TECHNICAL INFORMATION

CITIZEN QUARTZ

Cal.No.916※※

CITIZEN

§1. OUTLINE

This watch features the regular display of "hour", "minute", "second", "AM/PM", "day" and "date" plus "year" and "month" if necessary. The time display can be switched between the 12-hour and 24-hour periods.
In addition, such additional mechanisms are incorporated as the internal illumination lamp, power cell life indicating device, automatic calendar setting device and others.

§2. MAIN FEATURES

1. The time display is possible to switch between the 12-hour and 24-hour periods in accordance with the individual way of life of the watch customer.
2. The time screen displays various kinds of information including "hour", "minute", "second", "AM/PM", "day" and "date".
3. The colon on the time screen will start to flash when the power cell requires replacement.
4. The calendar can be set automatically including the leap year.
5. The internal illumination lamp facilitates an easy reading of the display information even in a dark place.

§3. SPECIFICATIONS

Caliber No.		9160A
Movement	Diameter	25.7 mmϕ
	Thickness	4.22 mm
Oscillation		32,768Hz
Accuracy		±10 sec./month under normal temperature
Display system		FE twist type nematic LC display
Display information		12-hour period display: "Hour", "minute", "second", "AM/PM", "date" and "day" 24-hour period display: "Hour", "minute", "second", "date" and "day" *The "year" and "month" are also displayed when the display is corrected.
Correction of display		Independent correction for each digit through push-button operation
Effective temperature range		0°C ~ +60°C (32°F ~ 140°F)
Integrated circuit		C/MOS-LSI (1 unit)
Additional mechanisms		• Internal illumination lamp • Power cell life indicating device (Flashing of colon) • Automatic calendar setting at the end of each year and month
Power cell		Small-size silver oxide power cell (1 unit) • Parts No. : 280–30 • Nominal voltage: 1.55V • Capacity : 38 mAH • Size : 11.6 mmϕ × 2.1 mm^t • Life : 1 year (5 sec. lighting/day)

§4. HANDLING INSTRUCTIONS

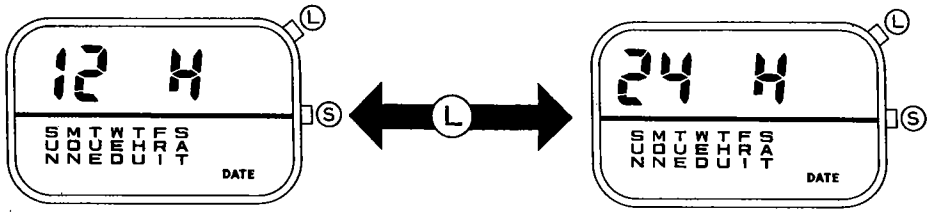
1. How to read time and calendar

(12-hour period display)

(24-hour period display)

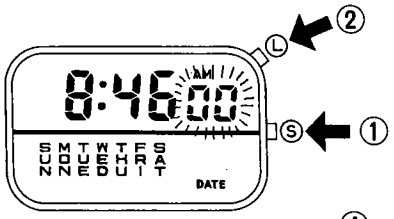
2. How to set time and calendar

- The switching between the 12-hour and 24-hour period displays is possible when the time or calendar is set.
  After setting of the day, "12H" or "24H" as shown in figure below is displayed by pushing Ⓢ button and changed over with every push of Ⓛ button.



- The illumination lamp usually lights up with push of Ⓛ button but does not when setting the time and the calendar even with push of Ⓛ button.

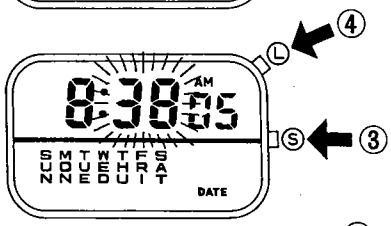
The following setting procedure is based on the 12-hour period display.



Second setting

① With push of Ⓢ button after confirming the normal time display state, the "second" flashes to be set.

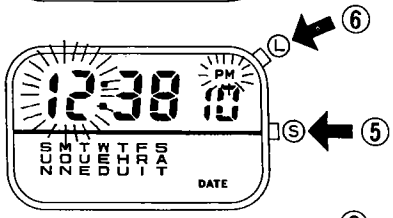
② With push of Ⓛ button, the time is reset to zero second and then starts again. (The time is carried by one minute between 30 and 59 seconds.)



Minute setting

③ The "minute" flashes.

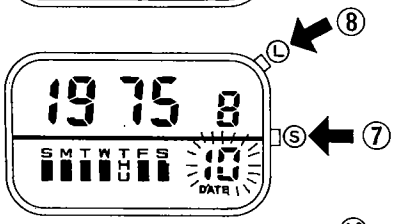
④ The time advances by one minute with every push of Ⓛ button, so the standard minute can be set.



Hour setting

⑤ The "hour" and "AM" or "PM" flash.

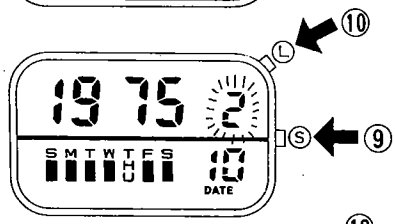
⑥ The "hour" is set along with "AM" or "PM".



Date setting

⑦ The "date" flashes.

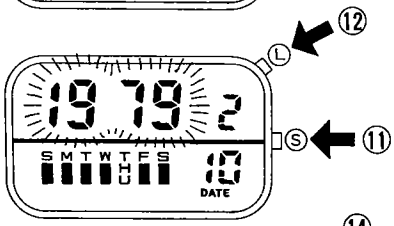
⑧ The "date" is set.



Month setting

⑨ The "month" flashes.

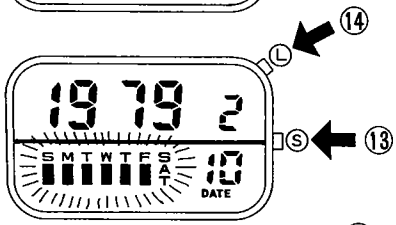
⑩ The "month" is set.



Year setting

⑪ The "year" flashes.

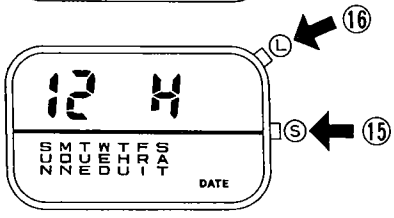
⑫ The "year" is set.
(The year can be set in a cycle of 1970～2009.)



Day setting

⑬ The "day" flashes.

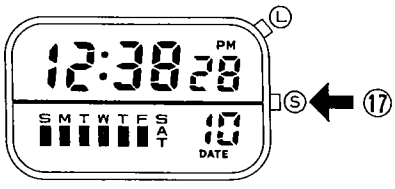
⑭ The "day" is set.



12-hour/24-hour period selection

⑮ The "12H" (12-hour period) or "24H" (24-hour period) is displayed.

⑯ The "12H" or "24H" is selected.
(The "12H" and "24H" have no flashing.)

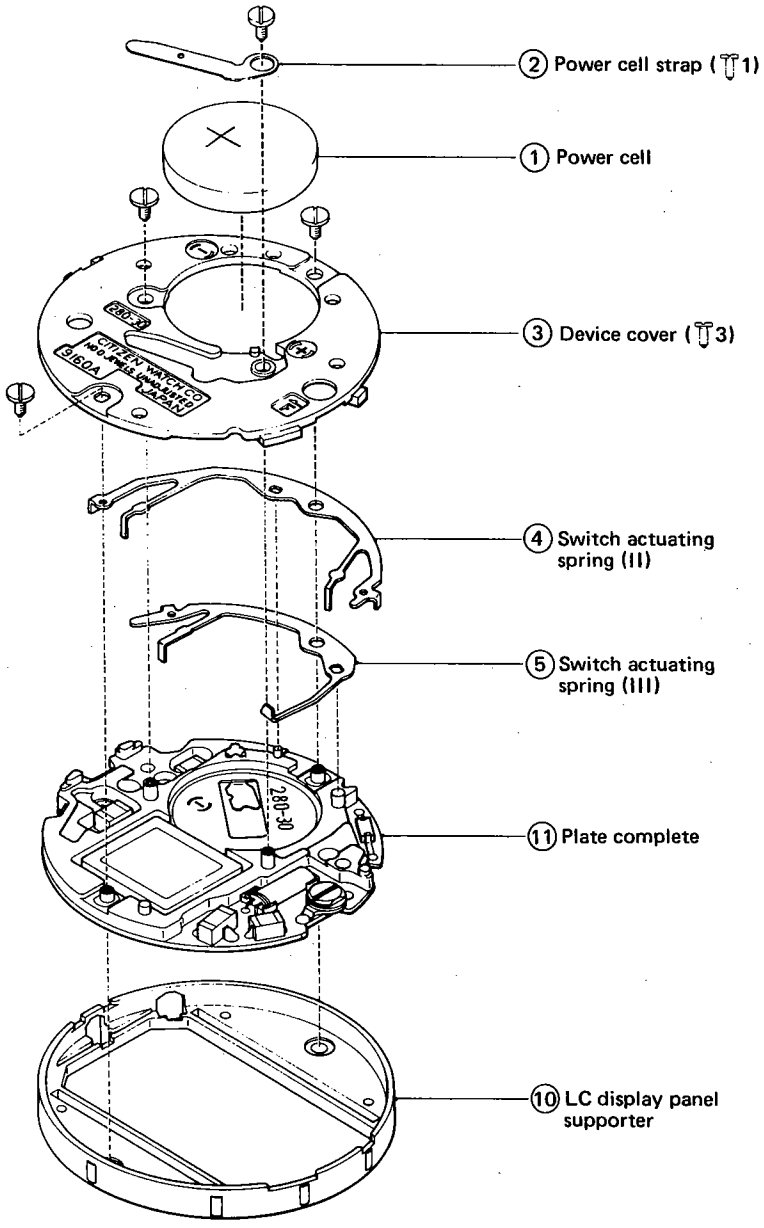


⑰ With push of Ⓢ button, the normal time display is secured again.

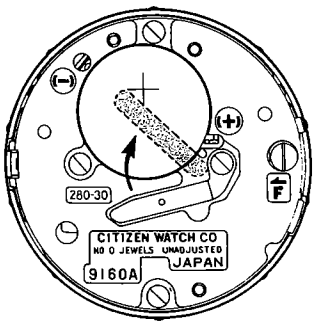
§5. DISASSEMBLY AND ASSEMBLY OF MOVEMENT

Disassembling procedure: ① → ⑪
Assembling procedure : ⑪ → ①
The number of screws necessary for parts is shown in the symbol like (T 2).

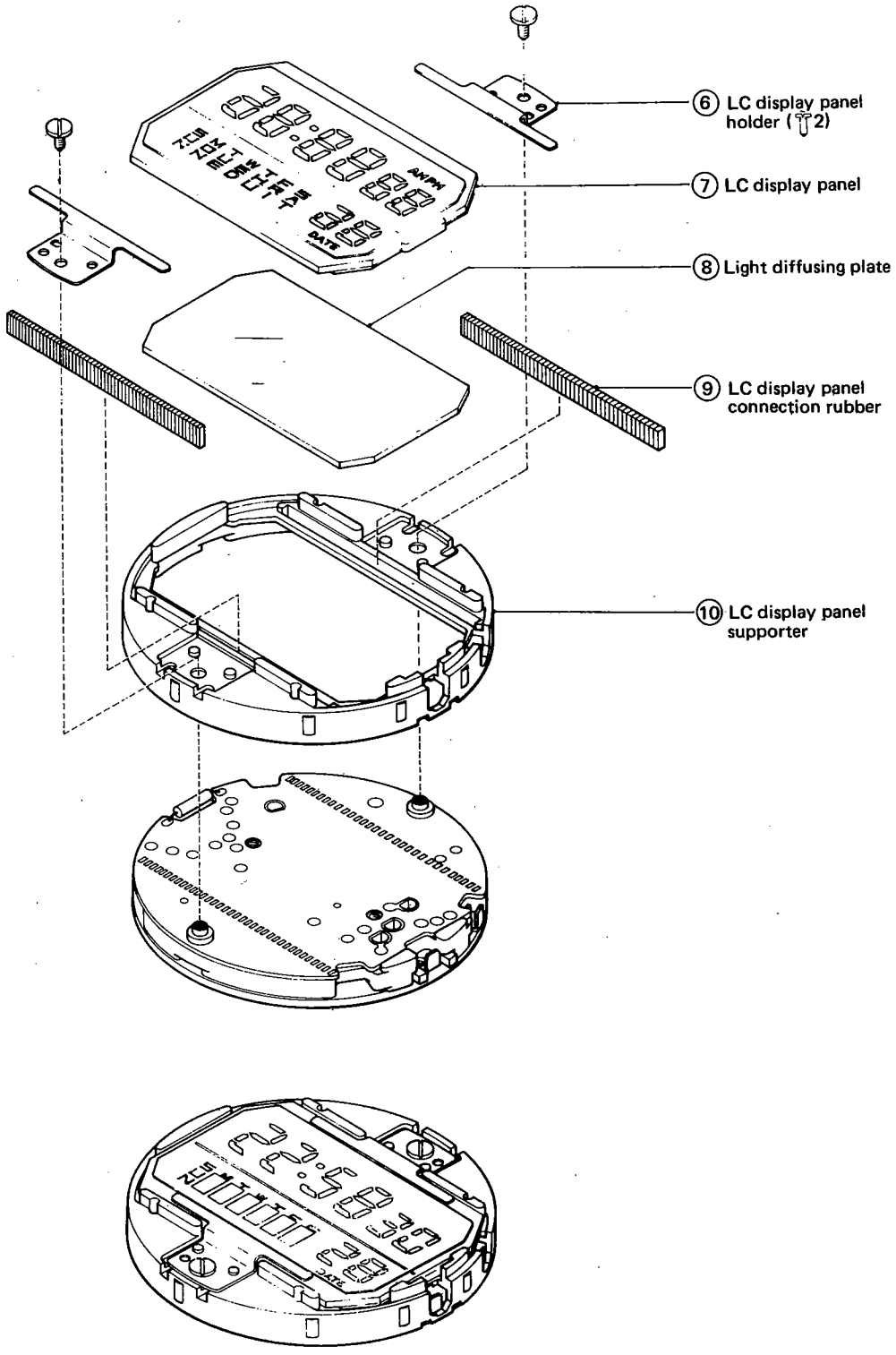
The power cell must be assembled with the plus-side up.
Avoid washing the electronic parts. The dust and stains must be cleared away since they may impair good contact.
No lubrication is required for the movement.



Handling of power cell strap:
As shown in the diagram below, the power cell strap does not hold the power cell in the state completed with the appearance parts. When measuring the time rate with a single unit of the movement, turn the power cell strap as indicated in the diagram to fix the power cell.



To avoid giving scratches or stains to the surface of the LC display panel or the plate complete, handle them carefully.



§6. TROUBLESHOOTING AND ADJUSTMENT

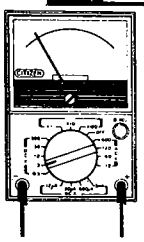
Watch stop
(No display at all)

1 Measurement of power cell voltage

Over 1.5V

Under 1.5V

Replacement of power cell



Incorrect time

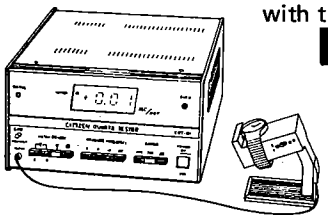
Confirmation of time rate

Big error in time rate

2 Confirmation of time rate adjustment

Nothing wrong with time rate

3 Confirmation of using condition



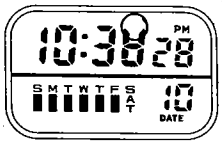
Incomplete functioning of display mechanism

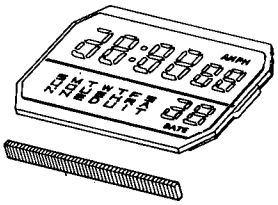
Partial segment break

4 Check of display panel contact areas

Something wrong and corrected

Nothing wrong





Incomplete functioning of additional mechanisms

Display correction impossible

No lamp lighting

5 Check of switch mechanism

Nothing wrong

Something wrong and corrected

Replacement of plate complete

No display

Display

Time rate adjustment possible

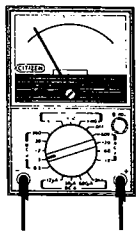
Time rate adjustment impossible

Replacement of plate complete

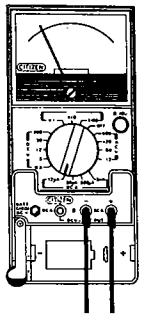
Replacement of plate complete

Common check items

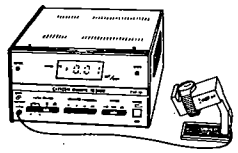
6 Measurement of power cell voltage



7 Measurement of Power consumption



8 Time adjustment



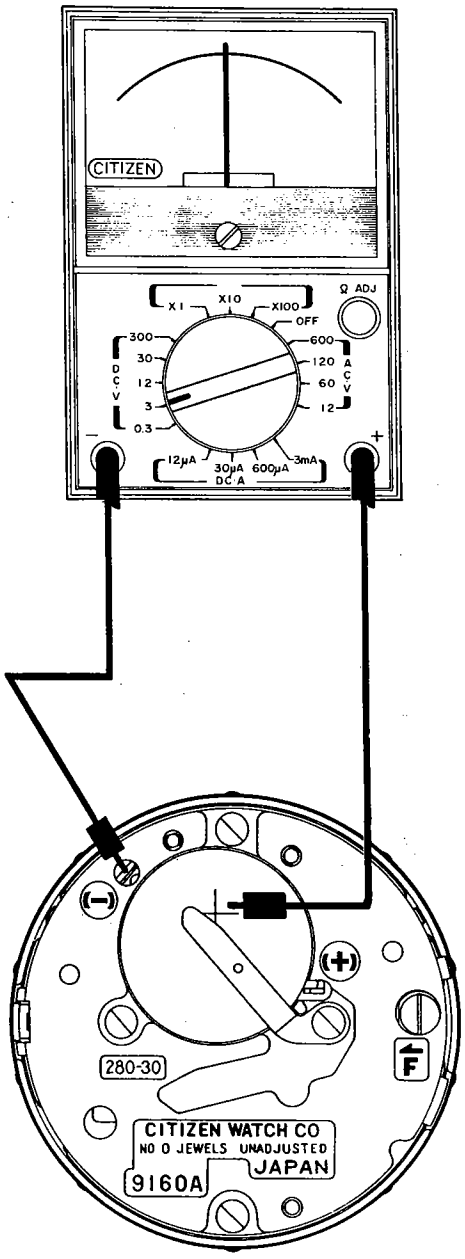
9 Check of appearance functions

Completion

Watch stop – No display at all

1 Measurement of power cell voltage

Power cell voltage: Over 1.5V



Result and Treatment

Over 1.5V

- Correct display of LC display panel → 7 Measurement of power consumption
- No display of LC display panel → Replacement of plate complete

Under 1.5V

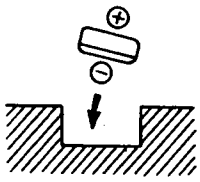
Replacement of power cell:

- Correct display of LC display panel → 7 Measurement of power consumption
- No display of LC display panel → Replacement of plate complete

Note:

If the watch has been used more than one year, replace the power cell with the new one even if it shows more than 1.5V output.

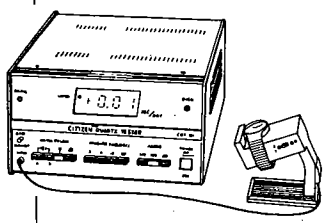
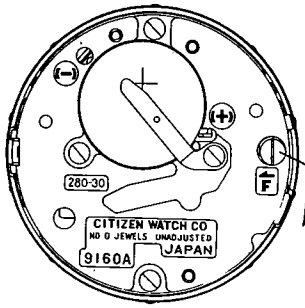
How to Put in Power Cell



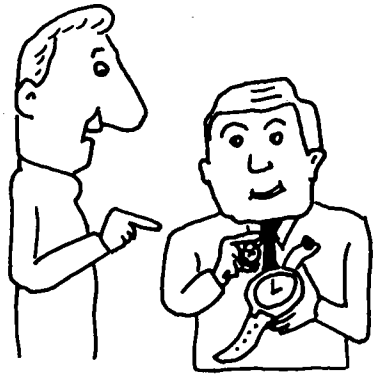
The power cell must be put into the watch with the plus (+) side up.

*In case the power cell itself shows more than 1.5V output and nevertheless the measured value is unsteady when the power cell is put into the watch, an incomplete contact is conceivable for the power cell. So the dust or stains sticked on the contact surface must be cleared away as well as the malformation of the contact surface must be corrected.

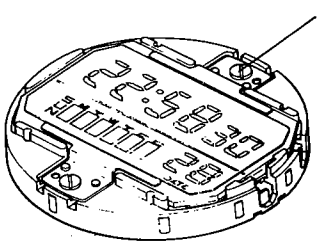
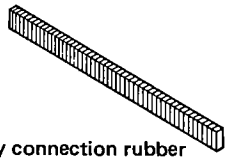
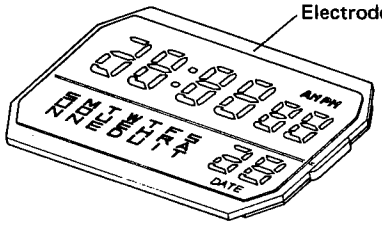
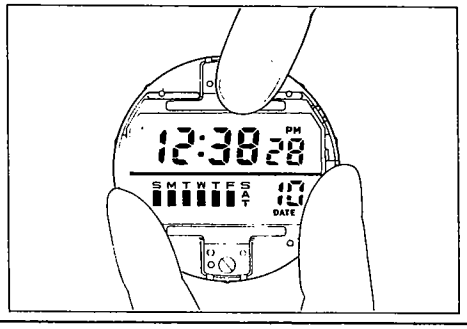
Big error recognized in time rate

Check items	How to check	Results	Treatment
2 Confirmation of time rate adjustment	The big error of the time rate is corrected by turning the trimmer condenser.   In case the time adjustment is impossible with the trimmer condenser, the quartz crystal oscillator may have some fault. And the trimmer condenser may have some fault if the time rate has no change at all.	Time adjustment possible → Common check items Time adjustment impossible → Replacement of plate complete Trimmer condenser	

Watch stop or incorrect time — Nothing wrong with time rate

Check items	How to check	Results	Treatment
3 Confirmation of using condition	How the watch has been used is confirmed to the customer. 1. Check whether the customer made any mistake in handling the watch. 2. Check whether the watch was used in an extreme temperature, i.e., outside the effective temperature range. 3. Other using factors.  **Check point:** In case the customer complains of the incorrect time for his watch although the instantaneous time rate is correct, the statistic data must be collected concerning the watch using condition. This is an important must to know the relation between the incorrect time and the watch using condition.		

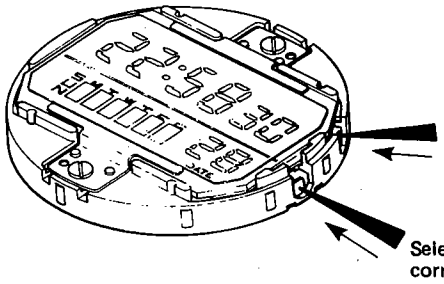
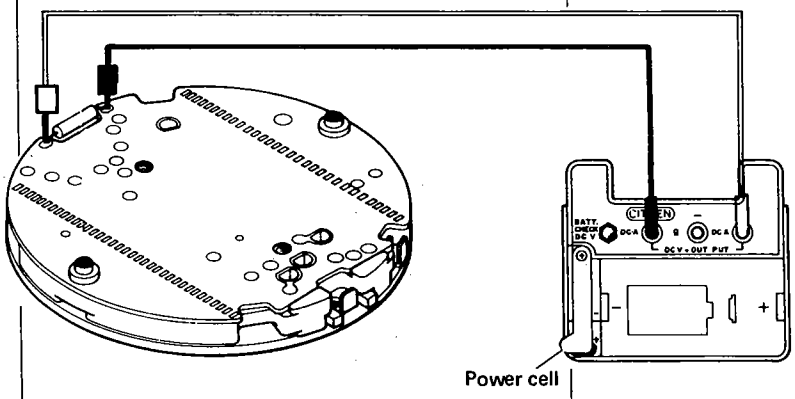
Incomplete functioning of display mechanism — Partial segment break

Check items	How to check	Results	Treatment
4 Check of display panel contact areas	When the segment breaks partially, an incomplete contact is first considered between the LC display panel and the electronic circuit. And then some fault is conceivable within the electronic circuit.		
	1. Check of LC display panel holder and its screws		
	(1) Check whether the screw is loose or broken.	Screw broken	→ Replacement
		Screw loosened	→ Retightening
	(2) Check whether the LC display panel holder is holding evenly the LC display panel with no upward warp.	Uneven holding	→ Reassembly
		Deformation of LC display panel holder	→ Replacement
			
	2. Check of LC display connection rubber		
	(1) Check whether the connection rubber is twisted.	Rubber twisted or worn out	→ Replacement
	(2) Check whether the rubber is worn out or extremely stretched.		
	(3) Check whether any dust or stains stick to the rubber.	Dust or stains sticked	→ Clearing
	 LC display connection rubber		
	3. Check whether any dust or stains stick to the electrode part of the LC display panel or whether any breakage is recognized there. Also have a meticulous check for the electrode at the broken segment part.	Dust or stains sticked	→ Clearing
		Electrode broken	→ Replacement of LC display panel
			

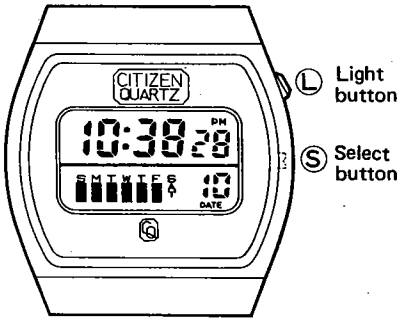
Check point:
The area near the broken segment is pushed lightly with a finger. And if the broken segment is displayed then, it is known that the contact is unsteady.

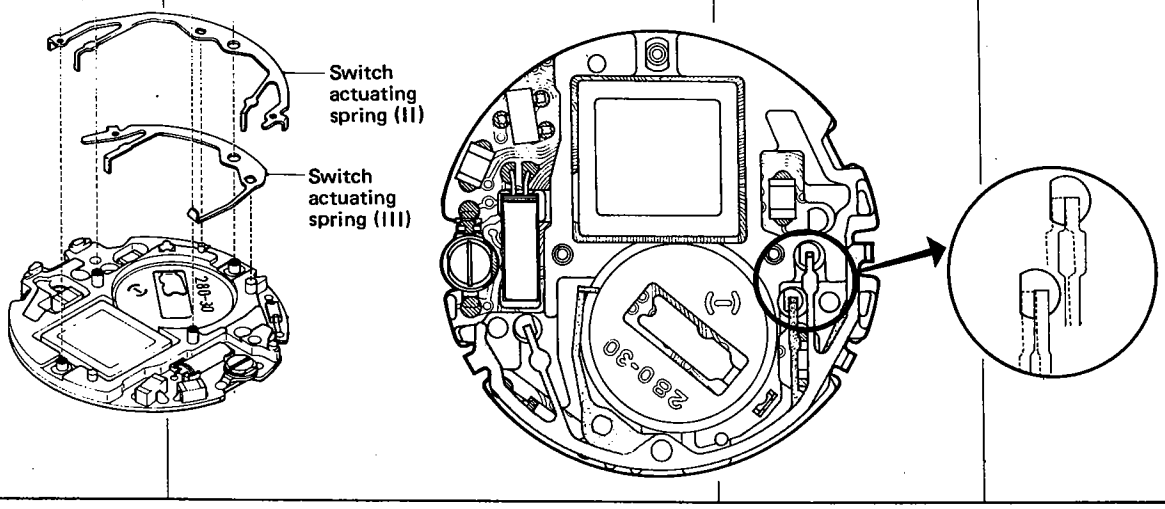
(Note) Avoid giving a strong push to the LC display panel to prevent the glass cracking.

Display correction impossible – No lamp lighting

Check items	How to check	Results	Treatment
5 Check of switch mechanism	In case the selection and correction is impossible for the display digit with no lamp lighting, some fault is conceivable within the electronic circuit or in the mechanical constitution including the unsteady contact, malformation of the parts and others. In this connection, the following check is conducted.		
	1. The movement is first taken out of the watchcase. Then each switch actuating spring is pushed with the tweezers or the like in order to check whether the correct operation is possible or not.	Correct operation possible →	Nothing wrong with movement 3. Check of push-buttons
		Something wrong with operation →	4. Check of switch actuating springs
	2. Check of lighting mechanism As illustrated below, apply Citizen Multi-Tester adaptor to both lamp terminals attached to the plate complete, and check whether the lamp lights up or not.	Lamp lighting →	4. Check of switch actuating springs
		No lamp lighting →	Replacement of plate complete
			

Check items	How to check	Results	Treatment
	3. Check of push-buttons In case the movement has nothing wrong, the push-buttons may have some defect. Each push-button is taken out of the watchcase. (1) Check whether the push-button has some bend or not. (2) The dust or stains sticked to the push-buttons must be cleared away completely. Also the dust sticked to the watchcase after removal of the push-buttons must be cleared away. (3) The push-buttons are set to the watchcase to confirm a smooth operation of the buttons. (The silicon oil must be applied to the packing of the push-button.)	Button deformed or broken	→ Replacement
		Dust or stains sticked	→ Clearing
	Never fail to clear away the dust or stains sticked to the push-buttons at all times even when the troubleshooting is given to other parts of the watch.		
	4. Check of switch actuating springs (1) Check whether the switch actuating spring (II) and (III) have some malformation or breakage. (2) Check whether the contact parts of switch actuating spring (II) and (III) have correct contact with the pattern of the plate complete. In this case, a meticulous inspection must be given to the dust or stains sticked to the contact part as well.	Something wrong	→ Replacement or reassembly
		Nothing wrong	→ Replacement of plate complete

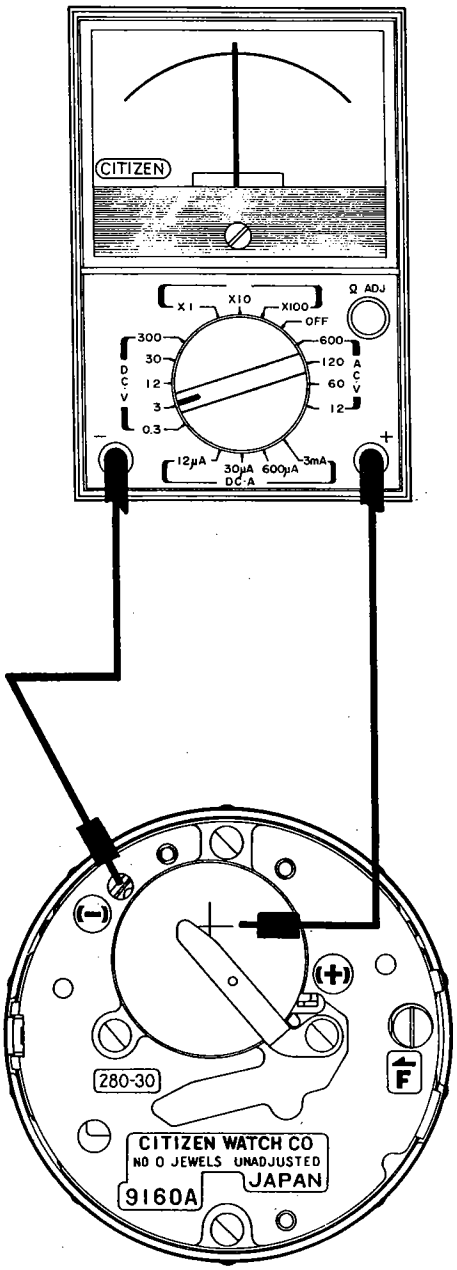




Common check items

6 Measurement of power cell voltage

Power cell voltage: Over 1.5V



Result and Treatment

Over 1.5V

→ 7 Measurement of power consumption

Under 1.5V

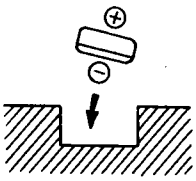
Replacement of power cell:

→ 7 Measurement of power consumption

Note

If the watch has been used more than one year, replace the power cell with the new one even if it shows more than 1.5V output.

How to Put in Power Cell

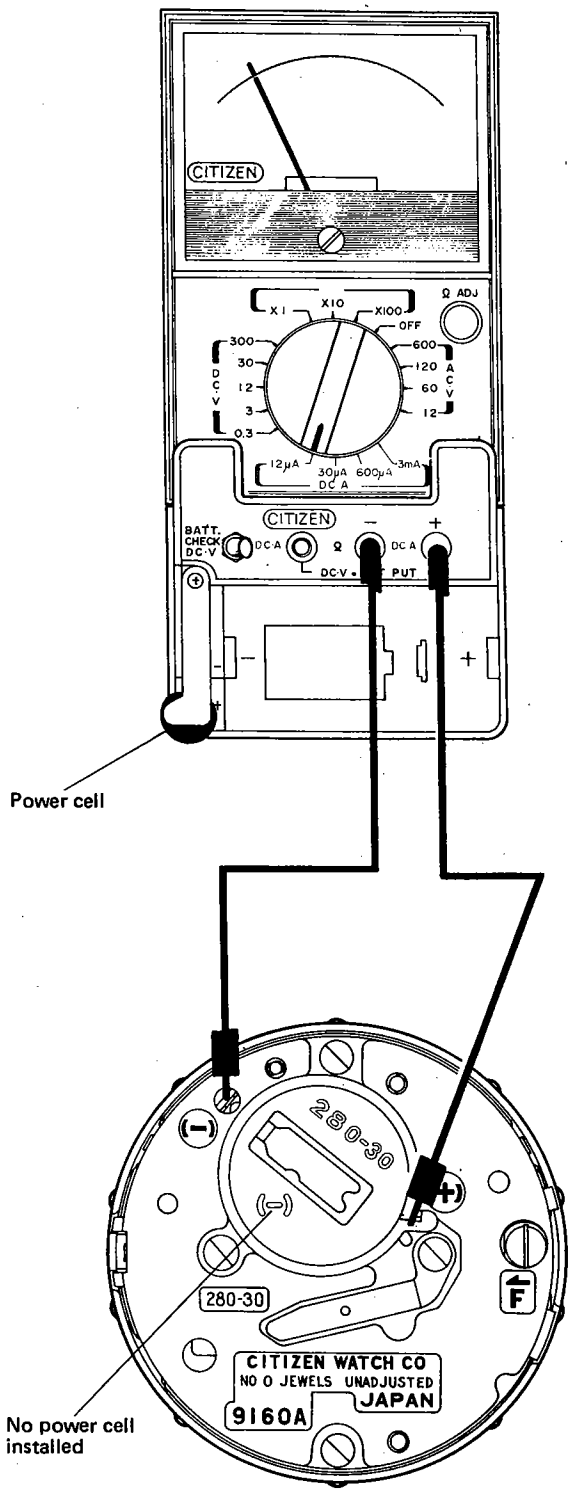


The power cell must be put into the watch with the plus (+) side up.

*In case the power cell itself shows more than 1.5V output and nevertheless the measured value is unsteady when the power cell is put into the watch, an incomplete contact is conceivable for the power cell. So the dust or stains sticked to the contact surface must be cleared away as well as the malformation of the contact surface must be corrected.

7 Measurement of power consumption

Power consumption: Under 4.0μA



Result and Treatment

1. Measurement under normal condition:

Under 4.0μA

→ 8 Time adjustment

Over 4.0μA

→ 2. Measurement of power consumption of electronic circuit part

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

Under 2.0μA

→ Replacement of LC display panel connection rubber or LC display panel

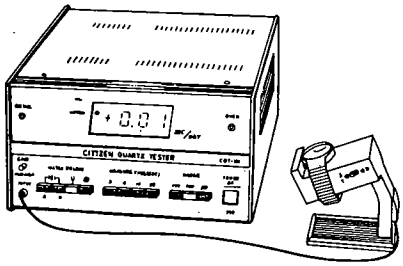
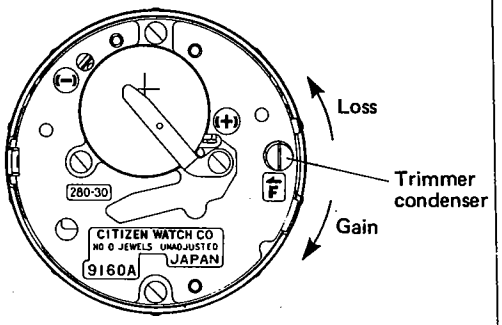
In this case, an inspection must be given to the dust or stains sticked.

Over 2.0μA

→ Replacement of plate complete

Note

A power cell of more than 1.5V output must be installed into the power cell holder of the adaptor.

Check items	How to check	Results	Treatment
8 Time adjustment	The time rate is measured using a timing machine, and then the time is adjusted.   The time rate is adjusted by turning the screw of the trimmer condenser.		

Check items	How to check	Results	Treatment
9 Check of appearance functions	Finally, the following points are confirmed. 1. The figures displayed must be correct. 2. Each operation must be performed in a correct way. 3. No dust nor stains stick to the appearance parts. 		

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