

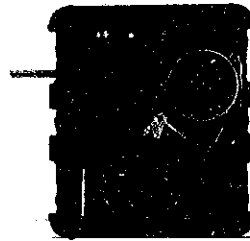
SEIKO

DIGITAL QUARTZ

Cal. H127A

PARTS LIST

Cal. H127A



4001 840



4242 842



4245 840



4245 841



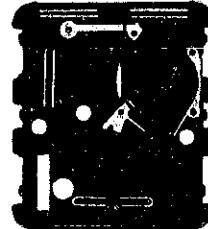
4313 840



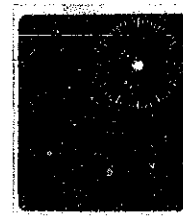
4313 841



4408 841



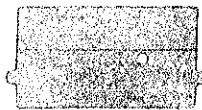
4410 840



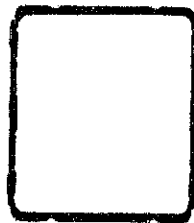
☆4510 840



☆4521 560



☆4521 562



4540 840



131 811



221 810



225 842



231 810



241 810



261 810



271 842



281 810



282 810



354 841



376 840



383 810



384 810



386 810



391 810



491 810



4001 841



4002 810



4146 810



4219 810



4239 810



☆Maxell SR936SW



022 257



022 424



022 446



022 740



022 743

2/1

Cal. H127A

Characteristics

Casing diameter : 27.2×30.3 mm
 Maximum height : 5.3 mm without battery
 Jewels : 8j
 Frequency of quartz crystal oscillator : 32,768 Hz (Hz=Hertz Cycles per second)
 Analogue indication : 2-hand time indication (Hour & Minute)
 Digital time and calendar display : Hour, minute, second, month, date and day of the week.
 Stop watch display : Digital Display System showing 12 hour, minute and second (or minute, second and 1/100 second up to 20 minutes measurement).
 Counter display : Two counter which each count from 1 to 99 or when used as one, count from 1 to 9999.
 Driving system : Step motor system (2 poles)
 Regulation system : Trimmer condenser
 Display medium : Nematic Liquid Crystal, FE-Mode
 Battery life indicator : All the digits in the display begin flashing.

PART NO.	PART NAME	PART NO.	PART NAME
4001 840	Circuit block A	4146 810	Step rotor
4242 842	Circuit connector	4219 810	Insulator for battery connection
4245 840	Setting switch spring A	4239 810	Rotor stator
4245 841	Setting switch spring B	011 547	Upper hole jewel for third wheel
4313 840	Connector A	011 547	Upper hole jewel for fourth wheel
4313 841	Connector B	011 547	Upper hole jewel for fifth wheel
4408 841	Reflecting mirror spacer	011 547	Lower hole jewel for fifth wheel
4410 840	Circuit cover	011 550	Lower hole jewel for third wheel
☆4510 840	Liquid crystal panel	011 550	Lower hole jewel for fourth wheel
☆4510 841		011 551	Upper hole jewel for center wheel
☆4521 560	Reflecting mirror A	011 726	Lower hole jewel for center wheel
☆4521 562	Reflecting mirror B	022 257	Screw for circuit block A
4540 840	Liquid crystal panel holder	022 424	Third wheel bridge screw
131 811	Third wheel bridge	022 424	Screw for circuit block B
221 810	Center wheel & pinion	022 424	Coil block screw
225 842	Cannon pinion	022 446	Lower plate screw
231 810	Third wheel & pinion	022 740	Setting lever spring screw
241 810	Fourth wheel & pinion	022 743	Hour wheel guard screw
261 810	Minute wheel	023 345	Tube for yoke
271 842	Hour wheel	027 006	Tube A for third wheel bridge screw
281 810	Setting wheel	027 007	Tube B for third wheel bridge screw
282 810	Clutch wheel	027 008	Tube A for circuit block screw
354 841	Winding stem	027 009	Tube B for circuit block screw
376 840	Hour wheel guard	027 010	Tube for coil block screw
383 810	Setting lever	027 823	Minute wheel pin
384 810	Yoke (Clutch wheel)	027 827	Second setting lever pin
386 810	Setting lever spring	027 828	Guide pin for unlocking stem
391 810	Second setting lever	027 833	Pin for unlocking stem
491 810	Dial washer	027 834	Setting lever pin
4001 841	Circuit block B	☆Maxell SR936SW	Silver oxide battery
4002 810	Coil block	☆U.C.C.394	

Remarks :

Liquid crystal panel, Reflecting mirror A, Reflecting mirror B.

Combination :

Liquid crystal panel	Reflecting mirror
☆4510 840(Black)	☆4521 560(Reflecting mirror A)
☆4510 841(White)	☆4521 560(Reflecting mirror A)
	☆4521 562(Reflecting mirror B)

Battery

☆Maxell SR 936 SW } The applied battery for this calibre might be added the substitutive in the future.
 ☆U.C.C. 394 } In that case, please refer to separate "BATTERIES FOR SEIKO QUARTZ WATCHES".

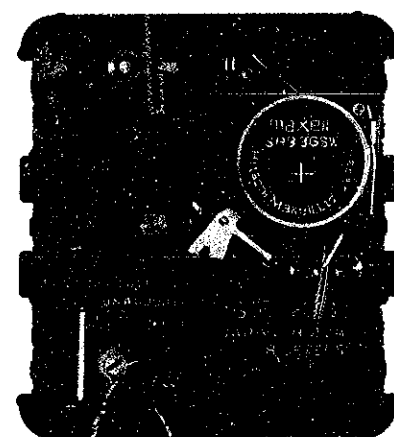
☆⇨Please see remarks.

Part numbers in light letters are not shown in photos.

TECHNICAL GUIDE

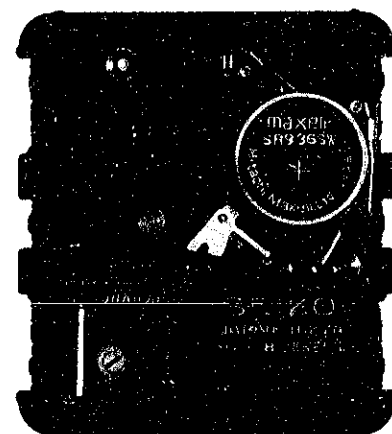
SEIKO DIGITAL QUARTZ

CAL. H127A



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I. SPECIFICATIONS

Calibre No.		H127A
Item		
Digital function	Display medium	Nematic Liquid Crystal, FEM (Field Effect Mode)
	Display system	Five-function changeover system with time, calendar, stopwatch, counter and time/calendar setting functions. - Time function: 12-hour digital display system showing hour, minute, second and day of the week. - Calendar function: Month, date and day of the week. (In the time/calendar function, the stopwatch function is activated by depressing a button.) - Stopwatch function: Hour, minute and second up to 12 hours (minutes, seconds and 1/100 second up to 20 minutes). - Counter function: - Single counter Counting up to 9999 - Twin counter Counting up to 99 in two ways - Time/calendar setting function: Setting of the second, minute, hour ("A" (A.M.)/"P" (P.M.)), month, date and day of the week.
	Additional mechanism	- Battery life indicator (All the digits in the display start flashing when the battery life nears its end.) - Pattern segment checking system
Analogue function	Time indication	Two-hand indication (Hour and minute)
	Additional mechanism	Electronic circuit reset switch
	Driving system	Step motor system (2 poles: steps once every 20 seconds)
Crystal oscillator		32,768 Hz (Hz = Hertz Cycles per second)
Loss/gain		Loss/gain at normal temperature range Mean monthly rate: less than 10 seconds (Annual rate: less than 2 minutes)
Module size (Square type)		30.3 mm between 12 o'clock and 6 o'clock sides 27.2 mm between 3 o'clock and 9 o'clock sides
Height		5.3 mm with battery
Operational temperature range		-10°C ~ +60°C (14°F ~ 140°F)
Regulation system		Trimmer condenser
Battery power		Silver oxide battery Maxell SR936SW or U.C.C. 394 Battery life is approximately 3 years. Voltage: 1.55V
IC (Integrated Circuit)		C-MOS-LSI 1 unit C-MOS-IC 1 unit
Jewels		8 jewels

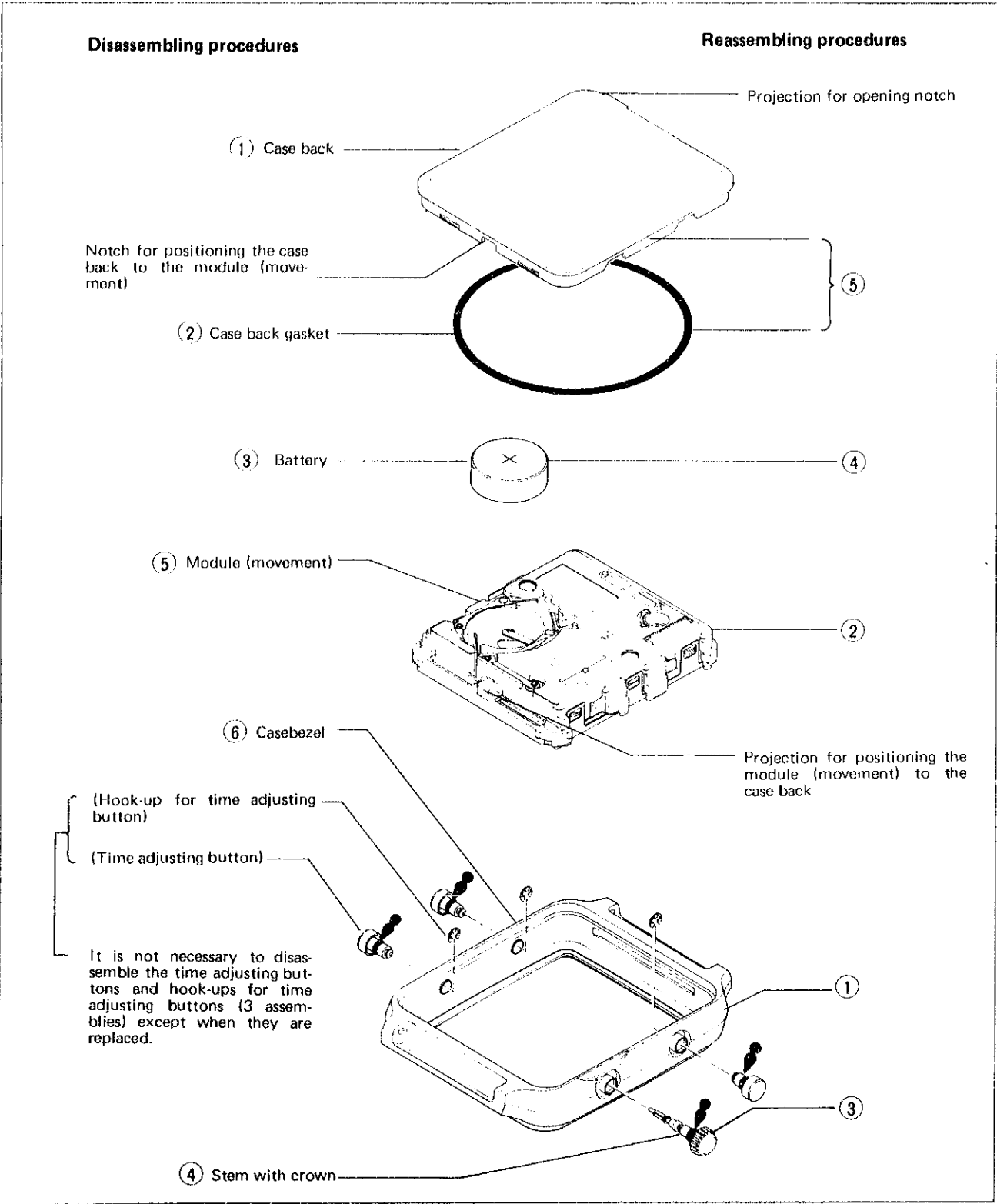
II. DISASSEMBLING, REASSEMBLING AND LUBRICATING

1. Disassembling and reassembling of the case

Lubricating: ●

Silicone grease 500,000 c.s., normal quantity

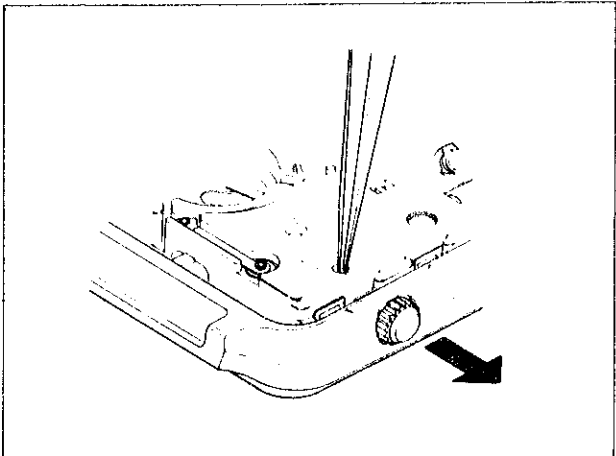
Example: H127-5009 A



Remarks for disassembling

4 Stem with crown

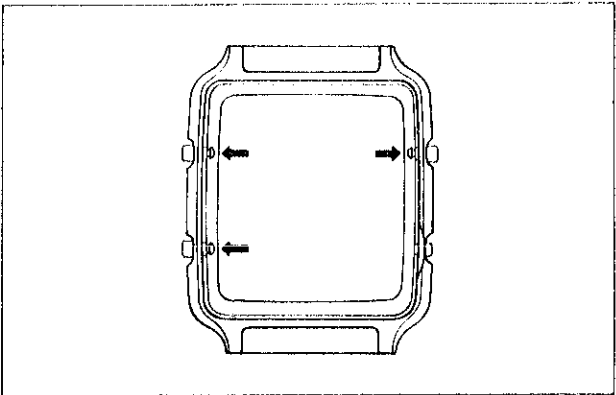
- Pull out the stem with crown while pushing the pin for unlocking stem.
- Be careful not to push the pin for unlocking stem excessively as the setting lever might be disconnected from the pin for unlocking stem, and the stem with crown will be prevented from being disassembled.



Remarks for reassembling

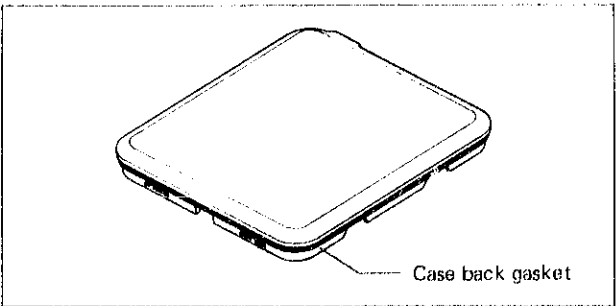
1 Casebezel

- Before reassembling the module (movement), pull out all buttons so that the switch springs do not prevent the module (movement) from being re-assembled. (Push the buttons from inside with tweezers.)

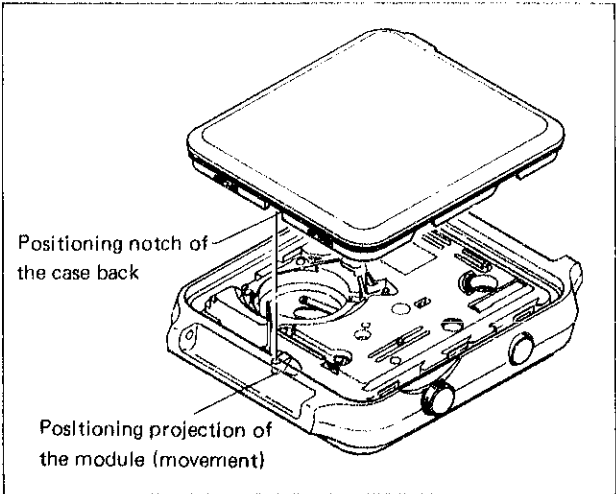


5 Case back and case back gasket

- Be sure to set the case back gasket in the case back before reassembling the case back.



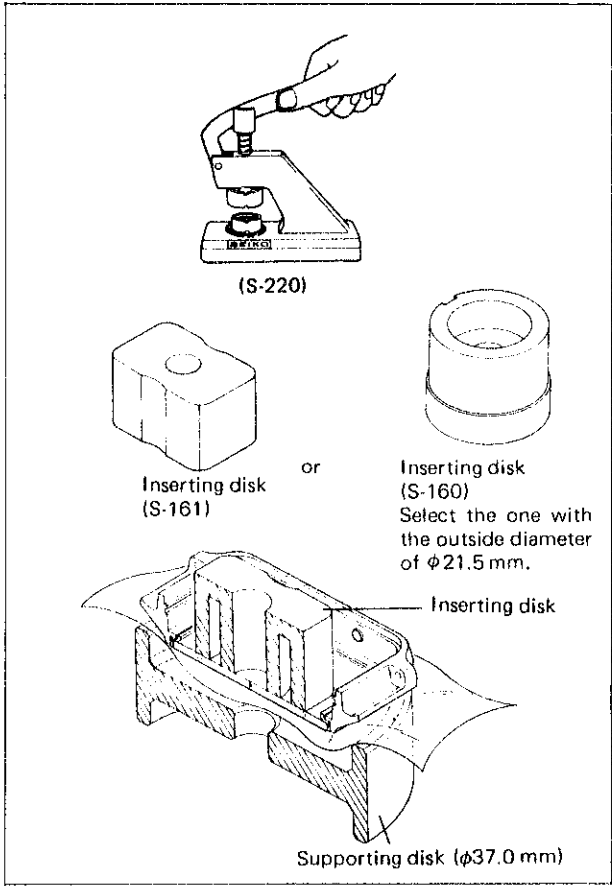
- Be sure to set the case back on the module (movement) so that the positioning projection (at 12 o'clock position) of the module (movement) is set in the positioning notch of the case back.



How to replace the glass

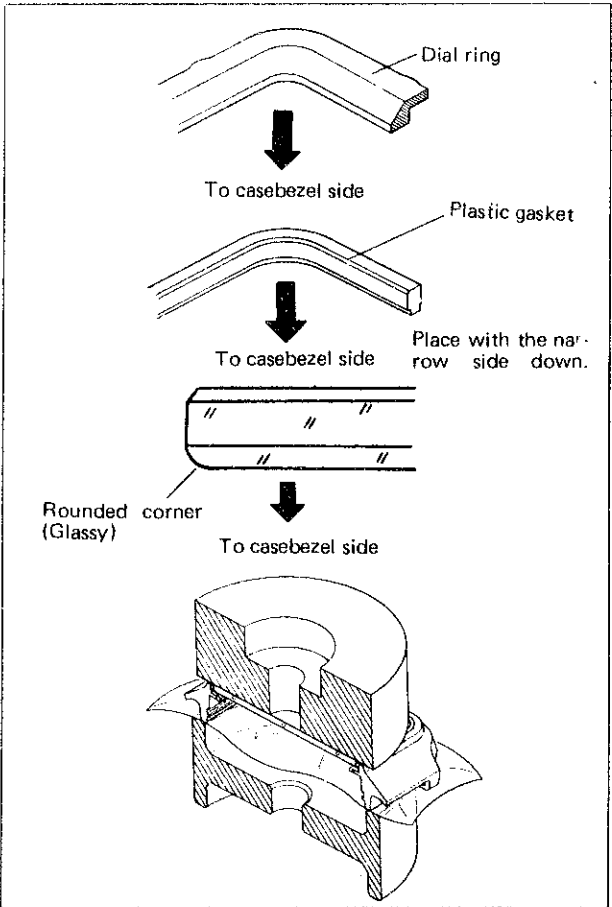
It is not necessary to disassemble the glass except when the glass or the dial ring is required to be replaced.

- How to disassemble the glass
- Use the tightening tool S-220 to disassemble the glass.
- Inserting disk: S-161 or the disk $\phi 21.5$ mm contained in the S-160 Disk unit.
- Supporting disk: $\phi 37.0$ mm
- Push the glass directly so as not to touch the dial ring and remove it.



• Reassembling of the glass

- Set the dial ring.
 - Be careful not to bend the dial ring as it might be broken.
 - Be careful not to mistake the upper side of the dial ring for the lower side.
- Set the plastic gasket.
 - Be sure to replace the plastic gasket with a new one in order to maintain the water resistance.
 - Be careful not to mistake the upper side of the plastic gasket for the lower side.
- Set the glass.
 - Set the glass with the rounded corner down.
- Push in the glass (by using S-220)
 - Inserting disk : S-173
 - Supporting disk: $\phi 32.0$ mm ~ $\phi 35.0$ mm



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

• List of screws used

The following five types of screws are used in Cal. H127A.

Shape	Parts No.	Parts Name (Interchangeability)	Shape	Parts No.	Parts Name (Interchangeability)
	022257	Screw for circuit block "A" (2 pcs.)		022446	Lower plate screw (2 pcs.)
	022424	Third wheel bridge screw (2 pcs.)		022740	Setting lever spring screw (2 pcs.)
		Screw for circuit block "B" (2 pcs.)		022743	Hour wheel guard screw (2 pcs.)
		Coil block screw (1 pc.)			Gold plated

• Lubricating

The following marks in the diagrams for disassembling and reassembling indicate the types of oil, oil quantity to be applied and the lubricating portions. Be sure to lubricate according to the marks.

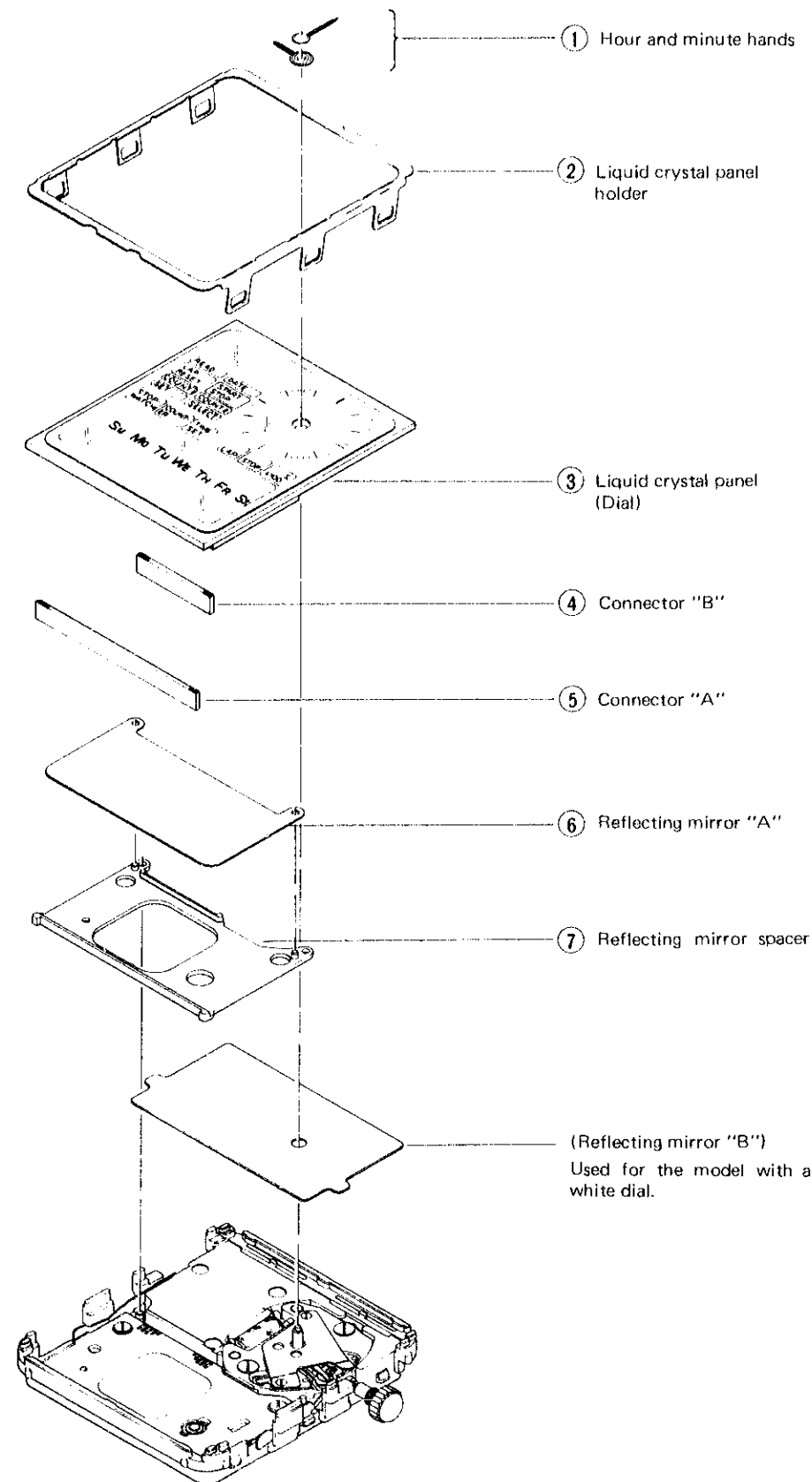
Types of oil	Quantity of oil
Moebius A	Normal quantity
SEIKO Watch Oil, S-6	Extremely small quantity

• Movement holder

Disassembling and reassembling of the gear train side of the analogue function	Disassembling and reassembling of the setting mechanism of the analogue function
(S-664) – Used for Cal. 16 series is interchangeable.	Disassemble or reassemble with the movement of the analogue function screwed down on the circuit cover.

The movement holder is not necessary for disassembling and reassembling of the digital function.

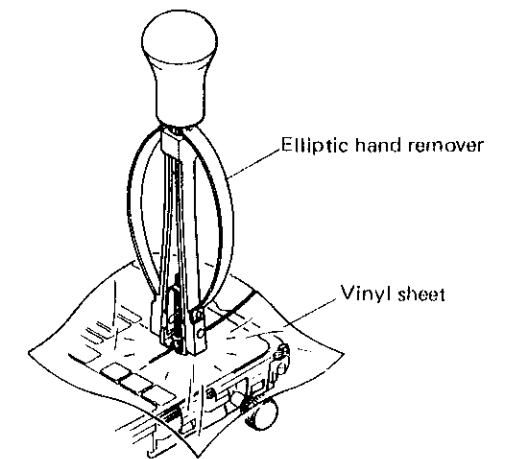
(1) Disassembling and reassembling of the hour hand and minute hand ~ reflecting mirror spacer.



Remarks for disassembling

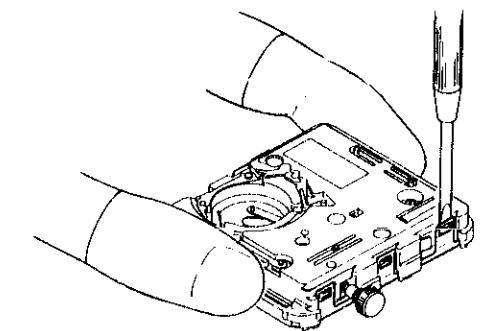
① Hour and minute hands

- Use the elliptic hand remover to pull out the hands.
- When using the hand remover, do not use the dial (liquid crystal panel) as a fulcrum. The dial (liquid crystal panel) may be damaged as it is made of glass.



② Liquid crystal panel holder

- The six projections of the circuit cover fit into the holes of the liquid crystal panel holder. To disassemble the liquid crystal panel holder, remove the joggles one by one with the tip of a screwdriver or tweezers.
- When the joggles are removed, there will be plastic dust on the circuit cover. Be sure to wipe off plastic dust with Rodico, etc.

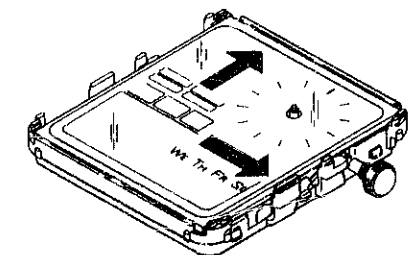


Hold the circuit cover with fingertips (Put the fingernails on your fingers) so that axle of the center wheel does not touch the movement holder.

Remarks for reassembling

③ Liquid crystal panel

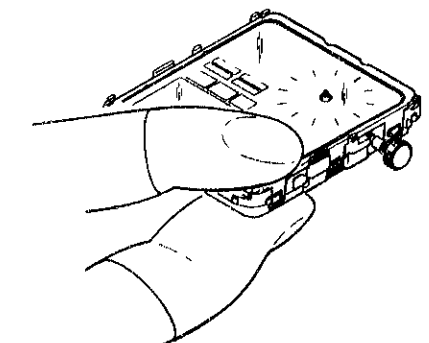
- Reassemble the liquid crystal panel so that the clearance between the hole of the dial and the hour wheel be even.
- Reassemble the liquid crystal panel while pushing it toward the 12 o'clock and 3 o'clock sides of circuit cover so that the clearance between the hole of the dial and the hour wheel become uniform in width.



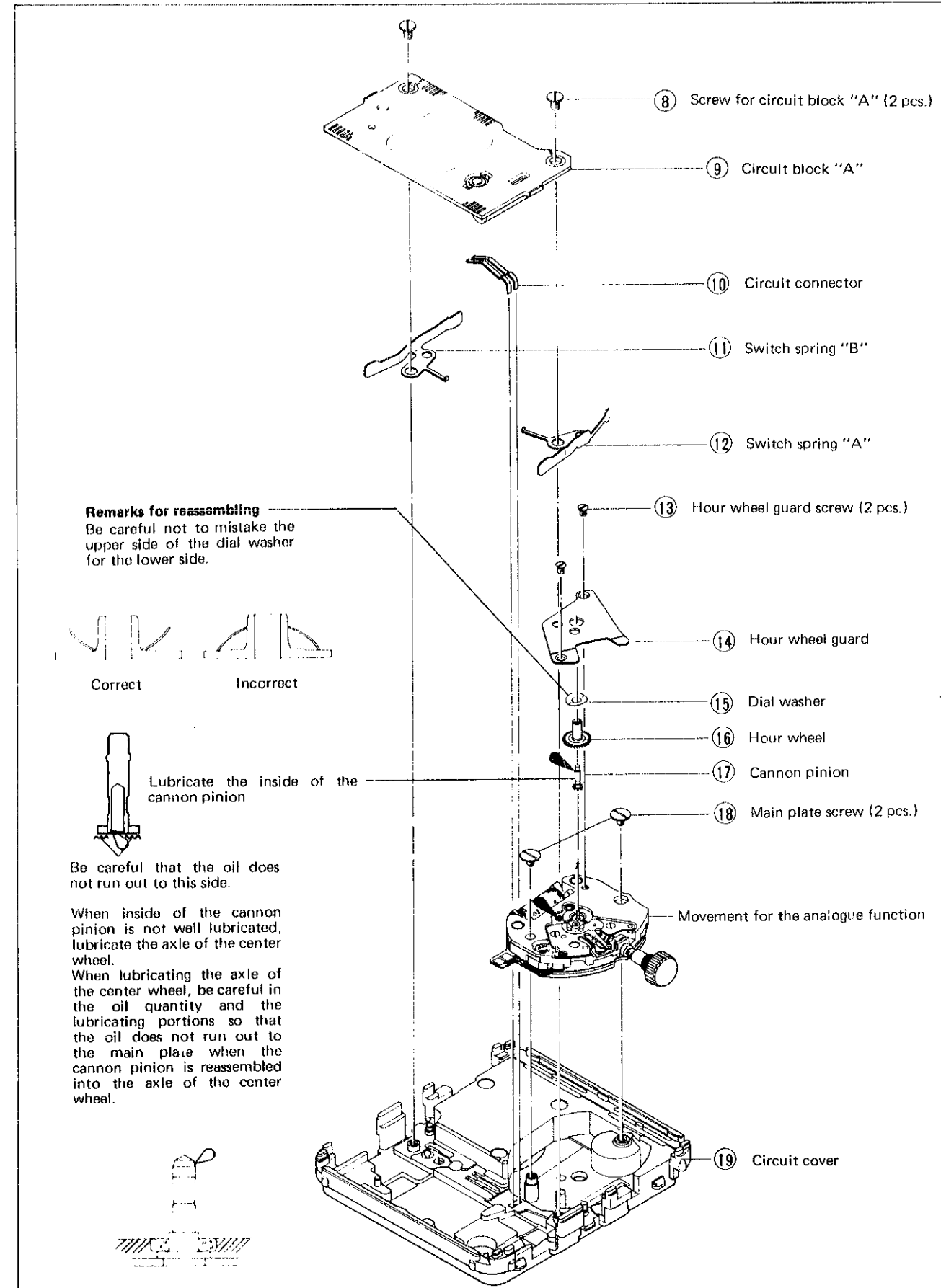
Reassemble while pushing toward the 12 o'clock and 3 o'clock sides of the circuit cover.

② Liquid crystal panel holder

- Reassemble the liquid crystal panel holder, then hold it with fingers and snap the spring portion as shown in the illustration.
- Be sure to set the six spring portions firmly.
- There will be plastic dust while reassembling the liquid crystal panel holder. Be sure to wipe off the plastic dust with Rodico, etc.



(2) Disassembling, reassembling and lubricating of the circuit block "A" ~ circuit cover



Remarks for disassembling

It is impossible to disassemble the movement for the analogue function unless the circuit block "A" is disassembled.

11 Switch spring "B"

12 Switch spring "A"

- Pry up the pin of the circuit cover and the pin of the screw for circuit block "A" gradually for disassembling the switch springs "A" and "B".
- Do not disassemble the switch springs "A" and "B" forcibly as they might be bent.

13 Hour wheel guard screw

- The hour wheel guard screw is plated with gold so that it can be distinguished from the setting lever spring screw.

Remarks for reassembling

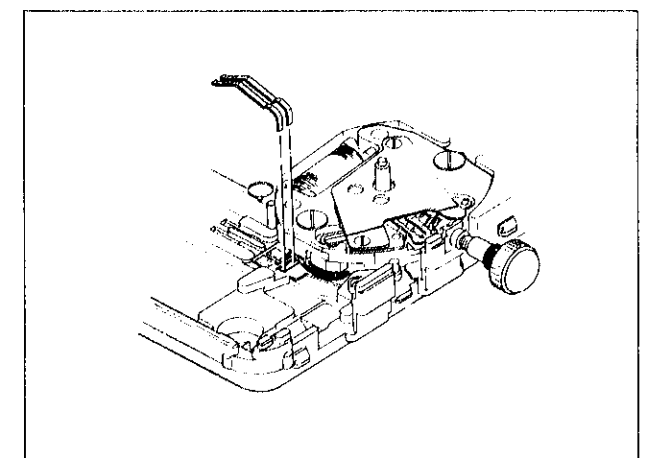
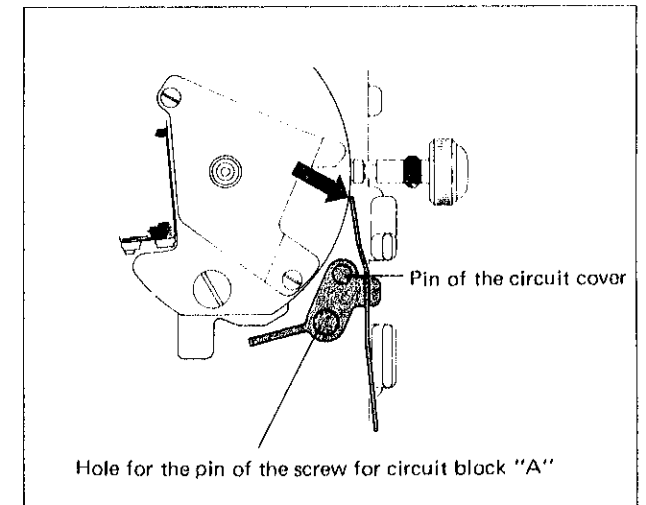
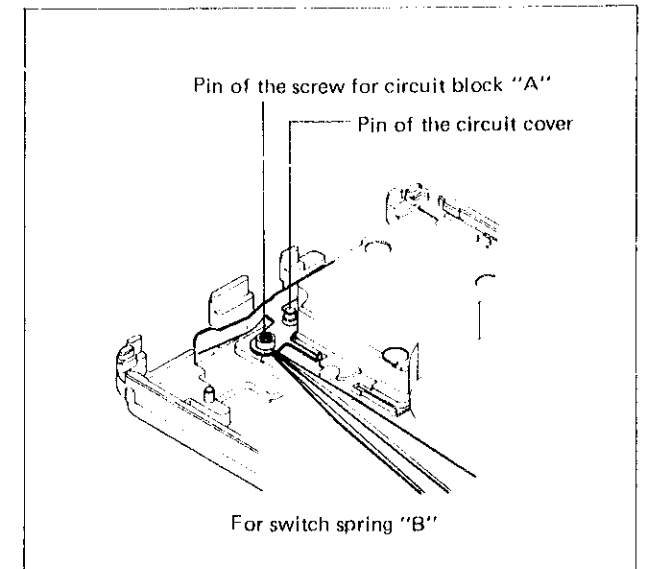
12 Switch spring "A"

11 Switch spring "B"

- Reassemble the switch springs "A" and "B" while bending themselves and aligning their holes with the pins of the circuit cover and the hole for the pin of the screw for circuit block.
- After reassembling, be sure to check if the arrow-marked portion touches the main plate of the movement for the analogue function firmly.

10 Circuit connector

- Fit the leg portions of the circuit connector in the holes of the circuit cover.
- Set the circuit connector so that its legs are parallel to each other.



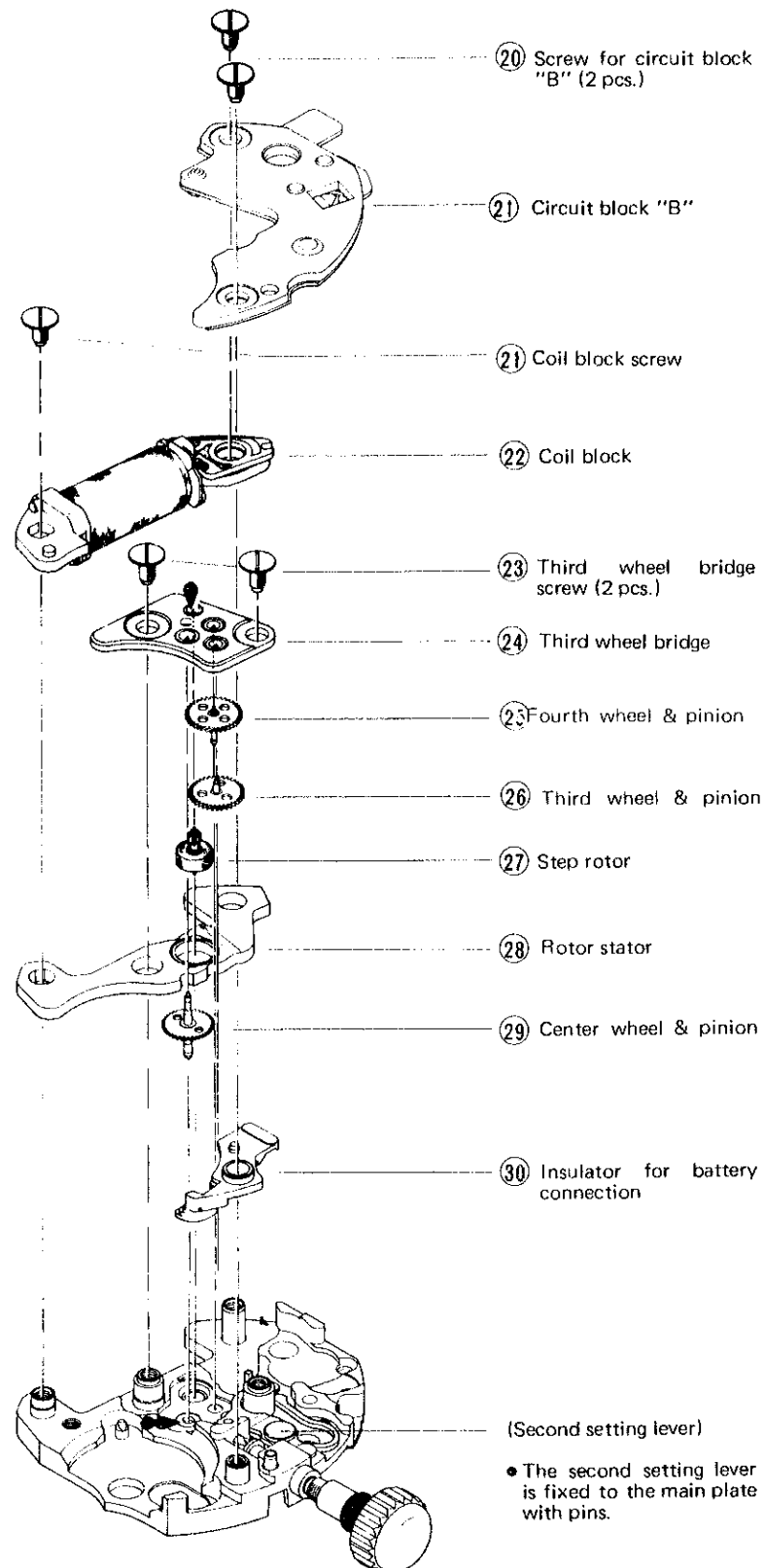
(3) Disassembling, reassembling and lubricating of the circuit block "B", coil block and gear train

Remarks for disassembling and reassembling of the gear train

- Be sure to disassemble and reassemble the gear train with the crown pushed in so that the second setting lever and the gears do not scratch and damage each other.

- It is not necessary to lubricate the gear train except the step rotor and lower hole jewel for center wheel.

When lubricating the gear train, lubricate slightly.

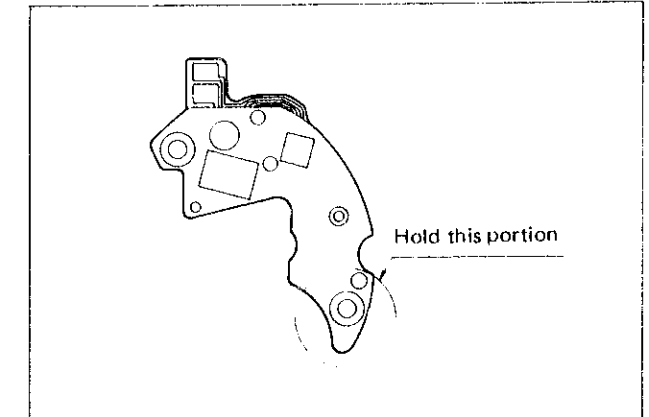


Remarks for disassembling and reassembling

21 Circuit block "B"

Remarks for disassembling and reassembling

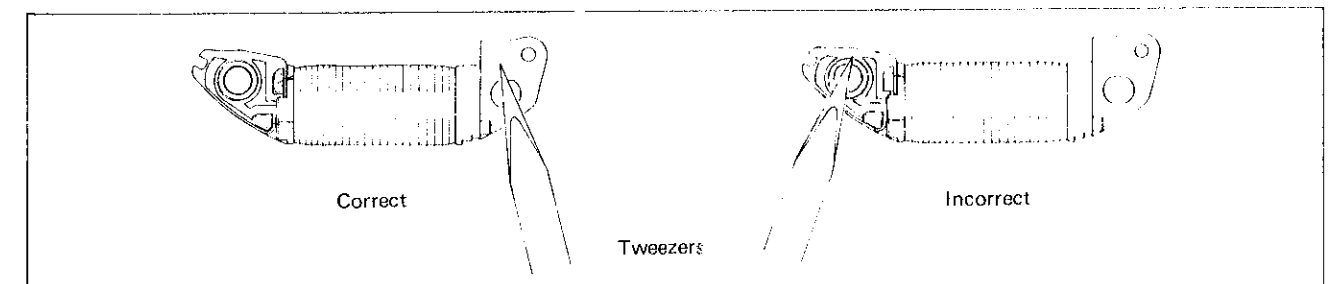
- Be careful not to cut the copper leaf patterns on the reverse side of the circuit block "B" with tweezers, etc.
- Do not touch the element.



22 Coil block

Remarks for disassembling and reassembling

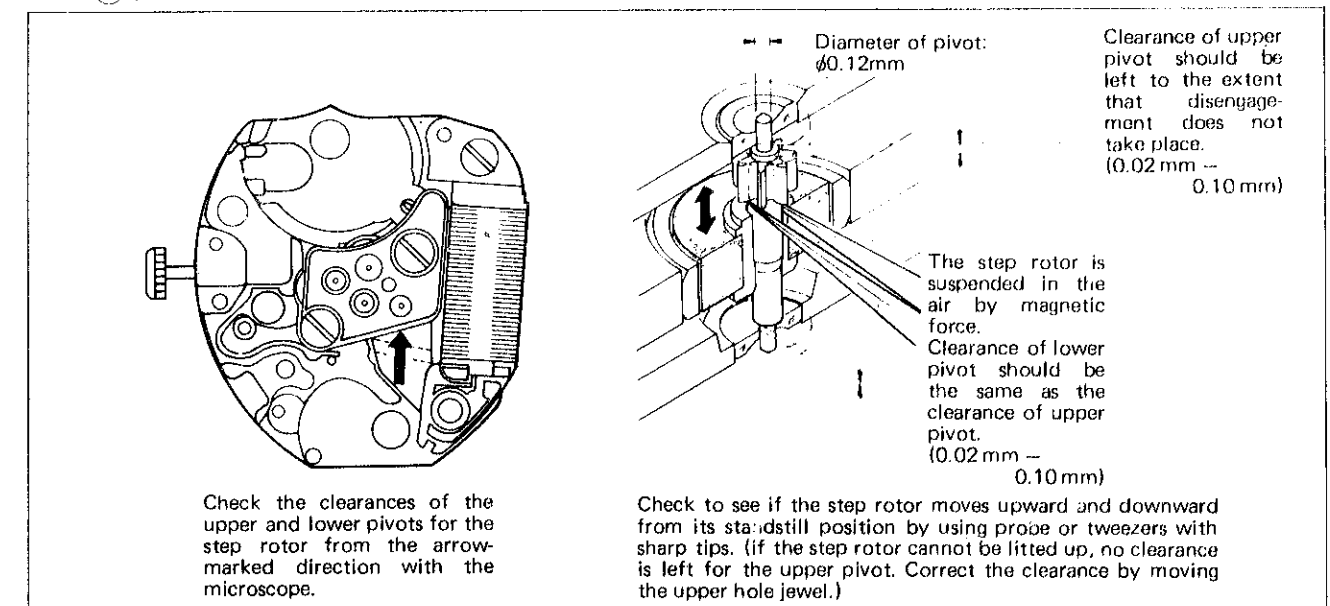
- Hold the coil block with tweezers as shown in the illustration so that the coil wire and the coil lead terminal may not be scratched and bent.



27 Step rotor

Remarks for reassembling

- Check for the clearances of the upper and lower pivots for the step rotor after reassembling the coil block screw 21.



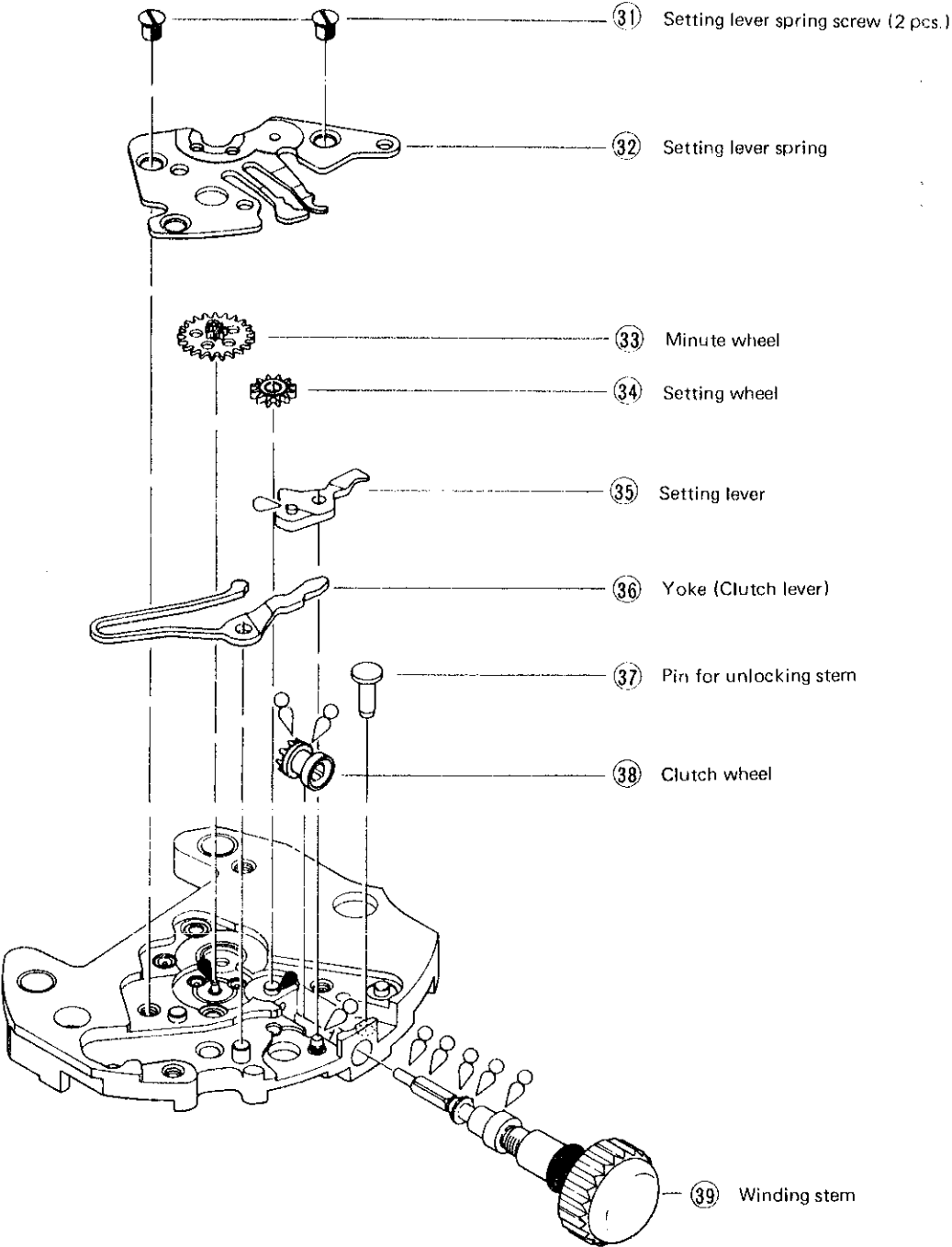
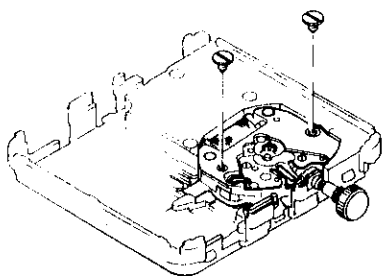
30 Insulator for battery connection

Remarks for disassembling

It is not necessary to disassemble the insulator for battery connection except when it is required to be replaced or cleaned.

(4) Disassembling, reassembling and lubricating of the setting mechanism

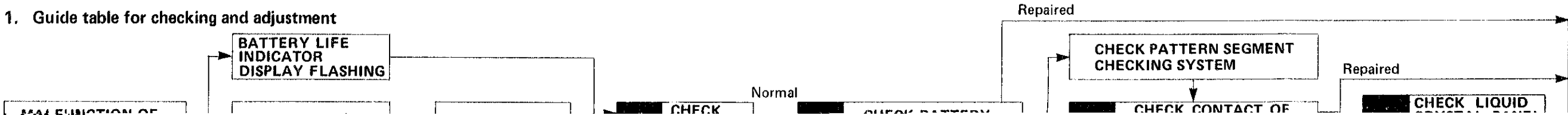
To facilitate disassembling and reassembling of the setting mechanism, it is recommended that the main plate is screwed down on the circuit cover beforehand.



III. CHECKING AND ADJUSTMENT

Be sure to use the Static electricity protector (S-830) when handling the module (movement)

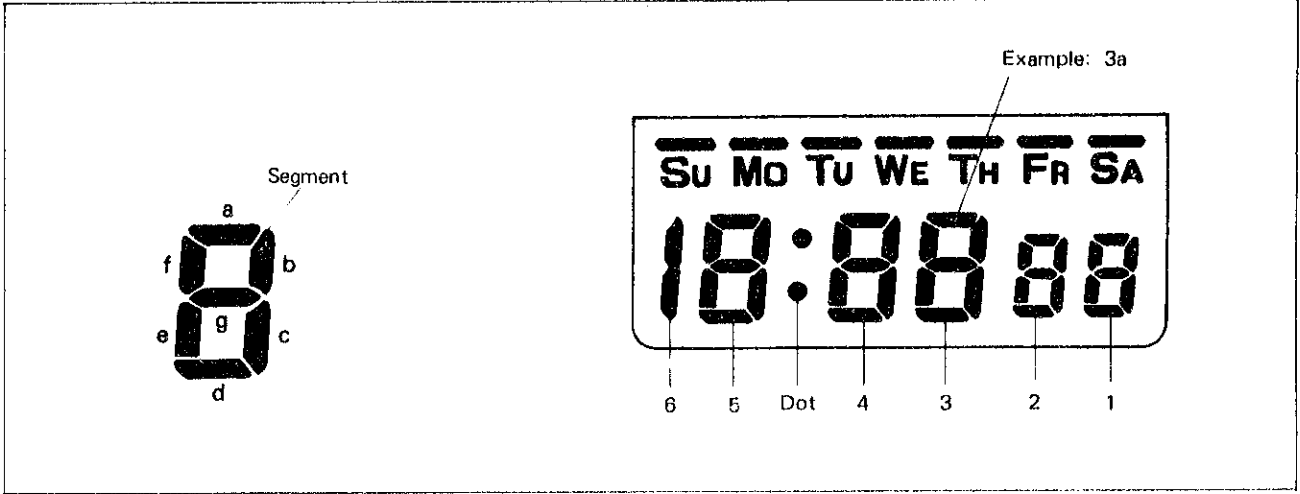
1. Guide table for checking and adjustment



2. 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.

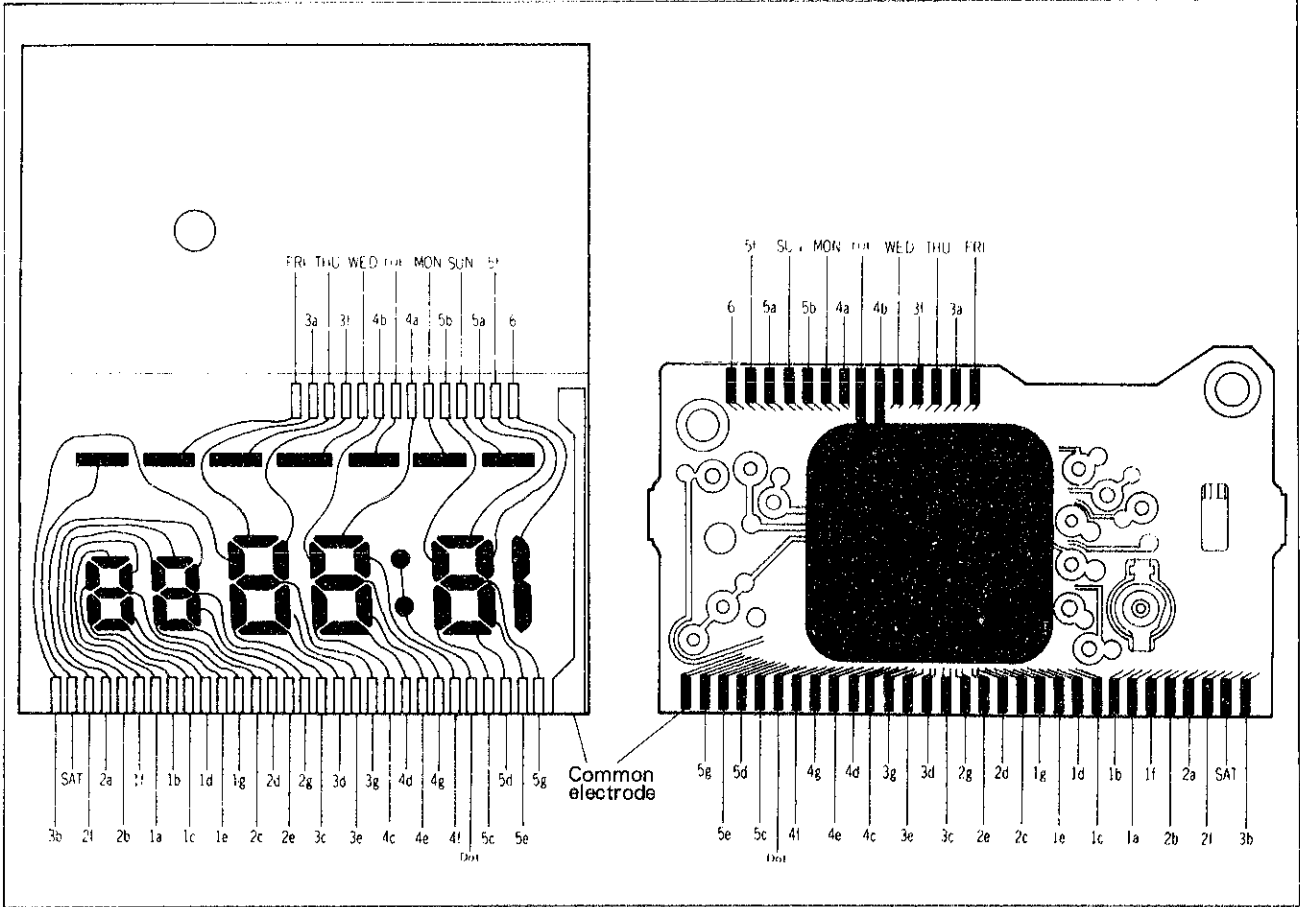
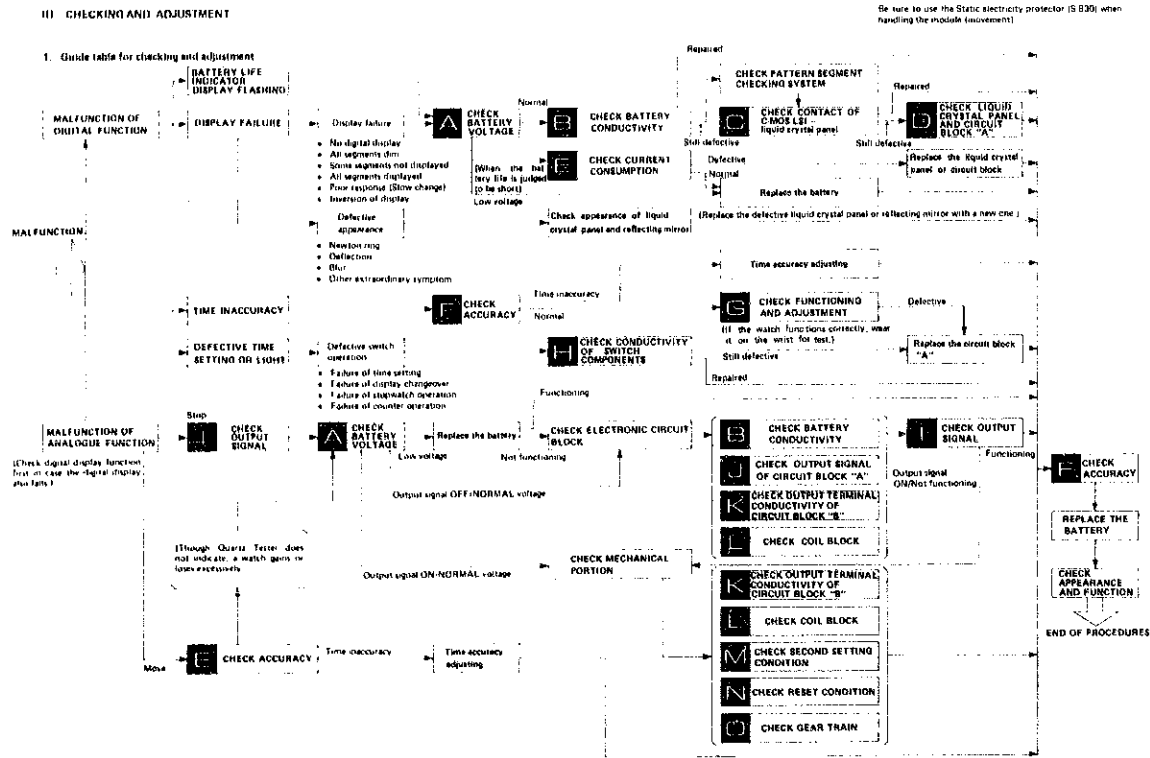
● Designation of segment



● Relationship between the segment and the C-MOS-LSI output terminal

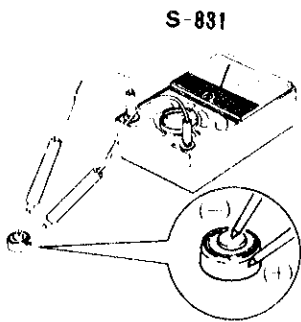
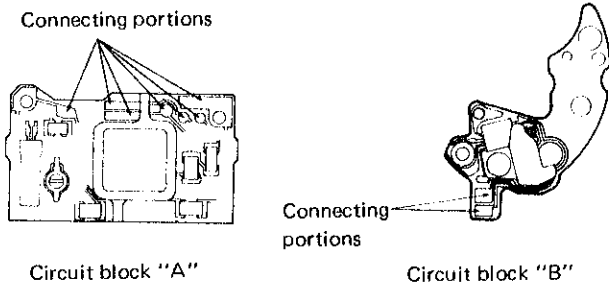
The liquid crystal panel electrode is connected electrically with each segment which forms a digital figures as shown in the illustration of the panel pattern below. (The panel pattern can be seen if the panel is slightly tilted and looked at in an angular position.)

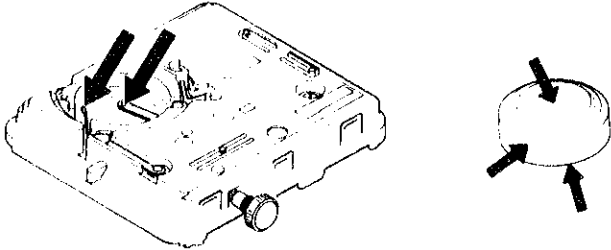
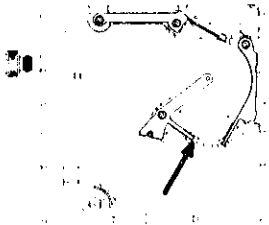
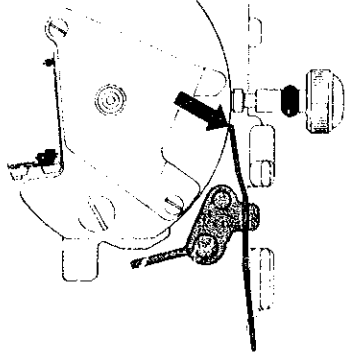
Also, the liquid crystal panel electrode is connected electrically with the C-MOS-LSI output terminal by the connector.

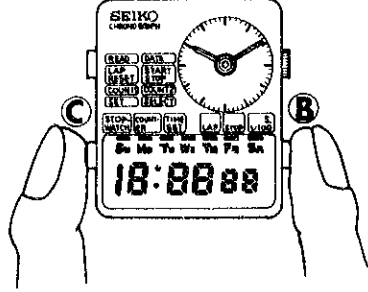
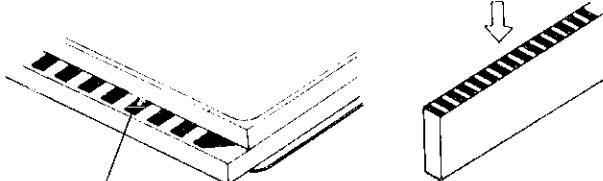
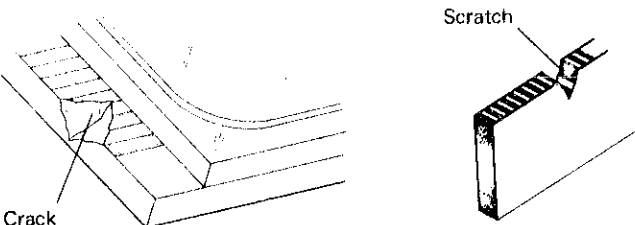
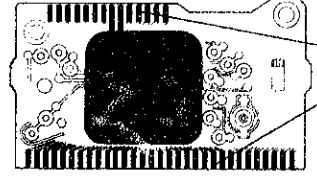


Note: Poor conductivity of the common electrode causes the lighting of all segments or inversion of the display.

3. Procedures for checking and adjustment

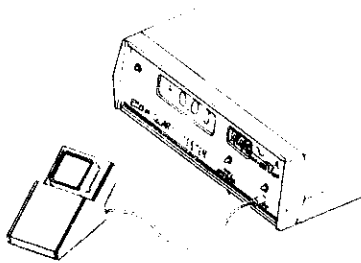
	Procedure	Result
△ CHECK BATTERY VOLTAGE	Use the following procedures to check battery voltage. (1) Set up the Volt-ohm-meter. Range to be used: DC3V (2) Measuring Probe Red (+): Battery surface (+) Probe Black (-): Battery surface (-)  When there is battery electrolyte leakage, refer to "HOW TO CHECK BATTERY ELECTROLYTE LEAKAGE AND REPAIR" below for repairing.	More than 1.5V Normal Less than 1.5V Defective
HOW TO CHECK BATTERY ELECTROLYTE LEAKAGE AND REPAIR	Procedures (1) Remove the module (movement) from the case. (2) Disassemble the module (movement). (3) Wipe off battery electrolyte on the circuit block "A" and "B". 1. Wipe off battery electrolyte with a cloth moistened with distilled water. (If distilled water is not available, use normal tap water.) Note: - Do not expose the trimmer condenser to water or alcohol, and if it is exposed, there may be a change in its capacity and eventually in the time accuracy. - Use a nylon cloth, etc. which does not give off lint. When the circuit blocks are cleaned, be sure to clean the connecting portions.  If the circuit block is badly contaminated with battery electrolyte, replace the circuit block with a new one. - When the circuit block is rusted. - When the liquid crystal panel side is contaminated with battery electrolyte. 2. Wipe off with a cloth moistened with alcohol. (If the cleaned portions remain wet with water, they will corrode with rust.) 3. Dry with hot air by using a dryer.	

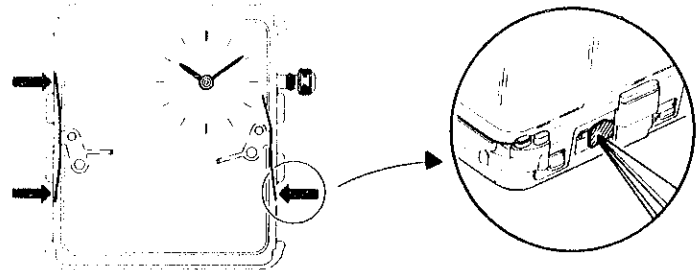
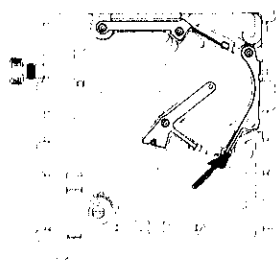
HOW TO CHECK BATTERY ELECTROLYTE LEAKAGE AND REPAIR	Procedure	Result
CHECK BATTERY CONDUCTIVITY	(4) Clean the other parts (circuit cover, switch spring, circuit connector, etc.) contaminated with battery electrolyte. 1. Wipe off battery electrolyte on the other parts with a soft brush moistened with distilled water. (If distilled water is not available, use tap water.) 2. Rinse with alcohol. 3. Dry with hot air by using a dryer. (5) Reassemble the module (movement). Replace the battery with a new one. (6) Check to see if the watch functions and the current consumption are normal.	
	Check to see if the battery current flow to the circuit is normal. (1) Check for any contamination on the connecting portions of the battery, plus terminal of battery connection and battery connection.  (2) Check to see if the battery connection contacts the circuit block "A".  Check the contact from the arrow-marked portion with a microscope. (3) Check to see if the switch spring "A" contacts the main plate of the analogue function.  Remove the liquid crystal panel and check the contact of the arrow-marked portion. The battery current (+) follows the course below. Plus terminal of battery connection ↓ Main plate ↓ Switch spring "A" ↓ Circuit block "A"	Uncontaminated: Normal Proceed to B (2). Contaminated: Defective Wipe off any foreign matter. Contacts: Normal Proceed to B (3). Does not contact: Defective Correct the bend of the battery connection. Contacts: Normal Proceed to next. Does not contact: Defective Correct the bend of the switch spring "A".

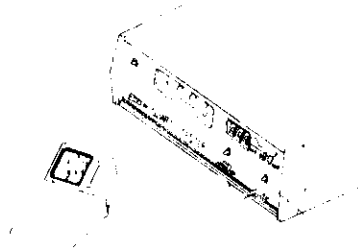
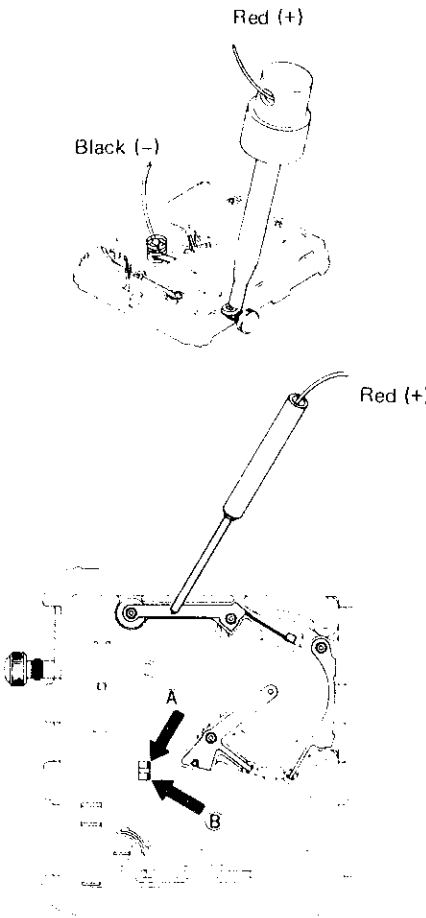
CHECK PATTERN SEGMENT CHECKING SYSTEM	Procedure	Result
CHECK CONTACT OF C-MOS-LSI - LIQUID CRYSTAL PANEL	If some segments are dead or dim, set the mode for the time and calendar setting function. Then depress buttons B and C together to find defective segments. (If there is no defective segment, all segments light up.) 	Proceed to C
	After removing the liquid crystal panel, check for poor conductivity of the liquid crystal panel, connector and C-MOS-LSI output terminal whose segments are found to be defective in "CHECK PATTERN SEGMENT CHECKING SYSTEM." (Refer to the "Relationship between the segment and the C-MOS-LSI output terminal" on page 14.) Use a microscope for checking. (1) Check for dust, lint and other contamination on the liquid crystal panel electrode and connector.  Liquid crystal panel electrode Be sure to check the connecting portions of the liquid crystal panel and the circuit block "A" carefully. (2) Check for any scratch, crack and break of the connector and the liquid crystal panel.  Crack Scratch (3) Check for any dust, lint and other contamination on the output terminal of the circuit block "A".  Output terminal of the circuit block	Uncontaminated: Normal Proceed to C (2). Contaminated: Defective Wipe off any foreign matter. No scratch, crack or break: Normal Proceed to C (3). Scratched, cracked or broken: Defective Replace the connector or liquid crystal panel with a new one. Uncontaminated: Normal Proceed to D Contaminated: Defective Wipe off any foreign matter.

D	Procedure	Result
	Check to see if the liquid crystal panel and the circuit block "A" function correctly. (Refer to the "Relationship between the segment and the C-MOS-LSI output terminal" on page 14.) (1) Check liquid crystal panel. 1. Set up the Volt-ohm-meter. Range to be used: OHMS $R \times 1 \sim R \times 1k$ <i>Note:</i> Any range will do if more than 3V is applied to the terminal of the Volt-ohm-meter. When the Volt-ohm-meter other than the SEIKO Volt-ohm-meter S-831 is used, all segments may not be lit. If any segment does not light, change the range to the one ($R \times 10k$) which is higher in resistance than $R \times 1k$. 2. Remove the liquid crystal panel from the module and turn it over. 3. Measuring (Check to see if the corresponding segment lights up.) Segment electrode Common electrode (Either red or black probe must be applied to the common electrode.) (2) Check the output voltage of the circuit block "A". 1. Set up the Volt-ohm-meter. Range to be used: DC 3V 2. Attach the current supplier (S-833) to the module (movement). Clip (+): Crown Spring (-): Battery connection 3. Measuring Probe Red (+): Main plate of the analogue function Probe Black (-): Each portion of the output terminal of the C-MOS-LSI. Red (+) Black (-)	Lights up: Normal Proceed to (2). Does not light up: Defective Replace the liquid crystal panel with a new one. More than 0.8V: Normal Return to . Less than 0.8V: Defective Replace the circuit block "A".

E	Procedure	Result
	Check to see if the current consumption is normal. (1) Check total current consumption of the digital and analogue functions. - Volt-ohm-meter Range to be used: DC $12\mu A$ (DC 0.03mA) * 1. Connect the condenser kit ($200\mu F \sim 500\mu F$) to the Volt-ohm-meter as shown in the illustration below. 2. Use the current supplier (S-833) and connect as shown in the illustration below. Probe Black Probe Red As the analogue function steps once every 20 seconds, measure for 2 to 3 minutes to obtain a stable value. - Micro Test Set up the Micro Test. ① Power switch: ON ② Polarity changeover button: + ③ Current consumption/Voltage indication button: μA ④ Voltage selection button: 1.55V Probe Black (+): Battery connection Clip Red (-): Crown	<i>Note:</i> *If the pointer of the Volt-ohm-meter swings over the maximum value when DC $12\mu A$ or 0.03mA is used, change the range to a greater one where the pointer does not run over the maximum value while applying the probes to the respective portions. Then, after two or three seconds, return the range to DC $12\mu A$ or 0.03mA again for measuring. Less than $3.0\mu A$: Normal Replace the battery with a new one. More than $3.0\mu A$: Defective Proceed to (2) <i>Remarks:</i> If the pointer of the Micro Test swings over the maximum value while the current consumption is measured, depress the Current consumption/Voltage indication button (3) so that it is released to indicate the voltage (1.5V) while the black probe and the red clip are applied. Then, after two or three seconds, depress the Current consumption/Voltage indication button again so that it holds in the pushed-in position (μA) to indicate the current consumption for measuring.

	Procedure	Result
CHECK CURRENT CONSUMPTION	Π (2) Check current consumption after removing the liquid crystal panel. Follow the same procedures as in E (1).	Less than 3.0μA: Normal Replace the liquid crystal panel. More than 3.0μA: Defective Proceed to E (3).
	(3) Check current consumption after removing the circuit connector. - Remove the circuit connector and check current consumption with the circuit block "A" reassembled in the circuit cover. - Follow the same procedures as in E (1).	Less than 3.0μA: Normal Replace the circuit block "B". More than 3.0μA: Defective Replace the circuit block "A".
CHECK ACCURACY	Π Check gain or loss of time. (1) Set up the Quartz Tester. - Be sure to measure the time accuracy by following the measuring procedures of a digital watch. - It is impossible to measure the time accuracy by following the measuring procedures of an analogue watch. (In Cal. H127A's analogue function, the minute hand steps once every 20 seconds. Therefore, it is impossible to measure its time accuracy if a measuring time is ordinary 10 seconds.) As there are several types of Quartz Testers, refer to the respective instruction manual. (2) Measuring	Normal: Proceed to next. Defective: If the watch tends to gain or lose, proceed to <u>Time accuracy adjusting</u>. Time accuracy is adjusted by turning the trimmer condenser.
		

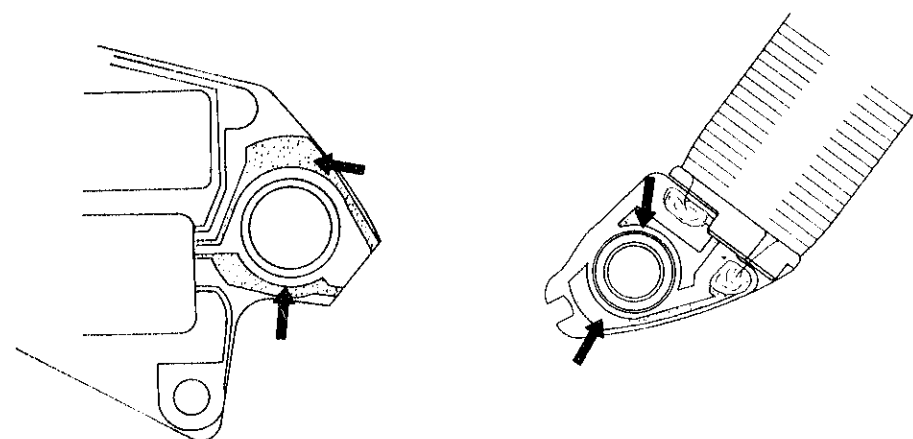
	Procedure	Result
CHECK FUNCTIONING AND ADJUSTMENT	Π Check functioning and adjustment. (1) Check the stopwatch function. In the stopwatch function, check to see if "start", "stop", "lap", "lap release" or "rest" function correctly. (2) Check the counter function. In the counter function, check to see if the watch counts correctly and if the digits can be reset to "00". (3) Check the time and calendar setting function. Set the time and calendar digits more than one cycle for each unit and check to see if each digit is advancing correctly.	Functions correctly: Normal Wear the watch on the wrist to check time accuracy. Does not function correctly: Defective Replace the circuit block "A".
	Γ Check to see if the switch springs function correctly and if the switch contacts are normal. (1) Check to see if the switch springs (three arrow-marked portions shown in the illustration below) function correctly when they are pushed in. Check to see if the three arrow-marked springs touch the respective portions correctly when they are pushed in with the tips of tweezers and that they do not touch when released.  (2) Check to see if the lead terminal of the switch spring touches the lead terminal of the circuit block "A" with a microscope.  (3) Check for dust, lint and other contamination on the contacting portions.	Functions correctly: Normal Proceed to Π (2). Does not function correctly: Defective If the switch springs do not function correctly after the switch springs are set correctly, replace the switch springs with new ones. Contact correctly: Normal Proceed to Π (3). Do not contact correctly: Defective Adjust by using tweezers so that the switch spring touches the lead terminal of the circuit block "A". No dust, lint or uncontaminated: Normal Replace the circuit block "A". Dust, lint or contaminated: Defective Wipe off any foreign matter.

	Procedure	Result	Adjustment and repair
CHECK OUTPUT SIGNAL	Check output signal of the analogue function. (1) Set up the Quartz Tester. (2) Checking • Check for blinking input indicator. • The input indicator must blink once every 20 seconds. <i>Note:</i> • Check with the crown pushed in. • Time accuracy is not indicated as the minute hand steps once every 20 seconds.  Input indicator	Blinks once every 20 seconds — Normal → Does not blink once every 20 seconds — Defective →	If not yet proceeded to CHECK ELECTRONIC CIRCUIT BLOCK, proceed to A. If already proceeded to CHECK ELECTRONIC CIRCUIT BLOCK and it functions, proceed to F. If already proceeded to CHECK ELECTRONIC CIRCUIT BLOCK and it does not function, proceed to CHECK MECHANICAL PORTION. Proceed to A.
CHECK OUTPUT SIGNAL OF CIRCUIT BLOCK "A"	Check to see if the output flows from the circuit block "A" to the circuit block "B" correctly. (1) Set up the Volt-ohm-meter. Range to be used: DC 3V (2) Attach the current supplier (S-833) to the module (movement). Clip (+): Crown Spring (-): Battery connection (3) Measuring Probe Red (+): Plus terminal of battery connection Probe Black (-): Portions A and B shown in the illustration on the right.  Red (+) Black (-) Red (+) A B	A portion: more than 0.7V B portion: more than 1.5V A portion: less than 0.7V B portion: less than 1.5V Normal → Defective →	K. If the conductivity of the connecting portions of the circuit blocks "A" and "B" are normal, proceed to Replace the circuit block "A".

Procedure

Check connecting portions of the coil block after removing the circuit block "B".

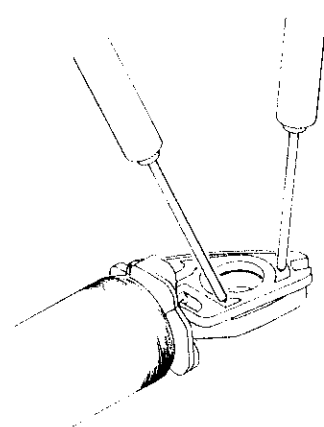
Check for any contamination on the output terminal of the circuit block "B" and the coil lead terminal.



Check for broken coil wire and short circuit of the coil block.

- (1) Set up the Volt-ohm-meter.
Range to be used: OHMS R x 100
- (2) Checking
Apply the red and black probes of the Volt-ohm-meter to the two coil lead terminals.

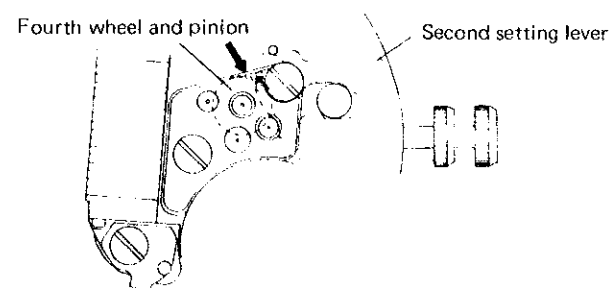
Either red or black probe will do.



Check to see if the second setting condition is normal.

Check to see if there is clearance between the second setting lever and the fourth wheel and pinion when the crown is in the normal position. Also, check to see if the second setting lever touches the fourth wheel and pinion when the crown is pulled out. (Check from the arrow-marked direction with a microscope.)

Check with the circuit block "B" removed.



Result

Uncontaminated ————— Normal —————▶

Contaminated ————— Defective —→

Adjustment and repair

Proceed to **L**

Wipe off any foreign matter.

1 – 3KΩ Normal

More than $3\text{K}\Omega$ Broken coil wire

Less than $1\text{K}\Omega$ Short circuit

Defective

Proceed to **1** if the Electronic circuit block must be checked.

Proceed to **M** if the Mechanical portion must be checked.

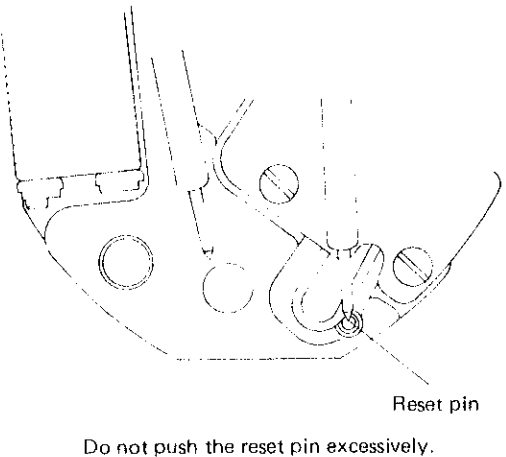
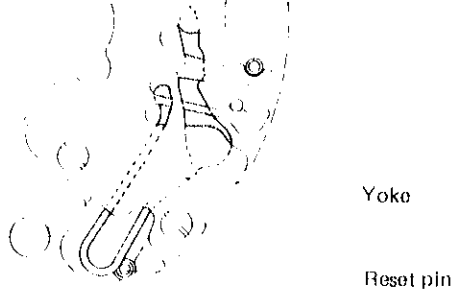
Replace the coil block with a new one.

Functions correctly ----- Normal ----▶

Does not function correctly ----- Defective -----▶

Proceed to

Correct the bend of the second setting lever if there is any.
If it is impossible to correct, replace the second setting lever with a new one.

	Procedure	Result	Adjustment and repair
Z CHECK RESET CONDITION	Check the reset condition after the circuit blocks "A" and "B", and the battery are reassembled. (1) Check to see if the step rotor stops when the crown is pulled out (observe the step rotor for 20 seconds or more,) and if it starts exactly after 20 seconds when the crown is pushed in. (2) Check to see if the conductivity between the reset pin and the main plate is normal when the crown is pulled out completely. 1. Set up the Volt-ohm-meter. Range to be used: OHMS R x 1 <i>Note:</i> Be careful not to use the range other than R x 1. The circuit might be damaged if another range is used. 2. Checking Apply the probes of the Volt-ohm-meter to the main plate and the reset pin. Either red or black probe will do.  Reset pin Do not push the reset pin excessively.	Stops completely and starts moving after 20 seconds ————— Normal —————> Does not stop or moves irregularly ————— Defective —————> Less than 10Ω ————— Normal —————> More than 10Ω ————— Defective —————>	Proceed to F Proceed to N (2). Proceed to O Defective contact between the reset pin and the yoke is the cause. 1. Correct the bend of the reset pin or the yoke if there is any. Replace the reset pin or the yoke if it is impossible to correct them.  Yoke Reset pin 2. Check the connecting portion of the reset pin and the yoke for any dust, lint and other contamination and remove it, if any.
O CHECK GEAR TRAIN	Check the gear train for the following points. (1) Check for any dust, lint and chip. (2) Check for oil condition (quantity, deterioration, etc.) (3) Check to see if the clearance is normal.	Normal —————> Defective —————>	• Replace the circuit block B with a new one. • Correct the diffective portions. (Removal of dust, lint and filings, relubricating and adjustment of clearance.)

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