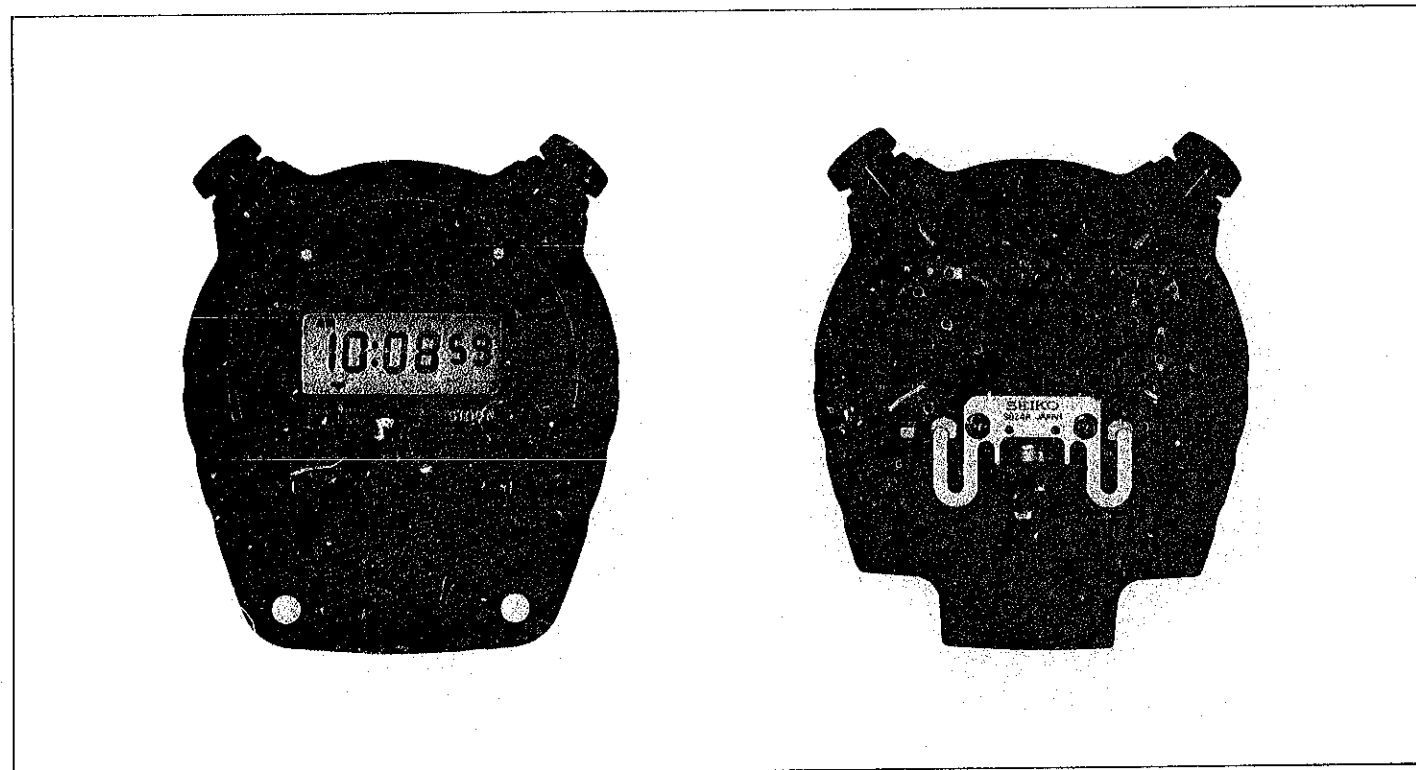


# TECHNICAL GUIDE

## SEIKO DIGITAL QUARTZ

CAL. S024A



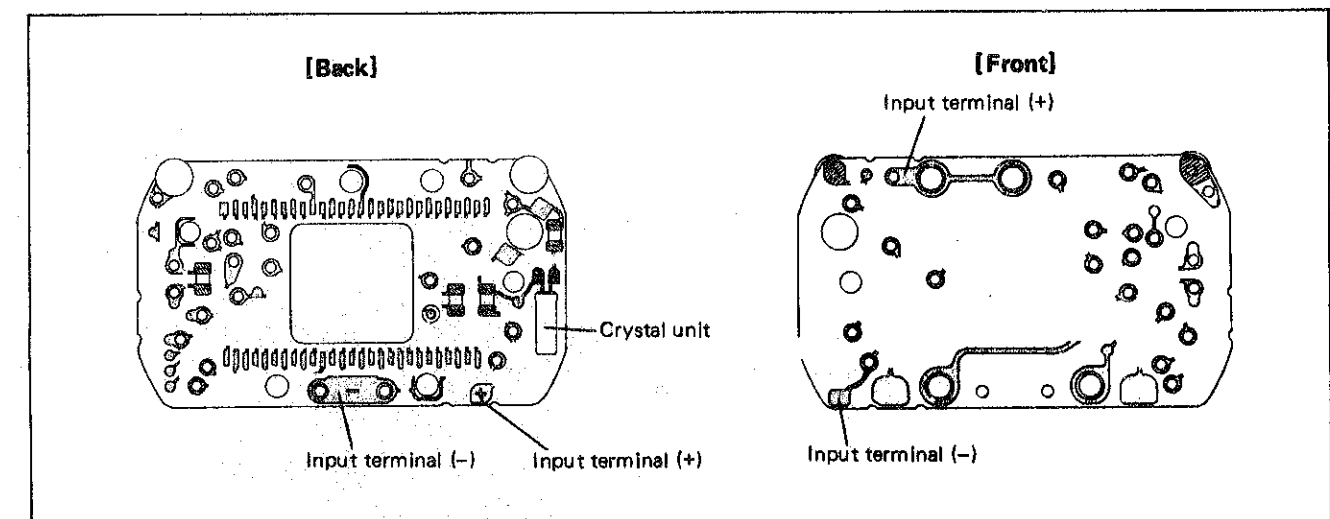
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## I. SPECIFICATIONS

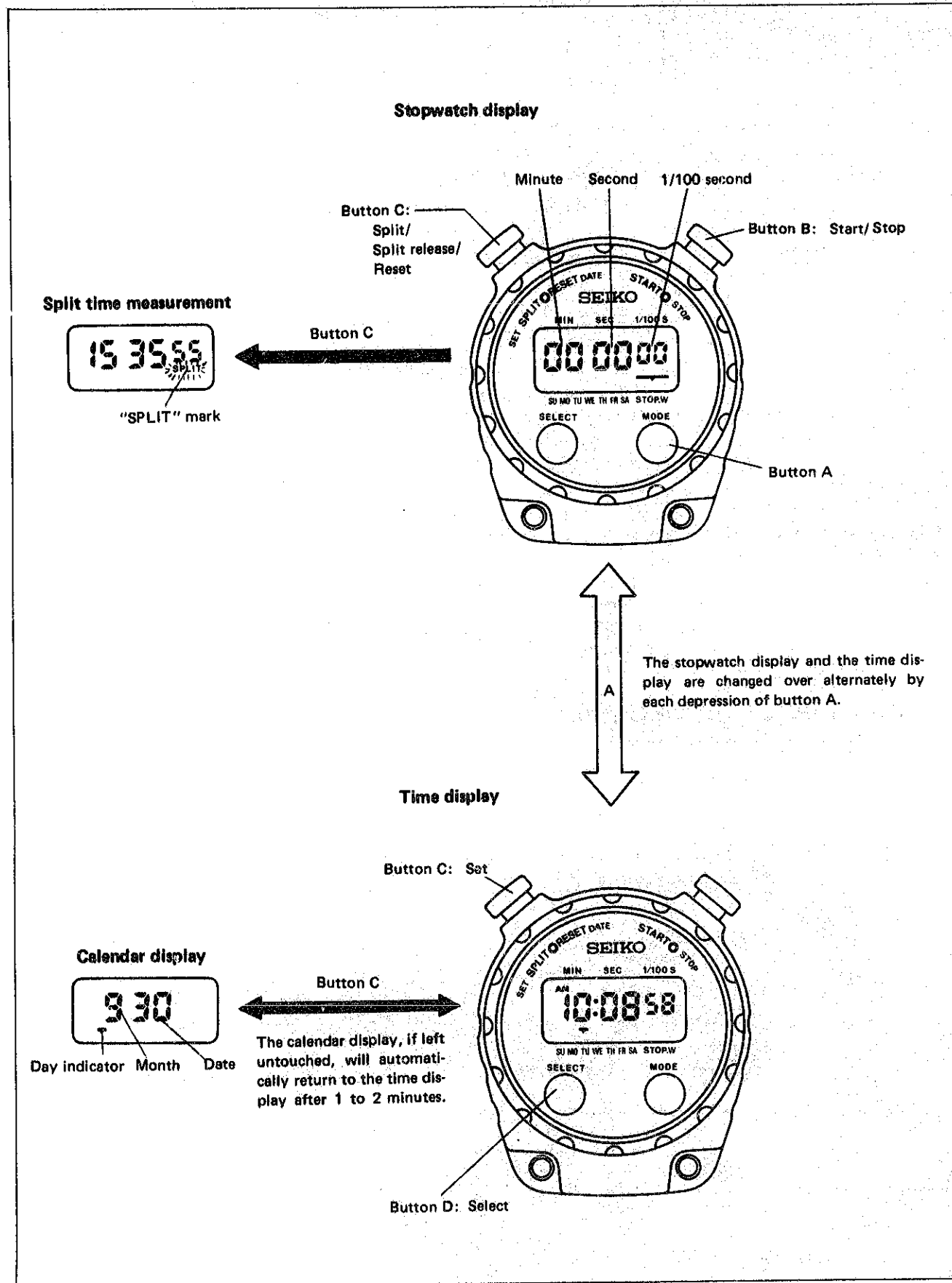
		Cal. No.	S024A
<b>Item</b>			
Display medium		Nematic Liquid Crystal, FEM (Field Effect Mode)	
Liquid crystal driving system		Direct driving system	
Display system		<ul style="list-style-type: none"> <li>• Time and calendar display</li> <li>• Stopwatch display (up to 60 minutes in 1/100 second)</li> </ul>	
Additional mechanism		Automatic calendar	
Loss/gain		Monthly rate at normal temperature range: less than $\pm 30$ seconds	
Module size	Outside diameter	$\phi 42.0$ mm 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	4.6 mm without battery	
Regulation system		—	
Measuring gate by quartz tester		Any gate can be used.	
Battery		SEIKO (SEIZAIKEN) TR41W, Maxell SR41W, U.C.C. 392, SONY EVEREADY 392 Battery life is approximately 2 years. Voltage: 1.57V	

## II. STRUCTURE OF THE CIRCUIT BLOCK



### III. DISPLAY FUNCTION

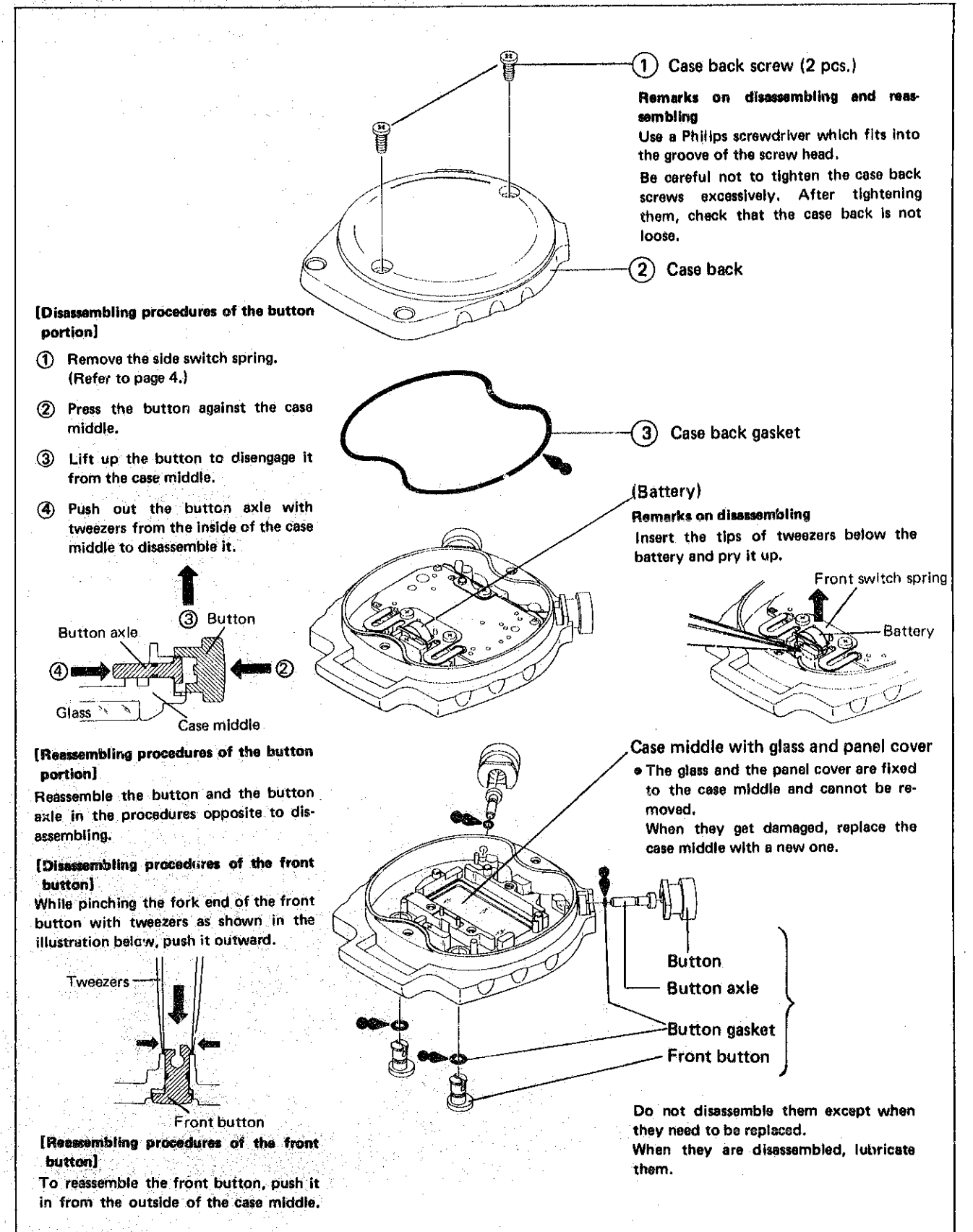
#### • Display and button operation



### IV. 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



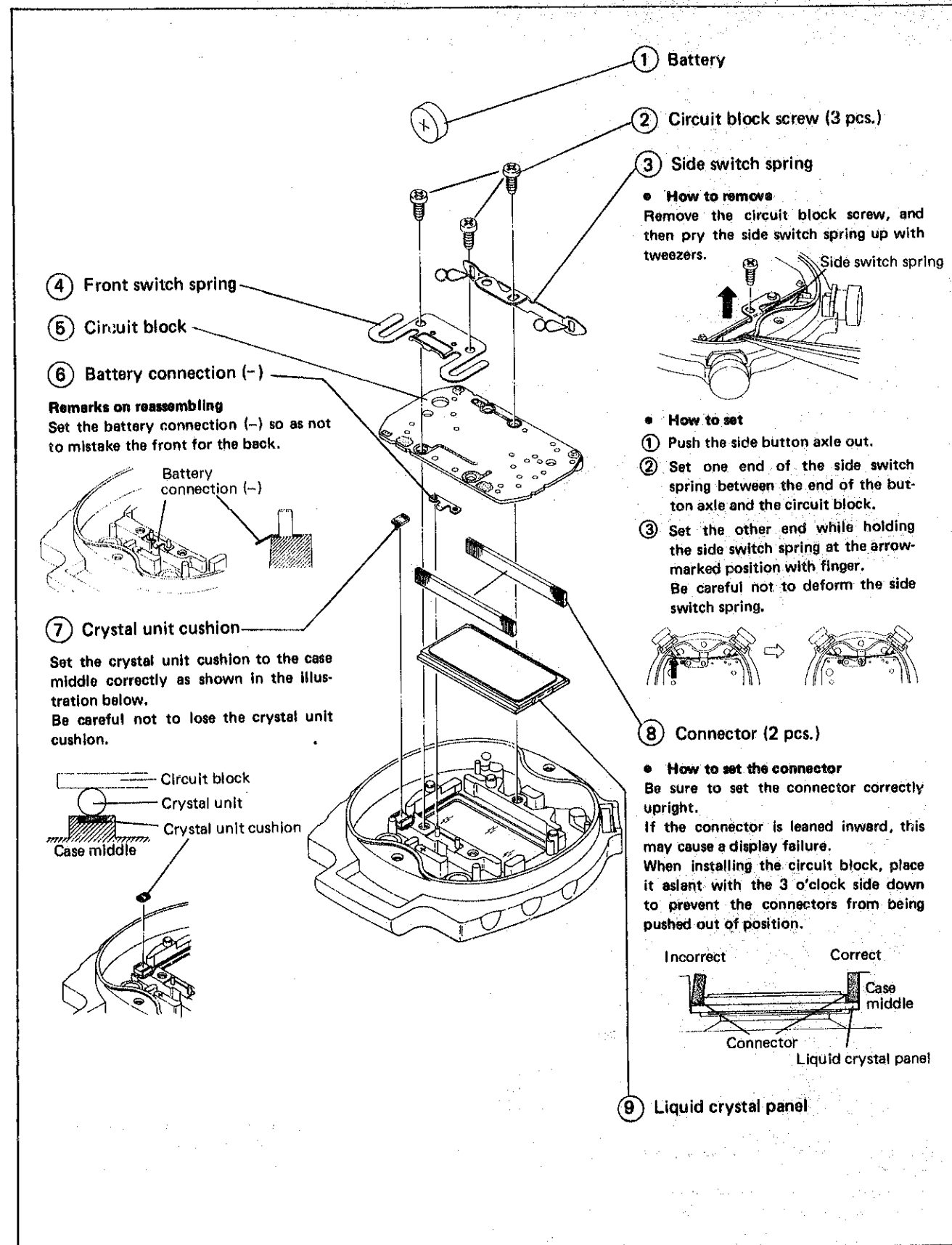
## V. DISASSEMBLING AND REASSEMBLING OF THE MODULE

Disassembling procedures Figs. : ① → ⑨

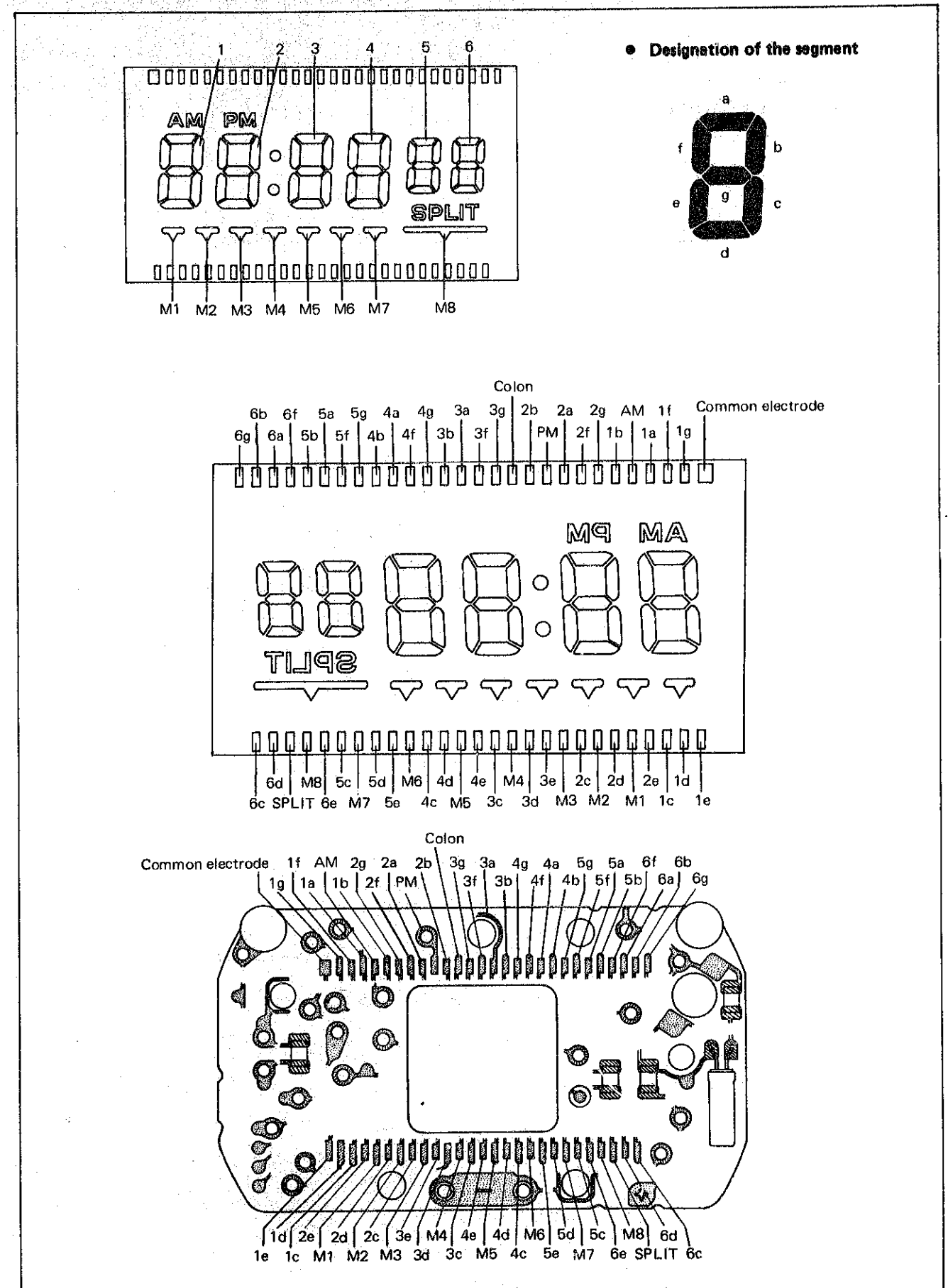
Reassembling procedures Figs. : ⑨ → ①

Lubricating: SEIKO Watch Oil S-6

Normal quantity



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



## VII. CHECKING AND ADJUSTMENT

- The explanation here is only for the particular points of Cal. S024A.  
Refer to the "TECHNICAL GUIDE, GENERAL INSTRUCTION" for SEIKO Digital Quartz for details.

### Procedure

#### CHECK BATTERY VOLTAGE

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

- Before starting measuring, short-circuit the probes to see that the Digital Multi-Tester displays "AUTO 00.0mV" or "AUTO 00.1mV".

**Result:**

Normal: More than 1.57V  
Defective: Less than 1.57V  
Replace the battery with a new one.

#### CHECK BATTERY CONDUCTIVITY

#### 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.

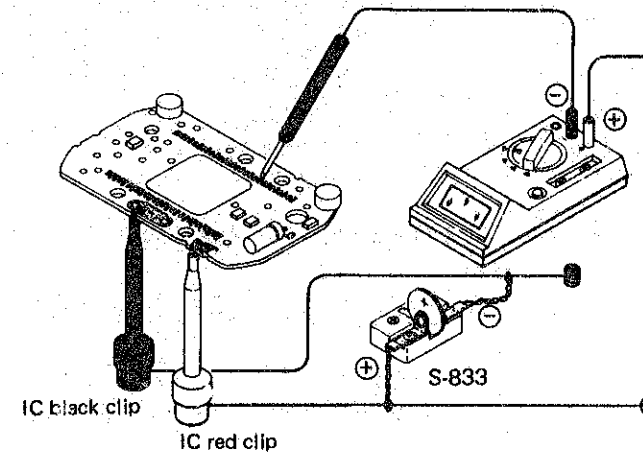
- (2) Check to see if the electric signal is correctly transmitted from the circuit block.

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

**Result:**

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

### Procedure



When the volt-ohm-meter is used for checking:

**Result:**

Normal: More than 0.8V  
Defective: Less than 0.8V

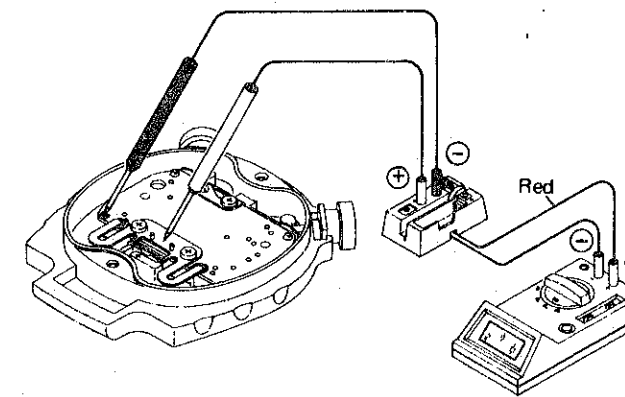
#### CHECK CURRENT CONSUMPTION

Use the Digital Multi-Tester S-840 and the Multi-Adapter MA-40.  
Mode to be used:  $\mu A$

- 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

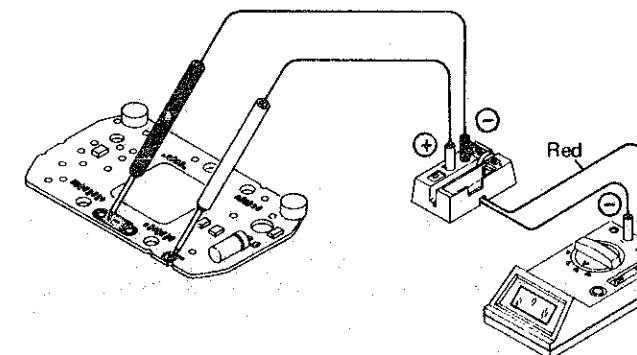
Apply the black and red probes to the input terminals of the circuit block, referring to the figure of the circuit block (front) on page 1.



**Result:**

Normal: Less than 2.5  $\mu A$   
Defective: More than 2.5  $\mu A$   
Replace the circuit block or liquid crystal panel with a new one.

- (2) Current consumption for the circuit block alone



**Result:**

Normal (Circuit block):  
Less than 1.7  $\mu A$   
Replace the liquid crystal panel with a new one.  
Defective (Circuit block):  
More than 1.7  $\mu A$   
Replace the circuit block with a new one.

Procedure

CHECK ACCURACY

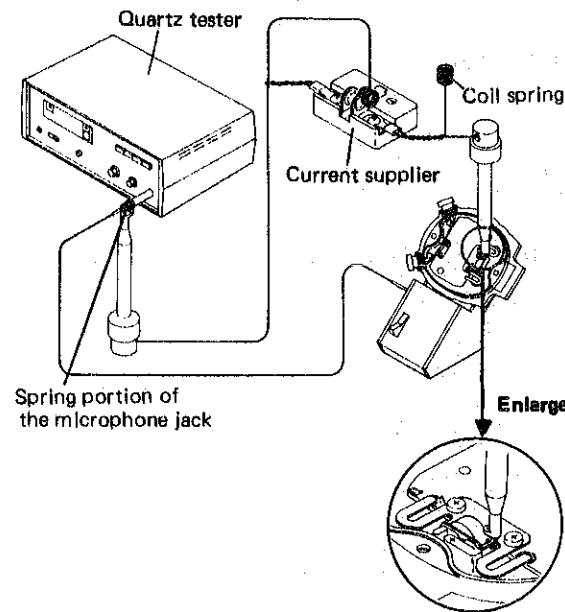
Caution:

Since the outside diameter of the watch is large, the segment to be detected of the liquid crystal panel may slip off from the sensory part of the quartz tester microphone. 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

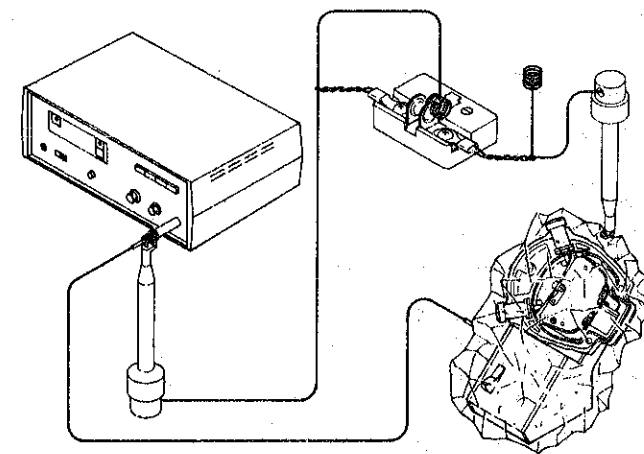
Use the current supplier S-833 or the Digital Multi-Tester in conjunction with the quartz tester and microphone.



- 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 the IC clip clasp the spring portion of the microphone jack, and connect the other IC clip to the front button spring.

\*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.

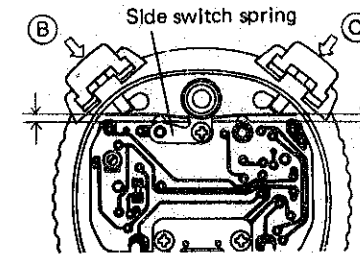
\* If the daily rate does not become stable through the above methods, turn the level control knob of the quartz tester.

Procedure

CHECK CONDUCTIVITY OF SWITCH COMPONENTS

(1) Check the side switch spring.

- 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.

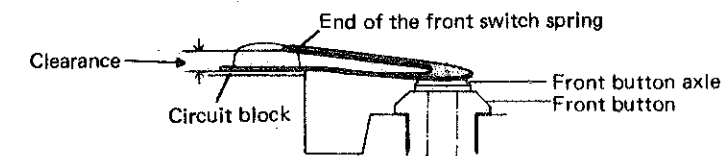


Result:

- Normal: Functions correctly.  
 Defective: Does not function correctly.  
 Replace the side switch spring with a new one.

(2) Check the front switch spring.

- Check to see that there is a clearance between the end of the front switch spring and the circuit block as shown in the illustration below.



- Check to see that the end of the front switch spring touches the electrode of the circuit block when the front button is pushed inward.