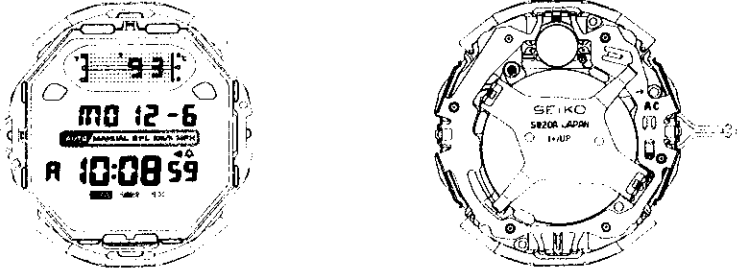


PARTS CATALOGUE / TECHNICAL GUIDE

Cal. S820A

[SPECIFICATIONS]

Item		Cal. No.	S820A
Module			 <p style="text-align: center;">(x 1.0)</p>
Module size	Outside diameter		34.3 mm between 6 o'clock and 12 o'clock sides 31.6 mm between 3 o'clock and 9 o'clock sides
	Casing diameter		—
	Height		7.3 mm
Display medium			Nematic Liquid Crystal, FEM (Field Effect Mode)
Liquid crystal driving system			Multiplex driving system
Display system			<ul style="list-style-type: none"> • Time/calendar display <ul style="list-style-type: none"> • Automatic calendar (from 1993 to 2042 including February 29 of leap years) • Temperature graph • Thermometer display <ul style="list-style-type: none"> • Automatic and manual temperature measurements • Measurable range : From -20° C to +50° C (From -4° F to +122°F) • Automatic measurement : Up to 30 sets of measurement data can be stored in memory. • Manual measurement : Up to 10 sets of measurement data can be stored in memory. • Thermometer recall display <ul style="list-style-type: none"> • Memory recall of automatic measurement: The newest, highest and lowest temperatures in memory and temperature graph • Memory recall of manual measurement: Temperature and month, date and time when the measurement was made are recalled. The data is recalled successively from the newest to the oldest. • Stroke display <ul style="list-style-type: none"> • The watch can be set to beep at a rate between 20 and 240 strokes per minute. • Chronograph/tachymeter display <ul style="list-style-type: none"> • Up to 10 hours in 1/1000 second increments • Auto start function : The chronograph/tachymeter can be set to start automatically after 10 seconds. The watch beeps to signal the remaining time and the start of measurement. • Chronograph recall display <ul style="list-style-type: none"> • Up to 10 sets of chronograph measurement data (total time and average speed per hour) are recalled. • Time difference display <ul style="list-style-type: none"> • Chronograph measurement data (total time, and difference between the fastest total time and another) are displayed in order from the fastest to the slowest. • Alarm display <ul style="list-style-type: none"> • One daily alarm and two single-time alarms

Item	Cal. No. S820A
Additional mechanism	<ul style="list-style-type: none"> • Sound on/off : Sound for button operation confirmation can be switched on and off as required. • Battery life indicator • Illuminating light (electroluminescent panel)
Loss/gain	Monthly rate at normal temperature range: less than 20 seconds
Regulation system	Nil
Measuring gate by quartz tester	Any gate can be used.
Battery	Matsushita CR2025 Battery life is approximately 2 years. Voltage: 3.0V
Temperature measurement accuracy	±2° C within a temperature range of -20° C and +50° C (when the watch is off the wrist)

PARTS CATALOGUE

Cal. S820A

Disassembling procedures Figs. : (1) → (19)

Reassembling procedures Figs. : (19) → (1)

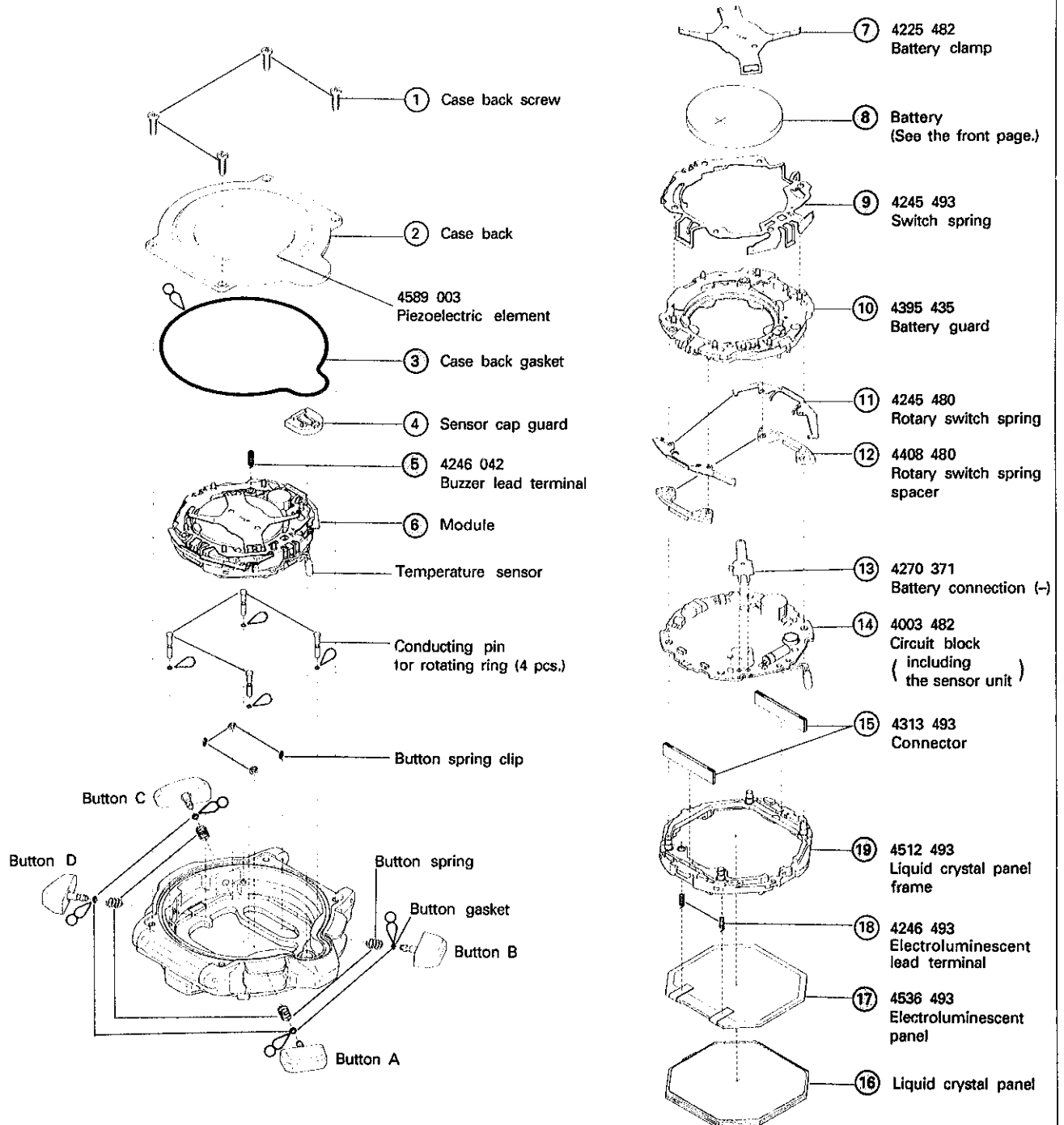
Lubrication: Types of oil

Oil quantity

∞ Silicone oil 500,000 c.s.

∞ Normal quantity

○ Extremely small

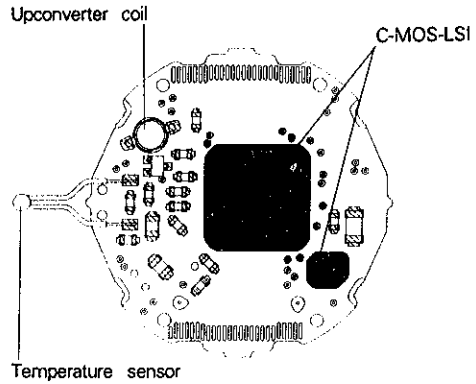
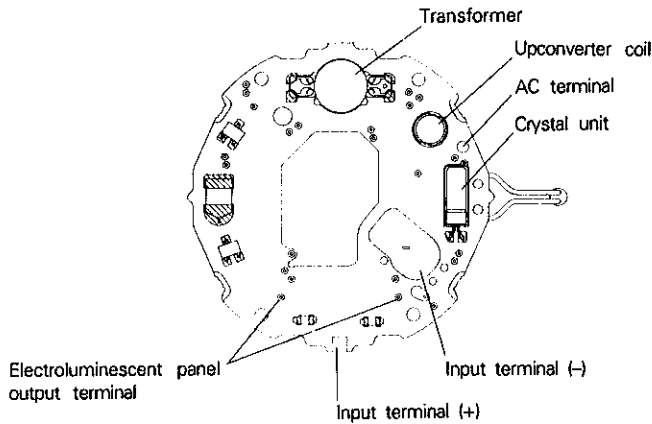


* Do not disassemble buttons A, B, C and D except when they need to be replaced.

○ → Please see the remarks on the following pages.

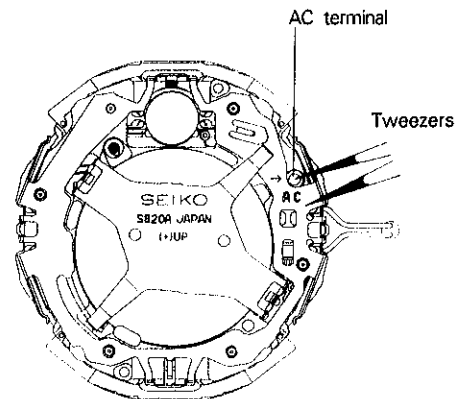
- The explanation here is only for the points part of Cal. S820A.
- For the repairing, checking and measuring procedures, refer to the "TECHNICAL GUIDE, GENERAL INSTRUCTIONS".

I. STRUCTURE OF THE CIRCUIT BLOCK

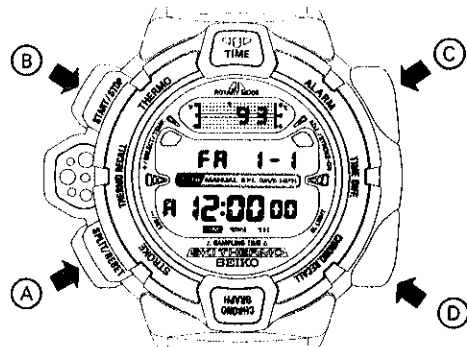


II. REMARKS ON INSTALLING THE BATTERY

- After the battery is replaced with a new one, or after the battery is re-installed following repairing procedures, be sure to short-circuit the AC terminal of the circuit block and the switch spring with conductive tweezers to reset the circuit as illustrated at right.



- To reset the circuit of the complete watch, press and hold buttons "A", "B", "C" and "D" at the same time for 2 to 3 seconds. The display will become blank, and "12:00'00" AM, Friday, January 1st, 1993" will be shown as the buttons are released, indicating that the resetting of the circuit has been completed.



III. REMARKS ON DISASSEMBLING AND REASSEMBLING

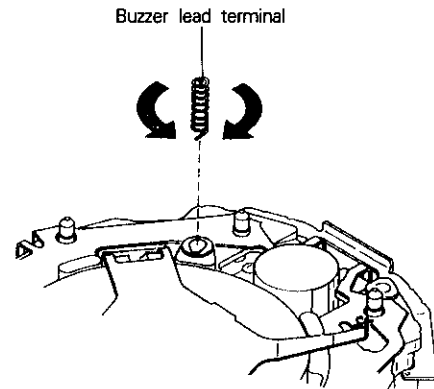
⑤ Buzzer lead terminal

- **How to remove**

Turn the buzzer lead terminal to release its end portion from the groove of the battery guard, and then remove it.

- **How to install**

Set the end portion of the buzzer lead terminal into the groove of the battery guard, then turn it to fix it in place.



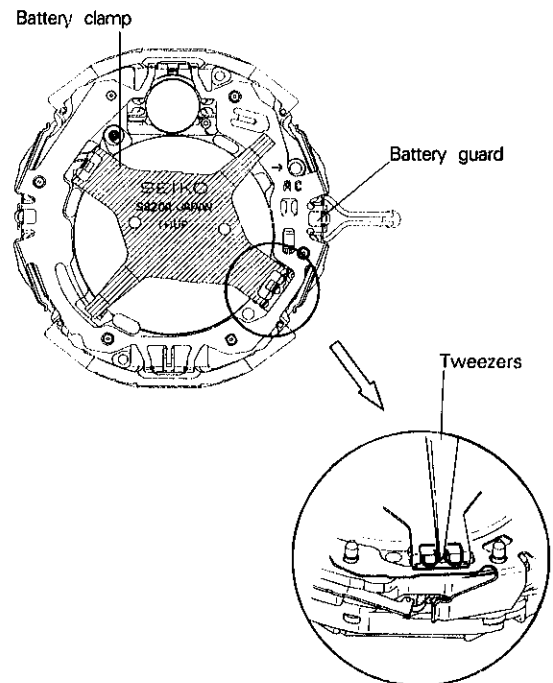
⑦ Battery clamp

- **How to remove**

Using tweezer tips or a screwdriver, pry up the two protrusions of the battery clamp hooked to the notches of the battery guard.

- **Checking after installation**

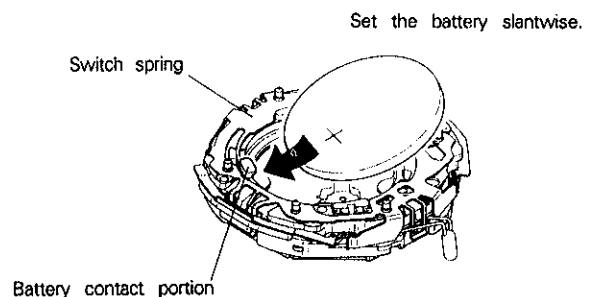
After installing the battery clamp, check that the battery guard is securely held by the two protrusions of the battery clamp.



⑧ Battery

- **How to install**

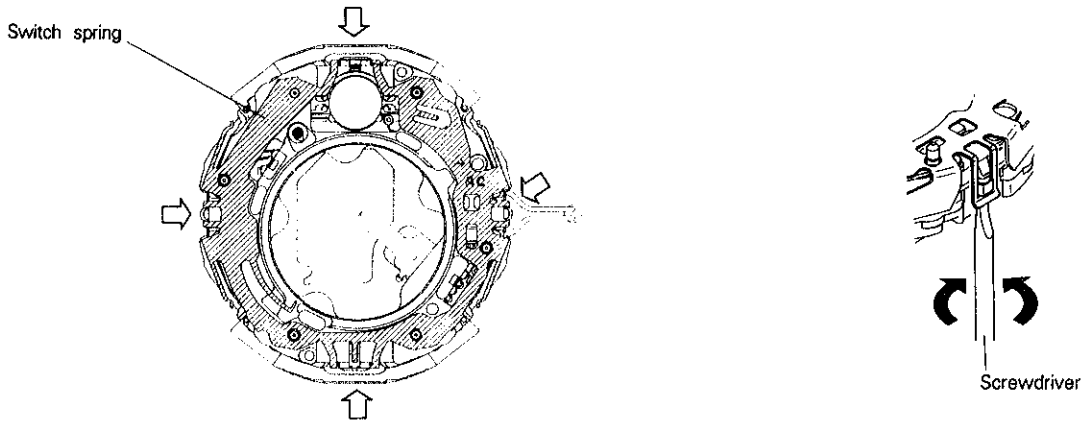
Install the battery slantwise as shown in the illustration lest it should distort the battery contact portion of the battery guard.



⑨ Switch spring

• How to remove

Pry up the four hooking portions of the switch spring with the tip of a screwdriver to remove it.

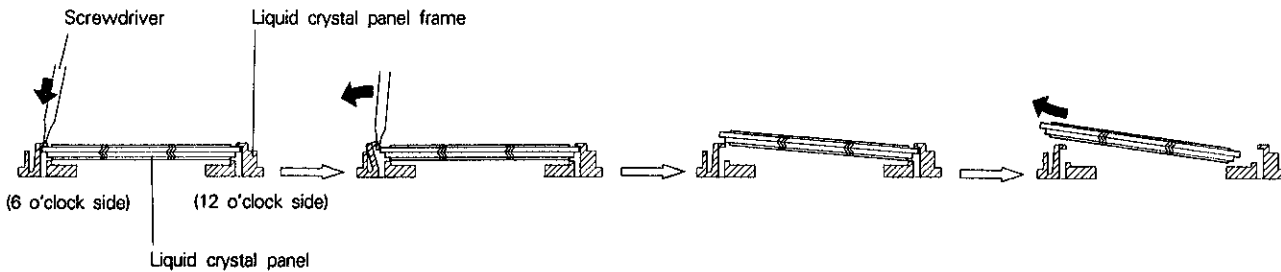


⑬ Liquid crystal panel

⑰ Liquid crystal panel frame

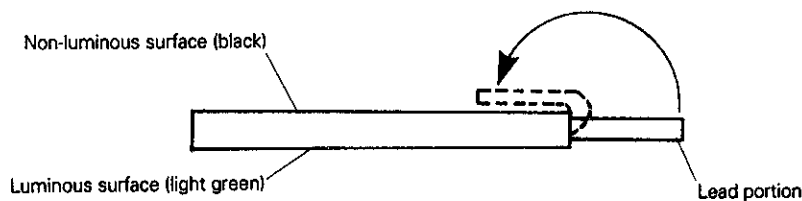
• How to remove

Insert the tip of a screwdriver into the hooking portion of the liquid crystal panel frame at the 6 o'clock position, and pry it up in the direction of the arrow as shown in the illustration to remove the liquid crystal panel.



⑰ Electroluminescent panel

When replacing the electroluminescent panel, bend the two lead portions of the new electroluminescent panel at the joint as shown in the illustration before reassembling it.

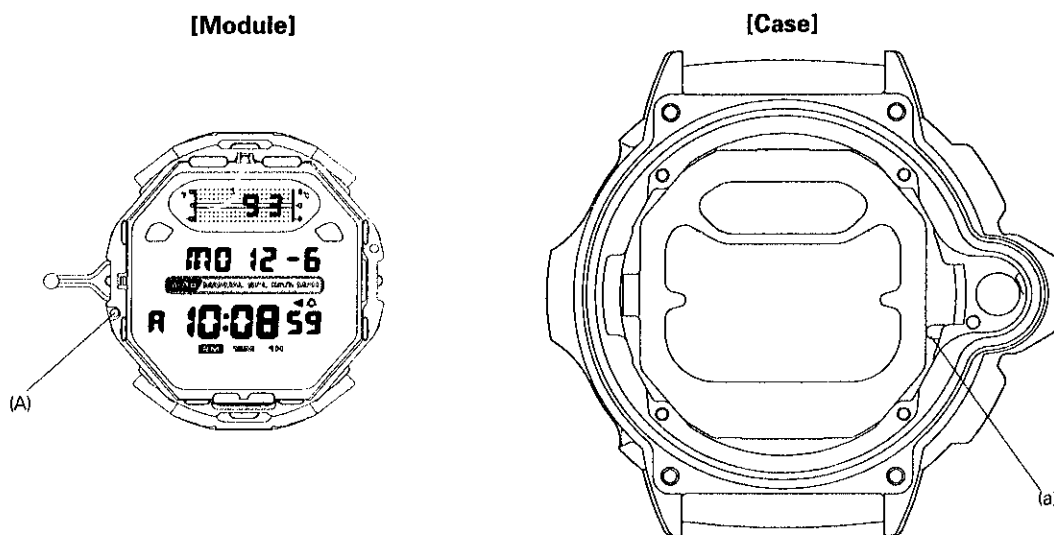


* The electroluminescent panel is highly susceptible to humidity. Therefore, a new electroluminescent panel should be put in a sealed moistureproof bag and kept in a cool, dark place if it is not used right away.

- ③ Case back gasket
- ⑥ Module

• **Remarks on installing the module and case back gasket in the case**

- The case back gasket is shaped for exclusive use with Cal. S820A. When installing the case back gasket in the case, set the protruding portion of the gasket securely in the groove of the case's sensor portion.
- Four conducting pins for the rotating ring protrude from the case. When attempting to install the module in the case, therefore, the module may not fit correctly into the case. Line up notch (A) of the module with protrusion (a) inside the case and close the case back pushing the module down in the case.



- After installing the module in the case, turn the rotary switch to check that the modes shown on the display correspond to the respective mode marks on the rotary switch.

IV. VALUE CHECKING

• **Time accuracy**

To measure accuracy, light up all the segments of the display. To do so, press buttons "A" and "B" at the same time in the TIME/CALENDAR SETTING display. After the measurement, press button "A", "B", "C" or "D" to return to the TIME/CALENDAR display.

• **Upconverter coil resistance**

125Ω ~ 175Ω

• **Current consumption for the whole of the module**

- When the electroluminescent panel is not used : less than 4.6μA
- When the electroluminescent panel is used : less than 17.0mA

Note: Before measuring the current consumption, be sure to reset the circuit. Otherwise, the display will become disordered, and the current consumption not be measured properly.

• Troubleshooting for the electroluminescent panel

If the electroluminescent panel will not light, check the following points for the cause of failure:

- Cause-1: Battery
Check the voltage of the battery.
- Cause-2: Insufficient contact of the parts with the battery
Check if the battery contact portion of the switch spring and the battery connection (-) are securely in contact with the battery.
- Cause-3: Insufficient contact of button "D"
Check if the switch spring and the circuit block are dusty.
- Cause-4: Defective circuit block or electroluminescent panel
Follow the procedure below.

Remove the case back of the complete watch, and supply power (3V) externally.
While keeping button "D" pressed, measure the voltage of the electroluminescent panel output terminal of the circuit block.

More than AC 35V

Less than AC 35V

The circuit block is normal.
Disassemble the watch and check the lead portions of the electroluminescent panel and the electroluminescent lead terminals for proper conductivity. (Also check them for dust)

Replace the circuit block with a new one.

If there is no conductivity failure, replace the electroluminescent panel with a new one.

• Checking of the temperature sensor

The following display in the THERMOMETER mode indicates a malfunction in the temperature sensor if the actual temperature is higher than this.

- 20.4 °C

(Centigrade display)

- 4.2 °F

(Fahrenheit display)

If this display appears, replace the whole circuit block with a new one.

Remarks: The temperature sensor is bonded to the circuit block and cannot be replaced nor be supplied as a separable unit.