

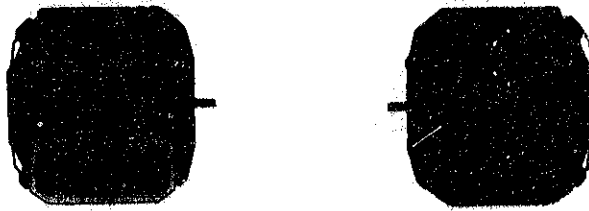
SEIKO

QUARTZ

Cal. H449A

**PARTS
CATALOGUE**

Cal. H449A



121 307



125 307



231 307



☆241 307



261 307



☆270 307



☆271 307



☆351 307



353 307



391 307



701 307



735 307



766 307



4001 309



4002 307



4146 307



4219 307



4219 308



4225 307



4238 307



4239 307



4245 307



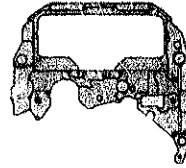
4270 307



4282 307



4313 307



4398 307



☆4446 307



4450 307



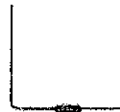
4455 307



☆4510 141



4521 307



4530 230



☆SEIKO TR926W

012 188	012 189	017 611	017 612	017 613	017 614
017 615	017 616	017 617	017 618	017 619	017 620

Cal. H449A

Characteristics

Casing diameter : 24.3 × 23.0 mm
 Maximum height : 2.7 mm without battery
 Jewels : 2 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 (12-hour or 24-hour indication), minute, second, date, "A.M."/"P.M." mark (displayed only in the 12-hour indication), 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.
 Time signal : Can be set to ring every hour on the hour.
 Stopwatch display : Digital display system showing 10-hour, minute, second and 1/100 second.
 Train wheel setting
 Driving system : Step motor (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
121 307	Center wheel bridge	017 614	Tube for circuit block screw (A)
125 307	Train wheel bridge	017 615	Tube for circuit block screw (B)
231 307	Third wheel & pinion	017 616	Tube for circuit block screw (C)
☆241 307	Fourth wheel & pinion	017 617	Tube for circuit block screw (D)
☆241 308		017 618	Tube for circuit block screw (E)
☆241 309		017 619	Tube for coil block screw
261 307	Minute wheel	017 620	Tube for center wheel & pinion
☆270 307	Center minute wheel & cannon pinion	☆SEIKO TR926W	Silver (II) oxide battery
☆270 308		☆Maxell SR926W	Silver oxide battery
☆270 309			
☆271 307	Hour wheel		
☆271 308			
☆351 307	Winding stem		
353 307	Reset lever spring		
391 307	Train wheel setting lever		
701 307	Fifth wheel & pinion		
735 307	Winding stem holder		
766 307	Intermediate minute wheel		
4001 309	Circuit block		
4002 307	Coil block		
4146 307	Step rotor		
4219 307	Battery connection insulator (A)		
4219 308	Battery connection insulator (B)		
4225 307	Battery clamp		
4238 307	Switch lever spring		
4239 307	Rotor stator		
4245 307	Switch spring		
4270 307	Battery connection (-)		
4282 307	Contact point lever		
4313 307	Connector		
4398 307	Liquid crystal panel frame		
☆4446 307	Crystal unit cushion		
4450 307	Switch lever		
4455 307	Reset lever		
☆4510 141	Liquid crystal panel (Silver)		
☆4510 142	Liquid crystal panel (Gold)		
4521 307	Reflecting mirror		
4530 230	Bulb		
011 542	Upper hole jewel for step rotor		
011 542	Lower hole jewel for step rotor		
012 188	Center wheel bridge screw		
012 185	Train wheel bridge screw		
012 189	Circuit block screw		
012 189	Coil block screw		
017 611	Tube for train wheel bridge (A)		
017 612	Tube for train wheel bridge (B)		
017 613	Tube for train wheel bridge (C)		

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



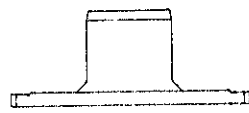
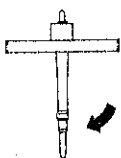

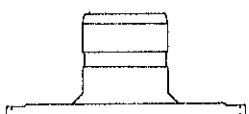
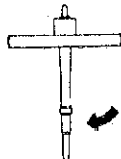

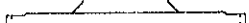
Cal. H449A

Remarks :

Fourth wheel & pinion, Center minute wheel & cannon pinion, Hour wheel

There are three different types as specified below.

Combination :

Type	Fourth wheel & pinion	Center minute wheel & cannon pinion	Hour wheel
a	 ☆241 307	 ☆270 307	 ☆271 307
*b	 ☆241 308	 ☆270 308	 ☆271 308
c	 ☆241 309	 ☆270 309	 ☆271 308

* As of this printing the Type b combination is not used. However it may be employed in the future with certain case designs.

Winding stem

☆351 307 Refer to the photograph on the front page.
 If the combination of the winding stem and case is unknown, check the case number and refer to "SEIKO Quartz Casing Parts Catalogue" to choose a corresponding winding stem.

Crystal unit cushion

☆4446 307 The crystal unit cushion designated by the same parts number may have different shapes, but they are interchangeable.

Liquid crystal panel

☆4510 141 } Be sure that combination between the color of panel cover and Liquid crystal panel
 ☆4510 142 } should be matched according to the "SEIKO Quartz Casing Parts Catalogue".

Battery

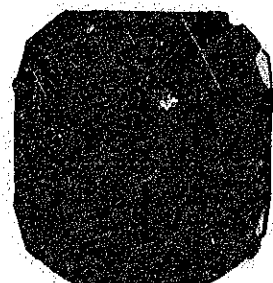
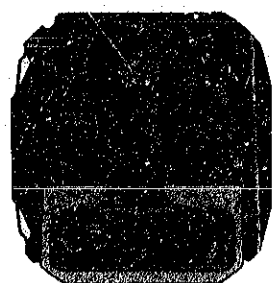
☆SEIKO TR926W } The substitutive battery might be added to the applied battery in the future.
 ☆Maxell SR926W } In that case, please refer to separate "BATTERY LIST FOR SEIKO QUARTZ WATCHES".
 Note that SEIKO battery is marked with "SEIZAIKEN" on its (+) side.

TECHNICAL GUIDE

SEIKO

DIGITAL QUARTZ

CAL. H449A



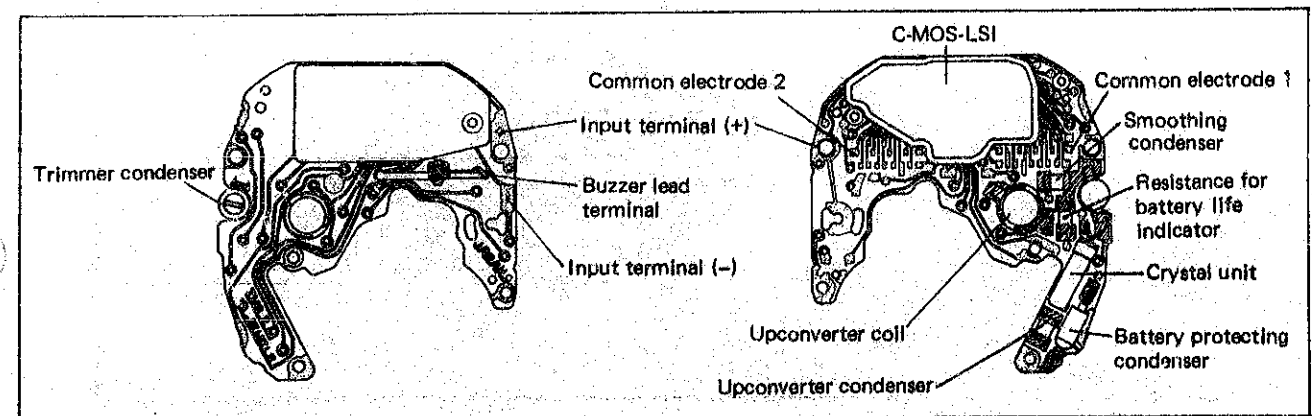
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I. SPECIFICATIONS

Item	Cal. No.	H449A
Analogue function	Time indication	Three-hand
	Additional mechanism	<ul style="list-style-type: none"> • Train wheel setting • Electronic circuit reset switch
	Display medium	Nematic Liquid Crystal, FEM (Field Effect Mode)
Digital function	Liquid crystal driving system	Multiplex driving system
	Display system	<ul style="list-style-type: none"> • Time display • Day and date display • Month and date display • Alarm I display • Alarm II display • Stopwatch display
	Additional mechanism	<ul style="list-style-type: none"> • Time signal • Alarm test system • Battery life indicator • Automatic calendar system • Illuminating light
Loss/gain		Loss/gain at normal temperature range Monthly rate : less than 10 seconds (Annual rate : less than 2 minutes)
Outside diameter		φ28.0mm (24.3mm between 6 o'clock and 12 o'clock sides) 23.0mm between 3 o'clock and 9 o'clock sides)
Height		2.7mm without battery
Regulation system		Trimmer condenser
Measuring gate by Quartz Tester		Any gate is available. (Measure at the analogue function.)
Battery		Maxell SR926W, SEIKO (SEIZAIKEN) TR926W Battery life is approximately 3 years Voltage: 1.55V
Jewels		2 jewels

II. STRUCTURE OF THE CIRCUIT BLOCK



III. DISASSEMBLING, REASSEMBLING AND LUBRICATING

Disassembling procedures Figs.: ① → ③⑨

Reassembling procedures Figs.: ③⑨ → ①

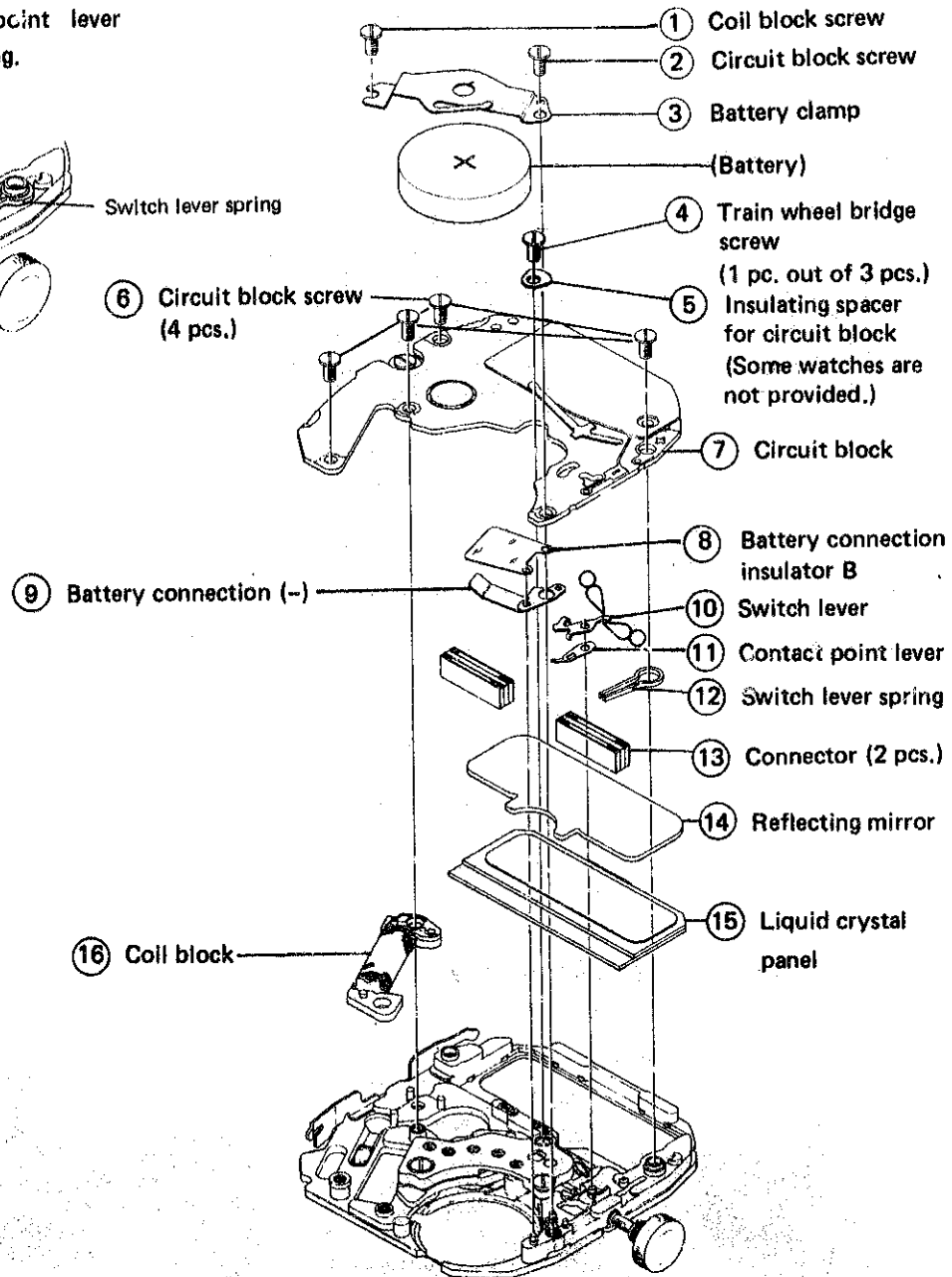
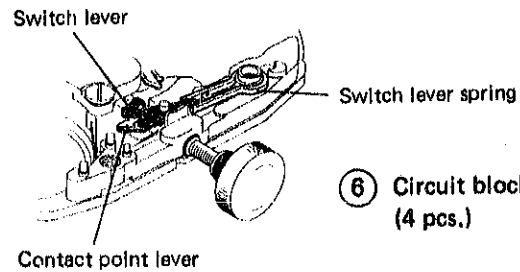
● Lubricating

Type of oil	Oil quantity
● Moebius A	▷ Small quantity
○ SEIKO Watch Oil S-6	○ Normal quantity

● Be sure to use the movement holder S-677 when disassembling and reassembling.

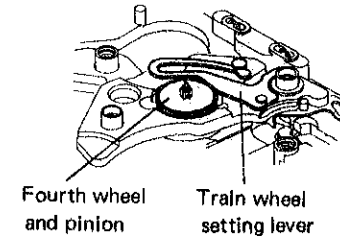
1. ① Coil block screw ~ ①⑥ Coil block

● Switch lever, contact point lever and switch lever spring.



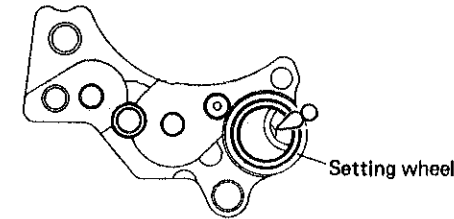
2. ①⑦ Train wheel bridge screw ~ ②⑥ Winding stem

● Train wheel setting lever

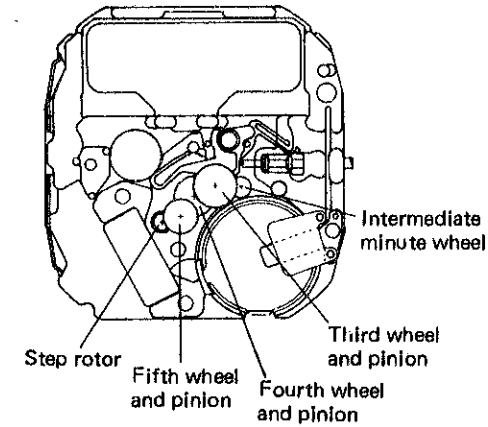


● Lubricating to the setting wheel

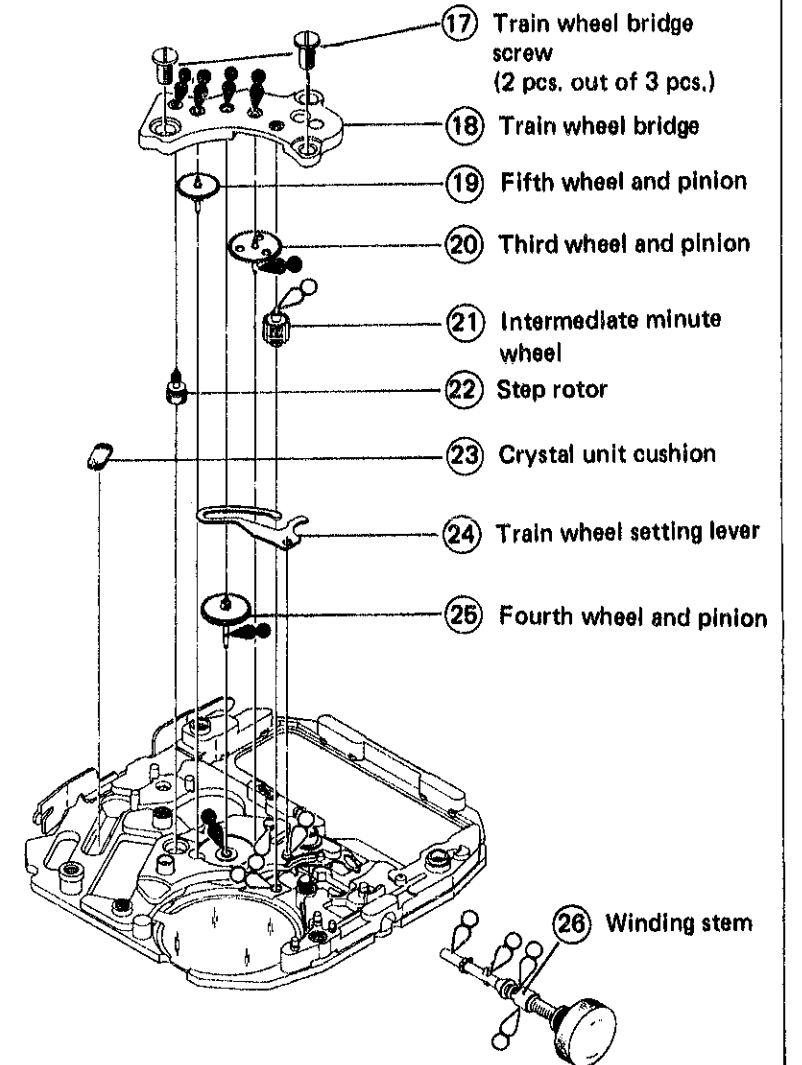
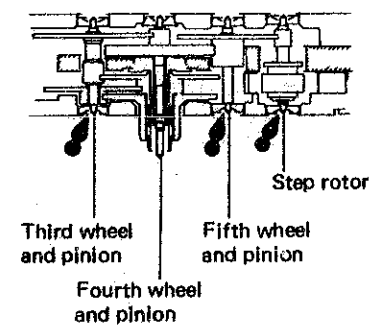
Lubricate the setting wheel which is on the back side of train wheel bridge.



● The setting position of train wheel (Plane figure)

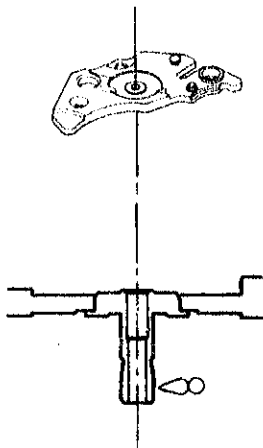


● The setting position of train wheel (Side view)

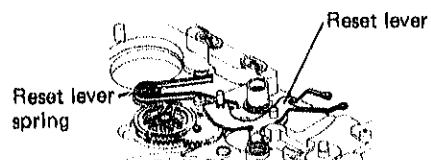


3. 27 Center wheel bridge screw ~ 39 Main plate

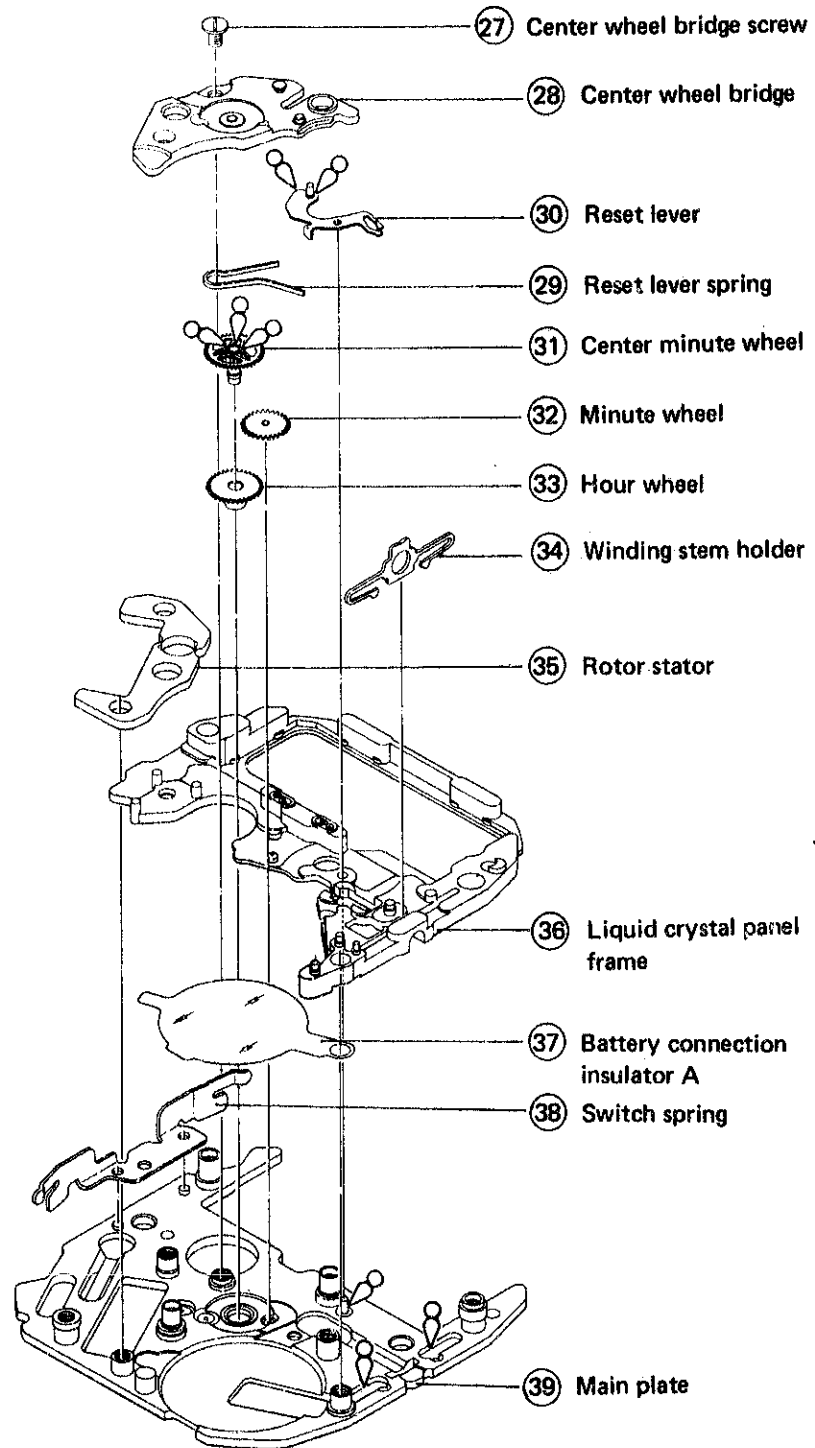
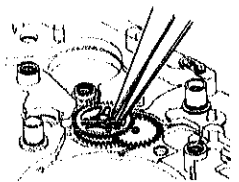
• Lubricating of center wheel bridge



• Reset lever spring and reset lever



• After reassembling the center minute wheel, engage the gears by moving the center minute wheel with tweezers.



IV. CHECKING AND ADJUSTMENT

- Refer to the "SEIKO QUARTZ TECHNICAL GUIDE GENERAL INSTRUCTION" for Digital watches and Analogue watches for details.

Procedure

CHECK BATTERY VOLTAGE

Result:
 More than 1.5V: Normal
 Less than 1.5V: Defective

*When the battery is replaced, the alarm will be disengaged and different alarm time may be displayed at random. However, the alarm function will be normal if the alarm time is set again.

CHECK BATTERY CONDUCTIVITY

CHECK OUTPUT SIGNAL

Use an electro-magnetic microphone for checking output signal.

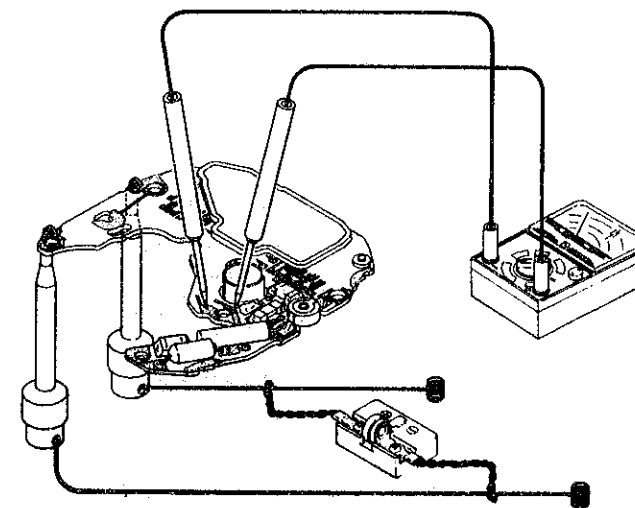
Result:
 Input indicator blinks every second: Normal
 Input indicator does not blink every second: Defective

CHECK CONDUCTIVITY OF LIQUID CRYSTAL PANEL, CIRCUIT BLOCK AND CONNECTORS

CHECK CIRCUIT BLOCK AND LIQUID CRYSTAL PANEL

- Output of analogue function

(Range to be used: DC3V)

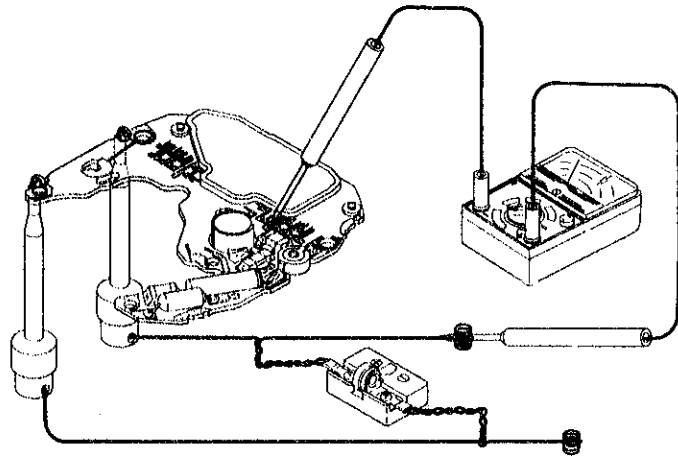


Result:
 Pointer of the Volt-ohm-meter swings every second: Normal
 Pointer of the Volt-ohm-meter does not swing every second: Defective
 Replace the circuit block with a new one.

Procedure



● Output of digital function

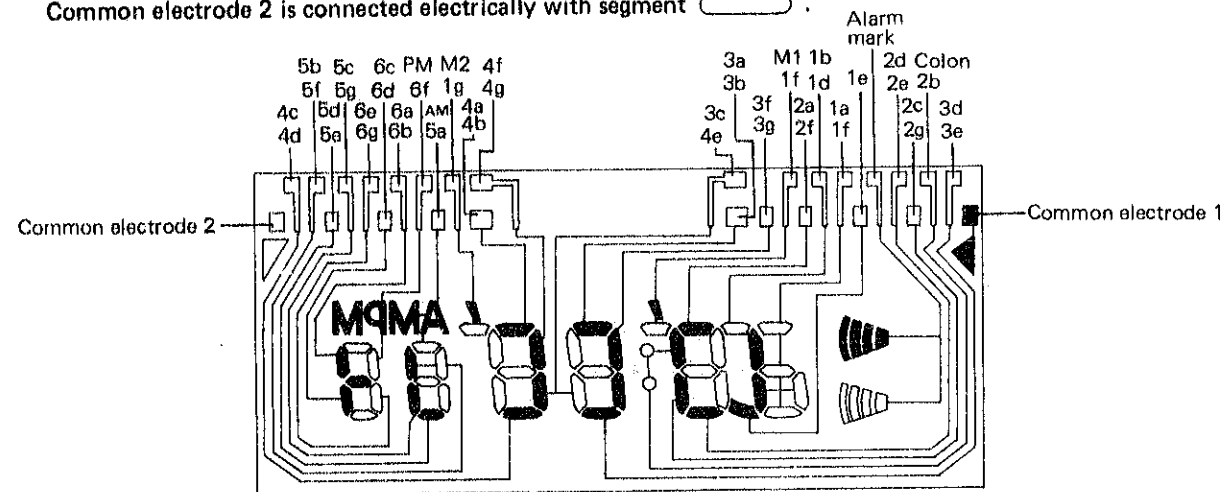
(Range to be used: DC3V)



Result:
 More than 0.8V: Normal
 Less than 0.8V: Defective
 Replace the circuit block with a new one.

● Liquid crystal panel electrode

Common electrode 1 is connected electrically with segment .
 Common electrode 2 is connected electrically with segment .



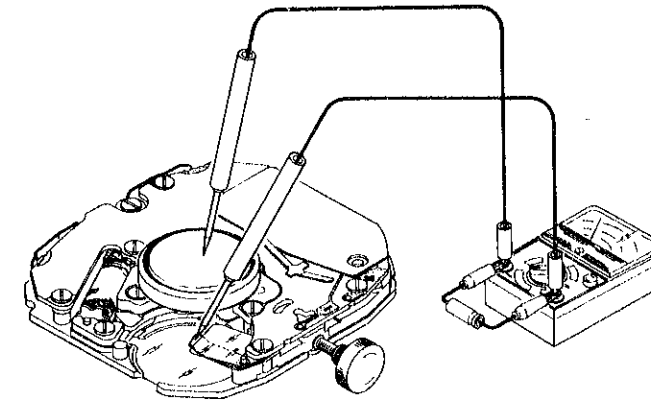
CHECK COIL BLOCK

Result:
 3.0KΩ ~ 3.4KΩ: Normal
 Less than 3.0KΩ (Short circuit)
 More than 3.4KΩ (Broken wire) — Defective
 Replace the coil block with a new one.

Procedure

CHECK CURRENT CONSUMPTION

Remove the battery clamp and the battery from the movement (module) and re-fasten the screws. Then, place the battery on the train wheel bridge and check current consumption.



Probe red — Battery connection (-)
 Probe black — Battery surface (-)

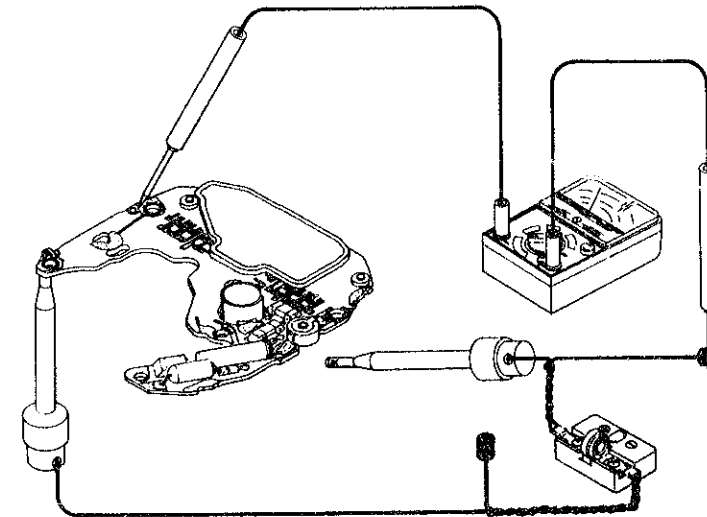
Result:
 Less than 2.0μA: Normal
 More than 2.0μA: Defective
 Replace the circuit block or the liquid crystal panel with a new one.

* How to find defects when the current consumption is more than 2.0μA.

(1) Check current consumption of the movement without the coil block.

Result:
 Less than 1.4μA: Normal
 Check to see if the gear train and the step rotor are set correctly and if there are dust and lint, etc.
 More than 1.4μA: Defective
 Proceed to [2].

(2) Check current consumption of the circuit block alone.



Result:
 Less than 1.3μA — Circuit block: Normal
 Replace the liquid crystal panel with a new one.
 More than 1.3μA — Circuit block: Defective
 Replace the circuit block with a new one.

Procedure

CHECK RESET AND TRAIN WHEEL SETTING CONDITIONS

● Reset condition

Check to see if the second hand stops immediately when the crown is pulled out to the second click and starts again promptly one second after it is pushed in to the first click or the normal position.

(Reset condition can also be confirmed by the procedure CHECK OUTPUT SIGNAL.)

Crown at the second click position : Does not blink every second.
 Crown at the first click or the normal position: Blinks every second.

Result:

The second hand stops completely and starts moving again after one second: Normal

The second hand does not stop or moves irregularly: Defective

Check the reset lever and the train wheel setting condition.

● Train wheel setting condition

Turn the crown after pulling it out to the second click and check to see if the train wheel setting lever regulates the fourth wheel and pinion surely.

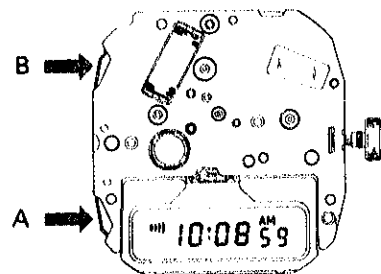
Fourth wheel and pinion does not move: Normal

Fourth wheel and pinion moves: Defective

Replace the train wheel setting lever with a new one.

CHECK CONDUCTIVITY OF SWITCH COMPONENTS

Check the following points after reassembling the battery to the movement.



- A and B portions of the switch spring touch with the switch components of the circuit block when they are pushed with tweezers and there is a clearance when they are not pushed.
- The digital display changes when A portion is depressed.
- The illuminating light is activated when B portion is depressed.
- Check to see if the digits advance correctly by turning the crown at the first click position in time display, alarm display I, II, day and date display or month and date display.

Result:

The digits advance by turning the crown counterclockwise and they go back when the crown is turned clockwise: Normal

The digits do not change even if the crown is turned clockwise or counterclockwise: Defective

Check the switch lever and switch lever portion.

Procedure

CHECK ACCURACY

- Check accuracy according to the accuracy measuring method for the analogue quartz watches.

CHECK ALARM TEST SYSTEM

Check alarm test system by depressing buttons A and B at the same time.

Result:

The alarm rings : Normal

The alarm does not ring: Defective

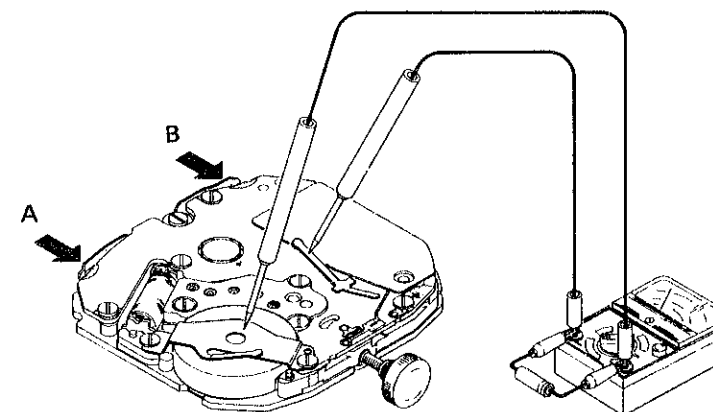
Check alarm condition

CHECK ALARM CONDITION

When the alarm does not ring, check the following points.

- Check output voltage.

Depress buttons A and B at the same time after connecting the Volt-ohm-meter as shown in the illustration below.



Probe red -- Battery clamp
 Probe black -- Buzzer lead terminal of circuit block.

Result:

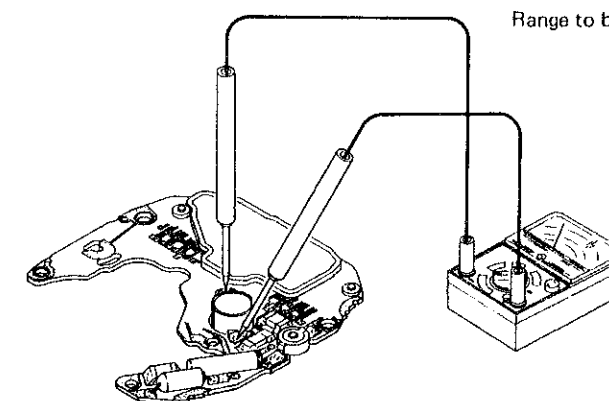
Pointer of the Volt-ohm-meter swings: Normal

Pointer of the Volt-ohm-meter does not swing: Defective

Check the upconverter coil.

Range to be used: DC 3.0V

- Check upconverter coil.



Range to be used: OHMS x 1

Result:

50 ~ 70Ω : Normal

Less than 50Ω (Short circuit) } Defective
 More than 70Ω (Broken wire) }

Replace the circuit block with a new one.

*When there is no defect to be found through the checking methods above, check the piezoelectric element.

Procedure

CHECK WATER RESISTANCE

CHECK FUNCTIONING AND ADJUSTMENT

[Check the analogue function]

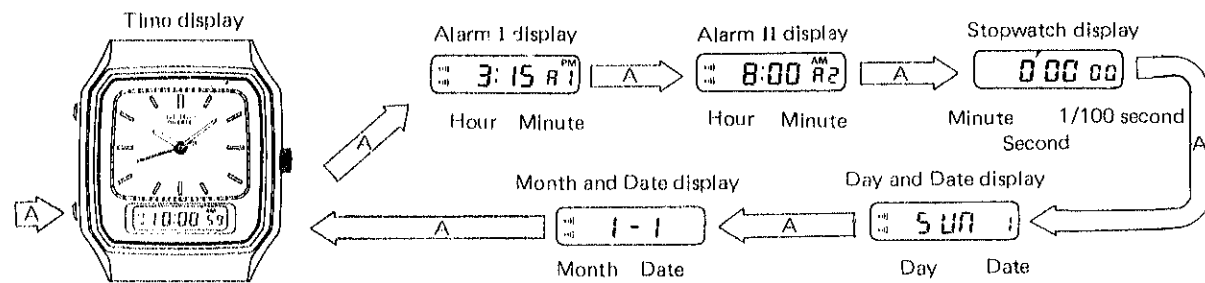
Pull the crown out to the second click and the second hand stops.

With this condition, check to see if time setting can be done by turning the crown.

* In any display in the digital function pull the crown to the second click to activate the analogue setting function.

[Check the digital function]

Check to see if the display changes in the following order by each depression of button A.



- Time, alarm time or calendar can be set by turning the crown clockwise or counterclockwise after pulling the crown out to the first click except stopwatch display.
- In the stopwatch display each depression of button B advances the function of "start", "stop" and "reset" repeatedly.

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