

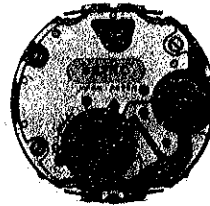
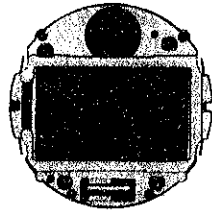
**SEIKO**

**DIGITAL QUARTZ**

**Cal. A628A**

**PARTS  
CATALOGUE**

# Cal. A628A



4001 242



4025 240



4216 240



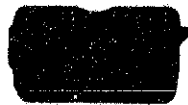
4219 240



4242 240



4245 244



4257 002



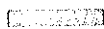
4270 240



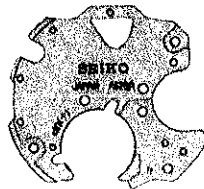
4271 240



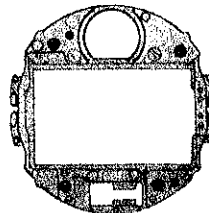
4313 240



4313 241



4398 257



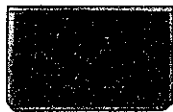
4398 258



4398 264



☆4398 265



4510 341



4521 240



4530 010



4580 249



☆4580 250



4991 237



☆4991 239



☆MaxellXR9527W

<b>T</b>	<b>L</b>	<b>A</b>	
012 178	017 230	017 272	2/1

# Cal. A628A

## Characteristics

Casing diameter :  $\phi$  27.0 mm  
 Maximum height : 4.7 mm without battery  
 Frequency of quartz crystal oscillator : 32,768 Hz (Hz = Hertz . . . . Cycles per second)  
 Time and calendar display : Digital Display System showing hour, minute, second, month, date and day of the week.  
 Alarm display : Can be set to operate at any desired hour and minute.  
 Stopwatch display : Digital Display System showing 12-hours, minute, second and 1/100 second.  
 Display medium : Nematic Liquid Crystal, FE-Mode.  
 Time signal : Can be set to ring every hour on the hour.  
 Regulation system : Trimmer condenser  
 Illuminating light : Illuminates the display in the dark by depressing the light button.

PART NO.	PART NAME	PART NO.	PART NAME
4001 242	Circuit block		
4025 240	Solar battery		
4216 240	Insulator for solar battery		
4219 240	Battery connection insulator		
4242 240	Solar battery lead terminal		
4245 244	Switch spring		
4257 002	Anti-magnetic shield plate		
4270 240	Battery connection (-)		
4271 240	Battery connection (+)		
4313 240	Connector A		
4313 241	Connector B		
4398 257	Battery guard		
4398 258	Liquid crystal panel frame		
4398 264	Speaker block frame		
☆4398 265			
4510 341	Liquid crystal panel		
4521 240	Reflecting mirror		
4530 010	Bulb		
4580 249	Speaker block		
☆4580 250			
4991 237	Speaker gasket		
☆4991 239			
012 178	Battery connection (+) screw		
012 178	Battery guard screw		
012 178	Circuit block screw		
017 230	Tube for battery guard screw B		
017 272	Tube for battery guard screw A		
☆Maxell XR9527W	Silver oxide battery (Secondary battery)		

### Remarks :

#### Speaker block frame, Speaker block, Speaker gasket

- ☆4398 265 } The parts designated with these parts numbers are manufactured specially for the water  
 ☆4580 250 } .....resistant case of a pressure of 10 atmospheres (100 meters or 300 feet).  
 ☆4991 239 } Be sure to use these parts for maintaining high water resistant quality.

#### Battery

- ☆Maxell XR9527W.....This battery is specially produced as secondary rechargeable battery for the solar battery.  
 Be sure to use the battery Maxell XR9527W when replacing the battery with a new one.

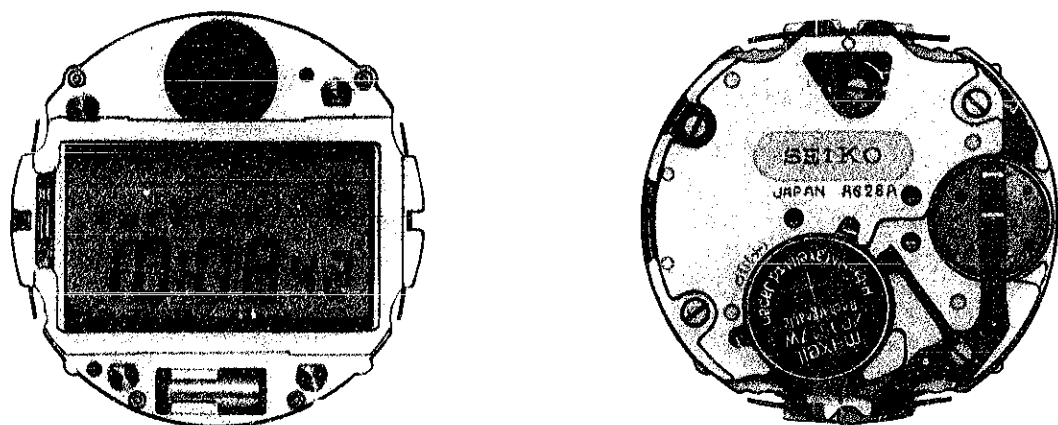
☆ □ Please see remarks.

Part numbers in light letters are not shown in photos.

# TECHNICAL GUIDE

## SEIKO DIGITAL QUARTZ

CAL. A628A

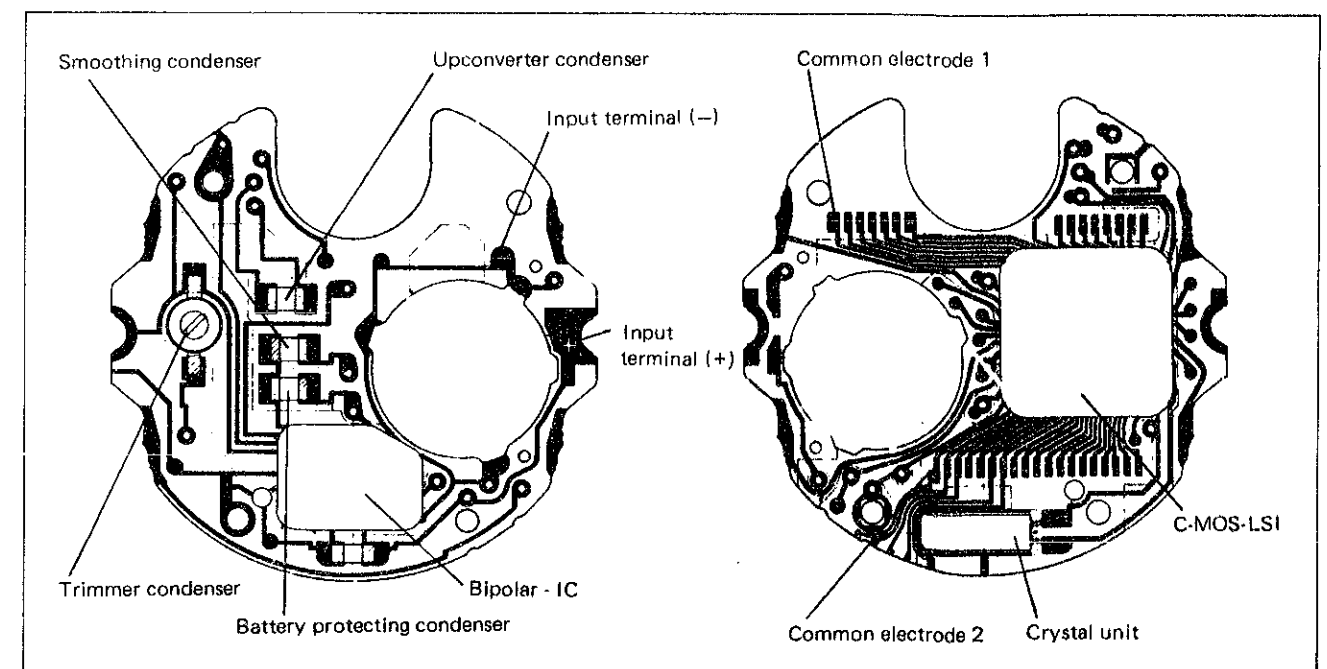


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## I. SPECIFICATIONS

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"> <li>• Time and calendar function</li> <li>• Alarm function</li> <li>• Stopwatch function</li> </ul>
Additional mechanism		<ul style="list-style-type: none"> <li>• Alarm test system</li> <li>• Time signal</li> </ul>
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: 1.55 V

## II. STRUCTURE OF THE CIRCUIT BLOCK



### III. DISASSEMBLING, REASSEMBLING AND LUBRICATING


#### 1. Disassembling, reassembling and lubricating of the case

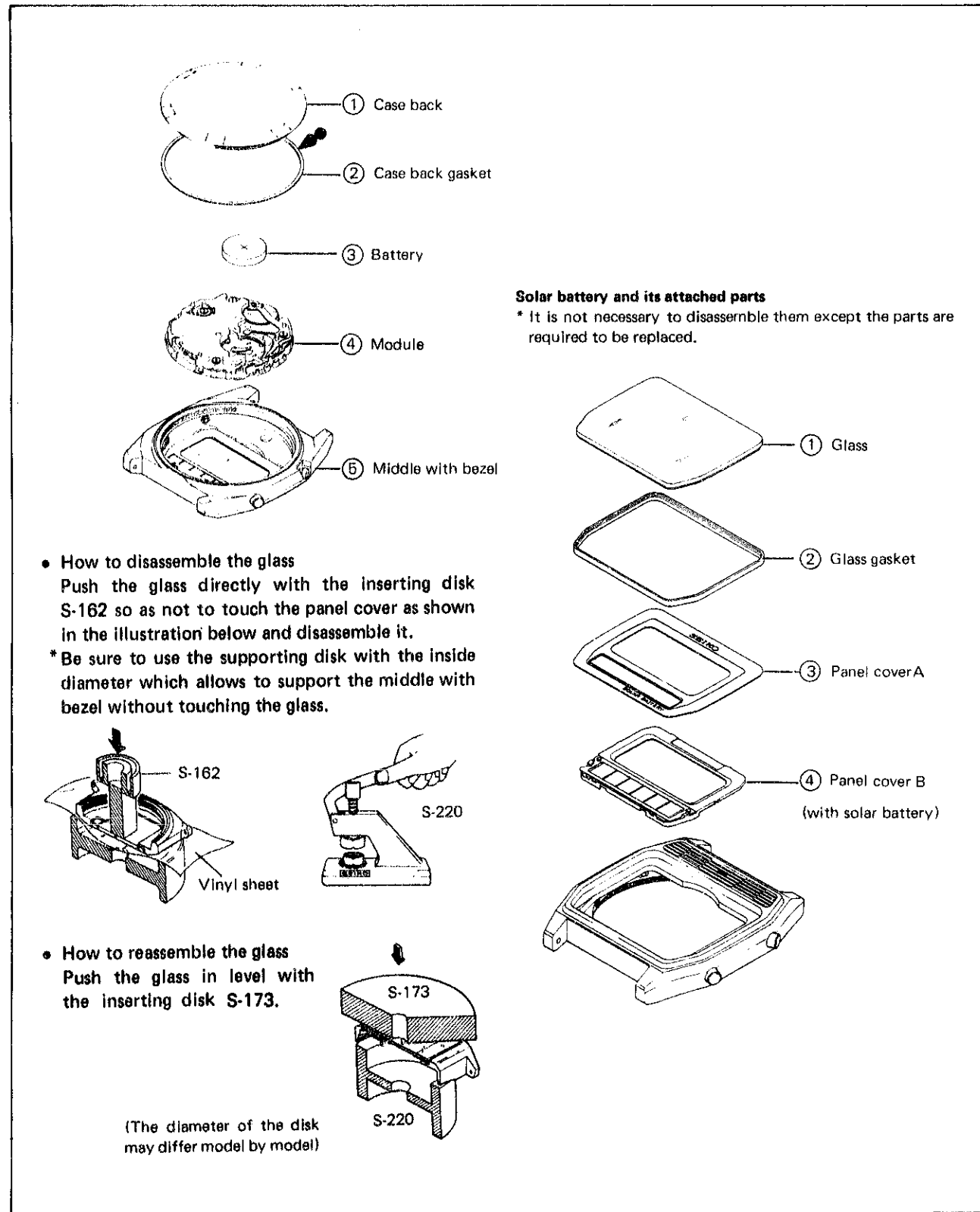
Disassembling procedures Figs.: ① - ⑤

Reassembling procedures Figs.: ⑤ - ①

Lubricating:

Silicone grease 500,000 c.s.

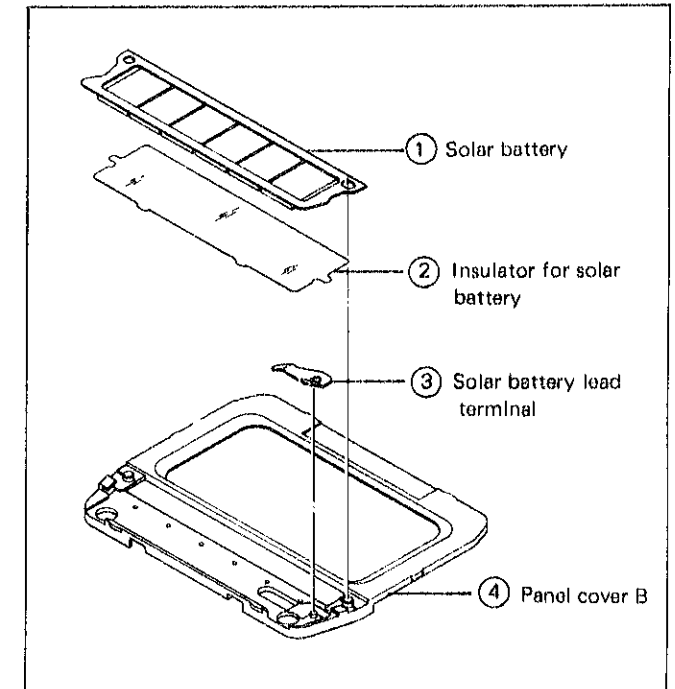
Normal quantity 



#### Replacement of the solar battery

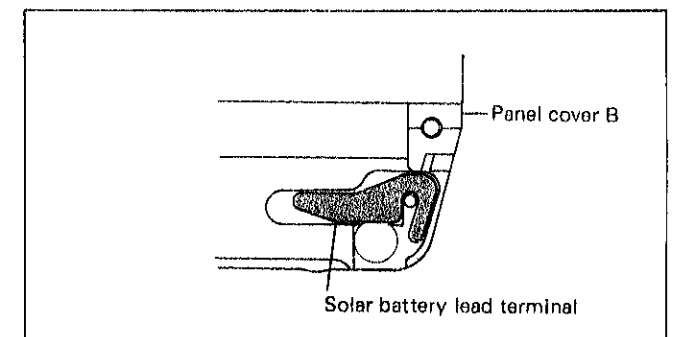
• How to disassemble

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

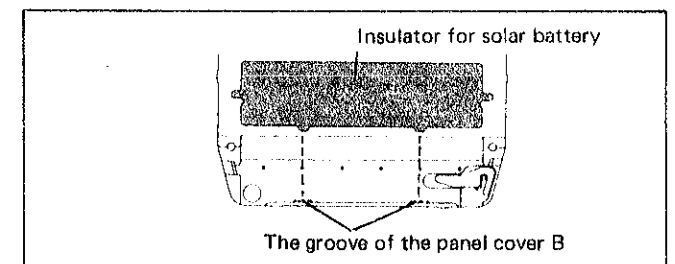


• How to reassemble

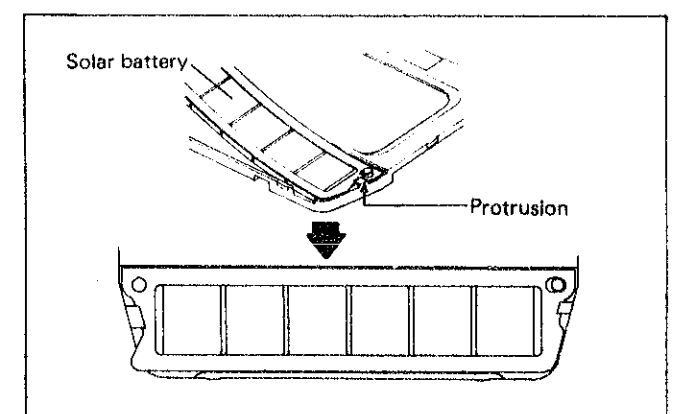
① Set the solar battery lead terminal to the panel cover B.



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.



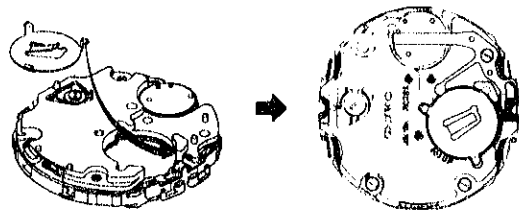
## 2. Disassembling and reassembling of the module

Disassembling procedures Figs.: ① - ⑩

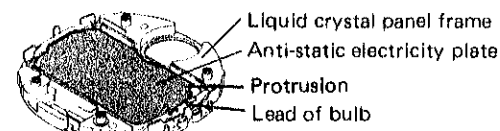
Reassembling procedures Figs.: ⑩ - ①

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.

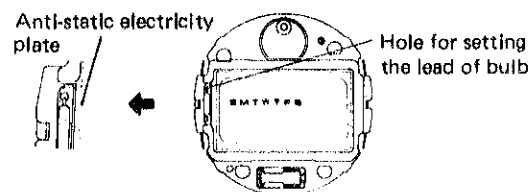
- ⑦ How to reassemble the battery connection (-)  
Put one of the three protrusions of the battery connection (-) in between the battery guard and the circuit block, and set the other two protrusions in place.  
Reassemble the battery connection insulator in the same manner as for the battery connection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



- 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.



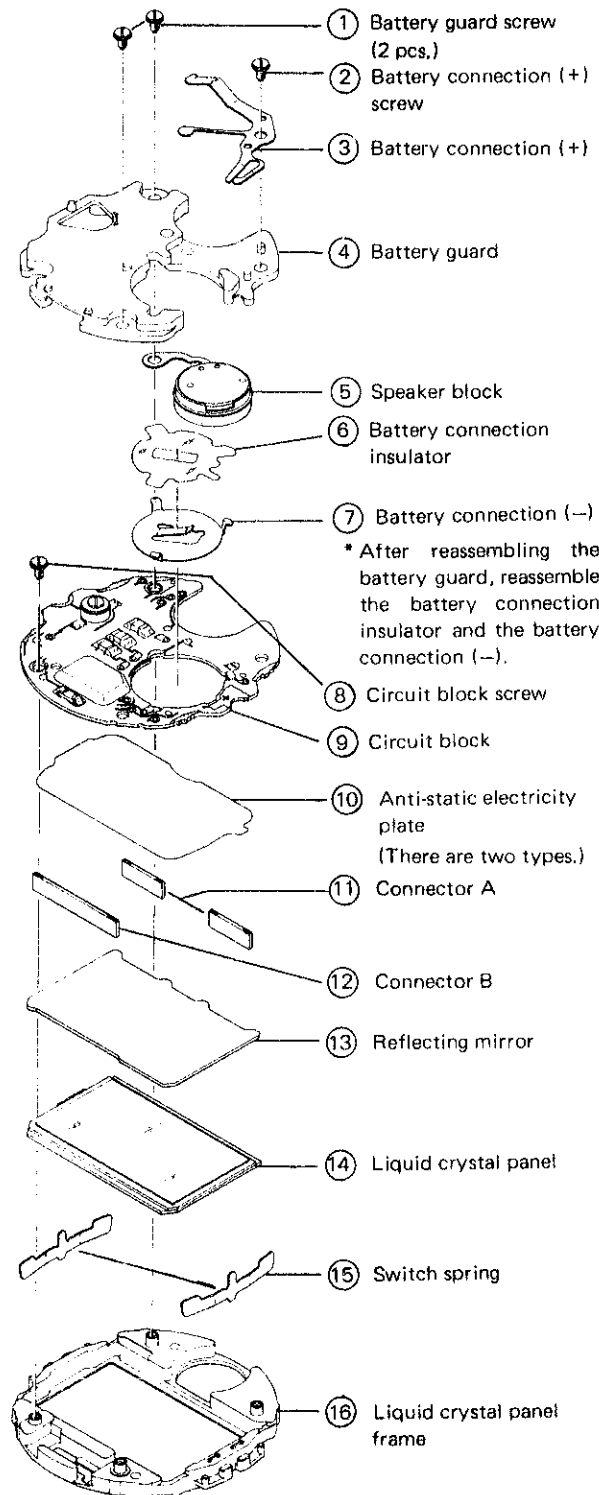
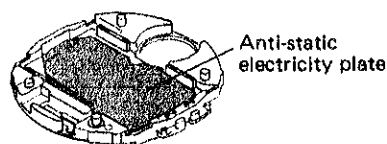
After reassembling the module, check to see if the anti-static electricity plate is set correctly to be seen through the hole for setting the lead of bulb, when viewed from the liquid crystal panel side.



\* 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.



## 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:

- Check solar battery  
In case solar battery is normal -- proceed to (2).  
In case solar battery is defective -- replace solar battery.
- 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.

- Be sure to recharge the secondary battery daily by exposing the watch face to the direct sunlight in order to keep its charge.
- 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.

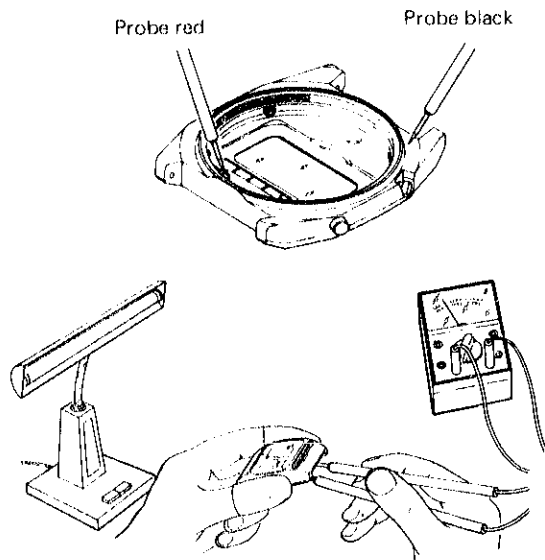
When the solar battery is normal, replace the secondary battery with a new one.

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.

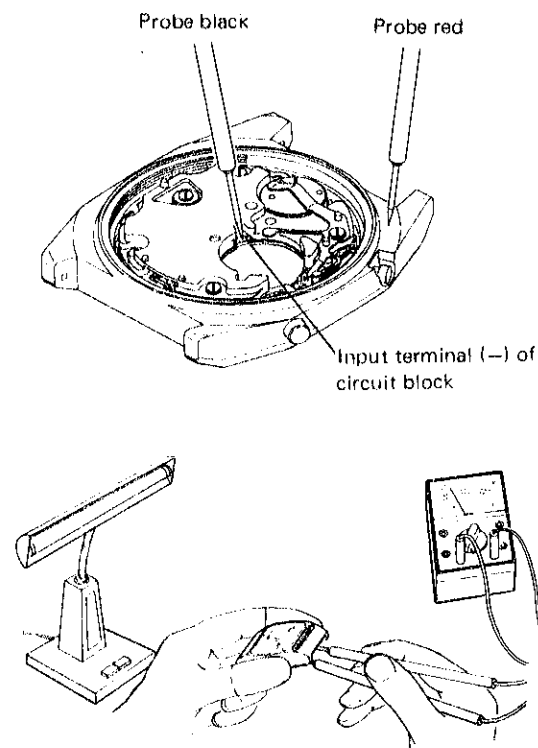


Type of light: Direct sunlight or white fluorescent lamp  
Range to be used: DC 3V or DC 6V

- 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.

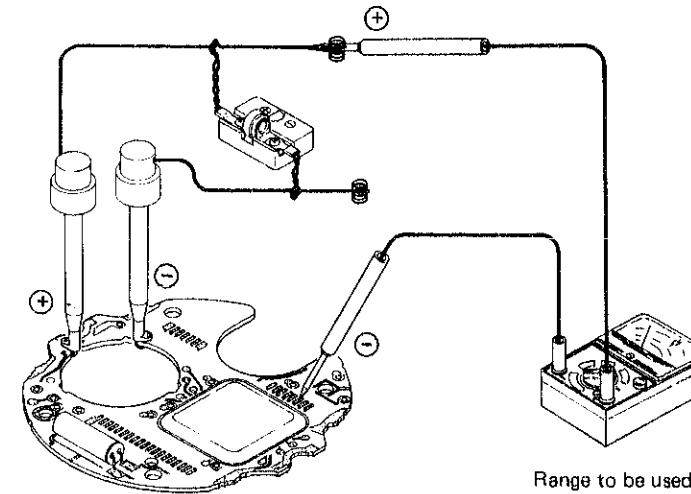
Procedure

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.



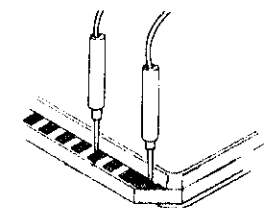
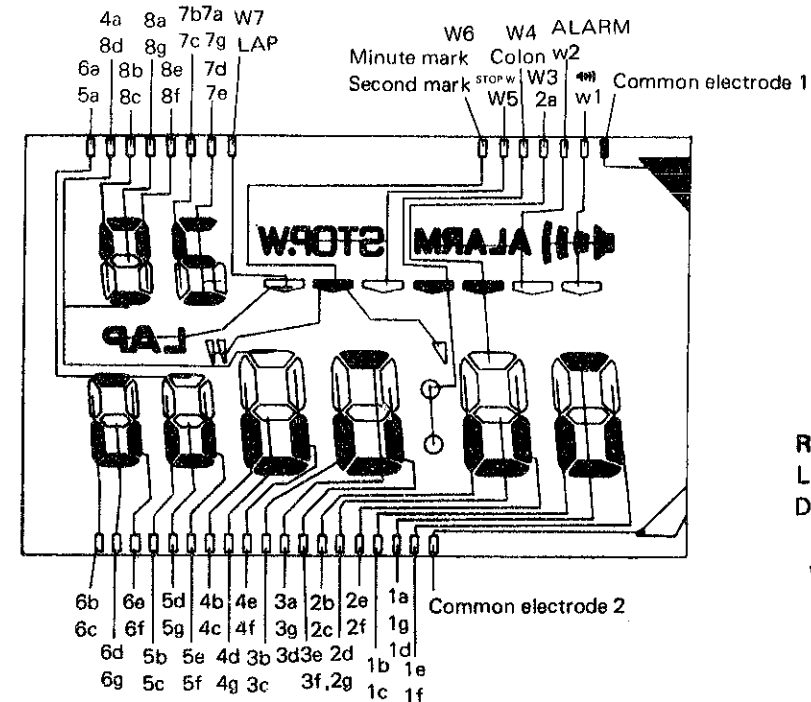
**Result:**  
More than 0.8V: Normal  
Less than 0.8V: Defective  
Replace the circuit block with a new one.

Range to be used: DC 3V

- 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 .



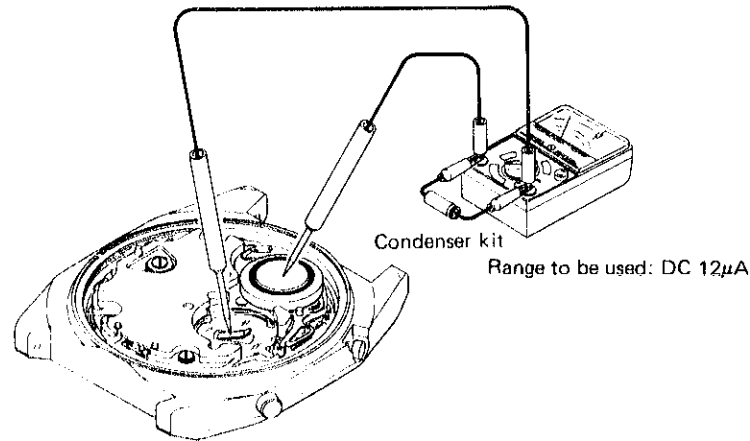
**Result:**  
Light up: Normal  
Do not light up: Defective  
Replace the liquid crystal panel with a new one.



Procedure

CHECK CURRENT CONSUMPTION

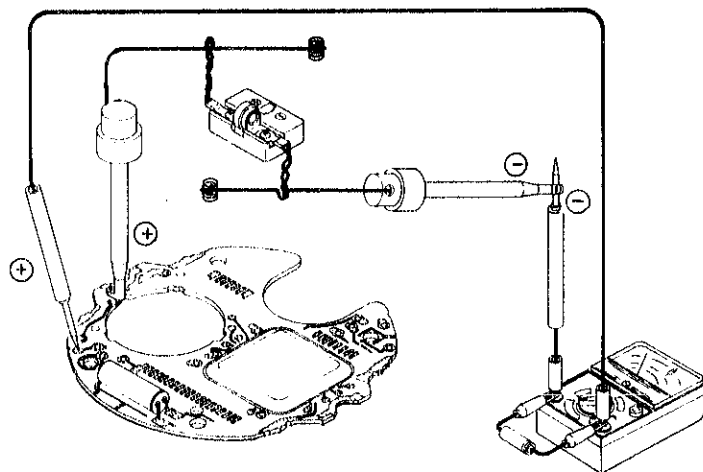
(1) Check the current consumption for the whole of the module.



**Result:**  
 Less than  $2.3\mu\text{A}$ : Normal  
 More than  $2.3\mu\text{A}$ : 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  $2.0\mu\text{A}$ :  
 Replace the liquid crystal panel with a new one.  
 More than  $2.0\mu\text{A}$ :  
 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.

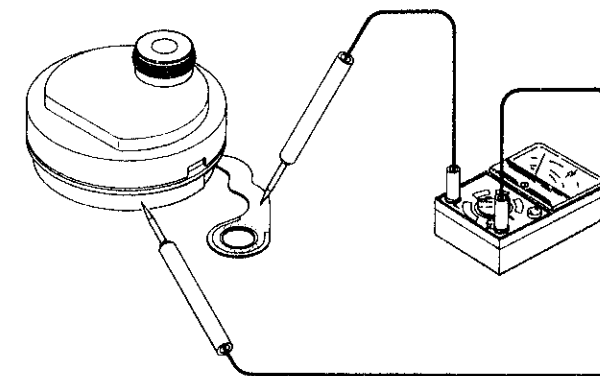
Procedure

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

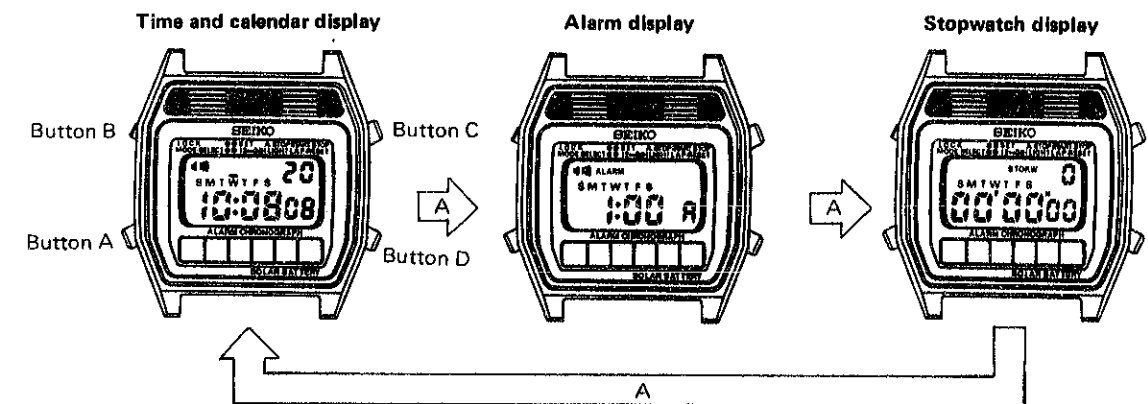


**Result:**  
 $120\Omega \sim 140\Omega$ : Normal  
 Less than  $120\Omega$  (Short circuit)  
 More than  $140\Omega$  (Broken wire) — Defective

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.