

TECHNICAL INFORMATION

CITIZEN QUARTZ

Cal. No. 411※



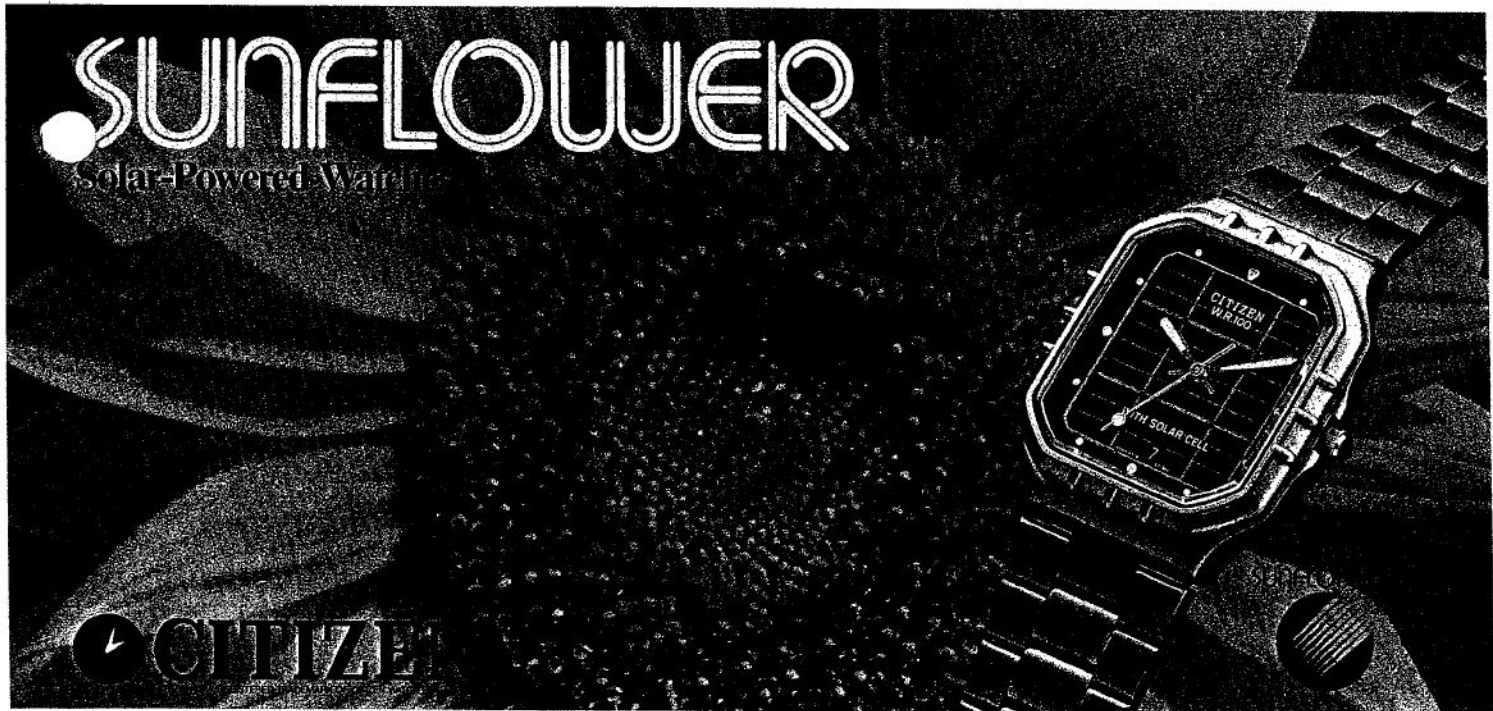
 **CITIZEN**

■1. OUTLINE

This watch is a man's analog quartz watch containing no power cell. It uses amorphous solar cells for the primary power source and an electrolytic capacitor for the secondary power source.

■2. SPECIFICATIONS

Caliber No.		4110A-01
Type		Analog solar cell watch (with second hand)
Module size (mm)		φ26.4 x 25.0 Thickness: 3.26t
Accuracy		±20 sec./month (at normal temperature)
Oscillation		32,768 Hz
Integrated circuit		C-MOS-LSI 1 unit
Effective temp. range		-10°C ~ +60°C (14°F ~ 140°F)
Converter		Bi-polar step motor
Time rate adjustment		DFC (without control terminal)
Time rate measurement		10 seconds
Additional functions		Date (with quick-setting device) Second hand stopping device Quick-start Charge warning Time setting notification (Overcharge prevention)
Capacitor (Double-layer electrolytic capacitor)	Part No. Capacitor code Size	298-182 GC 920 φ9.5 x 2.1
Current consumption		Under 1.0 μA (at 1.55V)
Coil resistance		1.8 ~ 2.4 kΩ



■3. CHARACTERISTICS

1) Long duration

Once the watch is fully charged, it will continue running for about 200 hours (190 hours in one-second steps and about 10 hours in two-second steps) without the need for recharging. (Duration varies to some degree, depending on the strength of the light or the characteristics of the capacitor.)

2) Quick-start function

If the watch is illuminated while it is not running, it will start to operate in irregular two-second steps after several seconds. This function is called "quick start."

Although the time required before the watch starts varies depending on the strength of the light, it should start in approximately 10 seconds in a normally illuminated room (about 500 lux).

3) Time setting notification

If the watch stops and then starts again, the second hand runs in irregular steps to indicate that the watch has stopped. This function is unique to CITIZEN.

If, at this time, the crown is pulled out to the second click position, the watch is set to the correct time and when the crown is pushed in, the second hand will begin to run normally (in one-second steps or two-second steps).

4) Charge warning function

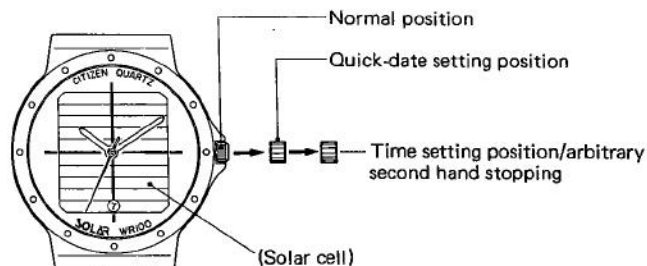
When the voltage of the capacitor (electrolytic double-layer capacitor) drops below 1.3V approx., the second hand reverts to two-second step running to signal that the watch requires charging.

Cal. 41-type watches are designed to stop at voltages lower than 1.15V approx., to run in two-second steps at approx. 1.15 – 1.3V and to run in one-second steps at approx. 1.3 – 2.65V. However, this varies somewhat depending on the watch or the strength of the light.

5) Overcharge prevention function

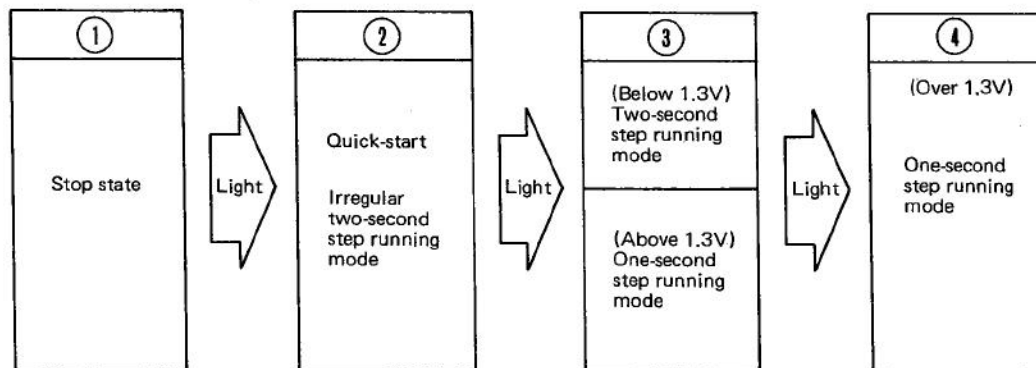
When the capacitor is fully charged a discharge circuit in the IC prevents it from being further charged and prevents further increases in voltage. Therefore, the watch cannot be overcharged even if it is exposed to light for a long period of time.

■4. HANDLING THE WATCH



This watch is operated in the same manner as an ordinary analog watch. However, since the watch uses light as the source of energy, please use it where sufficient light is available and in the one-second step running mode.

● Second hand running mode

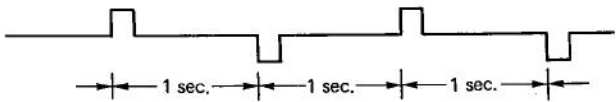
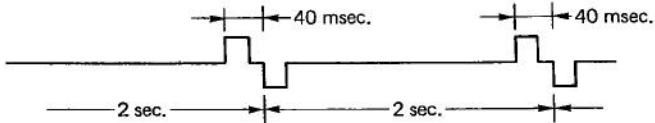
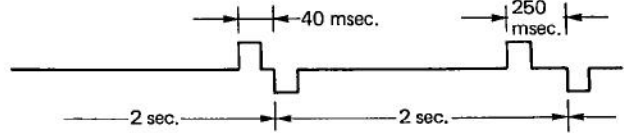


- (1) If the watch has been stopped for a long period of time due to lack of illumination, and then supplied with light, it will start running in irregular two-second steps after several seconds. (Quick-start function)
- (2) When the watch is in Mode ②, pull out the crown to the second click position and set the watch to the correct time. If the crown is pushed back to the normal position or the date setting position, the watch switches to the normal running mode (two-second step running/one-second step running mode) (Time setting notification function = irregular two-second step running).
- (3) When the watch is in Mode ③, the second hand runs in one-second steps if the capacitor voltage is higher than approximately 1.3V. But if the capacitor voltage is below 1.3V, the second hand runs in two-second steps to notify the user that the capacitor should be charged by exposing the watch to light. (Charge warning function = two-second step running)

Note: ● One-second step running/two-second step running/irregular two-second step running – In any of these modes, the watch is functioning normally. However please use the watch after charging it sufficiently, according to the instructions listed on the attached table: "Table of Charging Time." The energy source is "light".

- If the hands are set before quick-start, the watch will experience trouble in starting.

● **Second hand running modes and output pulses**

Second hand running modes			Output pulses
Ordinary running mode	One-second step running mode	(Under normal conditions)	
	Two-second step running mode	(When the charge is insufficient)	
Irregular two-second step running mode		(When the watch requires setting)	

During the irregular two-second step running mode, two pulses occur at an interval of 40 milliseconds, and the second hand appears to run in two seconds steps; but since the next two pulses occur at an interval of 250 milliseconds, the second hand appears to have run two seconds in two steps. This running mode of the second hand is the irregular two-second step running mode.