

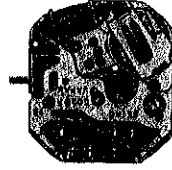
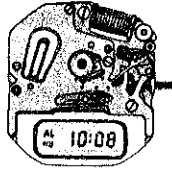
SEIKO

QUARTZ

Cal. E029A

**PARTS
CATALOGUE**

Cal. E029A



125 302



231 302



☆ 241 304



261 260



☆ 270 304



☆ 271 262



281 302



282 302



☆ 351 302



383 302



384 302



386 302



391 302



426 302



491 141



493 260



701 140



4001 310



4002 302



4146 302



4216 305



4225 302



4238 302



4239 302



4245 302



4246 302



4247 302



4270 302



4282 302



4313 302



4398 308



4450 302



4456 302



4457 302



☆ 4510 151



☆ SEIKO TR726W



012 198



012 793



017 621



017 622



017 623



017 624



017 625



017 626

3/1

Cal. E029A

Characteristics

Casing diameter : 19.2 × 17.4 mm
 Maximum height : 2.9 mm without battery
 Jewels : 2 j
 Frequency of quartz crystal oscillator : 32,768 Hz (Hz=Hertz Cycles per second)
 Time display : Digital Display System showing hour, minute, second, month, date and day of the week.
 Alarm display : Can be set to operate at any desired hour and minute.
 Display medium : Nematic Liquid Crystal, FE-Mode.
 Driving system : Step motor (2 poles)
 Regulation system : Trimmer condenser
 Train wheel setting
 Battery life indicator : All the digits in the display begin flashing.

| PART NO. | PART NAME | PART NO. | PART NAME |
|--|--|----------------|----------------------------------|
| 125 302 | Train wheel bridge | 011 541 | Upper hole jewel for step rotor |
| 231 302 | Third wheel & pinion | 011 541 | Lower hole jewel for step rotor |
| ☆241 299 } ☆ 241 304 } ☆241 305 } | Fourth wheel & pinion | 012 198 | Train wheel bridge screw |
| 261 260 | Minute wheel | 012 198 | Circuit block screw |
| ☆270 303 } ☆ 270 304 } ☆270 305 } | Center minute wheel with cannon pinion | 012 198 | Coil block screw |
| ☆ 271 262 } ☆271 266 } ☆271 303 } | Hour wheel | 012 793 | Setting lever spring screw |
| 281 302 | Setting wheel | 017 621 | Tube for train wheel bridge (A) |
| 282 302 | Clutch wheel | 017 622 | Tube for train wheel bridge (B) |
| ☆ 351 302 | Winding stem | 017 623 | Tube for circuit block screw (A) |
| 383 302 | Setting lever | 017 624 | Tube for coil block screw |
| 384 302 | Yoke (Clutch lever) | 017 625 | Tube for circuit block screw (B) |
| 386 302 | Setting lever spring | 017 626 | Tube for circuit block screw (C) |
| 391 302 | Train wheel setting lever | ☆SEIKO TR726W | Silver (II) oxide battery |
| 426 302 | Train wheel bridge support | ☆Maxell SR726W | Silver oxide battery |
| 491 141 | Dial washer | | |
| 493 260 | Hour wheel ring (Thickness 0.03 mm, Gold) | | |
| 493 261 | Hour wheel ring (Thickness 0.05 mm, Silver) | | |
| 493 262 | Hour wheel ring (Thickness 0.07 mm, Gold) | | |
| 701 140 | Fifth wheel & pinion | | |
| 4001 310 | Circuit block | | |
| 4002 302 | Coil block | | |
| 4146 302 | Step rotor | | |
| 4216 305 | Insulator for circuit | | |
| 4225 302 | Battery clamp | | |
| 4238 302 | Switch lever spring | | |
| 4239 302 | Rotor stator | | |
| 4245 302 | Changeover switch spring | | |
| 4246 302 | Speaker lead terminal | | |
| 4247 302 | Switch lever bush | | |
| 4270 302 | Battery connection (—) | | |
| 4282 302 | Contact point lever | | |
| 4313 302 | Connector | | |
| 4398 308 | Liquid crystal panel frame | | |
| 4450 302 | Switch lever | | |
| 4456 302 | Switch lever cover | | |
| 4457 302 | Circuit block cover | | |
| ☆ 4510 151 | Liquid crystal panel (Silver) | | |
| ☆ 4510 152 | Liquid crystal panel (Gold) | | |

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

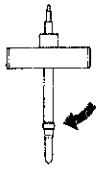


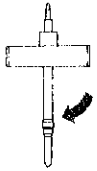


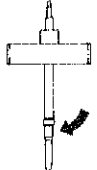

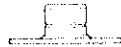
Cal. E029A

Remarks :

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

There are three different types as specified below.

Combination :

| Type | Fourth wheel & pinion | Center minute wheel with cannon pinion | Hour wheel |
|------|---|---|---|
| a |  ☆241 304 |  ☆270 304 | Silver  ☆271 262 |
| *b |  ☆241 305 |  ☆270 305 | Gold  ☆271 266 |
| c |  ☆241 299 |  ☆270 303 | Silver  ☆271 303 |

*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

☆351 302.....There are several types of winding stem. The size of winding stem is determined based on the design of cases. 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.

Liquid crystal panel

☆4510 151 } Be sure that the combination between the color of panel cover and liquid crystal panel
 ☆4510 152 } should be matched according to the "SEIKO Quartz Casing Parts Catalogue".

Battery

☆SEIKO TR726W } The substitutive battery might be added to the applied battery in the future.
 ☆Maxell SR726W } 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. E029A



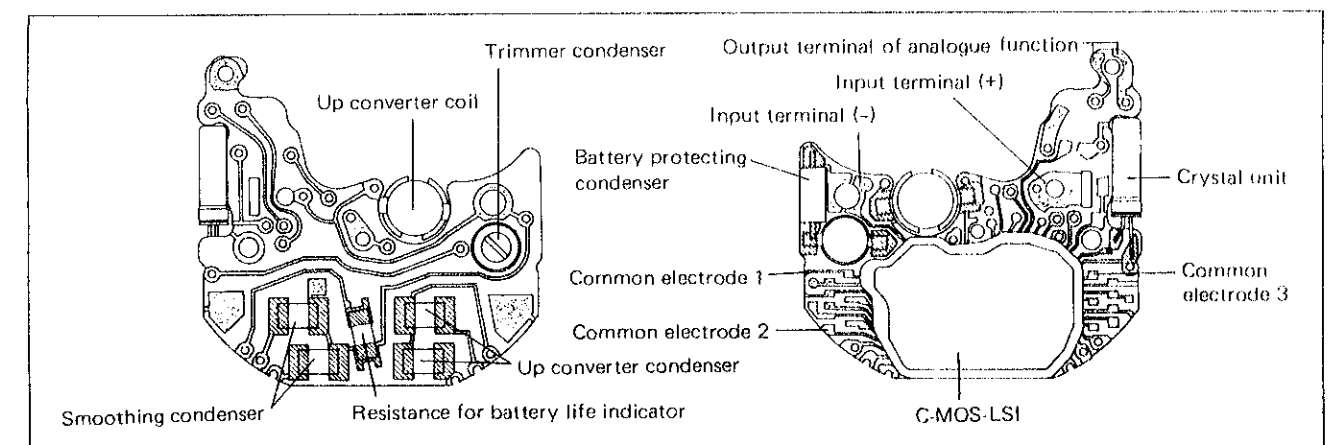
CONTENTS

| | |
|--|----|
| I. SPECIFICATIONS | 1 |
| II. STRUCTURE OF THE CIRCUIT BLOCK | 1 |
| III. DISASSEMBLING, REASSEMBLING AND LUBRICATING | 2 |
| 1. Indicating mechanism | 2 |
| 2. Electronic circuit and switch mechanism | 3 |
| 3. Gear train mechanism | 4 |
| 4. Setting mechanism | 5 |
| IV. CHECKING AND ADJUSTMENT | 6 |
| • Check battery voltage | 6 |
| • Check battery conductivity | 6 |
| • Check output signal | 6 |
| • Check conductivity of liquid crystal panel, circuit block and connectors | 6 |
| • Check circuit block | 6 |
| • Check coil block | 7 |
| • Check current consumption | 7 |
| • Check reset and train wheel setting conditions | 8 |
| • Check conductivity of switch components | 8 |
| • Check accuracy | 9 |
| • Check alarm test system | 10 |
| • Check speaker | 10 |
| • Check water resistant | 11 |
| • Check functioning and adjustment | 11 |

I. SPECIFICATIONS

| Item | | Cal. No. | E029A |
|---------------------------------|-------------------------------|----------|---|
| Analogue function | Time indication | | Three-hand |
| | Additional mechanism | | <ul style="list-style-type: none"> • Train wheel setting device • Electronic circuit reset switch |
| Digital function | Display medium | | Nematic Liquid Crystal, FEM (Field Effect Mode) |
| | Liquid crystal driving system | | Multiplex driving system |
| | Display system | | <ul style="list-style-type: none"> • Time display • Second display • Day and date display • Month and date display • Alarm display |
| | Additional mechanism | | <ul style="list-style-type: none"> • Alarm test system • Battery life indicator |
| Loss/gain | | | Loss/gain at normal temperature range Monthly rate: less than 15 seconds (Annual rate: less than 3 minutes) |
| Casing diameter | | | ϕ 21.0 mm (19.2 mm between 6 o'clock and 12 o'clock sides: 17.4 mm between 3 o'clock and 9 o'clock sides:) |
| Height | | | 2.9 mm without battery |
| Regulation system | | | Trimmer condenser |
| Measuring gate by Quartz Tester | | | Any gate is available. |
| Battery | | | Silver oxide battery Battery life is approximately 2 years for SEIKO (SEIZAIKEN) TR726W, and 1 year for Maxell SR726W. Voltage: 1.55 V |
| Jewels | | | 2 jewels |

II. STRUCTURE OF THE CIRCUIT BLOCK



III. DISASSEMBLING, REASSEMBLING AND LUBRICATING



• Disassembling and reassembling

Disassembling procedures Figs. : ① - ④⑤

Reassembling procedures Figs. : ④⑤ - ①

• Be sure to use the movement holder S-676

• List of used screw

| Shape | Parts No. | Name | Shape | Parts No. | Name |
|--|-----------|---|---|-----------|-------------------------------------|
|  | 012 198 | Train wheel bridge screw (2 pcs.) Circuit block screw (3 pcs.) Coil block screw (1 pc.) |  | 012 793 | Setting lever spring screw (4 pcs.) |

• Lubricating

Types of oil

Moebius A

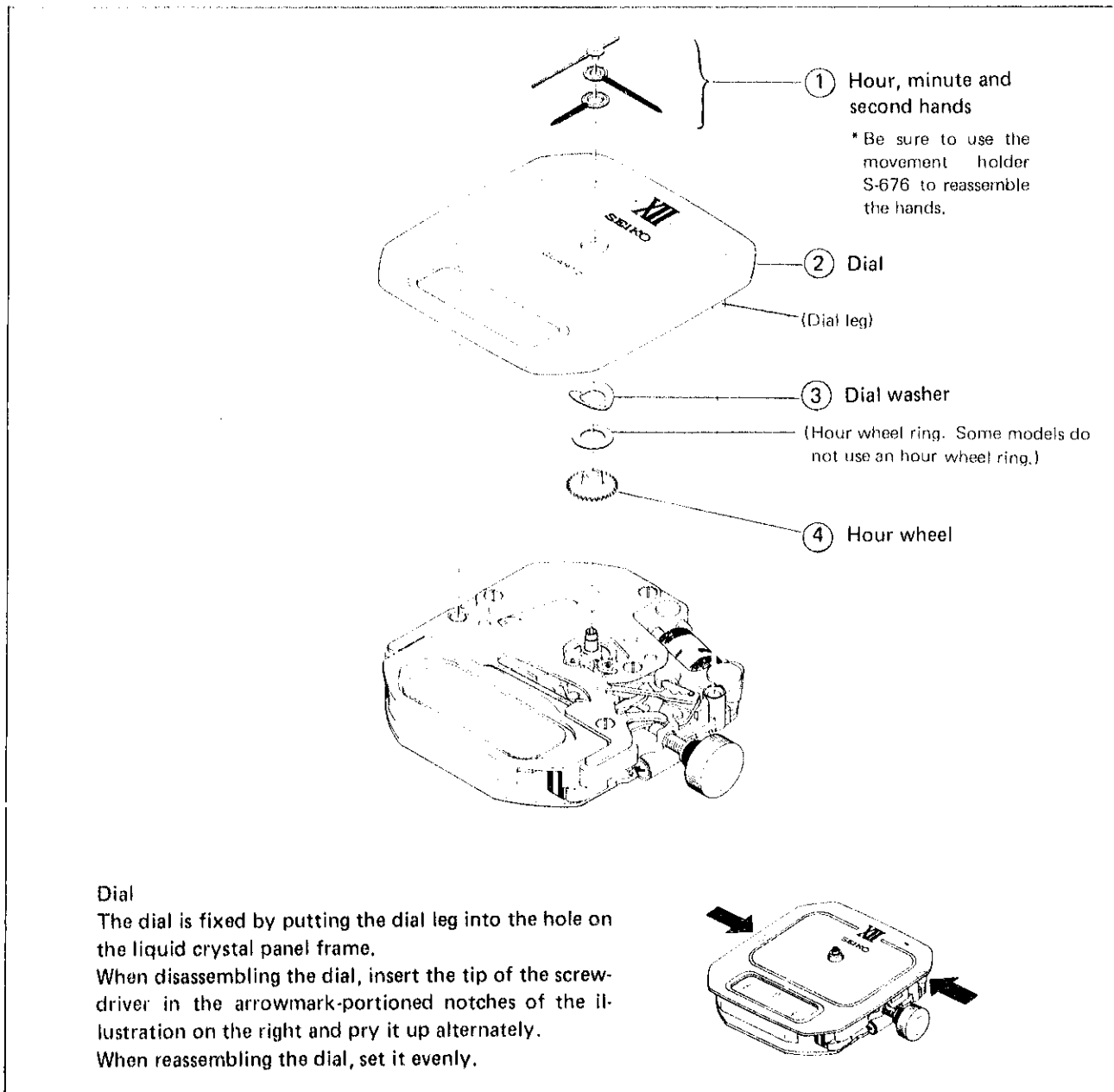
SEIKO Watch Oil S-6

Oil quantity

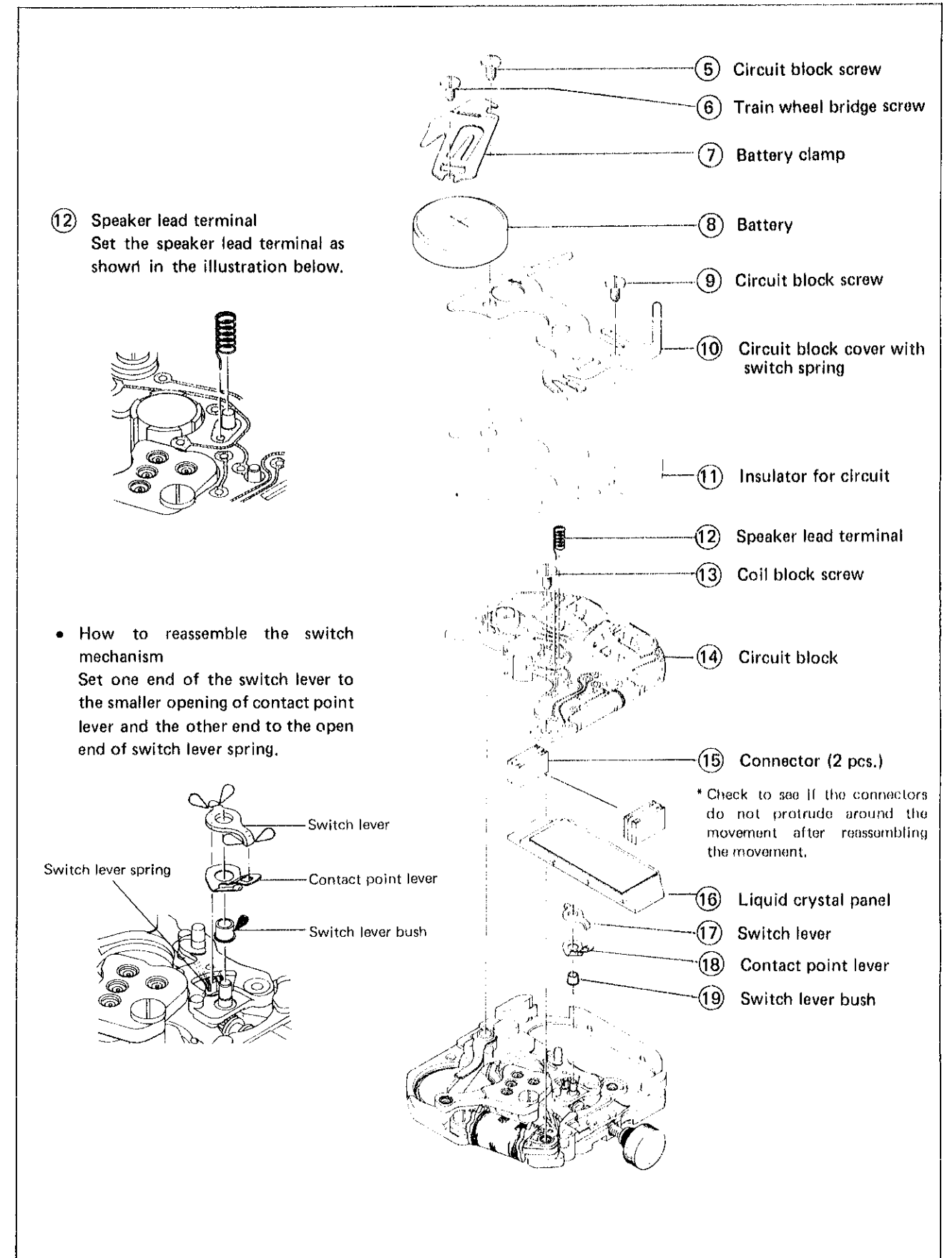
Normal



I. Indicating mechanism

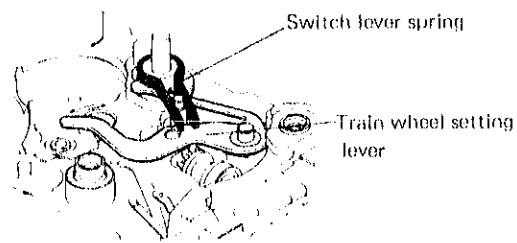


2. Electronic circuit and switch mechanism



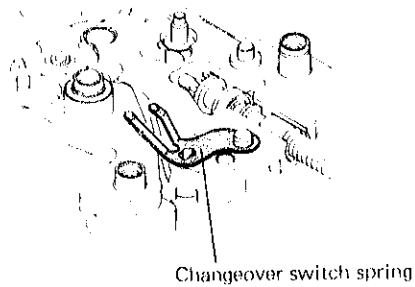
3. Gear train mechanism

- Switch lever spring and train wheel setting lever

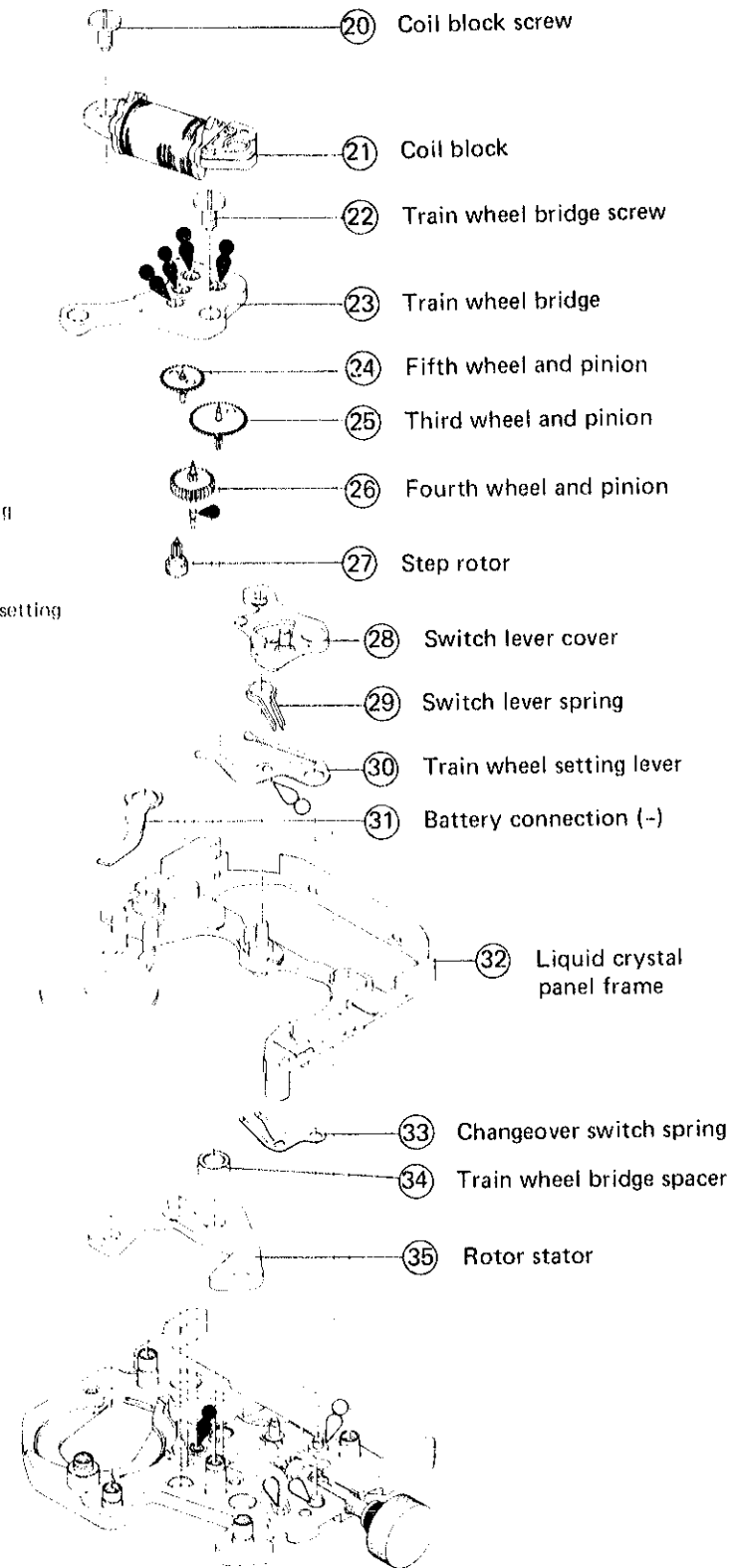


* Reassemble the train wheel setting lever while pulling out the crown completely. After reassembling it, push the crown back to the normal position.

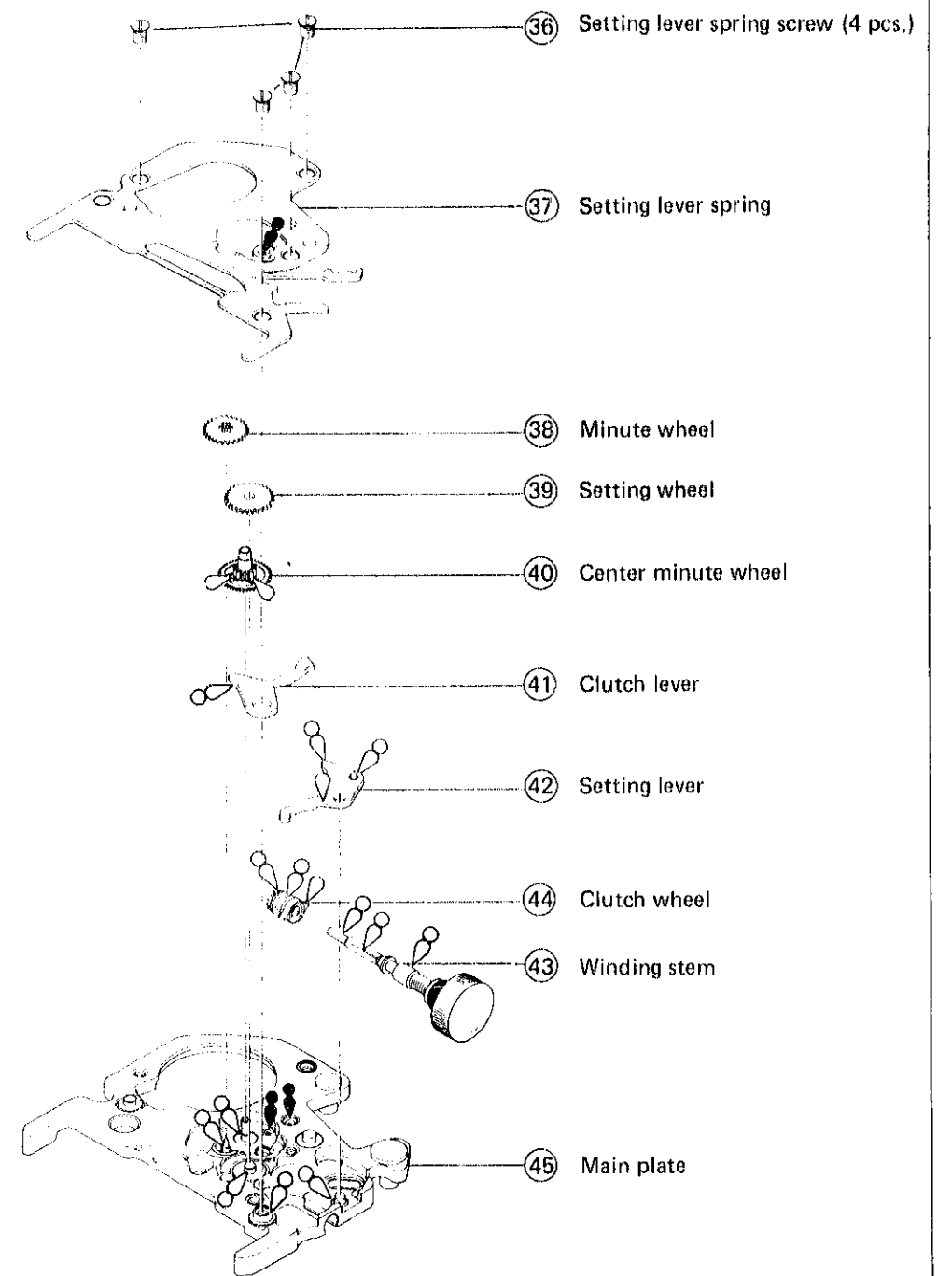
- Changeover switch spring



Changeover switch spring

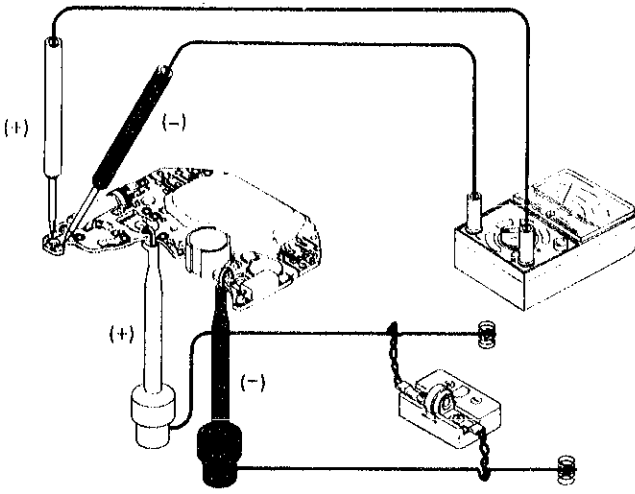


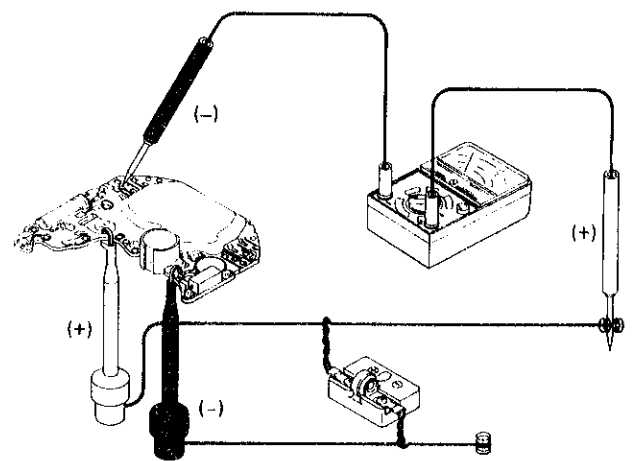
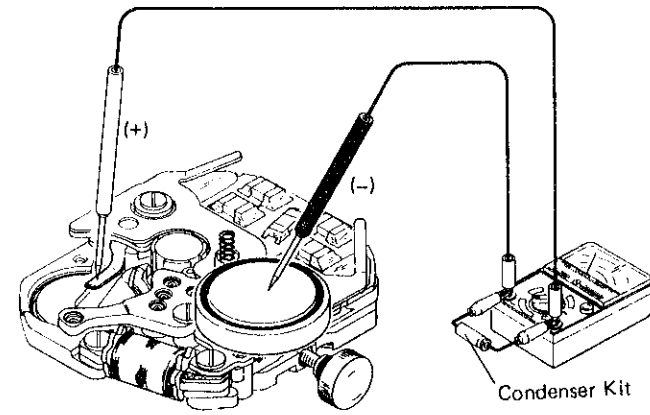
4. Setting mechanism



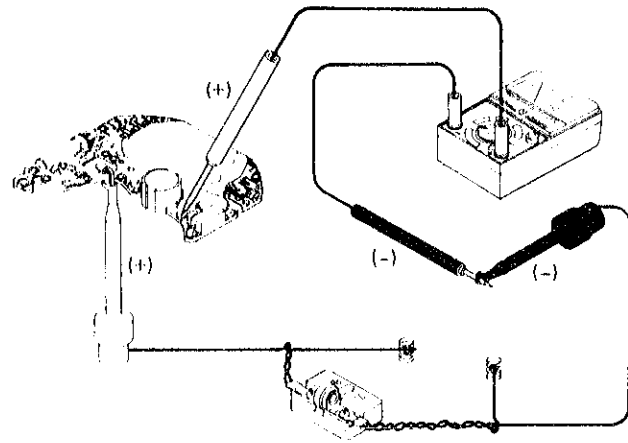
IV. CHECKING AND ADJUSTMENT

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

| Procedure | |
|--|--|
| CHECK BATTERY VOLTAGE | <p>Result: More than 1.5 V : Normal Less than 1.5 V : Defective</p> |
| CHECK BATTERY CONDUCTIVITY | |
| CHECK OUTPUT SIGNAL | <p>Result: Input indicator blinks every second: Normal Input indicator does not blink every second: Defective</p> |
| <p>* Be sure to use an electro-magnetic microphone for checking.</p> | |
| CHECK CONDUCTIVITY OF LIQUID CRYSTAL PANEL, CIRCUIT BLOCK, COIL BLOCK AND CONNECTORS | |
| CHECK CIRCUIT BLOCK | <p>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.</p> |
| <p>Output of analogue function (Range to be used: DC-3V)</p>  | |

| Procedure | | |
|---|--|--|
| <p>Output of digital function (Range to be used: DC-3V)</p>  | <p>Result: More than 0.8 V : Normal Less than 0.8 V : Defective Replace the circuit block with a new one.</p> | |
| CHECK COIL BLOCK | <p>Result: 3.2 KΩ ~ 3.8 KΩ: Normal Less than 3.2 KΩ (Short circuit) — Defective More than 3.8 KΩ (Broken wire) — Defective Replace the coil block with a new one.</p> | |
| CHECK CURRENT CONSUMPTION | <p>(Range to be used: DC-12 μA)</p>  | <p>Result: Less than 1.8 μA : Normal More than 1.8 μA : Defective</p> <p>* How to find defects when the current consumption is more than 1.8 μA</p> <p>[1] Check the current consumption of the movement without the coil block.</p> <p>Result: Less than 1.5 μA Check to see if the gear train and the step motor are set correctly and if there are dust, lint, etc.</p> <p>More than 1.5 μA Proceed to [2]</p> |

Procedure



[2] Check the current consumption with the circuit block alone.

Result:
Less than $1.2\mu A$ – Circuit block: Normal
Replace the liquid crystal panel with a new one.

More than $1.2\mu A$ – Circuit block: Defective
Replace the circuit block with a new one.

CHECK RESET AND TRAIN WHEEL SETTING CONDITION

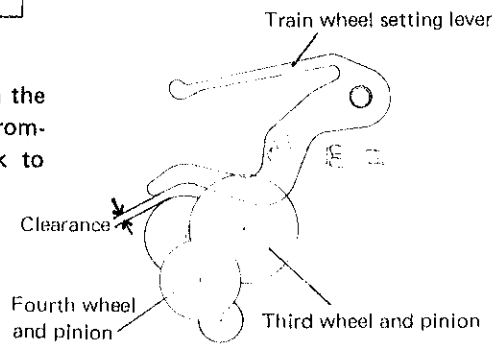
• **Reset condition**

Check to see if the second hand stops immediately when the crown is pulled out to the second click and if it starts promptly after one second when the crown is pushed back to the first 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 normal and first click position: Blinks every second



Result:
Stops completely and starts moving after one second: Normal
Does not stop or move irregularly: Defective
Check the changeover switch spring and train wheel setting condition.

• **Train wheel setting condition**

Check to see if there is the clearance between the train wheel setting lever and the fourth wheel and pinion.

Crown at the normal and first click position

Clearance: Normal
No clearance: Defective

Replace the train wheel setting lever with a new one.

Crown at the second click position

No clearance: Normal
Clearance: Defective

Replace the train wheel setting lever with a new one.

Procedure

CHECK CONDUCTIVITY OF SWITCH COMPONENTS

* Check after reassembling the battery to the movement.

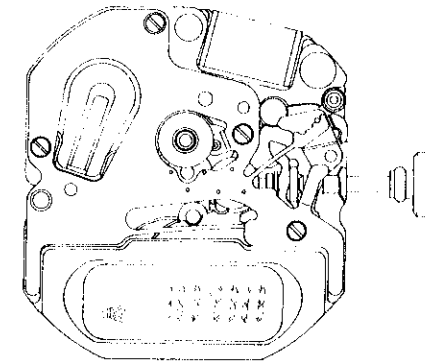
(Digital function)

[1] Turn the crown counterclockwise or clockwise at the normal position.

When turned, it clicks and the display changes: Proceed to [2].

When turned, it clicks but the display does not change: Defective

When turned, it does not click and the display does not change: Defective



* Check setting position of switch lever and switch lever spring.

* Check setting position of contact point lever and switch lever.

* Check the contact portion of contact point lever and circuit block.

[2] Pull the crown to the first click and turn it counterclockwise or clockwise in each display.

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

The digits do not advance or go back when the crown is turned counterclockwise or clockwise: Defective

* Check the contact portion of changeover switch spring and circuit block.

* Check setting position of changeover switch spring.

CHECK ACCURACY

• Check accuracy according to the accuracy measuring method for the analogue quartz watches. (When accuracy is measured by the accuracy measuring method for the digital quartz watches, it can not be checked stably.)

• Check accuracy with the crown side up.

Procedure

CHECK ALARM TEST SYSTEM

- In the time display, turn the crown in the following order within 2.5 seconds and the alarm will ring.
Clockwise → Counterclockwise → Clockwise → Counterclockwise

Result:

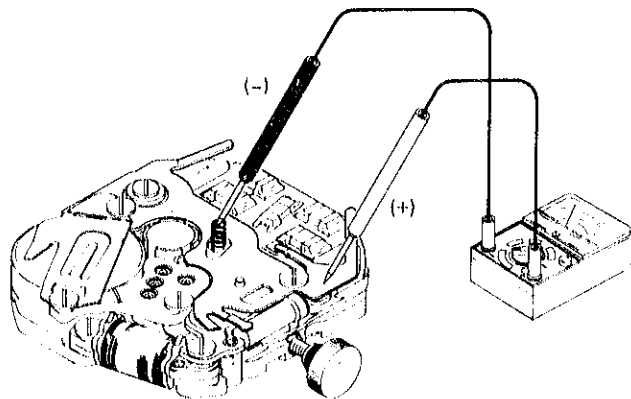
The alarm rings: Normal
The alarm does not ring: Defective
Check the speaker.

CHECK SPEAKER

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

- Check output voltage for alarm.
In the time display, turn the crown in the following order, clockwise → counterclockwise → clockwise → counterclockwise and check the speaker output as shown in the illustration below.
- * Output voltage for alarm is transmitted for 10 to 20 seconds.

(Range to be used DC: 30 mA or DC: 3 V)

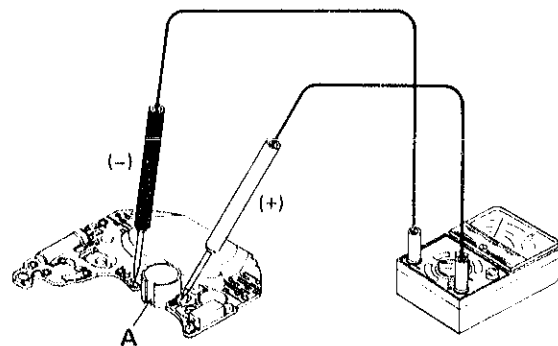


Probe red : Circuit block cover with switch spring.
Probe black : Speaker lead terminal

Result:

The pointer of the volt-ohm-meter swings: Normal
The pointer of the volt-ohm-meter does not swing: Defective
Replace the circuit block with a new one.

- Check up converter coil



Result:

60Ω ~ 100Ω : Normal
Less than 60Ω (Short circuit) — Defective
More than 100Ω (Broken wire) — Defective
Replace the circuit block with a new one.

- In case the color of portion A (arrow marked) is red.

Result:

130Ω ~ 170Ω : Normal
Less than 130Ω (short circuit) — Defective
More than 170Ω (Broken wire) — Defective
Replace the circuit block with a new one.

- Check piezoelectric element

When there is no defective found through the checking above, proceed to the checking of piezoelectric element.

Procedure

CHECK WATER RESISTANCE

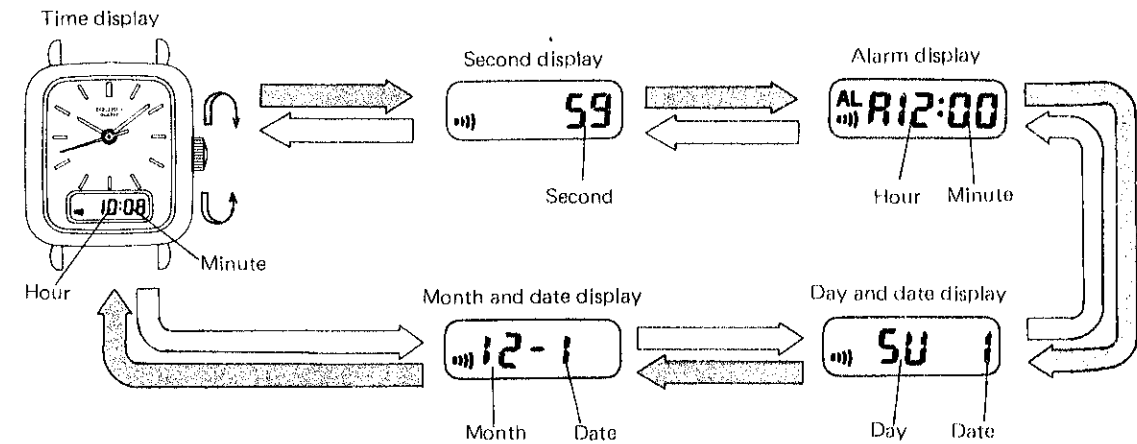
CHECK FUNCTIONING AND ADJUSTMENT

[Check the analogue function]

- Check to see if the second hand stops completely when the crown is pulled out to the second click and if time adjustment can be set.
- * In any digital display, analogue function can be adjusted when the crown is pulled out to the second click.

[Check the digital function]

- Check to see if the display changes in the following order by turning the crown clockwise or counterclockwise.



- Check to see if the setting function is activated when the crown is pulled out to the first click in each display and if the digits to be adjusted by turning the crown.

All procedures for disassembling, reassembling, lubricating, checking and adjustment are completed.