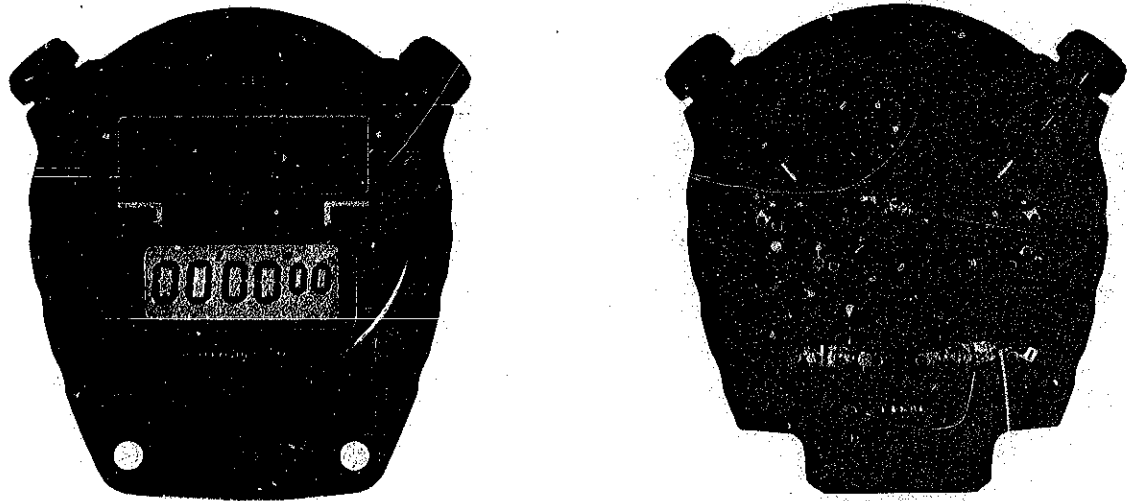


# TECHNICAL GUIDE

## SEIKO DIGITAL QUARTZ

CAL. S025A



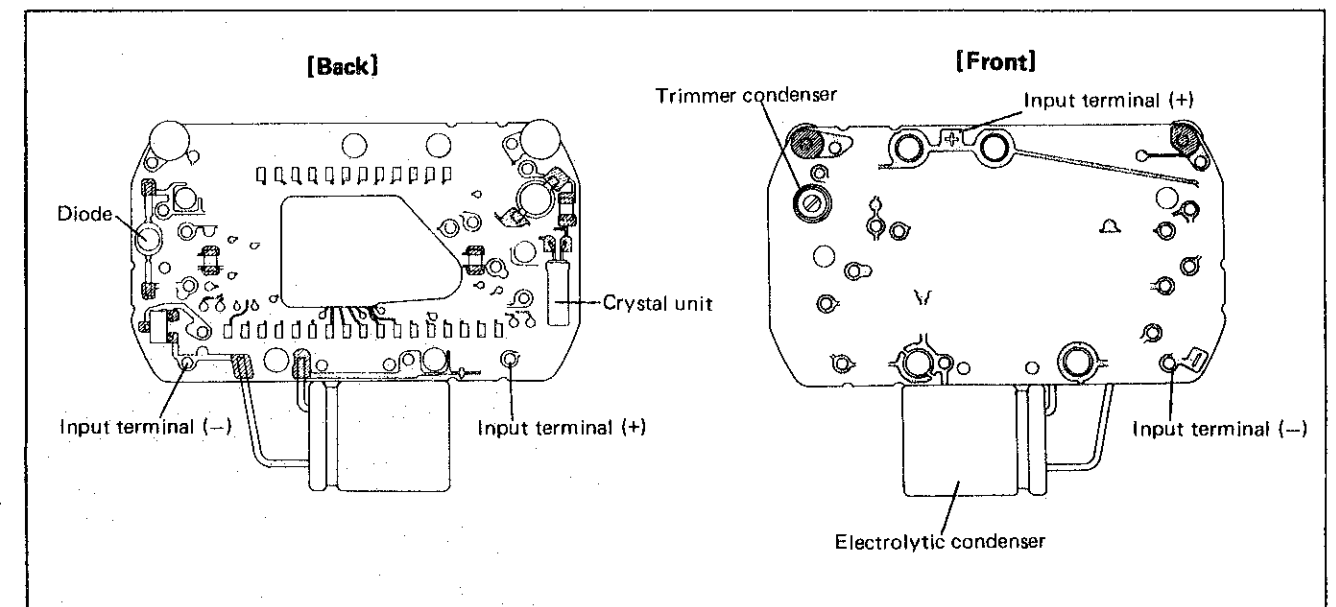
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## I. SPECIFICATIONS

Item	Cal. No.	S025A
Display medium		Nematic Liquid Crystal, FEM (Field Effect Mode)
Liquid crystal driving system		Multiplex driving system
Display system		Stopwatch display (up to 60 minutes in 1/100 second)
Additional mechanism		Battery recharge indicator
Loss/gain		$\pm 0.0012\%$ (equivalent to the monthly rate of approx. $\pm 30$ seconds)
Module size	Outside diameter	23.6 mm between 6 o'clock and 12 o'clock sides 40.0 mm between 3 o'clock and 9 o'clock sides
	Height	5.8 mm
Regulation system		Trimmer condenser
Measuring gate by quartz tester		Any gate can be used.
Battery		Solar battery (without secondary battery)

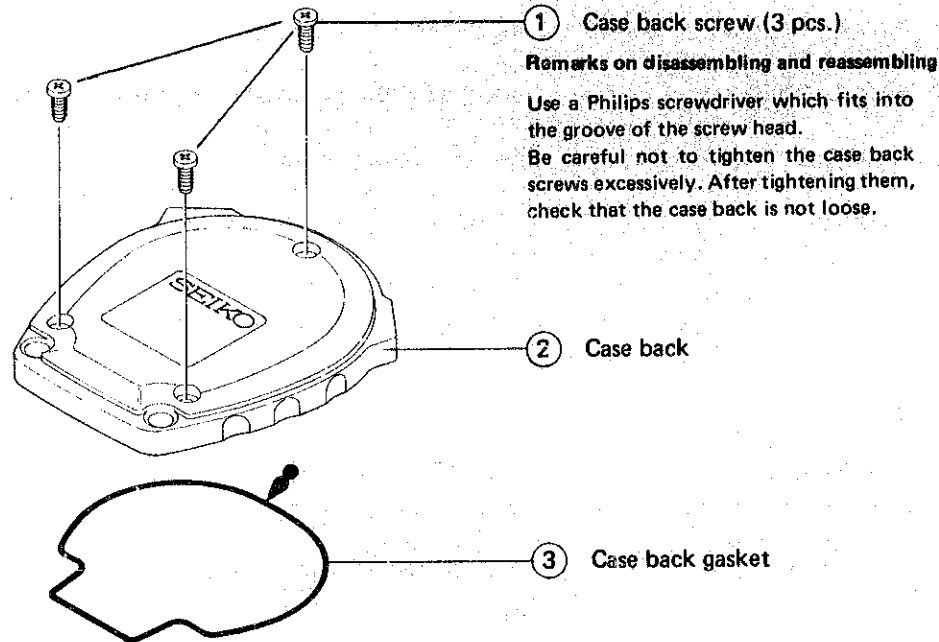
## II. STRUCTURE OF THE CIRCUIT BLOCK



### III. DISASSEMBLING AND REASSEMBLING OF THE CASE

Disassembling procedures Figs. : ① → ③  
 Reassembling procedures Figs. : ③ → ①

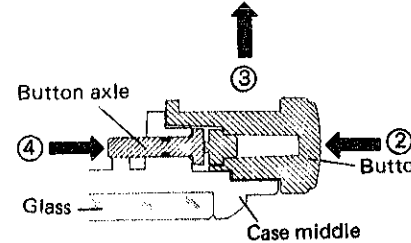
Lubricating:  Silicone grease 500,000 c.s.  
 Normal quantity



① Case back screw (3 pcs.)  
**Remarks on disassembling and reassembling**  
 Use a Philips screwdriver which fits into the groove of the screw head.  
 Be careful not to tighten the case back screws excessively. After tightening them, check that the case back is not loose.

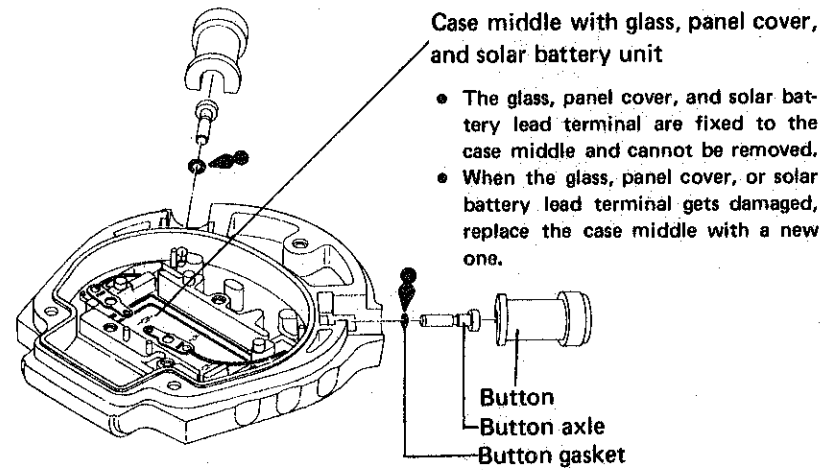
**[Disassembling procedures of the button portion]**

- ① Remove the side switch spring. (Refer to page 3.)
- ② Press the button against the case middle.
- ③ Lift up the button to disengage it from the case middle.
- ④ Push out the button axle with tweezers from the inside of the case middle to disassemble it.



**[Reassembling procedures of the button portion]**

Reassemble the button in the procedures opposite to disassembling.



Case middle with glass, panel cover, and solar battery unit

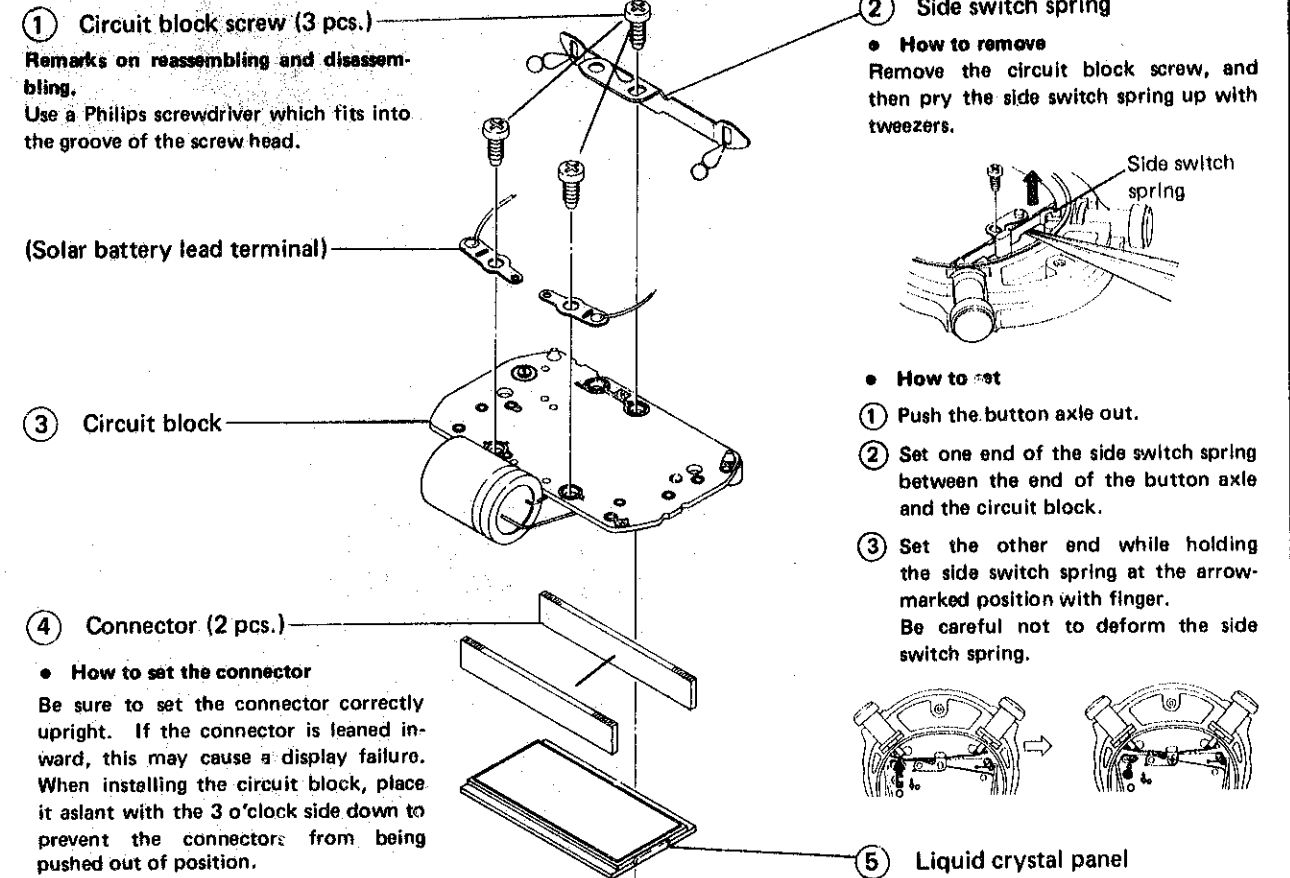
- The glass, panel cover, and solar battery lead terminal are fixed to the case middle and cannot be removed.
- When the glass, panel cover, or solar battery lead terminal gets damaged, replace the case middle with a new one.

Do not disassemble them except when they need to be replaced.  
 When they are disassembled, lubricate them.

### IV. DISASSEMBLING AND REASSEMBLING OF THE MODULE

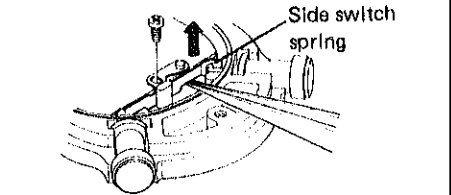
Disassembling procedures Figs. : ① → ⑤  
 Reassembling procedures Figs. : ⑤ → ①

Lubricating:  SEIKO Watch Oil S-6  
 Normal quantity



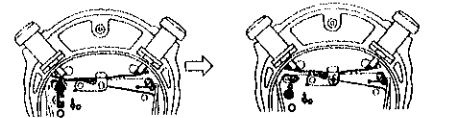
① Circuit block screw (3 pcs.)  
**Remarks on reassembling and disassembling.**  
 Use a Philips screwdriver which fits into the groove of the screw head.

② Side switch spring  
**How to remove**  
 Remove the circuit block screw, and then pry the side switch spring up with tweezers.



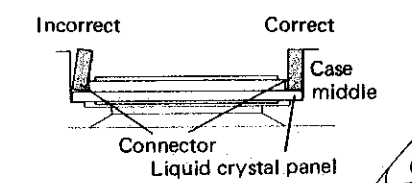
**How to set**

- ① Push the button axle out.
- ② Set one end of the side switch spring between the end of the button axle and the circuit block.
- ③ Set the other end while holding the side switch spring at the arrow-marked position with finger. Be careful not to deform the side switch spring.



③ Circuit block

④ Connector (2 pcs.)  
**How to set the connector**  
 Be sure to set the connector correctly upright. If the connector is leaned inward, this may cause a display failure. When installing the circuit block, place it aslant with the 3 o'clock side down to prevent the connectors from being pushed out of position.

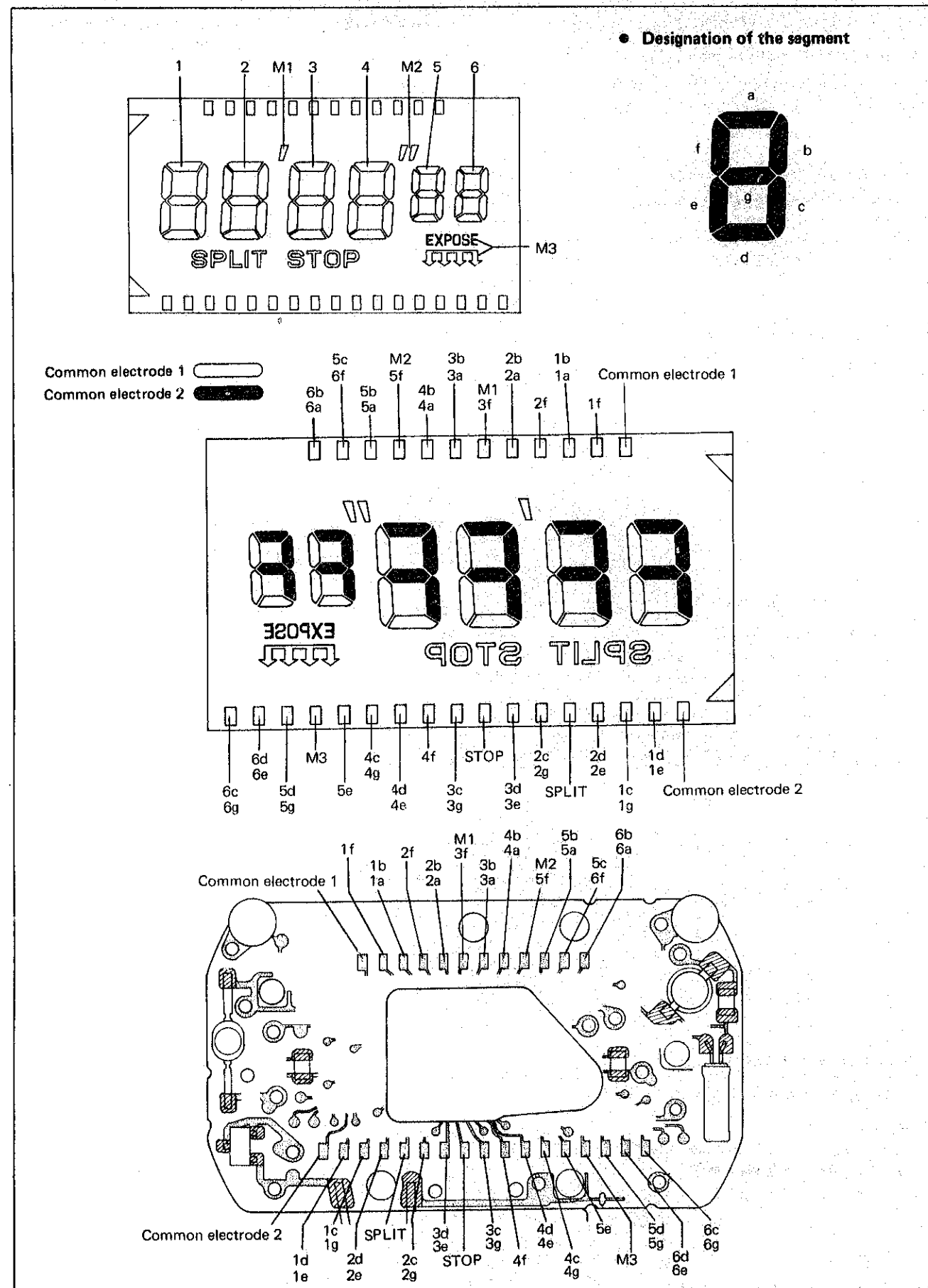


⑤ Liquid crystal panel

Solar battery lead terminal (+)  
 Solar battery lead terminal (-)

**Caution:**  
 Do not pull or bend the solar battery lead terminals (2 pcs.) excessively.

## V. RELATIONSHIP BETWEEN THE SEGMENT (LIQUID CRYSTAL PANEL ELECTRODE) AND C-MOS-LSI OUTPUT TERMINAL



## VI. CHECKING AND ADJUSTMENT

- The explanation here is only for the particular points of Cal. S025A. Refer to the "TECHNICAL GUIDE, GENERAL INSTRUCTION" for SEIKO Digital Quartz for details.

### Procedure

#### CHECK BATTERY RECHARGING CONDITION

Check to see if the solar battery can be recharged.

- Expose the solar battery to light and, referring to the table below, check to see if the display shows "00'00''00".

Type of light		Recharging time
Sunlight	Fine day	1 - 5 seconds
	Cloudy day	3 - 8 seconds
Lamp	1 m below a 40W fluorescent lamp	2 - 6 minutes

#### Result:

- Normal : Displays.  
 Defective : Does not display.  
 Check the solar battery.  
 (Replace the case middle with a new one.)

#### Note:

Do not bring the solar battery close to or leave it near a high heat generating light source, such as an incandescent lamp, for a long time. This may cause a malfunction.

#### CHECK CONTACT BETWEEN C-MOS-LSI AND LIQUID CRYSTAL PANEL

Referring to the "RELATIONSHIP BETWEEN THE SEGMENT (LIQUID CRYSTAL PANEL ELECTRODE) AND THE C-MOS-LSI OUTPUT TERMINAL", check for poor conductivity of the liquid crystal panel, connector, and C-MOS-LSI output terminal.

#### CHECK LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK

- (1) Check to see if there is any broken wire or short circuit in the liquid crystal panel.

Use the Digital Multi-Tester S-840.

Mode to be used:  $\Omega$

#### Result:

- Normal : Lights up black.  
 Defective : Does not light up.  
 Replace the liquid crystal panel with a new one.

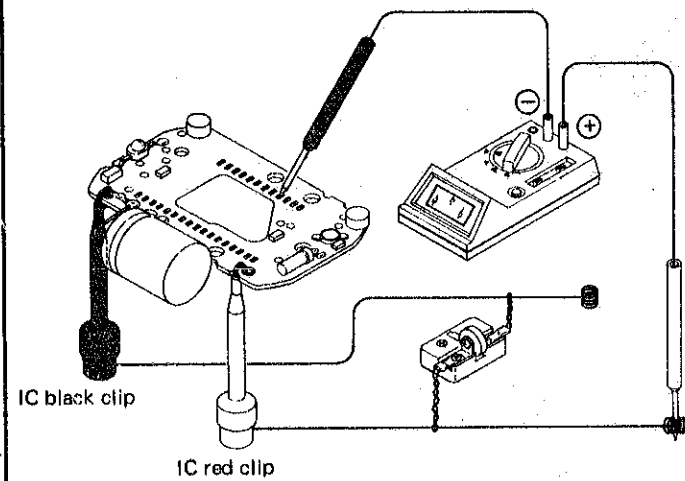
Procedure

(2) Check to see if the electric signal is correctly transmitted from the circuit block.

- Use the Digital Multi-Tester S-840.  
Mode to be used : DC V
- Current supplier S-833  
Battery voltage : 1.57V

**Result:**  
Normal : More than 1.2V  
Defective : Less than 1.2V  
Replace the circuit block with a new one.

(When the volt-ohm-meter is used for checking):  
Normal : More than 0.8V  
Defective : Less than 0.8V

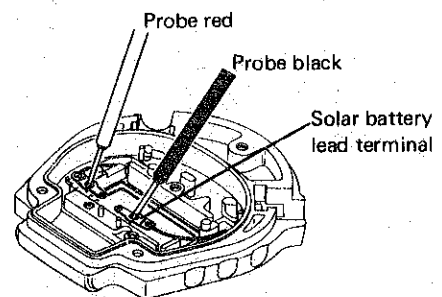


CHECK SOLAR BATTERY

Use the Digital Multi-Tester S-840.  
Mode to be used: DC V

Checking the battery voltage of the solar battery

- 1 Take out the module from the case middle.
- 2 With the case middle alone, apply the tester's probes to the solar battery lead terminals on the backside of the panel cover.



- 3 Expose the solar battery unit to light while keeping the tester's probes applied to the solar battery lead terminals.
- 4 Read the tester's value.

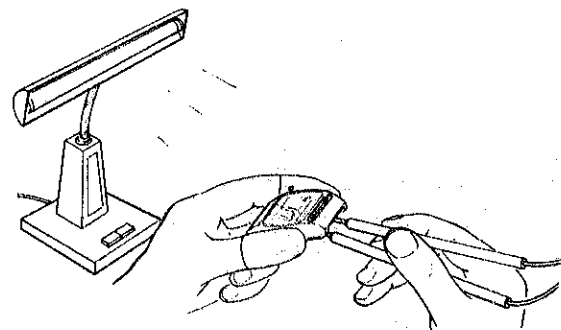
- Type of light: 20 – 40 cm below a white light fluorescent lamp

**Result:**  
Normal : More than 1.7V  
Defective : Less than 1.7V  
Replace the case middle (solar battery) with a new one.

(When the volt-ohm-meter is used for checking, the same value is obtained.)

Notes:

- Be careful not to allow your hand's shadow to be cast on the solar battery face.
- Wipe off stains on the glasses.



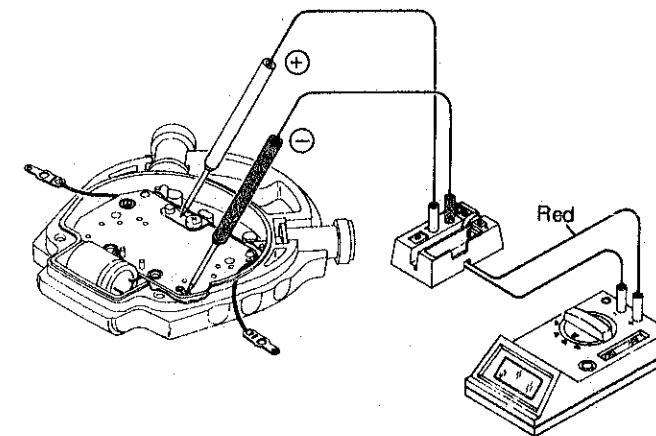
Procedure

CHECK CURRENT CONSUMPTION

- Use the Digital Multi-Tester S-840 with the Multi-Adapter MA-40.  
Mode to be used:  $\mu A$   
Battery voltage : 1.57V
- Before starting measuring, press the reset switch to reset the display to "00.0 $\mu A$ ".

(1) Current consumption for the whole of the module

Apply the probes to the input terminals of the circuit block, referring to the figure of the circuit block (front) on page 1.



Result:

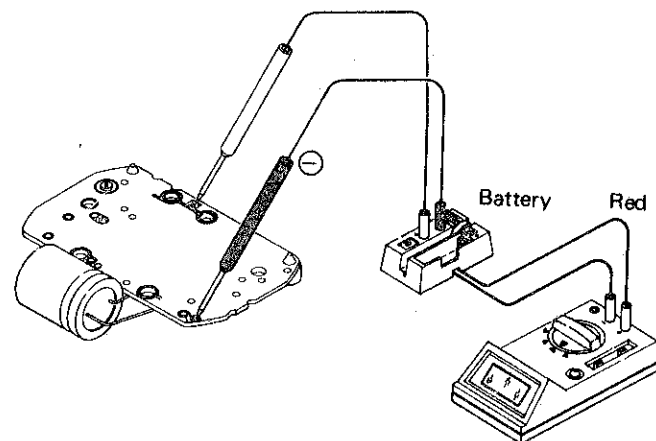
[While the stopwatch is functioning]

Normal : Less than 14.0 $\mu A$   
Defective : More than 14.0 $\mu A$   
Replace the circuit block or liquid crystal panel with a new one.

[When the watch display is reset to "00 00 00"]

Normal : Less than 6.0 $\mu A$   
Defective : More than 6.0 $\mu A$   
Replace the circuit block or liquid crystal panel with a new one.

(2) Current consumption for the circuit block alone



Result:

Normal : Less than 5.0 $\mu A$   
Replace the liquid crystal panel with a new one.  
Defective : More than 5.0 $\mu A$   
Replace the circuit block with a new one.

CHECK ACCURACY

Caution:

- Since the solar battery is shut off from light while measuring, the display will become dim after 1 to 2 minutes.  
Repeat exposing the solar battery to light when adjusting or measuring time accuracy.
- Since the outside diameter of the watch is large, the segment to be detected may slip off from the sensory part of the quartz tester microphone.

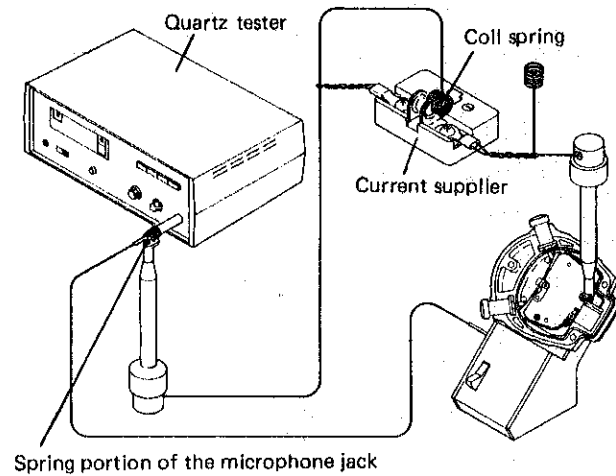
Procedure

Make sure to follow either method of measuring as below, or the daily rate will be less accurate, thereby putting the measured value into disorder.

Measuring time accuracy

• With the case back removed

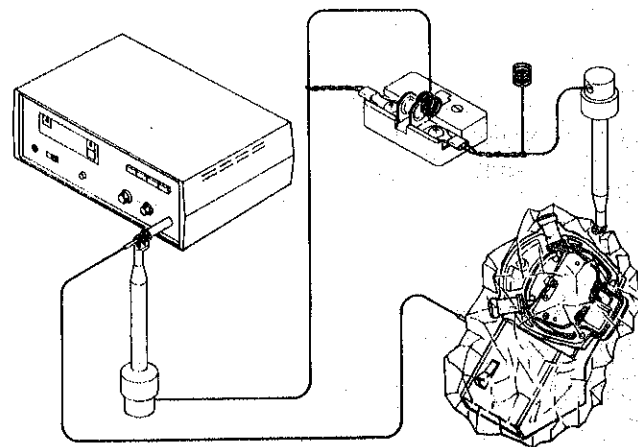
Use the current supplier S-833 or the Digital Multi-Tester in conjunction with the quartz tester and microphone.



- 1 Remove the battery from the current supplier and connect the lead wire with coil spring to the other connection of the battery.
- 2 Have an IC clip clasp the spring portion of the microphone jack, and connect the other IC clip to the (+) side of the electrolytic condenser.

\*The Digital Multi-Tester's probes can also be used in the like manner instead of the current supplier.

• With the watch complete



[Using aluminum foil]

- 1 Cover the watch and the microphone with aluminum.
- 2 Check conductivity between the aluminum foil and the microphone's spring portion, using the current supplier S-833.

\*If the daily rate does not become stable through the above methods, turn the level control knob of the quartz tester.

CHECK FUNCTIONING

Exposing the solar battery to light, check to see if the start, stop, split, split release, and reset of the stopwatch are correctly activated.

Procedure

CHECK CONDUCTIVITY OF SWITCH COMPONENTS

- Check that the side switch spring touches the circuit block electrode when the button is pressed and that there is clearance between them when the button is released.
- Check that the right and left buttons click to the same degree when the buttons are pushed in.

Result:

Normal : Functions correctly.

Defective : Does not function correctly.

Replace the side switch spring with a new one.

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