

TECHNICAL GUIDE

SEIKO DIGITAL QUARTZ

CAL. A628A

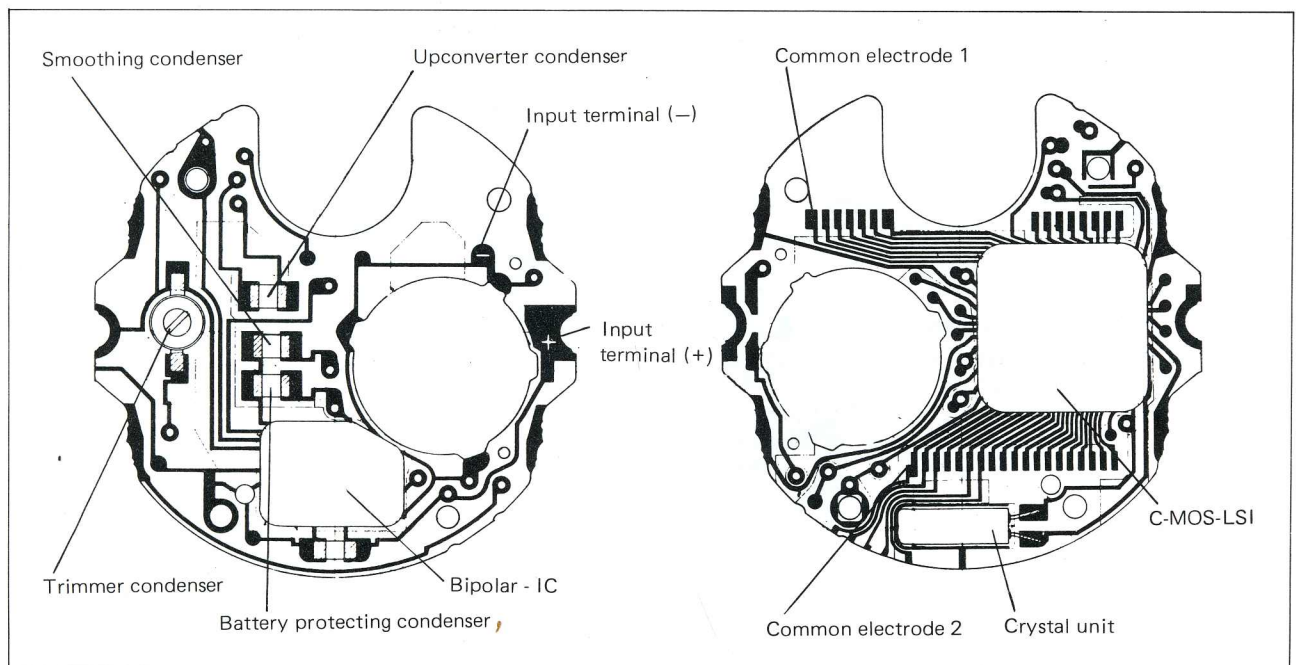


I. SPECIFICATIONS	1
II. STRUCTURE OF THE CIRCUIT BLOCK	1
III. DISASSEMBLING, REASSEMBLING AND LUBRICATING	2
1. Disassembling, reassembling and lubricating of the case	2
2. Disassembling and reassembling of the module	4
IV. CHECKING AND ADJUSTMENT	6
• Check recharging condition	6
• Check secondary battery	6
• Check solar battery	7
• Check battery conductivity	8
• Check contact between C-MOS-LSI and liquid crystal panel	8
• Check liquid crystal panel and circuit block	8
• Check current consumption	9
• Check accuracy	9
• Check alarm test system	9
• Check conductivity of switch components	10
• Check speaker block	10
• Check bulb condition	10
• Check functioning and adjustment	10

I. SPECIFICATIONS

Item	Cal. No.	A628A
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 and calendar function • Alarm function • Stopwatch function
Additional mechanism		<ul style="list-style-type: none"> • Alarm test system • Time signal
Loss/gain		Loss/gain at normal temperature range Monthly rate: less than 15 seconds (Annual rate: less than 3 minutes)
Casing diameter		φ27.0 mm
Height		4.7 mm without battery
Regulation system		Trimmer condenser
Measuring gate by Quartz Tester		Any gate is available.
Battery		Primary battery (solar battery): Silicon solar cell Secondary battery: Maxell XR9527W Battery life is approximately 7 years. Voltage: 1.55V

II. STRUCTURE OF THE CIRCUIT BLOCK



III. DISASSEMBLING, REASSEMBLING AND LUBRICATING


1. Disassembling, reassembling and lubricating of the case

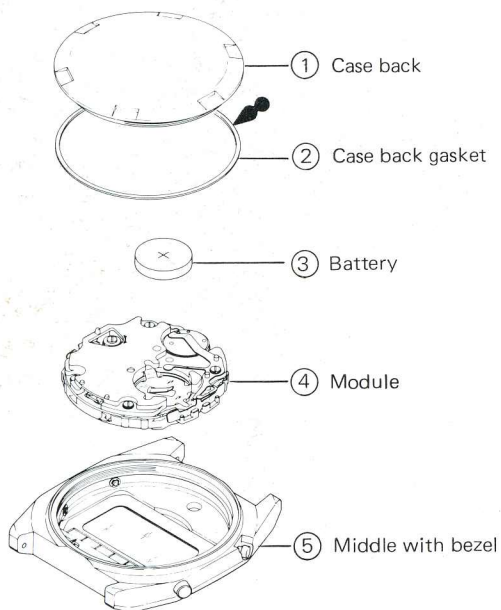
Disassembling procedures Figs.: ① - ⑤

Reassembling procedures Figs.: ⑤ - ①

Lubricating:

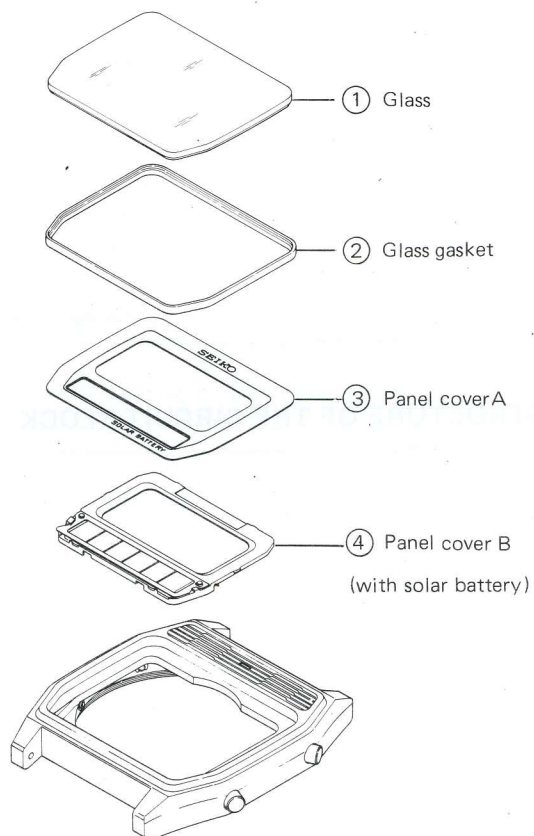
Silicone grease 500,000 c.s.

Normal quantity 



Solar battery and its attached parts

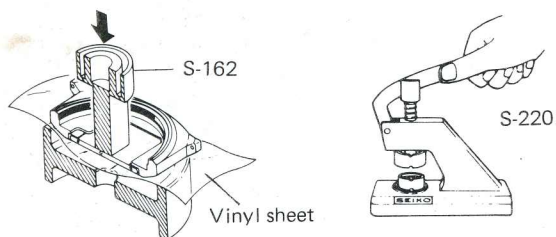
* It is not necessary to disassemble them except the parts are required to be replaced.



• How to disassemble the glass

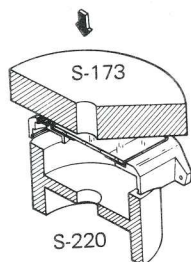
Push the glass directly with the inserting disk S-162 so as not to touch the panel cover as shown in the illustration below and disassemble it.

* Be sure to use the supporting disk with the inside diameter which allows to support the middle with bezel without touching the glass.



• How to reassemble the glass

Push the glass in level with the inserting disk S-173.

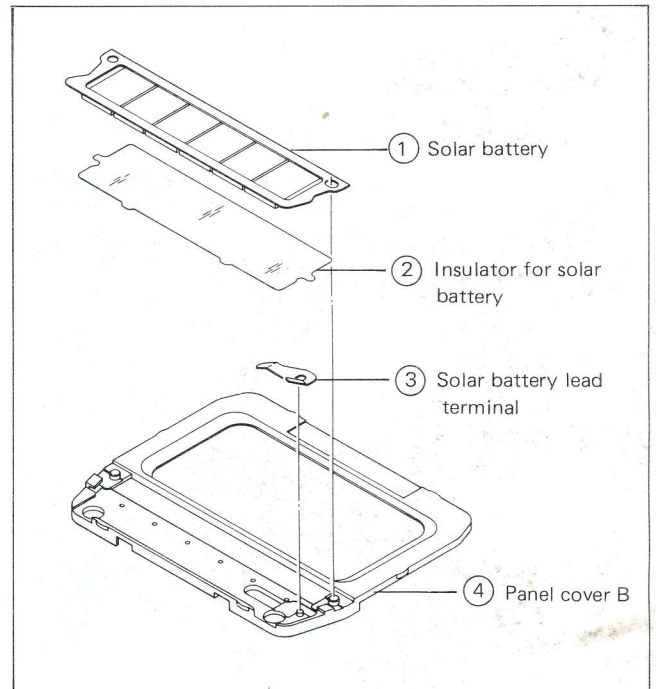


(The diameter of the disk may differ model by model)

Replacement of the solar battery

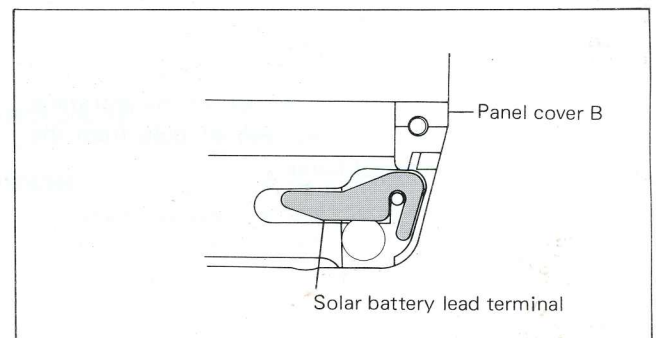
• How to disassemble

Lift up the middle of the solar battery at the edge with tweezers and disassemble it.

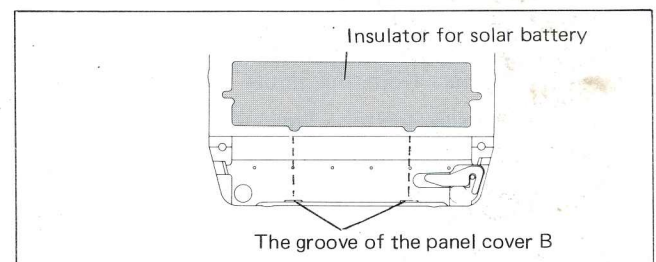


• How to reassemble

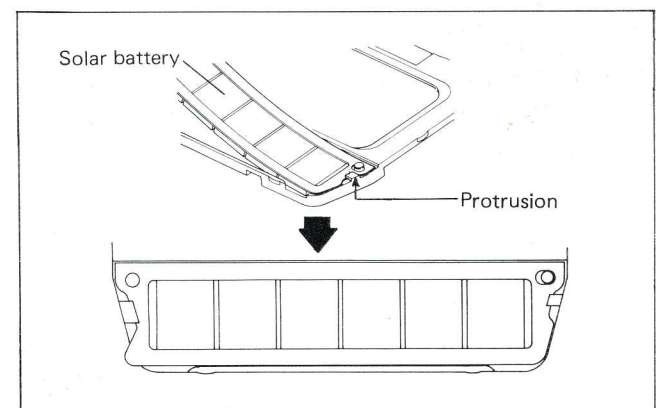
- ① Set the solar battery lead terminal to the panel cover B.



- ② Set the insulator for solar battery.
Be sure to put the protrusion of the insulator for solar battery into the groove of the panel cover B.



- ③ Set the solar battery.
First put one side of the solar battery on the solar battery lead terminal and then slip it under the protrusion of the panel cover B.
*When handling the solar battery, be careful not to make scratches on it.



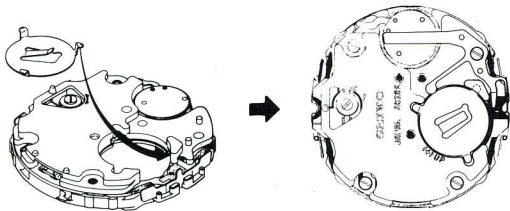
2. Disassembling and reassembling of the module

Disassembling procedures Figs.: ① - ⑩

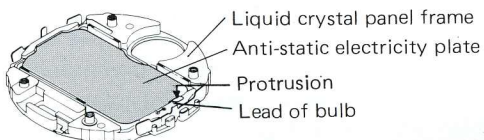
Reassembling procedures Figs.: ⑩ - ①

Use the inserting disk S-173 as the module holder. Be sure to use the inserting disk so that it may not touch the speaker pipe.

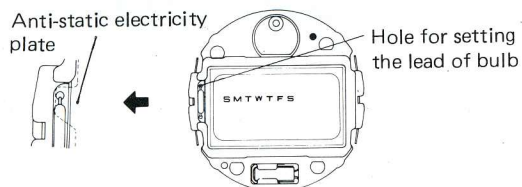
- ⑦ How to reassemble the battery connection (-)
Put one of the three protrusions of the battery connection (-) in between the battery guard and the circuit block, and set the other two protrusions in place.
Reassemble the battery connection insulator in the same manner as for the battery connection (-).



- ⑩ Anti-static electricity plate
Set the anti-static electricity plate on the reflecting mirror. Set the protrusion of the anti-static electricity plate on the lead of bulb from the liquid crystal panel frame.



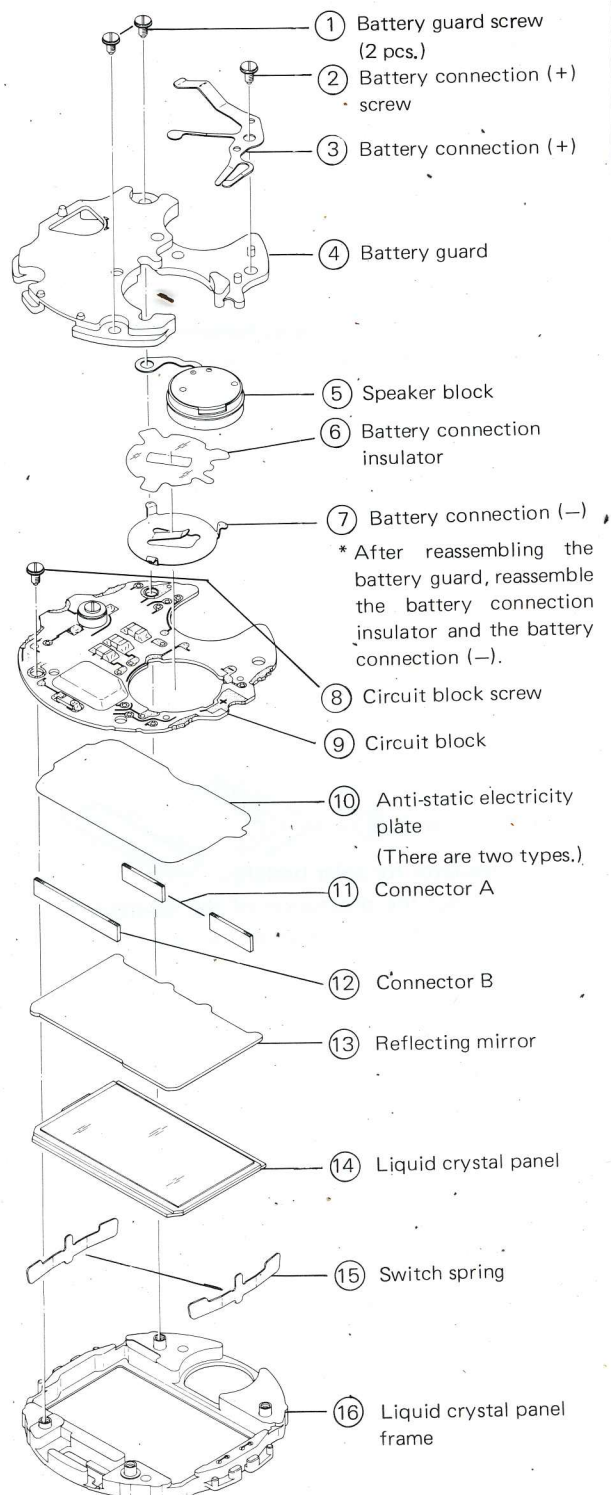
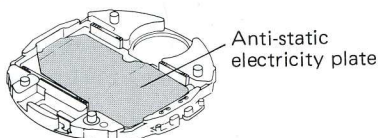
After reassembling the module, check to see if the anti-static electricity plate is set correctly to be seen through the hole for setting the lead of bulb, when viewed from the liquid crystal panel side.



* If the anti-static electricity plate is not set correctly, a short, etc., may be caused.

Some anti-static electricity plates have a shape (with no portion covering the lead of bulb) as illustrated below.

For these plates, set them inside the liquid crystal panel frame.



* After reassembling the battery guard, reassemble the battery connection insulator and the battery connection (-).

IV. CHECKING AND ADJUSTMENT

Refer to the "SEIKO QUARTZ TECHNICAL GUIDE GENERAL INSTRUCTION" for digital watches for details.

Procedure

CHECK RECHARGING CONDITION

- When the display is not shown or when the entire digits disappear or become dim with the light lit, the cause might be a poor voltage. Recharge the watch with the battery set by exposing the watch face to the direct sunlight for about 4 ~ 6 minutes. And if the watch is kept in a place that may shield it from light for a long time, it is necessary to make a checking after recharging in the same manner as the above.

Result:

The watch functions correctly

Insufficient charging

Recharge the secondary battery according to the "Recharging time".

The watch does not function correctly

Proceed to check as follows:

(1) Check solar battery

In case solar battery is normal — proceed to (2).

In case solar battery is defective — replace solar battery.

(2) Check secondary battery voltage

In case secondary battery is normal — replace circuit block.

In case secondary battery is defective — replace secondary battery.

[Recharging time]

Type of light	To operate the watch one day	To operate the watch one month
Direct sunlight (Clear day)	4 to 6 minutes	2 to 3 hours
Outside on a cloudy day	8 to 16 minutes	4 to 6 hours
On the window sill (Clear day)	30 minutes	15 hours

* Do not recharge the secondary battery with the light that has an extremely high temperature such as light bulbs that may cause the watch to malfunction.

* When recharging under the direct sunlight, be sure to set the watch at a place where there is sufficient air circulation so that it may not heat up excessively.

* When an malfunction probably resulted from an insufficient charging, instruct your customer to observe the following.

- ① Be sure to recharge the secondary battery daily by exposing the watch face to the direct sunlight in order to keep its charge.
- ② Be careful not to keep the watch in a place that may shield it from light for a long time (cabinet, drawer of a desk, etc.)

CHECK SECONDARY BATTERY VOLTAGE

Check the secondary battery voltage after checking recharging condition.

Result:

More than 1.5V: Normal

Less than 1.5V: Defective

Check the solar battery.

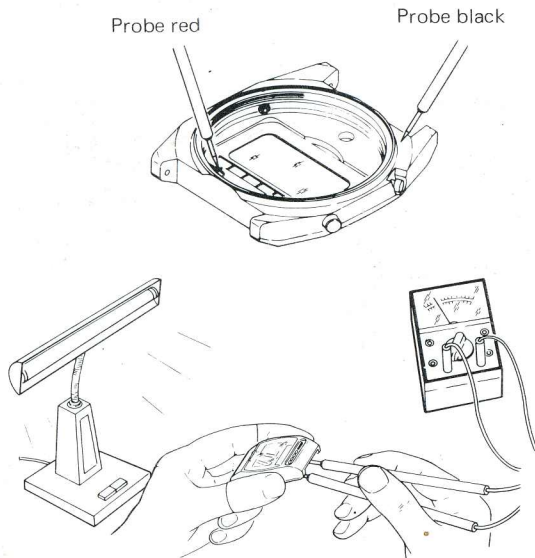
When the solar battery is normal, replace the secondary battery with a new one.

Procedure

CHECK SOLAR BATTERY

1. Check to see if the solar battery functions correctly.

- With the case alone, apply the probe of the Volt-ohm-meter to the solar battery lead terminal in the backside of the panel cover and check the swing of the pointer.



Type of light: Direct sunlight or white fluorescent lamp

Range to be used: DC 3V or DC 6V

- The swinging range of the pointer will vary depending on the power of and distance from a light source.
- Do not check with a high-temperature light source such as light bulbs.

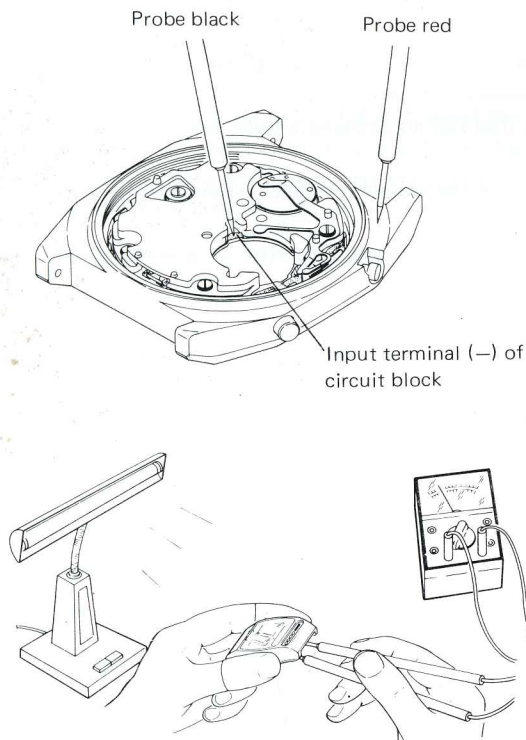
Result:

The pointer swings: Normal

The pointer does not swing: Defective

Replace the solar battery with a new one.

2. Check to see if the recharging circuit from the solar battery to the secondary battery functions correctly.



- Remove the secondary battery, the battery connection insulator and the battery connection (-) from the module and apply the probes of the Volt-ohm-meter to the module and the middle with bezel as shown in the illustration on the left.
- In this condition, expose the glass side to the light source and check to see if the pointer of the Volt-ohm-meter swings.

Note: Be careful not to shadow the solar battery side by your hand, and be sure to wipe the glass clean.

Result:

The pointer swings: Normal

The pointer does not swing: Defective

Replace the circuit block with a new one.

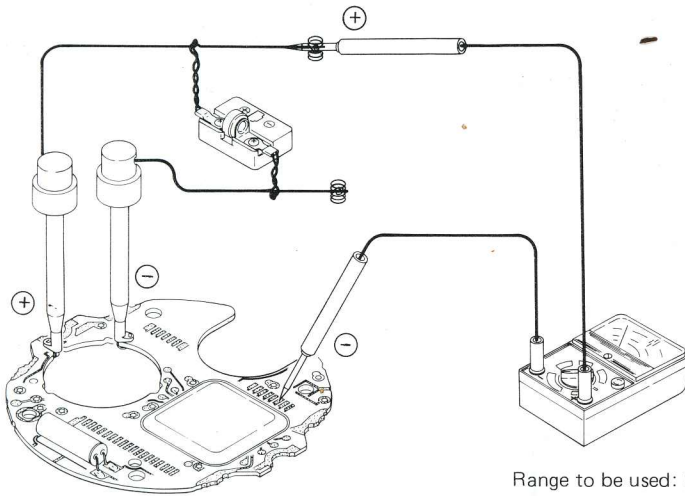
Procedure

CHECK BATTERY CONDUCTIVITY

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


CHECK LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK

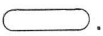
- Check the output voltage of the circuit block.

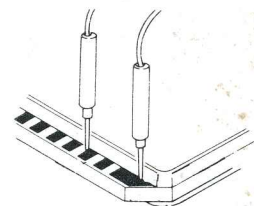
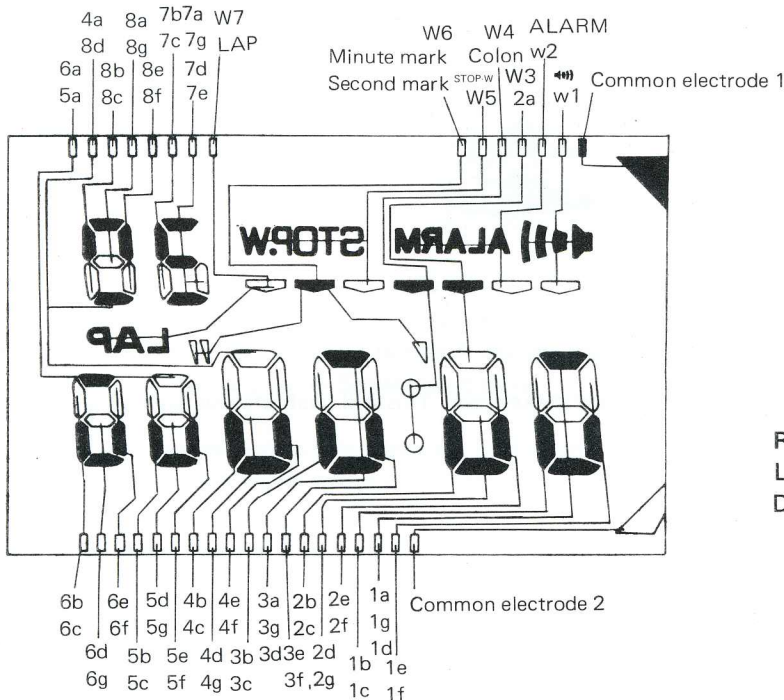


Result:
 More than 0.8V: Normal
 Less than 0.8V: Defective
 Replace the circuit block with a new one.

- Check for any broken wire, short circuit, etc., in the liquid crystal panel.

Common electrode 1 is electrically connected with segments .

Common electrode 2 is electrically connected with segments .

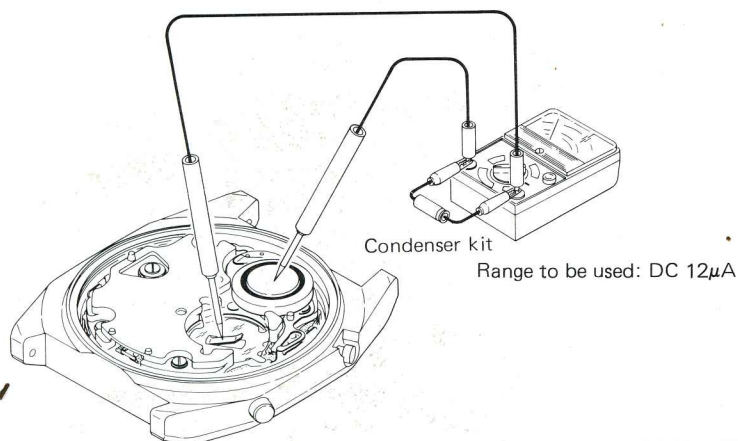


Result:
 Light up: Normal
 Do not light up: Defective
 Replace the liquid crystal panel with a new one.

Procedure

CHECK CURRENT CONSUMPTION

- (1) Check the current consumption for the whole of the module.

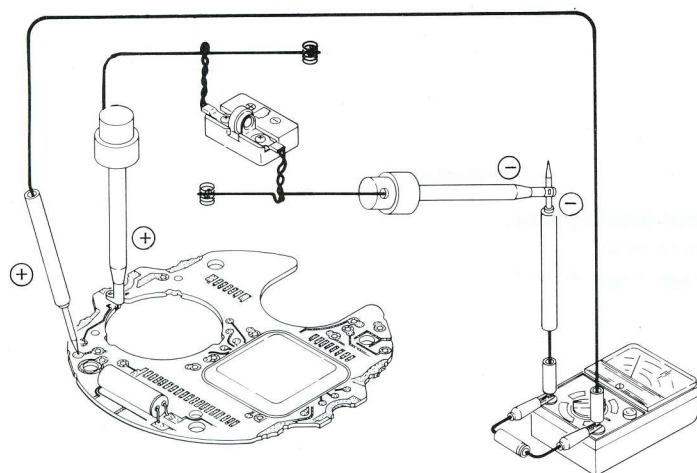


Result:

Less than 2.3 μ A: Normal
More than 2.3 μ A: Defective
Replace the liquid crystal panel or circuit block with a new one.
Proceed to (2).

* Since the watch uses a special IC, the pointer of the Volt-ohm-meter may swing unstably when checking. Read the intermediate value or use the condenser kit for checking the current consumption.

- (2) Check the current consumption of the circuit block alone.



Result:

Less than 2.0 μ A:
Replace the liquid crystal panel with a new one.
More than 2.0 μ A:
Replace the circuit block with a new one.

CHECK ACCURACY

- Change the mode to the stopwatch function and make reset. This will facilitate checking accuracy.

CHECK ALARM TEST SYSTEM

In the time and calendar display, each-depression of button C will make the colon flash and light up alternately. With the colon lit, depress button C and the alarm will ring.

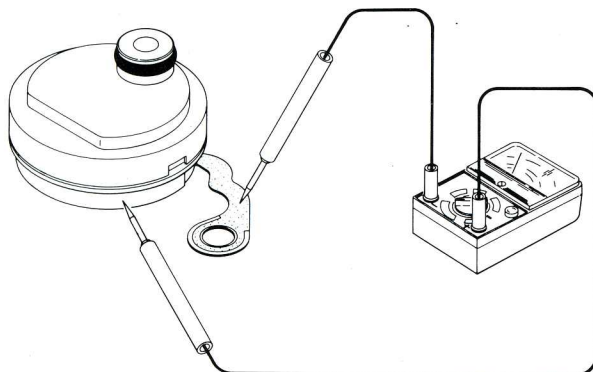
Procedure

CHECK CONDUCTIVITY OF SWITCH COMPONENTS

CHECK SPEAKER BLOCK

Check to see if there is any broken coil wire or short circuit in the speaker block.

Range to be used: OHMS R x 1



Result:

120Ω ~ 140Ω: Normal

Less than 120Ω
(Short circuit)

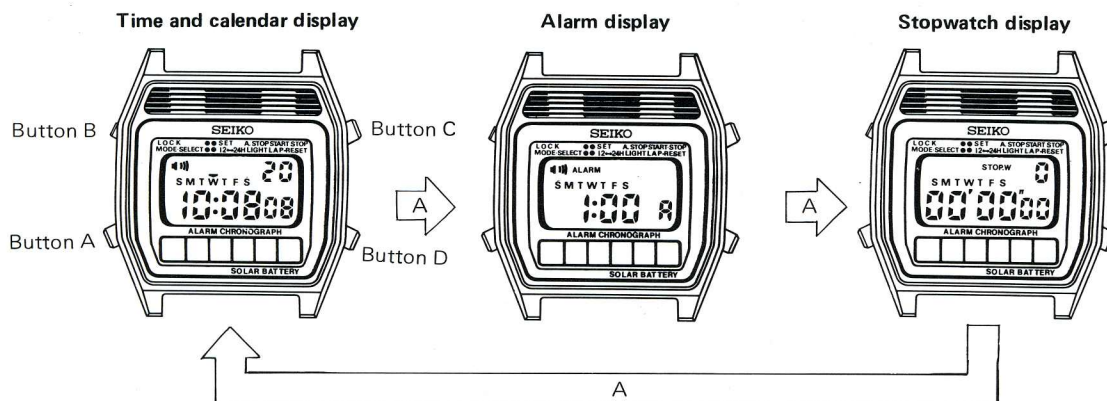
More than 140Ω
(Broken wire)

Defective

Replace the speaker block with a new one.

CHECK BULB CONDITION

CHECK FUNCTIONING AND ADJUSTMENT



- Check to see if each depression of button A changes the display in the following order: Time and calendar display → Alarm display → Stopwatch display.
- Check to see if when button B is depressed in the time and calendar display or alarm display, the time and calendar setting or alarm time setting is activated and the display starts flashing.
- Check to see if when button A is depressed in the time and calendar setting or alarm time setting, the digit to be set changes and if when button C is depressed, the digit advances one by one.
- Check to see if when button C is depressed in the stopwatch display, the start/stop is activated and when button D is depressed, the lap/reset is activated.

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