

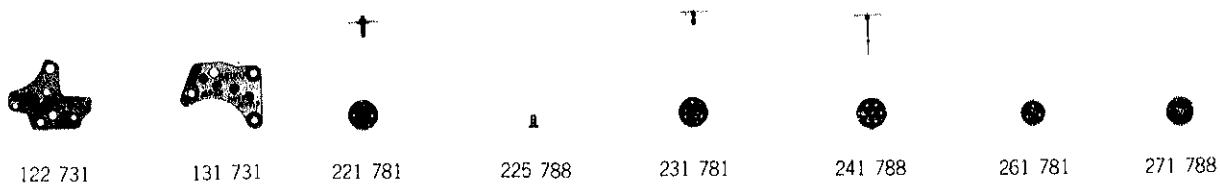
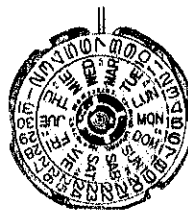
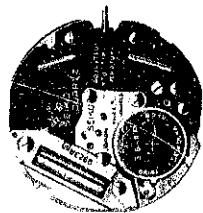
SEIKO

QUARTZ

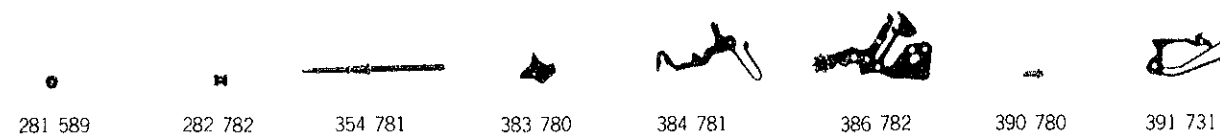
Cal. 9923A

PARTS LIST

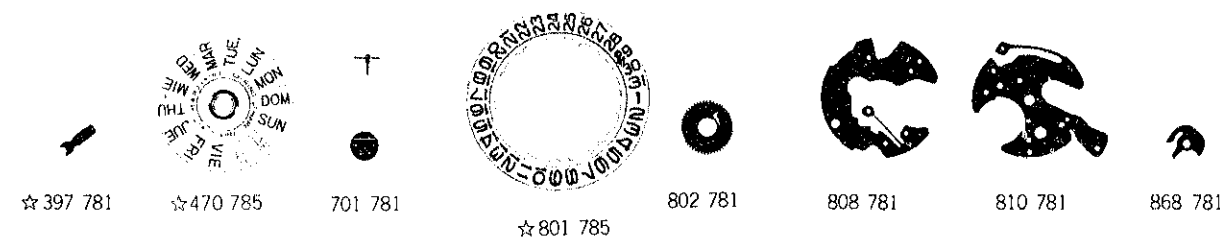
Cal. 9923A



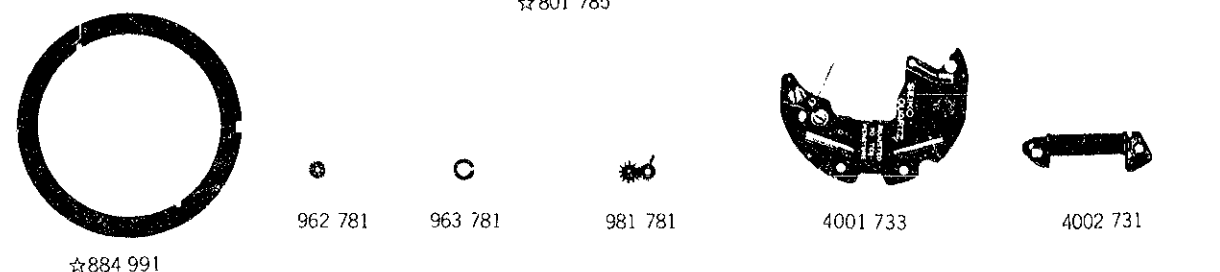
122 731 131 731 221 781 225 788 231 781 241 788 261 781 271 788



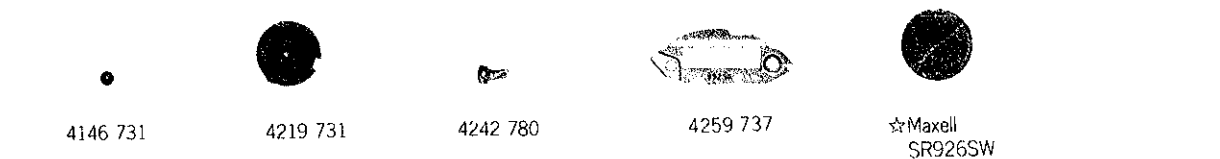
281 589 282 782 354 781 383 780 384 781 386 782 390 780 391 731



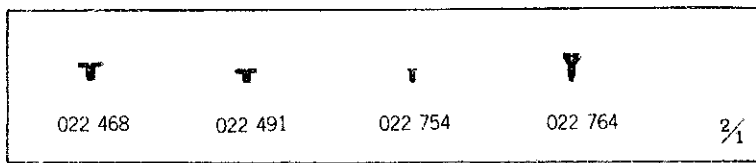
☆397 781 ☆470 785 701 781 ☆801 785 802 781 808 781 810 781 868 781



☆884 991 962 781 963 781 981 781 4001 733 4002 731



4146 731 4219 731 4242 780 4259 737 ☆Maxell SR926SW



Cal. 9923A

Characteristics

Casing diameter : ϕ 25.6 mm
 Maximum height : 3.7 mm without battery
 Jewels : 5 j
 Frequency of quartz crystal oscillator : 32,768 Hz (Hz = Hertz . . . Cycles per second)
 Driving system : Step motor system (2 poles)
 Regulation system : Trimmer condenser
 Second setting device
 Calendar (Day & Date)
 Instant setting device for day & date calendar
 Bilingual change-over system for day of the week
 Battery life indicator: Second hand moves in two-second interval

PART NO.	PART NAME	PART NO.	PART NAME
122 731	Center wheel bridge	022 468	Anti-magnetic shield plate screw
131 731	Third wheel bridge	022 468	Circuit block screw
221 781	Center wheel & pinion	022 491	Setting lever spring screw
225 788	Cannon pinion	022 491	Day finger screw
231 781	Third wheel & pinion	022 491	Date jumper screw A
241 788	Fourth wheel & pinion	022 754	Date jumper screw B
261 781	Minute wheel	022 754	Date dial guard screw
271 788	Hour wheel	022 764	Dial screw
281 589	Setting wheel	023 086	Tube for center wheel bridge screw
282 782	Clutch wheel	023 087	Tube for third wheel bridge screw A
354 781	Winding stem	023 091	Day finger pin
383 780	Setting lever	023 092	Day-date corrector wheel rocker pin
384 781	Yoke (Clutch lever)	023 359	Guide pin for setting lever spring
386 782	Setting lever spring	023 365	Date jumper pin
390 780	Setting lever axle	023 399	Second-setting lever pin
391 731	Second setting lever	023 741	Upper bush for center wheel
☆397 780	Lever for unlocking stem	023 744	Upper bush for third wheel
☆397 781		023 744	Lower bush for third wheel
☆397 782		023 902	Pin for second-setting lever spring
☆470 785	Day star with dial disk	027 002	Tube for third wheel bridge screw C
701 781	Fifth wheel & pinion	027 011	Tube for circuit block A
☆801 785	Date dial	027 012	Tube for circuit block B
802 781	Date driving wheel	027 013	Tube for circuit block C
808 781	Date dial guard	027 492	Pin for plus terminal of battery connection
810 781	Date jumper		Yoke pin
868 781	Day finger	027 824	
☆884 553	Holding ring for dial	☆SEIKO SB-AP	Silver oxide battery
☆884 991		☆Maxell SR926SW	
☆884 992			
☆884 993			
962 781	Intermediate wheel for calendar correction		
963 781	Snap for day star with dial disk		
981 781	Day-date corrector wheel rocker		
4001 733	Circuit block		
4002 731	Coil block		
4146 731	Step rotor		
4219 731	Insulator for battery connection		
4242 780	Plus terminal of battery connection		
4259 737	Anti-magnetic shield plate		
011 324	Upper hole jewel for fifth wheel		
011 324	Lower hole jewel for fifth wheel		
011 404	Upper hole jewel for fourth wheel		
011 537	Upper hole jewel for step rotor		
011 537	Lower hole jewel for step rotor		
022 468	Center wheel bridge screw		
022 468	Third wheel bridge screw		

☆⇨Please see remarks on the reverse page.

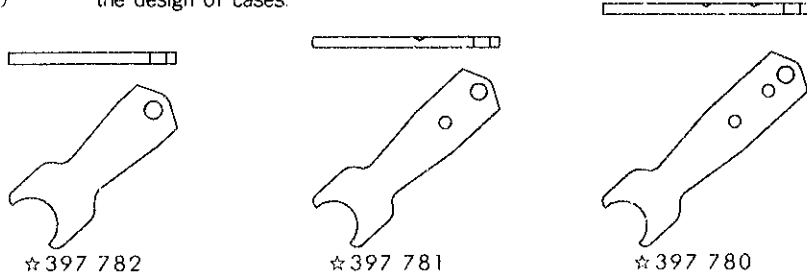
Part numbers in light letters are not shown in photos.

Cal. 9923A

Remarks :

Lever for unlocking stem

- ☆397 780 (Long) }
 ☆397 781 (Middle) } There are three types of lever for unlocking stem.
 ☆397 782 (Short) } The size of a lever for unlocking stem is determined based on
 the design of cases.



If the combination of the lever for unlocking stem and case is unknown, check the case number and refer to the "SEIKO Quartz Casing Parts List" to choose an appropriate lever for unlocking stem.

Day star with dial disk

- ☆470 785 (English↔Spanish, black figures on white background)
 Used when both the crown and the calendar frame are located at **3** o'clock position. If any other type of day star with dial disk is required, specify the number printed on the disk.

Date Dial

- ☆801. 785.....Used when both the crown and the calendar frame are located at **3** o'clock position.
 If any other type of date dial is required, specify ① Cal. No. ② The crown position ③ The calendar frame position ④ Dial No. and ⑤ Date Color of date dial.

Holding ring for dial

- ☆884 553.....Used for bayonet type case back with round dial.
 ☆884 991.....Used for both the watch of one-piece type case and the watch of round dial that the movement is fixed in the case back.
 ☆884 992.....Used for the snap-type case back with round dial.
 ☆884 993.....Used for the case with square dial.
 The type of holding ring for dial is determined based on the design of cases and dials. Check the case number and refer to "SEIKO Quartz Casing Parts List" to choose an appropriate holding ring for dial.

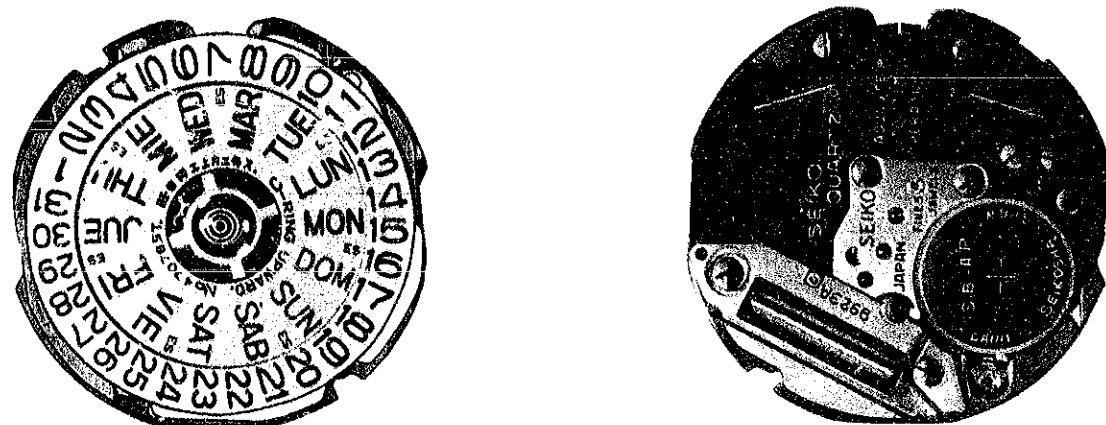
Battery

- ☆SEIKO SB-AP } The applied battery for this calibre might be added the substitutive in the future.
 ☆Maxell SR926SW } In that case, please refer to separate "BATTERIES FOR SEIKO QUARTZ WATCHES".

TECHNICAL GUIDE

SEIKO
QUARTZ

CAL. 9923A

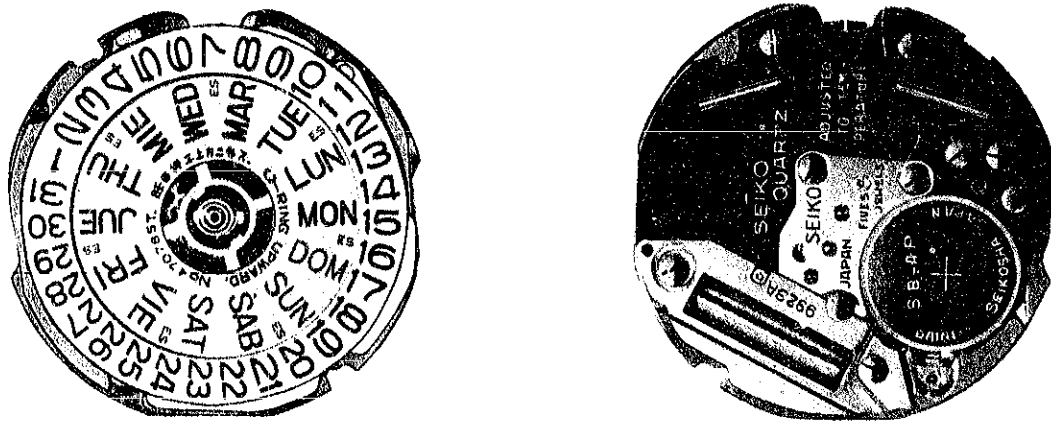


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Quartz Crystal Oscillator Watch SEIKO Twin Quartz Cal. 9923A

SEIKO Twin Quartz Cal. 9923A with two crystal oscillators is a high accuracy quartz watch whose annual time loss or gain has been reduced to approximately 20 seconds.



I. SPECIFICATIONS AND FEATURES

1. Specifications

Item	Cal. No.	9923A
Indicating system		3-hand time indication (hour, minute and second)
Additional mechanism		Calendar (day & date) Bilingual changeover system for day of the week Instant day and date setting Electronic circuit-reset switch Second setting device (stops at every second) Battery life indicator
Crystal oscillator		32,768 Hz (Hz = Hertz Cycles per second) (Two crystal oscillators are used.)
Loss/gain		When the watch is worn on the wrist for 8 hours or more per day at normal temperatures (5°C to 35°C), the annual loss/gain is approx. ± 20 seconds. However, up to 4 seconds of loss/gain per month may be caused depending on the wearing conditions.
Outside diameter		φ 26.0mm
Casing diameter		φ 25.6 mm
Height		3.7 mm without battery
Operational temperature range		-10°C ~ +60°C (14°F ~ 140°F)
Driving system		Step motor system (2 poles)
Regulation system		Trimmer condenser
Battery power		Silver oxide battery SEIKO SB-AP or Maxell SR926SW Battery life is approximately 3 years. Voltage: 1.55V
Jewels		5 jewels

2. Features

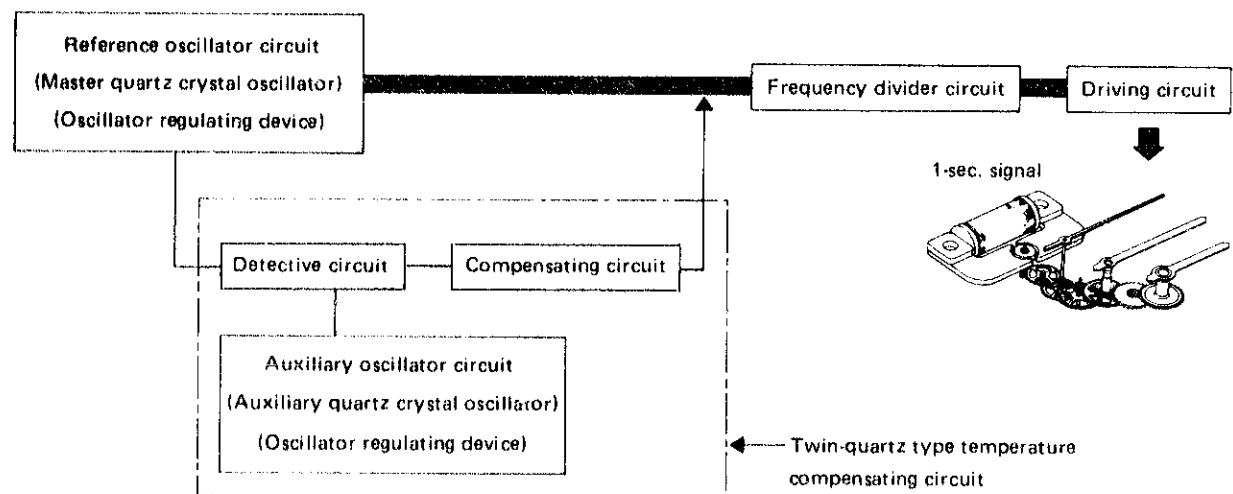
(1) A pair of crystal oscillators having different temperature characteristics are used in the circuit block. Each crystal oscillator is oscillated independently and detects temperature change, which is compensated through the micro computer. The influence of temperature change on the time accuracy is thus reduced to the minimum and extra-high accuracy is achieved.

(2) Although Cal. 9923A is adopting the instant day and date setting and equipped with the battery life indicator, they are neat in design because of the ultra thin movement.

3. Principle of high accuracy

(1) Operating principles

Cal. 9923A is an extra-high precision watch which is equipped with a twin-quartz type temperature compensating circuit, in addition to the oscillator circuit, frequency dividing circuit and driving circuit usually found on other analogue quartz watches.



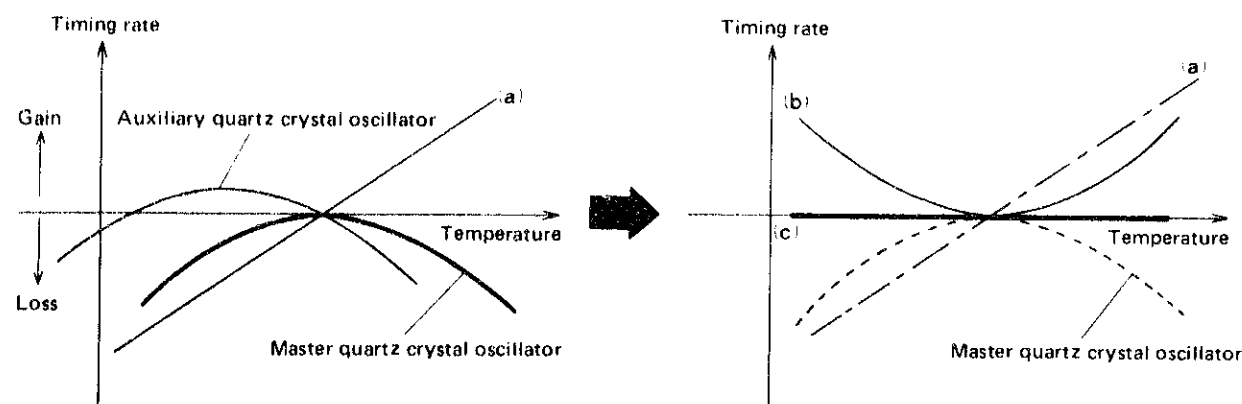
(2) Temperature compensating circuit

1) Arrangement

The temperature compensating circuit consists of the following components.

- Compensating oscillator circuit equipped with an auxiliary quartz crystal oscillator and an oscillator regulating device.
- Detective circuit which computes the watch temperature according to the difference in oscillating frequency between the master and the auxiliary quartz crystal oscillators.
- Compensating circuit which corrects the timing rate according to the detected temperature.

2) Method of temperature compensation



Step 1. The difference in oscillating frequency between the master and the auxiliary quartz crystal oscillators is computed Line (a)

Step 2. The straight line (a) obtained by computation in step 1 is squared and compensated through a microprocessor in the circuit Curve (b)

Step 3. The sum of the curve (b) and the characteristic curve for the master quartz crystal oscillator is computed to form a straight line (signal) which is not affected by temperature change.

II. DISASSEMBLING, REASSEMBLING AND LUBRICATING

1. Disassembling, Reassembling and Lubricating

• Disassembling and reassembling

Disassembling procedures Figs.: ① ~ ④⑤

Reassembling procedures Figs.: ④⑤ ~ ①

• Lubricating

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

Type of oil	Oil quantity
● Moebius A	∞ Normal quantity
○ SEIKO watch oil S-6	○ Extremely small quantity
⊗ Never lubricate the portions marked ⊗	

• Movement holder

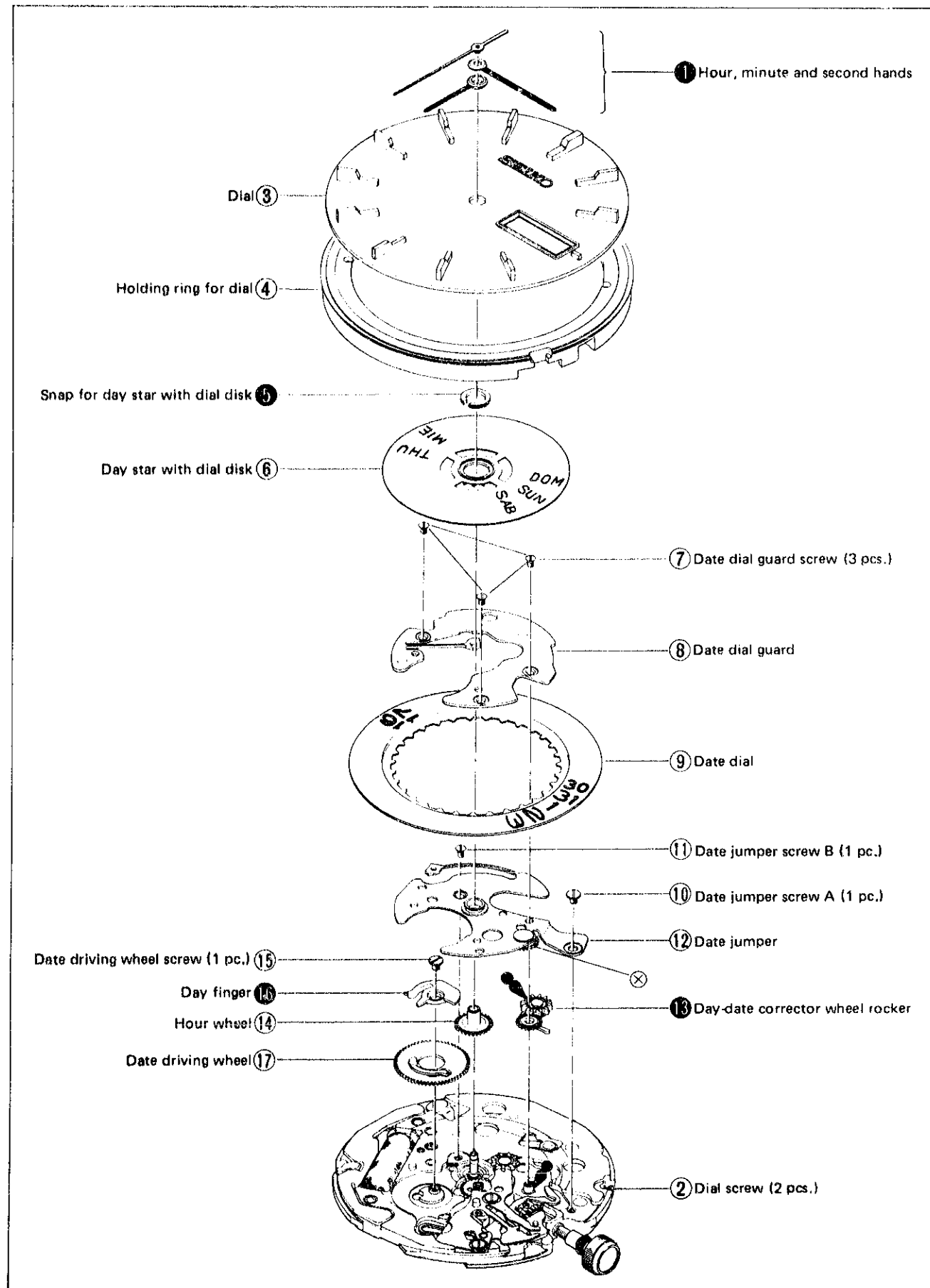
Use the movement holder S-651 when disassembling and reassembling.

List of screws used

The four types of screws used in Cal. 9923A are listed below.

Shape	Parts No.	Name	Shape	Parts No.	Name
	022 764	Dial screw (2 pcs.)			Day finger screw (1 pc.)
		Circuit block screw (3 pcs.)		022 491	Setting lever spring screw (2 pcs.)
		Center wheel bridge screw (1 pc.)			Date jumper screw A (1 pc.)
	022 468	Third wheel bridge screw (3 pcs.)			Date dial guard screw (3 pcs.)
		Anti-magnetic shield plate screw (2 pcs.)		022 754	Date jumper screw B (1 pc.)

(1) Disassembling, reassembling and lubricating of the calendar mechanism



1 Hour, minute and second hands

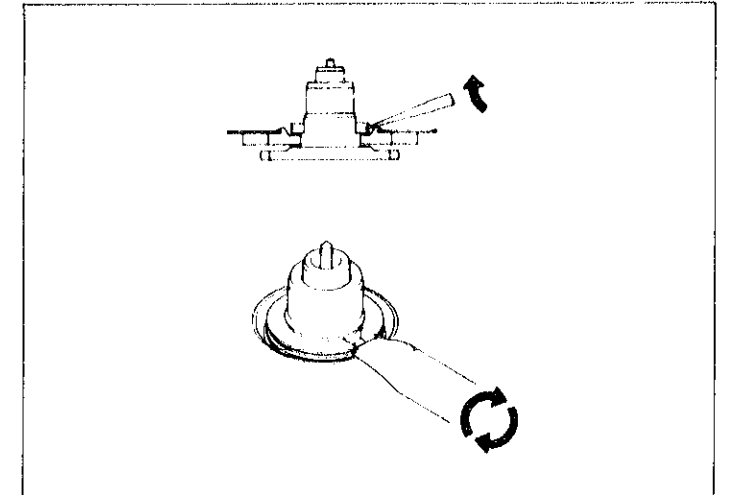
Remarks for disassembling and reassembling

- Pull the crown out to the second click for disassembling and reassembling.
- Be sure to reassemble the second hand correctly over the second mark. (Both odd and even second marks will do.)
- When reassembling, be careful that the hands do not touch each other as the watch is so thin that the clearance between the hands is less than that for ordinary type watches. Also be careful that the glass, hands and dial do not touch each other.

5 Snap for day star with dial disk

Remarks for disassembling

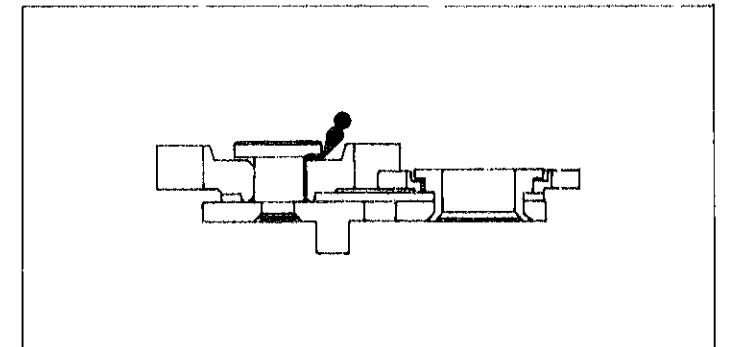
Put the tip of a screwdriver into the groove of the snap for day star with dial disk, and pry it open in the arrow-marked direction.



13 Day-date corrector wheel rocker

Remarks for reassembling

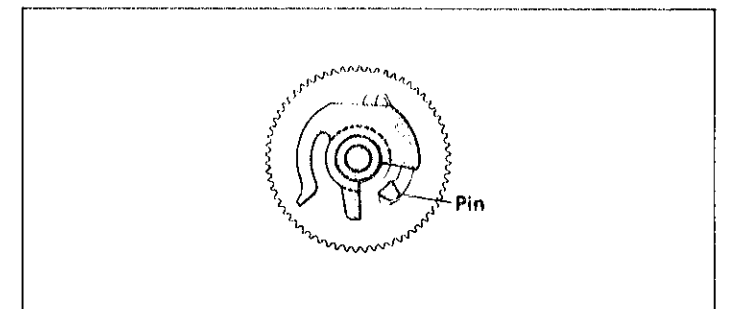
- Lubricate the day-date corrector wheel rocker as shown in the illustration on the right.
- Pull out the crown to the first click position and reassemble the day-date corrector wheel rocker.



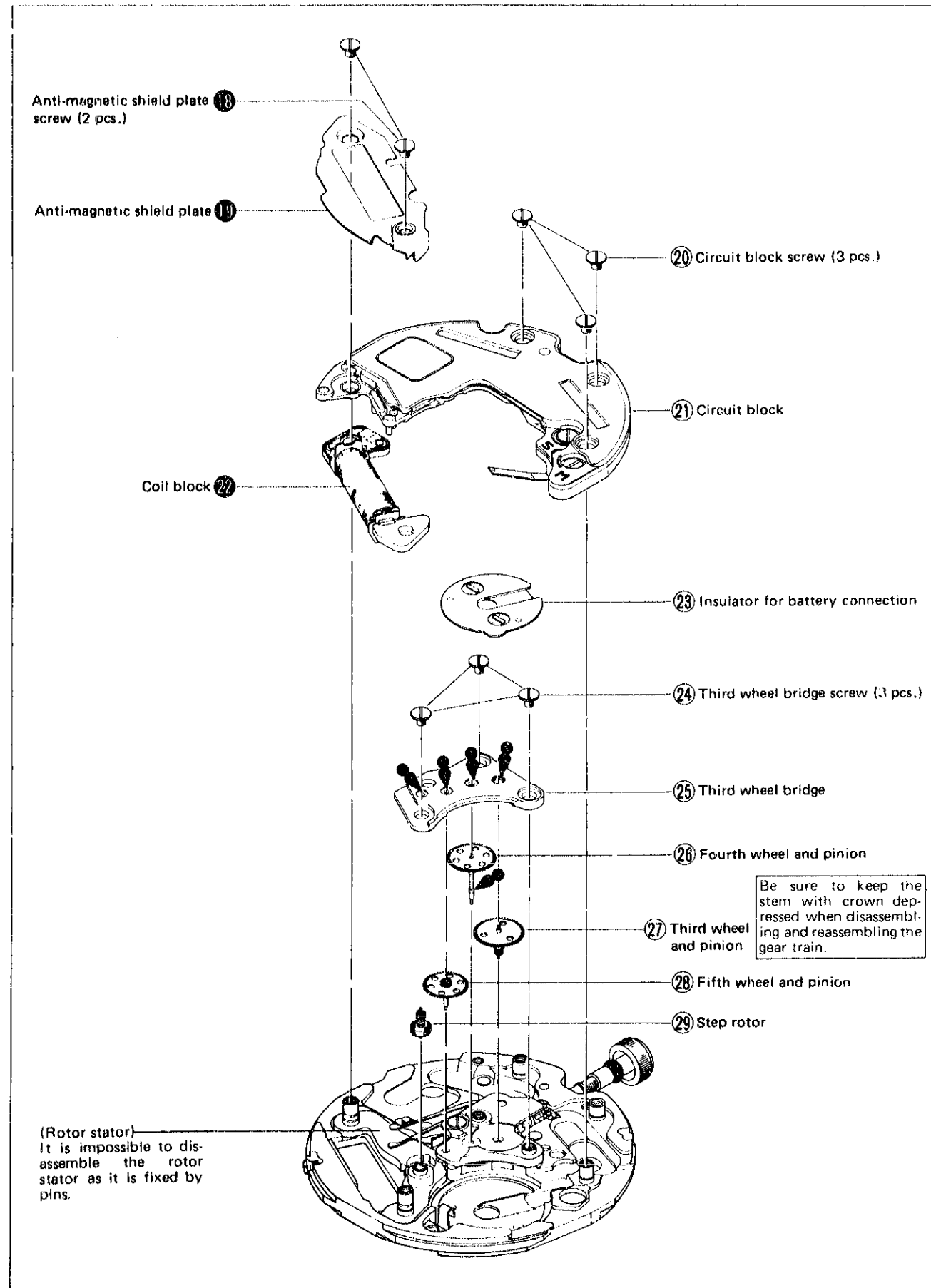
16 Day finger

Remarks for reassembling

- Reassemble the day finger so that the date driving wheel pin is positioned as shown in the illustration on the right.



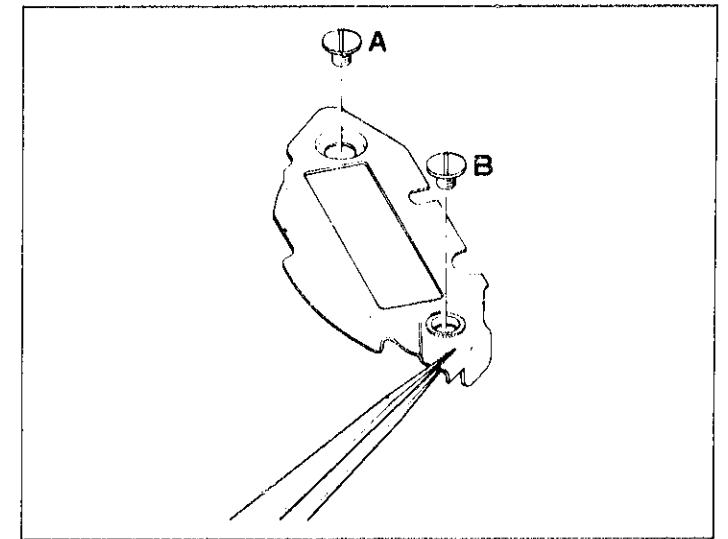
(2) Disassembling, reassembling and lubricating of the circuit block, coil block and gear train



19 Anti-magnetic shield plate

Remarks for disassembling and reassembling

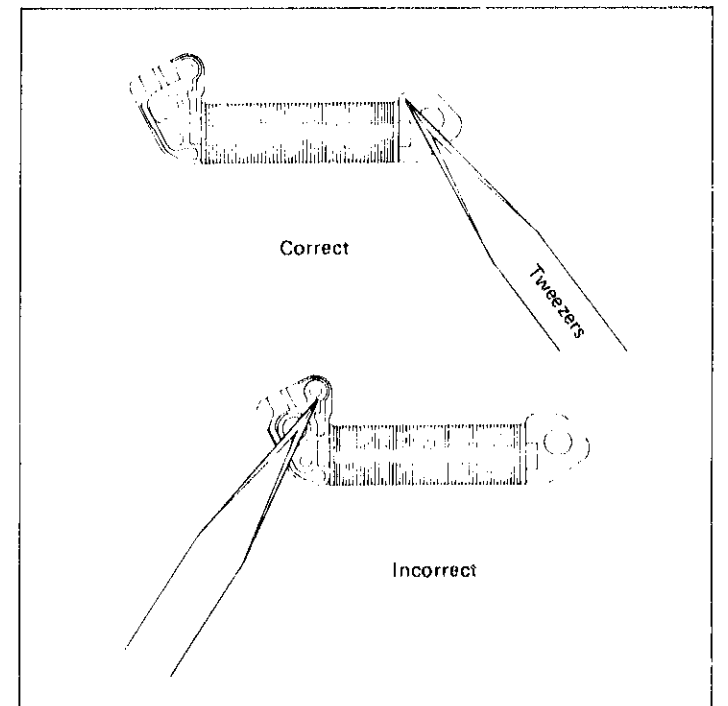
- Disassemble by holding with tweezers as shown in the illustration on the right.
- Be careful in handling as the anti-magnetic shield plate is easy to bend.
- Be sure to tighten the anti-magnetic shield plate screw A first and then B next. (If B is tightened first, it will be difficult to tighten A as A portion of the anti-magnetic shield plate lifts up.)



22 Coil block

Remarks for disassembling and reassembling

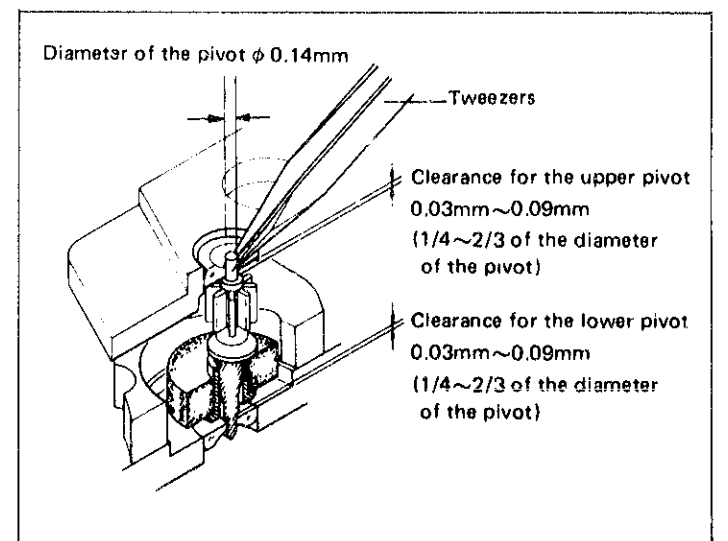
- Be careful not to damage the coil wire and the lead terminal. Handle it as shown in the illustration below.



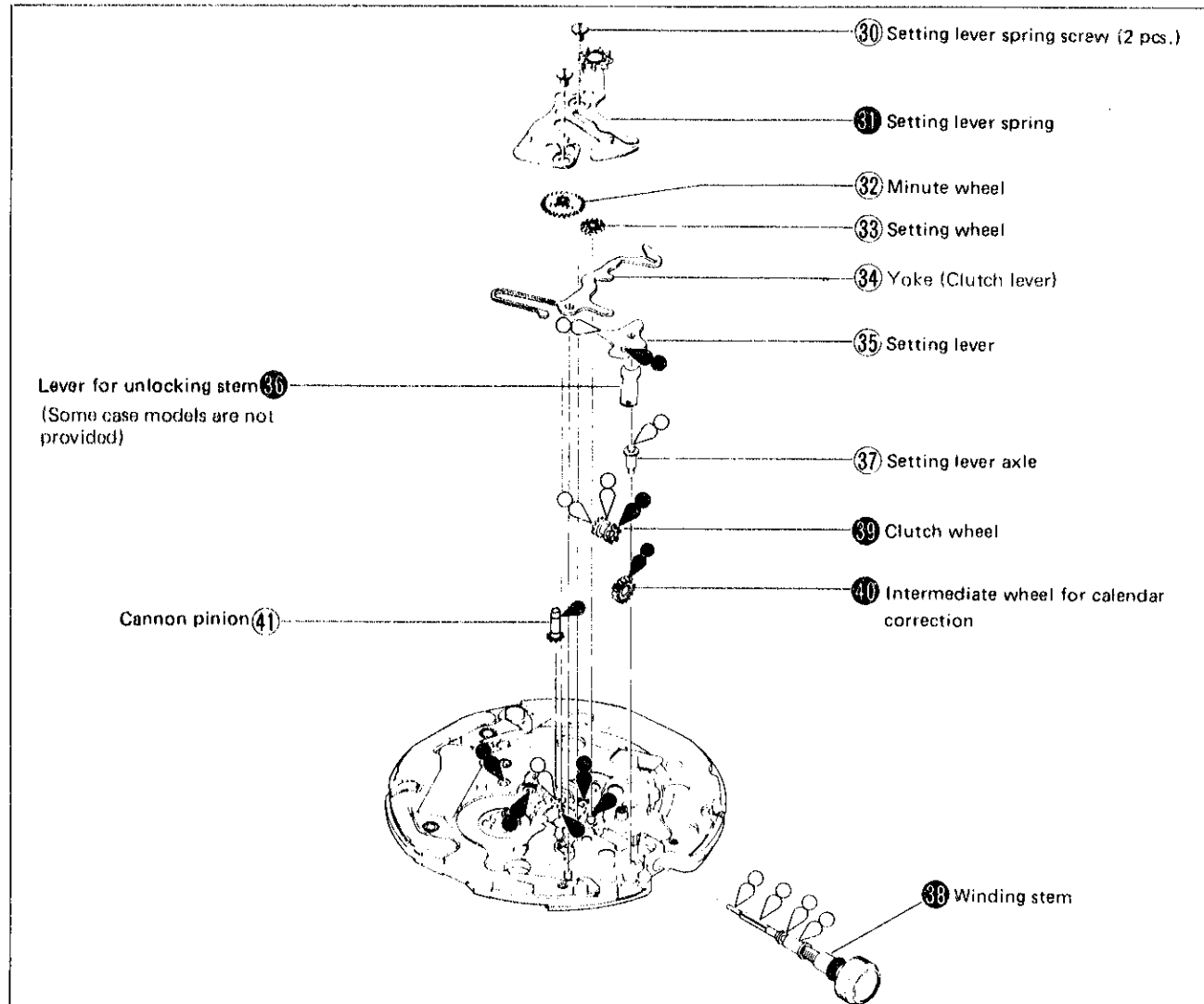
18 Anti-magnetic shield plate screw (2 pcs.)

Remarks for reassembling

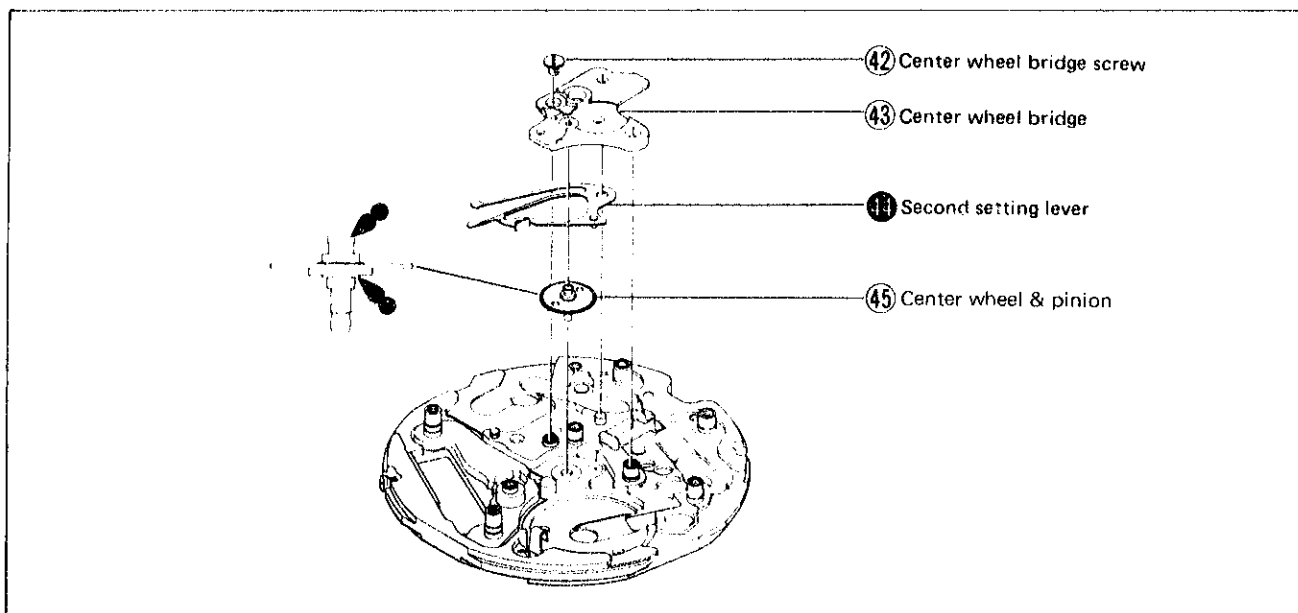
- Check the clearances for the upper and the lower pivots for the step rotor after tightening the anti-magnetic shield plate screws.
- Check the clearance for the lower pivot by depressing the upper pivot by tweezers.
- Check the clearance for the upper pivot by depressing the lower pivot by tweezers.
- Check the clearances by using the diameter of the pivot as a guide.



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



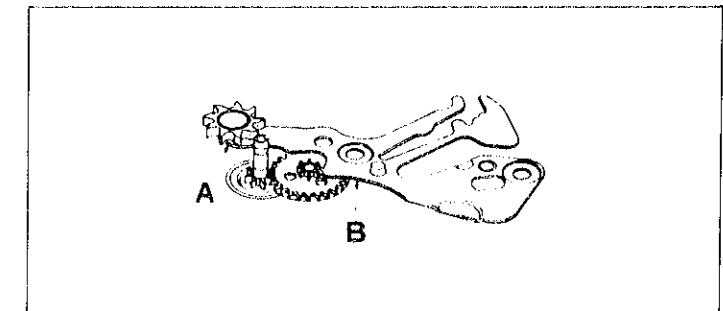
(4) Disassembling, reassembling and lubricating of the center wheel bridge ~ the center wheel and pinion



31 Setting lever spring

Remarks for disassembling

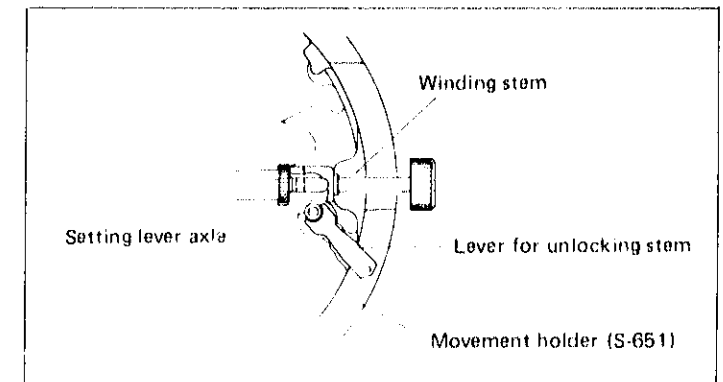
- Pry up the arrow-marked portion A slightly and remove the arrow-marked pin B (positioned under the setting lever spring). Then pry up the setting lever spring for disassembling by holding the portion A.



36 Lever for unlocking stem

Remarks for reassembling

- Use the circumference of the movement holder as shown in the illustration on the right to surely reassemble the lever for unlocking stem.



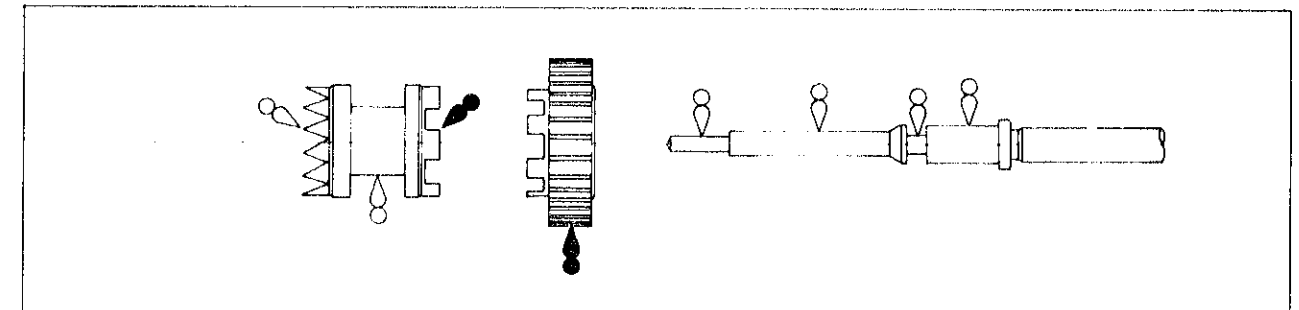
38 Winding stem

39 Clutch wheel

40 Intermediate wheel for calendar correction

Remarks for reassembling

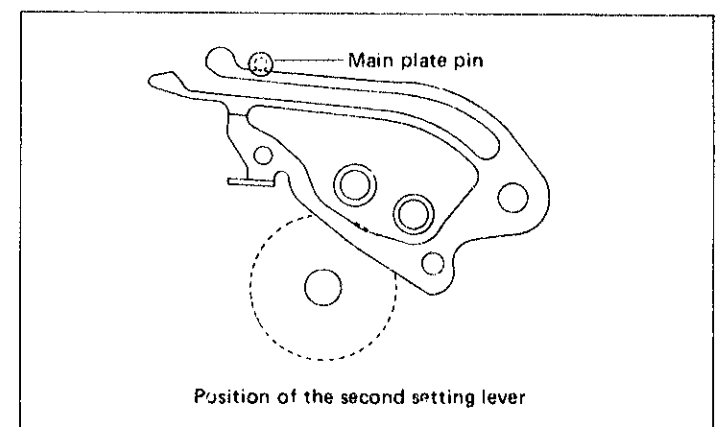
- Reassemble after reassembling the center wheel bridge. (It is difficult to reassemble the clutch wheel and the intermediate wheel for calendar correction if the center wheel bridge is not reassembled.)
- Refer to the illustration below for the direction of reassembling and the lubricating.



44 Second setting lever

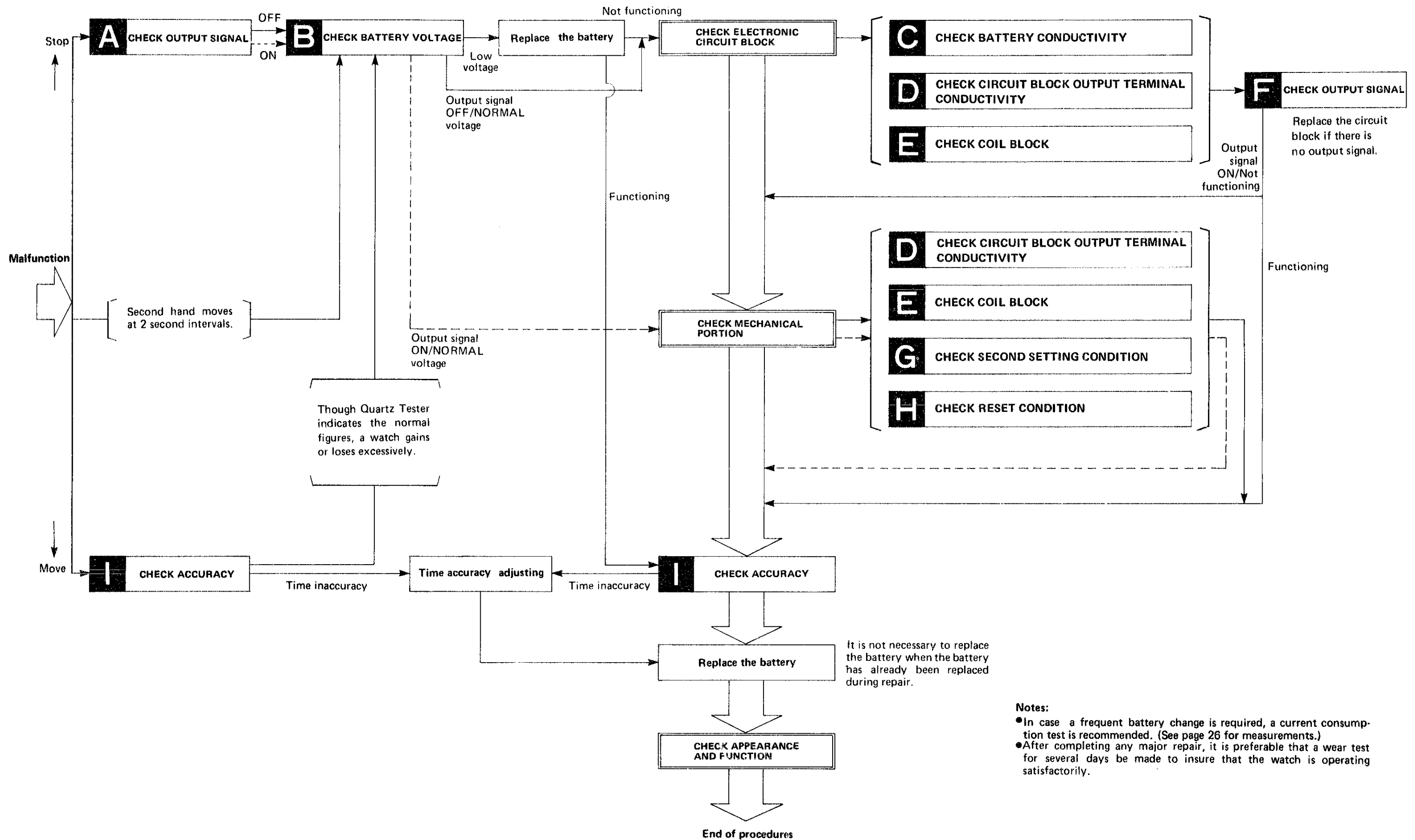
Remarks for reassembling

- Hook the spring portion to the main plate pin as shown in the illustration on the right.
- Be sure to pull out the winding stem completely and then reassemble the second setting lever when the setting mechanism is already reassembled.



III. CHECKING AND ADJUSTMENT

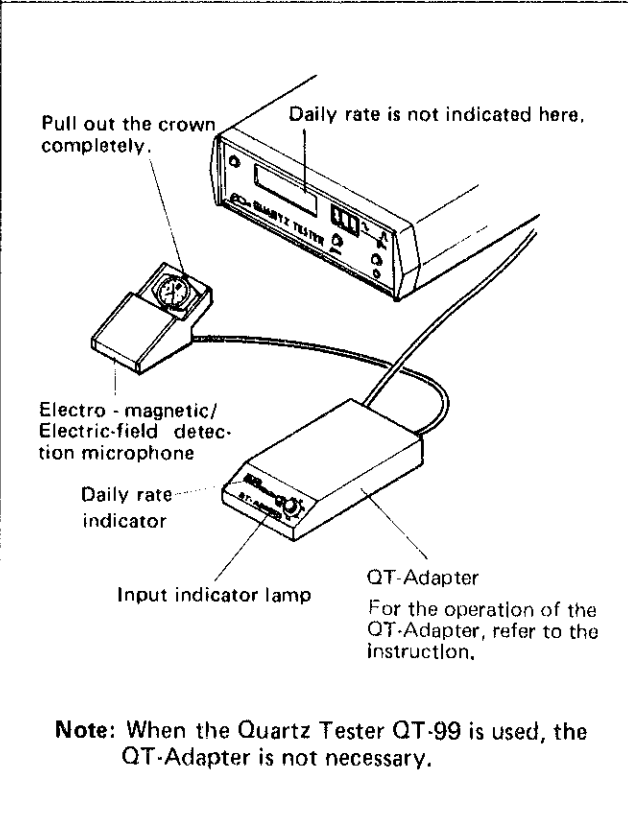
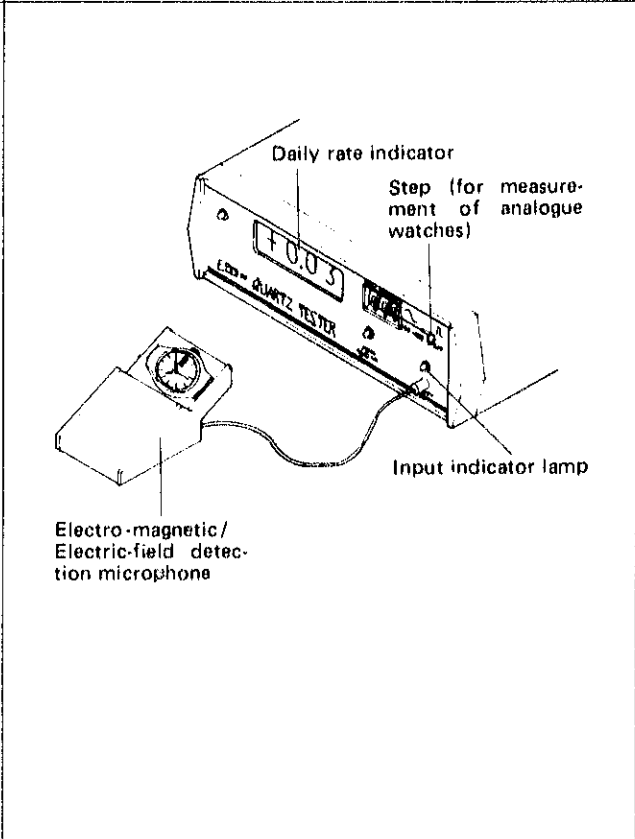
1. Guide table for checking and adjustment



How to check time accuracy of Cal. 9923A

(For time accuracy adjusting, refer to page 23.)

1. Difference in measurement between Cal. 9923A and the existing analogue quartz watches

Cal. 9923A	Existing analogue quartz watches
 <p>Pull out the crown completely.</p> <p>Daily rate is not indicated here.</p> <p>Electro-magnetic/Electric-field detection microphone</p> <p>Daily rate indicator</p> <p>Input indicator lamp</p> <p>QT-Adapter For the operation of the QT-Adapter, refer to the instruction.</p> <p>Note: When the Quartz Tester QT-99 is used, the QT-Adapter is not necessary.</p>	 <p>Daily rate indicator</p> <p>Step (for measurement of analogue watches)</p> <p>Input indicator lamp</p> <p>Electro-magnetic/Electric-field detection microphone</p>

2. Remarks for measuring Cal. 9923A

(1) Use the QT-Adapter or Quartz Tester QT-99.

Cal. 9923A employs a pair of quartz crystal oscillators to produce an extra-high timing accuracy that hampers the measuring efforts in an ordinary way using the conventional timing instruments. Therefore, in measuring its accuracy, the detection and computation of the signals from twin quartz crystal oscillators are needed.

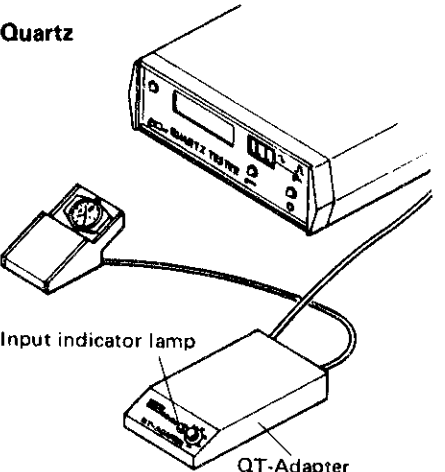
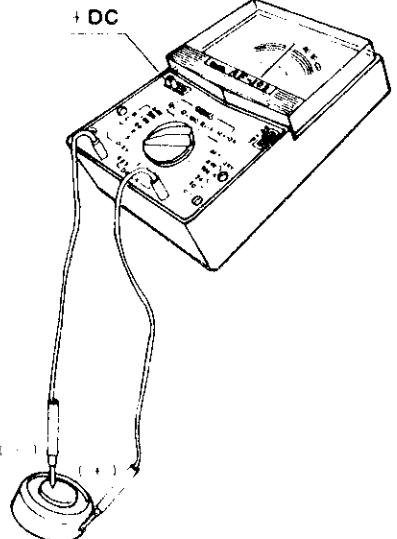
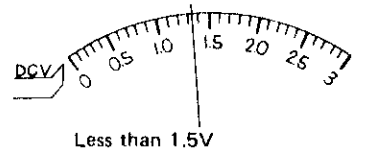
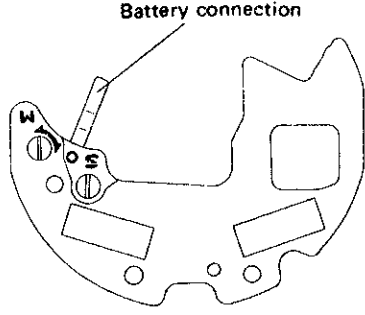
(2) Pull out the crown completely.

When the crown is pulled out to the second click position, Cal. 9923A watch gives signals, which will be computed by the QT-Adapter or Quartz Tester QT-99. While the watch is operating, it is impossible to measure its daily rate accurately.

Notes: If Cal. 9923A is measured in the same way as with the existing analogue quartz watches;

- There will be scatter in measurable value.
- The value displayed does not indicate the correct daily rate.

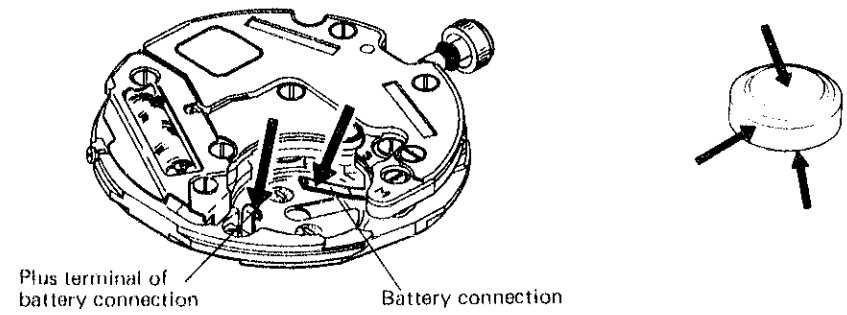
2. Procedures for checking and adjustment

	Procedure	Result	Adjustment and Repair
A CHECK OUTPUT SIGNAL	<p>Check output signal.</p> <ol style="list-style-type: none"> Set up the Quartz Tester together with the QT-Adapter or set up the Quartz Tester QT-99. (Set up the QT-Adapter properly according to the instruction.) Pull out the crown completely. And then place the watch on the microphone. (When the crown is pulled out to the second click, Cal. 9923A gives signals for time accuracy measurement.) Check output signal by blinking of the input indicator lamp. (Unlike the existing analogue quartz watches, Cal. 9923A gives signals at an irregular cycle.)  <p>When the Quartz Tester QT-99 is used, the QT-Adapter is not necessary.</p>	<p>Blinking ————— Normal</p> <p>No blinking ————— Defective</p> <p>→ Proceed to B.</p>	<p>Proceed to B.</p>
B CHECK BATTERY VOLTAGE	<p>Use the following procedures to check battery voltage.</p> <ol style="list-style-type: none"> Set up the Volt-ohm-meter. Range to be used: DC 3V Measuring <ul style="list-style-type: none"> Probe Red (+) Battery surface (+) Probe Black (-) Battery surface (-) <p>Note: When handling the battery, be sure to use non-metallic tweezers or fingercots.</p> <p>When there is battery electrolyte leakage, refer to "How to check battery electrolyte leakage and repair" below for repairing.</p> 	<p>More than 1.5V ————— Normal</p> <p>Less than 1.5V ————— Defective</p> 	<p>Proceed to CHECK MECHANICAL PORTION if blinking is found.</p> <p>Proceed to CHECK ELECTRONIC CIRCUIT BLOCK if blinking is not found.</p> <p>Replace the circuit block if the second hand moves at two second intervals.</p> <p>Proceed to Replace the battery.</p> <ul style="list-style-type: none"> If the watch operates after battery replacement, proceed to I. If the watch does not operate after battery replacement, proceed to CHECK ELECTRONIC CIRCUIT BLOCK.
C HOW TO CHECK BATTERY ELECTROLYTE LEAKAGE AND REPAIR	<p>Procedures</p> <ol style="list-style-type: none"> Remove the movement from the case. Disassemble the movement. Wipe off battery electrolyte on the circuit block. <ol style="list-style-type: none"> Wipe off battery electrolyte with a cloth moistened with distilled water. (If distilled water is not available, use tap water.) <p>Note: Do not expose the trimmer condenser to water or alcohol. If it is exposed, there may be a change in the condenser capacity and eventually in the time accuracy.</p>	<p>Be sure to wipe off battery electrolyte on the battery connection.</p> 	<ol style="list-style-type: none"> Wipe them with a cloth moistened with alcohol. (If the cleaned portions remain wet with water, they will corrode with rust.) Dry with cool air by using a dryer. Wipe off battery electrolyte on the other parts. (Rinse the insulator for battery with water.) Reassemble the movement. (Replace the battery with a new one.) Check to see if the time setting functions and the current consumption are normal. <p>Note: Replace parts with new ones if they are rusted to the extent that they cannot be used.</p>

C**CHECK BATTERY CONDUCTIVITY****Procedure**

Check to see if the battery current flow to the circuit is normal.

1. Check for any stain on the connecting portions of the battery, plus terminal of battery connection and the battery connection.

**Result**

Uncontaminated ————— Normal →
 Contaminated ————— Defective →

Adjustment and Repair

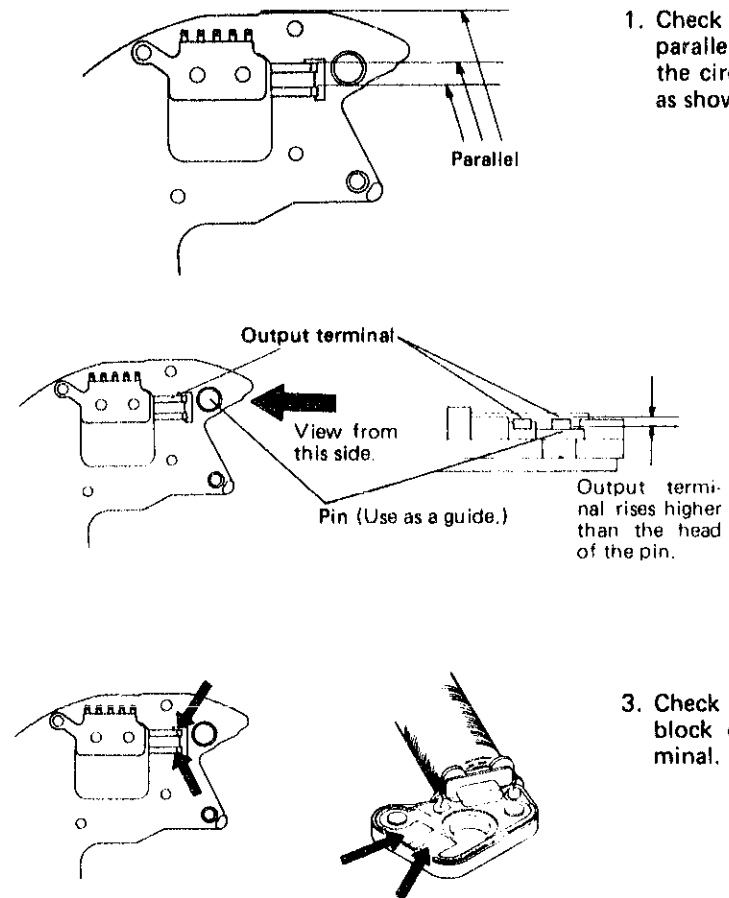
Proceed to **D**.

- Wipe off carefully.

Note: Be careful not to bend the plus terminal of battery connection and the battery connection.

D**CHECK CIRCUIT BLOCK OUTPUT TERMINAL CONDUCTIVITY**

Remove the circuit block, and check the connecting portions of the circuit block and the coil.



1. Check to see if the two output terminals are parallel to the edge of the circuit board when the circuit block is viewed from the back side as shown in the illustration on the left.

2. Check to see if the circuit block output terminal rises higher than the head of the pin for circuit block screw when viewed from the side.

3. Check for any contamination on the circuit block output terminal and the coil lead terminal.

Parallel ————— Normal →
 Bent ————— Defective →

Higher ————— Normal →
 Not higher ————— Defective →

Uncontaminated ————— Normal →
 Contaminated ————— Defective →

Proceed to **D** 2.

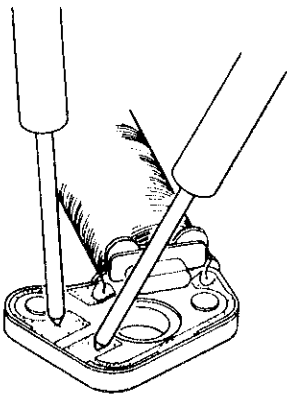
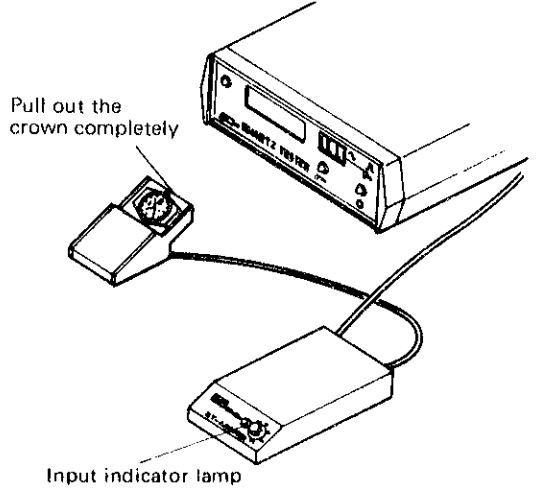
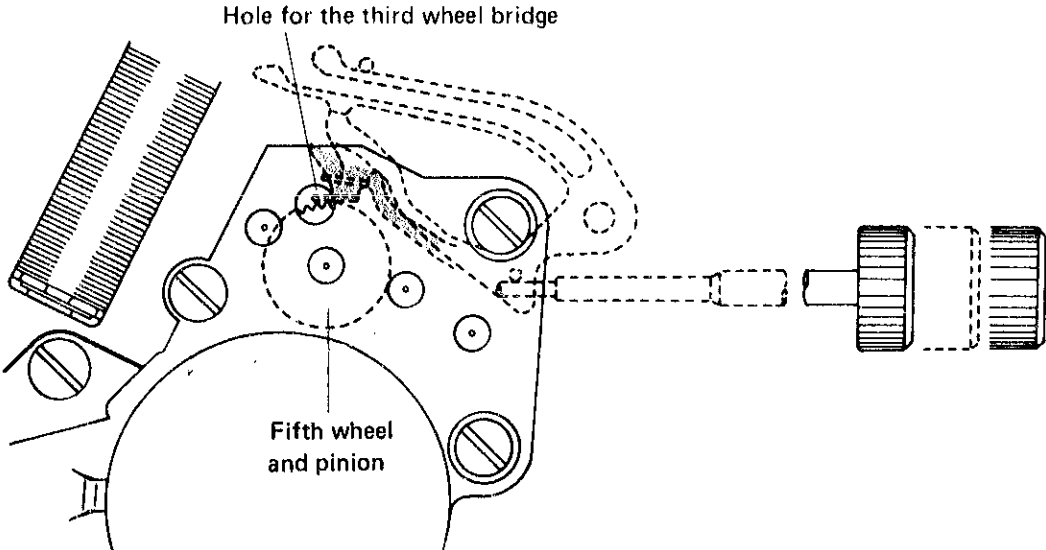
- Correct the bend of the output terminal.

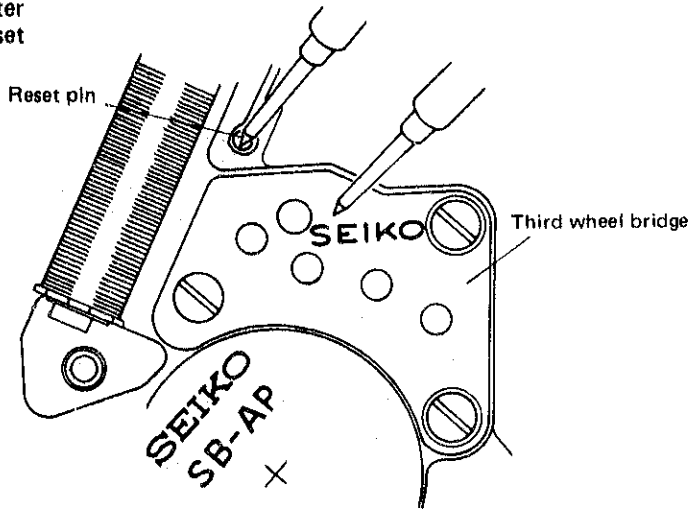
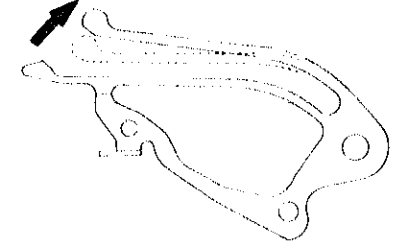
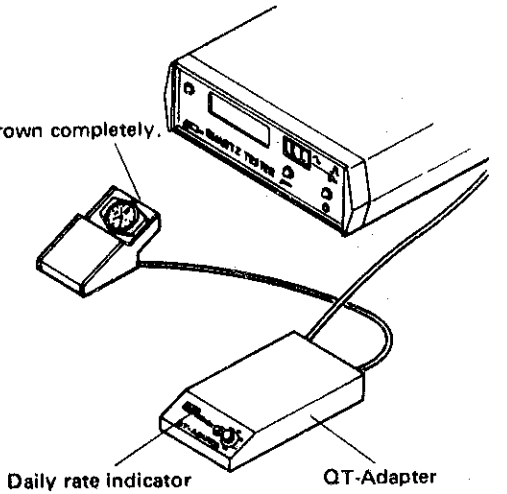
Proceed to **D** 3.

- Raise the output terminal.

Proceed to **E**.

- Wipe off the contamination.

	Procedure	Result	Adjustment and Repair
F CHECK COIL BLOCK	<p>Check for broken coil wire and short circuit of the coil block.</p> <p>1. Set up the Volt-ohm-meter. Range to be used: OHMS R x 100</p> <p>2. Checking Apply the red and black probes of the Volt-ohm-meter to the two lead terminals of the coil.</p> 	<p>2.5kΩ ~ 4.5kΩ Normal (Pointer of the Volt-ohm-meter swings.)</p> <p>More than 4.5kΩ Broken coil wire</p> <p>Less than 2.5kΩ Short circuit</p>	<p>Proceed to F if Electronic circuit block must be checked. Proceed to G if Mechanical portion must be checked.</p> <p>• Replace the coil block with a new one.</p>
F CHECK OUTPUT SIGNAL	<p>Check for output signal</p> <p>1. Set up the Quartz Tester and the QT-Adapter.</p> <p>2. Checking Follow the same procedures as in A.</p> 	<p>Blinking</p> <p>No Blinking</p> <p>Functioning</p> <p>Not functioning</p> <p>Defective</p>	<p>Proceed to I.</p> <p>Proceed to CHECK MECHANICAL PORTION and G.</p> <p>• Replace the circuit block with a new one.</p>
G CHECK SECOND SETTING CONDITION	<p>Check the second setting condition.</p> <p>Check to see if there is clearance between the second setting lever and the fifth wheel and pinion when the crown is in the normal and the first click positions. Also, check to see if the second setting lever touches the fifth wheel and pinion when the crown is in the second click position. (Check through the hole for the third wheel bridge by using a microscope.)</p> 	<p>Function</p> <p>Do not function</p> <p>Normal</p> <p>Defective</p>	<p>Proceed to H.</p> <p>• Correct the bend of the second setting lever.</p>

	Procedure	Result	Adjustment and Repair
I CHECK RESET CONDITION	<p>Check the reset condition after the circuit block and the battery are reassembled.</p> <ol style="list-style-type: none"> Check to see if the second hand stops immediately when the crown is pulled out completely and if it starts promptly after one second when the crown is pushed in to the normal position. Check to see if the conductivity between the reset pin and the main plate is normal when the crown is pulled out completely. <ol style="list-style-type: none"> Set up the Volt-ohm-meter. Range to be used: OHMS R x 1 <p>Note: Be careful not to use the range other than R x 1. The circuit might be damaged if another range is used.</p> <ol style="list-style-type: none"> Disassemble the anti-magnetic shield plate. (If the probes have sharp tips, it might be possible to check without disassembling the anti-magnetic shield plate. But if the probes touch the anti-magnetic shield plate, the checking result is unreliable.) Checking Apply the probes of the Volt-ohm-meter to the third wheel bridge and the reset pin. Either red or black probe will do. 	<p>Stops completely and starts moving after one second ————— Normal —————></p> <p>Does not stop or moves irregularly ————— Defective —————></p> <p>Less than 10Ω ————— Normal —————></p> <p>More than 10Ω ————— Defective —————></p>	<p>Proceed to I.</p> <p>Proceed to H 2.</p> <ul style="list-style-type: none"> Replace the circuit block with a new one. Correct the bend of the second setting lever, or replace the second setting lever with a new one. <p>Be sure to correct the shape so that enough resilience is obtained.</p> 
I CHECK ACCURACY	<p>Check gain and loss of time.</p> <ol style="list-style-type: none"> Set up the Quartz Tester and the QT-Adapter. Be sure to measure the time accuracy without disassembling the watch case. (When the Quartz Tester QT-99 is used, the QT-Adapter is not necessary.) Follow the same procedure as in A. <p>Note: At around 24°C* the daily rate measured by the QT-Adapter (or QT-99) may change slightly. In this case, take an average of several measurements. *This is the temperature at which the characteristics of the two quartz crystal oscillators agree with each other.</p> 	<p>Measured value is;</p> <p>Within ±0.05 ————— Normal —————></p> <p>±0.05 ~ ±0.20 ————— Defective —————></p> <p>More than ±0.20 ————— Defective —————></p> <p>When the user indicates the extent of loss or gain, follow the instructions shown on the next page.</p>	<ul style="list-style-type: none"> Follow the procedures on page 11. <p>Proceed to TIME ACCURACY ADJUSTING.</p> <p>Proceed to TIME ACCURACY ADJUSTING after replacing the circuit block.</p> <p>Note: When adjusting time accuracy, be sure to follow the instructions shown on the following pages.</p>

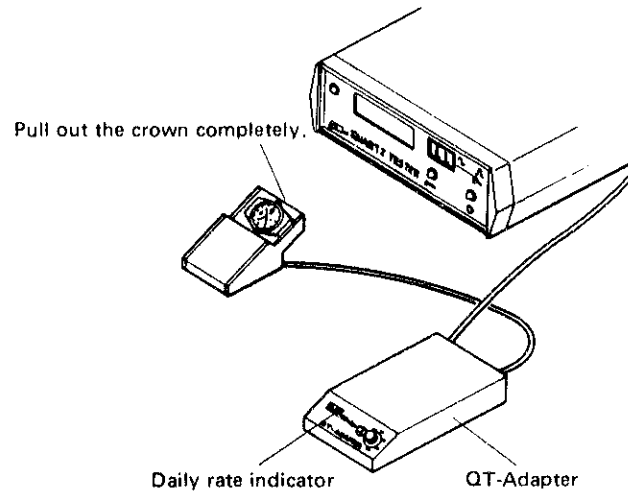
Procedure

The time accuracy of Cal. 9923A must be adjusted by far more strictly than that of the existing analogue quartz watches. When adjusting the time accuracy of Cal. 9923A, be sure to follow the procedures below.
Check to see which case applies to the watch among the following three.

I. The user indicates the constant monthly loss or gain of 4 to 6 seconds.

II. The user indicates the constant monthly loss or gain of more than 6 seconds.
Check time accuracy by using the QT-Adapter or QT-99. (See page 13 for details.)

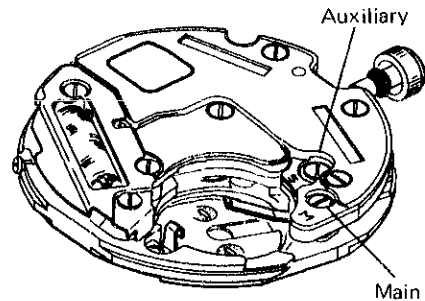
Reassemble the case and pull out the crown to the 2nd click, and place the watch on the microphone.



III. The watch loses or gains after the watch case is disassembled and reassembled or replaced. Usually, the daily rate changes slightly after disassembling and reassembling the watch case. Before measuring the time accuracy of Cal. 9923A after repair, be sure to reassemble the watch case.

Time accuracy adjusting

- Be sure to adjust the time accuracy by turning the main trimmer condenser.
- Be careful not to turn the auxiliary trimmer condenser.



Result

Loses or gains slightly

QT-99 or QT-Adapter indicates;
More than ± 0.20 sec./day

Less than ± 0.20 sec./day

QT-99 or QT-Adapter indicates;
 $\pm 0.05 \sim \pm 0.20$ sec./day

More than ± 0.20 sec./day

Adjustment and Repair

Proceed to **Time accuracy adjusting**. *1

1. Check for any dust and lint on the gear train, check to see if the gear train is properly lubricated and repair a malfunctioning portion.
2. Proceed to **Replace the circuit block**. *2
3. Proceed to **Time accuracy adjusting**. *1

Check for any dust and lint on the gear train, and check to see if the gear train is lubricated properly.

- If a malfunctioning portion is found, repair it and proceed to **Time accuracy adjusting**. *1
- If malfunctioning portion is not found, **Replace the circuit block** and proceed to **Time accuracy adjusting**. *1, 2

Proceed to **Time accuracy adjusting**. *2

Proceed to **Replace the circuit block** and **Time accuracy adjusting**. *1, 2

*1 Be sure to adjust time accuracy by following the instructions on the next page after reassembling the watch case and pulling out the crown completely.

*2 Even if the Quartz Tester does not indicate the daily rate of ± 0.20 sec./day after the circuit block is replaced, proceed to **Time accuracy adjusting**.

Procedure

- Be sure to use the QT-99 or QT-Adapter when adjusting time accuracy.
- The Cal. 9923A is available in two types of case back: Case back with battery hatch and that without battery hatch. For the watch with battery hatch, be sure to adjust the time accuracy with the case back attached as shown in the illustration on the right.

(The reason is that disassembling and reassembling of the case back will affect the daily rate slightly. This is negligible to the ordinary watches, but it is not negligible to the watch such as Cal. 9923A which maintains extremely high time accuracy.)

Refer to the following page for adjusting the time accuracy of the watch without battery hatch.

- While watching the value indicated by the QT-Adapter or QT-99, adjust the time accuracy by following the procedures below.

When the user indicates the extent of loss or gain of the watch.

(Ex.) The watch gains constantly 3 seconds a month.

- Step 1. Reduce the gain to a daily rate.
 $3 \text{ sec.} \div 30 \text{ days} = +0.10 \text{ sec./day}$
- Step 2. Read the daily rate indicated by the QT-Adapter or QT-99.
 $+0.08 \text{ sec./day}$
- Step 3. Calculate the difference between the gain (in daily rate) and the measured daily rate.
 $+0.08 - (+0.10) = -0.02 \text{ sec./day}$
Then adjust the trimmer condenser so that the QT-Adapter indicates the daily rate of -0.02 sec./day .

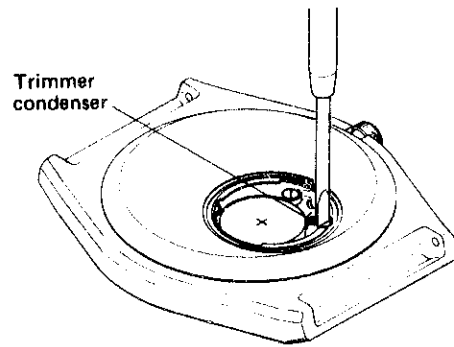
When the user complains of loss or gain, but does not indicate how much it is. Or when time accuracy adjusting is required after the watch case is disassembled and reassembled or replaced with a new one.

Adjust the trimmer condenser so that the QT-Adapter indicates $+0.01$. (Adjust to within $-0.02 \sim +0.03 \text{ sec./day}$.)

Note: For Cal. 9923A, time accuracy must be adjusted to a hundredth of a second. So the trimmer condenser must be turned most carefully by degrees.

- After the time accuracy is adjusted and the battery hatch is attached, warm the watch for about 5 minutes in your palm. (The watch will be warmed to about 30°C .) When the temperature of the watch has risen adequately, check the daily rate again. (Standard: $-0.04 \sim +0.05$)

Note: In practically all cases, the standard value above will be satisfied. Should any value other than the standard be given, adjust again the time accuracy.



Procedure

- Be sure to use the QT-99 or QT-Adapter when adjusting time accuracy.
- While watching the value indicated by the QT-Adapter or QT-99, adjust the time accuracy by following the procedures below.

When the user indicates the extent of loss or gain of the watch.

(Ex.) The watch gains constantly 3 seconds a month.

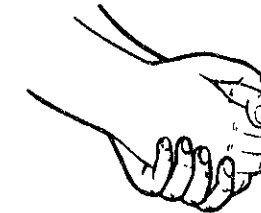
- Step 1. Measure the daily rate before adjusting time accuracy. $+0.12 \text{ sec./day}$
- Step 2. Measure the daily rate with the case back disassembled.
 $+0.09 \text{ sec./day}$
 $+0.09 - (+0.12) = -0.03 \text{ sec./day}$
- Step 3. Reduce the gain to a daily rate.
 $3 \text{ sec.} \div 30 \text{ days} = +0.10 \text{ sec./day}$
- Step 4. Calculate the difference between the gain (in daily rate) and the measured daily rate.
 $+0.09 - (+0.10) - (-0.03) = +0.02 \text{ sec./day}$
- Step 5. Check again the daily rate with the case back reassembled.

When the user complains of loss or gain, but does not indicate how much it is. Or when time accuracy adjusting is required after the watch case is disassembled and reassembled or replaced with a new one.

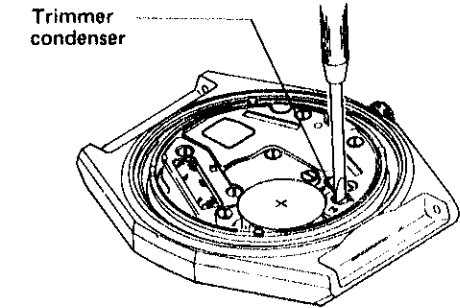
Adjust the trimmer condenser so that the QT-Adapter or QT-99 indicates $+0.01$ with the case back of the watch reassembled. Adjust to within $-0.02 \sim +0.03 \text{ sec./day}$.

Note: For Cal. 9923A, time accuracy must be adjusted to a hundredth of a second. So the trimmer condenser must be turned most carefully by degrees.

- After the time accuracy is adjusted and the battery holder is attached, warm the watch for about 5 minutes in your palm. (The watch will be warmed to about 30°C .) When the temperature of the watch has risen adequately, check the daily rate again. (Standard: $-0.04 \sim +0.05$)



Note: In practically all cases, the standard value above will be satisfied. Should any value other than the standard be given, adjust again the time accuracy.

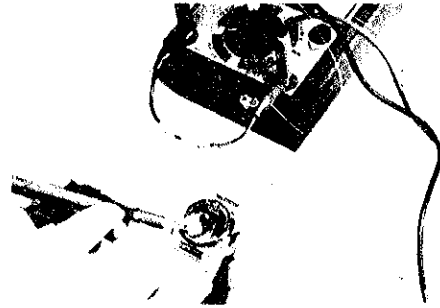


Procedure

In case a frequent battery change is required, make a current consumption test by following the procedures below.

Use the Micro Test or the Volt-ohm-meter for measuring current consumption. In the following case, the Volt-ohm-meter S-831 is used.

- 1) Set up the Volt-ohm-meter.
 - Range to be used: DC 12 μ A (blue)
 - Set up the condenser kit of 200 ~ 500 μ F as shown in the photo.
- 2) Prepare the watch.
 - Touch the (+) surface of the battery to the crown, as shown in the photo.
- 3) Measuring
 - Probe Red (+) Battery connection
 - Probe Black (-) Battery surface (-)



Note) Be sure to measure the current consumption with the crown in the normal position.

If the pointer of the Volt-ohm-meter swings over the maximum value, change over the measuring range to DC 30mA and turn it back to DC 12 μ A with the probes touched to the specified portions.

Remarks:
Current consumption would be measured more accurately if the current supplier is used instead of using the above procedure. (For the operation of the current supplier, refer to its instruction.)

Result	Adjustment and Repair
Less than 2.0 μ A ----- Normal →	• Current consumption is normal.
More than 2.0 μ A ----- Defective →	• Replace the circuit block with a new one.

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