
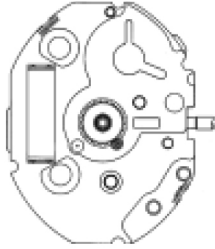
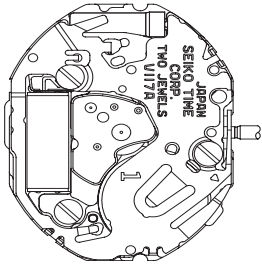


PARTS LIST/TECHNICAL GUIDE

Analogue Solar Cal. V117A

[SPECIFICATIONS]

Item		Cal. No.	V117A
 <ul style="list-style-type: none"> 3 hands (hour, minute, second hands) 		 <ul style="list-style-type: none"> Diameter 	 <ul style="list-style-type: none"> Height: 2.39 mm
Interval of hands movements		1-second intervals	
Driving system		Stepping motor (Load compensated driving pulse type)	
Additional function		<ul style="list-style-type: none"> Electronic circuit reset function Overcharge prevention function Second hand stop function 	
Crown operation	Normal position	Free	
	1st click position	Time setting, hand position adjustment/resetting the circuit	
Loss/Gain		Monthly rate: Less than 15 seconds (worn on the wrist at the temperature between -5 °C and 35 °C)	
Regulation system		Nil	
Gate time for rate measurement		Use 10-second gate.	
Current consumption		Movement:	Less than 0.55 μ A
		Circuit block:	Less than 0.16 μ A
Coil resistance		4002 929: 2.20 – 2.60 K Ω	
Power supply	Power generator	Solar power system	
	Rechargeable battery	MT516F	
	Operating voltage range	1.2 V - 2.2 V	
	Battery life	Approx. 6 months (from full charge)	
Number of jewels		2 jewels	

SEIKO WATCH CORPORATION

Cal.V117A is ladies' 3 hands analogue watch employing a new solar panel (3 cell unit), but the basic movement structure of Cal.V117A is similar to the previous Cal.V11 Series watches, and the knowledge and technique you have gained in handling the previous Cal.V11 Series watches will come in handy when you repair Cal.V117A.

FEATURES

Cal. V117A

This is the ladies' analogue watch powered by light energy. The battery used in this watch is a rechargeable battery, which is different from ordinary silver oxide batteries. Unlike other disposable batteries such as dry-cell batteries or button cells, this rechargeable battery can be used over and over again by repeating the cycles of discharging and recharging.

The capacity or recharging efficiency of the rechargeable battery may gradually deteriorate for various reasons such as long-term use or usage conditions. Worn or contaminated mechanical parts or degraded oils may also shorten recharging cycles. If the efficiency of the rechargeable battery decreases, it is necessary to have the watch repaired.

● Guideline of charging time

Environment/ Light source	Illumination (lux)	Time required for full charge	Time required for steady operation	Time to charge 1 day of power
Office, overhead/ Fluorescent light	700	-	60 hours	180 minutes
30W 20 cm/ Fluorescent light	3,000	180 hours	10 hours	35 minutes
30W 5 cm/ Fluorescent light	10,000	60 hours	4 hours	12 minutes
Cloudy weather/ Sunlight	10,000	60 hours	4 hours	12 minutes
Fine weather/ Sunlight	100,000	10 hours	0.5 hours	2 minute

The above table provides only a general guideline.

It is recommended that the watch be charged for as long as the charging time according to the column "Time required for steady operation" in this table in order to assure the stable movement of the watch.

● Caution for charging

When charging the watch, do not place it too close to a photo flash light, spotlight, incandescent light or other light sources as the watch temperature will become extremely high, causing damage to the parts inside the watch.

When exposing the watch to sunlight to charge it, do not leave it on the dashboard of a car, etc. for a long time, as the watch temperature becomes extremely high. While charging the watch, make sure the watch temperature does not exceed 60 °C.

PARTS LIST

Cal. V117A

Disassembling procedures Figs. : ① → ③①

Reassembling procedures Figs. : ③① → ①

Lubricating : Types of lubricant



Watch Oil AO-3



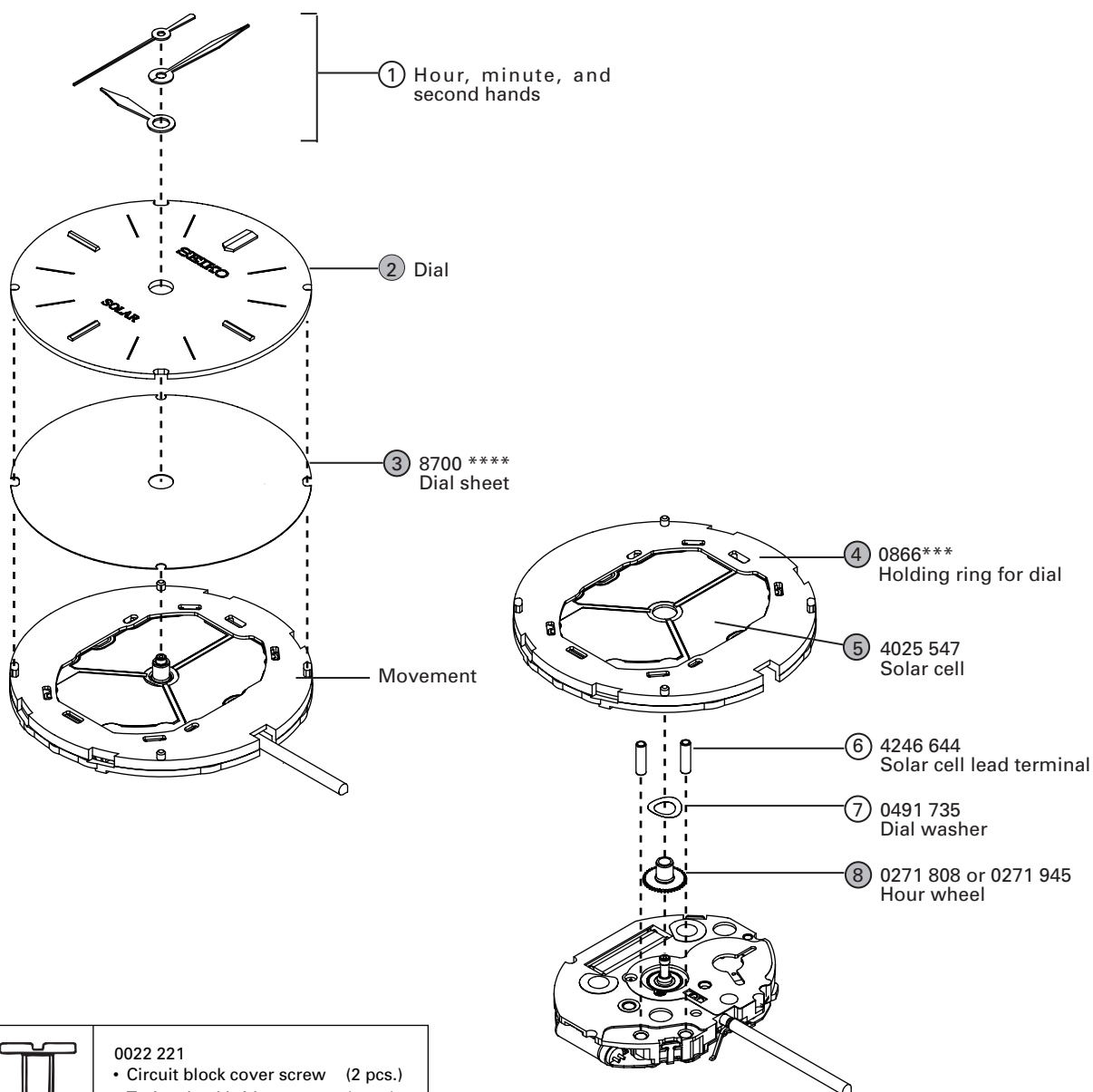
Watch Oil AO-2

Lubricant quantity:



Normal quantity

[SOLAR POWER GENERATION MECHANISM]

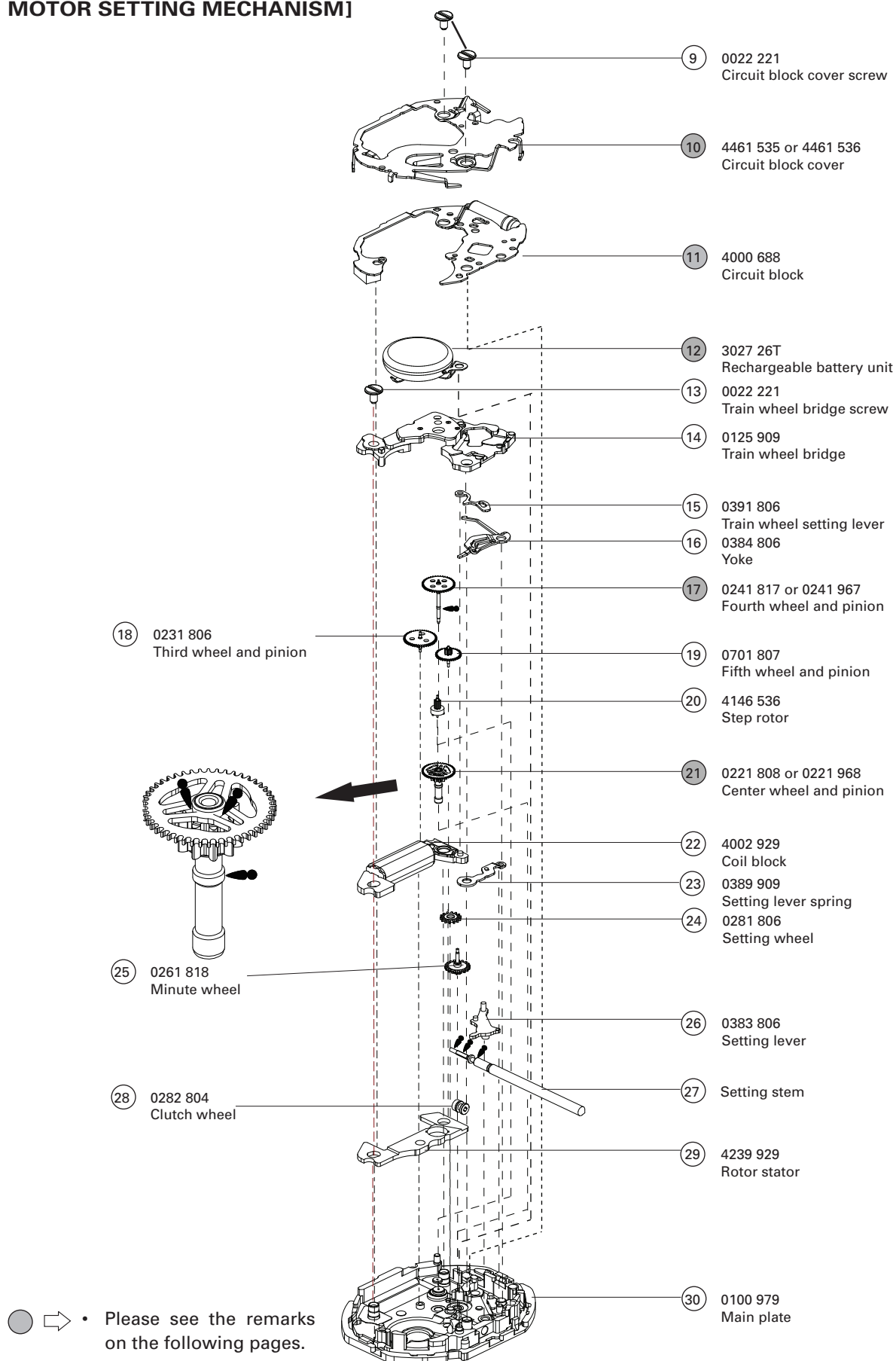


● ➡ • Please see the remarks on the following pages.

PARTS LIST

Cal. V117A

[BATTERY AND ELECTRONIC CIRCUIT - GEAR TRAIN MECHANISM AND STEPPING MOTOR SETTING MECHANISM]



● How to find the correct parts, if not determined by the 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.

③ DIAL SHEET (8700 ****)

The type of DIAL SHEET is determined based on the design of cases and some models do not need it. Check the case number and refer to the "Parts Catalogue web site" to choose a corresponding DIAL SHEET.

④ HOLDING RING FOR DIAL (0866 ***)

The type of HOLDING RING FOR DIAL is determined based on the design of cases. Check the case number and refer to the "Parts Catalogue web site" to choose a corresponding HOLDING RING FOR DIAL.

②⑦ SETTING STEM (0351 ***)

The type of SETTING STEM is determined based on the design of cases. Check the case number and refer to the "Parts Catalogue web site" to choose a corresponding SETTING STEM.

⑧ HOUR WHEEL

⑩ CIRCUIT BLOCK COVER

⑰ FOURTH WHEEL AND PINION

②① CENTER WHEEL AND PINION

The combination of the above parts differ depending on the hand installation height. Please refer the table below.

HAND INSTALLATION HEIGHT	CENTER WHEEL AND PINION	FOURTH WHEEL AND PINION	HOUR WHEEL	CIRCUIT BLOCK COVER
Short (1)	0221 808	0241 817	0271 808	4461 535
Standard (2)	0221 968	0241 967	0271 945	4461 536

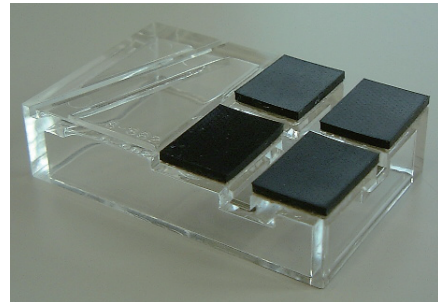
PARTS LIST

Cal. V117A

● Tools and consumables required for disassembling/reassembling

• Movement holder

UNIVERSAL MOVEMENT HOLDER
(S-682)



• Watch oils

SEIKO watch oils (AO-3 and AO-2)

AO-3



AO-2



REMARKS ON DISASSEMBLING AND REASSEMBLING THE MOVEMENT

● How to remove the SETTING STEM before dismantling the movement

Crown position: Normal position

Push the SETTING LEVER gently (refer to the Fig. 1) in order to disengage it from the SETTING STEM. Then pull out the crown with the stem completely.

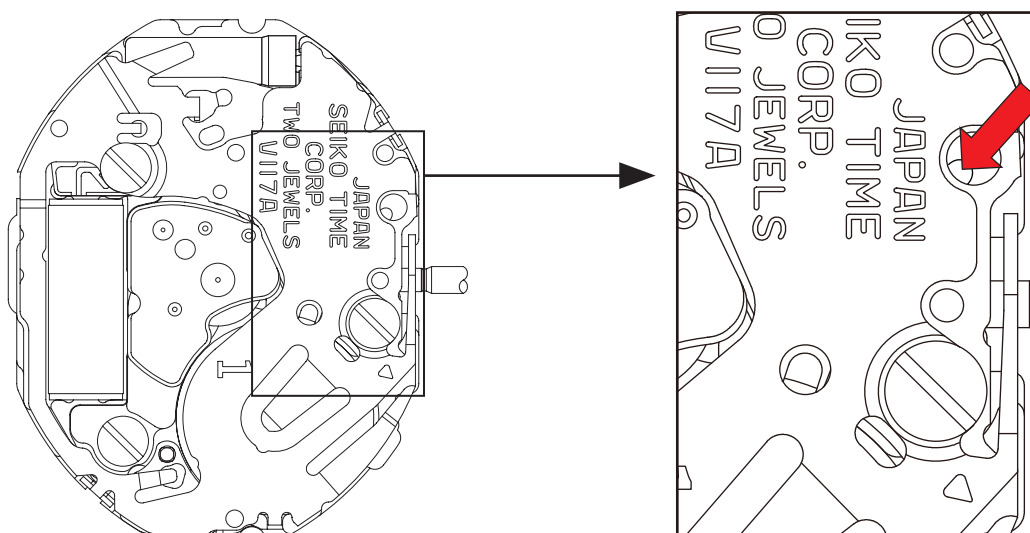


Fig. 1

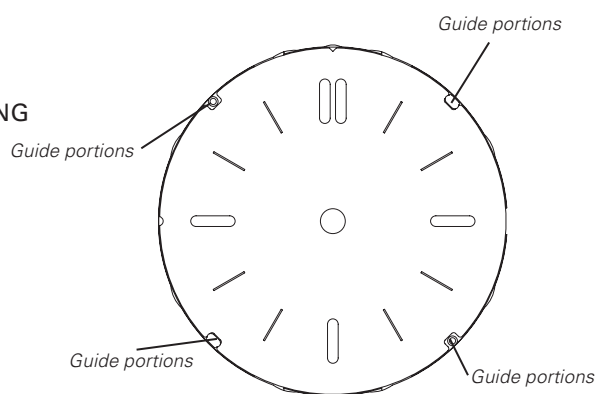
● Solar power generation mechanism - positions of the hooks

②

DIAL

• How to install

Set the 4 notched portions of the DIAL into the guide protrusions of the HOLDING RING FOR DIAL.



③

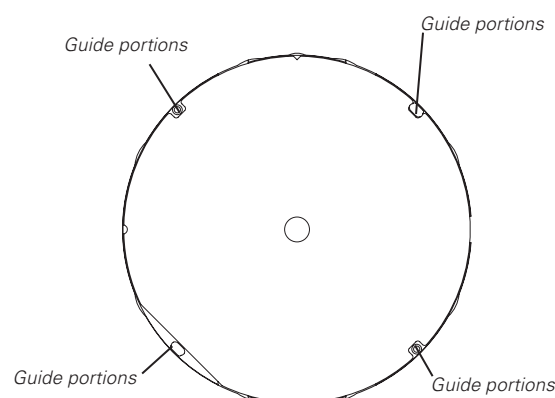
DIAL SHEET (8700 ***)

• How to install

Set the 4 notched portions of the DIAL SHEET into the Guide protrusions of the HOLDING RING FOR DIAL.

* Some models do not need the DIAL SHEET.

* As one side of the DIAL SHEET reflects lights, the reflecting side is the side on which to set the dial.



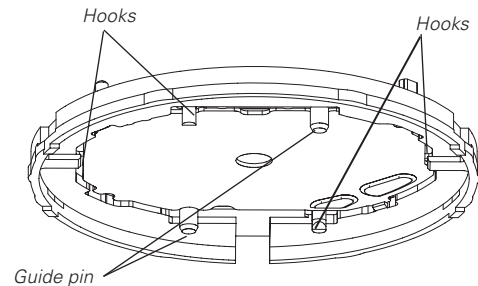
④ HOLDING RING FOR DIAL (0866 ***)

⑤ SOLAR CELL (4025 547)

The above 2 parts can be disassembled and re-assembled without separating the parts.
Please refer to "How to separate the DIAL HOLDING RING and SOLAR CELL."

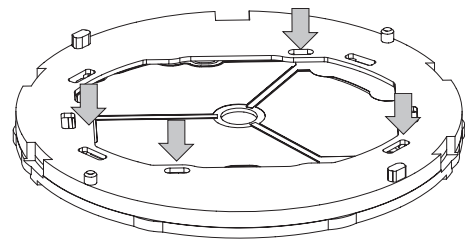
• **How to remove**

Release the pointed 4 hooking portions as shown in the right image from the main plate with tweezers.



• **How to install**

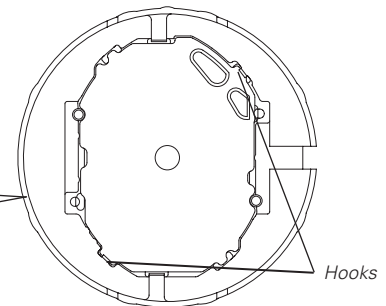
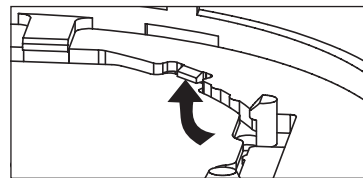
Set the 2 guide pins to the DIAL and push the 4 hooking portions. Make sure they are properly set and hooked to the DIAL.



● **How to separate and set the DIAL HOLDING RING and SOLAR CELL**

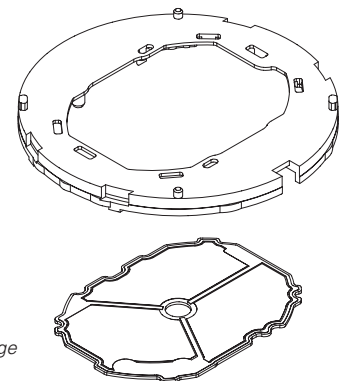
• **How to separate**

Remove the 2 hooks of the DIAL HOLDING RING gently as the SOLAR CELL is easily scratched.



• **How to set**

Set the 2 hooks of the DIAL HOLDING RING gently onto the SOLAR CELL.



Separate image

Notes:

- * When removing and installing the SOLAR CELL to the HOLDING RING FOR DIAL, take care not to damage or deform it. Do not apply excessive force to the SOLAR CELL.
- * If the SOLAR CELL is damaged, its power generating capacity may be greatly decreased. In that case, check the output voltage for the SOLAR CELL following the procedure in the corresponding section of the guide. If the voltage is not normal, replace the SOLAR CELL unit with a new one.
- * If the SOLAR CELL is soiled, gently wipe it with a soft chamois or the like soaked with alcohol, taking care not to damage it.
- * Since SOLAR CELL is not resistant to static electricity just like a circuit block, please treat it carefully so that it will not be charged with static electricity.

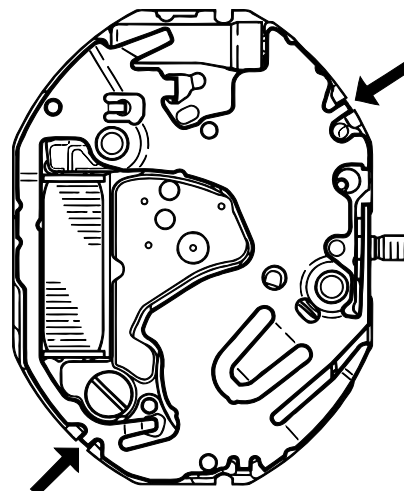
⑩ CIRCUIT BLOCK COVER

• How to disassemble

Remove the two circuit block cover screws, and then, release the two hooking portions marked with the arrows in the illustration at right from the main plate.

• How to reassemble

Set the circuit block cover so that the two hooking portions marked with the arrows in the illustration at right catch the main plate securely, and then, tighten the circuit block cover screws.



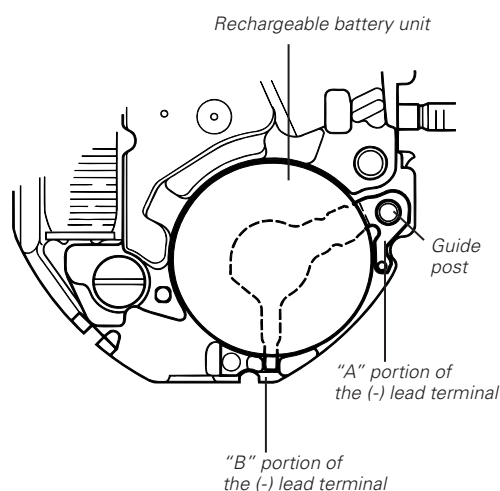
⑫ RECHARGEABLE BATTERY UNIT

• How to install

Set the "B" portion of the (-) lead terminal of the rechargeable battery unit to the groove of the main plate, and then, set the "A" portion of the (-) lead terminal to the guide post of the main plate.

Notes:

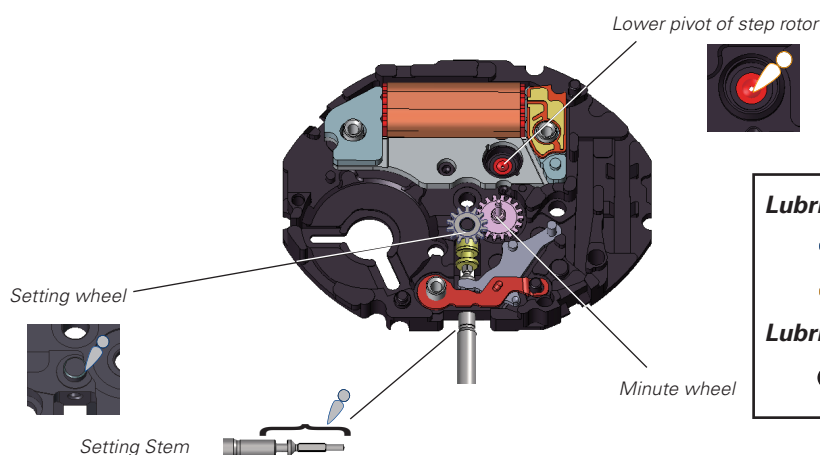
- * Handle the rechargeable battery unit with care so as not to short-circuit its (+) and (-) terminals. Otherwise, the rechargeable battery unit will be deteriorated.
- * Never wash the rechargeable battery unit as it is an electronic part.



②① STEP ROTOR ②④ SETTING WHEEL ②⑤ MINUTE WHEEL

• Setting position and lubricating

Refer to the illustrations below for the setting position and lubrication of the respective wheels.



Lubricating : Types of lubricant



Watch Oil AO-3



Watch Oil AO-2

Lubricant quantity:



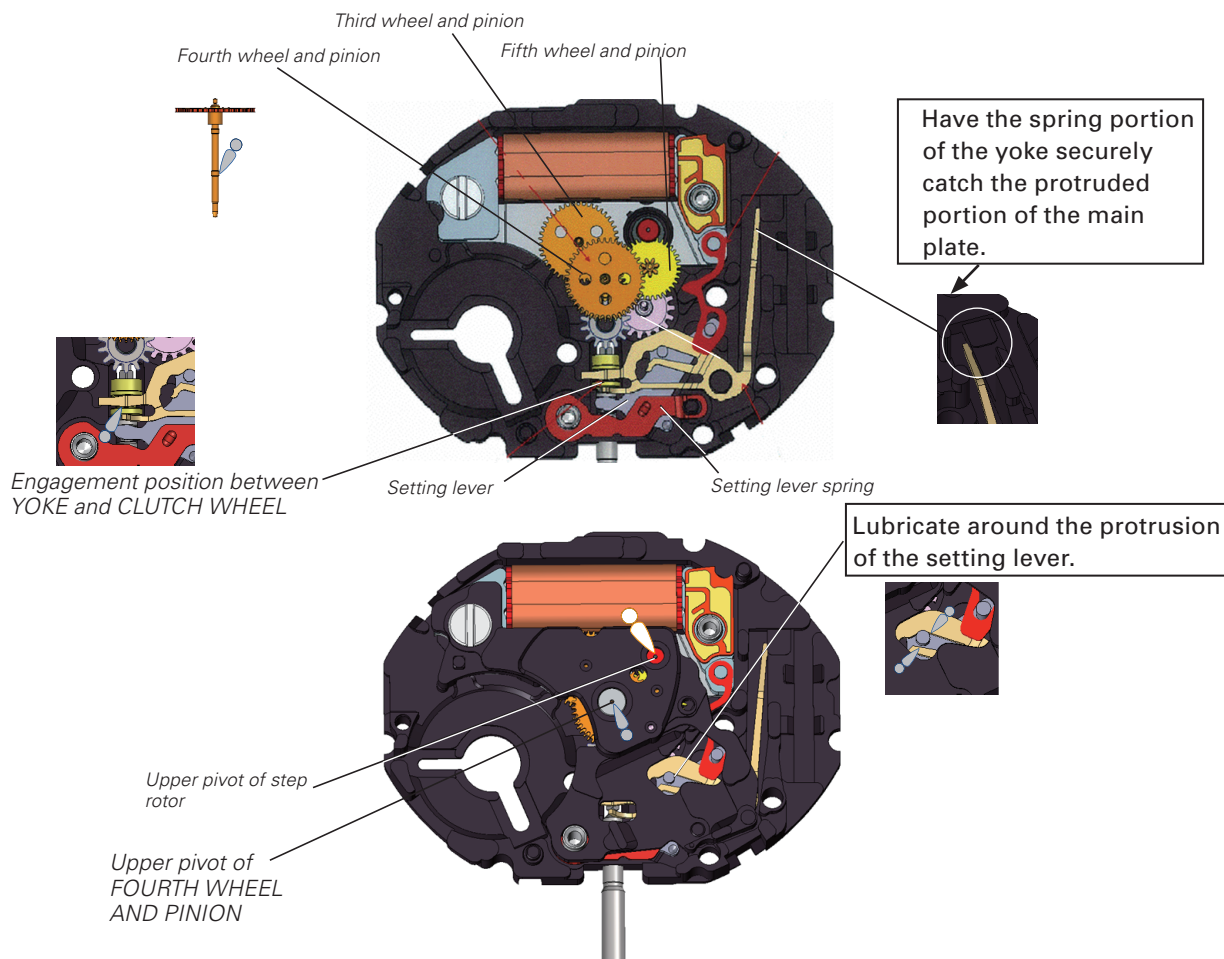
Normal quantity

①⑥ YOKE ①⑦ FOURTH WHEEL AND PINION ①⑧ THIRD WHEEL AND PINION ①⑨ FIFTH WHEEL AND PINION ②③ SETTING LEVER SPRING ②⑥ SETTING LEVER

• Setting position and lubricating

Refer to the illustrations below for the setting position and lubrication of the respective wheels.

Notes: * Take care not to install the SETTING LEVER SPRING upside down. (Refer to the illustration at right.)



REMARKS ON INSPECTION AND MEASUREMENT

● Value checking - coil resistance (coil blocks)

COIL BLOCK 4002 929 2.2KΩ - 2.6KΩ

● Current consumption

For the whole movement : Less than 0.55 μA (with voltage supplied from a battery)

For the circuit block alone : Less than 0.16 μA (with voltage supplied from a battery)

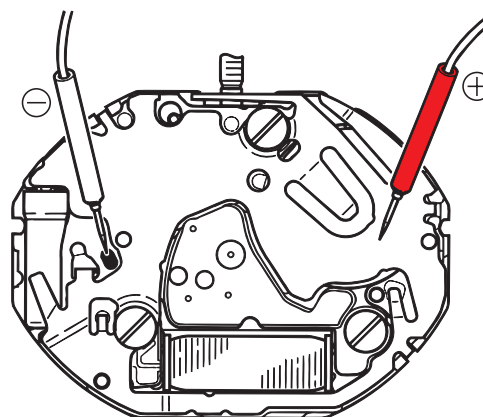
● How to measure the current consumption for the whole movement

1. Remove the solar cell holder and solar cell.
2. Remove the rechargeable battery unit, and then, reassemble the circuit block, circuit block cover and two circuit block cover screws.
(As a result, only the rechargeable battery is removed from the movement.)
3. Apply the probes of the tester as shown in the illustration below.

Note: When applying the minus probe of the tester, take care not to short-circuit the minus probe and circuit block cover.

4. After checking that a stable measurement is obtained with the tester connected, read the current consumption. (As the hands move at 20-second intervals, 3 to 5 minutes may be required before a stable measurement is obtained.)

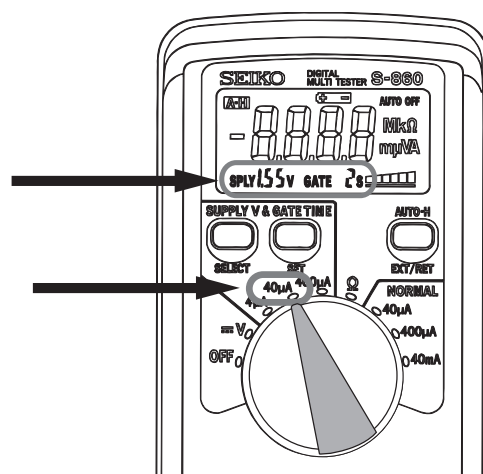
Note: If the measurement value remains high or unstable, shut out the light from the movement, and make a measurement again.



5. Wait until a stable measurement becomes available. It usually takes 30 seconds to a few minutes for getting a stable measurement.

6. Make sure that the read value is less than 0.80 μA.

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

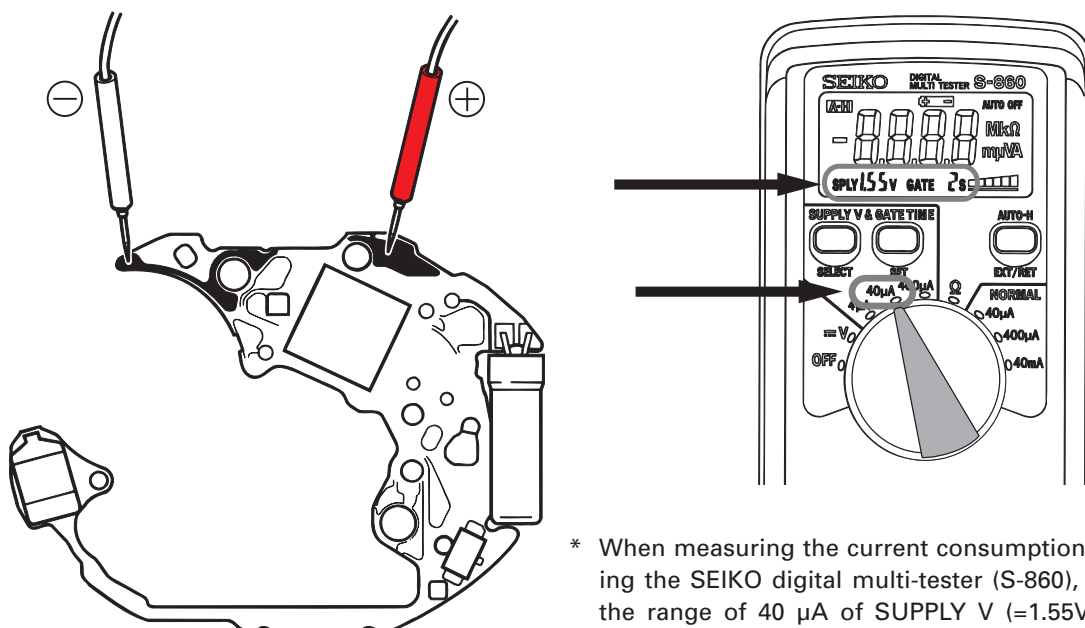


● How to measure the current consumption for the circuit block alone

1. Apply the probes of the tester as shown in the illustration.
2. Shut out the light from the circuit block.

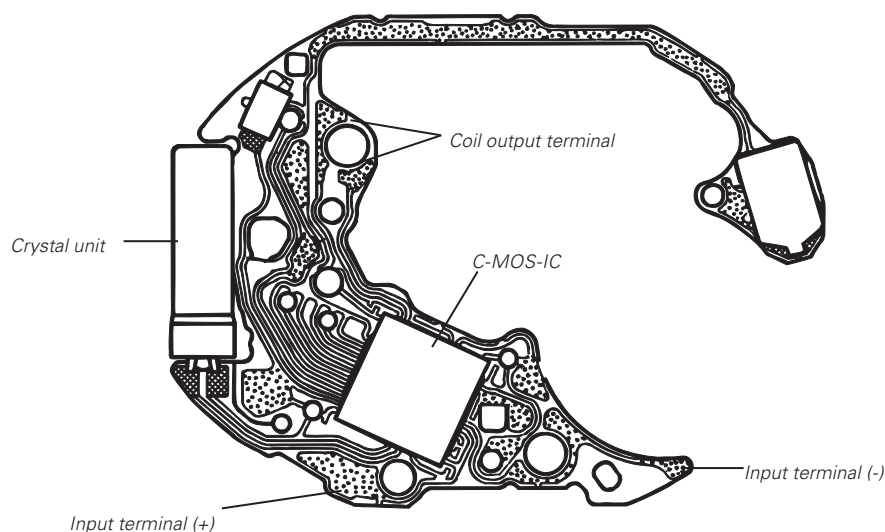
Note: If the circuit block is exposed to light, an extremely high measurement value may be obtained.

3. After checking that a stable measurement is obtained with the tester connected, read the current consumption.



- * When measuring the current consumption using the SEIKO digital multi-tester (S-860), use the range of 40 μ A of SUPPLY V (=1.55V) & GATE TIME (2S).
- * Avoid exposing the CIRCUIT BLOCK to direct light in order to obtain the correct measurement.

● Structure of the circuit block

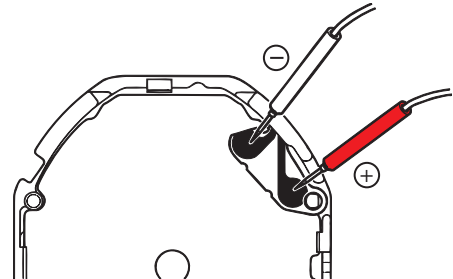


● Output voltage for the solar cell unit

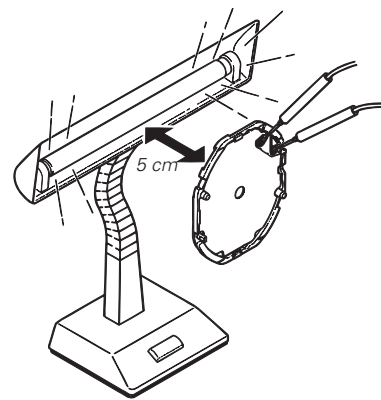
Output voltage when the watch is placed at a distance of 5 cm under a fluorescent light of 15 to 20 watts : More than 1.8 V

Checking procedure

1. Connect the tester to the output terminal of the solar cell unit as shown in the illustration at right.



2. With the probes of the tester applied, place the solar cell unit at a distance of 5 cm under a fluorescent light of 15 to 20 watts, exposing the solar cell side to the light, and then measure the output voltage.

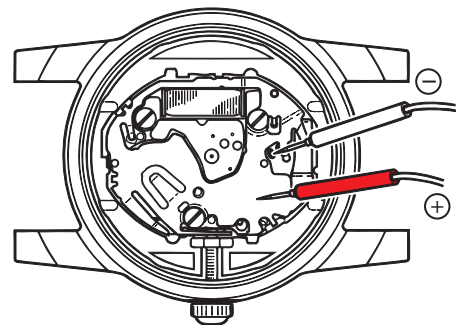


● Checking the recharging function

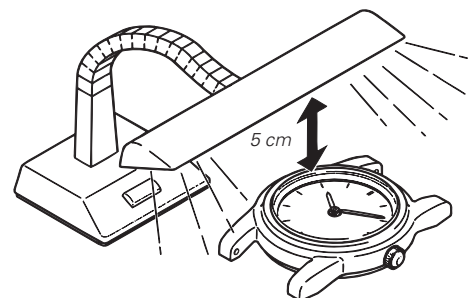
A conventional method of checking the recharging function is to check the difference of the rechargeable battery voltage between before and after a recharge.

Checking procedure

1. Apply the probes of the tester as shown in the illustration at right to measure the voltage of the rechargeable battery before recharge (initial voltage).



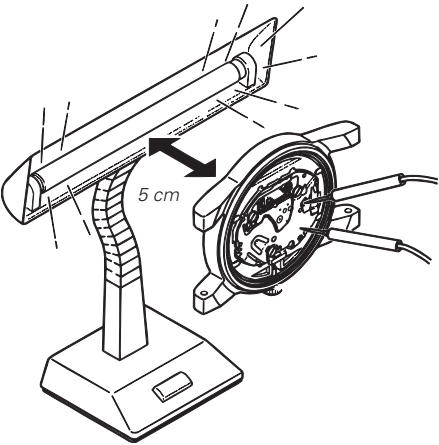
2. Place the watch at a distance of 5 cm under a fluorescent light of 15 to 20 watts, and charge it for 30 minutes.



Notes:

- * Use a fluorescent light to charge the watch, as light sources generating heat may cause damage to the watch. To charge the watch efficiently, place it under the center of the fluorescent tube.
- * While charging the watch, make sure that the watch temperature does not exceed 60 °C.

3. After recharging for 30 minutes, apply the probes of the tester in the same manner as in step "1," and measure the rechargeable battery voltage while keeping the watch exposed to the light.

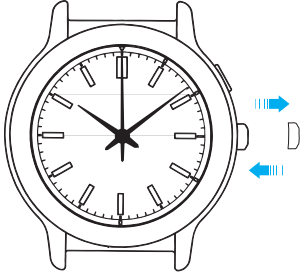
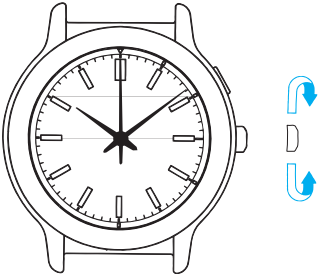


4. Refer to the table below to determine whether the recharging function is normal or not.

[Initial voltage and guidelines of normal/defective decision]

Initial voltage	Guidelines of normal/defective decision
0.5 V - 1.00 V	The battery is normal if the rechargeable battery voltage obtained after recharge is more than 1.2 V.
1.01 V - 1.2 V	The battery is normal if the rechargeable battery voltage has increased more than 0.08 V after recharge.

● Checking the general function

Operation	Function	Checkpoint
<div></div> <div>Pull out the crown and push it back in to the normal position. Repeat the same several times.</div>	Setting mechanism - function of the time setting	Make sure that it has a click at the 1st click position and the stem is not pulled off.
<div></div> <div>Pull out the crown, then turn it.</div>	Setting mechanism - hour and minute hand setting	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).
	Hands installation	

● Checking the water resistance

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

Marking on the case back	Test method	Applied pressure
WATER RESISTANT (WATER RESIST)	Air leak test	3 BAR
WATER RESIST 5BAR	<div>Water pressure test</div> <div>↓</div> <div>Condensation test</div>	5 BAR
WATER RESIST 10BAR		10 BAR
WATER RESIST 15BAR		15 BAR
WATER RESIST 20BAR		20 BAR
SCUBA DIVER'S (AIR DIVER'S) 150 m	Condensation 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	Water pressure test	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	Condensation test	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.