

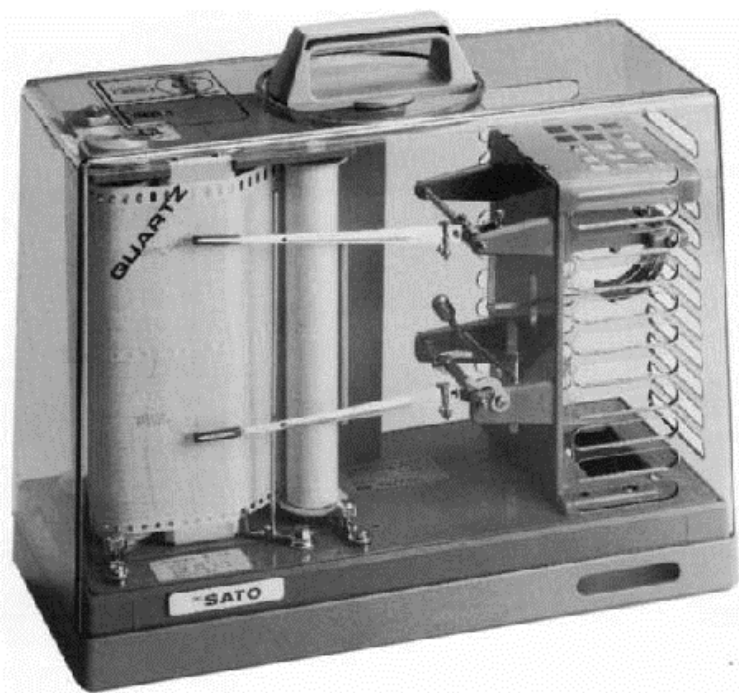
MODEL

AURORA-90 III

CAT No. 7012-00

LONG-TERM THERMOHYGROGRAPH

INSTRUCTION MANUAL



Thank you for purchasing the Long Term Thermohygrograph Model Aurora-90III

- This model is designed to record measured temperature and humidity for 1 month or 3 months. Do not use it for the other purposes.
- Read this manual thoroughly before using. Keep the manual in a safe place for future references whenever necessary.

SK SATO KEIRYOKI MFG.CO.,LTD.

1. INTRODUCTION

- . Roll-up type chart feeding mechanism is adopted.
- . This model can continuously record the measured temperature and humidity on a single roll paper for 3 months or 1 month.
- . The width of the chart per day is 76.8mm that makes easier to read measured value.
- . A bimetallic strip is used as temperature sensor and a bundle of specially-treated human hair is used as humidity sensor.
- . Six months continuous recording is available with 2 "C" sized manganese batteries.

2. NAME OF EACH SECTION

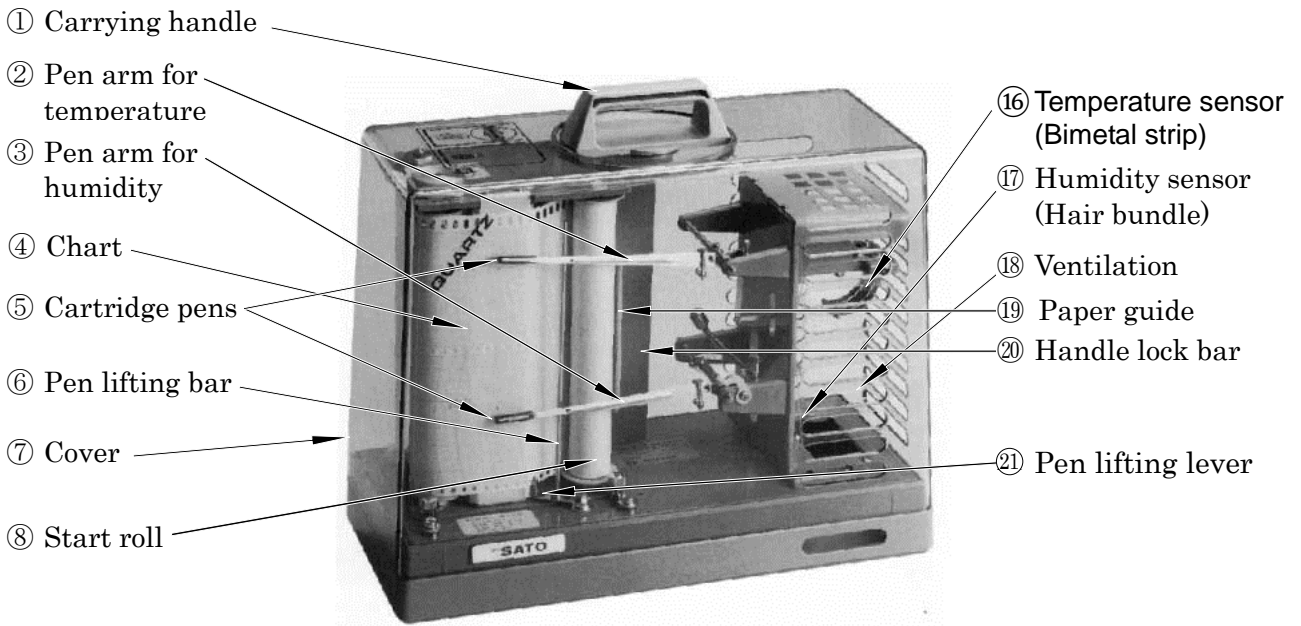
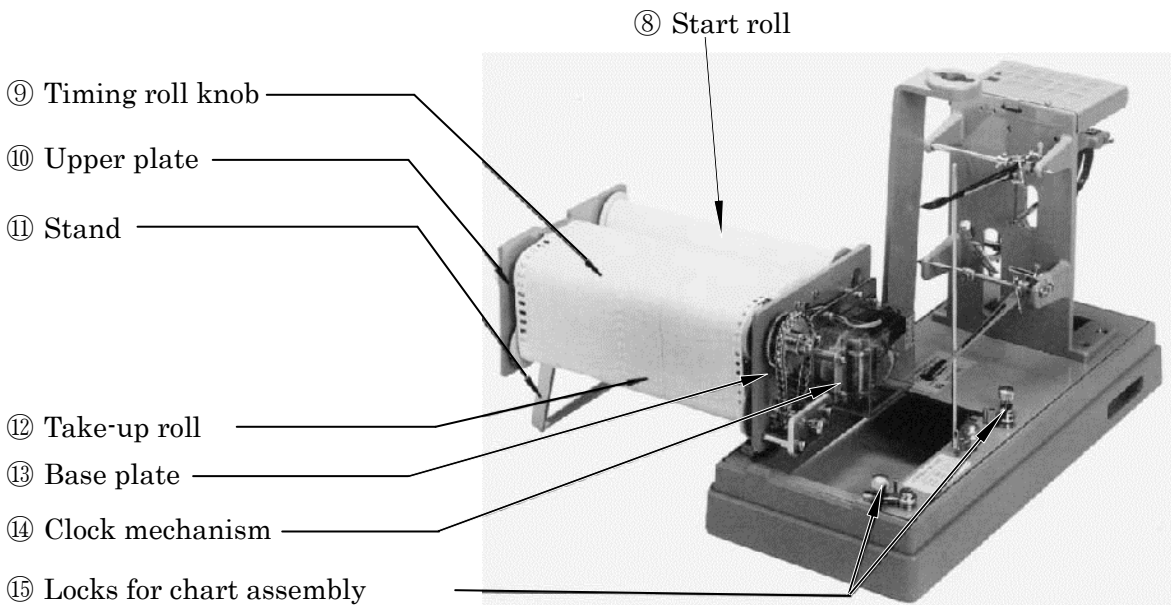
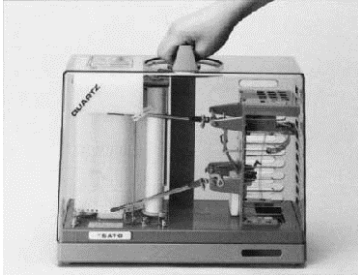


Chart assembly

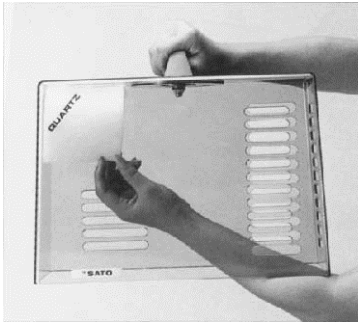


3. OPERATION

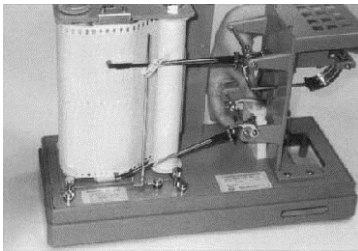


A chart and cartridge pens are factory set. Start the operation following to instruction blow after unpacking.

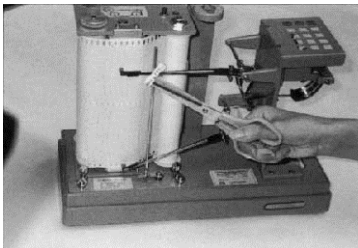
- (1) Remove the cover.
Turn the carrying handle to left until it stops. Lift the cover and remove it.



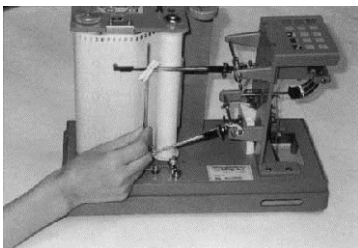
- (2) Remove the sponge packing material.



- (3) Remove the cardboard packing material that secures sensors during transportation.



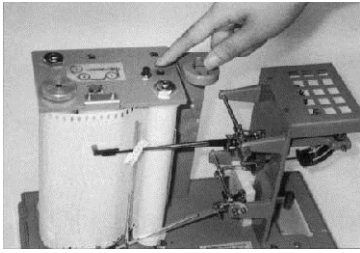
- (4) Cut the tape that secures upper pen arm.



- (5) Lift the pen holder clip that secures lower pen arm and remove it.



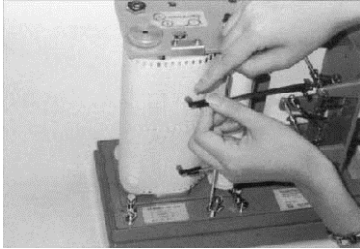
- (6) Load the batteries.
 - Insert 2 "C" size batteries (1.5VDC) in the battery compartment located lower back side and make sure the polarities (+) (-) are correct.
 - After loading batteries, be sure to push the red button of the battery check indicator once.
 - Clock will start feeding chart.



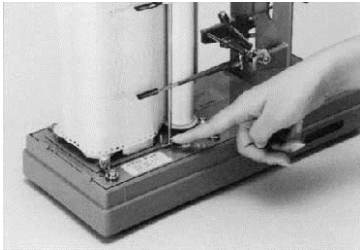
(7) Periodically verify the condition of battery with the battery check indicator. The criteria are as follows.

- The green LED is lit : The batteries are in good condition
- The red LED is lit : The batteries need to be replaced.

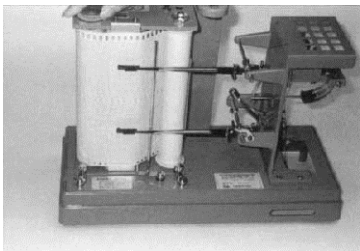
The red LED will not be lit when the voltage decreases 1.8VDC or less.



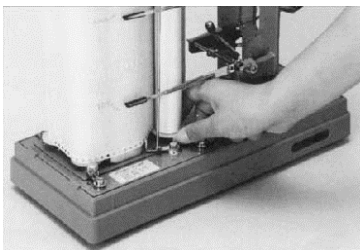
(8) Remove the cap for cartridge pen
Do not touch the pen tip. Otherwise, ink will not flow smoothly due to hand grease.



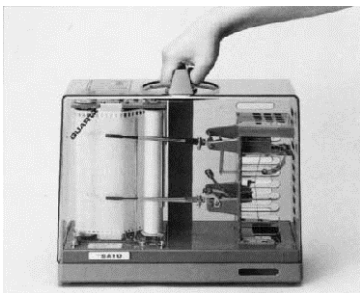
(9) Push the pen lifting bar
Push the pen lifting bar away from you until the pen tips touch to the chart. Be certain that the pen lifting bar is apart from the pen arms.



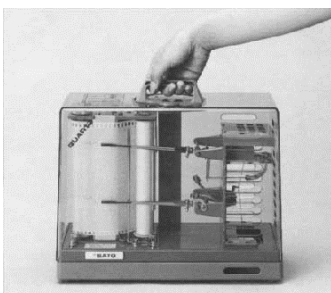
(10) Set the time
Turn the timing roll knob clockwise first and stop it at the position on one or two hours forwarder than the present time. Set it to the present time by turning it counterclockwise. This will enable you to set the time correctly avoiding the error due to the play of gear.



(11) Remove the "slack" of chart
If the chart is slacked, turn the lower disk of start roll clockwise to remove the slack.



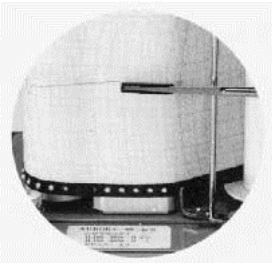
(12) Put the cover on the unit
Facing the carrying handle toward the front and secure the position of the cover.



(13) Turn the carrying handle clockwise until it stops.

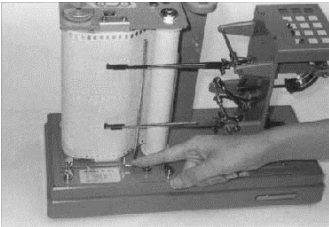
Make sure that the cover is locked when you carry the unit

4. REPLACEMENT OF CHART

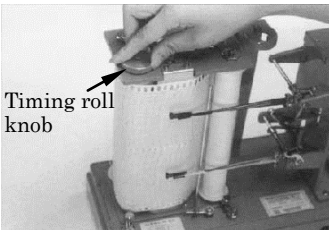


★ Mark on chart

- Replace the chart within three days since the red belt printed on the lower end of the chart will come out.
- Use the following specified charts.
 - i) For 1-month use: No. 1L100-2050-II
 - ii) For 3-month use: No. 3L100-2050-II

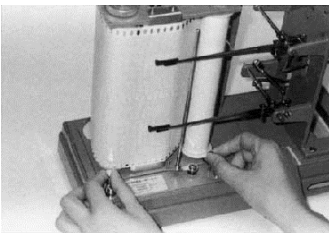


- (1) Remove the cover and pull the pen lift cover
Turn the carrying handle to left until it stops and lift the cover to remove it. Pull the pen lift bar toward you so that the pen tips are apart from the chart.

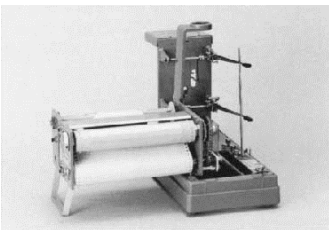


Timing roll knob

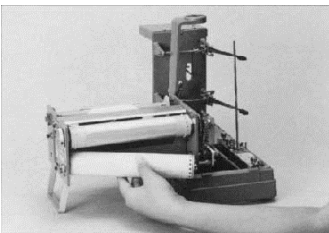
- (2) Wind the old chart
Take up the old chart fully by turning the timing roll knob clockwise



- (3) Release the right and left locks of the chart assembly located on the base of unit.

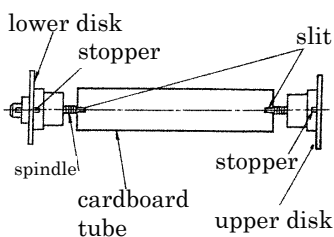


- (4) Push the chart assembly down backward and keep it in a horizontal position using a chart assembly stay.

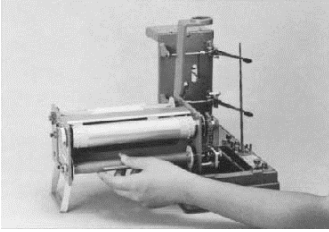


- (5) Remove the take-up roll
Push the take-up roll toward the upper disk to remove the take-up roll from the slit of lower disk.

Take-up roll

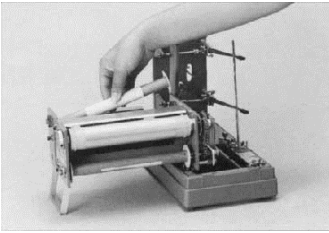


- (6) Replace used chart and cardboard tube
- Turn the upper disk of the take-up roll counterclockwise and remove it.
 - Take out the used chart from the take-up roll spindle.
 - Place the attached empty cardboard tube into the take-up roll spindle. Mate the slit of cardboard tube with the stopper of lower disk and slide the other end of the cardboard tube to the upper disk to install it.



(7) Install take-up roll

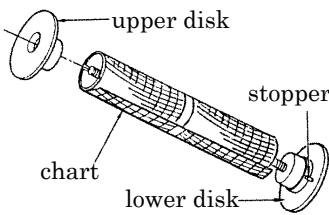
Put the center of upper disk spindle into the receptacle of upper plate pushing it toward the upper plate and put the center of spindle of lower disk into the receptacle of lower disk. Turn the lower disk slightly so that the take-up will be put into the receptacle.



(8) Remove start roll

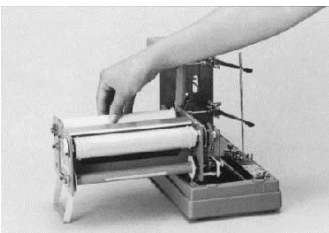
Push the start roll toward the upper disk to remove from the hole of the lower disk.

Start roll



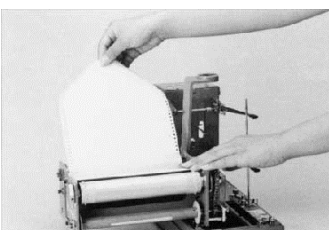
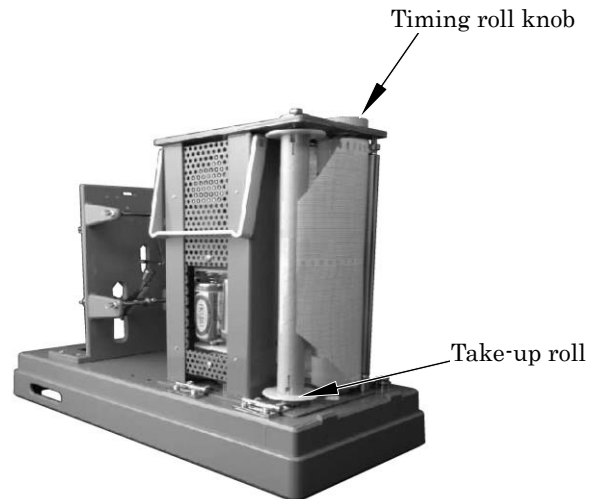
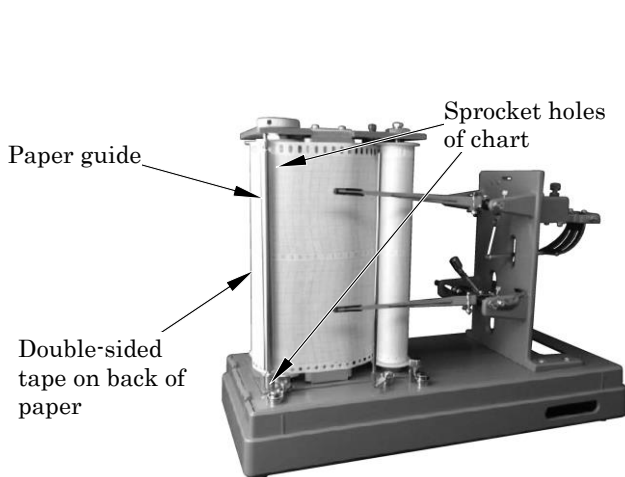
(9) Set the chart onto start roll

- Turn the upper disk of start roll counterclockwise to remove it.
- Remove the cardboard tube from the start roll spindle. (Keep this cardboard tube for the future use).
- Load a new chart onto the start roll spindle and mate the slit of cardboard tube with the stopper of the lower disk.
- Install the upper disk.



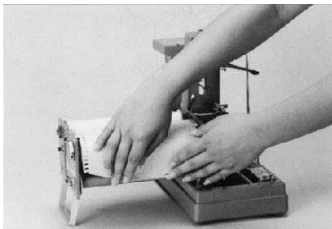
(10) Install the start roll

- Place the center of start roll spindle into the receptacle of upper disk and while pushing it toward upper disk, place the center of lower disk spindle into the receptacle of lower plate.
- Be sure to place the paper guide outside of chart to protect the chart from being slacken.



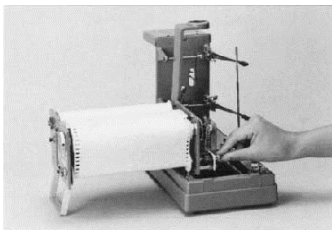
(11) Pull out the chart

Pull out the chart by about 15 cm.



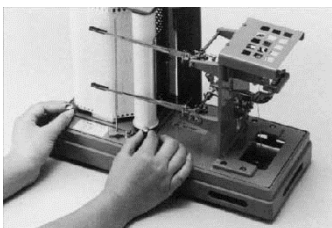
(12) Place the top of chart on the take-up roll

- Feed the tapered end of the chart through the gap between the paper guide and timing roll, and correctly place the sprocket holes of chart over the sprockets of timing roll.
- While turning the timing roll clockwise, pull the chart to the take-up roll.
- Remove the peel-off strip from the double-sided tape on the end of the chart and stick it onto the take-up roll so that the center of the chart and the take-up roll are aligned.
- Turn the timing roll clockwise to wind the chart around the take-up roll twice



(13) Take up the slack

By turning the take-up roll knob, take up the slack of the chart.



(14) Return the chart assembly to the original position and lock it.
Confirm the replacement time of batteries and cartridge pens

* For the follow-on procedure refer to No. 9 of "HOW TO USE".

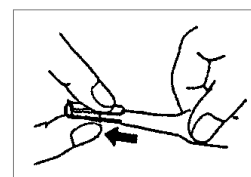
5. CAUTIONS

① On batteries

- Use 2 pcs. of "C" size batteries (1.5VDC). Make sure the polarities are correct (+) (-) when you install batteries in the battery compartment.
- Replace the batteries every year. Always use new batteries of the same type for replacement.
- Never dispose exhausted batteries into a fire.
- For environmental conservation purpose, dispose of the used batteries in accordance with local rules and regulations.

② Replacement of cartridge pens

- (1) Pull the pen lift bar toward you so that the pen tips are apart from the chart.
- (2) To remove the cartridge pen, hold the pen arm by hand and pull in the direction of the arrow.
- (3) To install the cartridge pen on the pen arm, slide it onto pen arm until it stops.



NB.

- Do not touch the pen tip by a finger or ink will not flow smoothly due to hand grease.
- Normally cartridge pen will last for 6 months, but the life may be shortened by the conditions in use

Be sure to use the cartridge pens specified by us.

③ Replacement of chart

When you place the sprocket holes of chart over the sprockets, be sure to mate the both ends of the sprocket holes chart are placed vertically.

Be sure to use the chart specified by us.

④ Carrying instrument

Before lifting the instrument, make sure that it is locked.

⑤ Cautions on installation place

Install the instrument at the other than following places

- In a place subject to vibration, shock or inclination
- Near a place subject to splash of water
- In a place subject to direct sunshine
- Near an exhaust port of air conditioner or oil heater
- In a place where thinner, ammonia or sprays are used
- In dusty or sooty environment

⑥ Other precautions

- Never use the unit in out of the specified measuring range.
- Be sure to remove the packing materials before use.
- Do not cover the unit with a plastic bag, vinyl or like for waterproof or other purposes. Otherwise, correct values will not be obtained
- Do not disassemble or modify the unit. Doing so may result in failure.
- Make sure to remove batteries during the transportation.

6. ADJUSTMENT OF INDICATION

All units are calibrated at a factory before shipment. So it is not necessary for you to make any adjustment before use. However, if the fine adjustment is required, follow the procedures below. (Each fine adjustment screw is located at the foot of each pen arm of temperature and humidity)

- . The indication decreases when the fine adjustment screw is turned clockwise
- . The indication increases when the screw is tuned counterclockwise.

NB:

- . For accurate and smooth adjustment use a screw driver.
- . Maximum adjustable range is $\pm 3^{\circ}\text{C}$ for temperature and $\pm 5\%$ for humidity
- . Adjustment shall be made based on a reliable instrument such as Assmann psychrometer.

It is desirable to calibrate the unit periodically once a year.

7. SPECIFICATIONS

Product	: No. 7012-00 Long Term Thermohygrograph Model Aurora-90III	
Sensors	: Temperature	: Bimetal strip
	: Humidity	: Human hair
Measuring range	: Temperature	: -20 to +50°C
	: Humidity	: 0 to 100%rh
Min. graduation	: Temperature	: 1°C
	: Humidity	: 1%
Accuracy	: Temperature	: ±1°C at 10 to 30°C, ±2°C at other range
	: Humidity	: ±3%rh at 20 to 95%rh, 15 to 25°C ±5%rh at other range
Clock drive	: Quartz clock (Driven by 2 "C" size manganese batteries continuously for 6 months at 20°C)	
Accuracy of clock	: ±35 min. per 7 days	
Recording cycle	: 3 months or 1 month	
Recording pens	: Cartridge pens (violet)	
Power source	: "C" size manganese battery (1.5VDC) x 2 pcs.	
Paper feeding speed	: 3.2 mm/hour (minimum scale; 2 hours) (a single speed)	
Paper width	: 174 mm (effective width: 156mm)	
Storage ambient	: 0 to +40°C, 20 to 80%rh (no condensing)	
Dimensions	: 295 mm (H) x 336 mm (W) x 148 mm (D)	
Weight	: 3.8kg	
Accessories	: 3 rolls of 3-month chart (No. 3L-1002050-II) (1 month paper No. 1L-1002050-II should be ordered separately) 2 spare cartridge pens (violet), 2 "C" size manganese batteries 1 cardboard tube	

WARRANTY POLICY

Warranty

Our products are warranted to be free from defects in materials and workmanship for a period of one year from date of delivery. If repair or adjustment is necessary and has not been the result of abuse or misuse within the one-year-period, please return the units on - Freight Prepaid – basis and correction of the defect will be made without charges. We alone will determine if the product problem is due to deviations or customer misuse.

Out-of-warranty products will be repaired on charge basis.

Warranty during transportation

The warranty during transportation only applies to the products that we arrange the shipment. The case that the products had been purchased in domestic and were sent to overseas by the purchaser is out of warranty.

Return of items

Authorization must be obtained from us before returning items for any reason. When applying for authorization, please include data regarding the reasons the items are to be returned.

Please note that we reserve the right to make improvements in design, construction and appearance of our products without notice.

SATO KEIRYOKI MFG. CO., LTD.

No. 3, Nishi Fukudacho, Kanda, Chiyodaku,
Tokyo 101-0037 JAPAN
TEL: +81 (0)3-3254-8117 FAX: +81 (0)3-3254-8123
URL: <http://www.sksato.co.jp/english/>