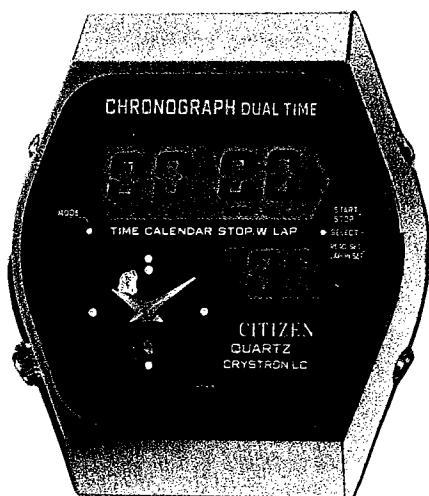


***TECHNICAL  
INFORMATION***

---

**CITIZEN QUARTZ  
Cal.No.890※※**

§1. OUTLINE



This unique watch combines the advantages of a digital quartz watch and an analog quartz watch together. It is finished in a well unified design thanks to adoption of an L-shaped LC display panel completed through special processing, furthermore featuring a stopwatch function.

§2. FEATURES

- 1) A compact and multi-function watch for gentlemen's use.
  - a) One chip of C/MOS-LSI controls both the digital and analog functions.
  - b) The module size is as follows: Outer diameter 30.0mm $\phi$  (max.); Thickness 4.50mm (without power cell); Thickness with power cell 5.51mm.
- 2) A high accuracy can be maintained about three years with only one unit of small-size silver oxide power cell.
  - a) Accuracy at the normal temperature:  $\pm 15$  sec. per month
  - b) Power cell No.: 280-15; Nominal power cell life: about 3 years
- 3) Digital display function
  - a) Time display (24-hour, minute & second)  $\leftrightarrow$  calendar display (month, date & day), plus stopwatch display
  - b) Automatic calendar setting at the end of each month and year (including the leap year)
  - c) Power cell life indicating device (with blinking of service mark, (The colon and the time or calendar mark start flashing).
- 4) Analog display function
  - a) 2 hands (4-second step movement for hour and minute hands)
  - b) Power conservation switch (to be actuated with pull-out of crown)
- 5) An easy time adjustment is possible by means of the trimmer condenser.
- 6) High-contrast and long-life FE-type LC display.
 

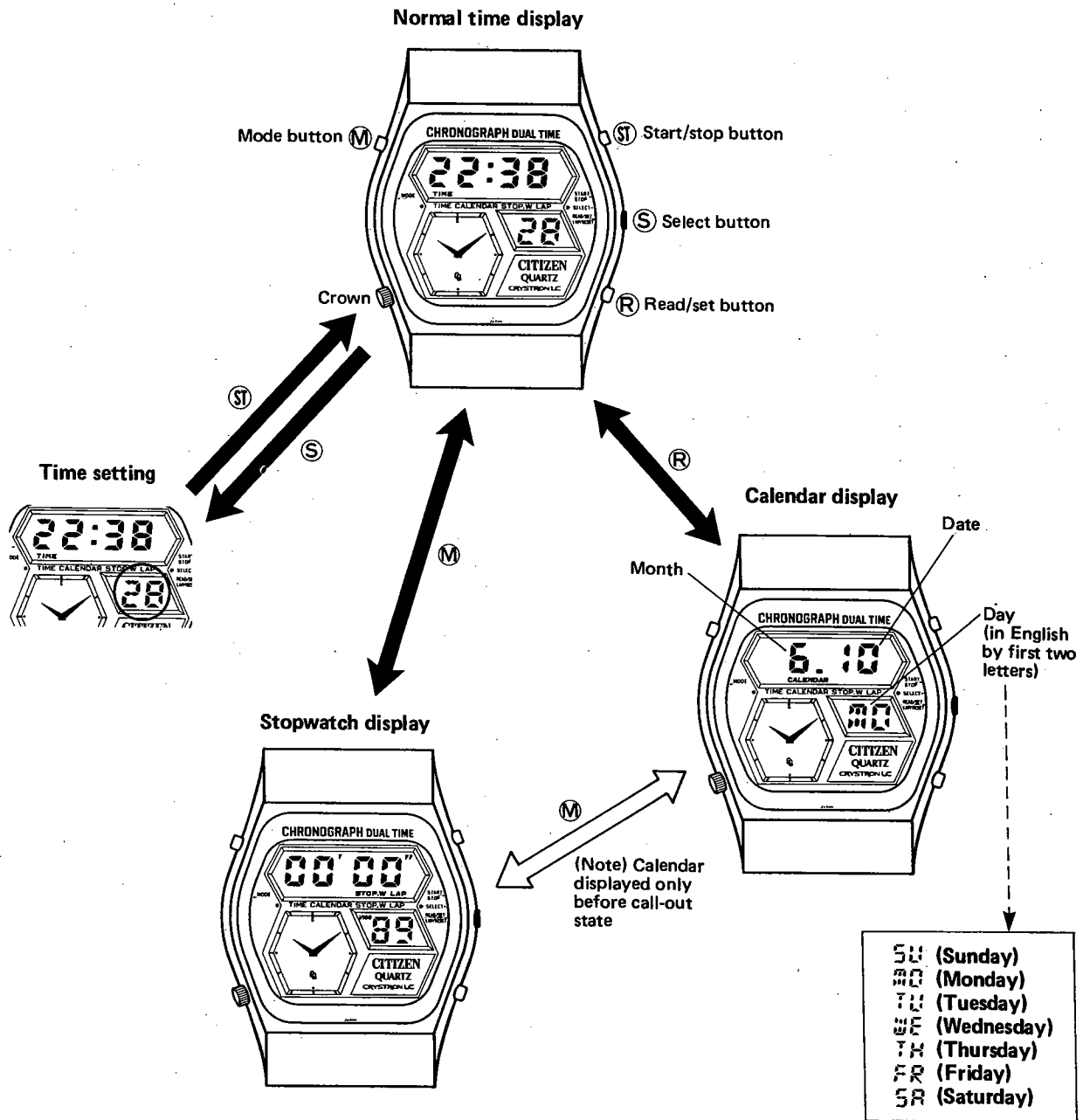
With application of a special-form LC display panel, an easy-to-see display screen is obtained with increased functional efficiency.

## § 3. SPECIFICATIONS

Caliber No.	8900-08A
Type	Quartz crystal watch with digital-analog simultaneous display
Movement	Size: 30.00mm $\phi$ Thickness: 4.50mm (5.51mm with power cell)
Accuracy	$\pm 15$ sec./month (at normal temperatures)
Oscillation	32,768Hz
Digital watch (Display system)	<ul style="list-style-type: none"> <li>●FE twist type nematic LC display</li> <li>●6-digit time display (hour, minute &amp; second)</li> <li>●Calendar display by switching (month, date, day &amp; year)</li> <li>●"Year" displayed only at display correction time</li> <li>●Stopwatch function by selecting button</li> </ul>
Analog watch (Display system)  (Converter)	<ul style="list-style-type: none"> <li>●Time display (hour &amp; minute) by two hands in 4-second step movement</li> <li>●Bipolar step motor</li> </ul>
Effective temperature range	0°C ~ +60°C (32°F ~ 140°F)
Integrated circuit	C/MOS-LSI (1 unit)
Additional mechanisms	<ul style="list-style-type: none"> <li>●Automatic calendar setting at the end of each month and year (Digital)</li> <li>●Power cell life indicating device (Digital)</li> <li>●Power conservation switch (Analog)</li> </ul>
Power cell	<p>Small-size silver oxide power cell (1 unit)</p> <p>Parts No. : 280-15 Voltage : 1.5V Capacity : 75mAH Size : 11.6mm<math>\phi</math> × 3.00mm Life : About 3 years</p>

4. HANDLING INSTRUCTION

1) Digital watch



2) Analog watch

- a) The crown is pulled out by one step and turned right or left to set the "hour" and "minute".
- b) The crown is pushed in to the original place to start the hands.
  - \*The power conservation state is also secured with pull-out of the crown.
  - \*The operation of the crown does not affect the digital display mechanism at all.
- c) The hands move once per 4 seconds.

§ 5. TIME AND CALENDAR SETTING



Normal time display

① (Second setting)



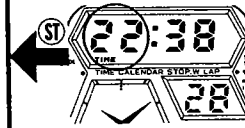
- With push of S button under the normal state, the "second" begins to blink.
- With push of R button, the "second" is reset to zero.\*

② (Minute setting)



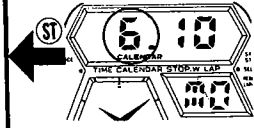
- With push of S button under the state of ①, the "minute" blinks.
- The "minute" is set with push of R button.

③ (Hour setting)



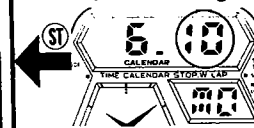
- With push of S button under the state of ②, the "hour" blinks.
- The "hour" is set with push of R button.

④ (Month setting)



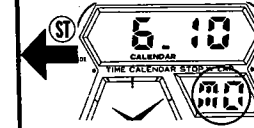
- With push of S button under the state of ③, the "month" blinks.
- The "month" is set with push of R button.

⑤ (Date setting)



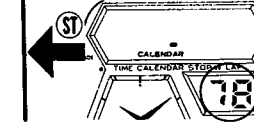
- With push of S button under the state of ④, the "date" blinks.
- The "date" is set with push of R button.

⑥ (Day setting)



- With push of S button under the state of ⑤, the "day" blinks.
- The "day" is set with push of R button.

⑦ (Year setting)



- With push of S button under the state of ⑥, the "year" blinks.
- The "year" is set with push of R button.

In case of only the "month", for example, is set, the S button is pushed four times. Then the "month" begins to blink and can be set with push of R button in the necessary pushing frequency. After setting the "month", the ST button is pushed to secure the normal time display.

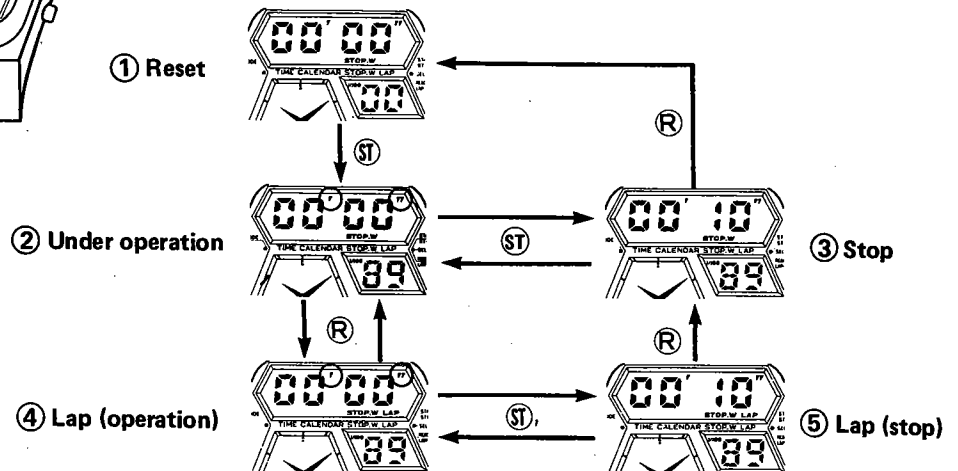
\*The "year" is set in a cycle of 1970 ~ 2009 with the last two digits of the year.

\* If R button pressed when indicating 30 to 59, then minutes will advance one minute.

## § 6. STOPWATCH OPERATION



The stopwatch display can be secured with push of (M) button under the state of either the normal time display or the calendar display.



## ① Reset

The service mark "TIME" disappears, and "▼▼▼", "STOP.W" and "1/100" are displayed instead. The "hour", "minute" and "second" of the normal time display are charged to the "minute", "second" and "1/100" of the stopwatch display respectively. Here, "00min. 00sec. 00" is secured for the stopwatch timing.

## ② Under operation

With push of (ST) button under the reset state, the service mark "▼▼▼" begins to blink to indicate that the timing is being carried out.

## ③ Stop

With push of (ST) button under the operation state, the service mark "▼▼▼" stops blinking. At the same time, the timing is also stopped and the elapsed time is displayed. If (ST) button is pushed under these conditions, the cumulative time can be displayed.

## ④ Lap (operation)

With push of (R) button under operation, "LAP" is displayed along with the elapsed time. In this case the time measurement is continued. With push of (R) button again, the continued time is displayed.

## ⑤ Lap (stop)

With push of (ST) button after pushing (R) button under operation, the timing is stopped under the "LAP" state. At this moment, the service mark "▼▼▼" stop blinking to indicate the stoppage of the timing. If (R) button is pushed under these conditions, the "LAP" display is erased and the "stop" state is secured.

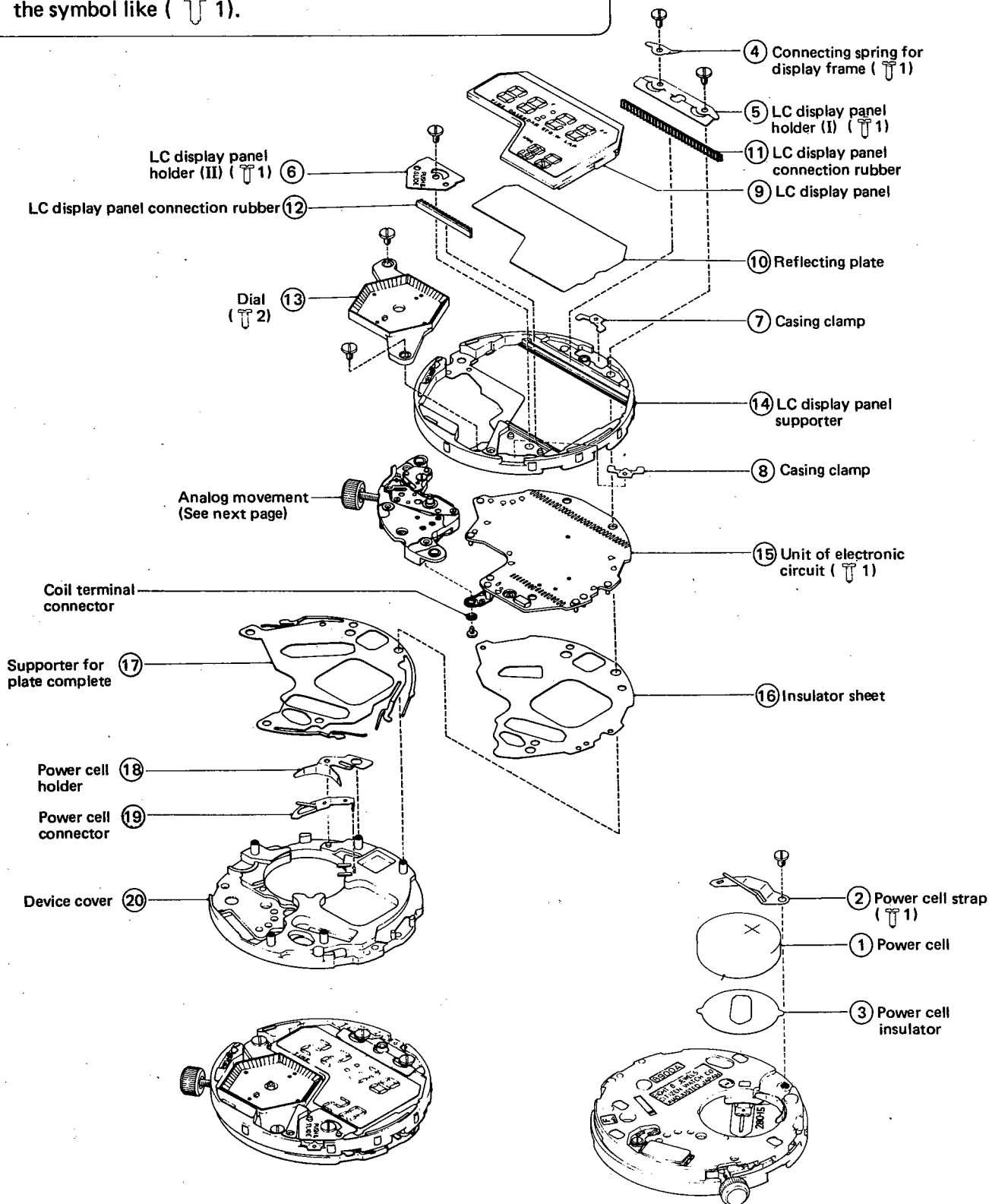
## ⑥ Reset

With push of (R) button under the state of ③ shown in the above diagram, the zero-second reset is given with '00 00 00' displayed. Thus, the "reset" state is secured.



§ 7. DISASSEMBLY AND ASSEMBLY OF MOVEMENT

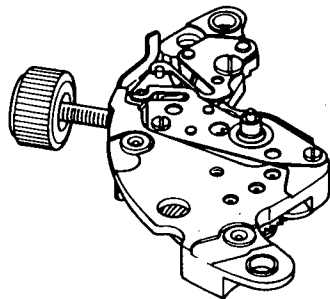
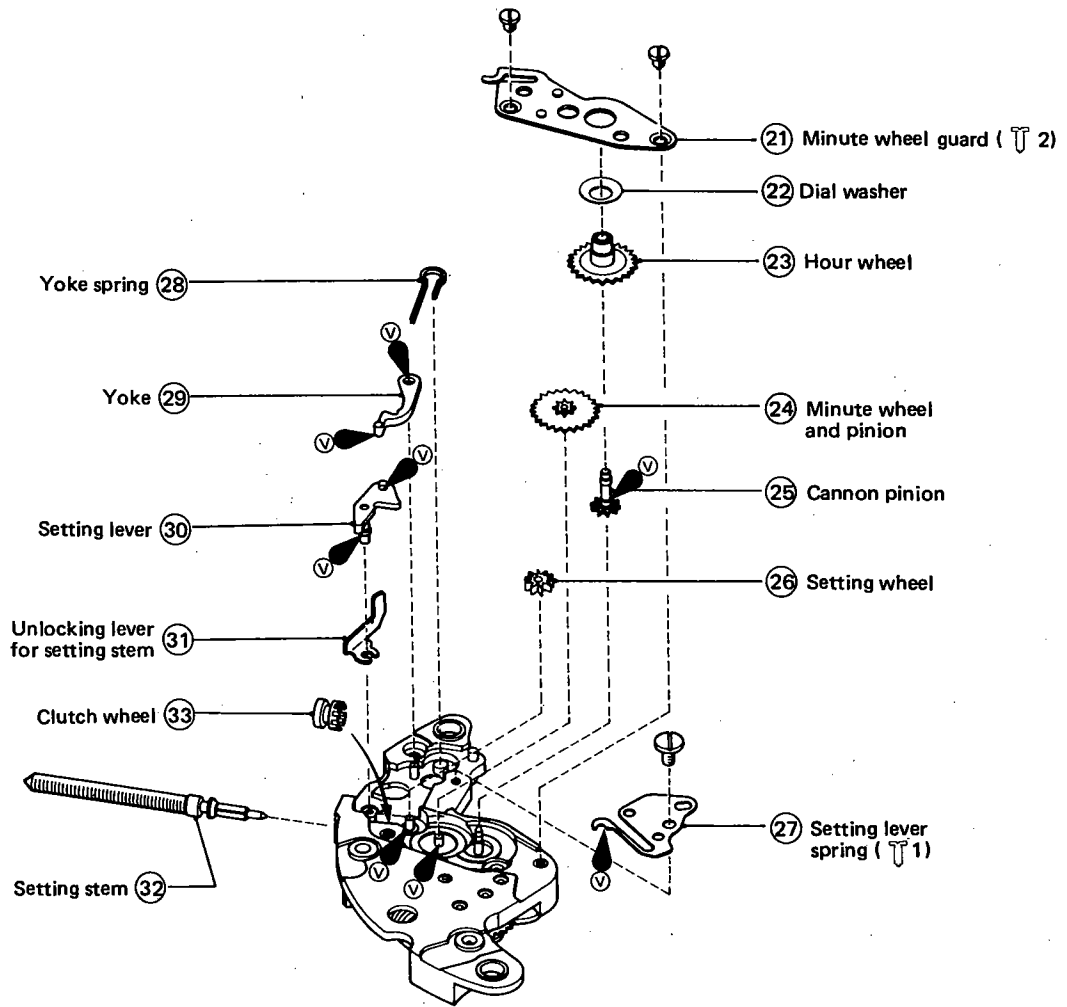
1) Digital watch

Disassembling sequence: ① ~ ④②  
 Assembling sequence: ④② ~ ①  
 The number of the screw coming with the parts is shown by the symbol like ( T 1).



2) Analog watch (I)

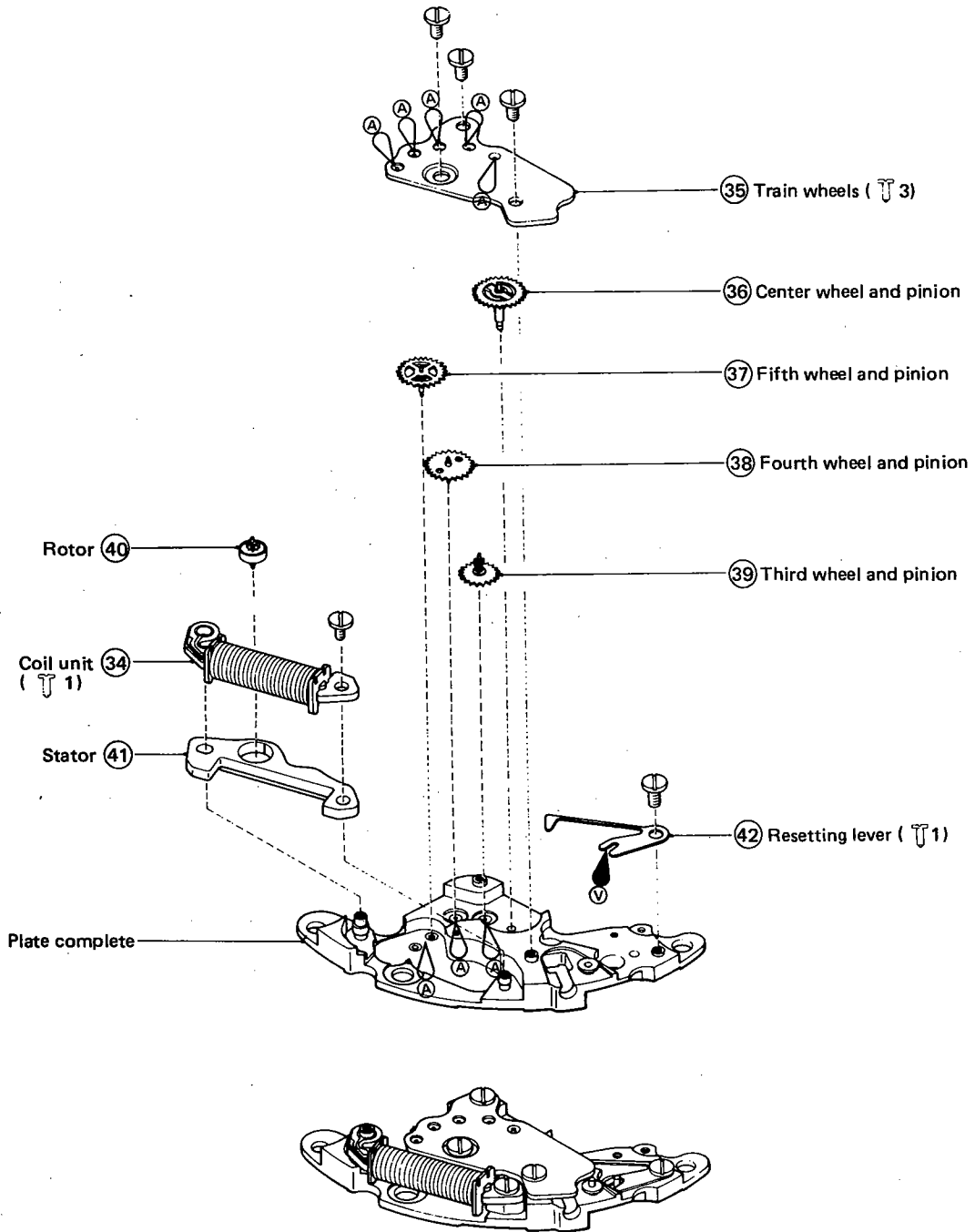
Lubrication mark:  
 Synt-A-Lube oil   
 Synt-V-Lube oil 





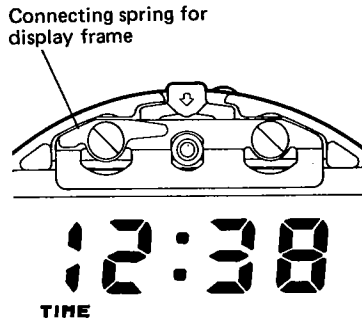
3) Analog watch (II)

**Note:**  
Avoid lubricating the center wheel and pinion.



#### 4) Notabilia of disassembly and assembly

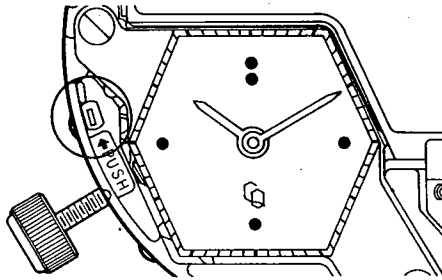
##### (1) Connecting spring for display frame



As shown in the left diagram, the connecting spring for display frame is incorporated above the LC display panel holder. It functions to give a contact to the display frame and to prevent the electrostatic "noise" from giving an evil effect to the display.

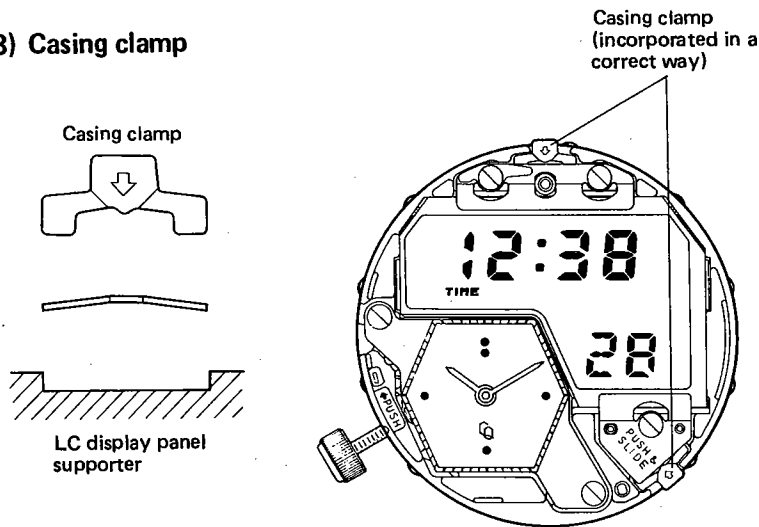
In this connection, the connecting spring must be incorporated assuredly and correctly. When the spring performance is lost, the spring must be bent upward to secure an assured contact.

##### (2) Assembly of LC display panel supporter



The LC display panel supporter must be set in such a way that the unlocking lever for setting stem is put into the guide hole (with arrow and PUSH marks) of the LC display panel supporter.

##### (3) Casing clamp



- ① The bent portion is put downward when incorporated.
- ② When removing, the casing clamp is slided inward while being pushed down to be detached through the groove of the caseback.

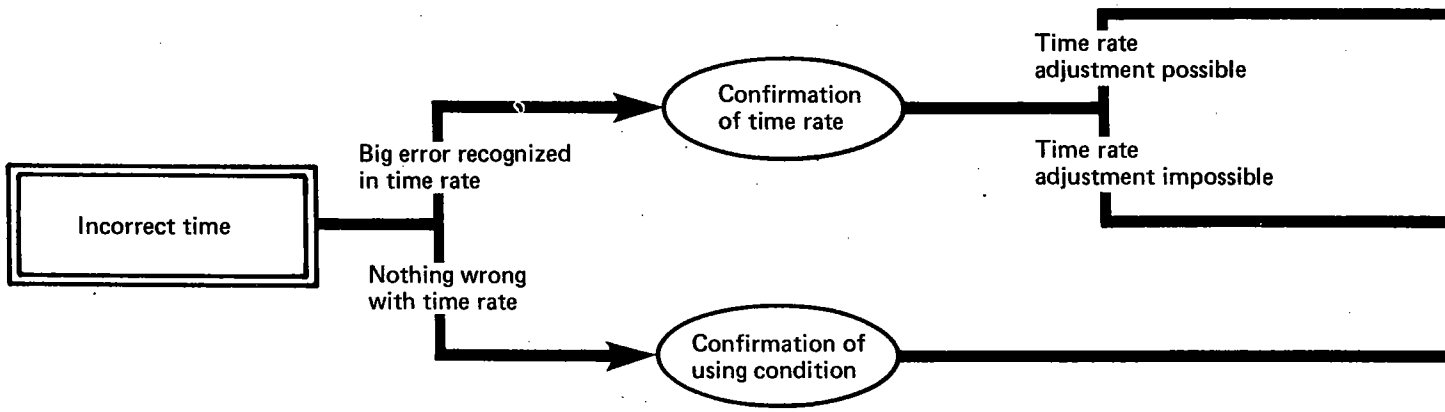
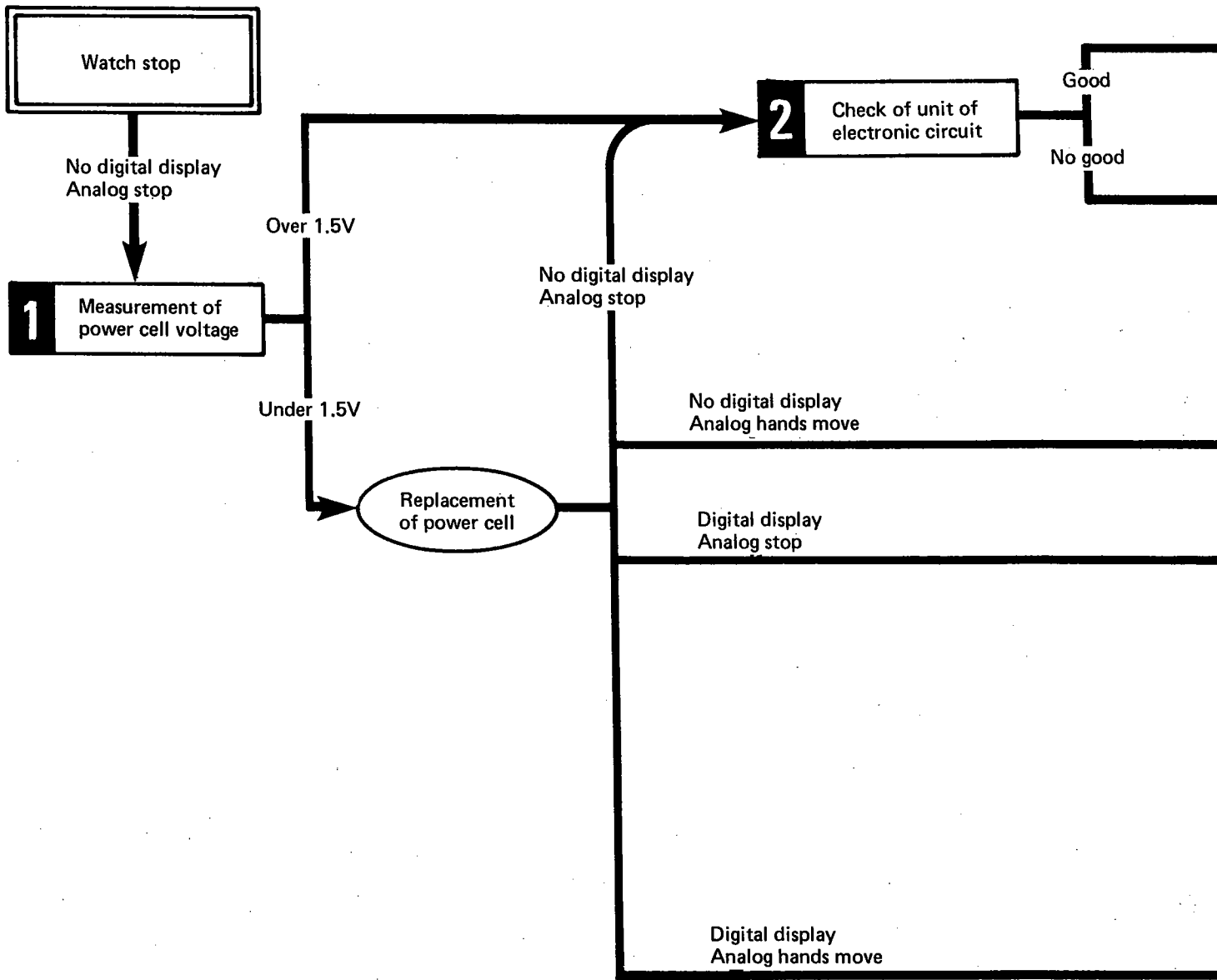
##### (4) Assembly of coil terminal connector

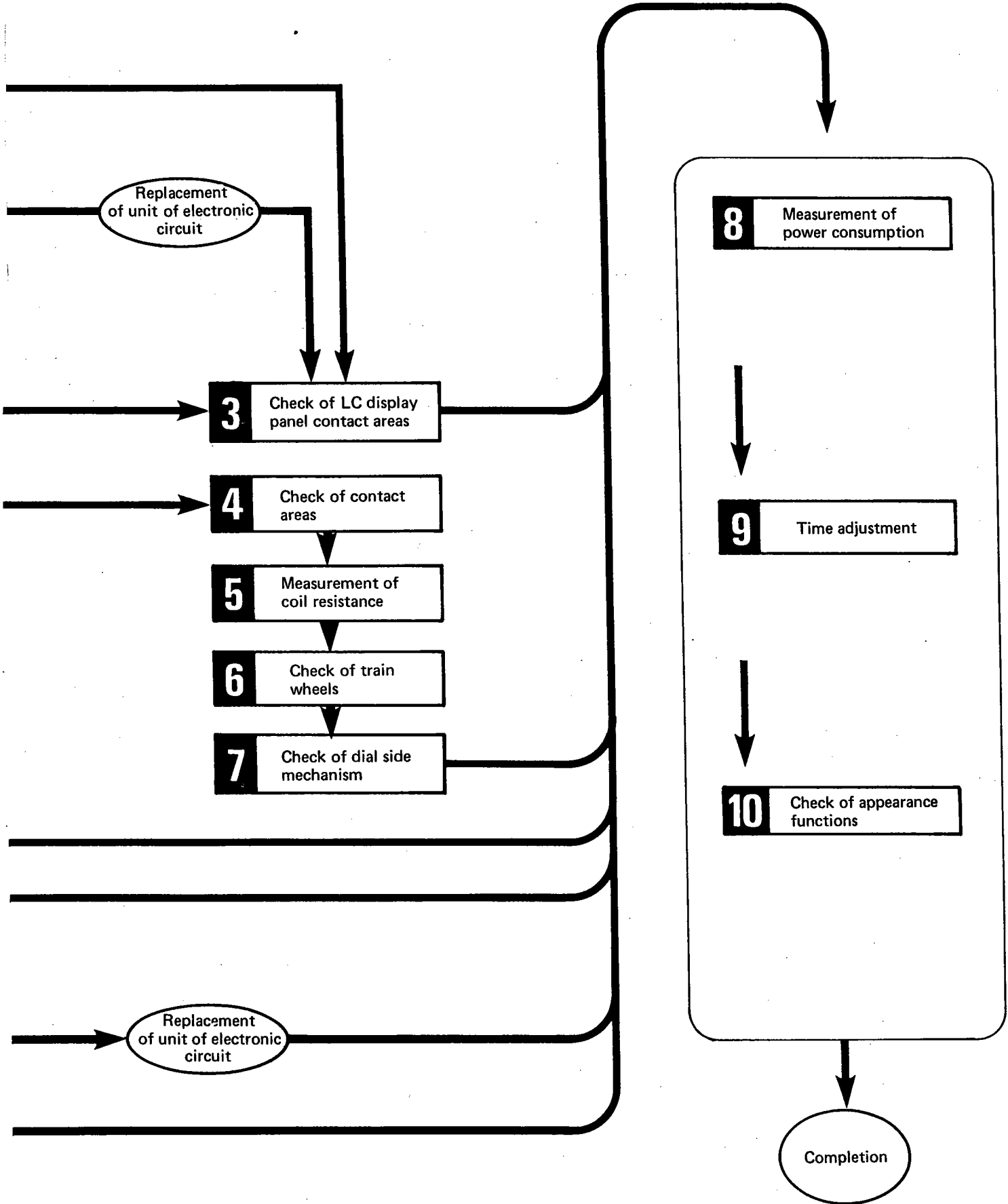
The coil terminal connector must be attached in such a way that the bent portion of the connector comes toward the coil terminal connector sheet.

##### (5) Assembly of power cell holder

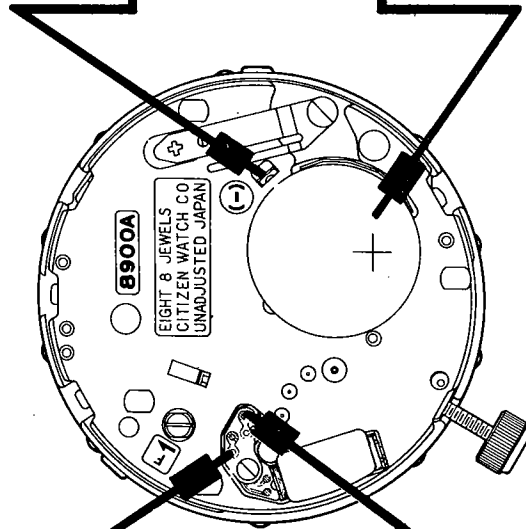
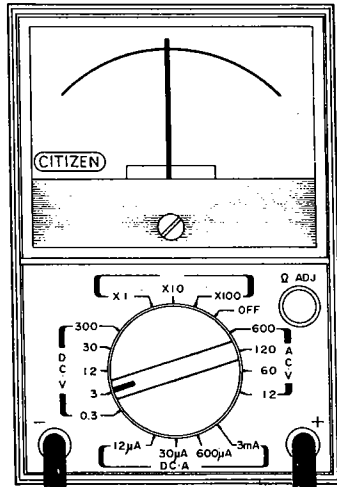
The power cell holder can be fitted firmly to the pin of the device cover and thus must be pushed in until it is settled completely to the device cover.

§ 8. TROUBLESHOOTING AND ADJUSTMENT

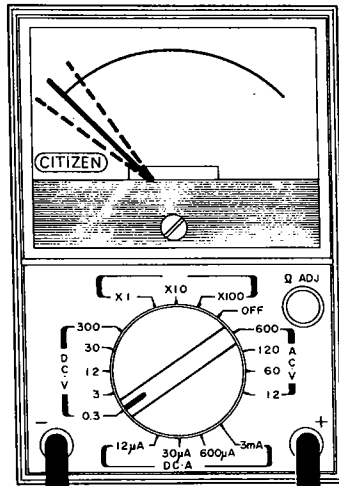




**1** Measurement of power cell voltage



**2** Check of unit of electronic circuit



**Results and Treatment**

**Over 1.5V**

→ Nothing wrong

**Under 1.5V**

→ Replacement of power cell

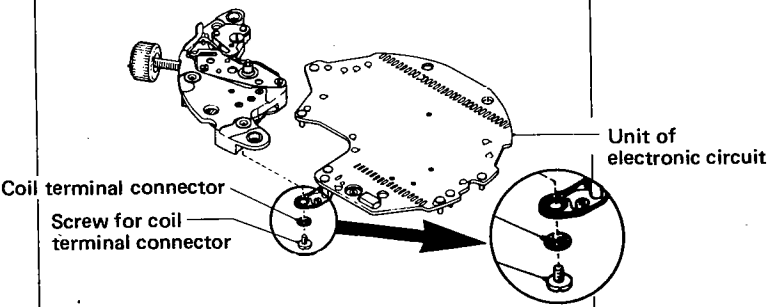
The output signal is confirmed with the unit of electronic circuit in incorporated.

**Results and Treatment**

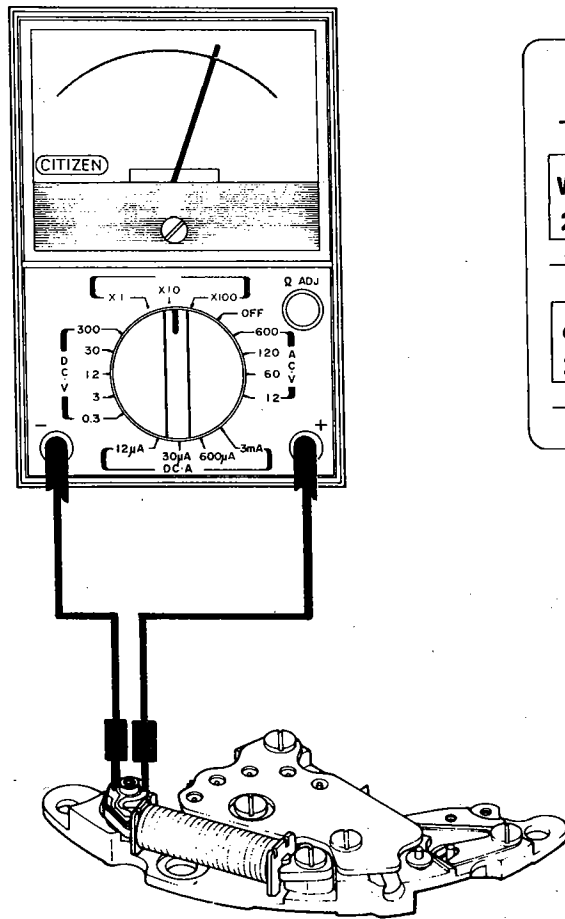
There is nothing wrong as long as the tester pointer goes and comes back every 4 seconds.

In case the pointer swings out or other abnormality is recognized.

↓  
Replacement of unit of electronic circuit.

Check items	How to check	Results	Treatment
<p><b>3</b> Check of LC display panel contact areas</p>	<p>An unsteady contact between the LC display panel and the electrode part as well as the faulty LC display panel are conceivable.</p> <ol style="list-style-type: none"> <li>1. The tightening condition is checked for the screws of LC display panel holder.</li> <li>2. How the LC display panel contact rubber is incorporated is confirmed.</li> <li>3. The dust or stains stuck to the electrode part of the LC display panel are inspected as well as the crack of the LC display panel.</li> </ol> <p><b>Check point:</b> The segment-broken area is pushed softly with a finger. If the broken segment is displayed again, it is known that the contact is unsteady.</p>	<p>Screw broken → Replacement</p> <p>Uneven holding of panel → Reassembly</p> <p>Rubber twisted or worn out → Replacement</p> <p>Dust or stains stuck → Clearing</p> <p>Panel cracked → Replacement</p>	
<p><b>4</b> Check of contact part</p>	<p>Check whether a good contact is secured between the coil terminal connector sheet protruded over the unit of electronic circuit and the analog part.</p>  <p>*The coil terminal connector is attached in such a way that the curved area comes toward the coil terminal connector sheet.</p>	<p>Screw loosened → Retightening</p>	

**5** Measurement of coil resistance



**Results and Treatment**

Tester pointer is:

**Within**  
2.5 ~ 3.0KΩ

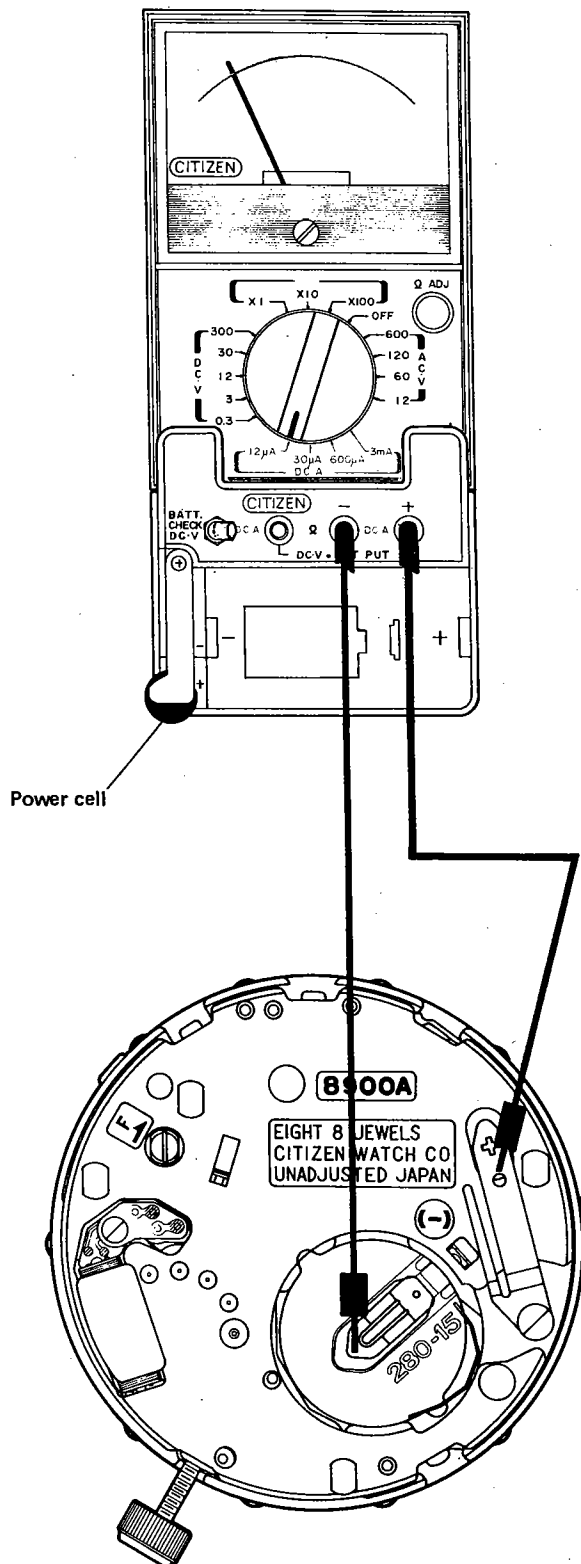
→ Nothing wrong

**outside**  
2.5 ~ 3.0KΩ

→ Replacement of coil unit

Check items	How to check	Results	Treatment
<b>6</b> Check of train wheels	<ul style="list-style-type: none"> <li>•Check whether each gear wheel has some creaking and dust or other foreign substances stuck.</li> <li>*The rotor may have rotations if the hands are turned in a completed state of the analog movement. This is, however, just a matter of the designing and has nothing to do with the trouble.</li> <li>•Check of oiling condition</li> </ul>	<p>Creaking → Replacement</p> <p>Dust and others stuck → Clearing</p>	
<b>7</b> Check of dial side	<ul style="list-style-type: none"> <li>•Check of each transmission</li> <li>*The train wheels have also rotations due to a designing although the center wheel and pinion itself should have a slip originally. The hand turning torque can be confirmed by removing the coil unit.</li> </ul>		

## 8 Measurement of power consumption



### Results and Treatment

Measurement under normal conditions.

**Under  $4.0\mu\text{A}$**

→ Nothing wrong

**Over  $4.0\mu\text{A}$**

→ Measurement of power consumption of electronic circuit.

### Reference value

- ① Unit of electronic circuit:  
About  $1.5\mu\text{A}$
- ② Converter (analog):  
About  $1.0\mu\text{A}$
- ③ LC display panel:  
About  $1.0\mu\text{A}$

### Measurement of power consumption of electronic circuit

**Under  $2.0\mu\text{A}$**

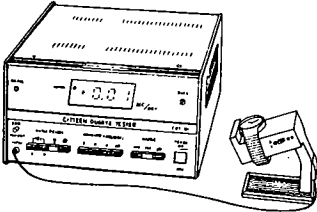
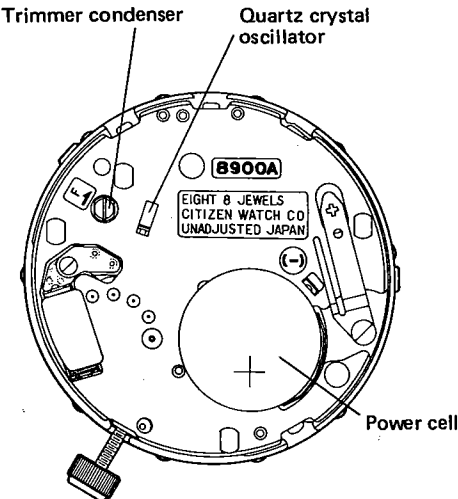
→ Replacement of LC display panel connector or LC display panel

**Over  $2.0\mu\text{A}$**

→ Replacement of plate complete.

\*It is important to know what kind of component part has a large amount of power consumption in case a large power consumption is shown through the measurement.



Check items	How to check	Results	Treatment
<p>9 Time adjustment</p>	<p>The time is adjusted by turning the trimmer condenser in case a big error is recognized in the time rate.</p>   <p><b>Set up to digital display</b> This watch can measure both out put of digital and analog. But analog movement moves once per four seconds. Therefore, it is better way that adjustment by digital display.</p>	<p>Time adjustment possible</p> <p>Time adjustment impossible</p>	<p>Next item 10</p> <p>Replacement of unit of electronic circuit</p>
<p>10 Check of appearance functions</p>	<ul style="list-style-type: none"> <li>•Check whether the time setting and the operation of the power conservation switch are smooth and accurate with the crown pulled out.</li> <li>•Check whether each push-button can be operated in a smooth and correct way.</li> <li>•Check whether the figures displayed have something wrong and whether some dust or stains stick to the appearance parts.</li> </ul>		

**CITIZEN WATCH CO., LTD.**  
Tokyo, Japan