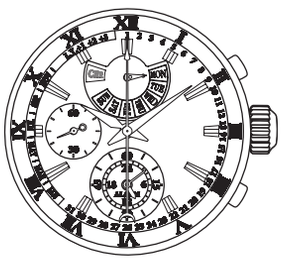
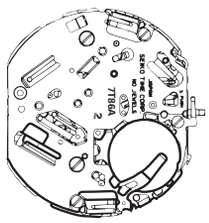
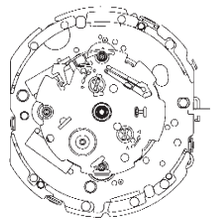
PARTS LIST /TECHNICAL GUIDE

Perpetual Calendar/Alarm Chronograph Cal. 7T86A

[SPECIFICATIONS]

Item \ Cal. No.		7T86A
 • 3 hands (hour, minute, and small second hands)		Movement  • Diameter Outside: Ø 27.6 mm • Height: 3.3 mm  Casing:Ø 27.0 mm
Interval of hands movements		1 second
Driving system		Stepping motor, 4 pieces
Additional function		• STOPWATCH functions 100-minute stopwatch in 1/5-second increments (measurable up to 24 hours) Split time measurement • SINGLE-TIME ALARM function Sound demonstration function • PERPETUAL CALENDAR No need to adjust up to February 28, 2100. • Battery life indicator • Second hand stop function • Electronic circuit reset function
Crown operation	Normal position	Free
	1st click position	Date setting (clockwise), Alarm setting
	2nd click position	Time setting, hand position adjustment / resetting the circuit
Loss/Gain		Monthly rate: Less than 15 seconds (worn on the wrist at temperature range between 5 °C and 35 °C)
Regulation system		Nil
Gate time for rate measurement		Use 10-second gate.
Current consumption		Movement: Less than 1.10 µA Circuit block: Less than 0.30 µA
Coil resistance		4002700, 2 pieces: 2.10 – 2.70 KΩ 1. Coil block for hour, minute, and small second 2. Coil block for perpetual calendar
		4002711, 2 pieces: 1.80 – 2.40 KΩ 1. Coil block for day 2. Coil block for alarm Up converter coil: 150 Ω - 180 Ω
Power supply	Battery No.	SEIKO SR927SW
	Battery voltage	1.55 V
	Battery life	Approx. 5 years
Number of jewels		0 jewel

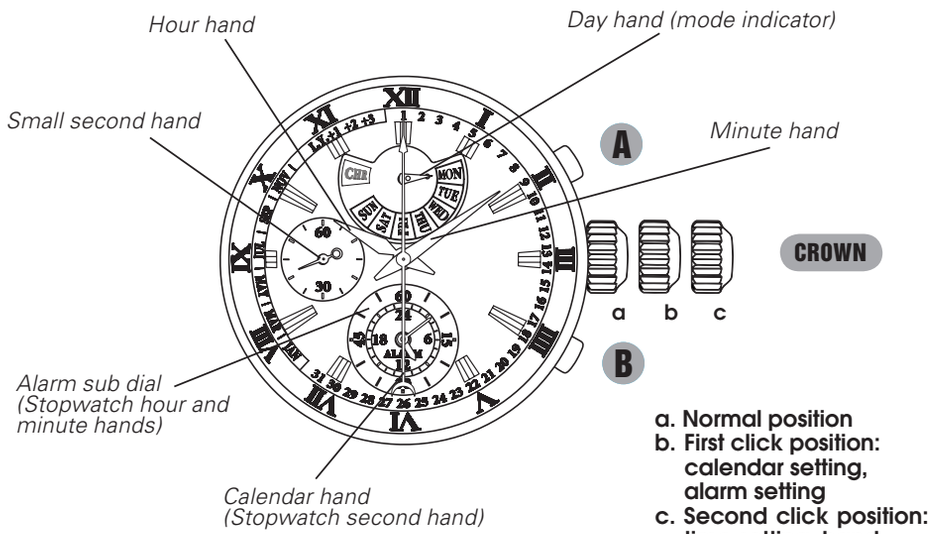
SPECIFICATIONS

Cal. 7T86A has a new structure employing one crown and two buttons, but the basic movement structure of Cal. 7T86A is similar to the previous Cal. 7T Series watches, and the knowledge and technique you have gained in handling the previous Cal. 7T Series watches will come in handy when you repair Cal. 7T86A.

When repairing, however, you are requested to have full knowledge of the features characteristic of these watches and strictly observe the repairing and checking instructions provided in this guide so that the watches will be repaired correctly.

FEATURES

Cal. 7T86A



1. PERPETUAL CALENDAR FUNCTION

- Date is indicated by the center hand in the CALENDAR/ALARM mode.
- Day of the week is indicated by the day hand at the 12 o'clock position.
- There is no need to adjust the date at the end of the month up to February 28, 2100.
- Month and year can be checked on demand.

2. STOPWATCH FUNCTION

- **Measurement performance**

  The measured time can be read up to 24 hours in 1/5-second increments.

- **Button operation (Crown position: Normal position)**

  Button A: START/STOP

  Button B: SPLIT/SPLIT RELEASE/RESET

- **Measurement functions**

  When the measurement reaches 24 hours, the stopwatch automatically stops and is reset.

3. RESETTING THE CIRCUIT

When an abnormal display appears, reset the built-in integrated circuit. The watch will resume its normal operation.

- **Button operation (Crown position: Second click)**

  Press and hold buttons A and B at the same time for longer than 2 seconds.

SPECIFICATIONS

NECESSARY PROCEDURE AFTER BATTERY CHANGE

After installing the battery, pull out the crown to the second click position. And then follow the instructions below to correct the hand positions and set the time.

1. Main time setting

Crown Pull out to the 2nd click when the small second hand is at the 12 o' clock position.

↓

Crown Turn to set the main time.
* Check that AM/PM is correctly set.

↓

2. Resetting the circuit

Pull out the crown to the 2nd click.
Press and hold both buttons A and B at the same time for longer than 2 seconds.

↓

3. Resetting stopwatch hands to "0" positions

[When the stopwatch is stopped]

Button B Press Button B to reset the STOPWATCH.

[When the sprit time measurement is displayed while the stopwatch is measureing]

Button B Press Button B to release the sprit time.

↓

Button A Press Button A to stop the STOPWATCH.

↓

Button B Press Button B to reset the STOPWATCH.

[When the sprit time measurement is displayed and the stopwatch is stopped]

Button B Press Button B to release the sprit time display.

↓

Button B Press Button B to reset the STOPWATCH.

PARTS LIST

Disassembling procedures Figs. : (1) → (53)

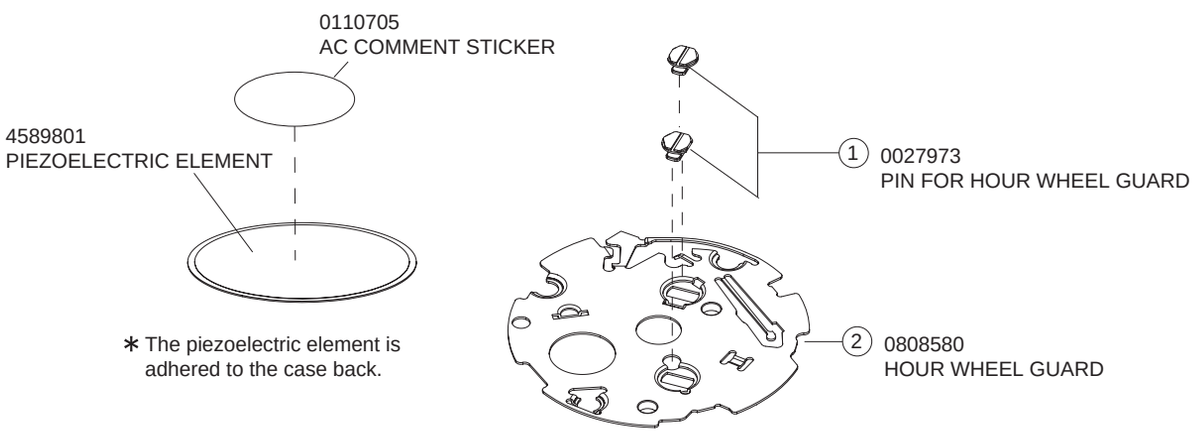
Reassembling procedures Figs. : (53) → (1)

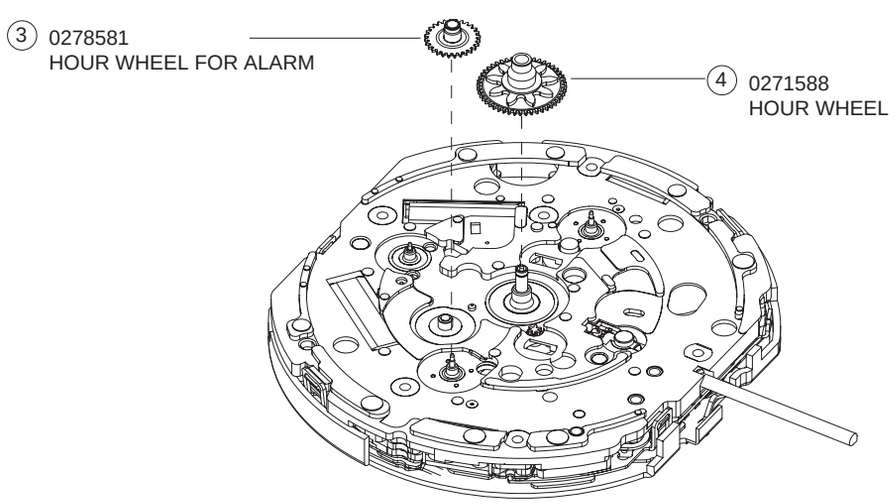
* For the type of oil and quantity of lubrication, refer to the following TECHNICAL GUIDE section.

Remarks on removing the SETTING STEM

To remove the SETTING STEM when taking out the movement from the case or while disassembling the parts during repair work, be sure to pull out the crown to the first click, and then, remove the SETTING STEM while pushing the setting lever. Refer to page 9 for further details.

[ALARM FUNCTION]

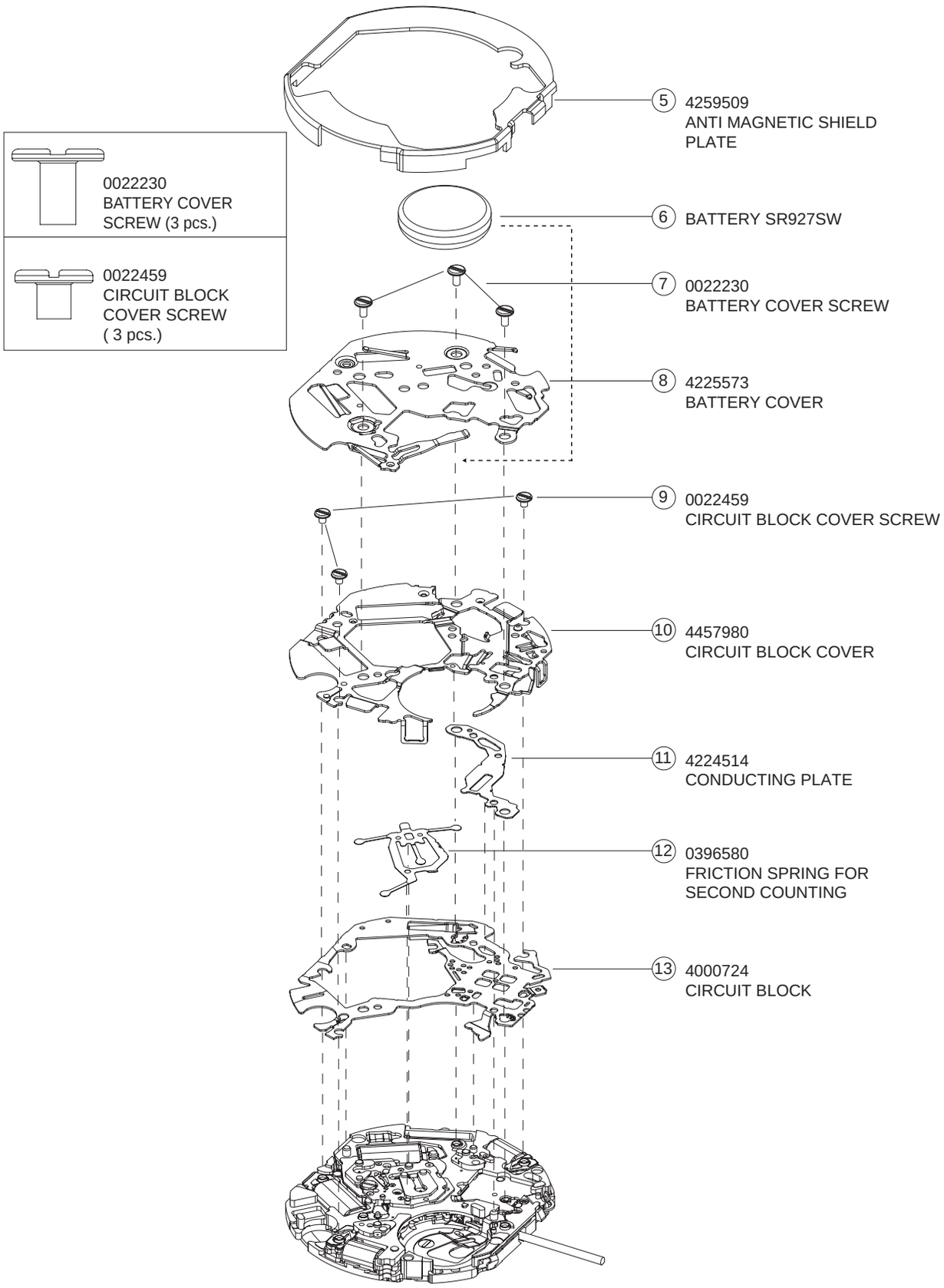




Lubricating of some parts is shown in "REMARKS ON DISASSEMBLING AND REASSEMBLING."

PARTS LIST

[BATTERY AND ELECTRONC CIRCUIT]

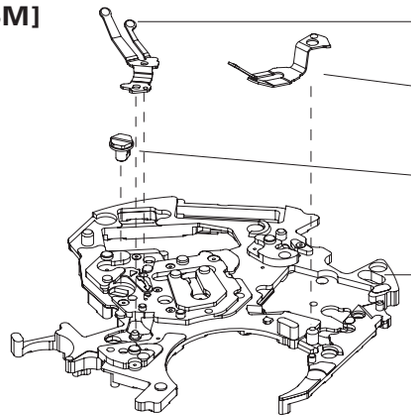


Lubricating of some parts is shown in “REMARKS ON DISASSEMBLING AND REASSEMBLING.”

PARTS LIST

Cal. 7T86A

[GEAR TRAIN MECHANISM]



(14) 4246 700
BUZZER LEAD TERMINAL

(15) 4270 710
BATTERY CONNECTION (–)

(16) 0027 974
PIN FOR TRAIN WHEEL BRIDGE

(17) 0125 509
TRAIN WHEEL BRIDGE

(18) 0888582
CALENDAR INDICATOR WHEEL

(19) 0885590
1ST INTERMEDIATE WHEEL FOR CALENDAR

(20) 0885591
2ND INTERMEDIATE WHEEL FOR CALENDAR

(21) 0950590
INTERMEDIATE DAY INDICATOR WHEEL

(22) 0270582
DAY INDICATOR WHEEL

(23) 0950590
INTERMEDIATE WHEEL FOR ALARM

(24) 0270582
CENTER MINUTE WHEEL FOR ALARM

(25) 0240580
SMALL SECONDS WHEEL

(26) 0241583
FOURTH WHEEL

(27) 0701580
FIFTH WHEEL

(28) 0231580
THIRD WHEEL

(29) 0261580
MINUTE WHEEL

(30) 4283581
CENTER WHEEL COCK

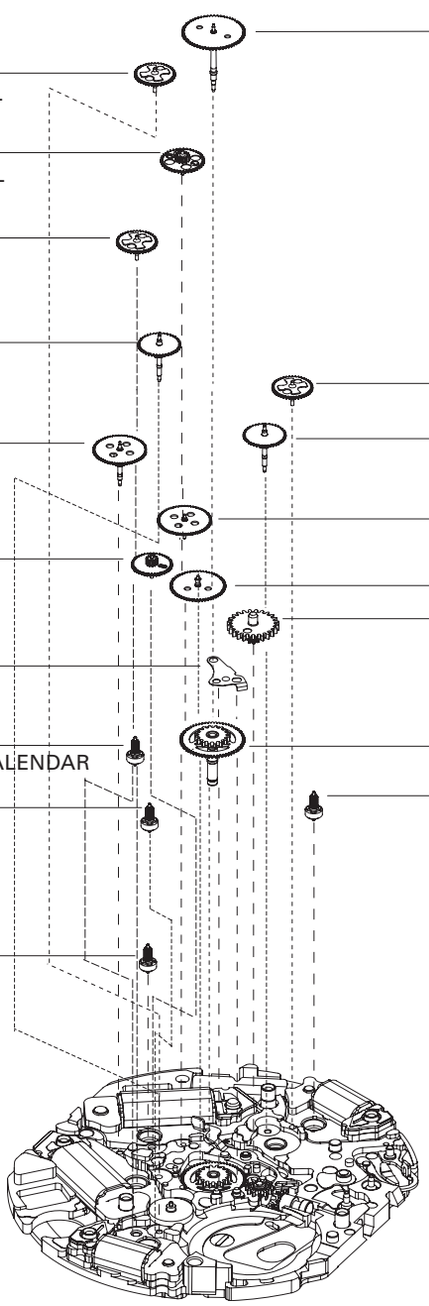
(31) 0221583
CENTER WHEEL

(32) 4146 710
ROTOR FOR PERPETUAL CALENDAR

(33) 4146 710
ROTOR FOR DAY

(34) 4146 710
ROTOR FOR ALARM

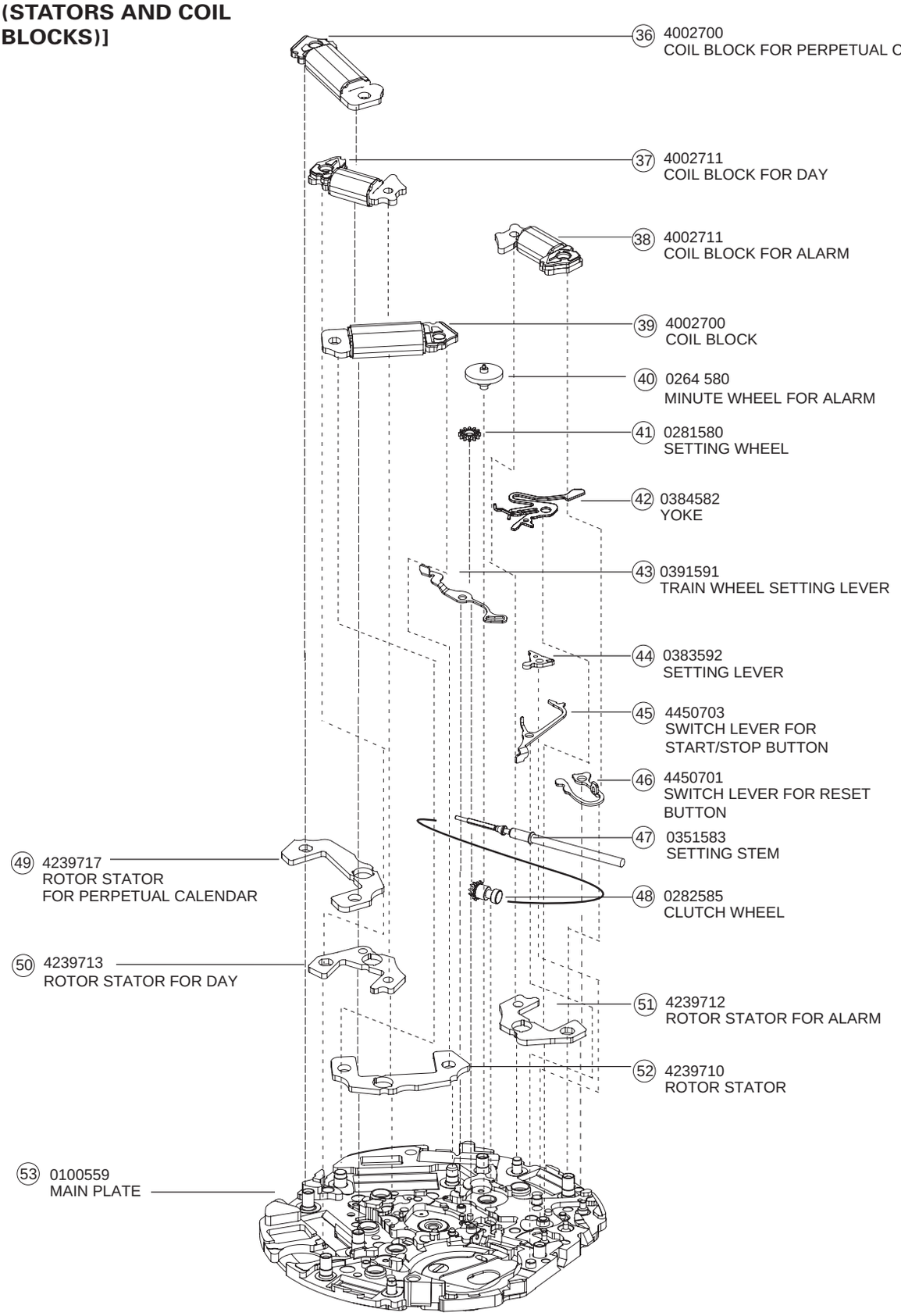
(35) 4146 710
ROTOR



Lubricating of some parts is shown in “REMARKS ON DISASSEMBLING AND REASSEMBLING.”

PARTS LIST

[SETTING MECHANISM/ STEPPING MOTORS (STATORS AND COIL BLOCKS)]



Lubricating of some parts is shown in “REMARKS ON DISASSEMBLING AND REASSEMBLING.”

PARTS LIST

● How to find the correct parts, if not determined by 4 digit caliber number

Following parts are determined based on the design of watches, such as hands height, dial color, and design of cases. Please refer to the SEIKO WATCH PARTS CATALOGUE in order to choose corresponding parts.

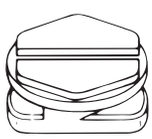
(49) SETTING STEM (0351583)

- For screw down crown models, the stem is assembled to the crown and is not available separately.

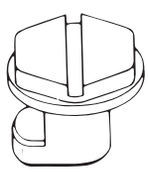
● How to discriminate resembled parts

Refer to the illustrations below to see the difference between those two types of pins.

(1) PIN FOR HOUR WHEEL GUARD
0027973



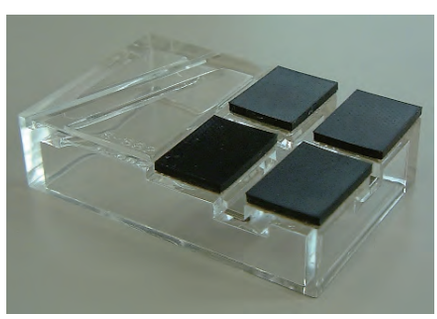
(18) PIN FOR TRAIN WHEEL BRIDGE
0027974



● Tools and consumables required for disassembling/reassembling

- **Movement holder**

  UNIVERSAL MOVEMENT HOLDER
  (S-682)



- **Watch oils**

  SEIKO watch grease (S-6) and watch oils (AO-3 and AO-2)

S-6

AO-3

AO-2

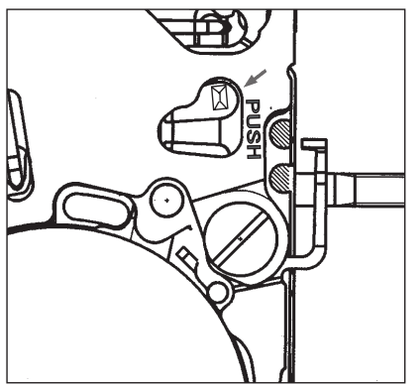
REMARKS ON DISASSEMBLING AND REASSEMBLING THE MOVEMENT

● How to remove the SETTING STEM before dismantling the movement

Crown position: 1st click position

Push the SETTING LEVER gently (refer to the picture on the right) in order to disengage it from the SETTING STEM.

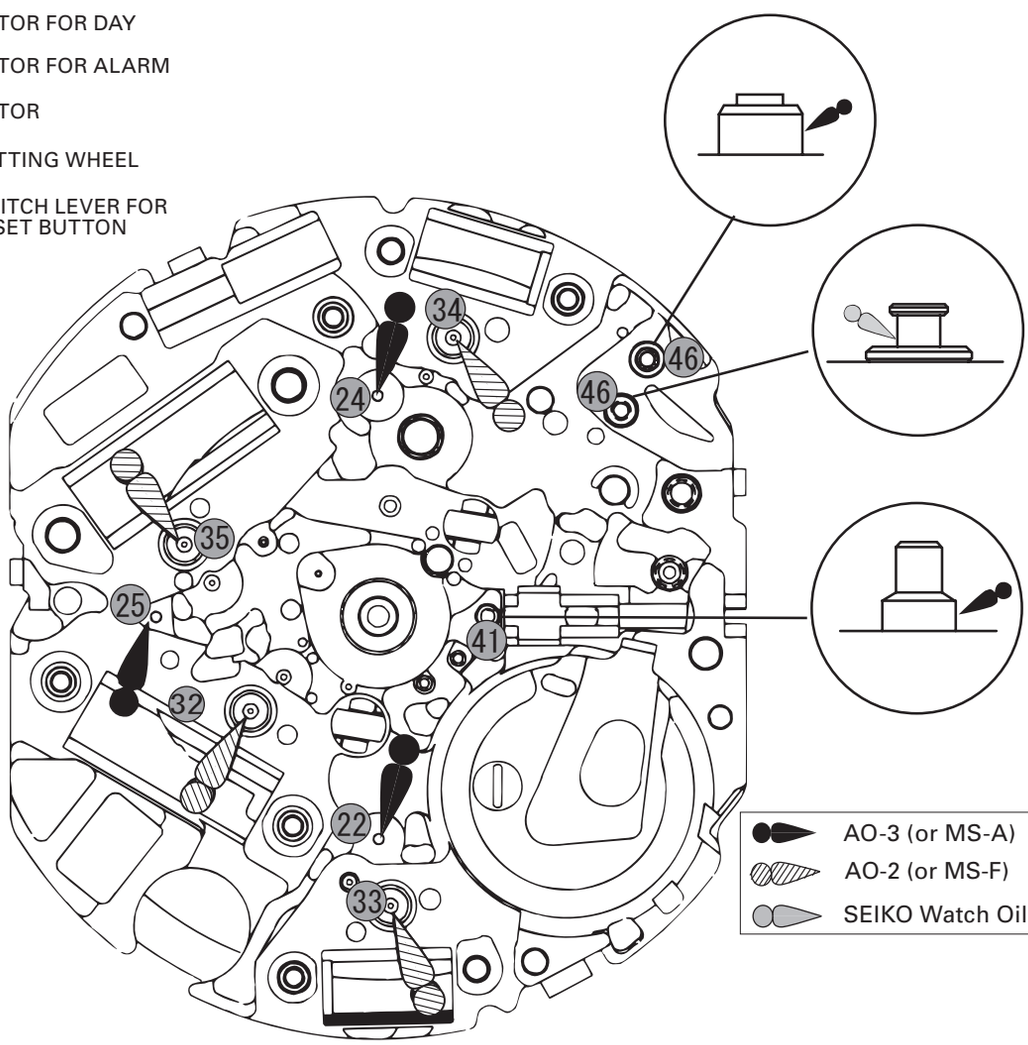
Then pull out the crown with the stem completely.



(53) MAIN PLATE

• Lubricating

(22) DAY INDICATOR WHEEL
(24) ALARM WHEEL FOR MINUTE
(25) SMALL SECONDS WHEEL
(32) ROTOR FOR PERPETUAL CALENDAR
(33) ROTOR FOR DAY
(34) ROTOR FOR ALARM
(35) ROTOR
(41) SETTING WHEEL
(46) SWITCH LEVER FOR RESET BUTTON



● Setting mechanism

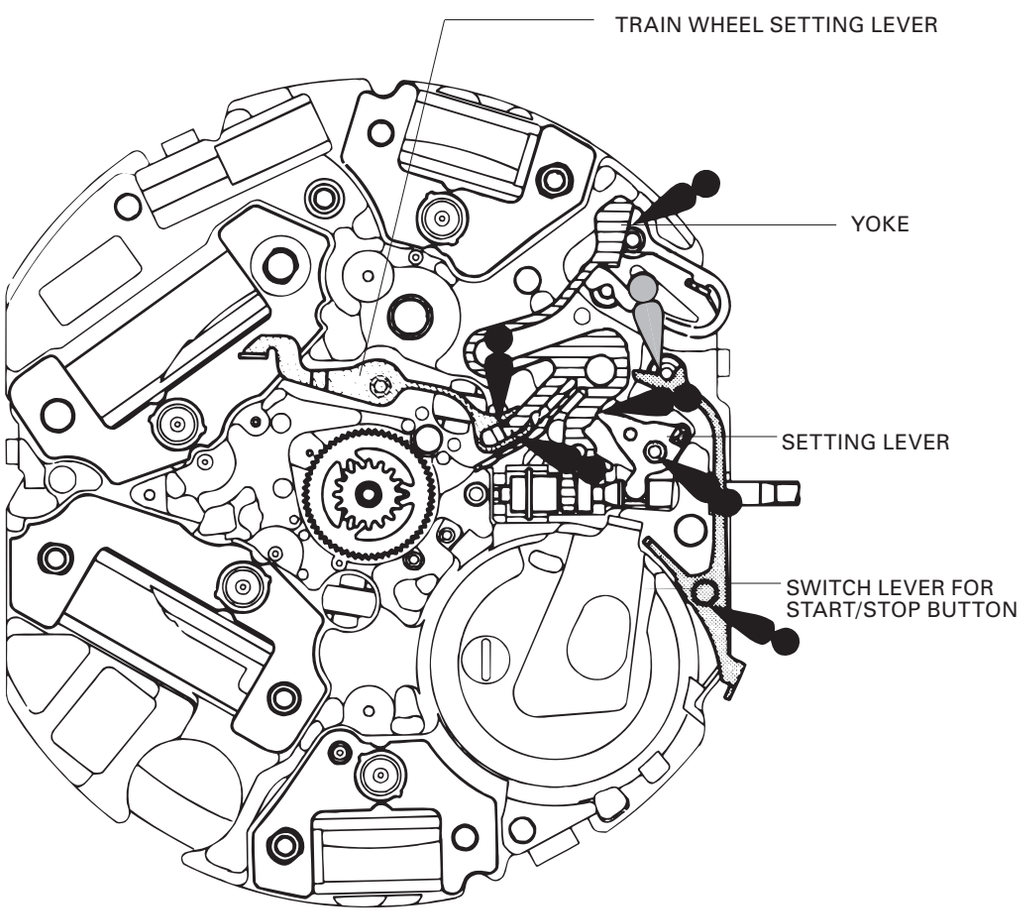
- **Setting position**

(45) SWITCH LEVER FOR START/STOP BUTTON

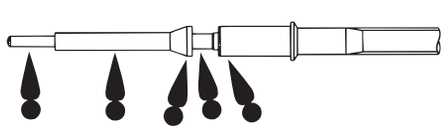
(44) SETTING LEVER

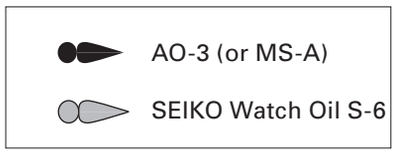
(42) YOKE

(43) TRAIN WHEEL SETTING LEVER



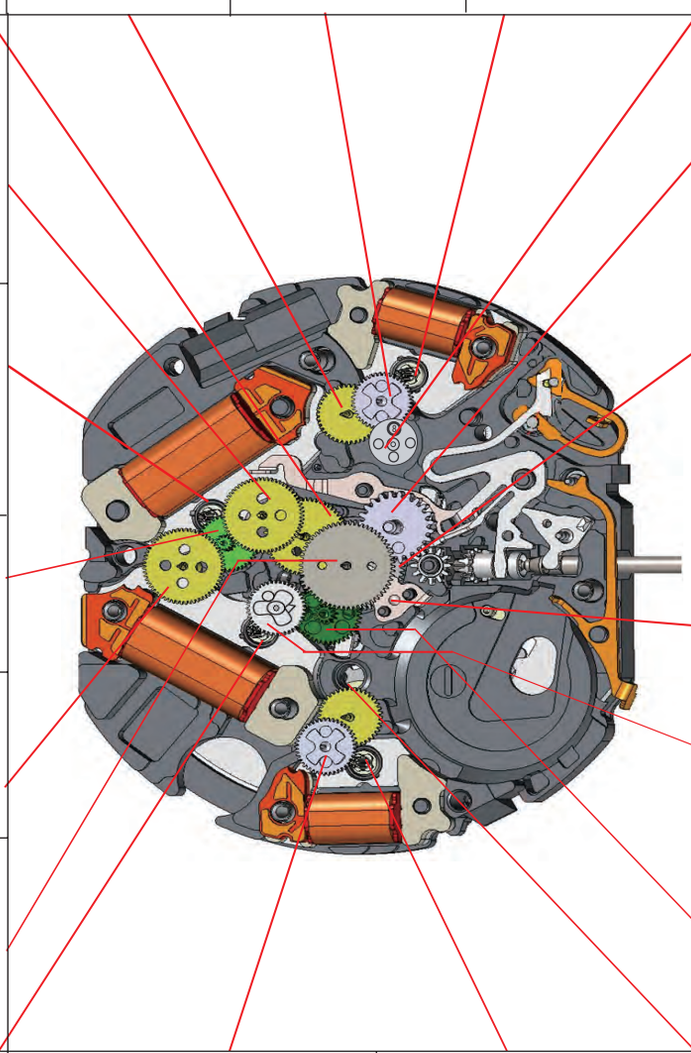
(47) SETTING STEM



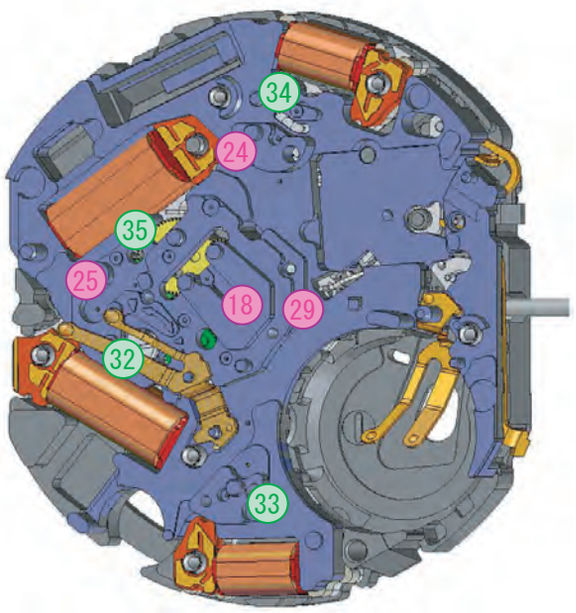


● Gear train mechanism

- **Setting position and lubricating**

(28) THIRD WHEEL 0231580	(24) CENTER MINUTE WHEEL FOR ALARM 0270582	(23) INTERMEDIATE WHEEL FOR ALARM 0950590	(34) ROTOR FOR ALARM 4146710	(40) MINUTE WHEEL FOR ALARM 0264580
(26) FOURTH WHEEL 0241583				(29) MINUTE WHEEL 0261580
(35) ROTOR 4146710				(31) CENTER WHEEL COCK 0221583
(27) FIFTH WHEEL 0701580				(30) CENTER WHEEL COCK 428358 1
(25) SMALL SECONDS WHEEL 0240580				(19) 1ST INTERMEDIATE WHEEL FOR CALENDAR 0885590
(18) CALENDAR INDICATOR WHEEL 0888582				(20) 2ND INTERMEDIATE WHEEL FOR CALENDAR 0885591
(32) ROTOR FOR PERPETUAL CALENDAR 4146710	(21) INTERMEDIATE DAY INDICATOR WHEEL 0950590	(33) ROTOR FOR DAY 4146710		(22) DAY INDICATOR WHEEL 0270582

After setting the (17) TRAIN WHEEL BRIDGE and (16) PIN FOR TRAIN WHEEL BRIDGE as illustrated below. lubricate the upper pivots of the following parts:



(34) ROTOR FOR ALARM

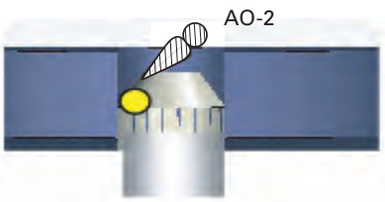
(35) ROTOR

(32) ROTOR FOR PERPETUAL CALENDAR

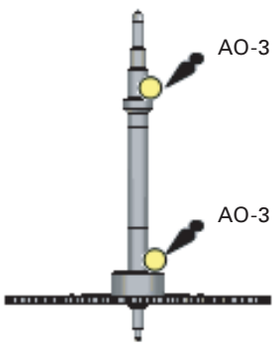
(33) ROTOR FOR DAY

(as illustrated below)

Upper pivot of the ROTOR



(18) CALENDAR INDICATOR WHEEL



(29) MINUTE WHEEL

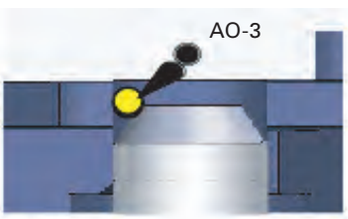
(24) ALARM WHEEL FOR MINUTES

(18) CALENDAR WHEEL

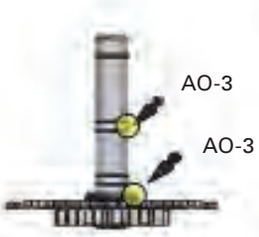
(25) SMALL SECONDS WHEEL

(as illustrated below)

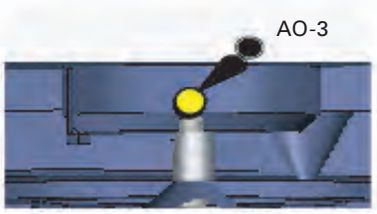
Upper pivot of the MINUTE WHEEL



(31) CENTER WHEEL & PINION



Other portions



AO-3 (or MS-A)

AO-2 (or MS-F)

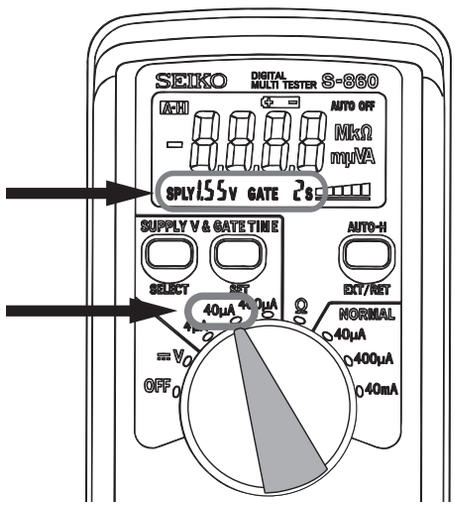
REMARKS ON INSPECTION AND MEASUREMENT

● How to measure the current consumption for the whole movement

1. To measure the current consumption for the whole movement, connect the (-) probe to the battery connection (-) and (+) probe to the other metal part of the movement, such as battery clamp or circuit block cover.

* When measuring the current consumption using the SEIKO digital multi-tester (S-860), use the range of 40 µ A of SUPPLY V (= 1.55 V) & GATE TIME (2 S).

2. Connect the AC component to the positive terminal for 2 seconds until a short circuit occurs to reset the integrated circuit.
3. After the integrated circuit is reset, wait approximately for 10 seconds until a stable measurement is obtained, and then read the measurement.
4. Make sure the read value is less than 1.10 µ A.



● How to measure the current consumption for the CIRCUIT BLOCK alone

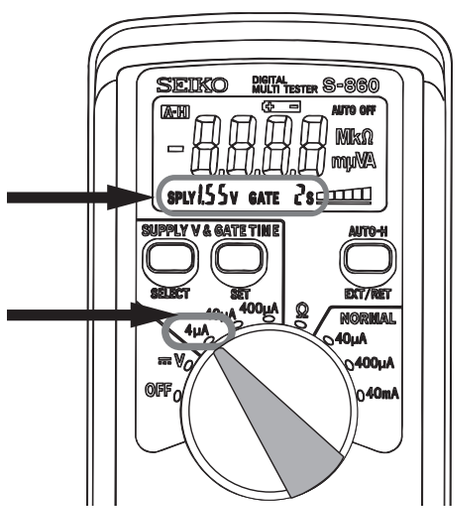
1. To measure the current consumption for the CIRCUIT BLOCK alone, connect each probe to the appropriate positive (+) or negative (-) input terminal of the CIRCUIT BLOCK (please refer to "Structure of the CIRCUIT BLOCK" below).

* When measuring the current consumption using the SEIKO Multi-Tester S-860, use the range of 4 µ A of SUPPLY V (= 1.55 V) & GATE TIME (2 S).

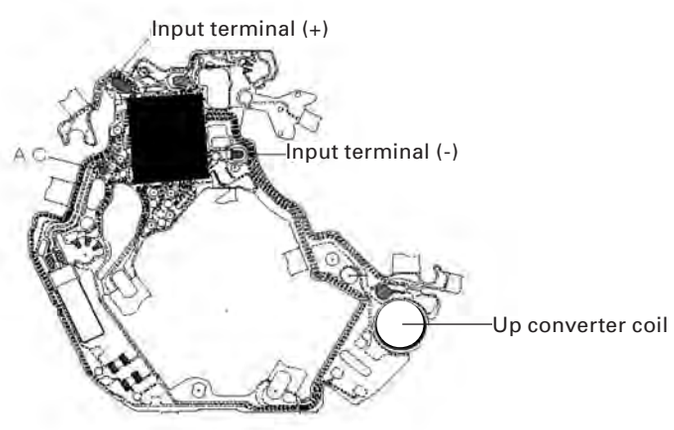
2. Repeat the same procedures as 2. and 3. of measuring current consumption for the whole movement above.

* When measuring the current consumption for the circuit block alone, be careful not to damage or deform the pattern of the circuit block.

3. Make sure the read value is less than 0.30 µ A.



[Structure of the CIRCUIT BLOCK]



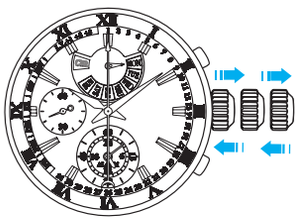
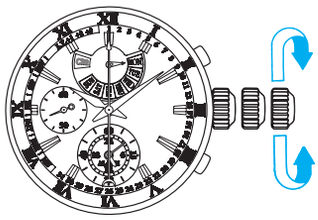
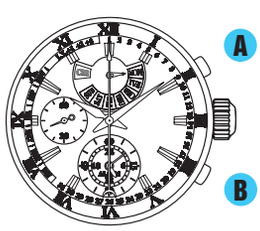
● **Value checking – coil resistance (coil blocks)**

Check the resistance of each coil block if they are within the range in the following table.

COIL BLOCK	4002700	2.10 KΩ - 2.70 KΩ
COIL BLOCK FOR PERPETUAL CALENDAR	4002700	2.10 KΩ - 2.70 KΩ
COIL BLOCK FOR DAY	4002711	1.80 KΩ - 2.40 KΩ
COIL BLOCK FOR ALARM	4002711	1.80 KΩ - 2.40 KΩ
UP CONVERTER COIL	4000724	150 Ω - 180 Ω

● Function check

Before doing the following function check, follow the instructions on P.3 to correct the hand positions, set the time and operate the stopwatch function.

<table>
<tr><th colspan="2">Operation</th><th>Function</th><th>Check point</th></tr>
<tr><td>  </td><td>Pull out the crown to the 2nd click and push it back in to the normal position. Repeat the same several times.</td><td>Setting mechanism - switching the function of the time setting</td><td>Make sure that it has a click at each position and the stem is not pulled off.</td></tr>
<tr><td rowspan="3">  </td><td rowspan="3">Pull out the crown to the 2nd click, then turn it.</td><td>Second hand stop function (if available)</td><td>Make sure that the second hand stops when the crown is pulled out to the 2nd click.</td></tr>
<tr><td>Setting mechanism - hour and minute hand setting</td><td rowspan="2">Make sure that the hour and minute hands move smoothly (without touching each other or touching the surface of the dial or inside of the glass).</td></tr>
<tr><td>Hands installation</td></tr>
<tr><td></td><td></td><td>Calendar mechanism - date change</td><td>Make sure that the date changes when the hour and minute hands pass around midnight.</td></tr>
<tr><td> 
</td><td><Standard Measurement>
Press button A to stop the stopwatch.
Press button B to reset the stopwatch.
A → A → B
Start Stop Reset

<Split Time Measurement>
A → B → B → A → B
Start Split Split Stop Reset
Release</td><td>Stopwatch mechanism</td><td>Make sure that the Stopwatch hands start/stop smoothly.

Make sure that the Stopwatch hands are reset to the “0” position.</td></tr>
</table>

● Water resistance test

Check the water resistance according to the designated specification of the watch.

Marking on the case back	Water resistance test	Applied pressure
WATER RESISTANT (WATER RESIST)	Air overpressure test	3 BAR
WATER RESIST 5 BAR	Water overpressure test and condensation test	5 BAR
WATER RESIST 10 BAR		10 BAR
WATER RESIST 15 BAR		15 BAR
WATER RESIST 20 BAR		20 BAR
SCUBA DIVER'S (AIR DIVER'S) 150 m	Water-tightness and water overpressure test and condensation tests before/after water overpressure test	18.75 BAR = 150 (m) times 0.125
SCUBA DIVER'S (AIR DIVER'S) 200 m		25 BAR = 200 (m) times 0.125
He-GAS DIVER'S 300 m		37.5 BAR = 300 (m) times 0.125
He-GAS DIVER'S 600 m		75 BAR =600(m)times 0.125
He-GAS DIVER'S 1000 m		125 BAR = 1000 (m) times 0.125

● Accuracy test

Measure the rate and make sure the value shows within ±0.50 s/d.

Use 10 seconds gate of the tester.

TROUBLESHOOTING

	Symptom	Possible causes	Solutions
Movement	The watch stops operating.	The battery has been depleted.	Measure the battery voltage. Replace the battery with a new one.
		The hour wheel and the pinion of the minute wheel are not properly engaged. (Or the teeth of the hour wheel and/or minute wheel have been broken.)	Check the relevant parts, and replace the damaged parts with new ones.
		The hooking portions of the circuit block cover are not properly engaged, resulting in poor conductivity.	Securely attach the hooks of the circuit block cover to the main plate.
		The coil is broken.	Measure the coil block resistance. Replace the coil with a new one.
		One or more wheels have been contaminated with dirt, dust or other particles. An excessive amount of oil in the movement has caused adhesive forces among the parts. (wringing)	Remove dirt or dust and clean the contaminated wheels. Be careful so as not to damage the teeth of the plastic parts while cleaning.
	The current consumption for the whole movement exceeds the standard value.	Dirt, dust or foreign particles are adhered to the movement.	Remove dirt, dust or foreign particles and clean the movement.
		The driving pulse is generated in order to compensate the excessive load applied to the wheels. (The oil has deteriorated, leaked or run out.)	If the current consumption for the circuit block alone is within the standard value range, overhaul and clean the movement parts, and then make the measurement again.
	The current consumption for the circuit block alone exceeds the standard value.	The light from outside the movement is affecting the measurement.	Shut out the light, and make the measurement again.
		There is a defect in the IC (integrated circuit).	Replace the circuit block with a new one.

	Symptom	Possible causes	Solutions
STOPWATCH	One or more STOPWATCH hands have stopped moving or show an abnormal movement.	The relevant coil is broken.	Measure the coil block resistance. Replace the coil with a new one if necessary.
		An excessive load is being applied to the chronograph wheels due to dust or foreign particles adhering to them or oil starvation.	Clean the relevant parts and lubricate with an adequate amount of oil.
	The step motor shows an abnormal movement.	There is a crack on the circuit block switch pattern.	Replace the circuit block with a new one.
		The step motor has been deformed.	Replace the stator with a new one.
	The buttons do not operate normally.	The amount of oil around the buttons is insufficient.	Clean the buttons and lubricate appropriately.
		The circuit block pattern has been broken or bent.	Adjust the circuit block pattern or replace the circuit block with a new one.
Exterior parts	The crown falls off.	The winding stem is not securely installed. (the setting lever and yoke are disengaged.)	Check the main plate, winding stem, setting lever and yoke. Replace the defective parts with new ones.
	The current consumption exceeds the standard value.	An excessive load is being applied due to friction among the hour, minute and STOPWATCH hands.	Adjust or remount the relevant hands.
	Small amount of water/blur inside of the glass persists.	Water resistance is deteriorated. The watch has been subjected to water pressure that exceeds the guaranteed degree.	Investigate the causes to take necessary measures, while cleaning inside of the watch.