

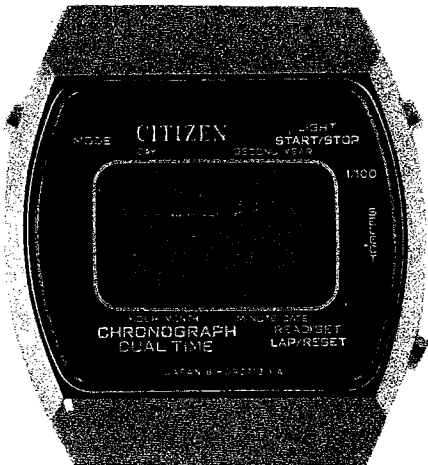
***TECHNICAL
INFORMATION***

CITIZEN QUARTZ

Cal. No. 923 ※ ※

 **CITIZEN**

§ 1. OUTLINE



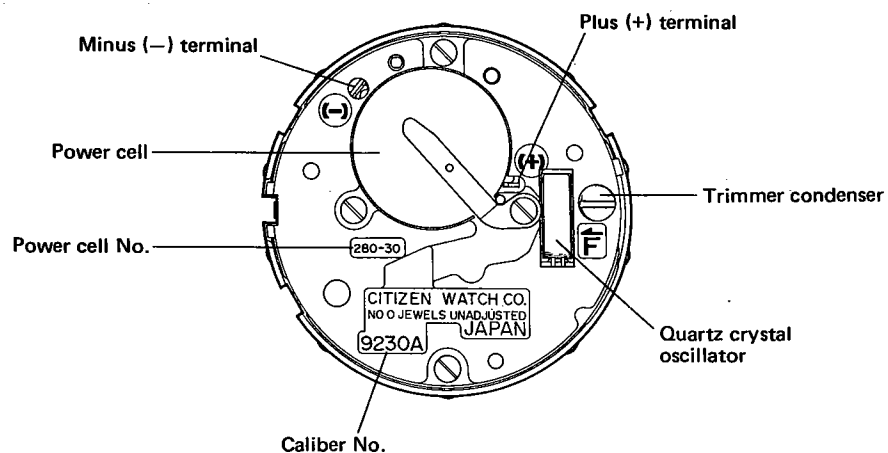
This is a digital quartz crystal watch which incorporates both the stopwatch and dual time functions in addition to the normal time/calendar display. The switching is possible between the 12- and 24-hour clocking systems for both the normal time and dual time displays.

§ 2. FEATURES

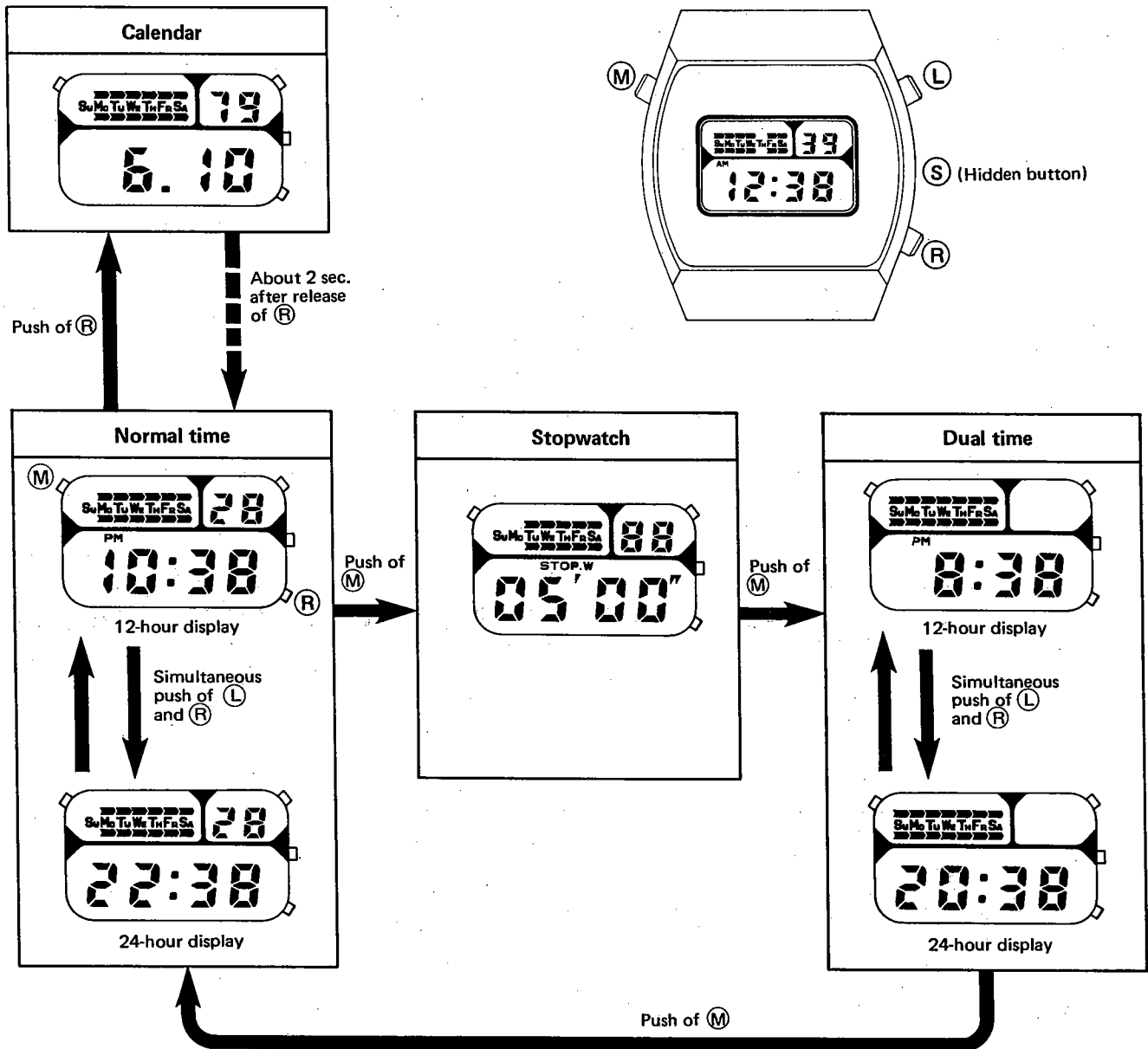
- 1) Both the stopwatch and dual time functions are added to the normal time/calendar displays.
- 2) An independent switching is possible with one-touch operation between the 12- and 24-hour clocking systems for both the normal and dual time displays.
- 3) The calendar is set automatically with correction including even the leap years after setting once.
- 4) A built-in illumination lamp facilitates an easy reading the display information even in the dark place.
- 5) The accurate time clocking is ensured for about 2 years with just a single unit of a miniature silver oxide power cell. (5 sec. lamp lighting per day)

§3. SPECIFICATIONS

Caliber No.	9230A	
Movement	Diameter: 25.7φmm (Max. 26.6mmφ)	
	Thickness: 5.45mm (Power cell part 5.51mm)	
Oscillation	32,768 Hz	
Accuracy	±15 Sec./month at normal temperature	
Time	Time	Hour, minute, second, day & AM/PM (12-hour display); hour, minute, second & day (24-hour display)
	Calendar	Year, month, date & day
	Stopwatch	Minute, second & 1/100 sec.
	Dual time	Hour, minute & AM/PM (12-hour display); Hour & minute (24-hour display)
Effective temperature range	0°C (32°F) ~ 60°C (140°F)	
Integrated circuit	C/MOS-LSI (1 unit)	
Additional mechanisms	<ul style="list-style-type: none"> •Stopwatch •Dual time •12-/24-hour display switching •Automatic calendar setting •Illumination lamp 	
Power cell	Silver oxide power cell (1 unit) Parts No. : 280-30 Nominal voltage : 1.55V Capacity : 42mAH Size : 11.6φ x 2.06mm ^t Life : About 2 years	



§ 4. HANDLING INSTRUCTIONS
 1) Display switching



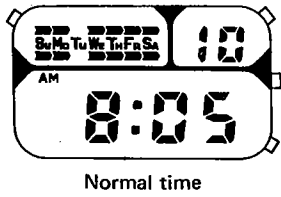
The normal time display is switched to the calendar display with push of (R) button. And the normal time display is reset in about 2 seconds after release of (R) button.

Also, with every push of (M) button, the display changes in the cycle of the normal time → stopwatch → dual time → normal time,


For both the normal time and dual time displays, the 12-hour and 24-hour clocking systems are switched alternately with every simultaneous push of both (L) and (R) buttons.

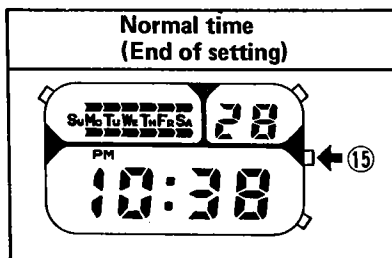
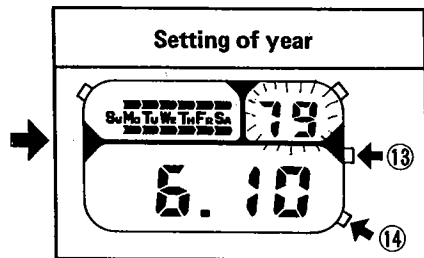
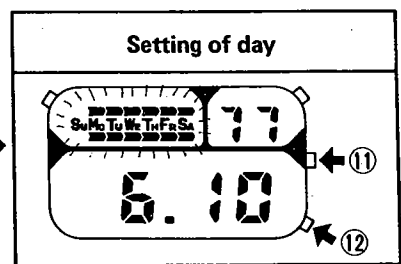
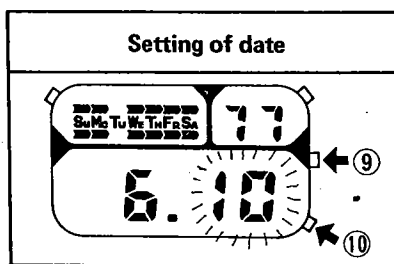
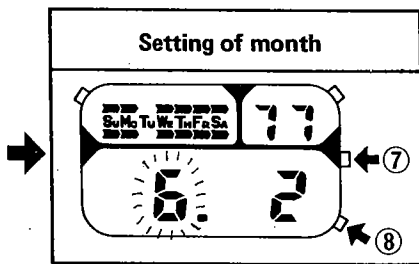
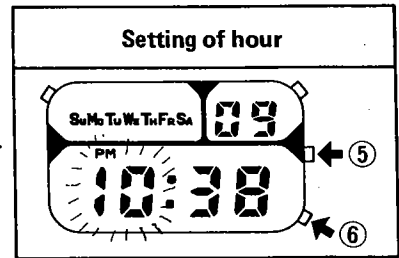
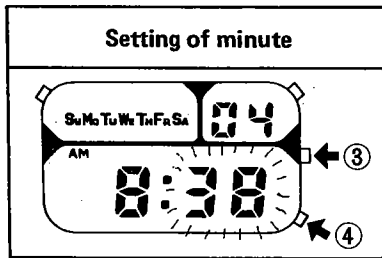
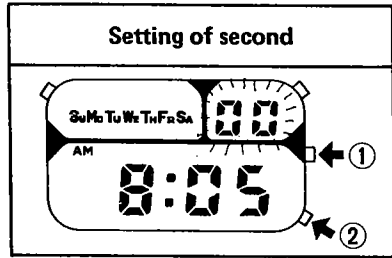
The AM/PM display is not available with the 24-hour display, and the second and day are not displayed with the dual time.

2. Setting of time and calendar



The area to be corrected is called out with push of (S) button and then set with push of (R) button.

The following method of setting is based on the 12-hour display system. The setting procedure must follow the sequence of ① ~ ⑮ as indicated below. (The flashing is shown by the  mark.)

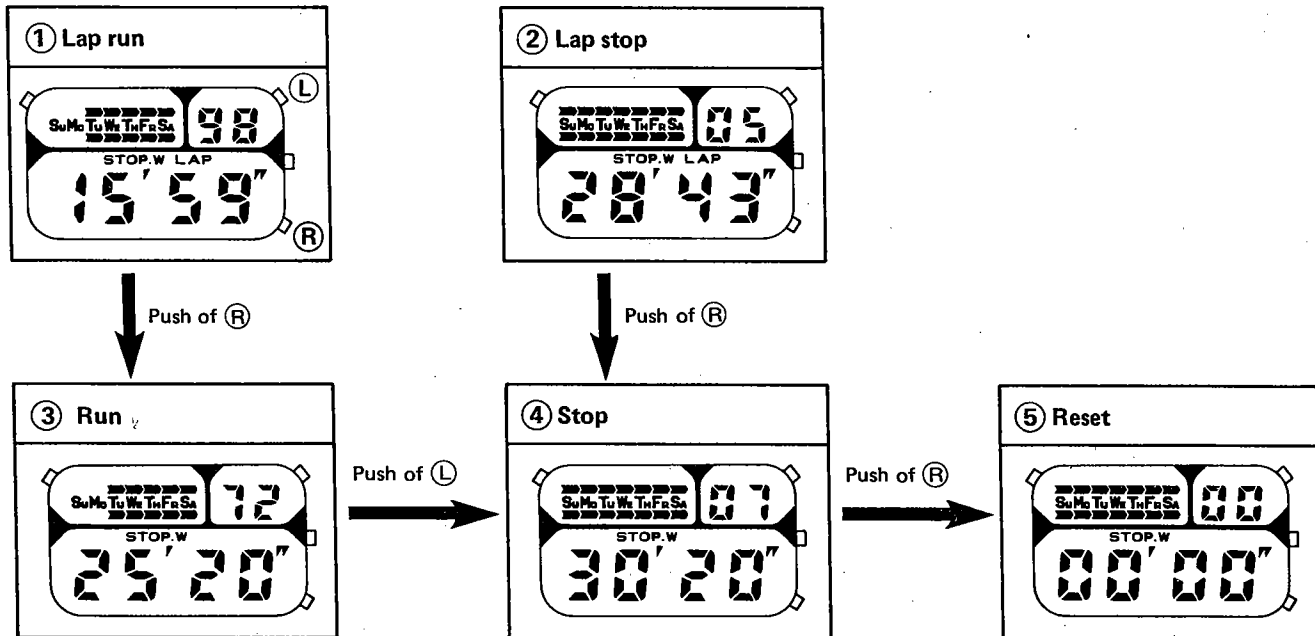


- *1. The minute is carried by one with push of (R) button when the second reads 30 ~ 59 in the setting of second.
- 2. The year is set in the cycle of 70 (1970) ~ 09 (2009) years.
- 3. The normal time display is reset instantaneously at any moment with push of (L) button (Quick re-setting device).
- 4. The setting method of the 24-hour display is quite identical to that of the above described 12-hour display except for non-display of AM/PM in the hour setting.

3. Operation of stopwatch

(1) Resetting

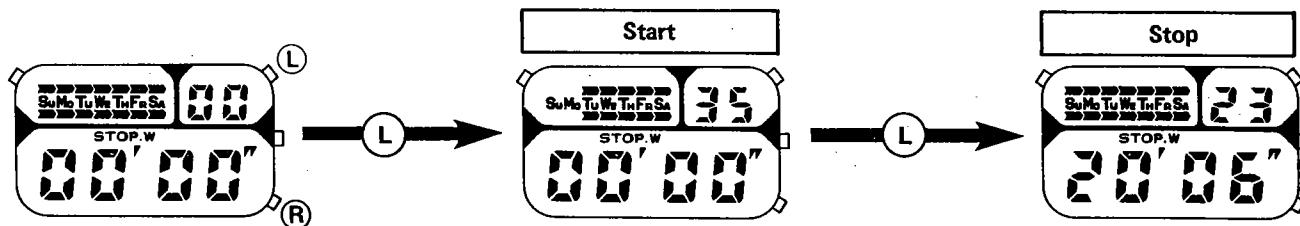
The following five modes (① ~ ⑤) are displayed under operation of the stopwatch.



The segment of the day runs from left to right under the run mode (including lap run), and all day segments are displayed under other modes. Under the modes of lap run and lap stop, "LAP" mark is displayed.

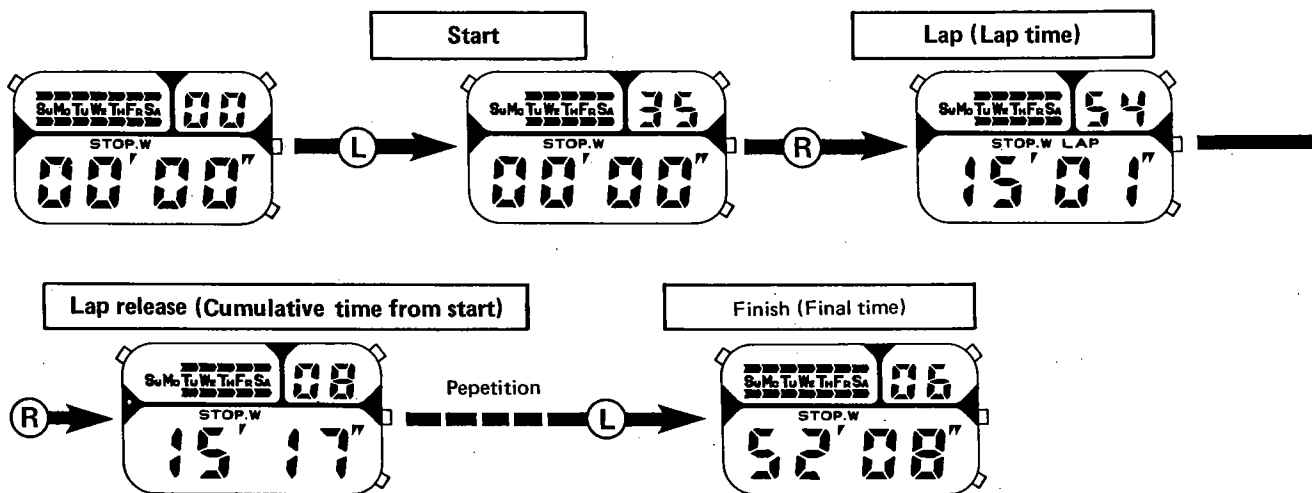
(2) Timing method

① Simple timing

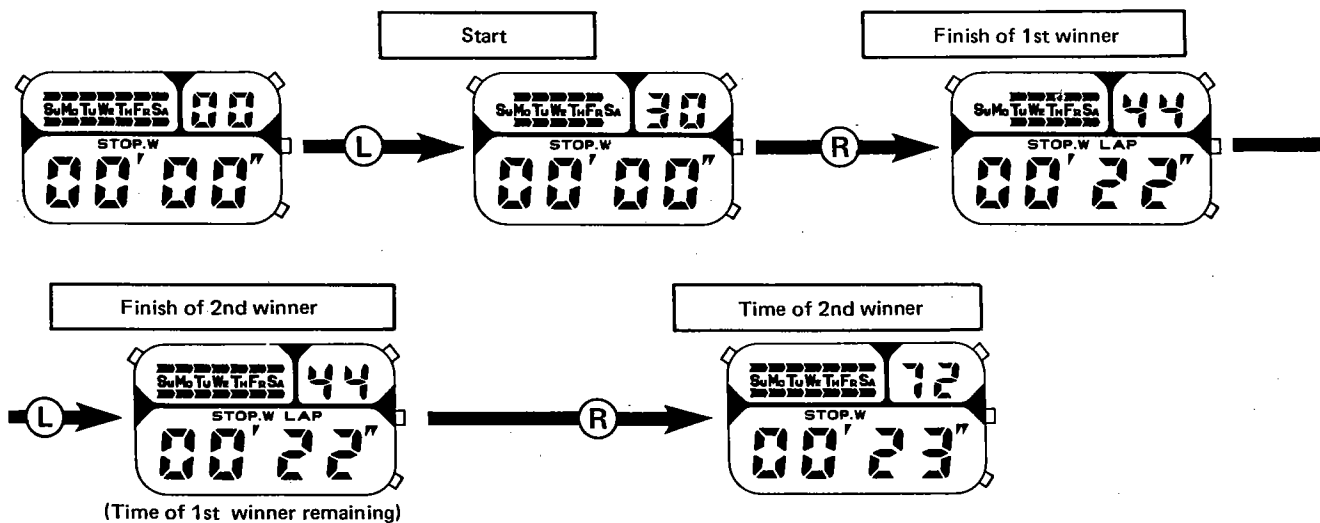


The timing starts again with push of (L) button after stop. And with repetition of the above simple timing, the "Integrating timing" becomes possible. (The stopping time means the loss time in the soccer game or the like.)

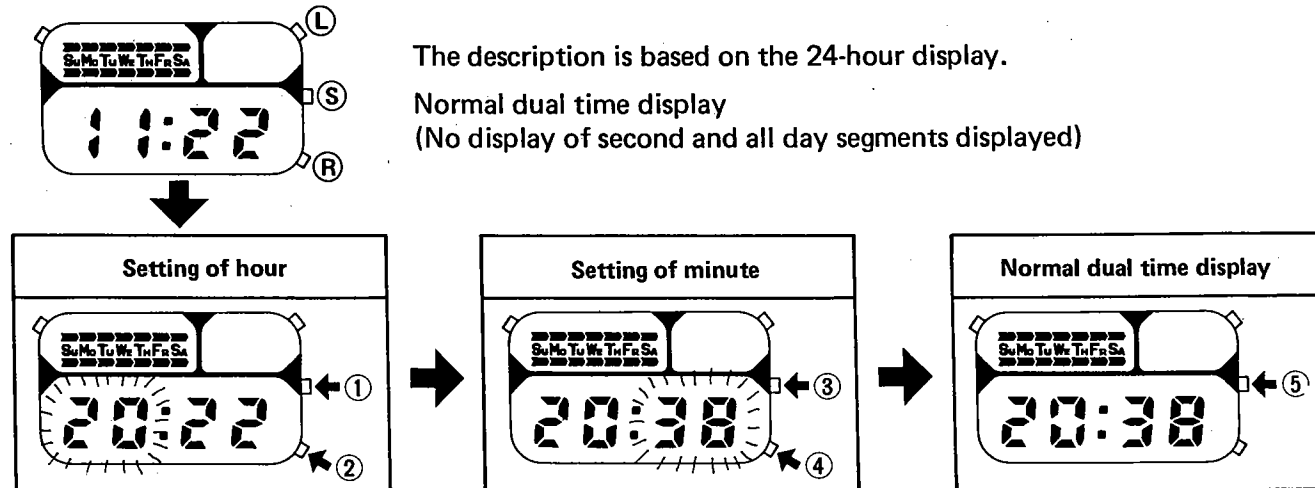
② Lap timing



③ Timing of 1st and 2nd winners



4. Setting of dual time



The description is based on the 24-hour display.

Normal dual time display
(No display of second and all day segments displayed)

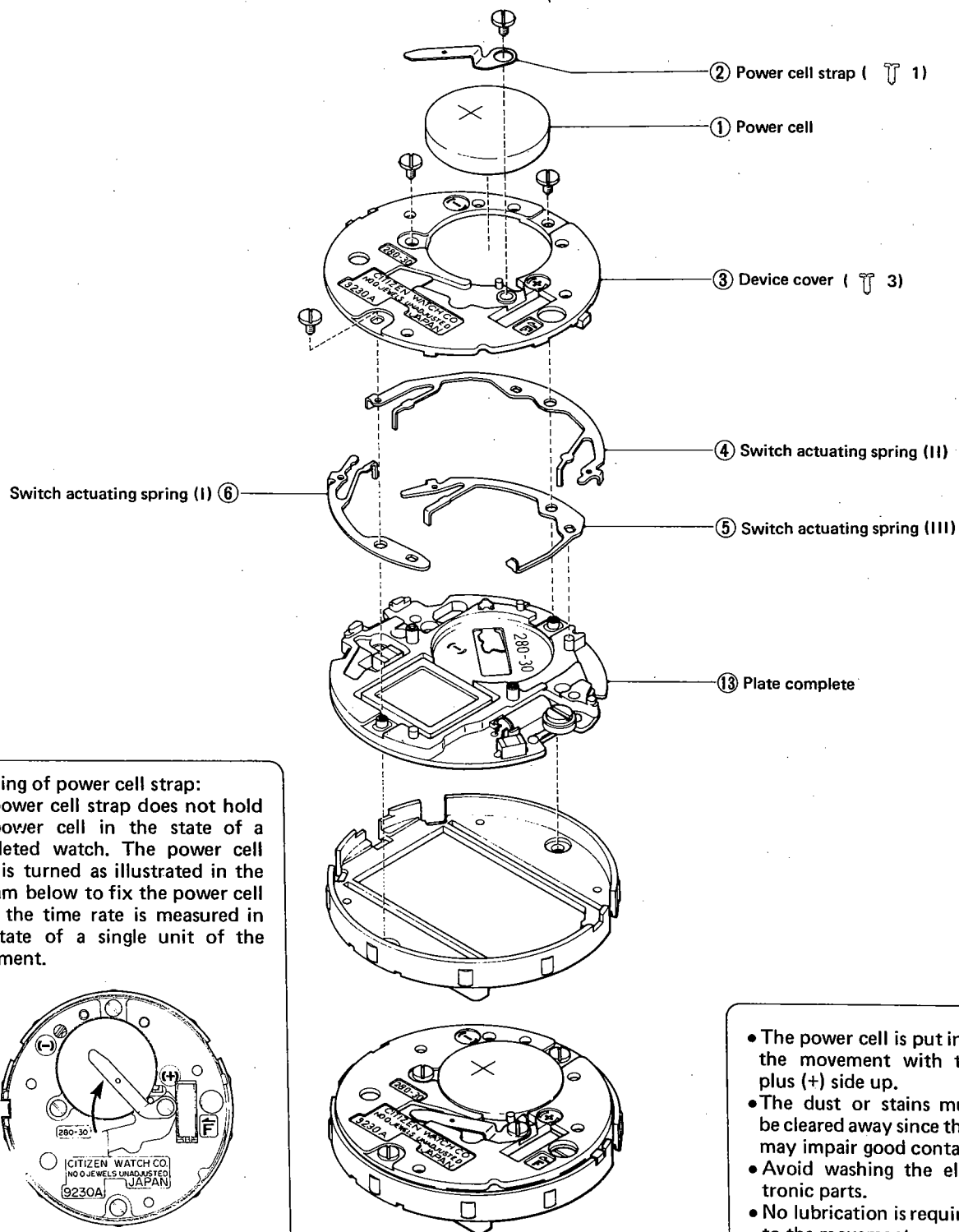
The normal dual time display can be reset at any moment with push of (L) button.

§ 5. DISASSEMBLY AND ASSEMBLY OF MOVEMENT

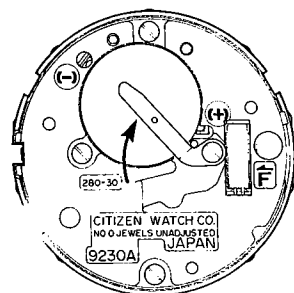
Disassembling sequence: ① ~ ⑬

Assembling sequence: ⑬ ~ ①

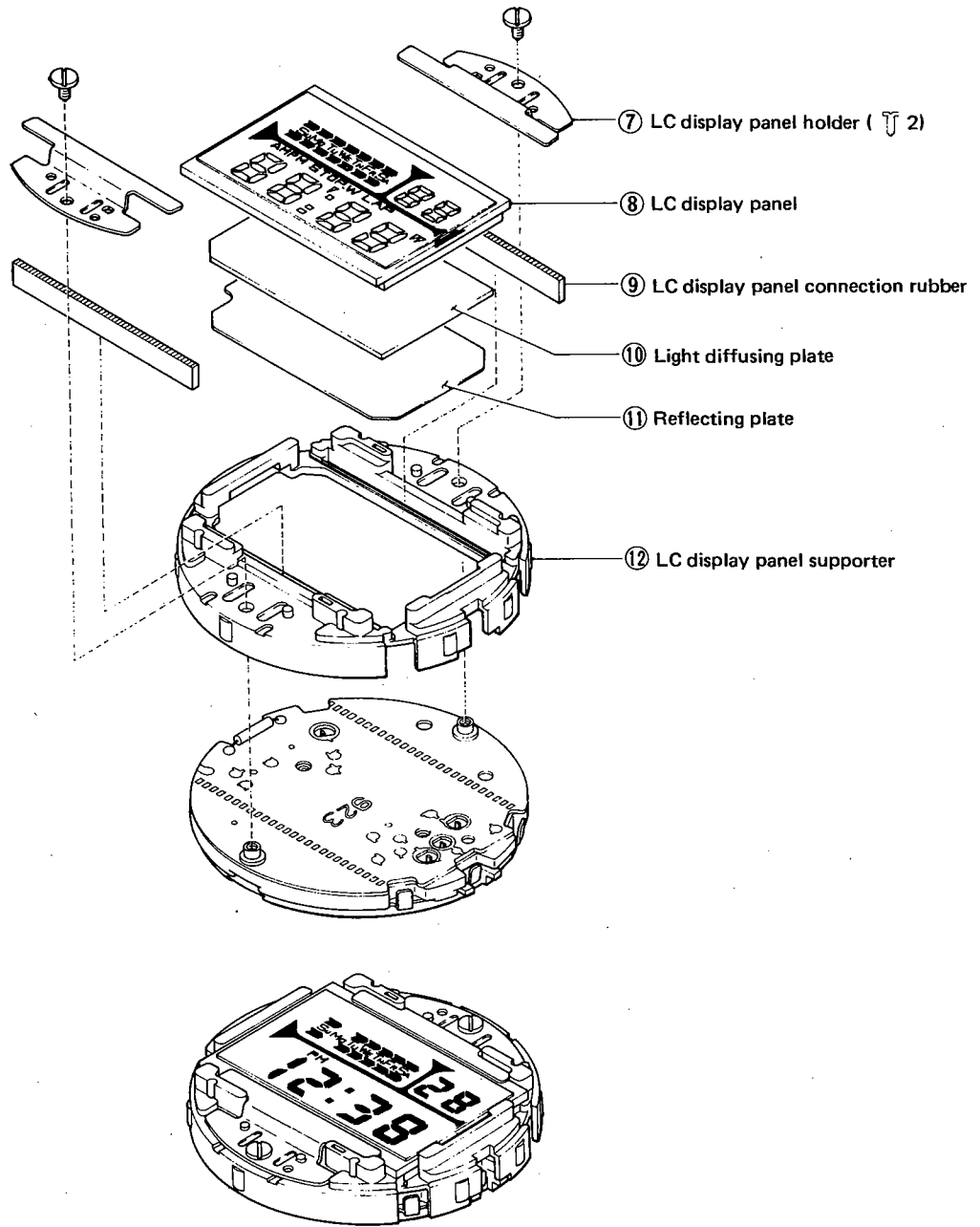
The number of the screw coming with the parts is shown by the symbol like (T 1).

**Handling of power cell strap:**

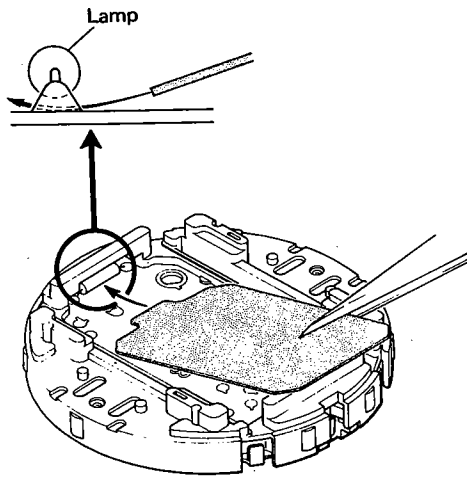
The power cell strap does not hold the power cell in the state of a completed watch. The power cell strap is turned as illustrated in the diagram below to fix the power cell when the time rate is measured in the state of a single unit of the movement.



- The power cell is put into the movement with the plus (+) side up.
- The dust or stains must be cleared away since they may impair good contact.
- Avoid washing the electronic parts.
- No lubrication is required to the movement.

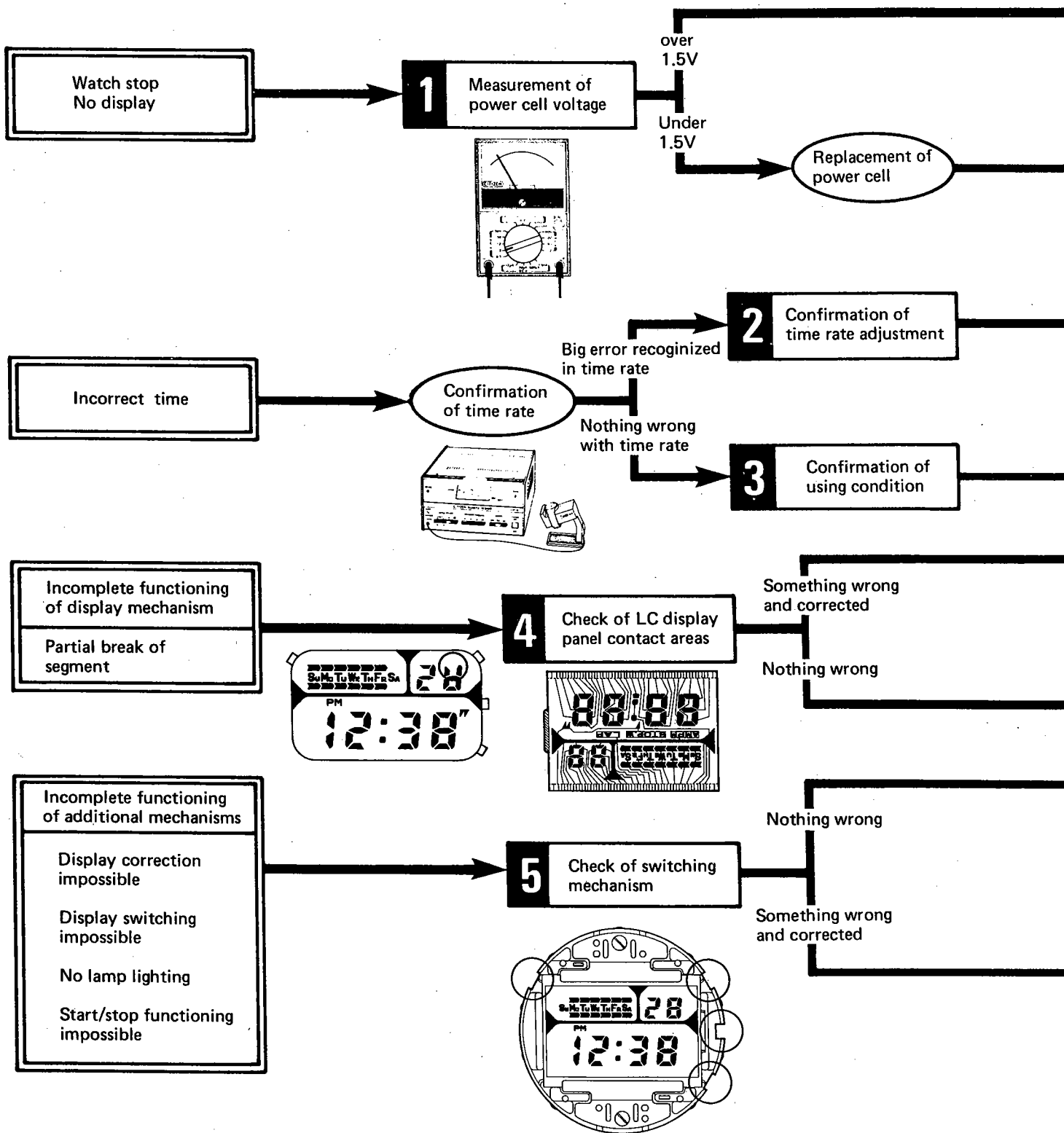


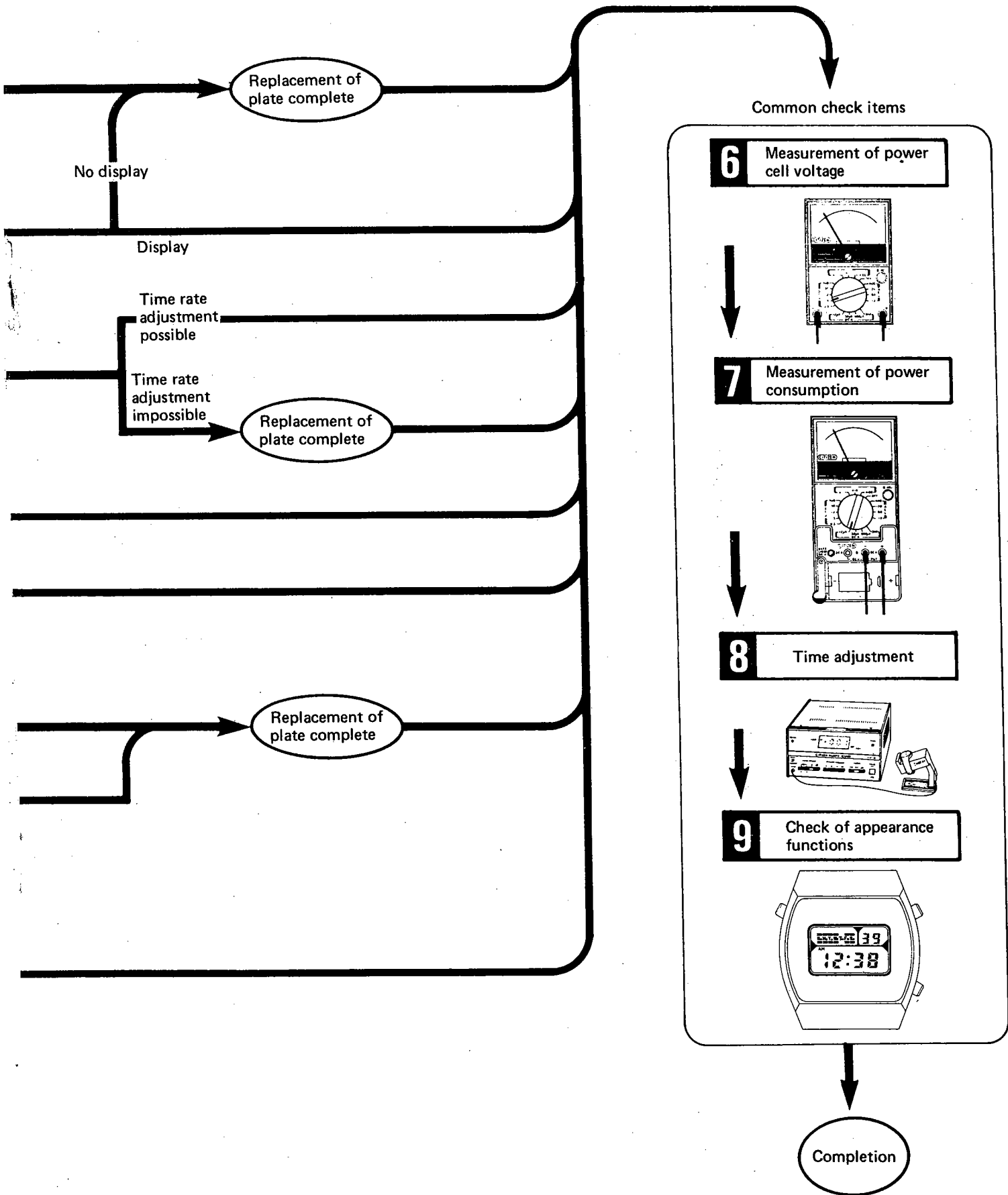
- Handling of reflecting plate



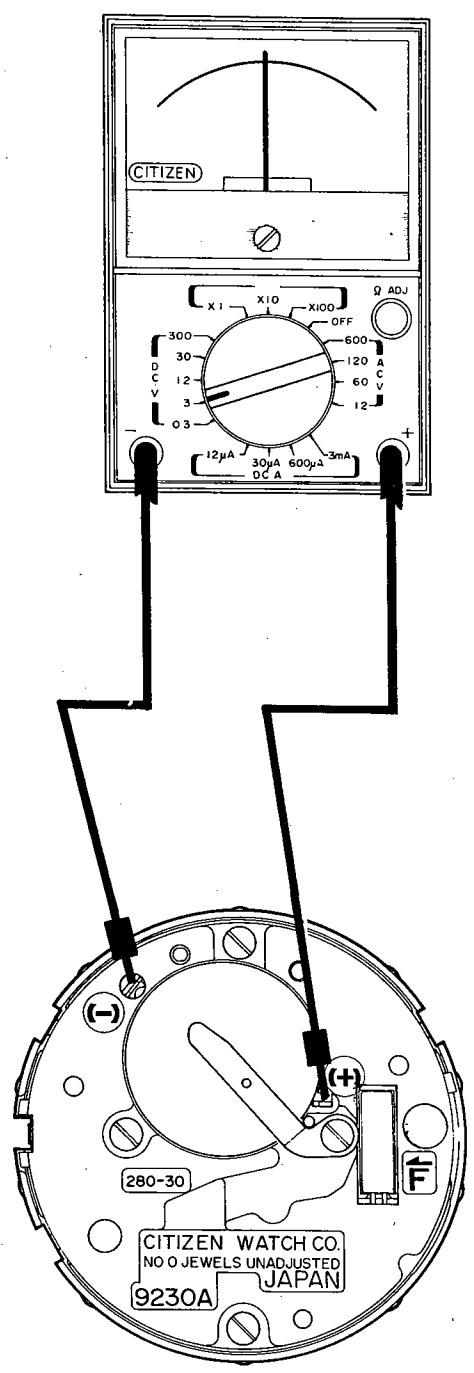
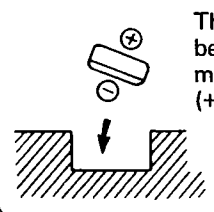
The reflecting plate of this watch slips under the lamp. (This is to enhance the efficiency of the light.) Thus, the reflecting plate has to be put in and out with a slight tilt.

§ 6. TROUBLESHOOTING AND ADJUSTMENT

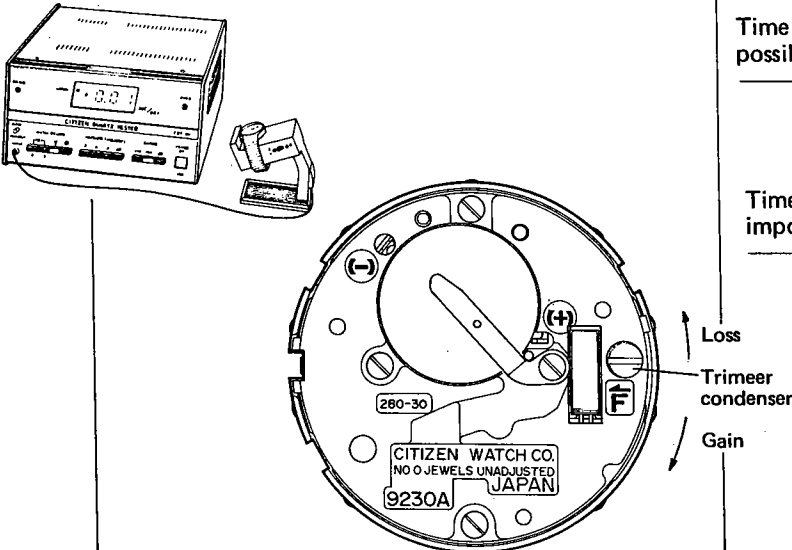




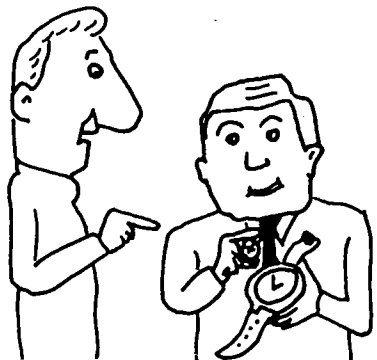
Watch stop — No display

Check items	How to check	Result and treatment
<p>1 Measurement of power cell voltage</p>	<p style="text-align: center;">Power cell voltage: Over 1.5V</p> 	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Over 1.5V</p> <ul style="list-style-type: none"> • No display of LC display panel → Replacement of plate complete </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Under 1.5V</p> <p>After replacement of power cell:</p> <ul style="list-style-type: none"> • Display of LC display panel → 7 Measurement of power consumption • No display of LC display panel → Replacement of plate complete </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">Note</p> <p>In case the watch has been used more than 2 years, the power cell must be replaced with new one although it shows more than 1.5V output.</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">How to Install Power Cell</p>  <p>The power cell must be put into the movement with the plus (+) side up.</p> </div>
<p>* In case the measured value is unsteady when the power cell is incorporated into the movement although the power cell itself shows more than 1.5V output, a poor contact is conceivable for the power cell. So a meticulous care must be given to the malformation of the contact surface as well as to the dust and stains stuck there.</p>		

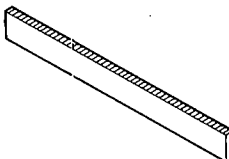
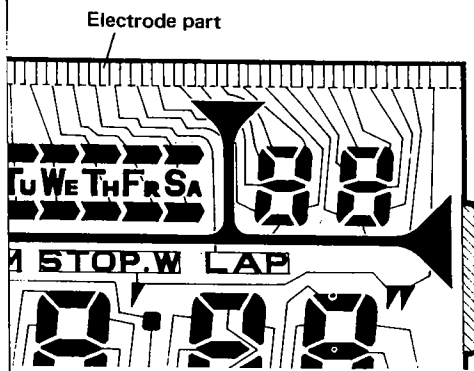
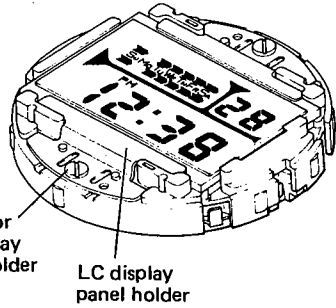
Big error recognized in time rate

Check items	How to check	Result and treatment
<p>2 Confirmation of time rate</p>  <p>The image shows a digital watch tester on the left and a watch movement on the right. The movement is labeled with '280-30', 'CITIZEN WATCH CO.', 'NO. 0 JEWELS UNADJUSTED JAPAN', and '9230A'. A trimmer condenser is highlighted with a box and labeled 'F'. Arrows indicate 'Loss' (upward) and 'Gain' (downward) directions for the trimmer condenser.</p>	<p>In case a big error is recognized in the time rate, the trimmer condenser is turned to adjust the time.</p>	<p>Time adjustment possible → Common check items</p> <p>Time adjustment impossible → Replacement of plate complete</p>

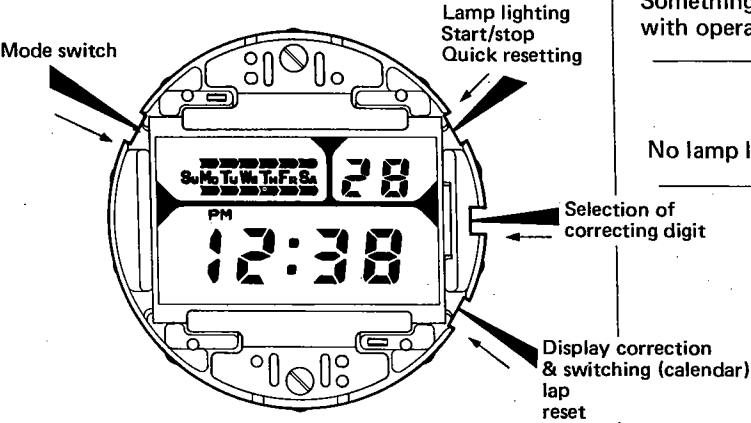
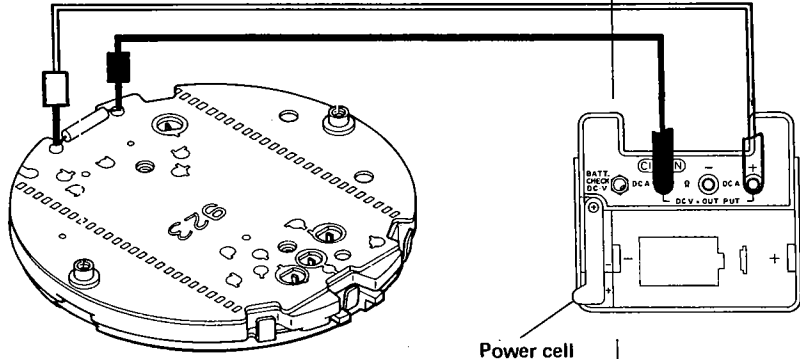
Nothing wrong with time rate


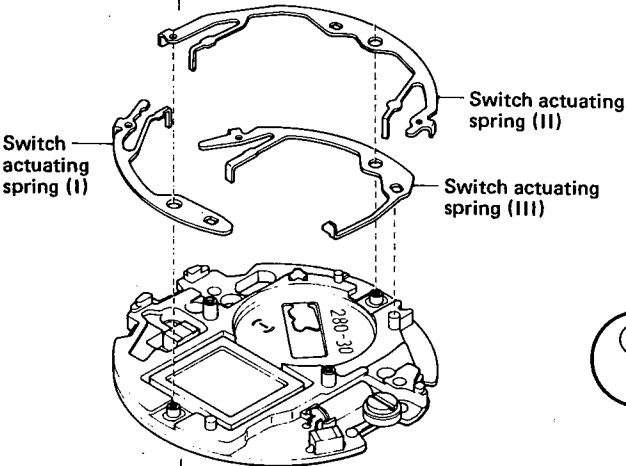
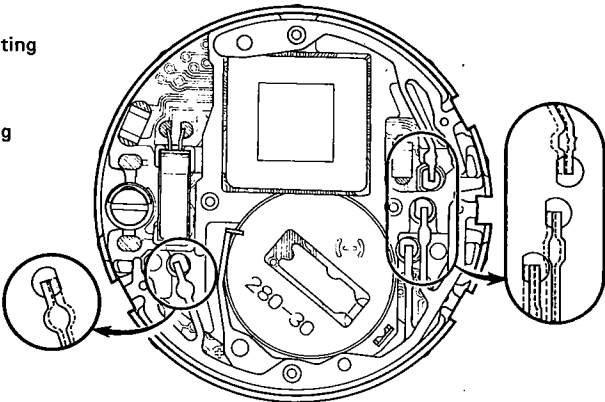
Check items	How to check	Result and treatment
<p>3 Confirmation of using condition</p>	<p>How the watch has been used must be confirmed to the customer.</p> <ol style="list-style-type: none"> 1. Check whether the customer made some mistake in handling the watch. 2. Check whether the watch was used in the extreme temperatures, i.e., outside the effective temperature range. 3. Check how many days have passed since the watch had the time adjustment last. 4. And other using factors.  <p>The illustration shows a technician on the right holding a watch and talking to a customer on the left who is pointing towards the watch.</p>	

Incomplete functioning of display mechanism – Partial break of segment

Check items	How to check	Result and treatment
<p>4 Check of LC display panel contact areas</p>	<p>For the factors of the partial break of the segment, a poor contact is first considered between the LC display panel and the electronic circuit. Secondly, some fault is conceivable within the electronic circuit. In this connection, the following inspections are given.</p> <ol style="list-style-type: none"> 1. Check of screw for LC display panel holder <ol style="list-style-type: none"> (1) Check whether the screw for the LC display panel holder is loosened or not. (2) Check whether the LC display panel holder is holding the LC display panel evenly with no upward warp. 2. Check of LC display panel connection rubber <ol style="list-style-type: none"> (1) Is the rubber twisted? (2) Is the rubber worn out or stretched extremely? (3) Are there any dust or stains stuck to the rubber? 3. A meticulous care must be given to the dust or stains at the LC display panel contact areas as well as to the crack of the electrode part which has some partial break of the segment.   <p>Note: Never fail to clear away completely the dust stuck to the electrode part because it may result in a large amount of the power consumption.</p>	 <p>Screw for LC display panel holder LC display panel holder</p> <p>Screw broken → Replacement</p> <p>Screw loosened → Retightening</p> <p>Panel held unevenly → Reassembly</p> <p>Deformation of display holder → Replacement</p> <p>Rubber twisted or worn out → Replacement</p> <p>Dust or stains stuck → Clearing</p> <p>Dust or stains stuck → Clearing</p> <p>Electrode cracked → Replacement</p> <p>Nothing wrong with above checks → Replacement of LC display panel</p> <p>Non-correctable yet. → Replacement of plate complete</p>

Incomplete functioning of additional mechanisms – Display switch and correction impossible; No lamp lighting and others

Check items	How to check	Result and treatment
<p>5 Check of switching mechanism</p>	<p>The movement is taken out of the watchcase.</p> <p>1. As shown in the diagram below, each switch actuating spring corresponding to each push-button is pressed with a tweezers or the like to check the correct operation for each spring.</p>  <p>2. Check of lamp lighting mechanism As shown in the diagram below, the adaptors of the Citizen Multi-Tester are applied to the both terminals of the lamp attached to the plate complete in order to check whether the lamp lights up or not.</p>  <p>Power cell</p>	<p>Nothing wrong with operation (No trouble in movement) → 3. Check of push-buttons</p> <p>Something wrong with operation → 4. Check of switch actuating springs</p> <p>No lamp lighting → 2. Check of lamp lighting mechanism</p> <p>Lamp lighting → 4. Check of switch actuating springs</p> <p>No lamp lighting → Replacement of plate complete</p>

Check items	How to check	Result and treatment
	<p>3. Check of push-buttons In case nothing wrong is recognized with the movement, the push-buttons may have some fault. Each push-button is taken out of the watchcase.</p> <p>(1) Check whether each push-button has some bend or not. (2) Check whether any dust or stains stick to the push-button as well as to the areas of the case where the push-buttons are to be attached. (3) Set each push-button to the watchcase and check whether each button has a smooth operation.</p>  <p>*The silicone oil must be applied to the packing of each push-button.</p> <p>4. Check of switch actuating prings (1) Check whether each switch actuating spring is deformed or broken. (2) Check whether the contact part of each switch actuating spring has a correct contact to the pattern of the plate complete.</p> <p>*An inspection must be given to the dust and stains stuck to the contact part as well.</p>  	<p>Push-button deformed or broken → Replacement</p> <p>Dust or stains stuck → Clearing</p> <p>Spring deformed or broken → Replacement and reassembly</p> <p>Nothing wrong with above checks → Replacement of plate complete</p>

Common Check items

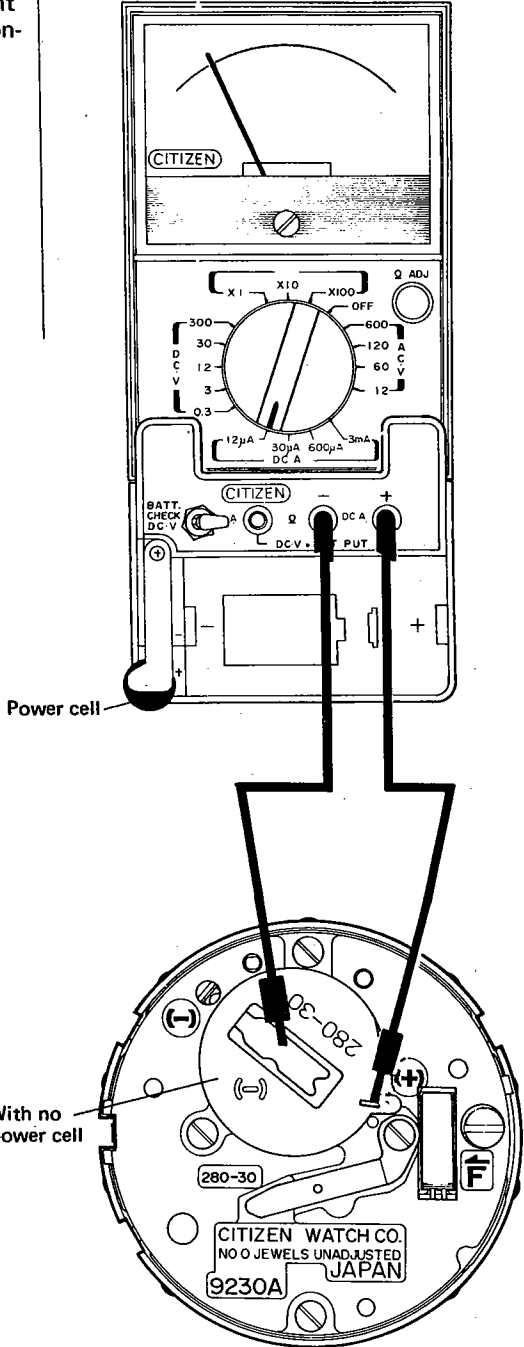
6 Measurement of power cell voltage
 Refer to **1** (Measurement of power cell voltage).

Results and Treatment

Over 1.5V
 → **7** Measurement of power consumption

Under 1.5V
 After replacement of power cell:
 → **7** Measurement of power consumption

7 Measurement of power consumption



Results and Treatment

1. Measurement under normal time display

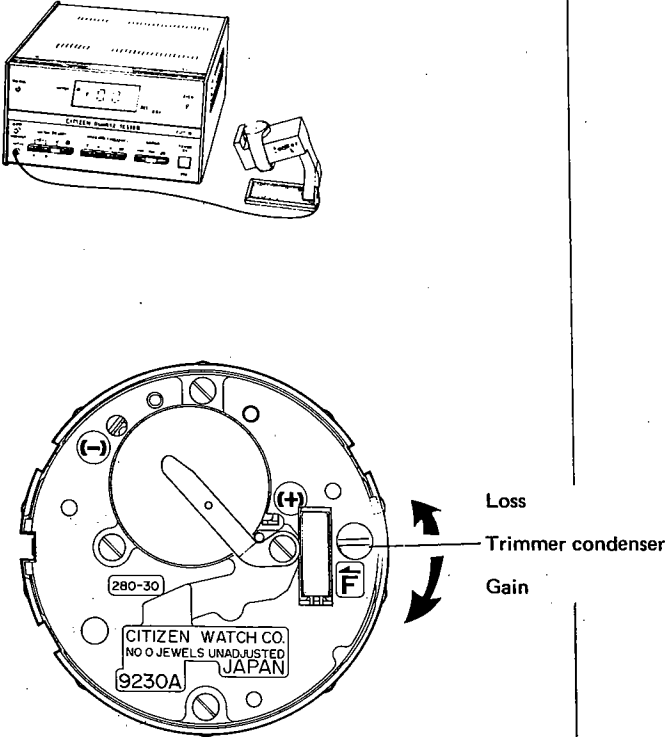
Under 4.0μA
 → **8** Time adjustment


Over 4.0μA
 → **2. Measurement of power consumption at electronic circuit part**

2. Measurement of power consumption at electronic part with LC display panel removed

Under 2μA
 → Replacement of LC display panel connection rubber or LC display panel (Also check dust and stains at electrode part carefully.)

Over 2μA
 → Replacement of palte complete

Check items	How to check	Result and treatment
<p>8 Time adjustment</p>	<p>The time rate is measured using a timing machine, and the time is adjusted by turning the screw of the trimmer condenser.</p>  <p>The diagram shows a timing machine at the top. Below it is a detailed view of a watch movement. A trimmer condenser is located on the right side of the movement, with a screw for adjustment. Two curved arrows indicate the direction of adjustment: one pointing towards 'Loss' (slower time) and the other pointing towards 'Gain' (faster time). The movement is labeled with '280-30', 'CITIZEN WATCH CO.', 'NO. 0 JEWELS UNADJUSTED', and '9230A JAPAN'.</p>	

Check items	How to check	Result and treatment
9 Check of appearance functions	<p>Finally, the following points are confirmed.</p> <ol style="list-style-type: none">1. The figures displayed have nothing wrong.2. Each function can be operated through each push-button in a smooth and correct way.3. No dust nor stains stick to the appearance parts at all. 	

CITIZEN WATCH CO., LTD.

Tokyo, Japan