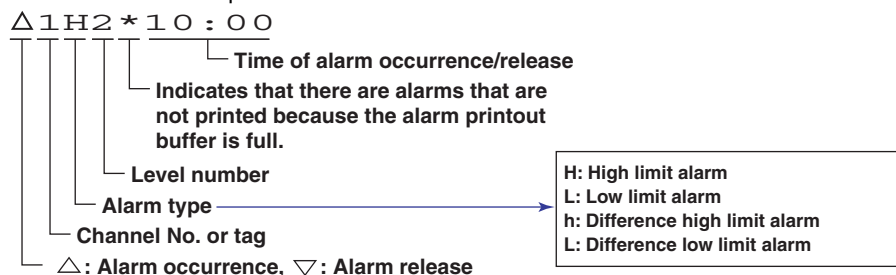


The printout description figures are for explaining the printout contents. The font is different from the actual printout. The printout positions are also slightly different.

- **Manual Printout**  
Prints the current measured values and alarm statuses of all channels by operating the keys.
- **New Chart Speed Printout**  
When the chart speed is changed, the time tick (dot model), the date/time of change, and the new chart speed are printed. The time ticks are marks that indicate the positions of the date/time on the chart paper. An asterisk (\*) shows there are messages that cannot be printed.
- **Periodic Printout**  
Measured values and other items are printed at the preset interval.
  - **Printout Contents**  
The date/time, time tick, measured value and channel status for each channel, the channel scale (the leftmost and rightmost values of the span), and the chart speed are printed. On the pen model, if a time tick is not printed at the correct position, a time tick cancel mark (!) is printed. Pen offset compensation mark is printed when the function to compensate the pen offset along the time axis is enabled. For details on the printout contents, see appendix 1 in the *SR10000 Recorder User's Manual* (IM 04P03B01-01E) on the CD-ROM.
  - **Printout Interval**  
The printout interval can be set by specifying the value or set automatically in sync with the chart speed.

**Alarm Printout**

Alarm information is printed when an alarm occurs or releases.



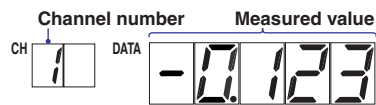
Alarms that occur while an alarm printout is in progress are temporarily saved to the buffer memory in a printout-wait condition. Alarms are cleared from the buffer memory when they are printed. A buffer overflow mark is printed when there are alarms that cannot be printed because the buffer is full.

- **Message Printout**  
An arbitrary character string from five character strings set in advance can be printed on the chart paper. Each message can be set using up to 16 characters. If message printout is executed while another message is being printed, the most recent message is temporarily stored to the buffer memory in a printout-wait condition. Messages are cleared from the buffer memory when they are printed. A buffer overflow mark is printed when there are messages that cannot be printed because the buffer is full.
- **Recording Start Printout**  
When recording is started, the time tick (dot model), the time, and the chart speed can be printed. By factory default, the recording start printout is disabled. An asterisk (\*) shows there are messages that cannot be printed.
- **Channel Printout (Dot Model)**  
Prints the channel No. or tag by the trend recording.

## Switching the Display Screen

The screen switches each time the **DISP** key is pressed. Below is a display example.

### Display Example (1-channel measured value display)



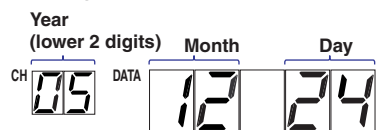
- **Channel Auto Switching**

The displayed channel is automatically switched in ascending order. The switching interval is 2 s.

- **Switching the Displayed Channel Using Keys**

If auto switching is not specified, the channel switches each time the **CH UP** key is pressed in ascending order. All channels are displayed in order.

### Display Example (Date: YY, MM, and DD)



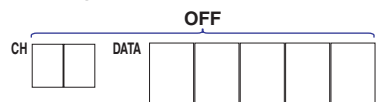
- **Date Display**

Displays the year, month, and day. The date format can be specified.

- **Time Display**

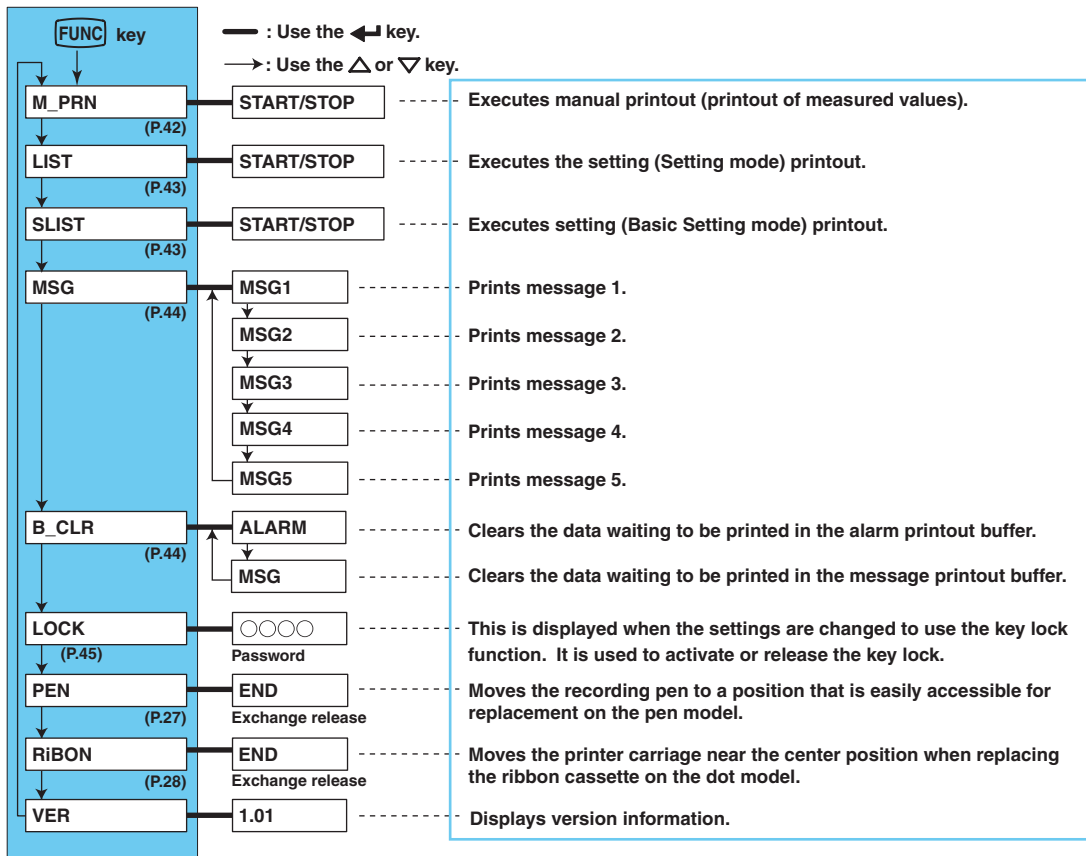
Displays the hour, minute, and seconds. The time format can be specified.

### Display Example (LED OFF)



## FUNC Key Operations in Operation Mode

The operations below can be carried out with the FUNC key in Operation mode.



### Printing Measured Values (Manual Printout)

The measured values of all channels are printed.

#### Starting the Manual Printout

1. Press the FUNC key.
2. Press the  $\triangle$  or  $\nabla$  key to select **M\_PRN** and then press the  $\leftarrow$  key.



3. Press the  $\leftarrow$  key with **ManualStart** shown on the screen. Manual printout starts. The screen returns to the data display screen.



#### Note

- When manual printout is executed, trend recording is suspended. However, the recorder continues the measurement and alarm detection (in the background).
- When manual printout is complete, trend recording resumes.
- If an alarm occurs during the manual printout, the alarm is printed after the recording resumes.

**Aborting the Manual Printout**

1. Press the **FUNC** key
2. Press the  $\Delta$  or  $\nabla$  key to select **M\_PRN**, and press the  $\leftarrow$  key.
3. Press the  $\leftarrow$  key with **STOP** shown on the screen.  
Manual printout stops. The screen returns to the data display screen.


**Printing the Recorder Settings**

This section explains the procedure for printing the recorder settings. There are two sets of settings that can be printed: LIST and SLIST.

- LIST: Prints the settings of Setting mode (input range for each channel, etc.)  
 SLIST: Prints the settings of Basic Setting mode

**Note**

- The printout takes several minutes to tens of minutes to complete.
- When printout is executed, trend recording is suspended. However, the recorder continues the measurement and alarm detection (in the background).
- When printout is complete, trend recording resumes.
- If an alarm occurs during the printout, the alarm is printed after the recording resumes.

**Starting the LIST Printout**

1. Press the **FUNC** key
2. Press the  $\Delta$  or  $\nabla$  key to select **LIST**, and press the  $\leftarrow$  key.



3. Press the  $\leftarrow$  key with **START** shown on the screen.  
The printout of the settings of Setting mode starts. The screen returns to the data display screen.


**Aborting the LIST Printout**

1. Press the **FUNC** key
2. Press the  $\Delta$  or  $\nabla$  key to select **LIST**, and press the  $\leftarrow$  key.
3. Press the  $\leftarrow$  key with **STOP** shown on the screen.  
The printout of the settings of Setting mode stops. The screen returns to the data display screen.


**Starting/Stopping the SLIST Printout**

SLIST printout can be started/stopped in a similar fashion to LIST printout.

### Clearing the Alarm Printout Buffer

Alarm information waiting to be printed is temporarily stored in the buffer memory. This operation clears all of the alarm information in the buffer. This function can be used to prevent unneeded alarm printouts from being executed.

1. Press the **FUNC** key
2. Press the  $\Delta$  or  $\nabla$  key to select **B\_CLR**, and press the  $\leftarrow$  key.



3. Press the  $\Delta$  or  $\nabla$  key to display **ALARM**, and press the  $\leftarrow$  key.  
The data in the alarm printout buffer is cleared. The screen returns to the data display screen.



### Printing a Message

This section explains the procedure for printing the preset character strings. For details on setting the character strings, see the *SR10000 Recorder User's Manual (IM 04P03B01-01E)* on the CD-ROM.

#### Note

- Messages can be printed only during trend recording. However, regardless of whether recording is in progress or not, messages waiting to be printed are temporarily stored in the buffer memory.
- Message printouts are not performed when the chart speed is greater than or equal to 1800 mm/h and 120 mm/h on the pen model and dot model, respectively.

### Printing a Message

1. Press the **FUNC** key
2. Press the  $\Delta$  or  $\nabla$  key to select **MSG**, and press the  $\leftarrow$  key.



3. Press the  $\Delta$  or  $\nabla$  key to display the message number, and press the  $\leftarrow$  key.  
The message printout starts. The screen returns to the data display screen.



### Clearing the Message Printout Buffer

Messages waiting to be printed are temporarily stored in the buffer memory. This operation clears the messages in the buffer.

1. Press the **FUNC** key
2. Press the  $\Delta$  or  $\nabla$  key to select **B\_CLR**, and press the  $\leftarrow$  key.
3. Press the  $\Delta$  or  $\nabla$  key to display **MSG**, and press the  $\leftarrow$  key.  
The data in the message printout buffer is cleared. The screen returns to the data display screen.



## Activating/Releasing the Key Lock

When the recorder is configured to use the key lock function, this operation activates or releases the key lock. For details on setting the key lock function, see the *SR10000 Recorder User's Manual (IM 04P03B01-01E)* on the CD-ROM.

### Activating the Key Lock

1. Press the **FUNC** key
2. Press the  $\Delta$  or  $\nabla$  key to select **LOCK**, and press the  $\leftarrow$  key.  
The key lock is activated. The screen returns to the data display screen.



### Releasing the Key Lock

#### Note

A password is required to release the key lock.

1. Press the **FUNC** key
2. Press the  $\Delta$  or  $\nabla$  key to select **LOCK**, and press the  $\leftarrow$  key.
3. Enter the password for releasing the key lock. The password values are shown as a line for digits other than the one you are setting.  
Press the  $\triangleright$  key to select the desired digit. Press the  $\Delta$  or  $\nabla$  key to change the value.



4. Press the  $\leftarrow$  key  
The key lock is released. The screen returns to the data display screen.



## Recommended Replacement Periods for Worn Parts

To preserve the reliability of the recorder and to use the recorder in good condition for an extended time, it is recommended that periodic replacements be made on parts.

The table below shows the recommended replacement period for expendable parts. The replacement period shown here applies when the recorder is used under standard operating conditions. For the actual replacement period, consider the actual conditions of use.

Replacement of parts other than the chart paper, pen, and ribbon cassette will be carried out by one of our engineers or an engineer certified by us. Contact your nearest dealer when such replacement is necessary.

### Pen Model

Item	Replacement Period	Part Name	Part No.	Note	Quantity Used
Z-fold chart paper	33 days	CHART	B9565AW	When used at 20 mm/h	1
Felt pen	2 km	PEN ASSY	B9902AM B9902AN B9902AP B9902AQ	Red Green Blue Violet } At a pen speed of 10 cm/s	1 each
Plotter pen	100,000 characters	PEN ASSY	B9902AR	When printing continuously	1
Chart paper feed motor	5 years	MOTOR ASSY	B9962EJ		
Plotter carriage	5 years	CARRIAGE ASSY	B8800DJ		
Plotter motor	5 years	MOTOR ASSY	B8800DT	For the X-axis	1
Lever bearing	5 years	BEARING	B9900RP	For the plotter	1
Pen servo	5 years	SERVO ASSY	B8800FG	Shared by all pens (excludes the pen arm ASSY)	1 1 to 4

### Dot Model

Item	Replacement Period	Part Name	Part No.	Note	Quantity Used
Z-fold chart paper	33 days	CHART	B9565AW	When used at 20 mm/h	1
Ribbon cassette	3 months	RIBBON CASSETTE	B9901AX		1
Chart paper feed motor	5 years	MOTOR ASSY	B9962EJ		1
Lever	3 years	LEVER ASSY	B9901EK	For the carriage	1
Pulley	3 years	PULLY	B9963CJ	For the carriage	2
Carriage motor	5 years	MOTOR ASSY	B9963CF		1
Carriage	5 years	CARRIAGE ASSY	B9963CL		1
Ribbon shift motor	5 years	MOTOR ASSY	B9962EJ		1
Ribbon shift gear	5 years	GEAR	B8801BX B8801BW		1 each
Ribbon feed motor	5 years	MOTOR ASSY	B9962EJ		1
Ribbon feed gear	5 years	GEAR	B9901HL B9901HM B9901HN		1 each