

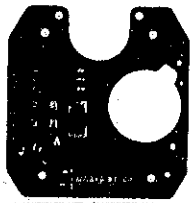
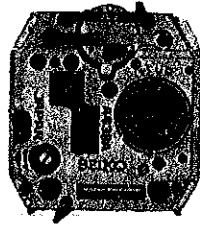
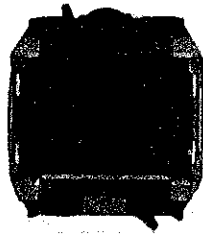
SEIKO

DIGITAL QUARTZ

Cal. A439A

PARTS LIST

Cal. A439A



4001 233



4216 232



4242 235



4245 232



4245 233



4256 230



4259 011



4270 231



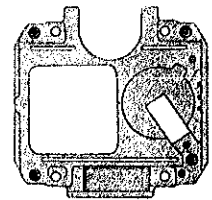
4271 230



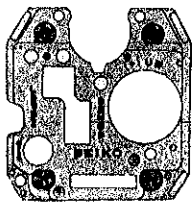
4313 232



4313 233



4398 081



4398 085



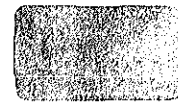
4398 087



4458 230



4510 193



4521 231



4530 230



4540 232



4580 233



4991 232



☆ SEIKO TR926W



012 458



017 197



017 198



017 324

Cal. A439A

Characteristics

Casing diameter : 26.5×25.4 mm
 Maximum height : 5.7 mm without battery
 Frequency of quartz crystal oscillator : 32,768 Hz (Hz=Hertz Cycles per second)
 Time 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 20-hour, minute and second (or minute, second and 1/100 second up to 20 minutes measurement) on both the upper row and the lower row. The lap time is displayed in the upper row and the accumulated elapsed time is displayed in the lower row at the same time by simply depressing a button.
 Display medium : Nematic Liquid Crystal, FE-Mode
 Time signal : It 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 233	Circuit block		
4216 232	Battery connection insulator		
4242 235	Speaker block lead terminal		
4245 232	Switch spring A		
4245 233	Switch spring B		
4256 230	Speaker block fixing spring		
4259 011	Anti-magnetic shield plate		
4270 231	Battery connection (-)		
4271 230	Battery connection (+)		
4313 232	Connector A		
4313 233	Connector B		
4398 081	Liquid crystal panel frame		
4398 085	Battery guard		
4398 087	Speaker frame		
4458 230	Module holding lever		
4510 193	Liquid crystal panel		
4521 231	Reflecting mirror		
4530 230	Bulb		
4540 232	Liquid crystal panel holder		
4580 233	Speaker block		
4991 232	Speaker gasket		
012 458	Liquid crystal panel holder screw		
017 197	Tube for liquid crystal panel holder screw A		
017 198	Tube for liquid crystal panel holder screw B		
017 324	Tube for speaker block lead terminal		
☆SEIKO TR926W	Silver (II) oxide battery		
☆Maxell SR926W	Silver oxide battery		
☆U.C.C.399			

Remarks :

Battery

- ☆SEIKO TR926W
- ☆Maxell SR926W
- ☆U.C.C.399

..... The applied battery for this calibre might be added the substitutive in the future. In that case, please refer to separate "BATTERIES FOR SEIKO QUARTZ WATCHES".

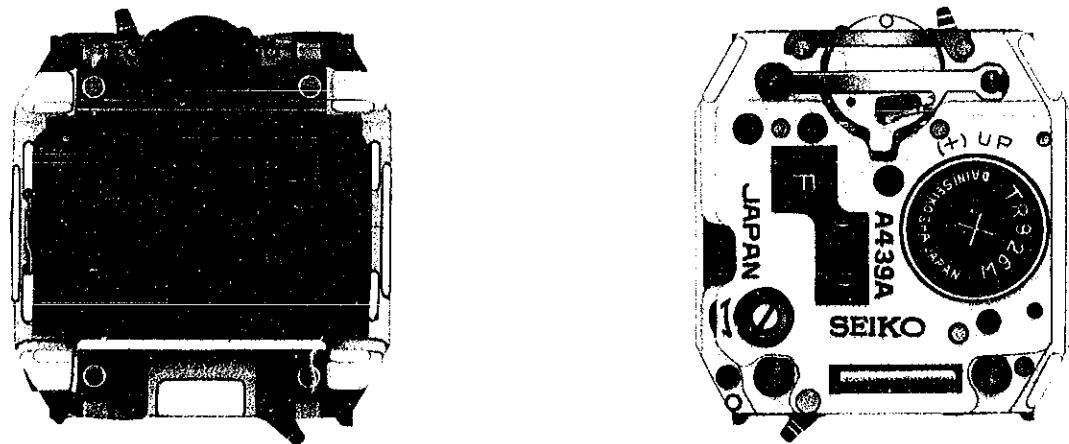
☆⇨Please see remarks.

Part numbers in light letters are not shown in photos.

TECHNICAL GUIDE

SEIKO DIGITAL QUARTZ

CAL. A439A



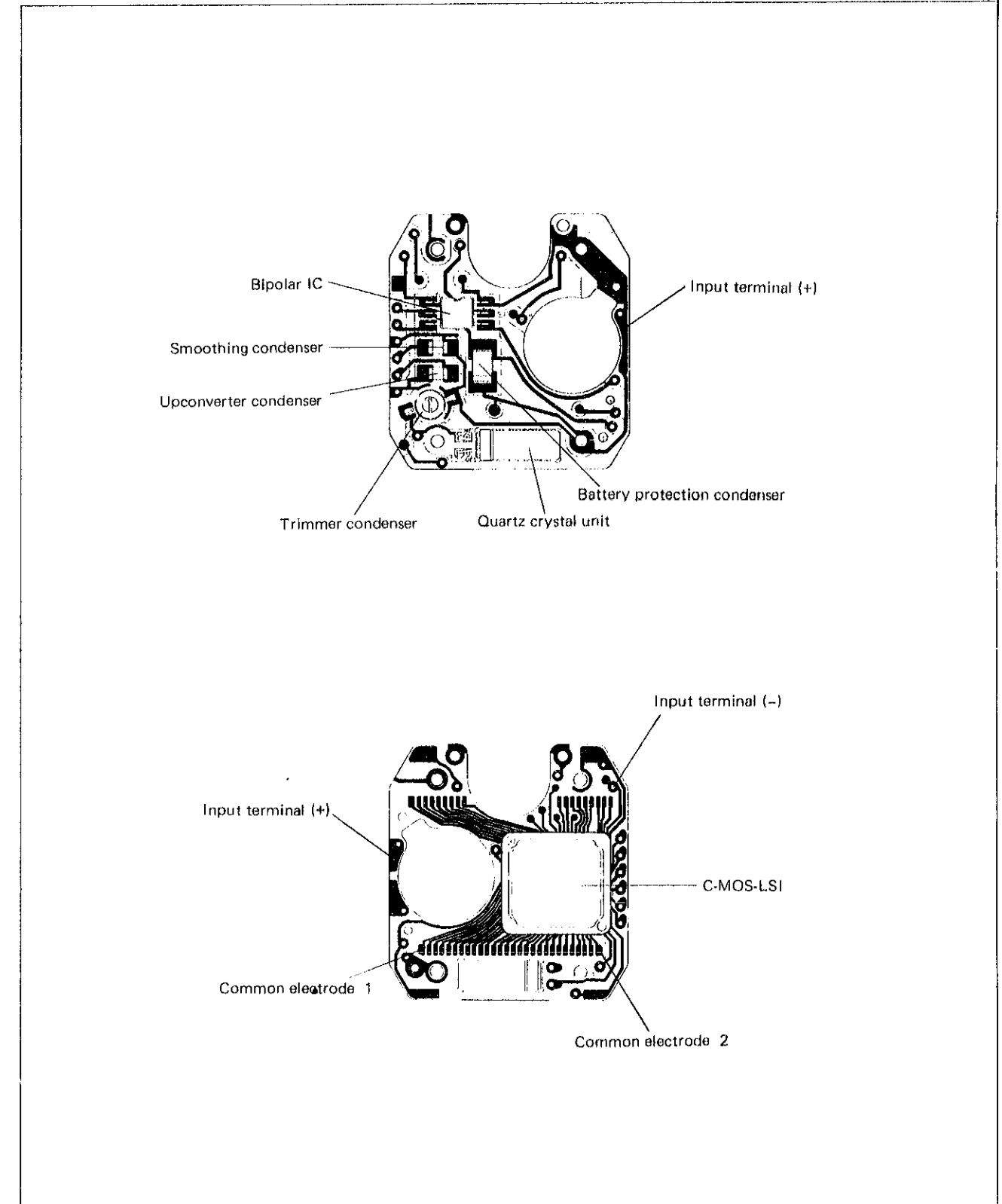
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I. SPECIFICATIONS

Item	Cal. No.	A439A
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 Digital display system showing hour, minute, second, month, date and day of the week. "A"(A.M.)/"P" (P.M.) is displayed only when the hour digit is adjusted. ● Stopwatch display Upper row : Section lap time (elapsed time of each segment of an event) <ul style="list-style-type: none"> ● Minute, second and 1/100 second Lower row : Standard lap time (accumulated elapsed time) <ul style="list-style-type: none"> ● 20-hour digital display system showing minute, second and 1/100 second. (Minute, seconds and 1/100 seconds are displayed up to 20 minutes, and they are automatically changed to hours, minutes and seconds display after 20 minutes.) ● Alarm display Upper row : Designated alarm time. <ul style="list-style-type: none"> ● Hour, minute "A" (AM)/"P" (PM) and alarm mark. Lower row : Present time <ul style="list-style-type: none"> ● Hour, minute, second and function indicator
Additional mechanism		<ul style="list-style-type: none"> ● Time signal starts sounding every hour on the hour (When the minute and second digits indicate "00".) ● Stopwatch function ● Alarm test system ● Illuminating light ● Function change indicating sound ("peep")
Loss/gain		Loss/gain at normal temperature range Mean monthly rate : less than 15 seconds (Annual rate : less than 3 minutes)
Casing diameter		26.5 mm (between 6 o'clock and 12 o'clock side) 25.4 mm (between 3 o'clock and 9 o'clock side)
Height		5.7 mm
Operational temperature range		-10°C ~ +60°C (14°F ~ 140°F)
Regulation system		Trimmer condenser
Measuring gate by Quartz Tester		Any gate is available.
Battery		Battery life is approximately 2 years for SEIKO TR926W and 1 year for Maxell SR926W and U.C.C. 399. Voltage: 1.55 V
IC (Integrated Circuit)		C-MOS-LSI 1 unit Bipolar IC 1 unit

II. STRUCTURE OF CIRCUIT BLOCK



III. DISASSEMBLING, REASSEMBLING AND LUBRICATING

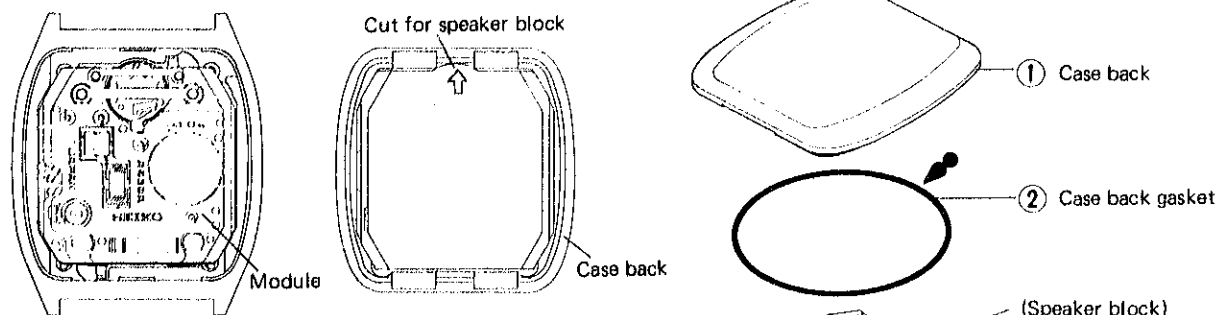
1. Disassembling, reassembling and lubricating of the case

Disassembling procedures Figs.: ① → ④

Reassembling procedures Figs.: ④ → ①

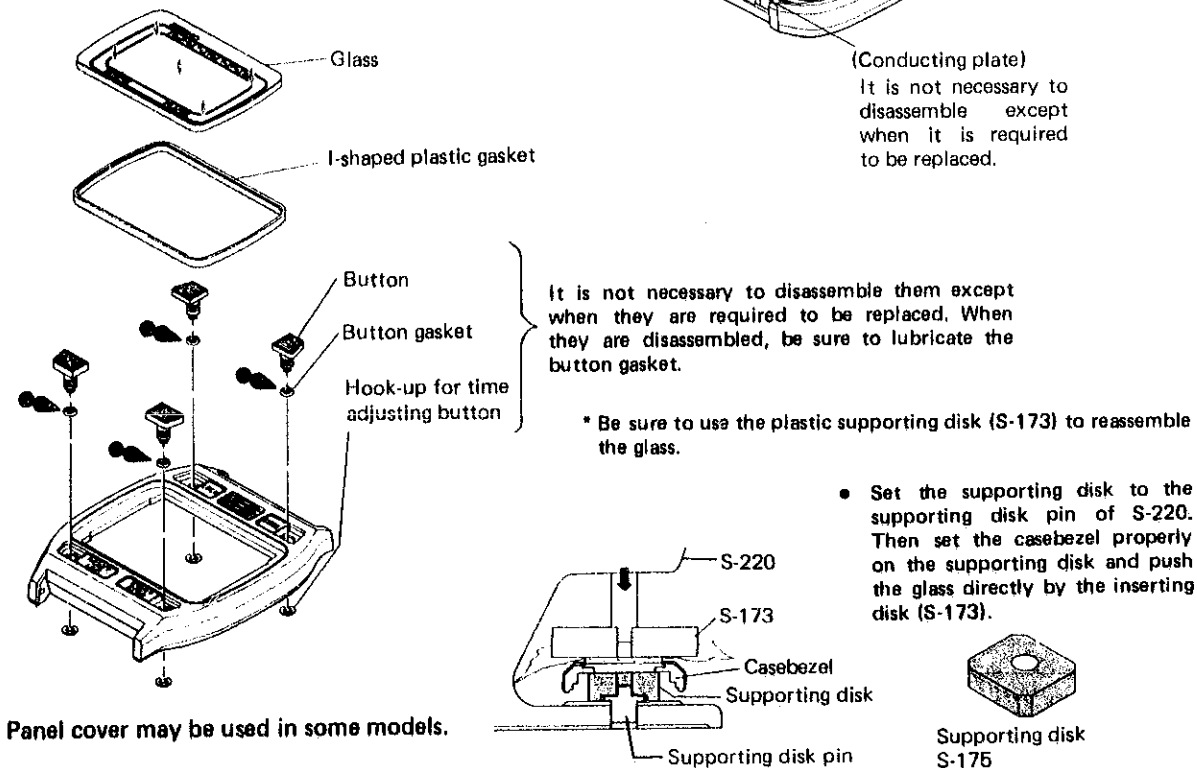
Lubricating: Silicone grease 500,000 c.s.
Normal quantity ●●

● Position for setting the case back



- Cut for speaker block (arrow-marked) is provided inside the case back as shown in the illustration above. Set the cut for speaker block to the corresponding portion of the case bezel and reassemble the case back.
- It is impossible to remove the fastening projection (plastic part) inside the case back as it is combined with the case bezel.

● How to disassemble the glass and buttons



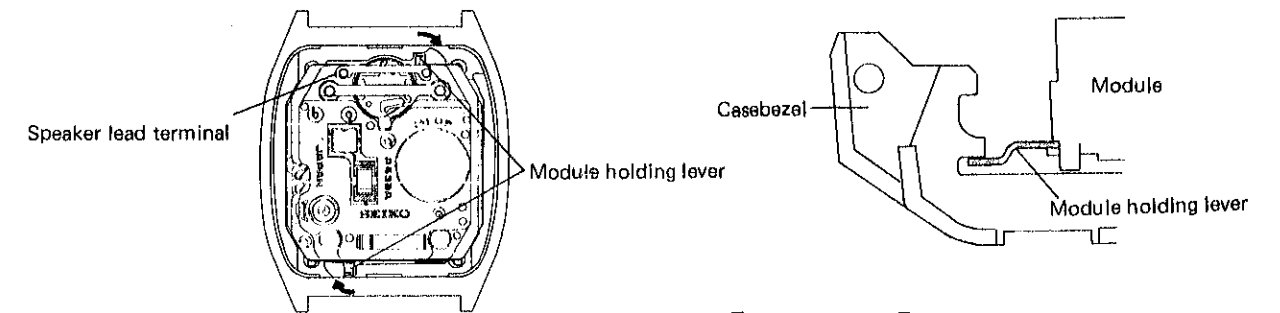
● Panel cover may be used in some models.

Remarks for disassembling and reassembling

③ Module

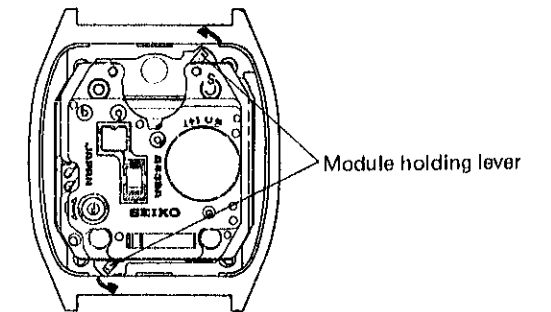
● How to disassemble the module

Turn the two module holding levers in the arrow-marked direction as shown in the illustration below and disassemble the module (with the speaker block) from the case bezel. When disassembling the module, be careful not to lose the speaker lead terminal.



● How to reassemble the module

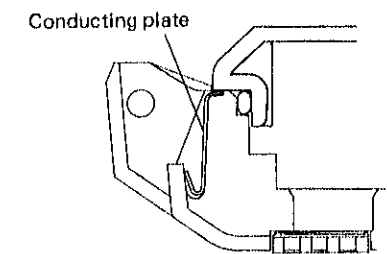
- Put the module in the case bezel.
- Set the two module holding levers in the case bezel as shown in the illustration on the right. Turn them in the arrow-marked direction until stopping.
- Speaker block should be reassembled after setting the module in the case bezel.



④ Case bezel

● Conducting plate

The conducting plate attached to two portions of the case bezel is to protect the circuit block from static electricity. It is not necessary to remove the conducting plate except when it is required to be replaced. When they get out of place, be sure to set them correctly.

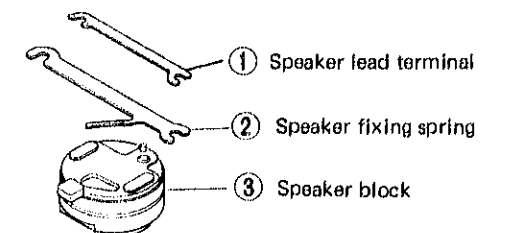


● Speaker block

The speaker block is fixed to the module by the speaker lead terminal and the speaker fixing spring.

Disassembling procedures Figs.: ① → ③

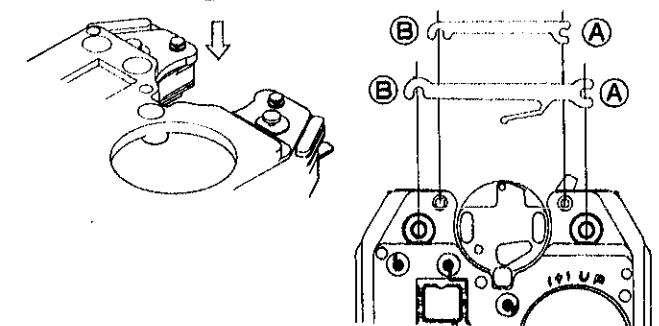
Reassembling procedures Figs.: ③ → ①



● Speaker lead terminal and speaker fixing spring

Disassembling procedure: ② → ①

Reassembling procedure: ① → ②



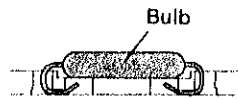
2. Disassembling and reassembling of the module

Disassembling procedures Figs.: ① → ⑯

Reassembling procedures Figs.: ⑯ → ①

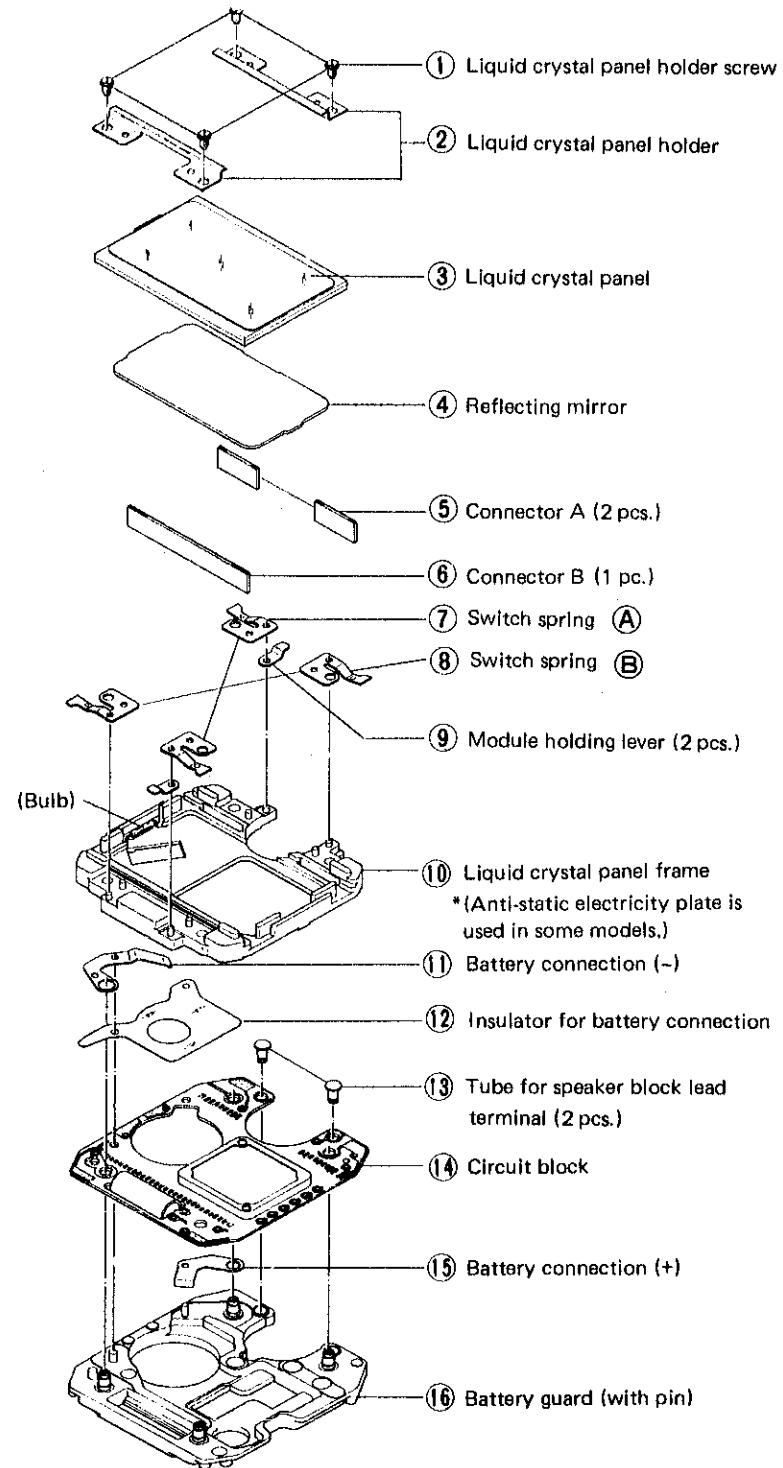
• Bulb

It is not necessary to disassemble the bulb except when it is required to be replaced. When replacing the bulb, reassemble it as shown in the illustration below.



Put the tips of the bulb lead wire in the holes of the liquid crystal panel frame.

• Be sure to reassemble the switch spring **A** and **B** in the correct direction.



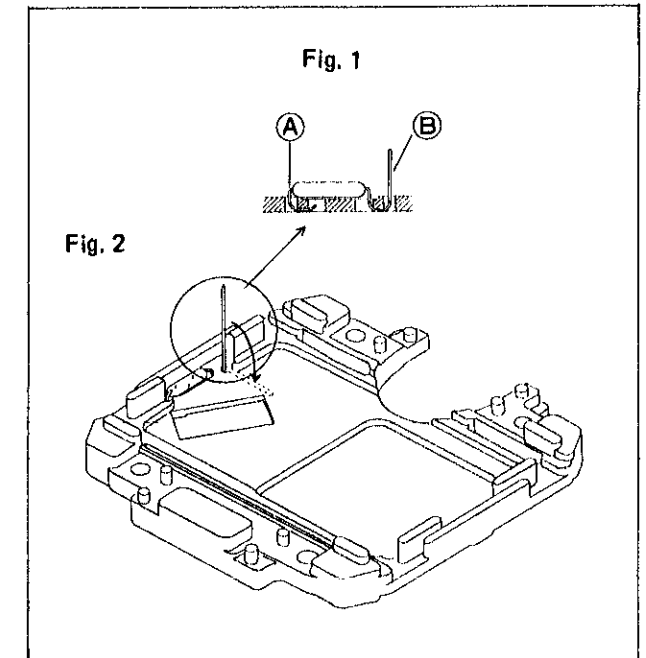
• *When the model has the anti-static electricity plate

For some models, the anti-static electricity plate is provided between the liquid crystal panel frame and the reflecting mirror to protect the circuit block from being damaged by static electricity. When handling the model with the anti-static electricity plate, follow the procedures below.

1. How to set the anti-static electricity plate

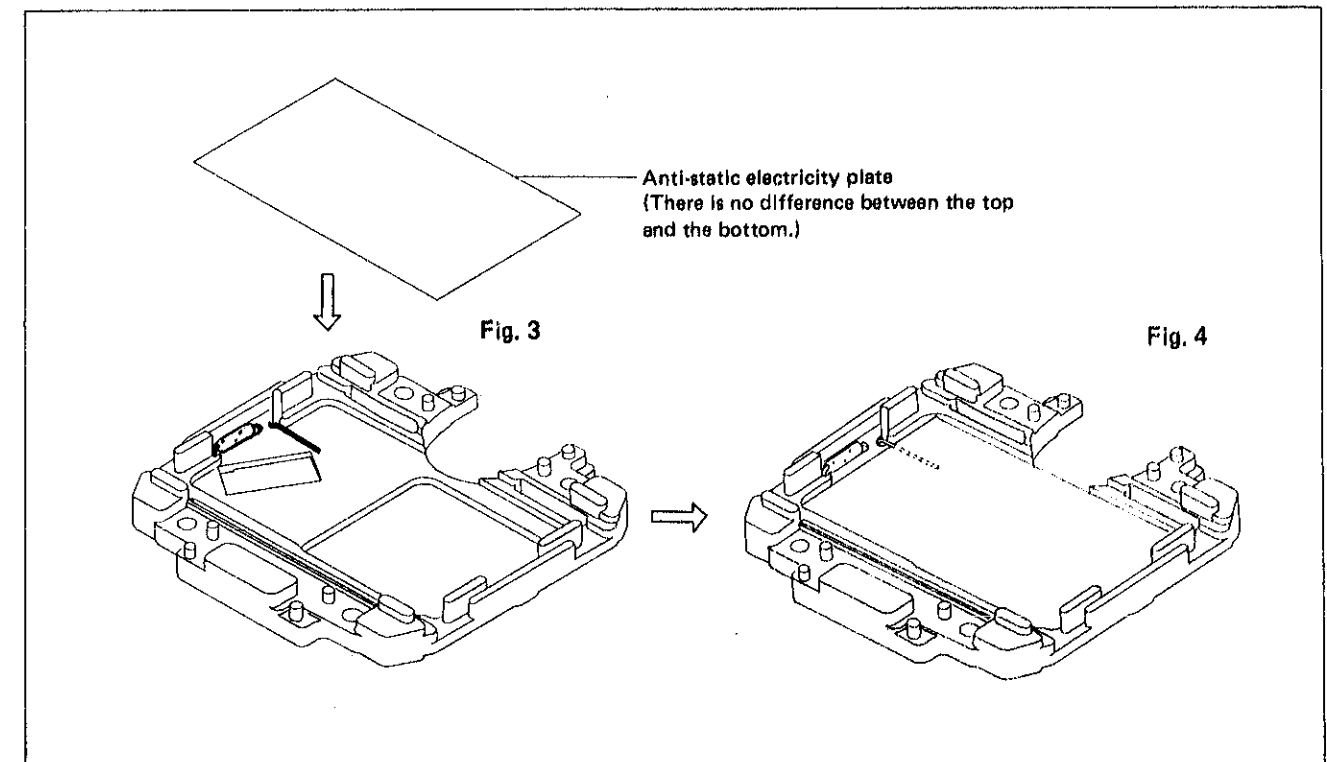
Cut the bulb lead wire **A** at the 2mm point from the liquid crystal panel frame. Bend the bulb lead wire **A** in the same manner as with the model without the anti-static electricity plate, and set it in the liquid crystal panel frame.

Pull out the bulb lead wire **B** to the bulb side after setting it in the liquid crystal panel frame. Then bend it as shown in Fig. 2 and put the anti-static electricity plate over it.



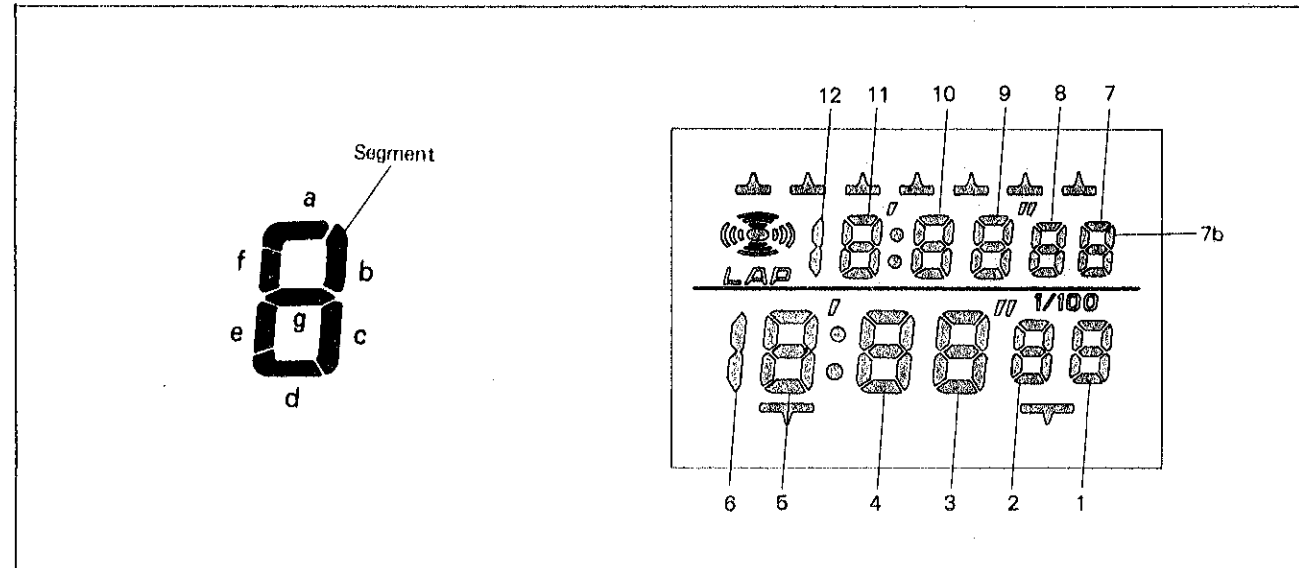
2. How to set the bulb (In case the bulb is required to be replaced)

One end of the bulb lead wire is longer than that of the bulb lead wire for the model without the anti-static electricity plate.



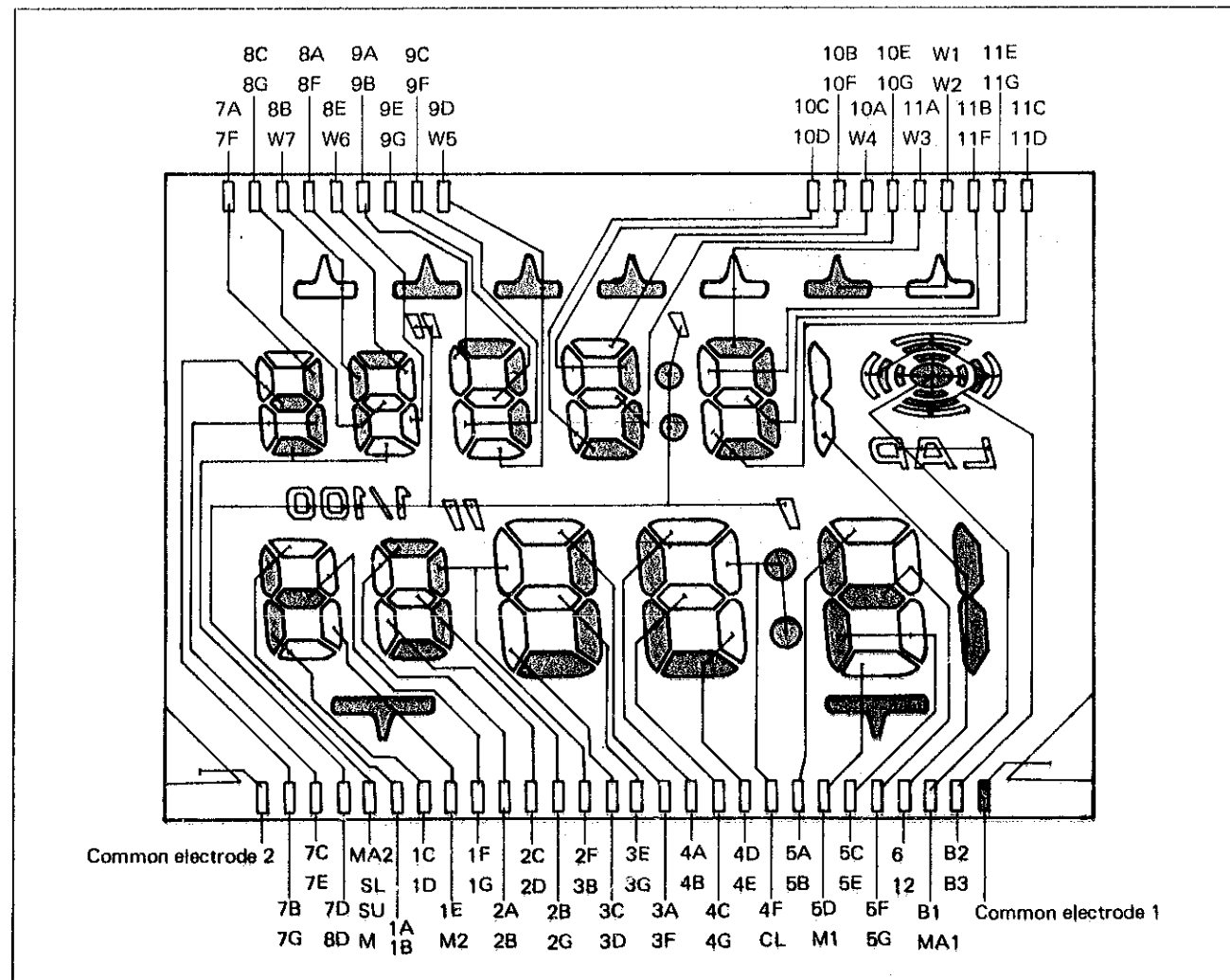
3. Segment (Liquid crystal panel electrode)

• Designation of segment



Common electrode (1) corresponds to the segment .

Common electrode (2) corresponds to the segment .



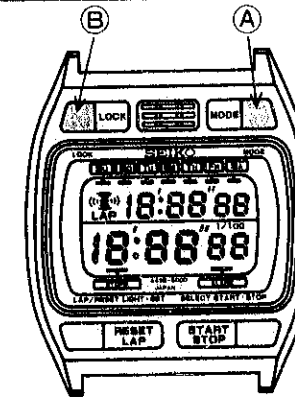
Refer to the "SEIKO QUARTZ TECHNICAL GUIDE, GENERAL INSTRUCTION FOR DIGITAL WATCHES" for further details.

IV. CHECKING AND ADJUSTMENT

Procedure

CHECK BATTERY VOLTAGE

CHECK PATTERN SEGMENT CHECKING SYSTEM

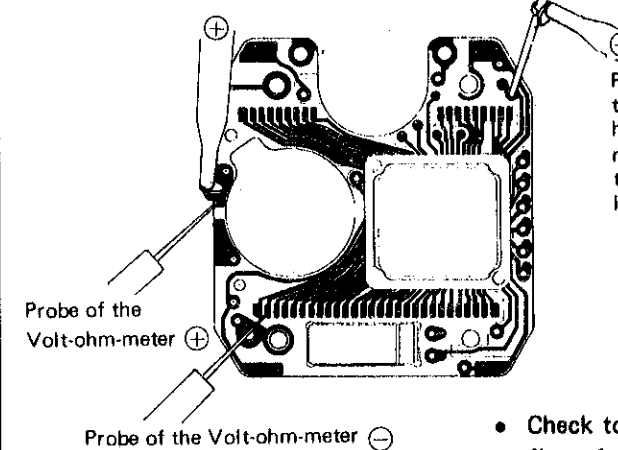


- Depress buttons "A" and "B" together for 4 to 5 seconds, and all segments are displayed with a signal "peep". And the defective segments will be identified.

CHECK CONDUCTIVITY OF LIQUID CRYSTAL PANEL, CIRCUIT BLOCK AND CONNECTOR

CHECK LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK

Current suppliers (S-833)

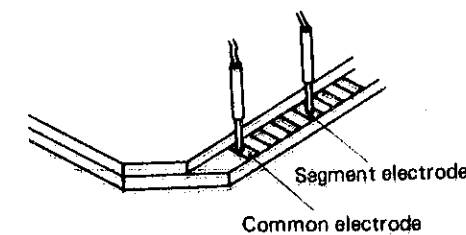


Put a metal probe in the minus electrode hole and clasp the metal probe with the IC clip as shown in the illustration.

Probe of the Volt-ohm-meter +
Probe of the Volt-ohm-meter -

- Check to see if the electric signal flows from the circuit block correctly.

Result:
More than 0.8V: Normal
Less than 0.8V: Defective
Replace the circuit block.

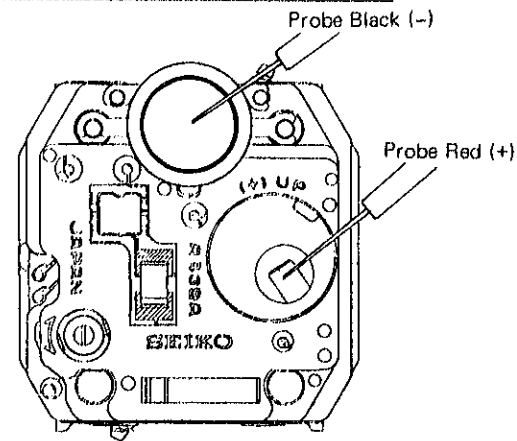


- Check for any broken panel pattern, contamination and short circuit of the liquid crystal panel.

Result:
Lights up: Normal
Does not light up: Defective
Replace the liquid crystal panel.

Procedure

CHECK CURRENT CONSUMPTION



- When the Volt-ohm-meter is used.
Probe Red (+): Battery connection (-)
Probe Black (-): Battery surface (-)

Result:
Less than $3\mu\text{A}$: Normal
More than $3\mu\text{A}$: Defective
* Replace the liquid crystal panel or the circuit block.

* How to check if the liquid crystal panel or the circuit block is defective when the current consumption is more than $3\mu\text{A}$.

- Disassemble the liquid crystal panel from the module, and measure the current consumption (with the liquid crystal panel holder screwed down).

Less than $2.5\mu\text{A}$ – Circuit block: Normal
Replace the liquid crystal panel.
More than $2.5\mu\text{A}$ – Circuit block: Defective
Replace the circuit block.

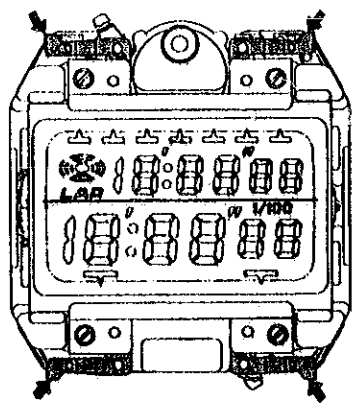
- When checking the current consumption with the module alone, be sure to check with the speaker block disassembled from the module and the speaker lead terminal and the speaker fixing spring reassembled in the module.
- When checking the current consumption with the module in the case, be sure to check with the speaker block reassembled in the module.

CHECK ACCURACY

- It is easier to measure the daily rate if all the segments are displayed.

CHECK FUNCTIONING AND ADJUSTMENT

CHECK CONDUCTIVITY OF SWITCH COMPONENTS



- Check to see if the four arrow-marked spring portions in the illustration on the left touch the switch terminal of the circuit block when the spring portions are pushed with the tips of tweezers and there are clearance between spring portions and switch terminals when released.
- Check for dust, lint and other contamination of the connecting portions.

Result:
Function correctly: Normal
Do not function correctly: Defective
Correct the switch spring.
If it is impossible to correct, replace the switch springs.

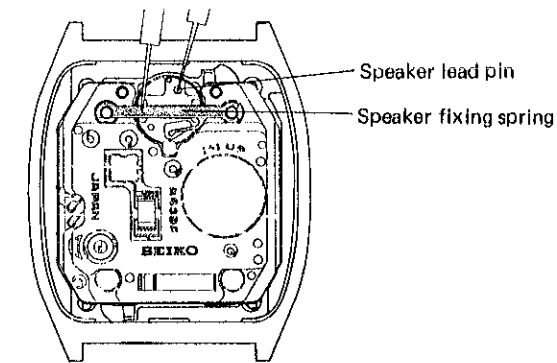
Procedure

CHECK SPEAKER BLOCK

- Check for any broken coil wire and short circuit of the speaker block by measuring the coil resistance.

1. Set up the Volt-ohm-meter.
Range to be used: OHM R x 1
 2. Measuring
Apply the probes of the Volt-ohm-meter to the head of the speaker lead pin and the speaker fixing spring.
- Measure with the speaker lead terminal disassembled.

Result:
Resistance $120\Omega \sim 140\Omega$: Normal
Less than 120Ω (Short circuit) or more than 140Ω (Broken coil wire): Defective
Replace the speaker block.



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