

TECHNICAL INFORMATION ***INFORMACION TECNICA***

CITIZEN QUARTZ
Cal. No. 851 ✕



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§1. OUTLINE

This analog solar watch has a solar cell on its dial, which converts the energy of light into electric energy to operate the hands.

§2. SPECIFICATIONS

Caliber No.		8510A	8511A	8515A
Type		Analog Quartz Solar Cell Watch		
Module size (mm)		ø23.7 x 3.4 mm		
Accuracy (at normal temperature)		Within ±20 sec/month Normal temperature range of 5°C/41°F ~ 35°C/95°F		
Oscillation frequency		32,768 Hz		
IC		C/MOS-LSI 1 unit		
Operating temperature range		-10°C ~ +60°C (14°F ~ 140°F)		
Converter		Bipolar step motor		
Time adjustment function		Not installed		
Measurement gate		10 sec		
Display features	Time	Hour, Minute, Second		
	Calendar	Date		
Additional functions		Quick start		
		Overcharging prevention		
		Insufficient recharging		
		Time setting indication		
Secondary battery	Part No & Code	295-28 (MT621)	295-33 (MT621)	
	Remarks	Secondary battery block (With welded lead plate at (+) side)	Secondary battery block (With welded lead plate at (-) side)	

§3. ABOUT SOLAR CELL WATCH

- A secondary battery is used in this watch to store electrical energy. This secondary battery is a clean energy battery which doesn't use any toxic substances such as mercury. Once fully charged, the watch will continue to run for about 60 days without further charging.

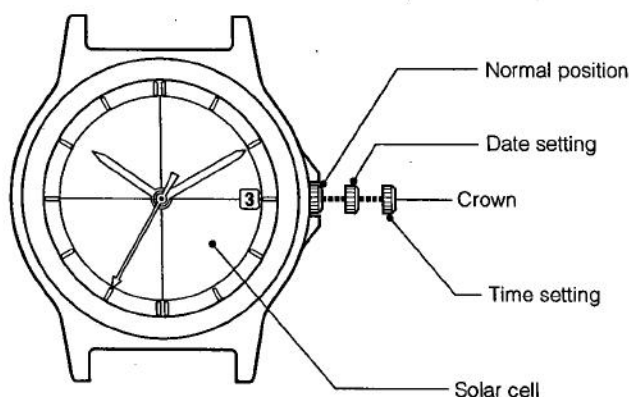
<How to use the solar watch properly>

To use this watch comfortably, make sure that the watch is always recharged before it finally stops. There is no concern for overcharging this watch. (Overcharging Prevention Feature) we recommend that you recharge the watch everyday.

<Replacing secondary battery>

- Because the secondary battery repeatedly charges and discharges, it is not necessary to replace regularly like a normal battery.

§4. SETTING THE TIME AND CALENDAR



Setting the Time

1. Stop the second hand at the 0 second position by pulling out the crown to the 2nd click.
2. Turn the crown to set the time.
3. After setting the time, firmly push the crown back into its normal position.

Setting the Calendar

<Adjusting the date>

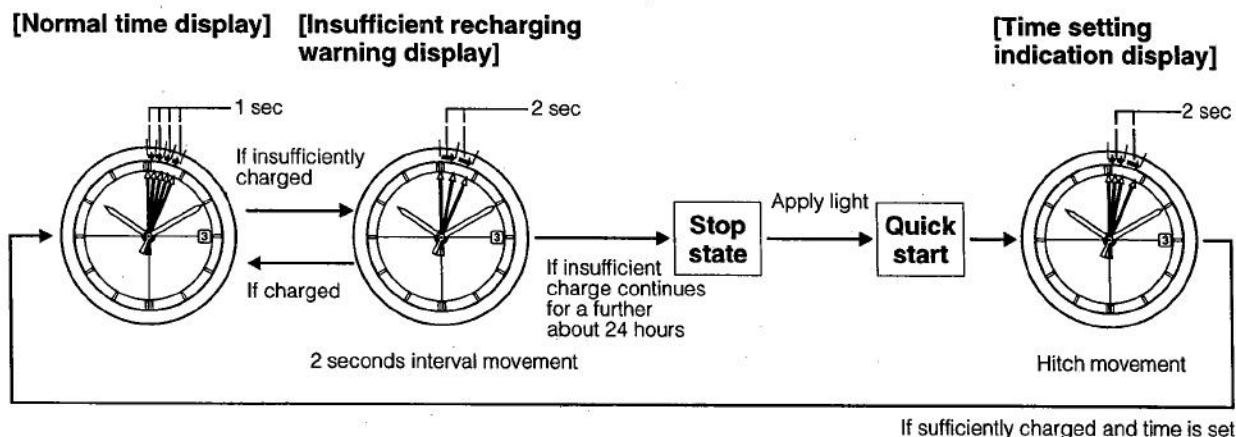
1. Pull the crown out to the 1st click.
2. Set to the desired date by turning the crown.
 - If you adjust the date when the watch display is reading between 9:00 pm and 1:00 am, the date might not change on the following day.

After you have set the calendar, be sure to firmly return the crown to its normal position.

§5. SPECIAL ADDITIONAL FEATURES OF THE SOLAR POWER WATCH

These functions are only found in the solar power watch.

If this watch becomes insufficiently charged, a warning function comes into operation and the display changes, as below:



Insufficient Recharging Warning Feature

The second hand changes to two-second interval movement to indicate insufficient recharging. Even in such a case, the watch keeps correct time, but it about 24 hours pass after two-second interval movement begins, the watch stops operating.

After exposing the watch to light, recharging takes place and the watch returns to one-second interval movement.

Quick Start Feature

The watch will stop if it is completely discharged.

It will begin to operate soon after it is exposed to light.

(However, the time it takes to start may vary according to the brightness of the light.)

Please note that if the light is blocked the watch might stop again as a result of being insufficiently recharged.

Time Setting Indication Feature

If the watch stops, subsequent exposure to light allows the 'quick start' function to start again, and the second hand moves with a hitch movement to indicate that displayed time is now incorrect.

In this case, quickly recharge the watch and reset the time.

Otherwise, the hitch movement will continue.

Overcharging Prevention Feature

You can recharge without worry.

Once the secondary battery is fully recharged, the overcharging prevention feature comes into operation and prevents further recharging, so that the secondary battery is not overcharged.

§6. WHEN THE SECOND HAND MOVEMENT IS ABNORMAL

Two-second interval movement

Insufficient recharging warning feature is working.

Recharge the watch immediately by exposing it to light until it has returned to one-second interval movement.

During two-second interval movement, the watch continues to keep the correct time.

Two-second interval movement continues for about 24 hours, and the watch stops.

Hitch movement

Time setting indication feature is working.

Immediately expose the solar cell to light in order to recharge it, then reset to the correct time.

§7. TIME REQUIRED FOR RECHARGE

Time required for recharge may vary according to the design (color of the dial, etc.) and operating environment. The following table will serve you as rough reference.

* The recharging time is the time when the watch is continuously exposed to radiation.

Illuminance (lux)	Environment	Time required		
		One day usage	From the stop state to the one second movement	Empty to full
500	Inside an ordinary office	2 hours	9 hours 30 minutes	180 hours
1000	60–70cm under a fluorescent light	50 minutes	5 hours	90 hours
3000	20cm under a fluorescent light	20 minutes	1 hour 30 minutes	30 hours
10000	Exterior, cloudy	5 minutes	30 minutes	9 hours
100000	Exterior, summer, sunny	2 minutes	10 minutes	3 hours 30 minutes

Full recharging time The time from when the watch is stopped to when it is fully recharged.
(Empty to full)

One day usage The recharging time required for the watch to run for one day.

§8. NOTE ON RECHARGING

The watch will be damaged during recharging if it leaves in hot (about 60°C/140°F or more).
Avoid recharging at high temperatures.

§9. CAUTION

Never use another battery apart from the secondary battery (Titanium Lithium Ion Battery) used in this watch.

The watch structure is so designed that a different kind of battery other than the specified cannot be used to operate it. However, in case a different kind of battery such as a silver battery is used by some chance, there is a danger that the watch will be overcharged to burst, causing damage to the watch and even to the human body.

When you replace the secondary battery, be sure to use a designated secondary battery.