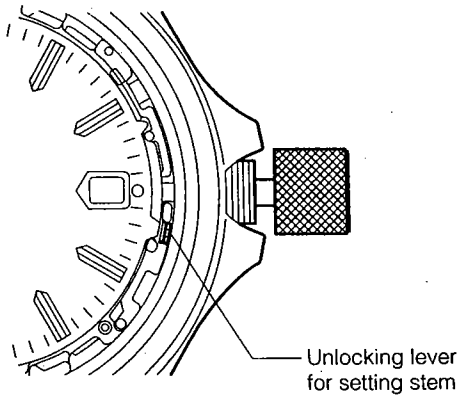


# PRECAUTIONS FOR DISASSEMBLY AND ASSEMBLY

## A. How to Pull Out Setting Stem from One-piece Case

### 1. When removing the setting stem from the case

- Pressing down the end of the unlocking lever for setting stem from above, pull out the setting stem.



#### <Procedure>

- (1) Set the crown at the normal position (Push it in).
- (2) Lightly press the end of the unlocking lever for setting stem with a screwdriver, etc. from above.
- (3) With the lever pressed, pull out the setting stem.

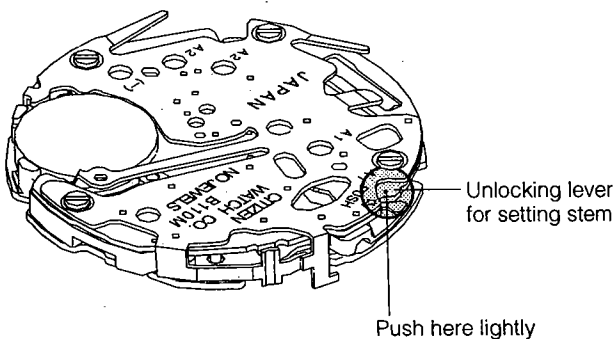
### 2. When removing the setting stem from the movement

- Pressing the base of the unlocking lever for setting stem ("PUSH →" position), pull out the setting stem.

#### <Note>

When the movement has been removed from the case, do not press the end of the unlocking lever for setting stem. If it is pressed in this case, it may be pressed too much to deform itself, circuit unit supporter, etc. since there is not a stopper.

If the movement is installed to the case with any part deformed, the setting stem may not be pulled out even if the unlocking lever for setting stem is pressed.



#### <Procedure>

- (1) Set the crown at the normal position (Push it in).
- (2) Lightly press the base of the unlocking lever for setting stem ("PUSH →" position) with a screwdriver, etc. from above.
- (3) With the lever pressed, pull out the setting stem.

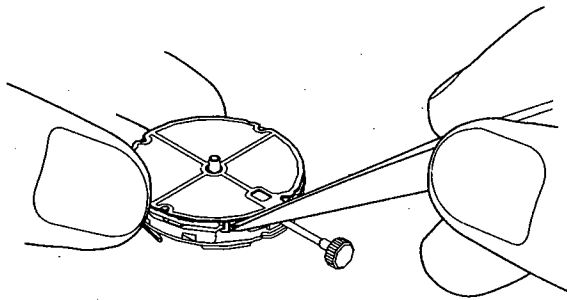
## <Precautions for Removal and Setting of Solar Cell>

### 1. Precautions for handling of solar cell

- If the top of the solar cell is damaged, its charging capacity and other functions are lowered. Accordingly, sufficiently take care not to damage the top of the solar cell when removing and setting it.
- If the electrodes are stained or flaked off, a continuity trouble occurs. Since it is difficult to clean the top of solar cell, do not touch them with a finger, etc.

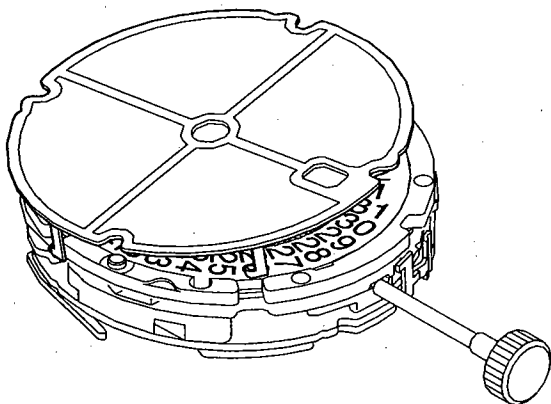
### 2. Removing and setting methods of solar cell

#### <Removing method of solar cell>



- (1) Remove the four hooks on the side of the solar cell from the movement with tweezers, etc.
  - Take care not to deform the hooks by opening them outward too much.
- (2) Lift up the solar cell to remove it.
  - Take care that the solar cell connecting spring will not jump.

#### <Setting method of solar cell>

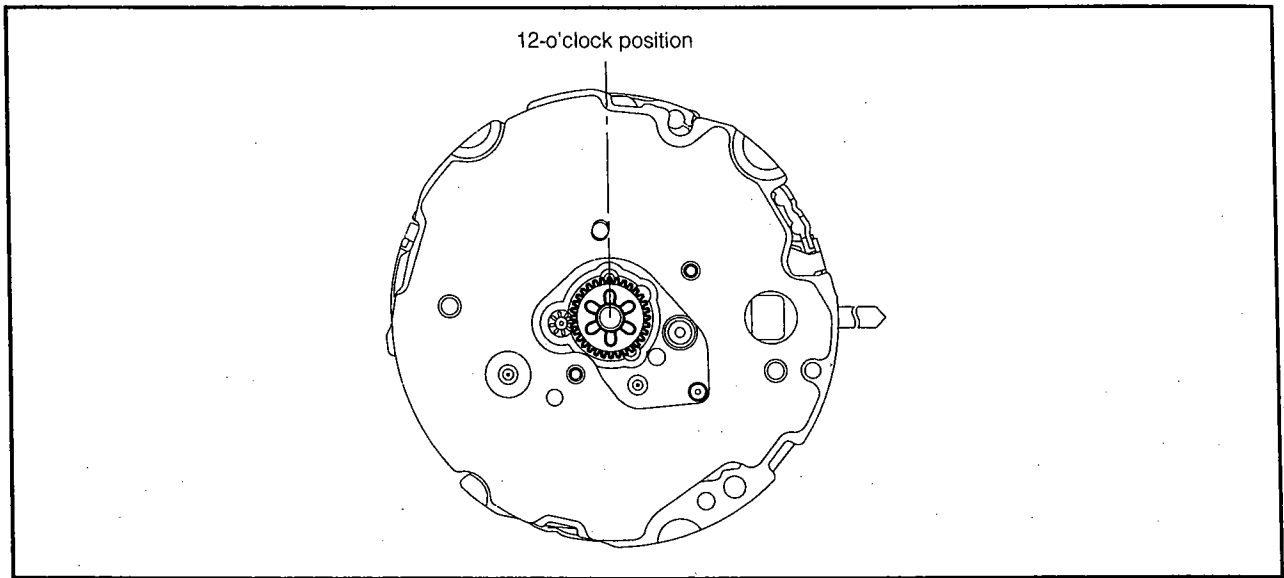


- (1) Press the hooks on the side of the solar cell lightly to hitch them to the movement securely (4 places).
  - Take care not to deform the hooks by pressing them too strongly.

## [Assembly of Parts Around Calendar]

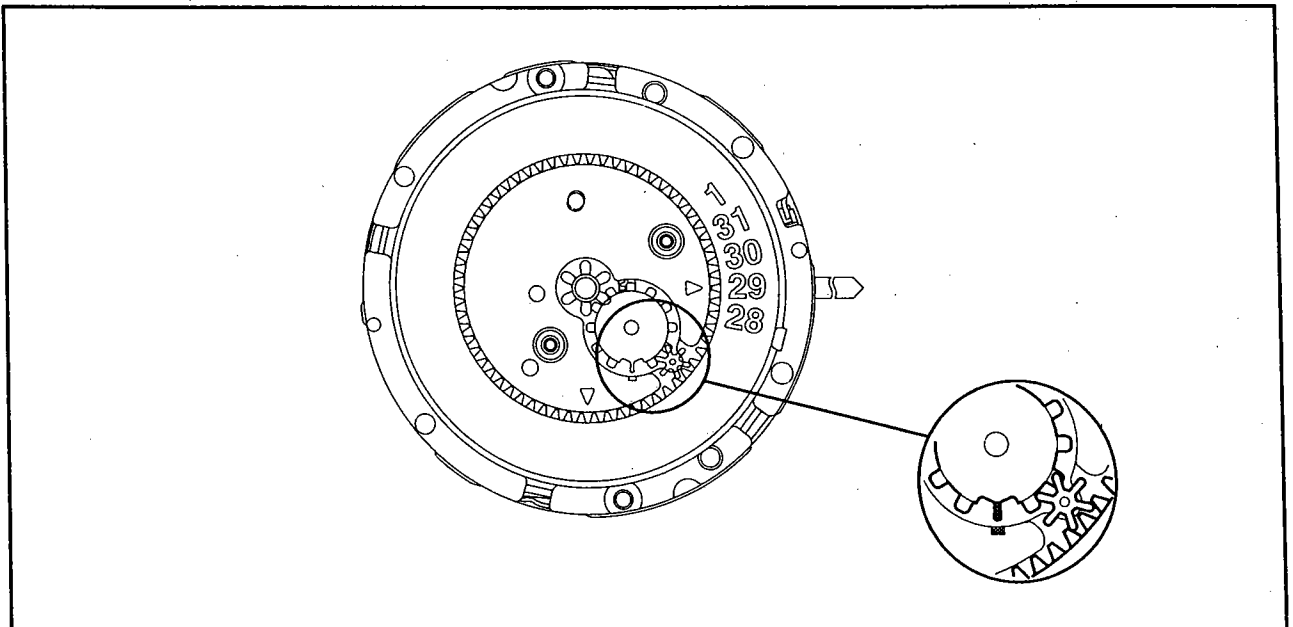
### 1. Installing position of hour wheel

Install the hour wheel so that the end of its pinion will be at the 12-o'clock position.  
If this wheel is deviated from the correct position, 0-setting operation will take long time.



### 2. Installing position of intermediate date wheel

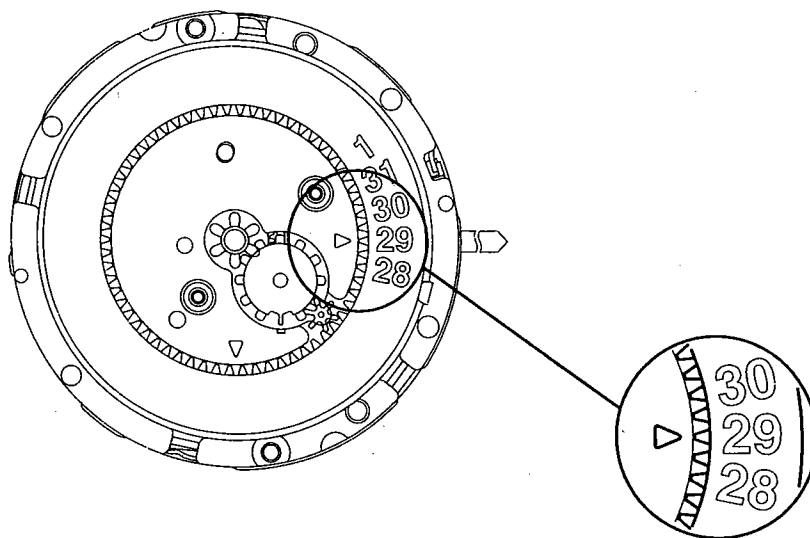
Install the intermediate date wheel, matching its tooth tip to the "installing position mark of the intermediate date wheel". At this time, take care not to lap the tooth tip of the intermediate date wheel over the tooth of the date dial driving wheel.  
If the intermediate date wheel is deviated from the correct position, 0-setting operation will take long time.



### 3. Installing position of date dial

Install the date dial so that 29 on itself will be at the reference position for installation of the data dial.

If this wheel is deviated from the correct position, 0-setting operation will take long time.



### [Installing Method of Hands]

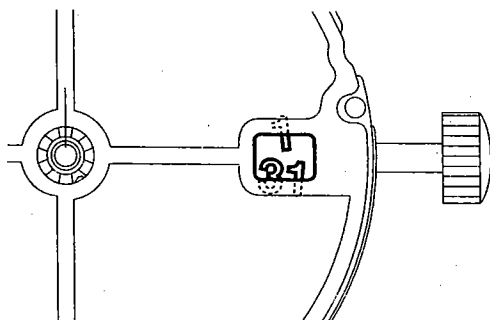
Before installing the hands, perform the all-reset operation.

1. Perform the all-reset operation.

① Pull out the crown to the second click and press and hold the **A** button (the switch spring in the 2-o'clock direction) for more than 1 second.

2. Perform "reference position setting of date".

① Pull out the crown to the first click and turn it in either direction to set the date between "31 and 1".



3. Install each hand.

① Install the "hour hand", setting it to the 12-o'clock division.

② Pull out the crown to the second click and install the "minute hand", setting it to before the 12-o'clock division.

③ Turn the crown to the right to set the "minute hand" to the 12-o'clock division.

④ Install the "second hand", setting it to the 12-o'clock division.

⑤ Push back the crown to the normal position, and the second hand starts the irregular 2-second interval movement.

4. Remove the setting stem and install the movement to the case.

5. Perform the "all-reset" and "0-setting" operations again, then set the time and calendar correctly.

# DISASSEMBLY AND ASSEMBLY OF MOVEMENT

● Lubrication mark

Disassembly procedure: ① → ④①

Assembly procedure: ④① → ①

- Ⓐ : A-Lube oil
- Ⓥ : V-Lube oil
- Ⓕ : F-Lube oil
- Ⓞ : CH-1 oil

Secondary battery ①

⑮ Circuit unit supporter

⑮ Unit of electronic circuit

Train wheel bridge ⑳

⑲ Coil unit

Fourth wheel and pinion ㉓

㉕ Fifth wheel and pinion

Third wheel and pinion ㉔

㉘ Setting lever spring

Intermediate hour wheel 1 ㉑

㉖ Rotor 1

Center wheel ㉔

㉓ Switching wheel

Rotor 2 ㉒

Minus lead plate ⑰

㉙ Switch spring 2

㉑ Switch lever

㉒ Switch spring 1

Setting stem spacer ㉕

㉚ Setting lever

Intermediate wheel 2 ㉗

⑱ Unlocking lever for setting stem for one piece case type

Coil unit ㉖

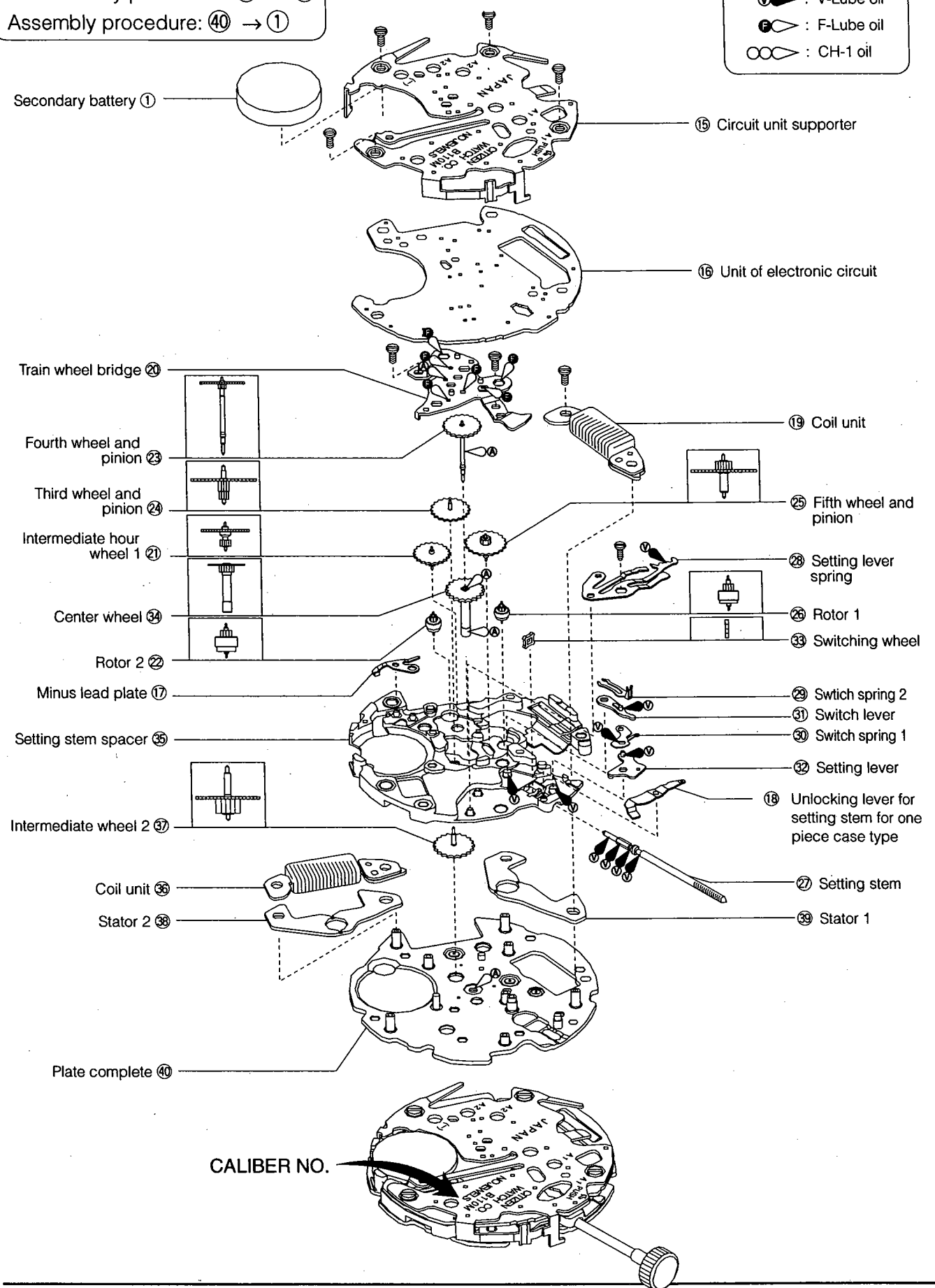
㉑ Setting stem

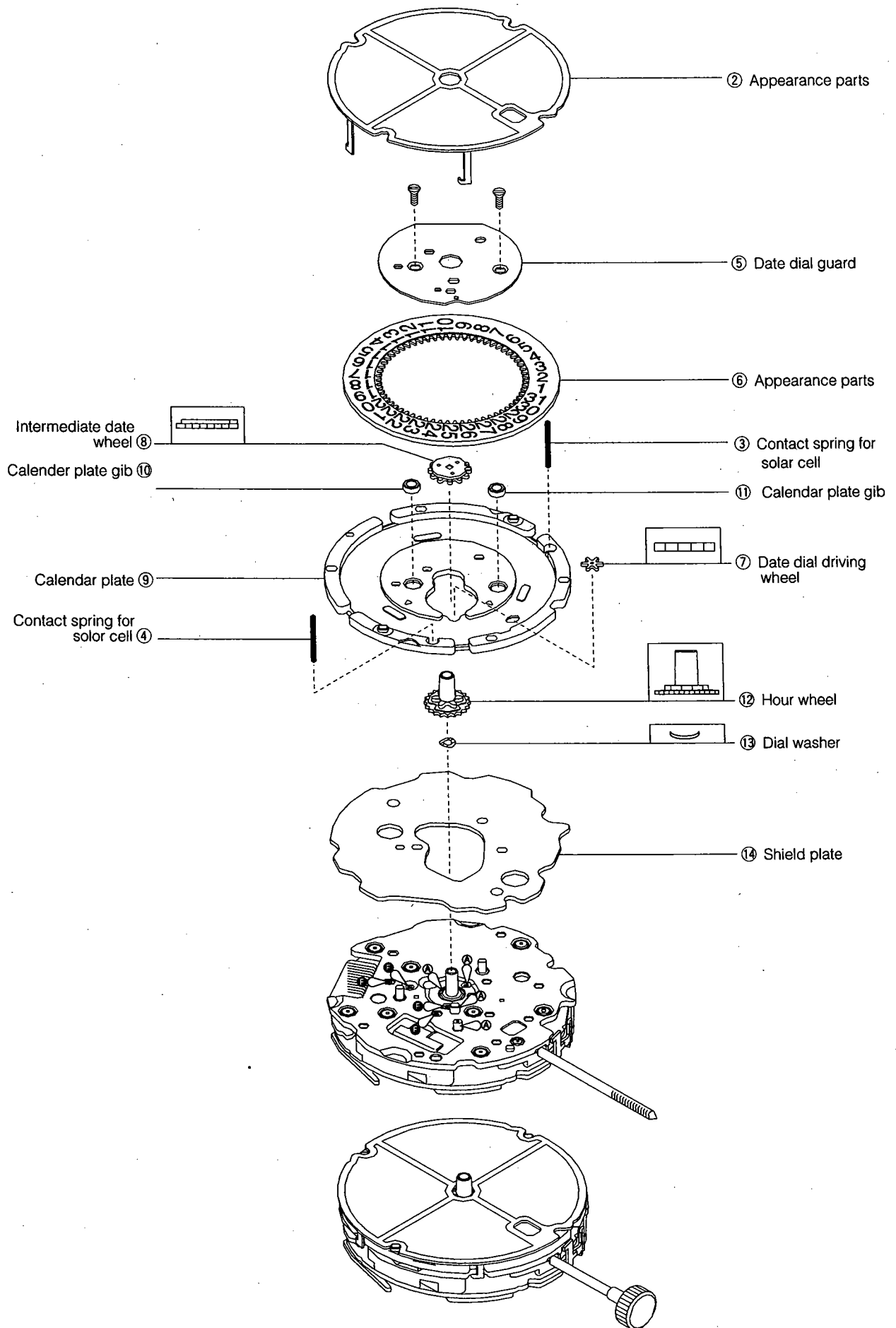
Stator 2 ㉗

㉒ Stator 1

Plate complete ④①

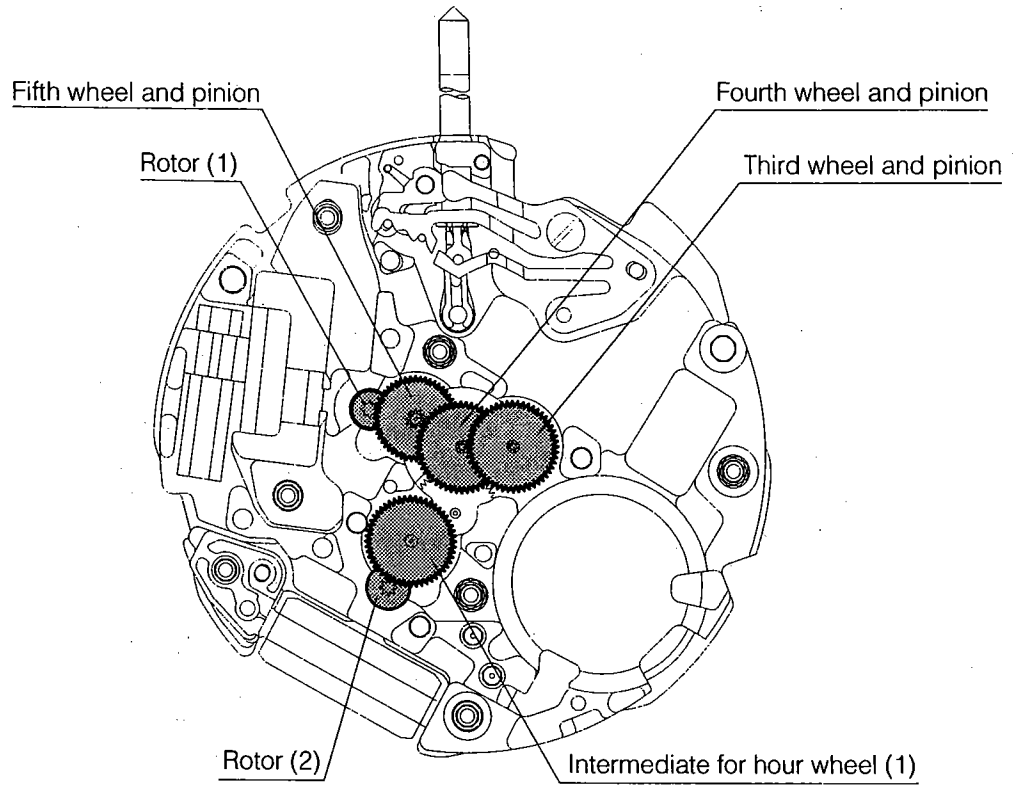
CALIBER NO.



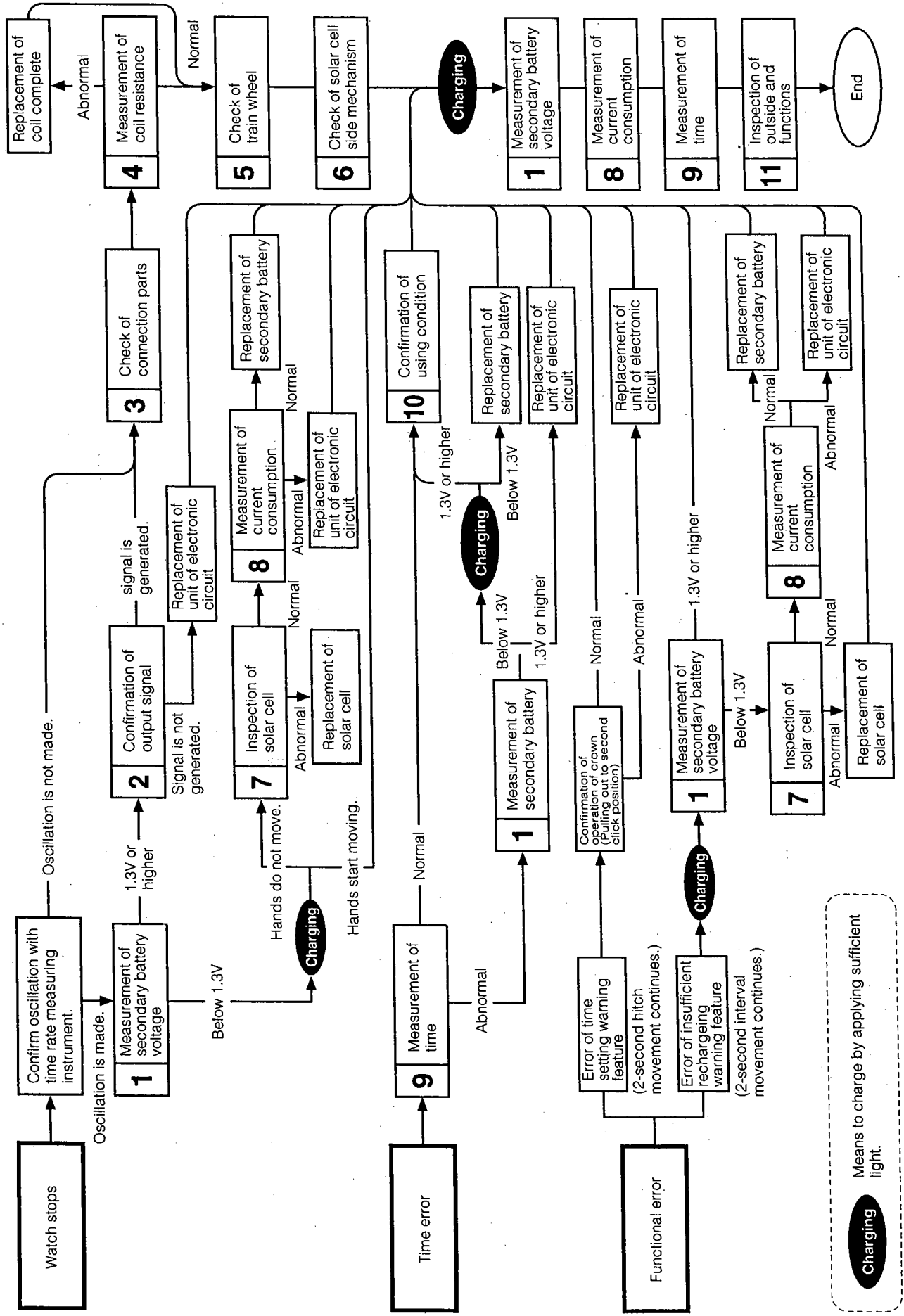


**[Assembly drawing for train wheel]**

From Rotor (1) to Intermediate for four wheel (1)

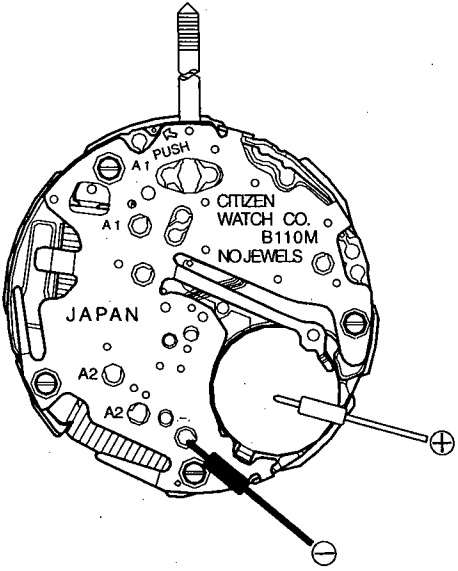


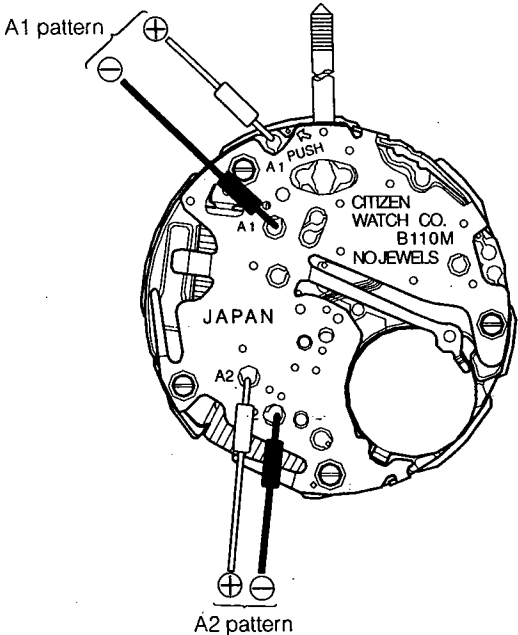
# TROUBLESHOOTING AND ADJUSTMENT METHOD

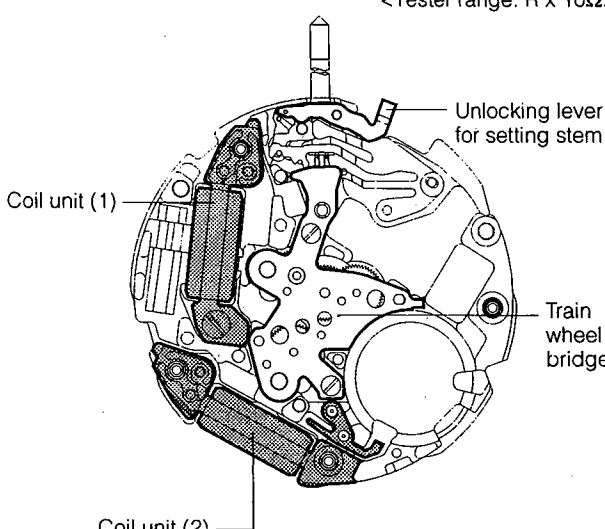


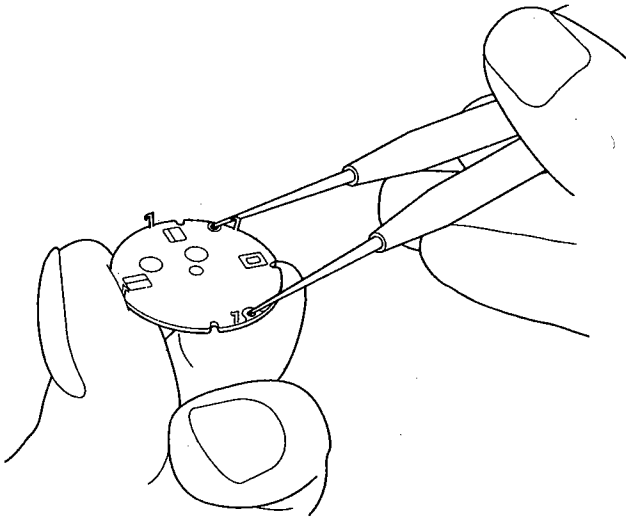
**Charging**  
Means to charge by applying sufficient light.

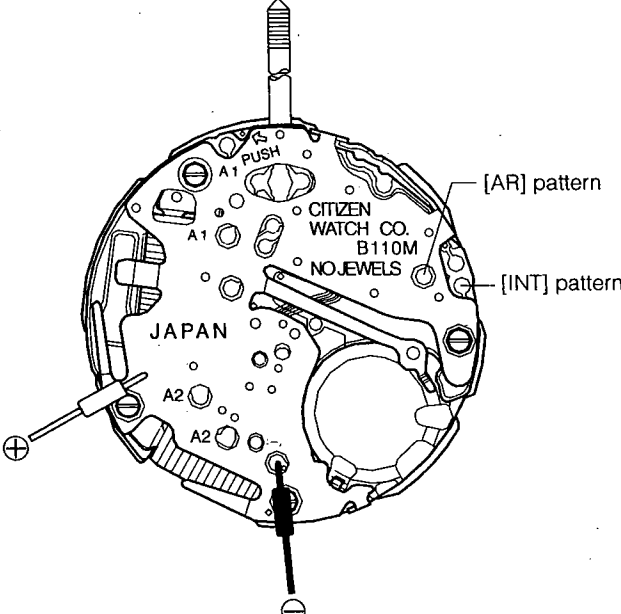


Check Items	How to Check	Result and Treatment
<p>① Measurement of secondary battery voltage</p>	<p style="text-align: right;">&lt;Tester range: DC. 3V&gt;</p>  <p>Reference:</p> <ul style="list-style-type: none"> <li>● 1.1V~1.3V: 2-second interval movement</li> <li>1.3V~2.1V: Normal 1-second interval movement</li> <li>● 2-second hitch movement is a function that signals that the watch has stopped and restarted. This mode will continue until the watch is set to the correct time, irrespective of the voltage.</li> </ul> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Caution:</b> When measuring the voltage, be careful not to place the ⊖ tester pin on the supporter for electronic circuit (a short circuit will occur).</p> </div>	<p>1.3V or higher → Good</p> <p>Below 1.3V → Charge.</p> <p style="text-align: center;">↓</p> <p>Measure again after charging. 1.3V or higher → Check connecting parts.</p> <p>Below 1.3V → Check solar cell.</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Good</p> <p style="text-align: center;">↓</p> <p>Replace secondary battery.</p>

Check Items	How to Check	Result and Treatment
<p>② Confirmation of output signal</p>	<p>* Refer to Technical Manual, Basic Course: II-1-b. &lt;Tester range: DCV. 0.3V&gt;</p>  <p>&lt;Pattern A1&gt;</p> <ul style="list-style-type: none"> <li>● In the 1-second interval movement, the tester pointer should move to the right left every 1 second.</li> <li>● In the 2-second interval movement or 2-second hitch movement, the test pointer moves in only one direction every 2 seconds.</li> </ul> <p>&lt;Pattern A2&gt;</p> <ul style="list-style-type: none"> <li>● The tester pointer vibrates finely.</li> </ul> <p>Measure with the "hour hand" in the correction mode.</p> <ol style="list-style-type: none"> <li>(1) Press the (A) button with the crown at the normal position to set the "hour hand" in the "correction mode".</li> <li>(2) Turn the crown to the left continuously to rotate the "hour" train wheel continuously.</li> <li>(3) Check the output signal of pattern 2.</li> </ol>	<p>Tester pointer does not move → Check connection parts.</p> <p style="text-align: center;">↓</p> <p>Connection parts are normal → Replace of electronic circuit unit.</p>
<p>③ Check of connection parts</p>	<p>* Refer to Technical Manual, Basic Course: II-2-a.</p> <ul style="list-style-type: none"> <li>● Check for looseness of screws, dust, stain, etc.</li> <li>● Check for stain and removal of the solar cell pattern (two places), deformation of connection spring, removal of welded lead plate of the secondary battery, stain of the circuit pattern, bad contact of each part.</li> </ul>	<p>Stain of solar cell pattern and circuit pattern → Remove stain.</p> <p>Removal of solar cell pattern, removal of circuit pattern, removal of welded lead plate of secondary battery → Replace parts.</p>

Check Items	How to Check	Result and Treatment
<p>④ Measurement of coil resistance</p>	<p>* For the setting method of the tester, see Basic Course: II-1-c.</p> <ul style="list-style-type: none"> <li>● Remove the unit of electronic circuit and measure the coil resistance.</li> </ul> <p style="text-align: right;">&lt;Tester range: R x 10Ω&gt;</p>  <p style="text-align: center;">&lt;The tester lead pins have no polarity&gt;</p>	<p>Coil units (1)</p> <ul style="list-style-type: none"> <li>● 2.2 ~ 2.0kΩ → Good</li> <li>● Out of range of 2.2 ~ 2.0kΩ → Replace coil unit.</li> </ul> <p>Coil units (2)</p> <ul style="list-style-type: none"> <li>● 1.5 ~ 1.2kΩ → Good</li> <li>● Out of range of 1.5 ~ 1.2kΩ → Replace coil unit.</li> </ul>
<p>⑤ Check of train wheel</p>	<p>* Refer to Basic Course: II-2-b.</p> <ul style="list-style-type: none"> <li>● Check that the all wheels are meshed smoothly.</li> <li>● Check the lubricating condition, etc.</li> <li>● Check that each train wheel works normally.</li> </ul>	
<p>⑥ Check of solar cell side mechanism</p>	<p>* Check that the parts around the calendar are installed correctly.</p> <ul style="list-style-type: none"> <li>● Are the hour wheel, intermediate date wheel, and data dial installed to the correct positions?</li> <li>● Are the parts free from dirt and deformation?</li> <li>● Are the all parts lubricated normally?</li> </ul>	

Check Items	How to Check	Result and Treatment
<p>⑦ Check of solar cell</p>	<ul style="list-style-type: none"> <li>● Check the solar cell for breakage and stain, and check its electrode for stain and flaking.</li> </ul>  <ul style="list-style-type: none"> <li>● Exposing the solar cell unit to light, measure its voltage with a tester to see roughly if the solar cell works.</li> </ul> <ol style="list-style-type: none"> <li>(1) Keep the solar cell exposed to light and set the tester. (Tester range: D.C. 3V)</li> <li>(2) Check swinging of the tester pointer.</li> </ol> <p><b>(Precaution)</b></p> <p>When measuring the voltage of the solar cell, extremely take care not to damage its terminals.</p>	<ul style="list-style-type: none"> <li>● Breakage of solar cell → Replace solar cell.</li> <li>● Stain → Remove stain.</li> <li>● Flaking of electrode → Replace solar cell.</li> <li>● Tester pointer swings → Normal.</li> <li>● Tester pointer does not swing → Replace solar cell.</li> </ul>

Check Items	How to Check	Result and Treatment
<p>③ Measurement of current consumption</p>	<p>* Refer to Basic Course: II-1-f.</p> <p>This watch uses a secondary battery instead of a battery. Accordingly, prepare a silver battery (1.50V or higher), then measure the current consumption according to the following procedure.</p> <ol style="list-style-type: none"> <li>(1) Set the crown to the normal position.</li> <li>(2) Remove the secondary battery.</li> <li>(3) Referring to Technical Manual, Basic Course, set the silver battery (1.55V) to the adapter of the tester correctly.</li> <li>(4) Set the tester. <ul style="list-style-type: none"> <li>Replace the positive ⊕ tester pin with a clip, then hitch it on the ground spring of the circuit unit supporter.</li> <li>Apply the negative ⊖ tester pin to the negative ⊖ pattern of the unit of electronic circuit.</li> </ul> </li> <li>(5) Apply one leg of tweezers to the "AR pattern" and apply the other one to the "INT pattern" and "circuit unit supporter" simultaneously to short them.</li> <li>(6) Separate the tweezers from the "AR pattern" and "INT pattern" in order.</li> <li>(7) Check that the "second" train wheel is rotating, then separate the tweezers from the "INT pattern". <ul style="list-style-type: none"> <li>• If the "second" train wheel is not rotating, repeat steps 5 and 6 again.</li> </ul> </li> <li>(8) Measure the current consumption.</li> </ol> <p><b>Note:</b> The tester indicates a high value at first. Wait until the tester pointer is stabilized, then measure the current consumption of the movement.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Note:</b> When measuring the current consumption, do not apply any light to the solar cell. If any light is applied, the voltage changes and correct current consumption cannot be measured.</p> </div> <p style="text-align: center; margin-top: 10px;">&lt;Tester range: DC 10μA&gt;</p> 	<p>Current consumption by module</p> <p><b>Below 1.4μA</b> → Good</p> <p><b>1.4μA or higher</b> → Measure unit of electronic circuit.</p> <p>Measurement of unit of electronic circuit.</p> <p><b>Below 0.4μA</b> → Good</p> <p><b>0.4μA or higher</b> → Replace unit of electronic circuit.</p> <div style="border: 1px solid black; padding: 10px; margin-top: 20px;"> <p>Current consumption by module is high but that by electronic circuit unit is low → A part other than circuit seems to have a trouble. Check for stain, bad lubrication, deformation of parts, and remove causes of load.</p> </div>

Check Items	How to Check	Result and Treatment
<p>⑨ Measurement of time</p>	<p>* Refer to Basic Course: II-2-d.</p> <ul style="list-style-type: none"> <li>● Since DF measurement is applied, measure in the 10-second range. The time rate cannot be adjusted, however. The time rate may not be measured accurately in the 2-second interval movement or 2-second hitch movement. In this case, apply light to the watch until the second hand moves in the 1-second interval movement, then measure the time rate.</li> </ul>	<ul style="list-style-type: none"> <li>● Time rate is very different from specification → Replace unit of electronic circuit.</li> </ul>
<p>⑩ Confirmation of using condition</p>	<p>* Refer to Basic Course: II-2-e.</p> <ul style="list-style-type: none"> <li>● Since this watch is energized by light, it should receive light as much as possible. If the watch is placed near a light source which generates heat (above 60°C) such as an incandescent lamp, a halogen lamp, etc., its functions and parts may be deteriorated or deformed by the heat. Accordingly, take care when applying light to it.</li> </ul> <p>Example: When the watch is hidden under a long sleeve or the customer works in a dark place, it needs to be exposed to light on purpose.</p>	
<p>⑪ Inspection of outside and functions</p>	<p>* Refer to Basic Course: II-2-f.</p>	