

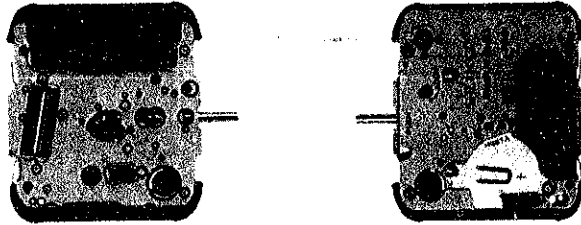
**SEIKO**

**QUARTZ**

**Cal. H357A**

**PARTS LIST**

# Cal. H357A



122 651



125 650



☆ 221 650



231 650



☆ 241 650



261 650



☆ 271 650



281 650



282 650



354 650



383 650



384 650



386 650



389 650



391 650



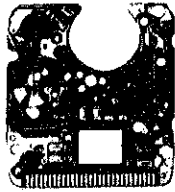
491 546



701 650



766 650



4001 595



4002 650



4146 650



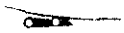
4216 650



4225 650



4239 650



4245 650



4245 651



4246 650



4270 650



4313 650



4398 650



4398 651



4450 650



4408 651



4408 653



☆ 4510 520



4521 790



☆ Maxell SR926W

022 241

022 493

2/1

# Cal. H357A

## Characteristics

Casing diameter : 23.6 × 26 mm  
 Maximum height : 3.3 mm without battery  
 Jewel : 7 j  
 Frequency of quartz crystal oscillator : 32,768 Hz (Hz=Hertz . . . . Cycles per second)  
 Analogue indication : Three hand time indication (Hour, Minute and Second)  
 Digital time and calendar display : Hour (24 hour indication or 12 hour indication), Minute, Second, Date and Day of the week.  
 (The month is displayed only when the calendar is adjusted.)  
 Alarm display : Can be set to operate at any desired hour and minute.  
 Stop watch display : Digital Display System showing 12 hour, minute, second and 1/100 second up to 60 minutes.  
 Display medium : Nematic Liquid Crystal, FE-Mode  
 Driving system : Step motor (2 poles)  
 Regulation system : Trimmer condenser  
 Time signal : It can be set to ring every hour on the hour.  
 Battery life indicator : All the digits in the display begin flashing.

PART NO.	PART NAME	PART NO.	PART NAME
122 651	Center wheel bridge	011 503	Upper hole jewel for fourth wheel
125 650	Train wheel bridge	011 547	Upper hole jewel for third wheel
☆221 650	Center wheel & pinion	011 547	Upper hole jewel for fifth wheel
☆221 651		011 547	Lower hole jewel for fifth wheel
231 650	Third wheel & pinion	011 550	Lower hole jewel for third wheel
☆241 650	Fourth wheel & pinion	011 552	Upper hole jewel for step rotor
☆241 651		011 552	Lower hole jewel for step rotor
261 650	Minute wheel	023 330	Train wheel setting lever adjusting pin
☆271 650	Hour wheel	023 347	Guide pin for setting lever spring A
☆271 651		023 363	Guide pin for setting lever axle spring
281 650	Setting wheel	023 378	Guide pin for switch spring
282 650	Clutch wheel	023 378	Tube for yoke
354 650	Winding stem	027 044	Tube for coil block screw A
383 650	Setting lever	027 067	Tube for train wheel bridge
384 650	Yoke (Clutch lever)	027 068	Tube for circuit block screw A
386 650	Setting lever spring	027 068	Tube for battery clamp screw A
389 650	Setting lever axle spring	027 069	Tube for circuit block screw B
391 650	Train wheel setting lever	027 069	Tube for battery clamp screw B
491 546	Dial wheel	027 075	Tube for coil block screw B
701 650	Fifth wheel & pinion	027 700	Switch spring fixing pin
766 650	Intermediate minute wheel	027 701	Guide pin for setting lever spring B
4001 595	Circuit block	027 898	Setting lever pin
4002 650	Coil block	027 946	Eccentric dial pin
4146 650	Step rotor	☆Maxell SR926W	Silver oxide battery
4216 650	Insulator for battery	☆U.C.C. 399	
4225 650	Battery clamp	☆SEIKO TR926W	Silver (II) oxide battery
4239 650	Rotor stator		
4245 650	Switch spring		
4245 651	Changeover switch spring		
4246 650	Buzzer lead terminal		
4270 650	Battery connection (—)		
4313 650	Connector		
4398 650	Battery guard		
4398 651	Liquid crystal panel frame		
4450 650	Switch lever		
4408 651	Reflecting mirror spacer		
4408 653	Washer for circuit block screw		
☆4510 520	Liquid crystal panel (Silver)		
☆4510 521	Liquid crystal panel (Gold)		
4521 790	Reflecting mirror		
022 241	Center wheel bridge screw		
022 241	Train wheel bridge screw		
022 241	Coil block screw		
022 241	Setting lever spring screw		
022 241	Setting lever axle spring screw		
022 493	Circuit block screw		
022 493	Battery clamp screw		

☆⇨ Please see remarks on the reverse page.  
 Part numbers in light letters are not shown in photos.

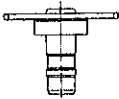
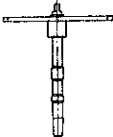

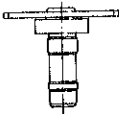
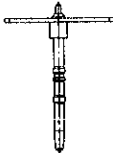

# Cal. H357A

## Remarks :

### Center wheel & pinion, Fourth wheel & pinion, Hour wheel

There are two different types as specified below.

Combination :

Type	Center wheel & pinion	Fourth wheel & pinion	Hour wheel
a. Dials for thin type models. (Standard type)	 ☆221 650	 ☆241 650	 ☆271 650
b. Dials for thick type models (Two-layer type)	 ☆221 651	 ☆241 651	 ☆271 651

### Liquid crystal panel

☆4510 520 (Silver) } ..... Be sure that the combination between the color of panel cover and liquid crystal panel should be matched according to the "SEIKO Quartz Casing Parts List".  
 ☆4510 521 (Gold) }

### Battery

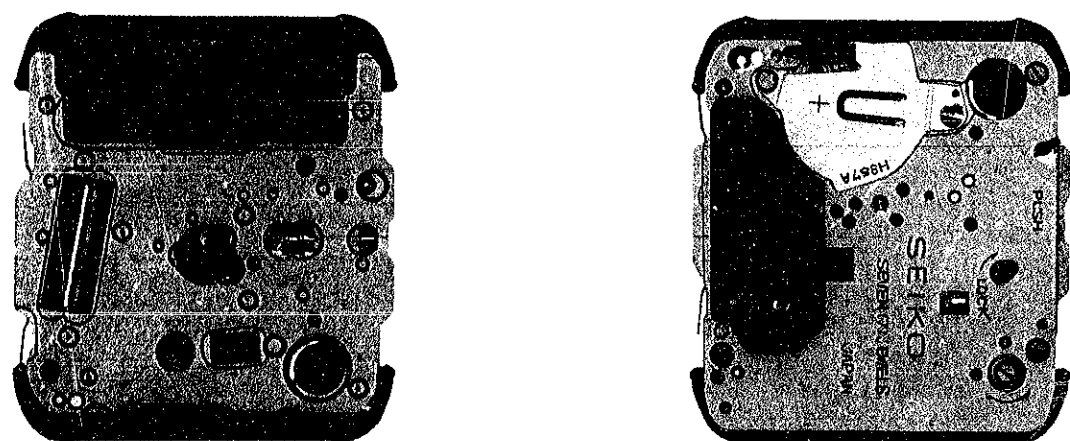
☆SEIKO TR926W } ..... The substitutive battery might be added to the applied battery in the future.  
 ☆Maxell SR926W } ..... In that case, please refer to separate "BATTERY LIST FOR SEIKO QUARTZ WATCHES".  
 ☆U.C.C. 399 }

Note that SEIKO battery is marked with "SEIZAIKEN" on its (+) side.

# TECHNICAL GUIDE

**SEIKO**  
QUARTZ

CAL.H357A



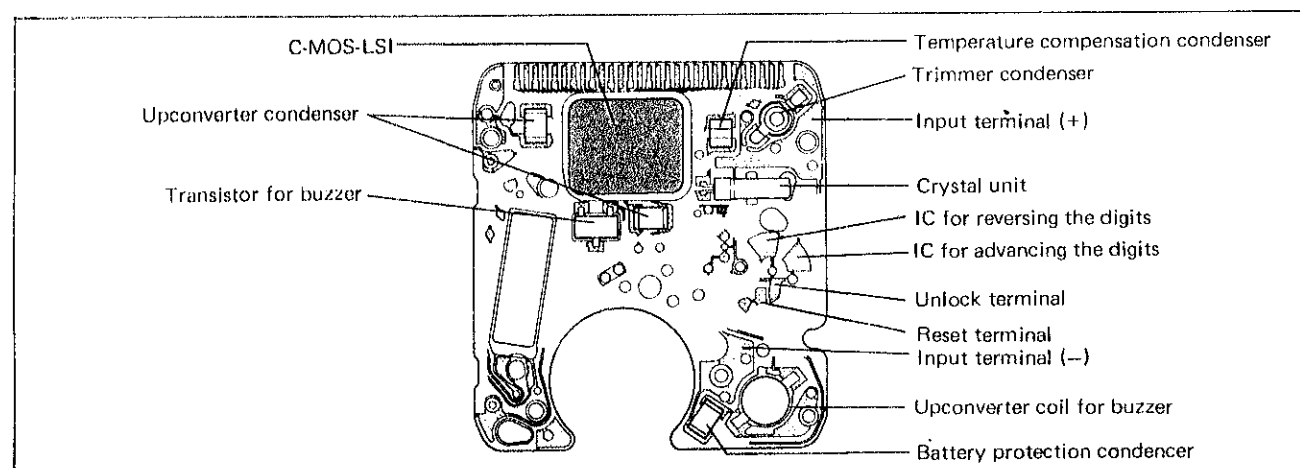
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## I. SPECIFICATIONS

Item	Cal. No.	H357A
Analogue function	Time indication	Three-hand time indication (Hour, minute and second)
	Additional mechanism	<ul style="list-style-type: none"> <li>• Electronic circuit reset switch</li> <li>• Train wheel setting (stops at every second)</li> </ul>
Digital function	Display medium	Nematic Liquid Crystal, FEM (Field Effect Mode)
	Display system	<ul style="list-style-type: none"> <li>• Calendar function</li> <li>• Time function (12 or 24 hour indication)</li> <li>• Alarm function (12 or 24 hour indication)</li> <li>• Stopwatch function</li> </ul>
	Additional mechanism	<ul style="list-style-type: none"> <li>• Battery life indicator</li> <li>• Alarm test system</li> <li>• Time signal</li> <li>• Pattern segment checking system</li> </ul>
	Liquid crystal driving system	1/2 Multiplex driving system
Loss/gain		Loss/gain at normal temperature range Monthly rate: less than 10 seconds (Annual rate: less than 2 minutes)
Movement size		23.6mm (between 3 o'clock and 9 o'clock sides) 26.0mm (between 6 o'clock and 12 o'clock sides)
Height		3.3mm without battery
Regulation system		Trimmer condenser
Measuring gate		Any gate is available.
Battery		SEIKO TR926W, Maxell SR926W or U.C.C. 399 Battery life is approximately 2 years. Voltage: 1.55V
Jewels		7 jewels

## II. STRUCTURE OF CIRCUIT BLOCK



## III. DISPLAY FUNCTION (Digital function)

• **Calendar display**

Alarm set mark

Day Date

\* Alarm set mark is displayed when the alarm function is activated.

• **Time display**

12-hour indication

24-hour indication

Alarm set mark

AM/PM Hour Minute Second

• **Alarm time display**

12-hour indication

24-hour indication

Alarm set mark

Alarm function mark AM/PM Hour Minute

• **Stopwatch display**

Alarm set mark

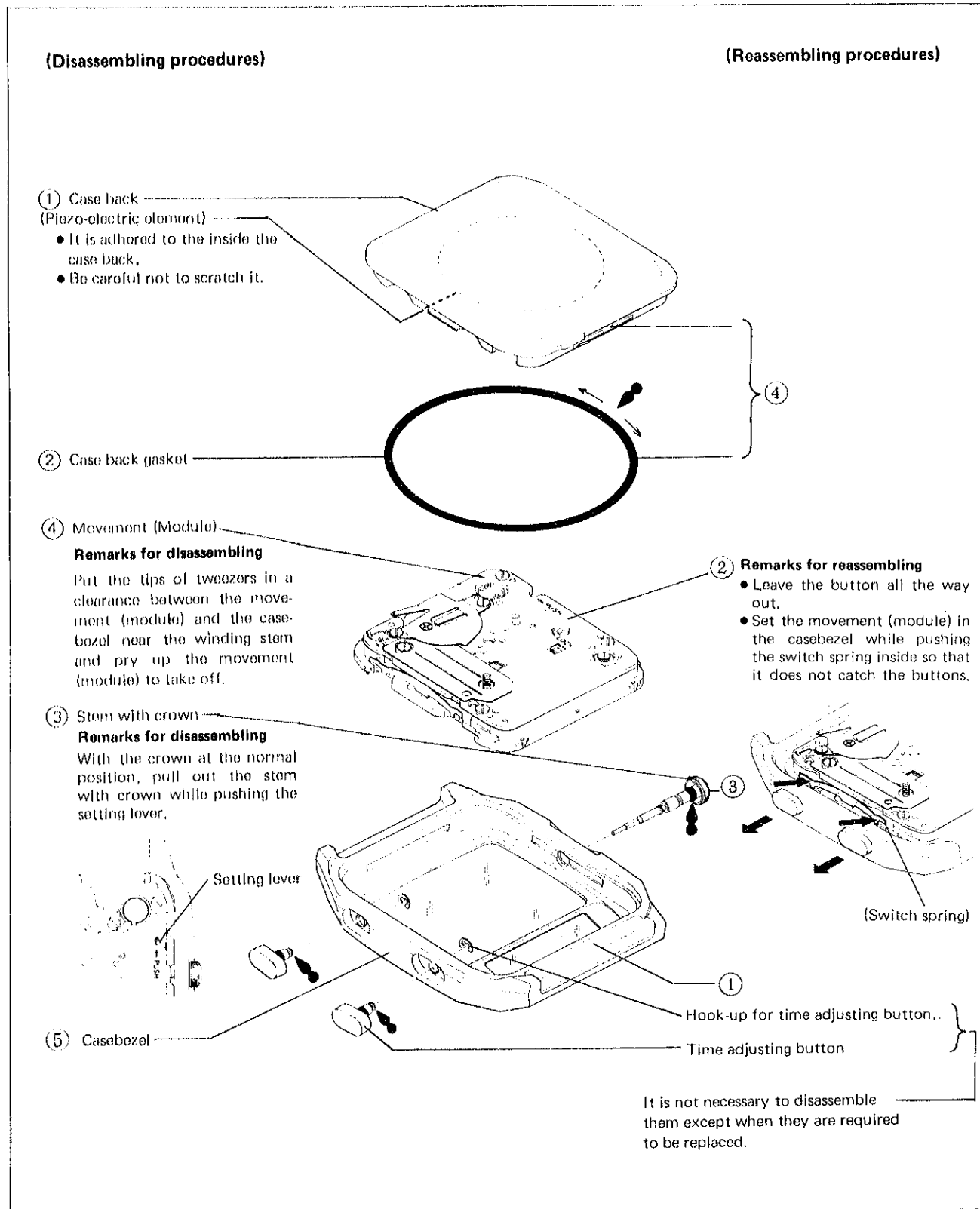
Minute Second 1/100 second

## IV. DISASSEMBLING, REASSEMBLING AND LUBRICATING

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

- Lubricating
 

Type of oil	Oil quantity
Moebius A	Normal quantity
SEIKO Watch Oil S-6	Small quantity
Silicone grease 500,000 c.s.	



### 2. Disassembling, reassembling and lubricating of the movement (module)

Disassembling procedures Figs.: ① ~ ④⑤

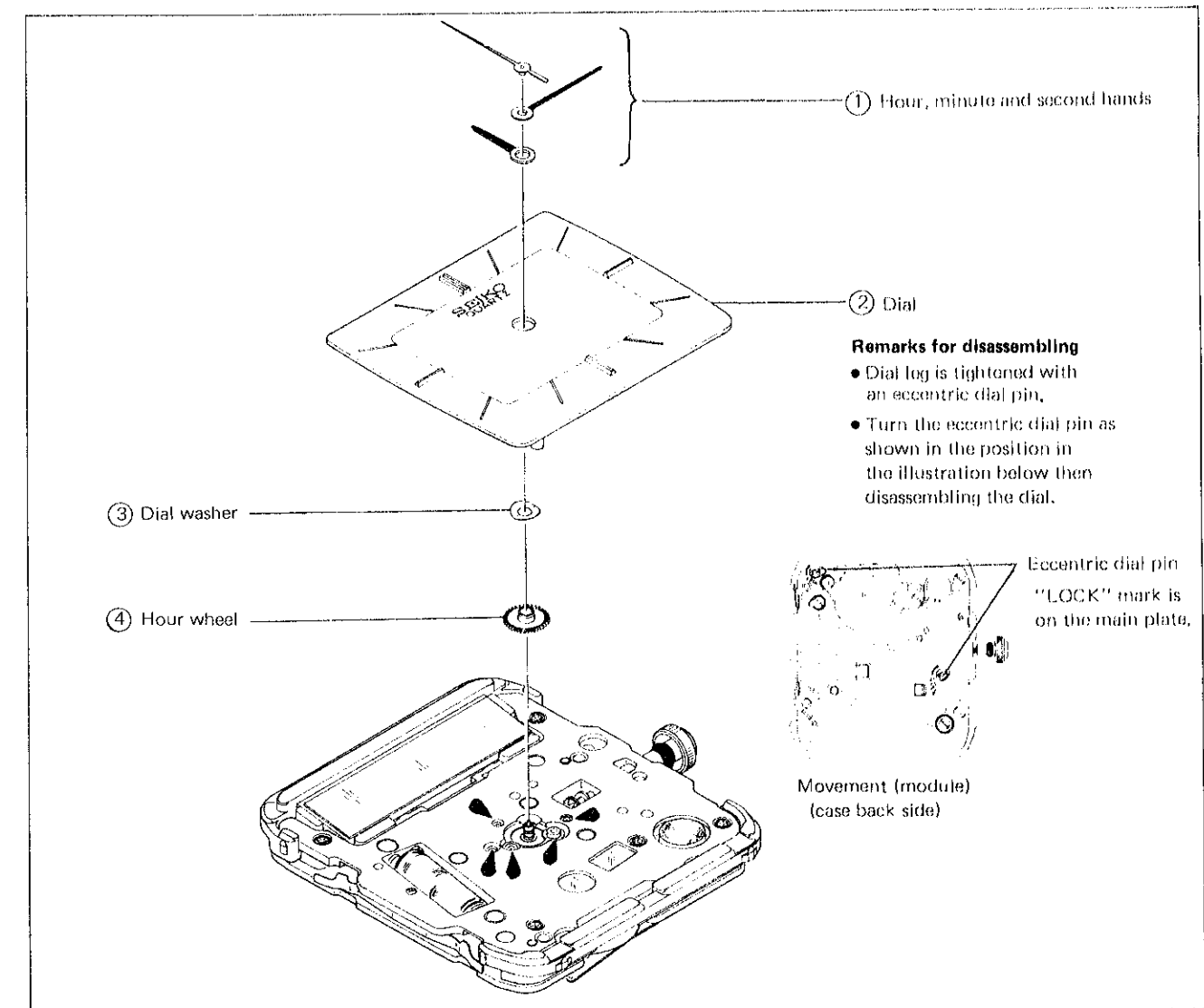
Reassembling procedures Figs.: ④⑤ ~ ①

#### • List of screws used

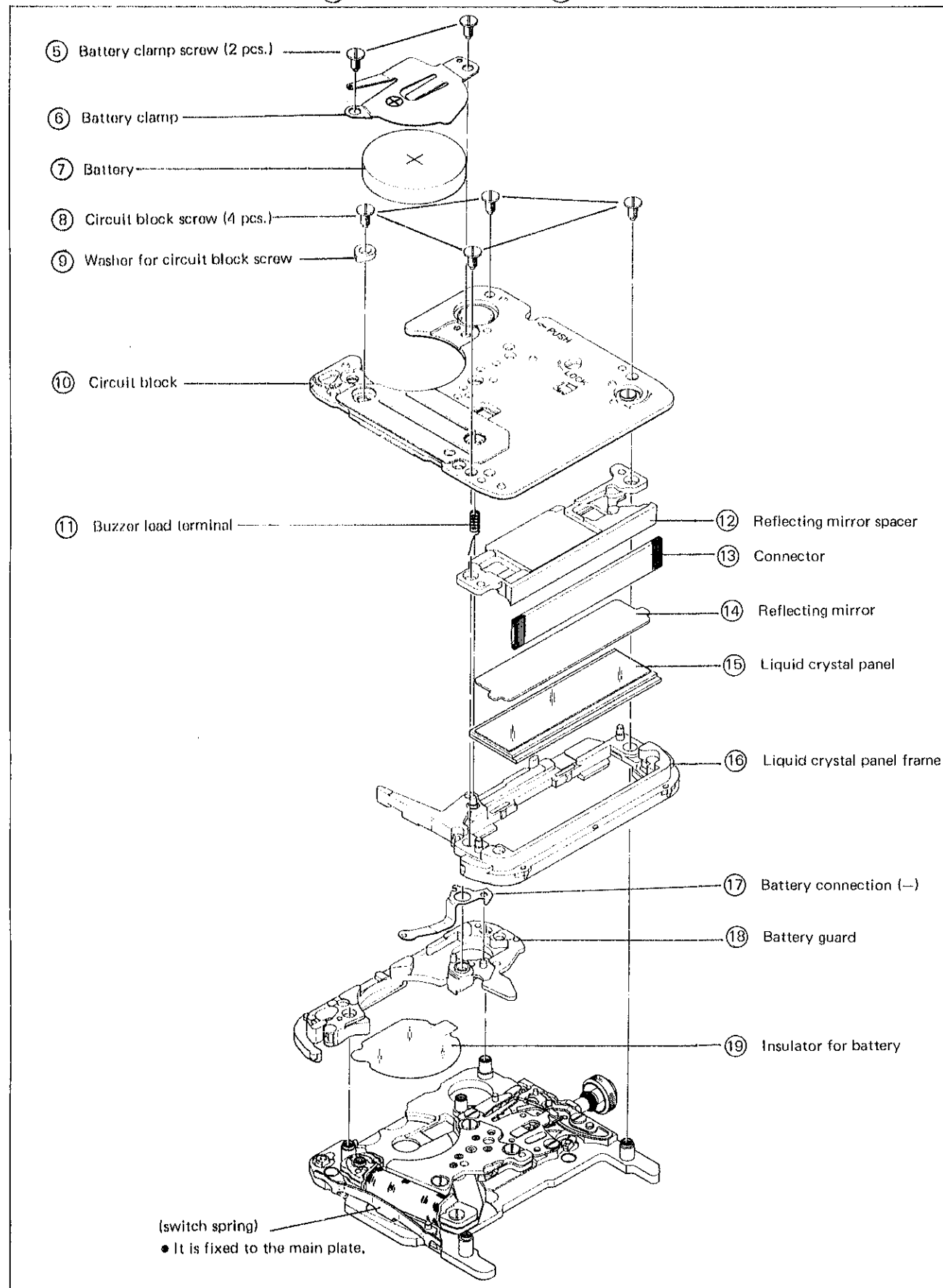
Shape	Parts No.	Parts Name	Shape	Parts No.	Parts Name
	022 241	Center wheel bridge screw (1 pc.)		022 493	Circuit block screw (4 pcs.)
		Train wheel bridge screw (3 pcs.)			Battery clamp screw (2 pcs.)
		Coil block screw (1 pc.)			
		Setting lever spring screw (2 pcs.)			
		Setting lever axle spring screw (1 pc.)			

- Use the movement (module) holder S-672 for disassembling and reassembling.

#### (1) Disassembling and reassembling of ① Hour, minute and second hands ~ ④ Hour wheel



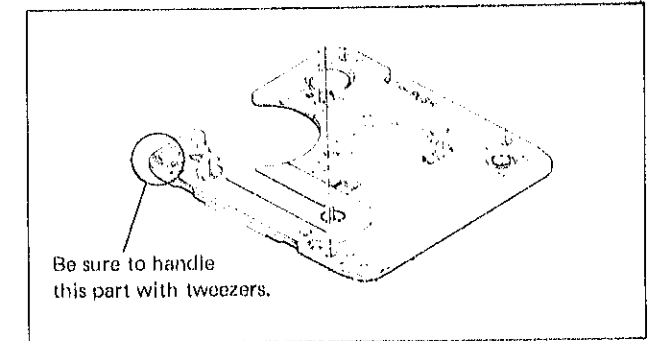
(2) Disassembling and reassembling of ⑤ Battery clamp screw ~ ⑱ Insulator for battery



Remarks for disassembling and reassembling

⑩ Circuit block

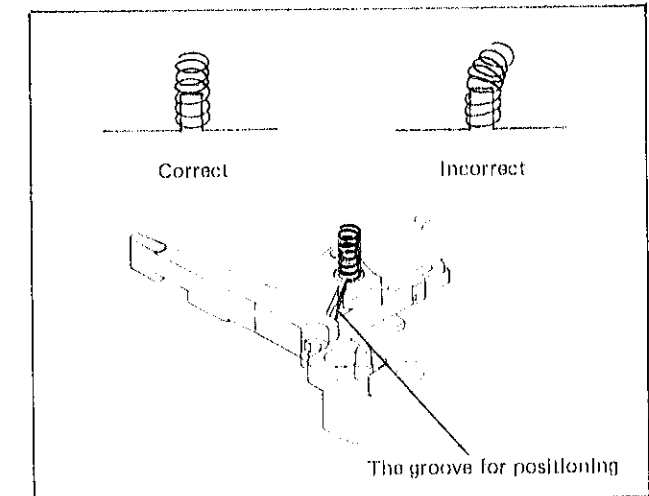
- Be careful not to touch the elements except when it is required.



Remarks for reassembling

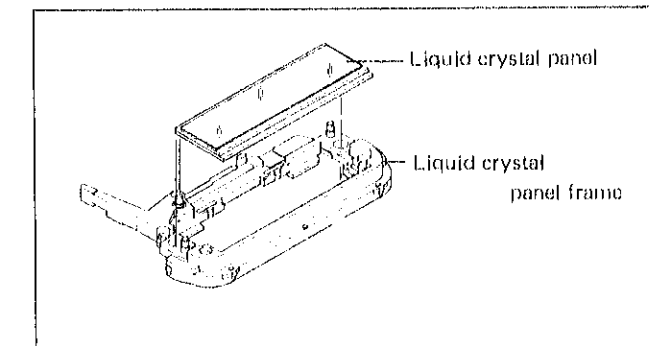
⑪ Buzzer lead terminal

- Set the buzzer lead terminal on the pin of the liquid crystal panel frame.
- Be sure to set it vertically.
- Set the tip of the buzzer lead terminal in the groove for positioning on the liquid crystal panel frame as shown in the illustration on the right.



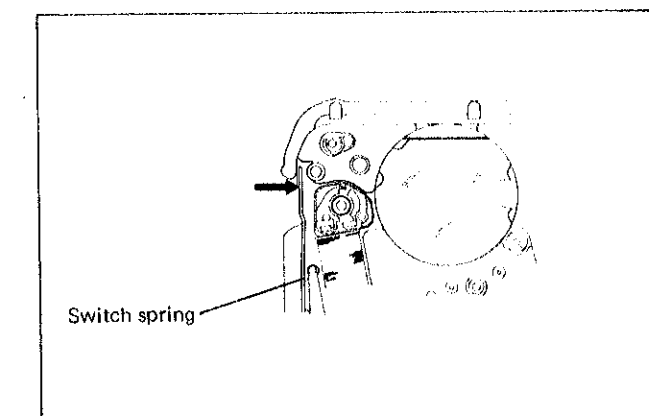
⑮ Liquid crystal panel

- The electrode turns upward at the 12 o'clock direction.
- Be careful not to mistake the top for bottom.



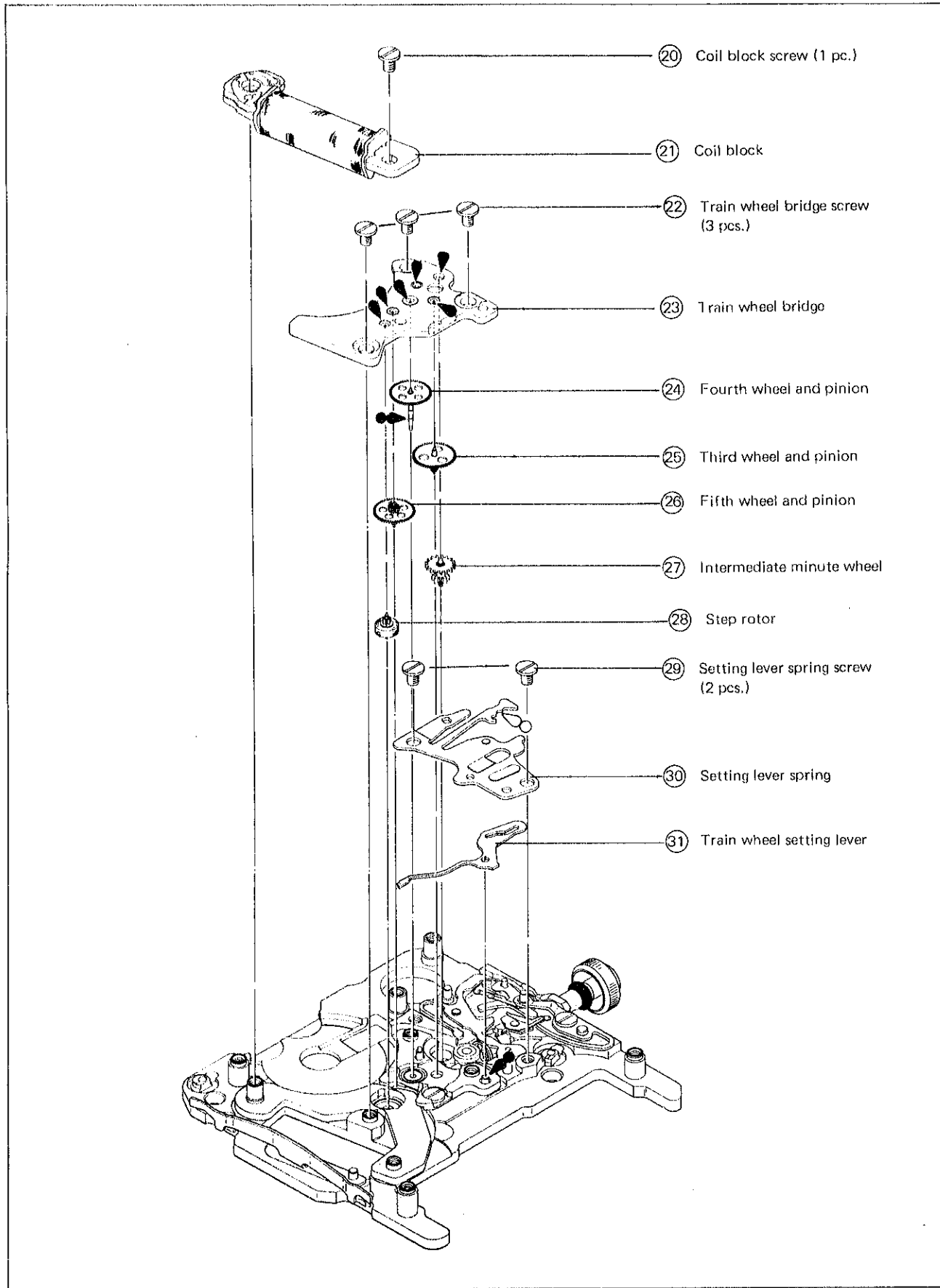
⑱ Battery guard

- Set the battery guard so that it does not catch the switch spring.





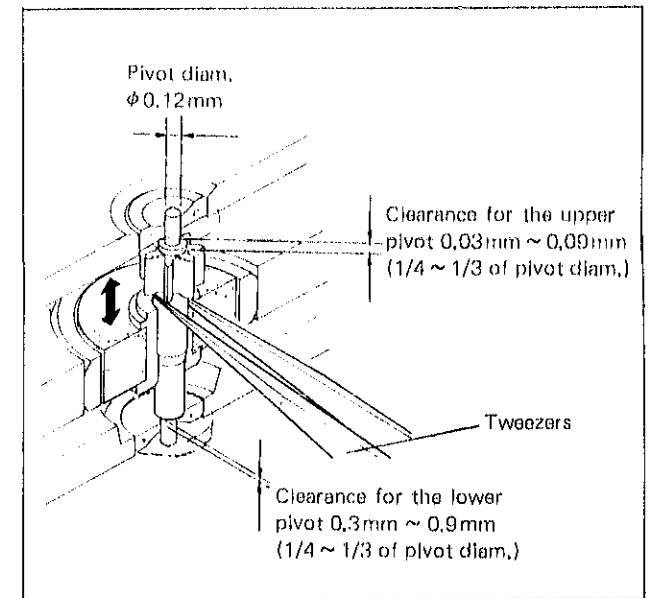
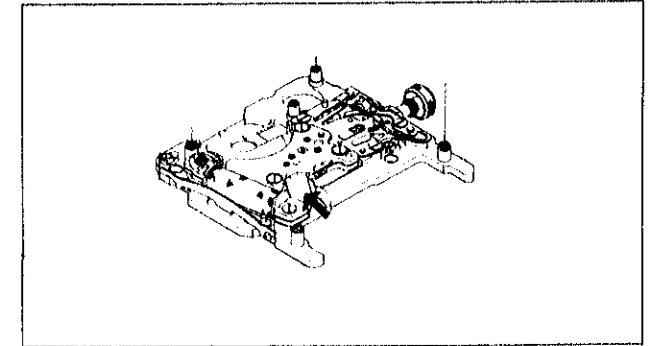
(3) Disassembling and reassembling of ⑳ Coil block screw ~ ㉑ Train wheel setting lever



Remarks for reassembling

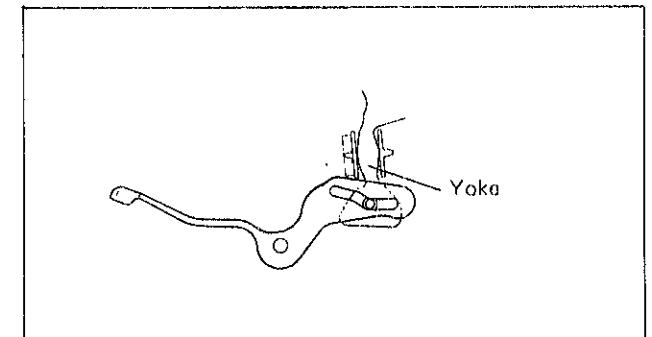
㉒ Step rotor

- Use a microscope to check the clearances from the arrow marked direction.
- Check the clearances for the upper and lower pivots for the step rotor after tightening the coil block screw.
- Check the clearance for the lower pivot by depressing the upper pivot by tweezers or a probe.
- Check the clearances by using the diameter of the pivot as a guide.

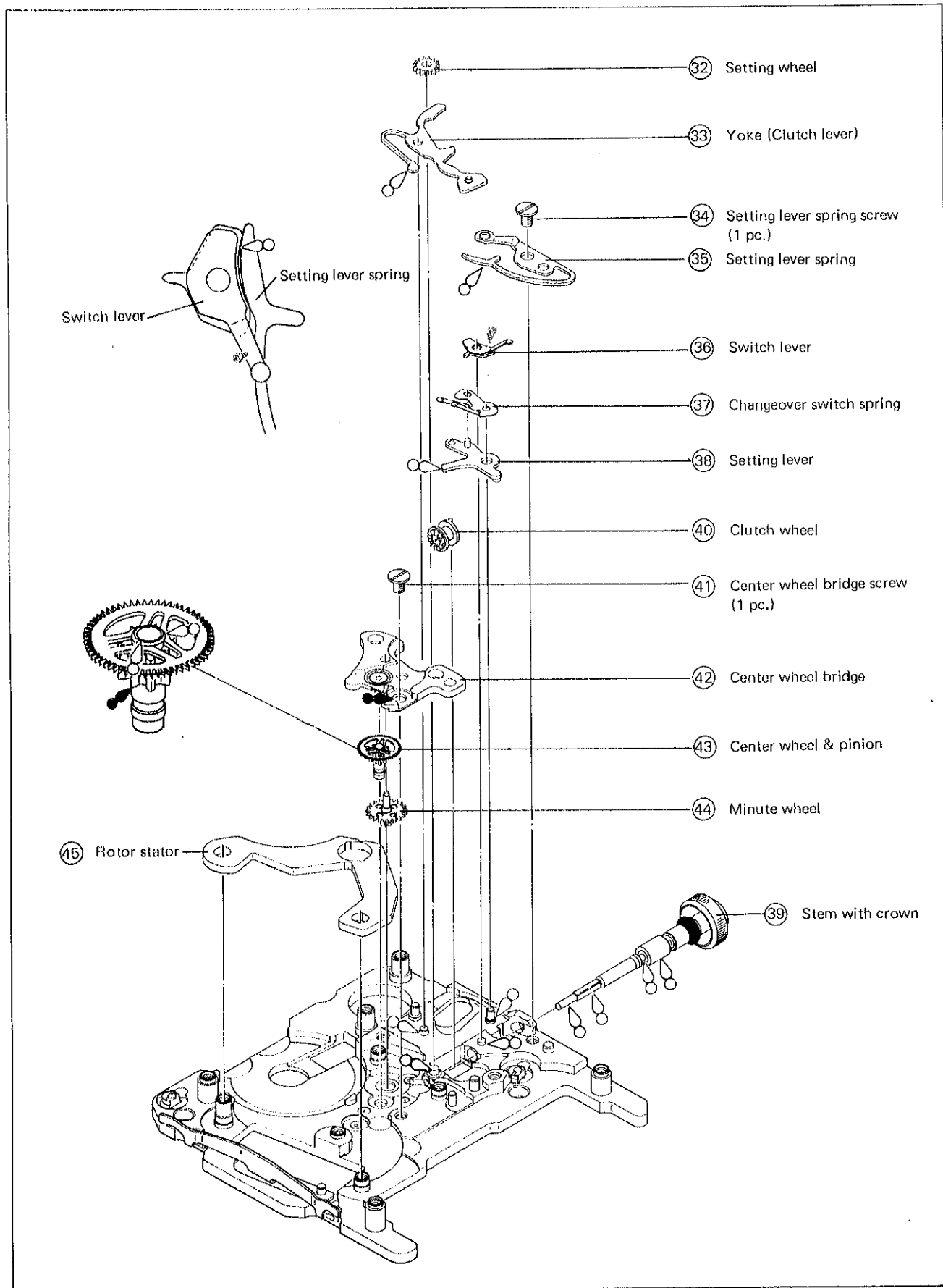


㉓ Train wheel setting lever

- Place the elongate hole on the pin portion of the yoke to set the train wheel setting lever as shown in the illustration on the right.



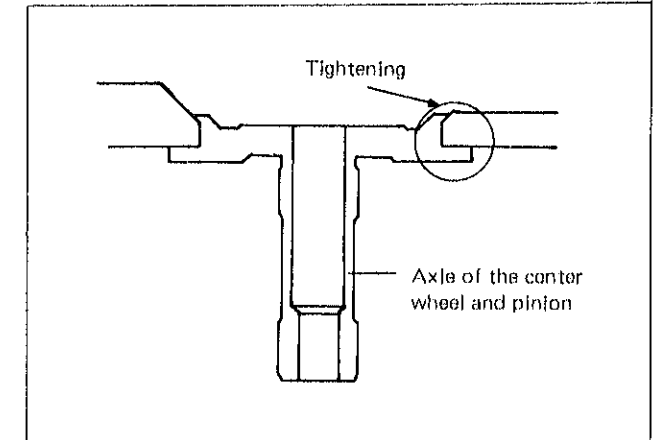
(4) Disassembling and reassembling of ③② Setting wheel~④⑤ Rotor stator



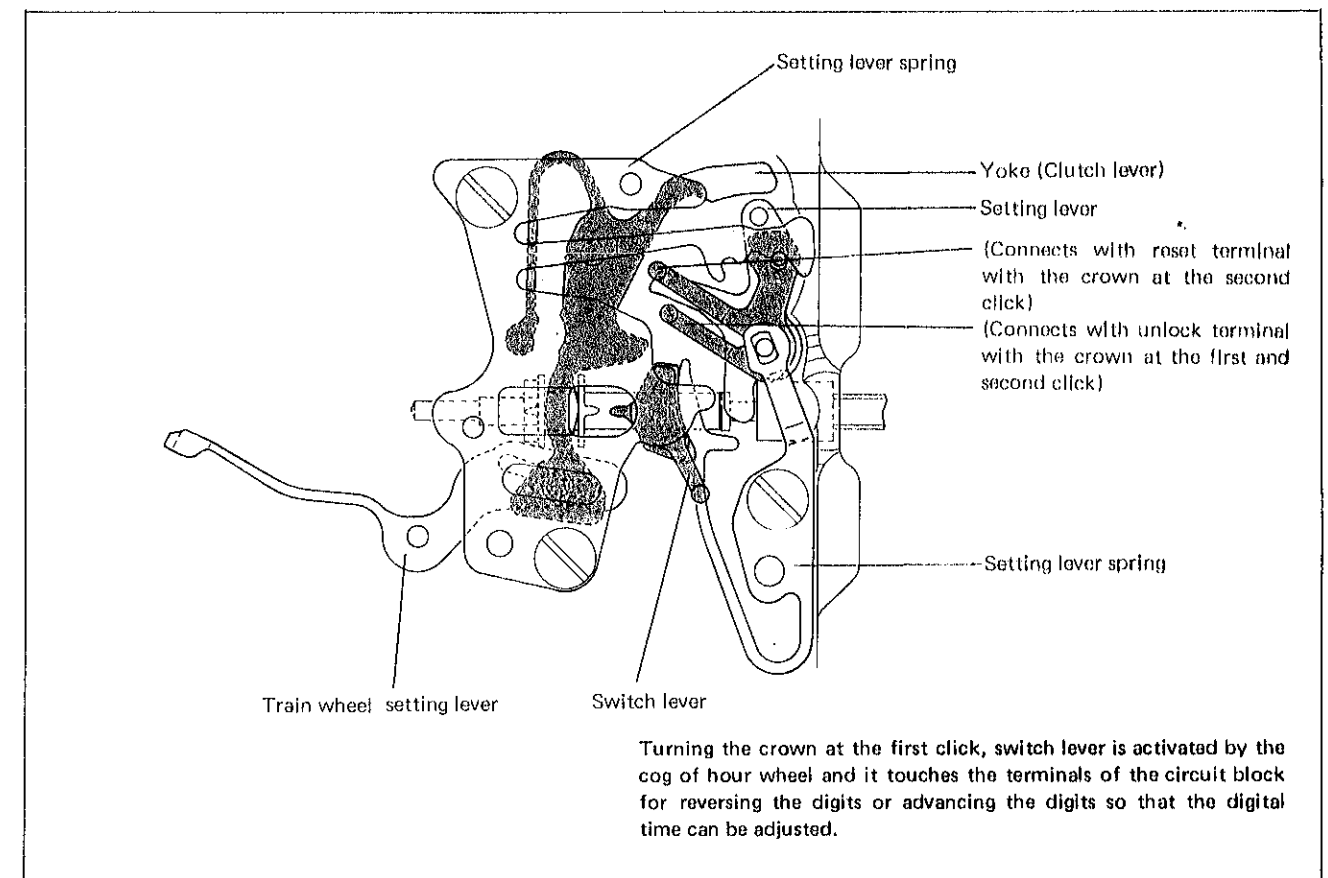
Remarks for disassembling

④② Center wheel bridge

- The axle of the center wheel and pinion is tightened to the center wheel bridge. Be sure to handle the center wheel bridge horizontally when disassembling and reassembling otherwise the parts may be broken.
- Pick it up a little and turn over the main plate and push the center wheel and pinion with tweezers, then it can be untightened.



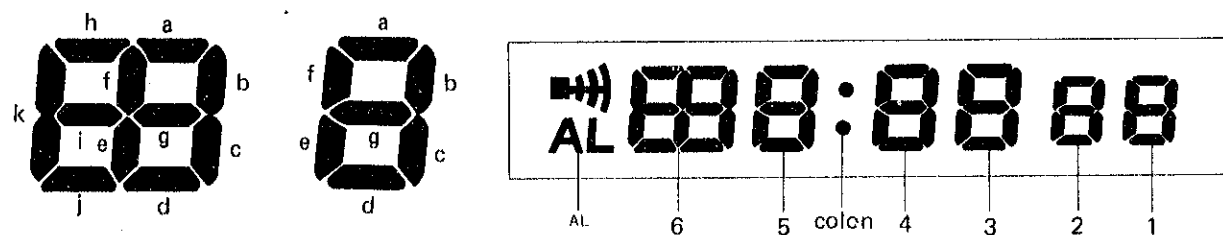
(Structure of the setting mechanism)



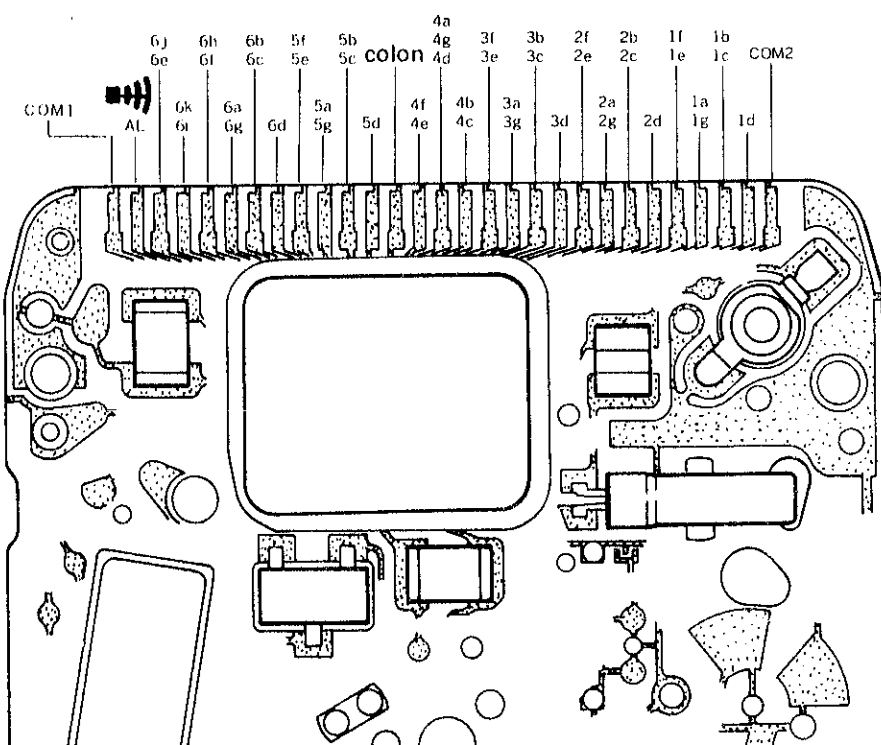
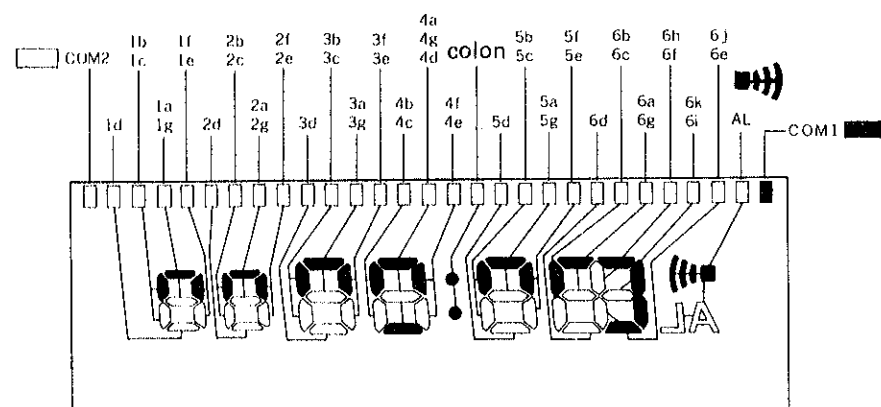
### 3. Relationship between the segment (Liquid Crystal Panel Electrode) and the C-MOS-LSI output terminal

A complete knowledge of how the segment (Liquid Crystal Panel Electrode) works with the C-MOS-LSI output terminal will provide the proper procedures for checking and adjustment.

#### • Designation of segments



#### • Relationship between the segment and the C-MOS-LSI output terminal



### V. CHECKING AND ADJUSTMENT

Refer to the "SEIKO QUARTZ TECHNICAL GUIDE, GENERAL INSTRUCTION for Digital Quartz Watches" and "Analogue Quartz Watches".

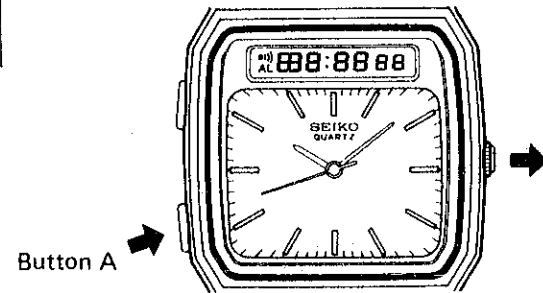
Procedures	
<b>CHECK BATTERY VOLTAGE</b>	<p><b>Result:</b></p> <p>More than 1.5V: Normal Less than 1.5V: Defective</p>
<b>CHECK BATTERY CONDUCTIVITY</b>	
<b>CHECK CURRENT CONSUMPTION</b>	
<p><b>1. Current consumption for the whole of the module</b></p> <p>Probe Red Probe Black Battery connection (-) Condenser Kit Battery surface (-)</p> <p>Make sure that the screw is tightened firmly.</p>	<p><b>Result:</b></p> <p>Less than 2.5<math>\mu</math>A: Normal More than 2.5<math>\mu</math>A: Defective Check current consumption of the circuit block alone.</p>
<p><b>2. Current consumption of the circuit block alone</b></p> <p>Probe Red Probe Black Battery surface (-) Input terminal (-) Connect the battery surface (+) with the input terminal (+).</p>	<p><b>Result:</b></p> <p>Less than 1.5<math>\mu</math>A: Normal Check the coil block and if there is not a short circuit, replace the liquid crystal panel with a new one. More than 1.5<math>\mu</math>A: Defective Replace the circuit block with a new one.</p>

Procedures

CHECK WATER RESISTANCE

CHECK PATTERN SEGMENT CHECKING SYSTEM

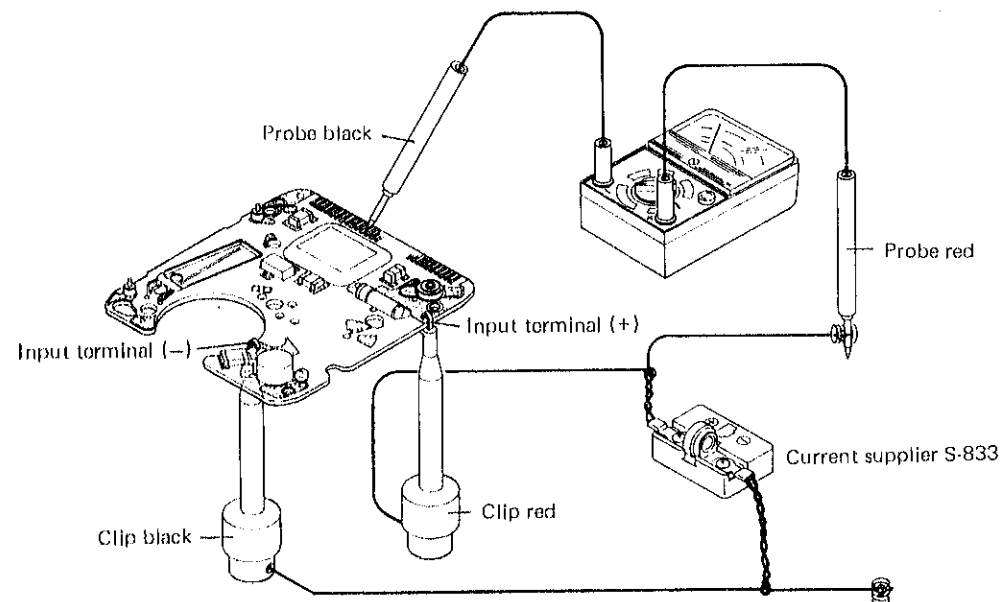
Pull out the crown with depressing button A.



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

CHECK LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK

• How to check the circuit block output voltage.



CHECK ACCURACY

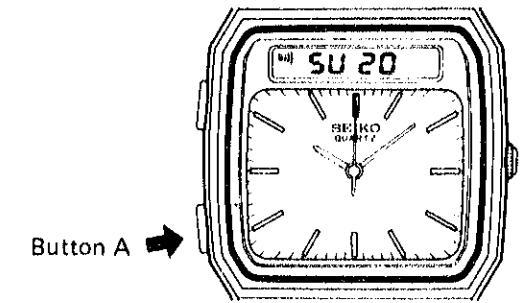
- Either electro-magnetic microphone (for analogue watches) or electric-field detection microphone (for digital watches) is available.
- When measuring up with electric-field detection microphone, it is easier to measure the daily rate if all the segments are displayed.

CHECK FUNCTIONING AND ADJUSTMENT

Procedures

CHECK ALARM TEST SYSTEM

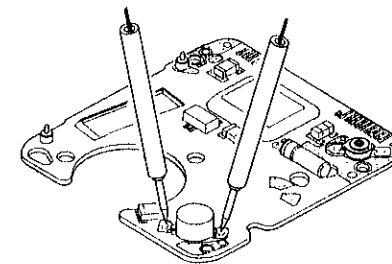
Depress button A more than two seconds.



CHECK CONDUCTIVITY OF SWITCH COMPONENTS

CHECK ALARM CONDITION

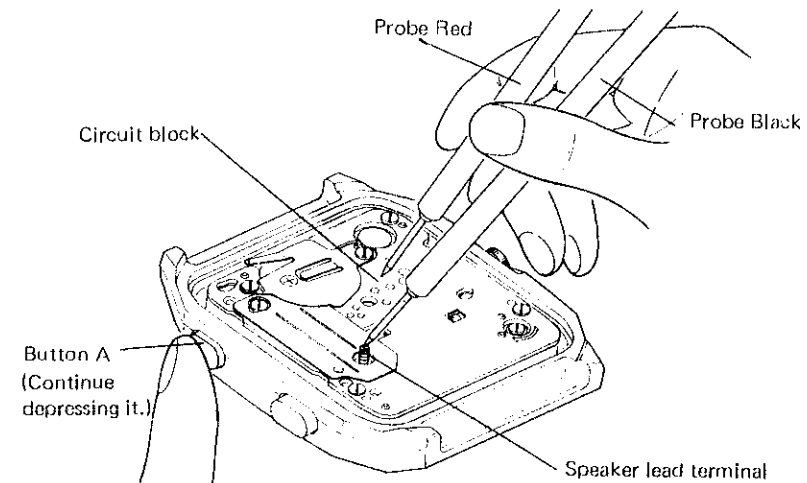
- How to check upconverter coil  
Measure the resistance of the upconverter coil and check if there is a broken wire or a short circuit.  
The range to be used for volt-ohm-meter: R x 1



Result:

20Ω ~ 80Ω: Normal  
Less than 20Ω (Short circuit)  
or over 80Ω (Broken coil wire):  
Defective

- Check output signal  
Check to see if the output voltage of the alarm function flows from the circuit block correctly.  
The range to be used for volt-ohm-meter: DC3V



Result:

The pointer swings regularly: Normal  
The pointer does not swing: Defective

Note: Be sure to depress button A with the probes applying to them. (That prevents the transistor for buzzer from breaking.)

**Procedures**

**CHECK OUTPUT SIGNAL**

**Result:**

One-second blinking: Normal  
 One-second does not blinking:  
 Defective

**CHECK HAND CONDITION**

**CHECK CONDUCTIVITY OF CIRCUIT BLOCK**

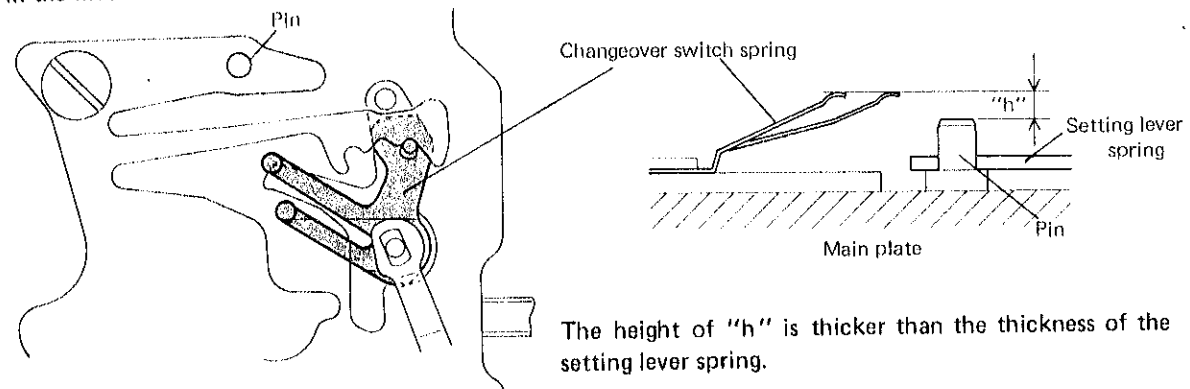
**CHECK COIL BLOCK**

**Result:**

30kΩ ~ 50kΩ: Normal  
 Less than 3.0kΩ (Short circuit)  
 or over 5.0kΩ (Broken wire):  
 Defective

**CHECK RESET CONDITION**

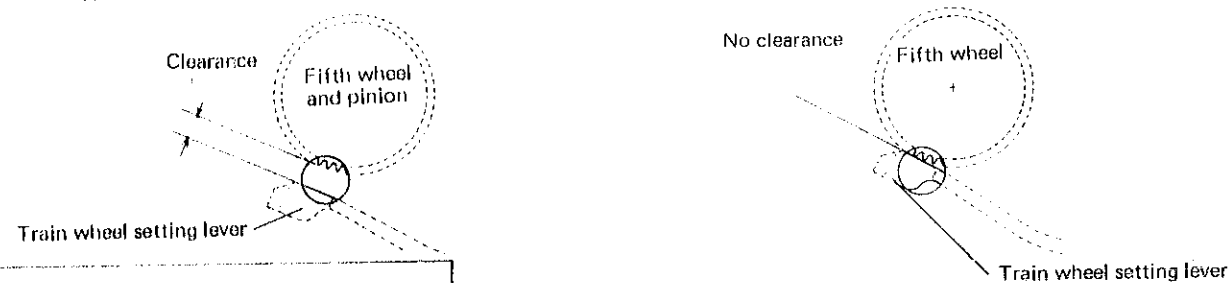
1. Check to see if the second hand stops immediately when the crown is pulled out to the second click and starts again one second after it is pushed in to the normal position.
2. Disassemble the circuit block and check the height of the tip of changeover switch spring as shown in the illustration.



3. Check for the clearance of the train wheel setting lever and fifth wheel and pinion.

The crown at the first click or second click position

The crown at the third click position



**CHECK GEAR TRAIN MECHANISM**

All procedures of Disassembling, Reassembling and Adjustment are completed.