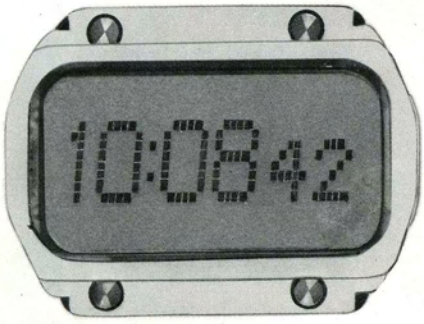
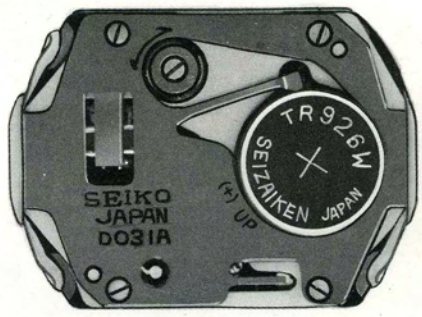
TECHNICAL GUIDE

SEIKO

DIGITAL QUARTZ

CAL. D031A





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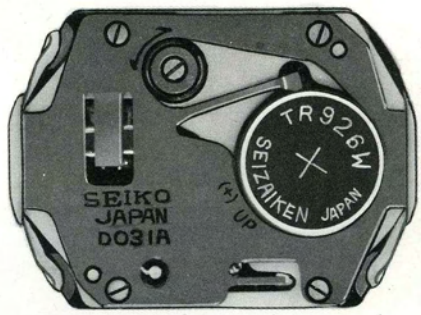

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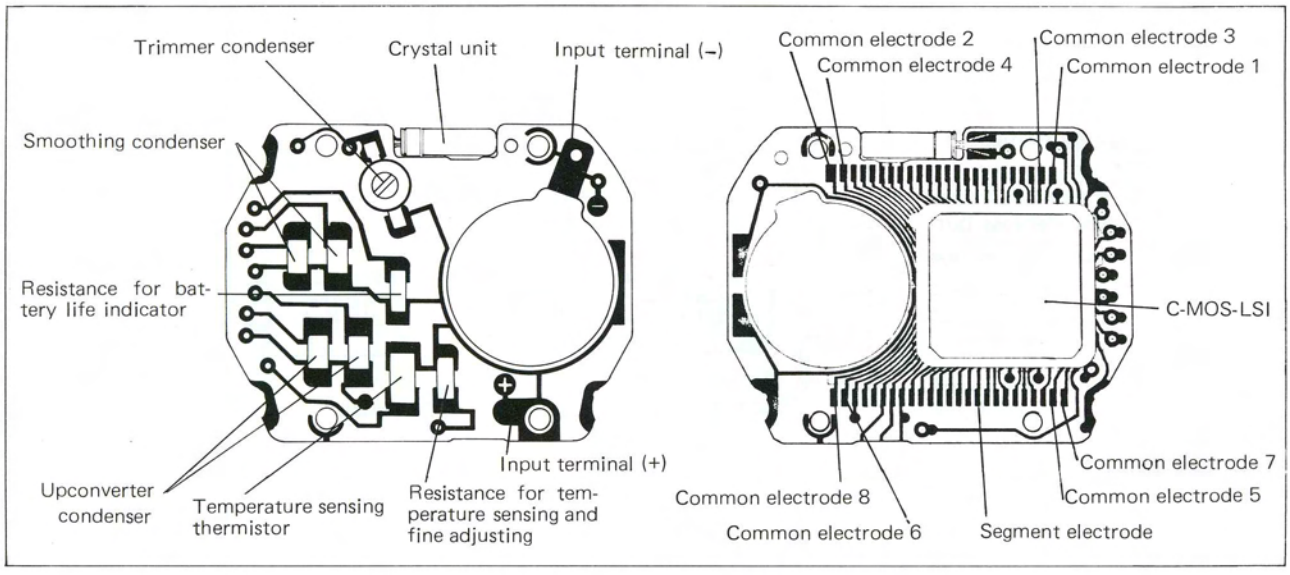
I. SPECIFICATIONS

Item \ Cal. No.	D031A
Display medium	Nematic Liquid Crystal, FEM (Field Effect Mode)
Liquid crystal driving system	Multiplex driving system
Display system	• Dot matrix display system • Time display: Hour, minute and second (12 or 24 hour indication) • Calendar display: Day and date
Additional mechanism	• Dot matrix sweep display system • Sweep display test system • Illuminating light • Battery life indicator
Loss/gain	Loss/gain at normal temperature range Monthly rate: less than 15 seconds (Annual rate : less than 3 minutes)
Outside diameter	ϕ26.0mm (19.0mm between 6 o'clock and 12 o'clock sides) (25.6mm between 3 o'clock and 9 o'clock sides)
Height	3.9mm
Regulation system	Trimmer condenser
Measuring gate by Quartz Tester	Any gate is available. (Measure the daily rate with all dots displayed)
Battery	SEIKO (SEIZAIKEN) TR926W, Maxell SR926W or U.C.C. 399. Battery life is approximately 2 years. Voltage: 1.55V

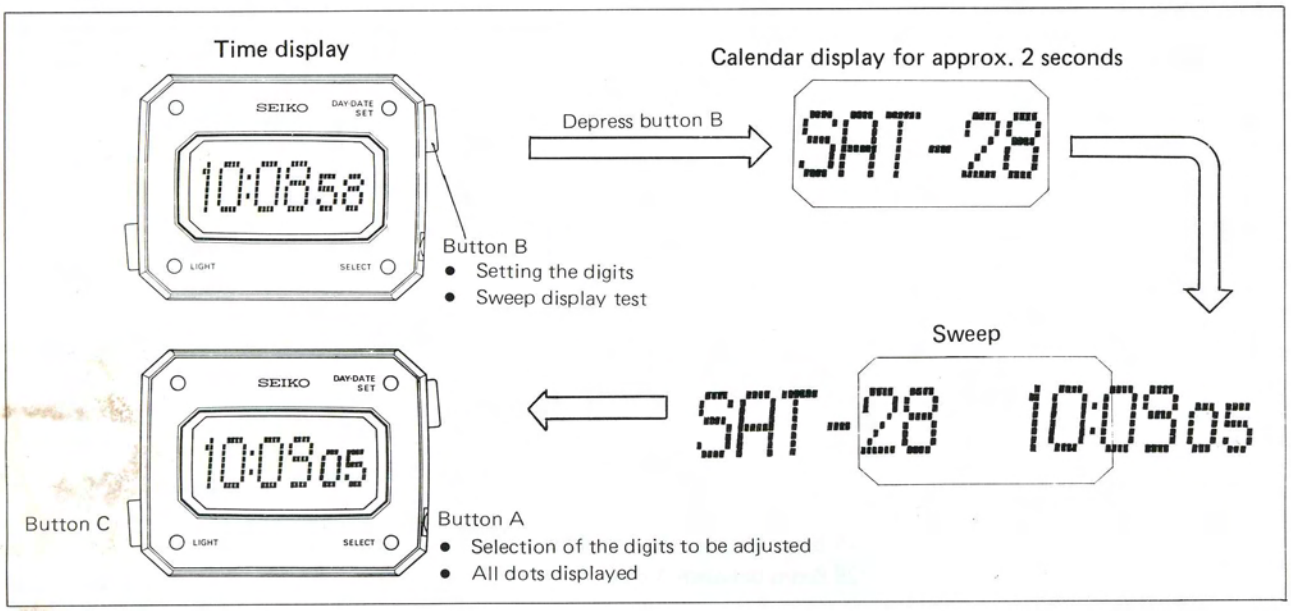
II. STRUCTURE OF THE CIRCUIT BLOCK



III. DISPLAY FUNCTION

- Cal. D031A uses the "Dot matrix display system" in which digits, letters and marks are displayed by the arrangement of small dots. It is equipped with the "Sweep display system" which enables the time display and calendar display to start sweeping from right to left every hour on the hour and when button B is depressed.

- **Time and calendar display**

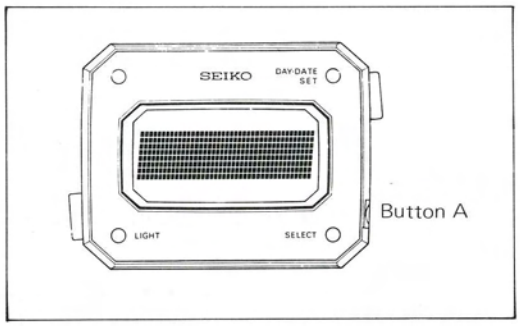


- **Sweep display test**

If button B is depressed for more than 2 seconds from the time display, the sweep is repeated continuously as Time display → Calendar display → Time display. Depress button A, B or C to return to the time display.

- **All dots displayed**

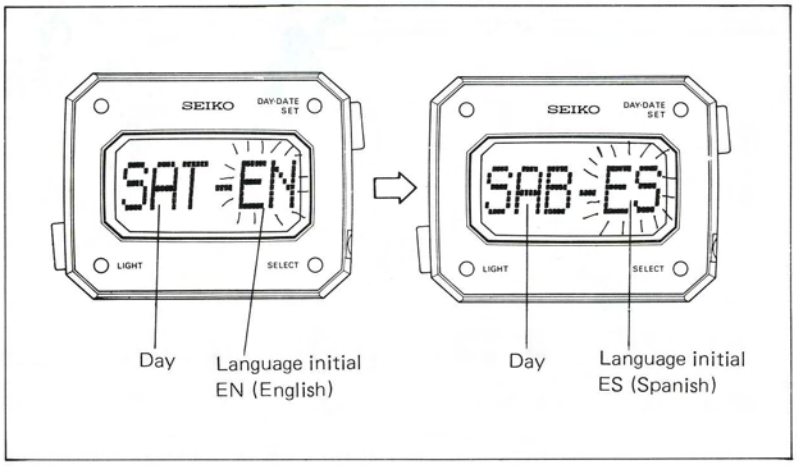
Depress button A for more than 2 seconds and all the dots are displayed.
This is designed to facilitate checking accuracy. Depress button A, B or C to return to the time display.



- **Selection of the language to indicate the day of the week**

- From the time display depress button A six times, and the language initial and the day of the week are displayed with the language initial flashing.
- The language initial changes in the following order by each depression of button B and the language to indicate the day of the week also changes automatically.

EN (English) → ES (Spanish) → FR (French) →
↑ IT (Italian) ← DE (German) ←



IV. DISASSEMBLING AND REASSEMBLING

1. Disassembling and reassembling of the case

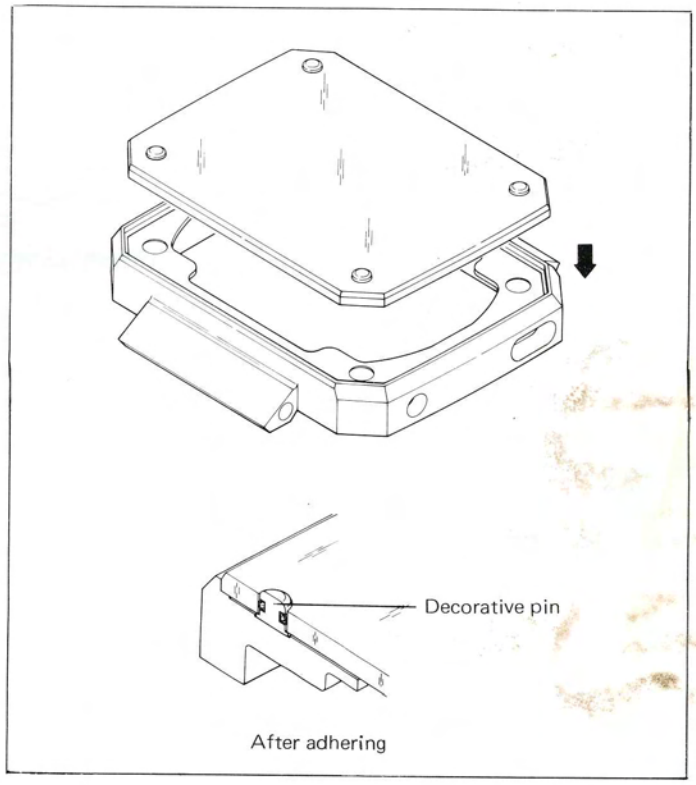
Ex.) Case No. D031-4000 R0

This model uses decorative pins (4 pcs.) on the glass.

- How to set the glass

Adhere the glass with decorative pins to the casebezel by the adhesive for glass S-310. Also apply the S-310 on the bottom (4 places) of the decorative pins.

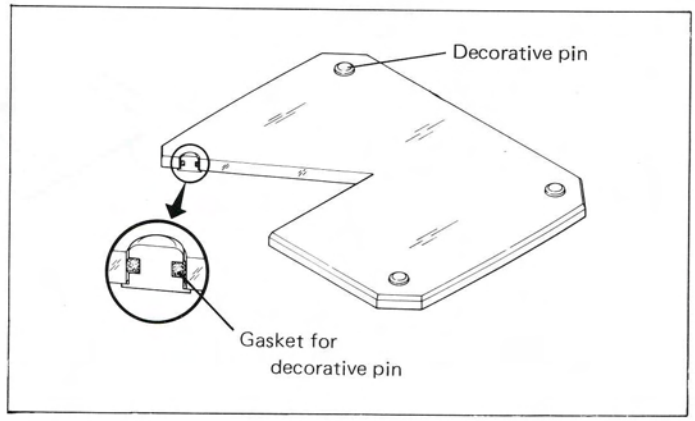
Note: Apply the S-310 slightly to the surface to be adhered so that it is uniformly coated.



- Adhering time

When left at the normal temperature
(24°C) . . . . . 24 hours
When left at the temperature of
40°C ~ 50°C . . . . . 5 to 6 hours

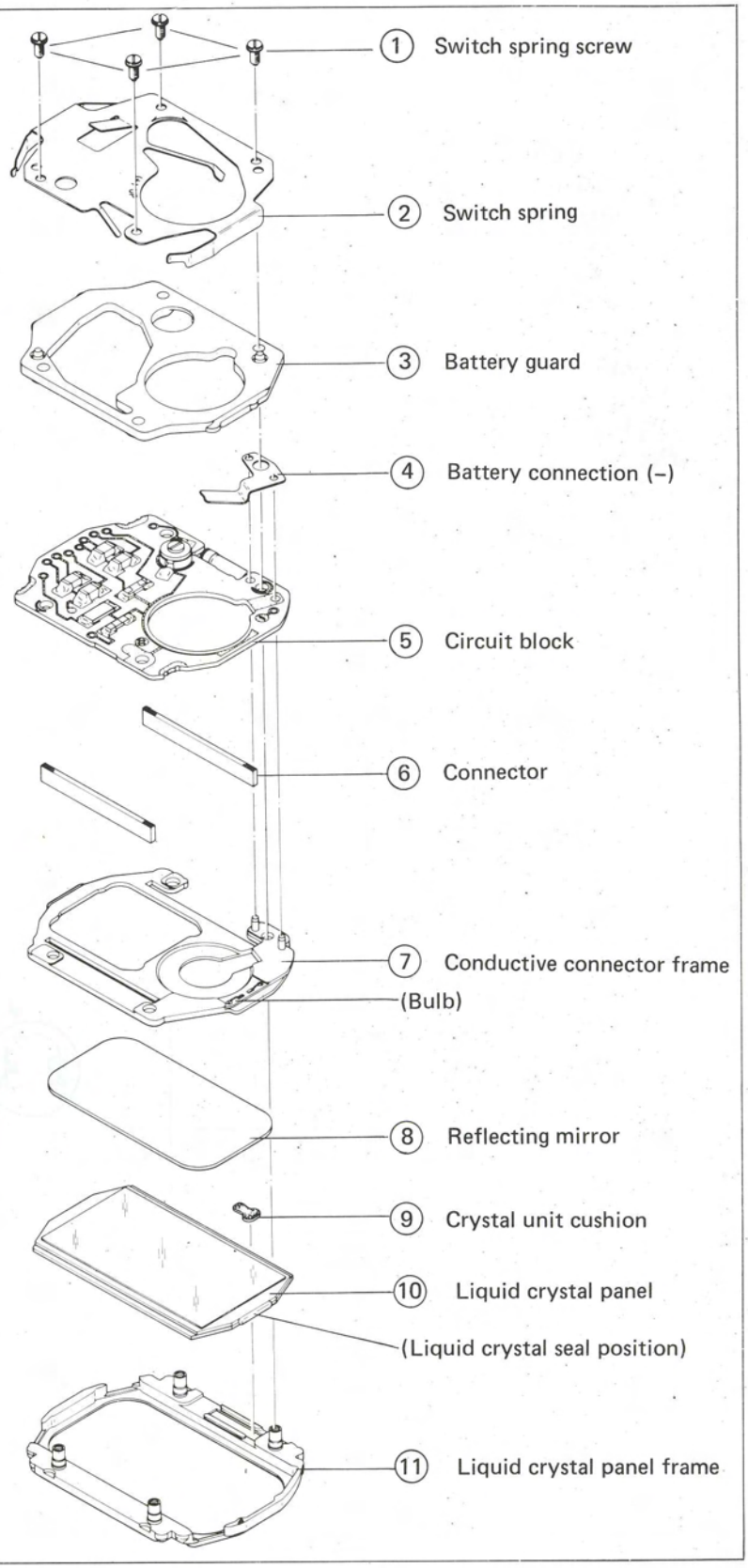
Note: The glass is supplied with the decorative pin with gasket. (The decorative pin and the gasket for decorative pin can be supplied separately as well.)



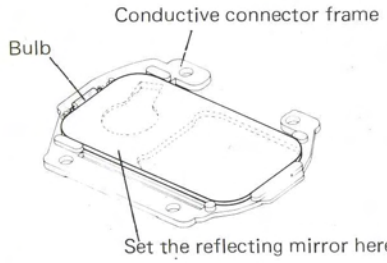
2. Disassembling and reassembling of the module

Disassembling Procedures Figs.: ① → ⑪

Reassembling Procedures Figs.: ⑪ → ①

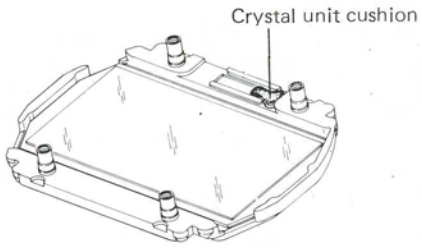


- How to set the reflecting mirror



Attach the reflecting mirror with its white side up to the side of the conductive connector frame where the bulb is set as shown in the illustration above and then reassemble it on the liquid crystal panel frame.

- Crystal unit cushion setting position



V. CHECKING AND ADJUSTMENT

- **Refer to the "SEIKO QUARTZ TECHNICAL GUIDE, GENERAL INSTRUCTION" for Digital Watches for details.**

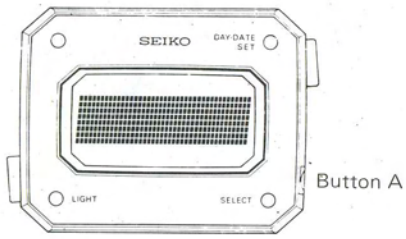
Procedure

CHECK BATTERY VOLTAGE

Result:
More than 1.5V: Normal
Less than 1.5V: Defective
Replace the battery with a new one.

CHECK BATTERY CONDUCTIVITY

CHECK ALL DOTS DISPLAY AND LIQUID CRYSTAL PANEL

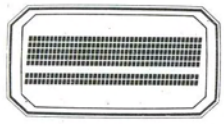


All dots displayed

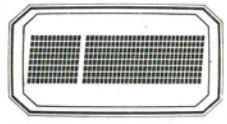
- Depress button A for more than 2 seconds and all the dots light up.

Result:
All the dots light up: Normal
Lines of dots are not displayed partially crosswise or lengthwise: Defective
- Check the common electrode of the liquid crystal panel at 8 places.
- Check the connector and the circuit block electrode for dust, lint, and contamination.

(Ex.)



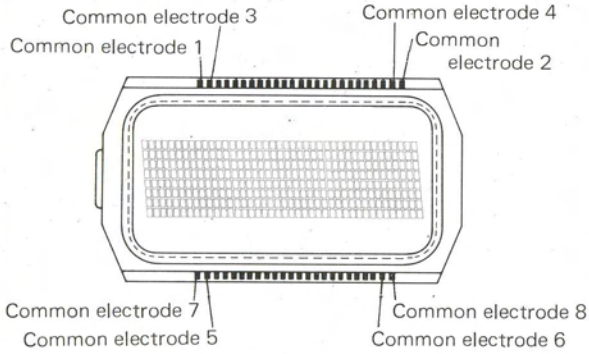
The figure indicates poor conductivity in a part of the common electrode.



The figure indicates poor conductivity of an electrode other than the common electrode.

CHECK CONDUCTIVITY OF LIQUID CRYSTAL PANEL, CIRCUIT BLOCK AND CONNECTOR

- Liquid crystal panel electrode



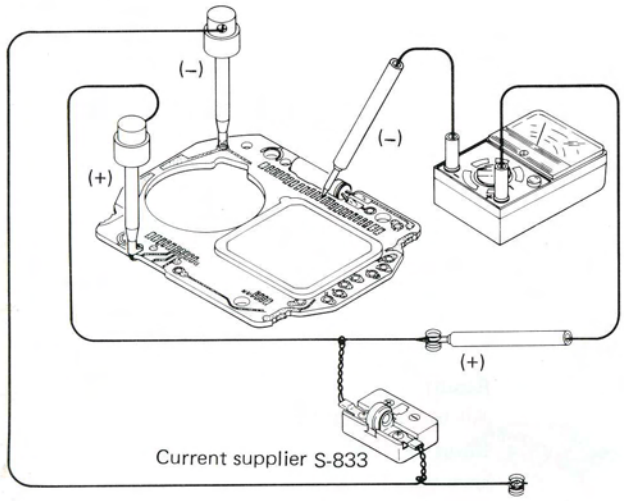
- In Cal. D031A, there are 8 common electrodes on the liquid crystal panel as shown in the illustration on the left and the number of electrodes used are more than those of other calibres.
Therefore its conductivity may be affected easily both by the dust, lint, and contamination on the connecting portions between the common electrode and the connector, and their set position. Check the liquid crystal panel, circuit block, and connector.

Procedure

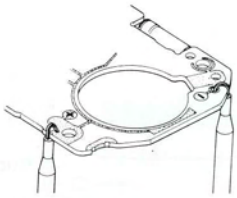
CHECK CIRCUIT BLOCK

(1) Check the output voltage of the circuit block.

Range to be used: DC 3V

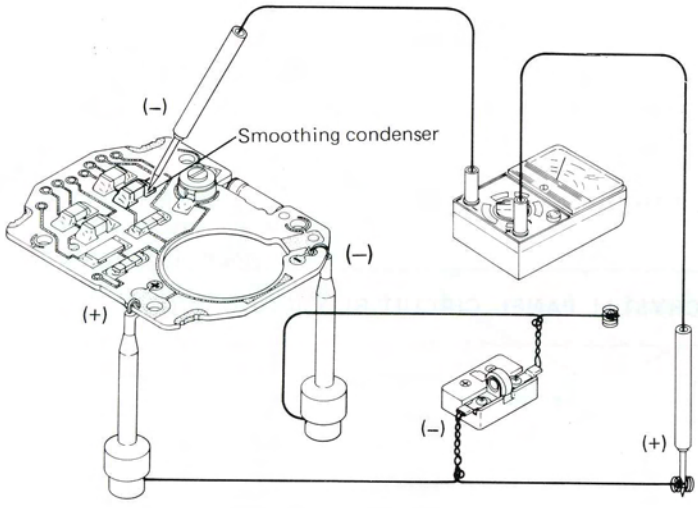


Result:
More than 0.8V: Normal
Less than 0.8V: Defective
Replace the circuit block with a new one.



(2) Check the upconverter voltage of the circuit block.

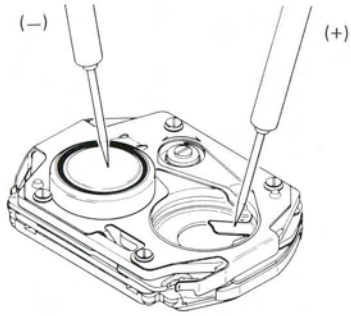
Range to be used: DC 3V



Result:
More than 2.5V: Normal
Less than 2.5V: Defective
Replace the circuit block with a new one.

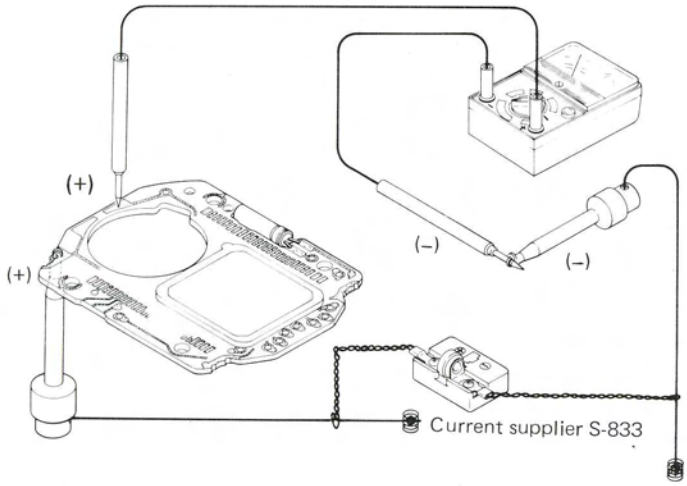
Procedure

CHECK CURRENT CONSUMPTION



Result:
Less than 3.4μA: Normal
More than 3.4μA: Defective

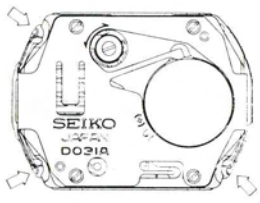
* How to check if the liquid crystal panel or the circuit block is defective when the current consumption is more than 3.4μA.



- Check the current consumption for the circuit block alone.

Result:
Less than 2.5μA:
Replace the liquid crystal panel with a new one.
More than 2.5μA:
Replace the circuit block with a new one.

CHECK CONDUCTIVITY OF SWITCH COMPONENTS

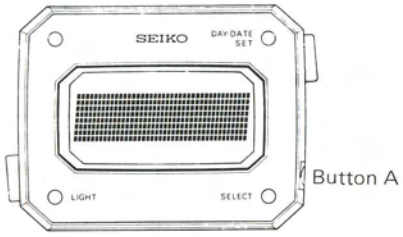


- Check to see if the switch spring (arrow-marked in the illustration on the left) touches the switch terminals of the circuit block when they are pushed in with the tips of tweezers and to see if they do not touch the switch terminals of the circuit block when released.
- Check the connecting portions for dust, lint, and other contaminations.

Result:
Functions correctly: Normal
Does not function correctly: Defective
(If it is not adjustable, replace the switch spring with a new one.)

Procedure

CHECK ACCURACY



All dots displayed

- Depress button A for more than 2 seconds to light up all the dots and check the daily rate.
- Depress button A, B or C to return to the time display.

CHECK FUNCTIONING AND ADJUSTMENT

- Check to see if each display is activated correctly by depressing each button in accordance with the instruction on page 2.

All procedures of Disassembling, Reassembling, Checking and Adjustment are completed.