

**Instruction Manual**  
**No. 7630-00 Digital Barometer**  
**Model SK-500B**

**SATO KEIRYOKI MFG. CO., LTD.**

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URL: <http://www.sksato.co.jp/english/>

V. R01E

Thank you for purchasing the Digital Barometer Model SK-500B.

- This product is designed to measure atmospheric pressure. Do not use it for other purposes.
- Read this manual thoroughly before using. Keep the manual in a safe place for future references whenever necessary.

 **Warning**

The SK-500B is not explosion-proof. Never use it in an atmosphere containing flammable gases.



**Beware of explosion!**  
There is a risk of explosion. Take extreme care.

Should you have any questions, please consult with us or the store where the unit was purchased.

 **Caution**

- Observe the following precautions to use this equipment correctly.
  - This is a precision equipment. Do not drop or apply impact or vibrations to it.
  - Be sure to use this equipment in standard air composition (general atmosphere).
  - Do not use this equipment outside the measuring range. Doing so may result in failure.
  - Check the operating condition and use the equipment within the operating condition.
  - Do not use this equipment near heaters. Doing so may result in failure or casing deformation.
  - This equipment is not waterproof and so must not be allowed to get wet.
  - Do not leave this equipment in a car or like since the temperature raises extremely high under the midsummer heat. Doing so may be a cause of trouble.
  - Never disassemble or modify the equipment. Doing so may result in failure.
  - Do not use this equipment in an area subject to dust, flammable gas, explosive gas, corrosive gas (SO<sub>2</sub>, H<sub>2</sub>S, etc.), etc.
  - Using this equipment in an environment with electrical noise may produce an unstable display or an increase in measurement errors.
  - Do not wash or wipe the equipment with solvents such as alcohol or thinner. If the equipment becomes dirty, dip a gauze pad or soft cloth in warm water containing neutral detergent, wring out the cloth, and then wipe the equipment with the cloth.

\*\*\* For repair or calibration, contact us or the store where the unit was purchased.

## **Overview**

The SK-500B is a desktop type digital barometer using a piezo resistance pressure sensor. The standard functions include the display of computed maximum and minimum values, RS-232C or printer output and monitoring with upper and lower limit alarms.

## **Features**

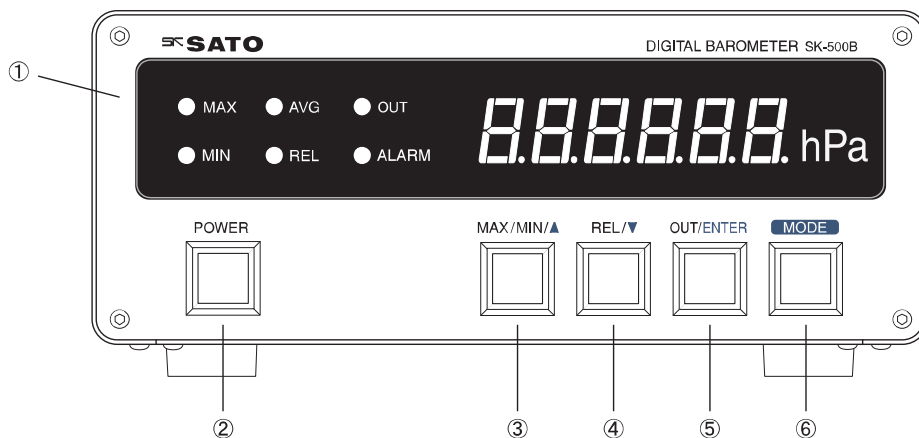
- Wide measuring range of 600 to 1100 hPa
- High resolution of 0.01 hPa
- Red LED for easy visibility
- Display of various arithmetic results  
The values of maximum (MAX), minimum (MIN), moving average (AVG) and relative (REL) are calculated and displayed.
- RS-232C output  
Equipped with an RS-232C output. Using the exclusive application, measured values can be displayed on a computer in real time and also stored with "CSV" format.  
\* Visit our web site to download the exclusive application.
- Printer output  
With the optional dedicated printer, measurement results can be printed out in real time.
- Upper and lower limit alarms  
Equipped with a contact output that can be connected to an external alarm device such as a buzzer and revolving light. Upper and lower limit alarm values can be separately set.

## **Safety Precautions**

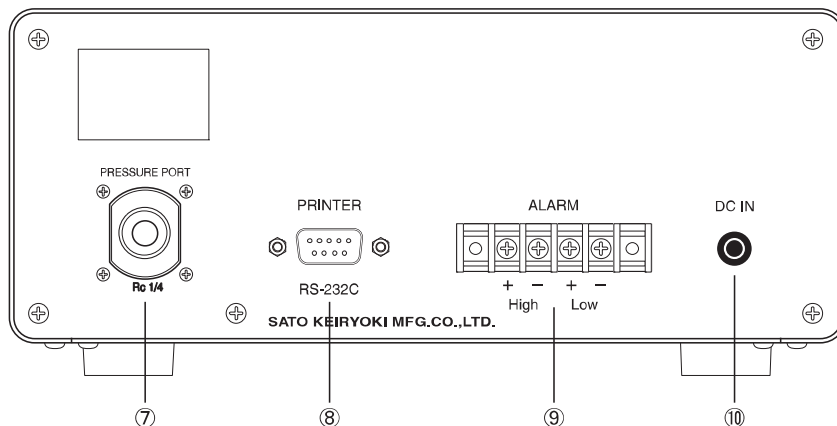
Check that the unit has not been damaged during transportation.  
If any damage is found, contact us or the store where the unit was purchased.

# Names of Components

## Front view



## Rear view



- |   |                             |   |
|---|-----------------------------|---|
| ① | Display                     | : Displays measured values or the status of the unit.   |
| ② | POWER key                   | : Used to turn on or off the unit.  |
| ③ | MAX/MIN/▲ key               | : Used to switch between the MAX or MIN function.<br>Used to increase the setting values in the setting mode.     |
| ④ | REL/▼ key                   | : Used to set the REL function to ON or OFF.<br>Used to decrease the setting values in the setting mode.          |
| ⑤ | OUT/ENTER key               | : Used to set the RS-232C/Printer output to ON or OFF.<br>Used to confirm the setting values in the setting mode. |
| ⑥ | MODE key                    | : Used to switch between the setting and measuring modes.   |
| ⑦ | Pressure port               | : Inlet for atmospheric pressure  |
| ⑧ | RS-232C/Printer output port |   |
| ⑨ | Alarm output port           |   |
| ⑩ | AC adapter connection port  |   |

# How to use

## 1. Installation

SK-500B is an indoor use desk-top digital barometer. Install the equipment horizontally avoiding the places as below.

- In flammable gas, explosive gas and corrosive gas
- A place subject to direct sunlight and near heaters
- At the exhaust port of air conditioner
- In a place subject to vibration
- In outside of the operation ambient (-10 to 50°C, less than 85%rh, no condensing)
- In an envelopment with electric noise
- Near splashing water and the place rainwater pours.

## 2. Connection

### 2-1. Pressure port

This is the inlet for atmospheric pressure. An R1/4 fitting can be used for connection. When connecting a fitting, use a sealing material such as sealing tape to prevent leakage.

- Fitting tightening torque: 10 to 12 N·m –



Caution

- Do not allow any foreign matter such as the end of the sealing material to enter inside the pressure port. If foreign matter gets inside, measurement errors or failure could result.
- When installing the fitting, do not overtighten it as this could result in failure. Be sure to tighten it within the tightening torque range.

### 2-2. RS-232C/Printer output

When the RS-232C/Printer output is to be used, first connect the cable below to the RS-232C/Printer output port on the back of the unit.

When a USB-Serial cable is used for the first time, you may have to install the USB driver.

For details on installing the USB driver and its system requirements, refer to the instruction manual of the USB-Serial cable that you will use.

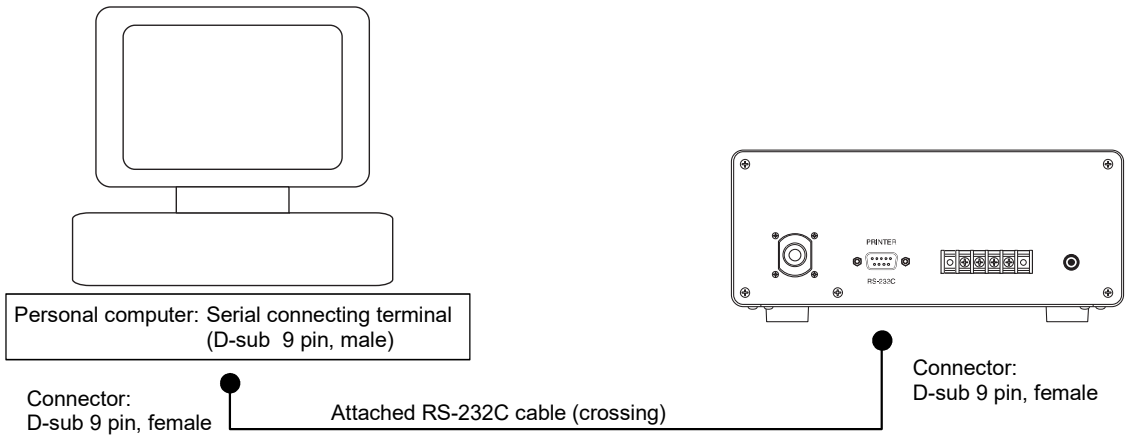
### Communications standard for RS232C and Printer output

	Connection	Connection cable / connector
Personal computer	Serial connecting terminal (D-sub 9 pin, male)	Attached RS232C cable (D-sub 9 pin, crossing)
	USB connecting terminal (Type-A, female)	Attached RS232C cable (D-sub 9 pin, crossing) and USB serial cable
Exclusive printer	Serial connecting terminal (D-sub 9 pin, female)	Attached cable for printer (D-sub 9 pin, straight)

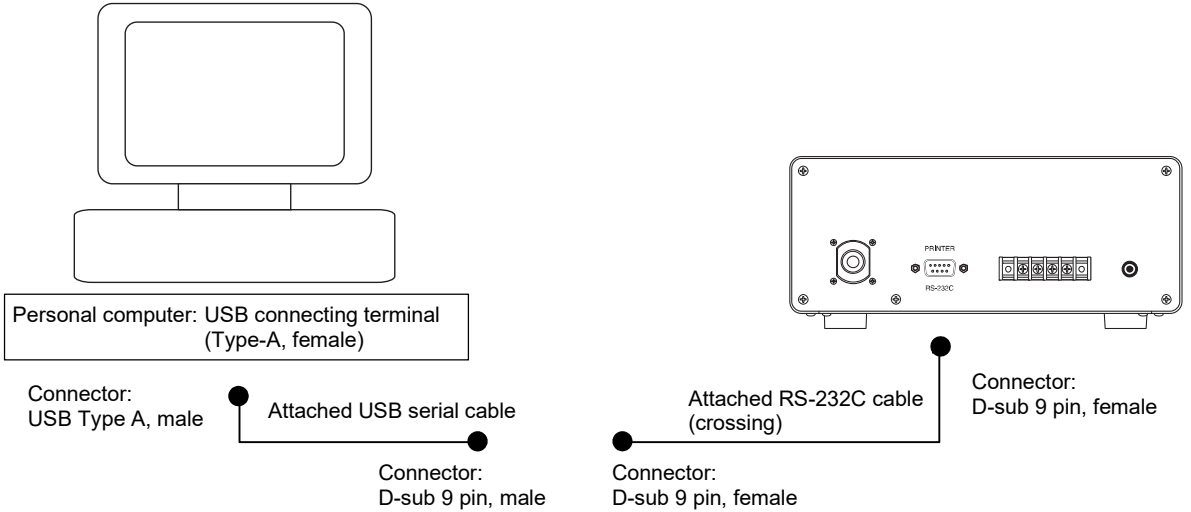
Note: We have checked the operation with the USB-Serial cables (Japanese version) listed below. Depending on the use of other USB-serial cable, the country to be used and the connection environment, the unit may fail to operate correctly. Our technical and customer supports are provided to Japanese OS only.

- BSUSRC0605BS (cable length: 0.5 m) of Buffalo Inc. (supplied with the product)
- BSUSRC0610BS (cable length: 1.0 m) of Buffalo Inc.

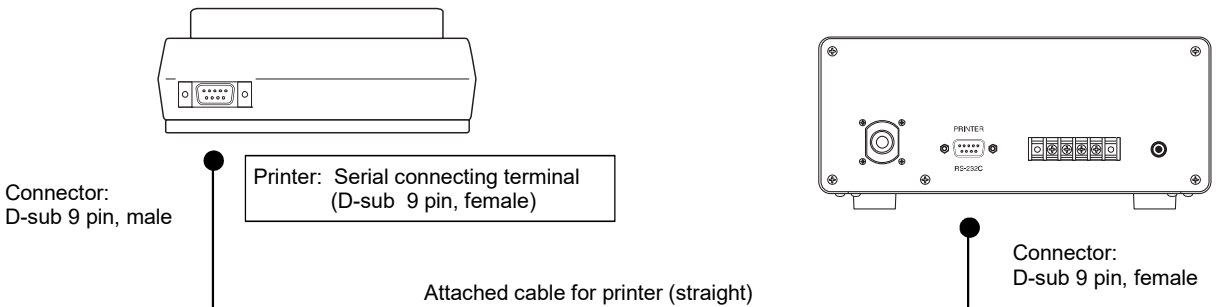
- Connection: SK-500B – Personal computer (serial connecting terminal)



- Connection: SK-500B - Personal computer (USB connecting terminal)



- Connection: SK-500B – Printer (serial connecting terminal)



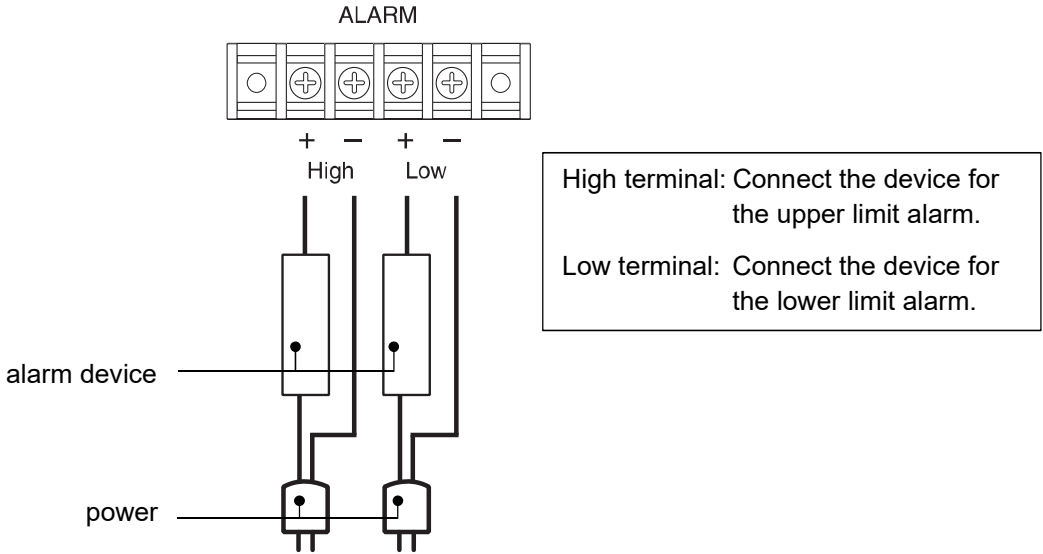
### 2-3. Alarm output ports

These ports are used to connect an external alarm device. The unit uses a relay contact for its alarm output. The devices to be connected must meet the following conditions:

Maximum rating: Load voltage : 280 VAC/VDC Max.  
Continuous load current: 100 mA

Be sure to make the correct connection by referring to the figure below.

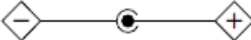
Note: The screws on both edges of the terminal block are used to hold the terminal block. Do not remove them.



### 2-4. AC adapter connection port

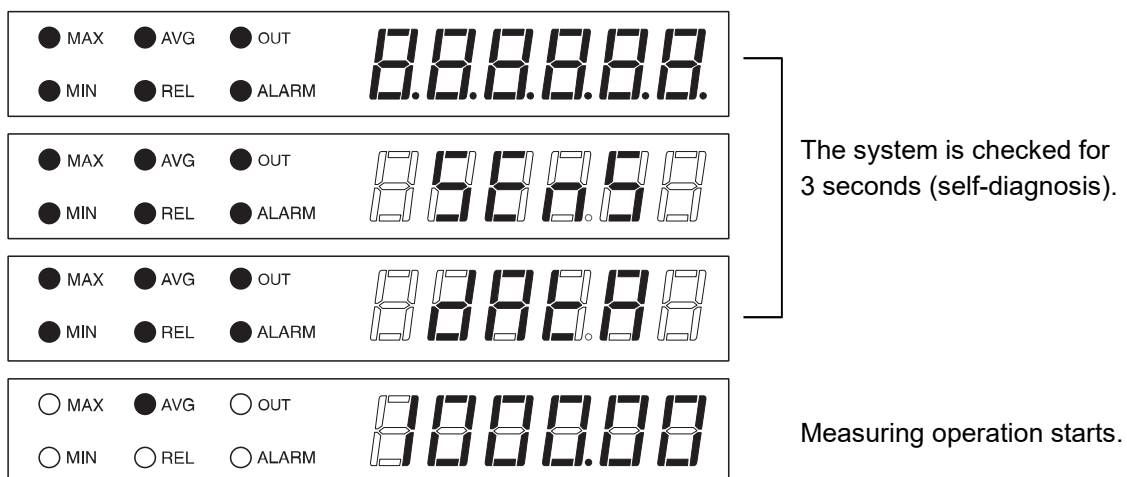
This port is used to connect the AC adapter. Insert the AC adapter plug all the way into the terminal.

NB. When using another adaptor that was not included in the instrument, select an adaptor which meets following specifications

<Primary output> Voltage : 9VDC  
Electrical Current : 600mA or more  
Polarity :   
Plug diameter : outer diameter  $\varnothing$ 5.5mm, inner diameter  $\varnothing$ 2.1mm, length 9.5mm

### 3. Turning on the unit

After completing the necessary connections to the unit and external devices, press the POWER key to turn on the unit. The self-diagnosis function checks the system, and then the measuring operation starts.



### 4. Cautions on Use

For accurate measurement, observe the following.

#### 4-1. Warm-up

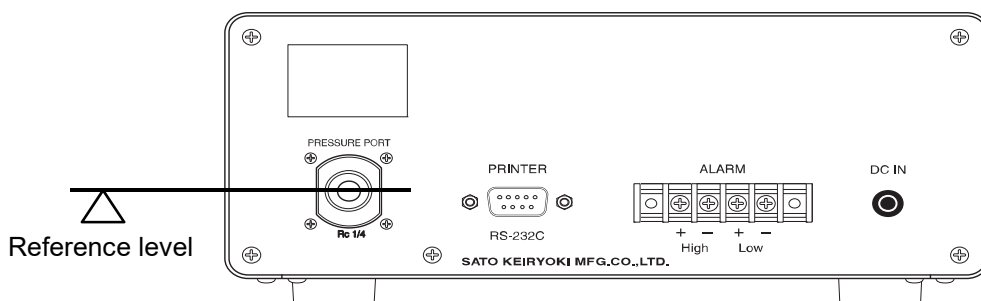
Upon power-on, allow about 30 minutes to warm up before starting operation.

#### 4-2. Measurement position

Atmospheric pressure differs according to height.

Align the reference level on the unit with the height of the pressure to be measured.

The reference level on the unit is set to the center of the pressure port.





## 5. Function and Setting

5-1. Measuring mode: This mode is for measuring atmospheric pressure.  
(Upon power-on, the unit enters the measuring mode.)

### ○ AVG function

This function displays the moving average value per 10 data items.

When the AVG function is set to ON, the AVG light turns on and the following functions are operated based on the moving average values.

- MAX/MIN function
- REL function
- ALARM function
- RS-232C/Printer output



Note: The AVG function is set to ON at the factory.

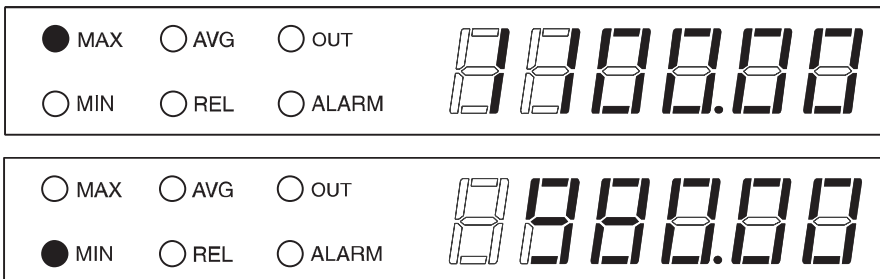
To set the averaging function to OFF, refer to "Setting mode" on page 10.

The moving average is based on a fixed 10 data items; the number of data items cannot be changed. If the number of data items falls below "10", the average value of data items up to the time is displayed.

### ○ MAX/MIN function

This function records and displays the maximum (MAX) and minimum (MIN) values recorded since power-on.

Pressing the MAX/MIN key toggles among maximum, minimum and measured values in this order. The MAX or MIN light turns on when the MAX or MIN value is displayed, respectively.



To reset the MAX or MIN value, press and hold the MAX/MIN key for at least two seconds while the maximum or minimum value is being displayed. The MAX and MIN lights, as well as the measured value, start flashing to indicate that the maximum and minimum values are reset.

Note: The maximum or minimum value is also reset under the following conditions:

- When the unit is turned off
- When the unit enters the setting mode

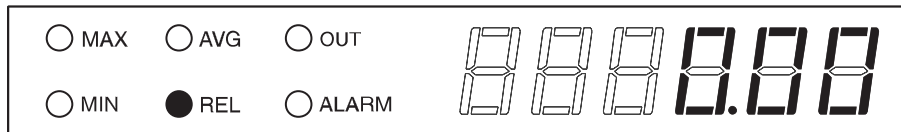
Note: The function cannot be used in combination with the REL function.

### ○ REL function

This function displays the relative values (changes in measured values) compared to the current measured value (set to 0.00 hPa).

① Press the REL key in the measuring mode.

The REL light turns on to indicate that the measured value is set to "0.00".



② To cancel, press the REL key again.

The REL light goes out to indicate that the unit has returned to the measuring mode.

Note: The REL function is also cancelled under the following conditions:

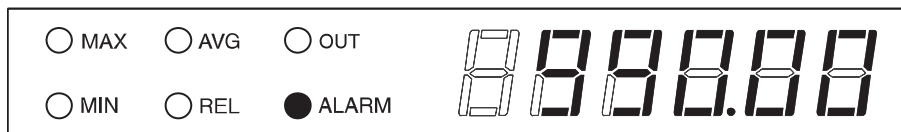
- When the unit is turned off
- When the unit enters the setting mode

Note: The function cannot be used in combination with the MAX/MIN function.

○ Alarm function

If the measured value exceeds or falls below the alarm value, the ALARM light flashes and notifies the user via the contact output. Upper and lower limit alarm values can be separately set.

For setting the alarm, refer to "Setting mode" on page 10.



Alarm operation conditions: Upper limit alarm: Measured value  $\leq$  Alarm value

Lower limit alarm: Measured value  $\geq$  Alarm value

The alarm operation on the unit has a hysteresis of 1 hPa for protection of alarm devices.

The alarm operation is cleared under the following conditions:

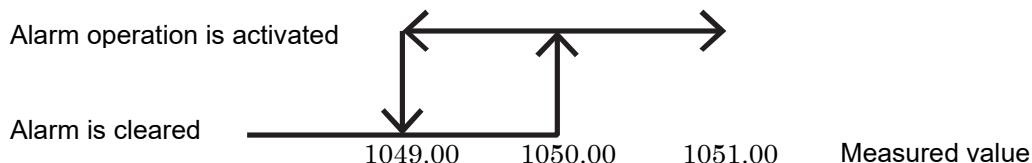
Alarm clearing conditions: Upper limit alarm: Measured value  $\leq$  alarm value - 1 hPa

Lower limit alarm: Measured value  $\geq$  alarm value + 1 hPa

\* Operation example (upper limit alarm is set to 1050 hPa):

The alarm operation is activated when the measured value is 1050.00 hPa or higher.

The alarm is cleared when the measured value is equal to 1049.00 hPa or less.



Note: The alarm operation is retained while the maximum, minimum or relative value is being displayed.

The alarm is triggered based on the measured value even while the maximum, minimum or relative value is being displayed.

Note: The alarm operation is cancelled while in the setting mode. The alarm operation resumes when the unit is returned to the measuring mode.

○ RS-232C/Printer output

The measured values can be output to the computer or dedicated printer through the RS-232C serial output. For setting the RS-232C/Printer output, refer to "Setting mode" on page 10.

Note: When using the dedicated printer, first turn on the unit and then turn on the printer.

If the printer is turned on before the unit, an abnormal value could be printed as the first output value.

- ① Enter the measuring mode, and then press the OUT key.

The OUT light turns on and the measured values are output.



- ② To cancel, press the OUT key again.

The OUT light goes out to indicate that the output has been stopped.

Note: Output is stopped and cancelled if the unit is switched to the setting mode.

To output again, switch to the measuring mode.

5-2. Setting mode: Various settings are made in this mode.

Pressing the MODE key while in the measuring mode enters the setting mode. To return to the measuring mode, press the MODE key on each screen for the setting items shown in the table below.

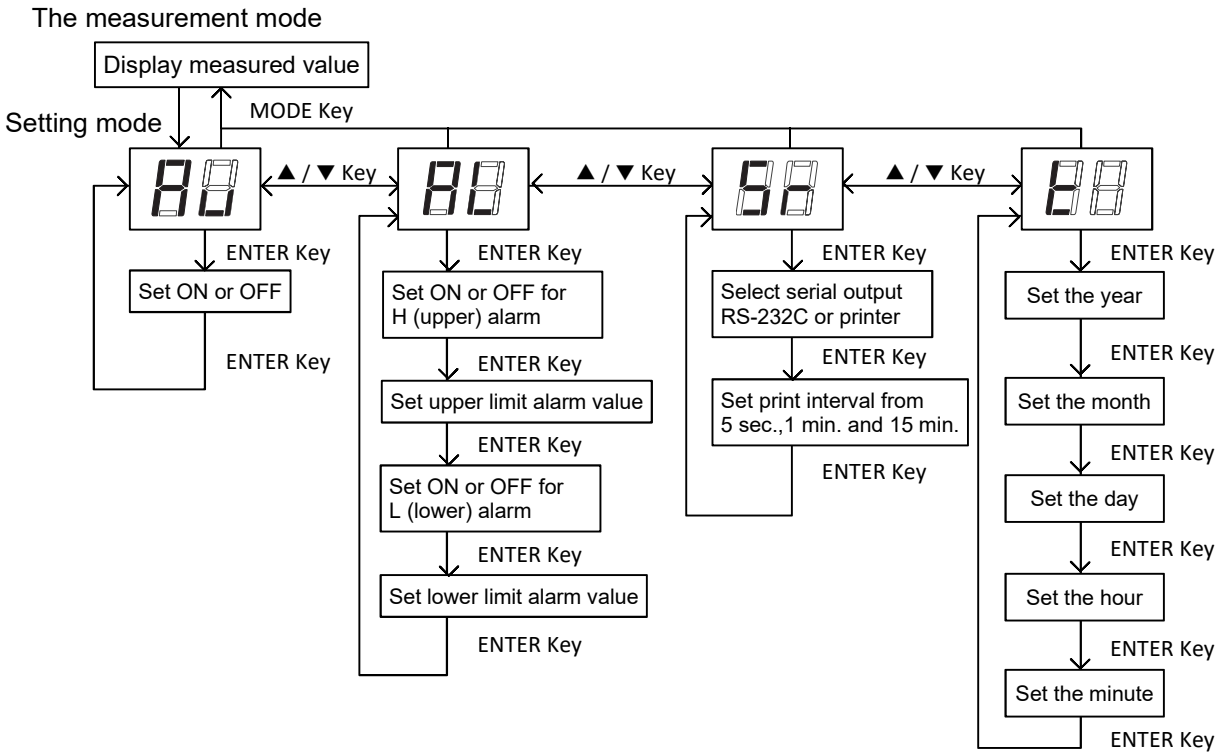
Note: When changed to the setting mode from the measuring mode, each ongoing operation in the measuring mode is forcibly changed as follows.

- MAX/MIN value : Value is reset.
- REL function : Operation is canceled and the REL value is reset.
- Alarm operation : Operation is stopped.
- RS-232C/Printer output : Output is stopped and the operation is canceled.

The settings listed below are available in the setting mode.

Display	Setting item	Description
	AVG	Set the moving averaging to ON or OFF.
	Alarm	Set the upper and lower limit alarm values.
	RS-232C/Printer output	Set the RS-232C/Printer output.
	Clock	Set the date and time.

[Flow chart for Setting Mode]



[Key operation in the setting mode]

The keys to be used during setting mode are identified by blue text on the unit.

- Selecting or editing the set value

Use the ▲ or ▼ key to select or change the set values.  
Hold down the ▲ or ▼ key to quickly change the value.

- Confirming the setting

Press the ENTER key to confirm the set value.

[Backing up the set values]

Because of the internal backup battery, the items set in the setting mode are retained even after the power is turned off.

Note: The internal backup battery lasts for about five years.

To replace the battery, contact the store where you purchased the unit or our service network.

- AVG (Averaging) setting: Set the AVG function to ON or OFF

Default setting (factory setting): ON

- ① Use the ▲ or ▼ key to select "Av". The AVG light starts flashing. Press the ENTER key.
- ② Use the ▲ or ▼ key to set to ON or OFF, and then press the ENTER key to confirm.

○ Alarm setting: Set the upper and lower limit values separately.

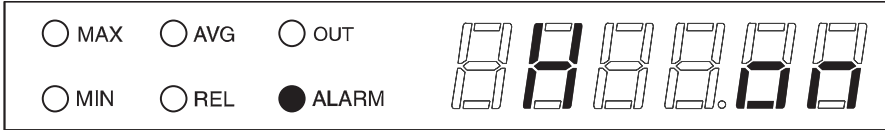
- Default setting (factory default) : OFF
- Alarm setting range : 600 to 1100 hPa
- Alarm setting unit : 1 hPa

Note: The lower limit value must be less than the upper limit value.

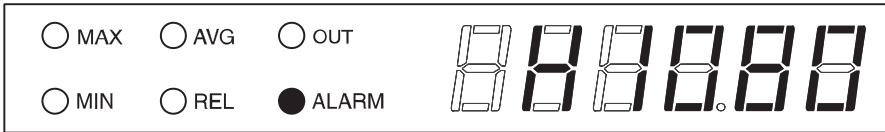
① Use the ▲ or ▼ key to select "AL". The ALARM light starts flashing. Press the ENTER key.

② Set the upper limit alarm.

Use the ▲ or ▼ key to set to ON or OFF, and then press the ENTER key to confirm.



If set to ON, use the ▲ or ▼ key to set the alarm value, and then press the ENTER key to confirm.



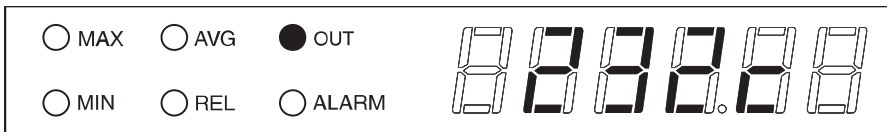
③ Set the lower limit alarm in the same way as above.

○ RS-232C/Printer output setting: Set the RS-232C/Printer output option.

- Default setting (factory setting) : RS-232C
- Output interval : RS-232C:1 sec  
Printing : select from 5 sec, 1 min and 15 min.

① Use the ▲ or ▼ key to select "Sr". The OUT light starts flashing. Press the ENTER key.

② Use the ▲ or ▼ key to select either "232C (RS-232C)" or "PRINT (Printer)", and then press the ENTER key.



③ When "PRINT (Printer)" is selected, use the ▲ or ▼ key to set the print interval, and then press the ENTER key to confirm.

Display	Interval
	5 sec.
	1 min.
	15 min.

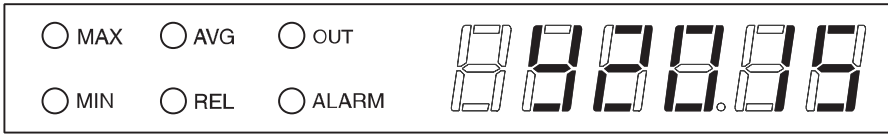
o 3 Clock setting: Set the clock on the unit.

Note: The clock on the unit has been set at the factory.

① Press the ▲ or ▼ key to select "t", and then press the ENTER key.

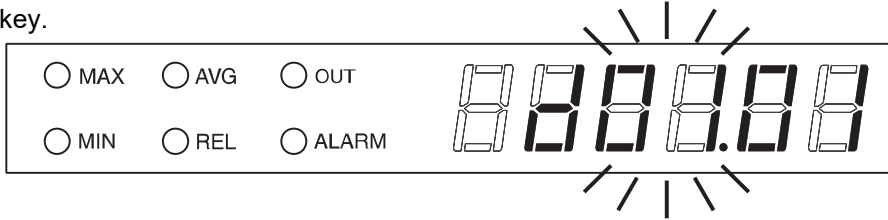
② Setting the year

Use the ▲ or ▼ key to set the year, and then press the ENTER key.



③ Setting the month, day, hour and minute

The month digits are flashing. Use the ▲ or ▼ key to set the month, and then press the ENTER key.



Then, set the day, hour and minute in this order.

Note: In the SK-500B, the "second" is automatically set to "0" at the moment the "minute" setting is confirmed (ENTER key is pressed).

## 6. Communications

The specifications of RS-232C/Printer output are as follows.

### 6-1. Communications standard

Transmission speed	: 9600 bps
Data length	: 8 bit
Stop bit	: 1 bit
Parity check	: none
Flow control	: none

### 6-2. Output format

Display of measured values

2	0	1	5	/	0	1	/	0	1	0	0	:	0	1	:	0	1	1	0	1	3	.	2	5	h	P	a	CR	LF
year				month			day		hour		minute		second		measured value														

- When the AVG function is ON, the value of moving average is output, however ON/OFF information of the AVG function is not output.
- When the MAX/MIN, REL and ALARM functions are active, measured value is output with the format above, however the values of MAX/MIN or REL are not output.

When the measured value is Hi, Lo, Er or Er2

2	0	1	5	/	0	1	/	0	1	0	0	:	0	1	:	0	1	H	i	CR	LF
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

2	0	1	5	/	0	1	/	0	1	0	0	:	0	1	:	0	1	L	o	CR	LF
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

2	0	1	5	/	0	1	/	0	1	0	0	:	0	1	:	0	1	E	r	CR	LF
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

2	0	1	5	/	0	1	/	0	1	0	0	:	0	1	:	0	1	E	r	2	CR	LF
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

## Calibration

For maintain the accurate measurement, we recommend to calibrate the unit on a regular basis. Contact us on the calibration.

## Error message

Code	Description	Action
Hi	Measured value exceeds the upper limit of the display range	Use within the measuring range
Lo	Measured value exceeds the lower limit of the display range	
Er	Measured value is abnormal	
Er2	Pressure sensor is abnormal	Keep the unit away from equipment generating electrical noise. When the problem has not been solved even if a measure against noise is taken, the unit is likely to be faulty. Stop using and contact us or the store where you purchased the unit.
Er0 to 5	Unit is failure	Stop using and contact us or the store where you purchased the unit.

## Troubleshooting

Problem	Possible cause	Action
Readings are unstable.	The unit is being used in an environment where electrical noise is generated.	Keep the unit away from equipment generating electrical noise. If the cause comes from the power line, use stabilized power source
	Ambient temperature is fluctuating.	Leave the unit in the ambient temperature for a while to adapt before using the unit.
	Air is blowing against the pressure port.	Reinstall the unit such that it is not affected by wind.
Measured values are not retained.	Backup battery is exhausted.	Contact us or the store where you purchased the unit.

\* If the problem still exists after trying the above actions, contact us or the store where you purchased the unit.

## Specifications

Cat. No.	No. 7630-00 Digital Barometer
Model	SK-500B
Measuring range	600.00 to 1100.00 hPa
Resolution	0.01 hPa
Accuracy	±0.50 hPa (at 700.00 to 1100.00 hPa, 10 to 40°C) ±1.00 hPa (other than above)
Sampling time	approx. 1 sec.
Pressure sensor	Piezo resistance pressure sensor
Display	7 segment red LED (6 digits), condition display: red LED
Clock accuracy	±1 min. per month
Operation ambient	-10 to 50°C, less than 85%rh (No condensing)
Power requirements	9VDC/660mA (exclusive AC adapter: 100 to 240VAC 50/60Hz 0.66A)
Materials	Main body : SPCC Display section : Acrylic resin Pressure port : SUS304
Dimensions	approx. 200(w) x 90(H) x 280(D) mm (without protrusion)
Weight	approx. 3.0 kg
Standard accessories	Instruction manual AC adapter x 1 RS-232C cable x 1 USB serial cable (with CD-ROM for USB driver) x 1

\* The specifications or appearance subject to change for improvement with or without notice

## Exclusive Printer (Option)

Cat. No.	No. 7630-00 Printer for SK-500B Digital barometer
Operation ambient	0 to 40°C, 30 to 80%rh (No condensing)
Power requirements	Exclusive AC adapter and built-in chargeable battery
Dimensions	approx. 170(w) x 66.5(H) x 160(D) mm
Weight	approx. 690g
Standard accessories	Instruction manual (CD-ROM) x 1 Exclusive AC adapter x 1 Printing paper x 1 Printer cable x 1

\* The specifications or appearance subject to change for improvement with or without notice

## Consumable

No. 8009-82 Printing paper (10 rolls/pack) for No. 7630-00 printer

**Warranty conditions comply with our Warranty Policy**

**SATO KEIRYOKI MFG. CO., LTD.**