TECHNICAL INFORMATION
INFORMACION TECNICA

CITIZEN QUARTZ
Cal. No. 724※

CITIZEN

ENGLISH

Contents

ESPAÑOL

Índice

2. Precautions for Use

This watch is not a measuring instrument authorized by official authorities.

Do not use the altimetry function to judge situations involving danger.

The following precautions should be adequately understood before using the altimeter. Please remember that the altimetry function should be used only as general reference.

(1) Do not Use the Altimetry Function When ...

The altimetry should not be used in the following situations:

- When judging your actions or situation involving danger in an environment where the temperature changes drastically.
- In an environment where pressure is subject to change, such as in an airplane or building (correct measurement cannot be obtained).
- When the altitude changes greatly within a short time.
- In case of special handling other than normal use, not described in this manual.

(2) Altimetry Function

The altitude displayed by this watch is relative altitude based on the sensored air pressure and "The international standard atmospheric pressure and altitude". Therefore, display of measured altitude will change if air pressure changes, even if measurement is made in the same place. The time delay from measurement to display of altitude is approximately 5 seconds (in continuously altimetry mode). Therefore, this altimetry function may not be used in sports as sky diving, etc. where altitude changes greatly within a short time.

After 30 minutes, Continuous Altimetry Mode will automatically change to Altimetry Mode in which measurement is made every hour. To resume Continuous Altimetry Mode, operate the watch as explained in the instruction manual. In order to efficiently use the altimetry function of this watch, the altitude must always be corrected for your location, clearly indicated with the altitude.

(3) Pressure Sensor

Do not disassemble the pressure sensor used in this watch or poke it with a thin rod. Take care that no dust enters the pressure sensor.

(4) Battery

Battery life will maintain stable accuracy for about 2 years under normal conditions after installing a new battery.

However the battery life will change depending on the frequency that the altimetry, chronograph are used.

Thus, early replacement of the battery is recommended.

3. Basic Functions of the Altimeter

This watch is designed to calculate altitude from changes in air pressure by using the relationship between air pressure and altitude, based on the conditions for standard atmosphere* specified by the International Civil Aviation Organization (ICAO). To obtain correct altitude on the watch, altitude must be aligned with an accurate point (triangulation station or benchmark). Such operation is called "Compensating the altitude" (see page 7).

* Standard atmosphere: ICAO Standard Atmosphere adopted by the ICAO in 1964, whereby 1013.25 hPa at 15°C is specified as elevation 0. However, air pressure continuously changes at any given place.
This watch's operating are based on ISA standards. The following chart provided an outline of ISA standard configurations.

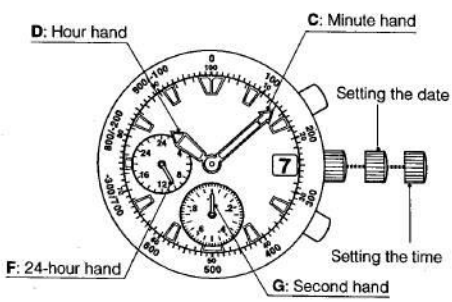
(from International Standard Atmospheric)

Altitude (m)	Atmospheric Pressure (hPa)	Temperature (°C)	Temperature difference every 1,00
5,000	540.2	–17.5	Approx. 6.5°C
4,000	616.4	–11.0	
3,000	701.1	–4.5	
2,000	795.0	2.0	
1,000	898.7	8.5	
0	1,013.25	15.0	

4. Setting the Time and Date

[Time mode]

- The Time Mode displays both 12-hour and 24-hour time.
- The hour, minute and 24-hour hands indicate the time even when the watch is in Chronograph Mode.



[Setting the time and date]

1) Setting the time

If your watch is of a type with a screw-lock crown, unscrew the crown.

① Pull the crown out two steps.
The second hand will spin rapidly and stop at 0.

② Set the hours and minutes to the current time by turning the crown.
Check the 24-hour hand (F) to confirm whether the hands are set apporopriately to AM or PM.

③ Push the crown back to its original position.
The watch will then resume with the correct time.

2) Setting the date

① Pull the crown out one step.

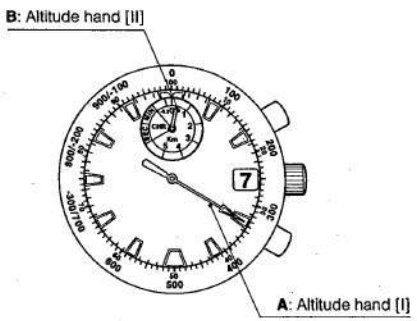
② Set the desired date by turning the crown.

③ Push the crown back to its original position.

Note: If setting the date between the hours of 9:00 PM and 1:00 AM, may result in the date ot change by the next day.

* If your watch is of a type with a screw-lock crown, tighten the crown after setting the time and/or date.

5. Altimetry



1) Altimetry

- The altimeter automatically measures altitude every hour in Time Mode.
- The altimeter measures and displays from –300 m to 5,000 m in 10 m gradation.
- Altitude hand [I] (A) is synchronized with altitude hand [II] (B) to display the current altitude.
  Altitude hand [I] (A): Displays the altitude in 10 m gradation.
  Altitude hand [II] (B): Displays the altitude in 1,000 m gradation.

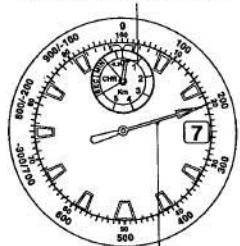
Note: The altimeter displays "–300 m" for an altitude of less than -300 m, and "5,000 m" for over than 5,000 m.

2) Reading the altimetry display

(1) Altitude from 0 to 1,000m

* The figure below shows an altitude of 190m.

Altitude hand [II] (B) points to a position equivalent to 190m.

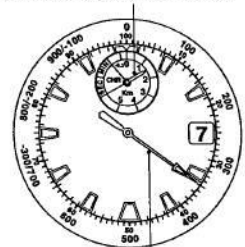


Altitude hand [I] (A) indicates 190m.

(2) Altitude from 1,000 to 2,000m

* The figure below shows an altitude of 1,350m.

Altitude hand [II] (B) points to a position equivalent to 1,350m.

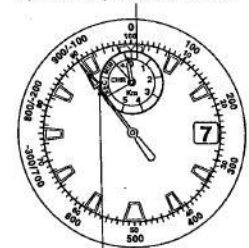


Altitude hand [I] (A) indicates 350m.

(3) Altitude from –300 to 0m

* The figure below shows an altitude of -100m.

Altitude hand [II] (B) points to a position equivalent to –0.1m.

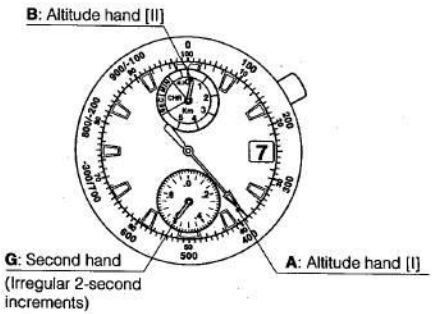


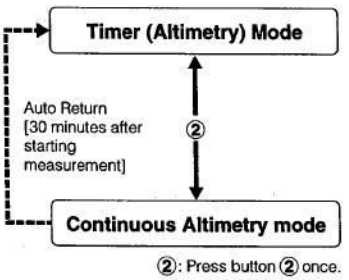
Altitude hand [I] (A) indicates –100m.

3) Continuous altimetry

The watch shows continuous changes in altitude once every 5 seconds for 30 minutes after the starting measurement for altitudes.

- Measuring the altitudes
  Press button ② once in Time Mode. The second hand changes to operate on an extended 2-second increments basis. This indicates that the watch is now in Continuous Altimetry Mode. Pressing button ② once returns the watch to Altimeter Mode. Also, the watch will automatically return to Altimeter Mode 30 minutes after being set to Continuous Altimetry Mode even if no button is pressed.

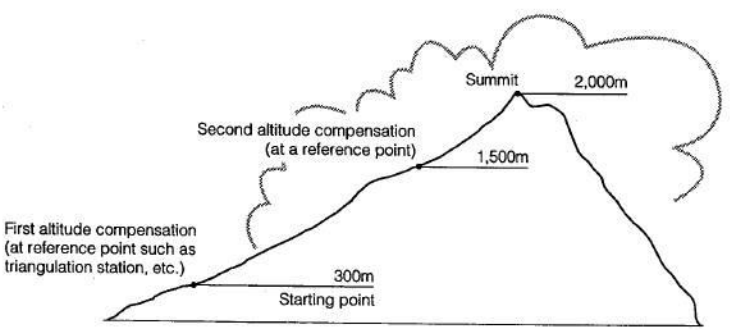




6. Altitude Compensation

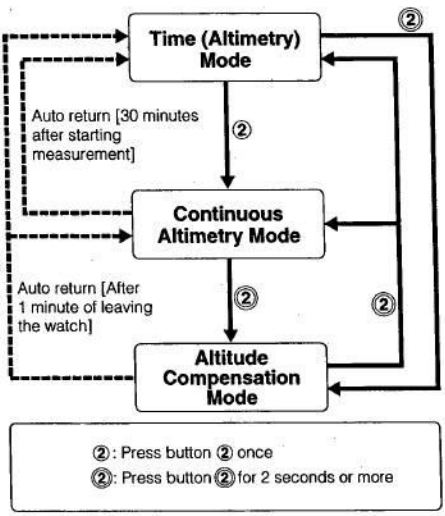
The altitude displayed by this watch is relative altitude based on standard atmosphere. To obtain the correct altitude during mountain climbing, the altitude displayed by this watch must be aligned with an accurate altitude at a geographical point of reference (triangulation station, first-order benchmark, an altitude on an accurate map, etc.). Such an operation is called "altitude correction." If air pressure changes 1 hPa, the altitude difference will be approximately 10 m.

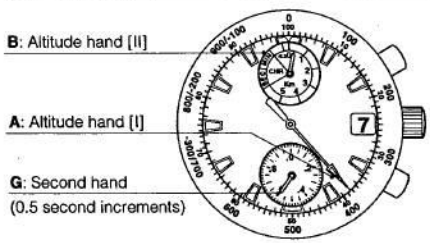
Therefore, altitude compensation must be made several times a day if the weather changes drastically during mountain climbing.



[Compensating the altitude]

The current altitude can be corrected within a range of ±300 m.





Compensation

a) Press button ② for more than 2 seconds in Time Mode (or Continuous Altimetry Mode). The second hand (G) changes to indicate 0.5 second increments. This indicates that the watch is now in Altitude Compensation Mode.

b) Press button ① or ② to correct the altitude.

- Button ①:.....Altitude Hand [I] (A) decrement up by 10 min each time the button is pressed.
- Button ②:.....Altitude Hand [I] (A) increment by 10 min each time the button is pressed.

c) After compensation is completed, return to Time Mode (or Continuous Altimetry Mode). Pressing button ② for 2 seconds or more, returns the watch to Time Mode (or Continuous Altimetry Mode).

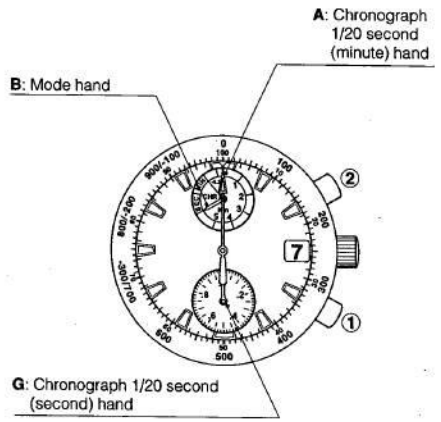
Note: If the watch is left in Altitude Compensation Mode for more than 1 minute it will automatically return to Time Mode or Continuous Altimetry Mode. (Auto Return)

7. Chronograph

1) Switching to chronograph mode

Press button ① once in Time Mode. The function hand (A) and the second hand (G) will move forward to the 0 position. The mode hand (B) will advance to SEC (seconds). The watch is now in Chronograph Mode (reset).

* If the watch is left in Reset Chronograph Mode for 3 minutes it will automatically return to Time Mode.



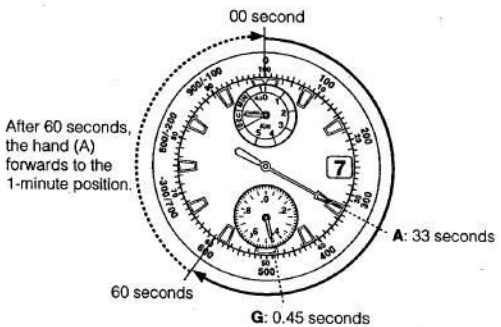


Fig. a

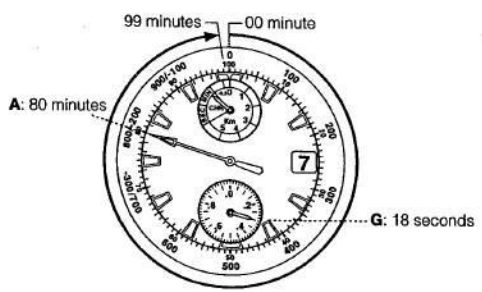


Fig. b

2) Chronograph measurement

A maximum of 99 minutes and 59 seconds may be measured by the chronograph. After that, measurement stops automatically and the chronograph returns to the reset position.

① Measurements of less than 1 minute

The chronograph measures in units of 1/20 (0.05 seconds).
Measurement is indicated by the chronograph's 1/20 hand (G) and the chronograph's second hand (A). The mode hand (B) indicates the SEC (seconds) zone.

② Measurements of over 1 minute

The chronograph measures in one second increment.
Measurement is indicated by the chronograph's second hand (G) and the chronograph's minute hand (A). The mode hand (B) indicates the MIN (minutes) zone.

3) Reading the chronograph's scales

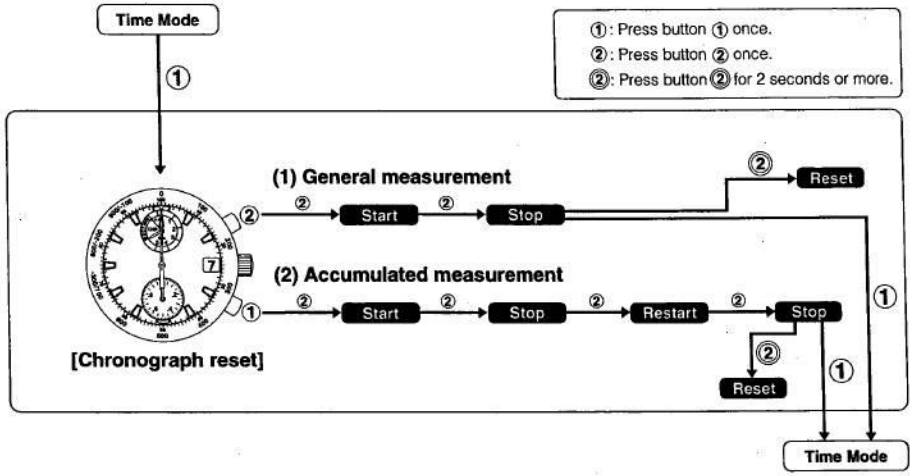
① Measurements of less than 1 minute:

Values are indicated by the chronograph's second hand (A) and 1/20 hand (G). To read seconds, use the outer scales. In Fig. a as foloows, the chronograph displays 33.45 seconds.
Once 60 seconds is reached, the second hand (A) will change to the minute hand and indicate 1 minute.

② Measurements of more than 1 minute:

Values are indicated by the chronograph's minute hand (A) and second hand (G). To read minutes, use the outer scales. In Fig. b as fololows, the chronograph indicates 80 minutes and 18 seconds.
Once 100 minutes is reached, measurement automatically stops and the chronograph returns to the reset position.

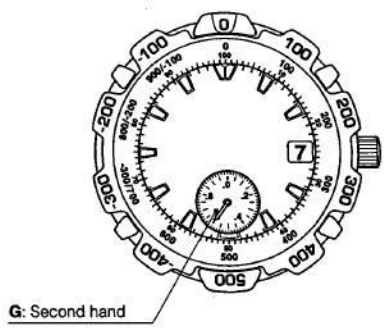
4) Operating the chronograph mode



Note: The chronograph will be reset if the crown is pulled out two steps during chronograph measurement.

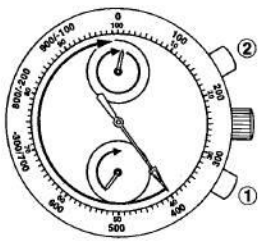
8. Battery-Low Warning Function

Accurate altimetry measurements cannot be made when the battery is low. To prevent inaccurate measurement, the altimeter stops measurement and the second hand (G) moves in 2-second increments to notify of battery low. Altitude hands [I] and [II] will stop at the altitude position where measurement has been stopped.



9. Adjusting Hands To "0" Position

Use the following steps to adjust the hands to the hands to the "0" position. After battery replacement or when resetting the chronograph, or if the seconds hand does not return to the "0" position when the crown is pulled out two steps.



1. Pull the crown out two steps.
2. Depress buttons ① and ② simultaneously for 2 seconds or more.

   The function hand (A) will move slightly.
3. Press button ② and respectively align the function hand (A) and the mode hand (B) to the zero position. (The function hands (A) is synchronized with the mode hand (B).)

* Depressing the button will advance the function/mode hands.

4. Press button ① to align the second hand to the zero position.

* Depressing the button will advance the second hand.

5. Push the crown back to its original position. Function hand (A) will change to Altitude hand (I).

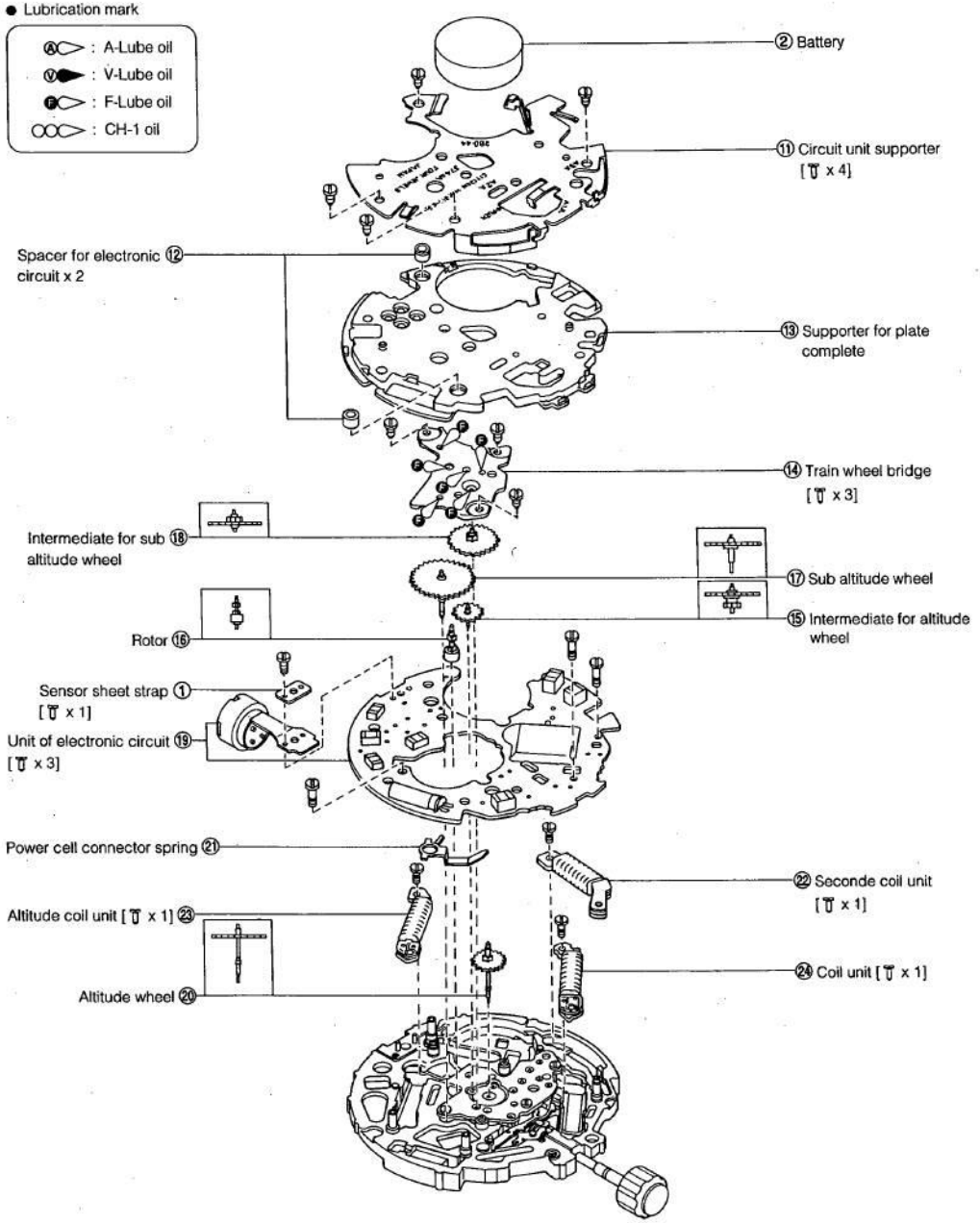
Note: Make sure to perform zero positioning after replacing the battery. Otherwise, correct altimetry and chronograph measurement may not be performed.

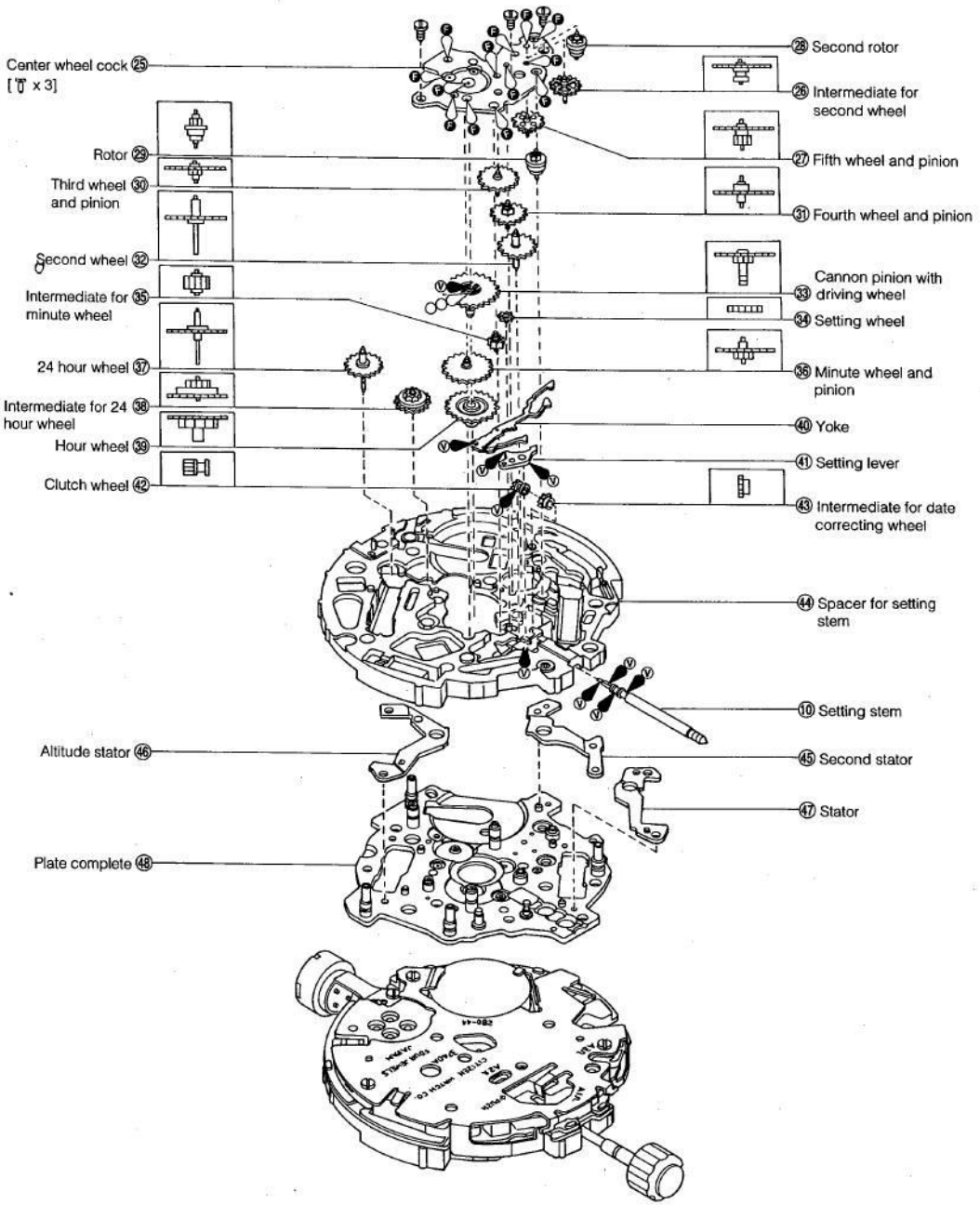
§4. DISASSEMBLY AND ASSEMBLY OF THE MOVEMENT

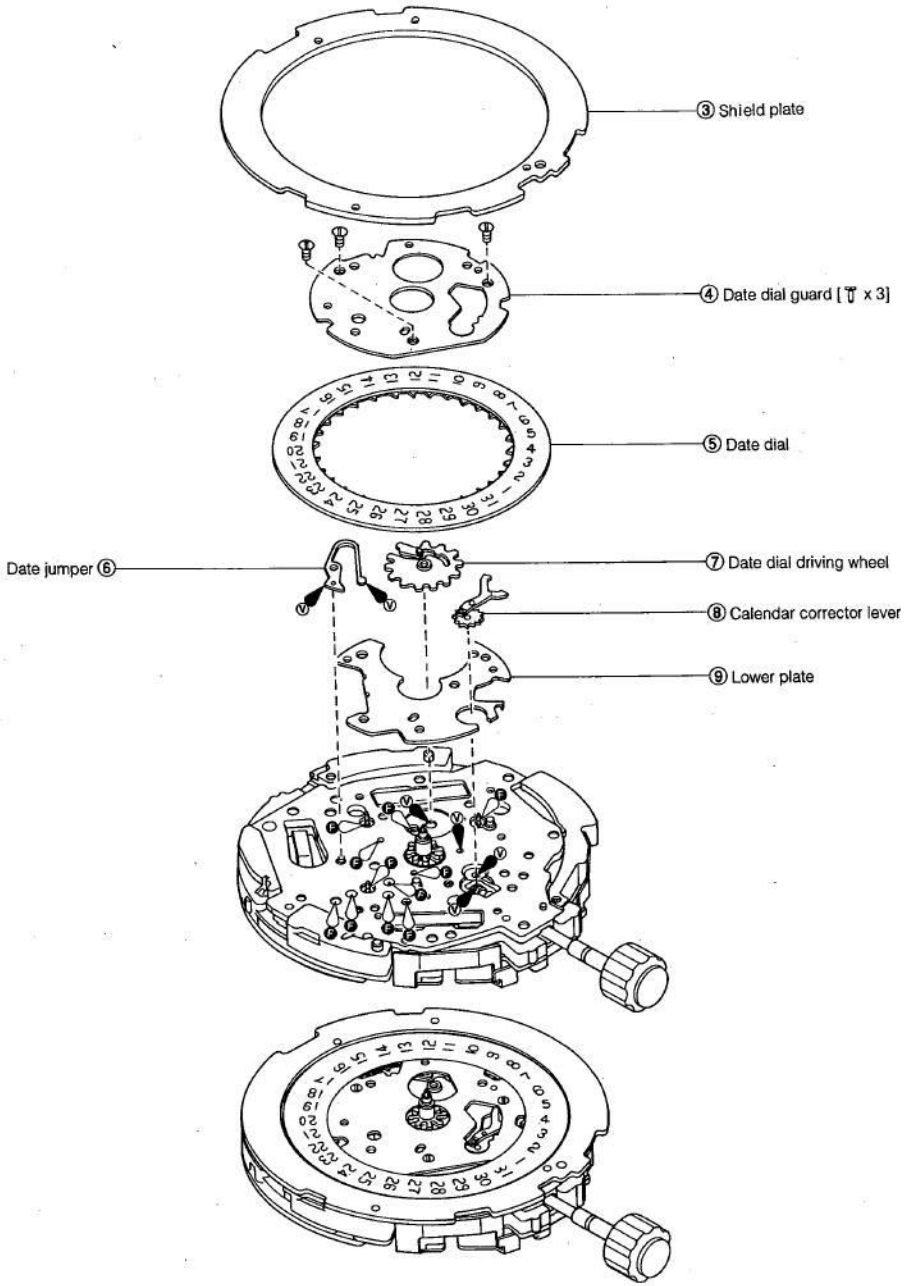
Disassembly procedure: ① → ㊽
Assembly procedure: ㊽ → ①

● Lubrication mark

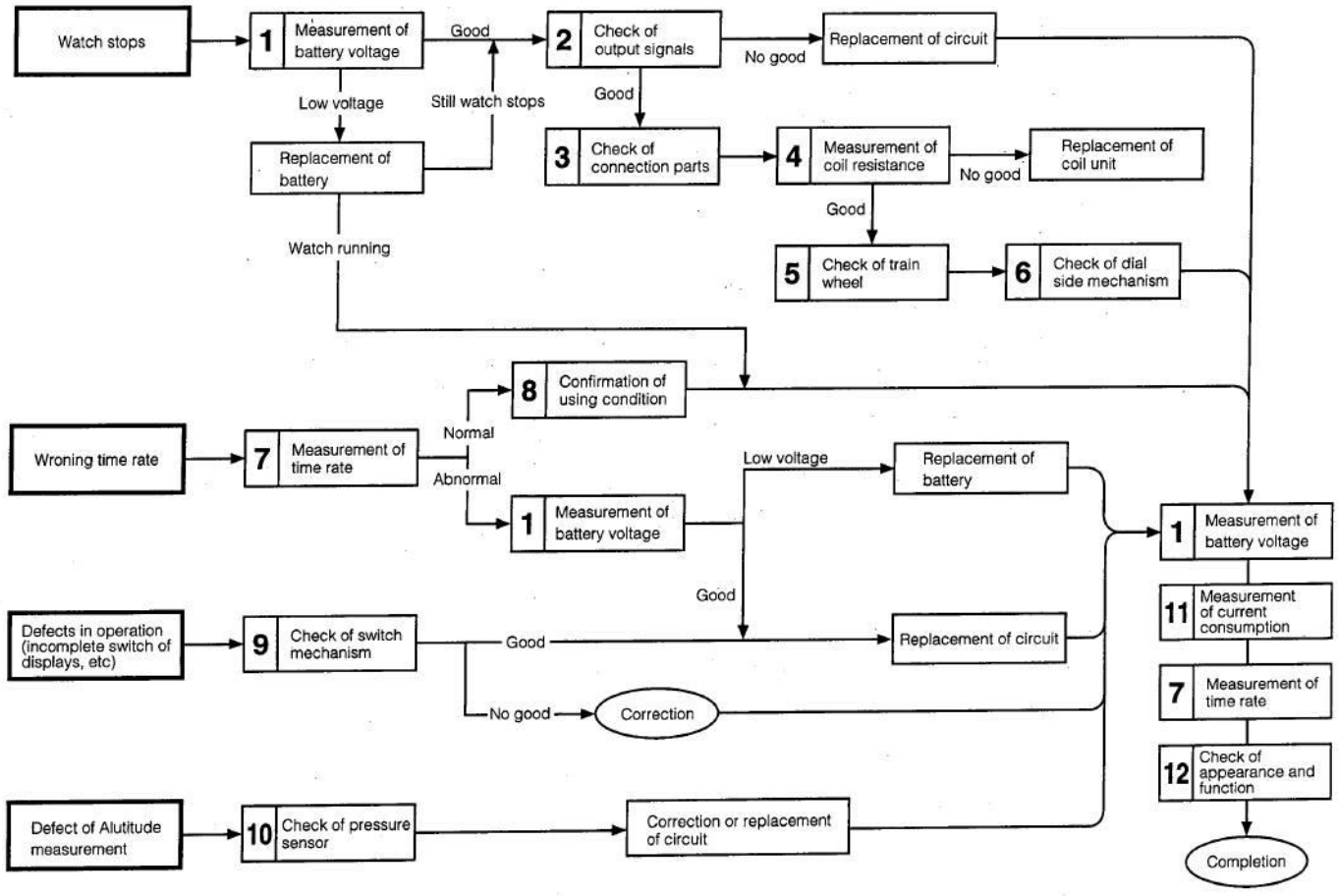
Ⓐ : A-Lube oil
Ⓥ : V-Lube oil
Ⓕ : CH-1 oil

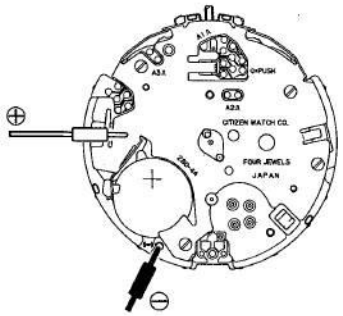
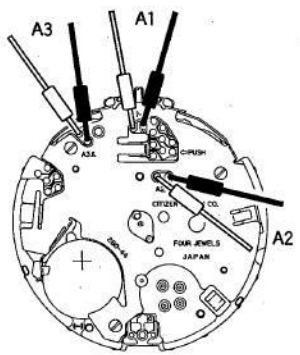
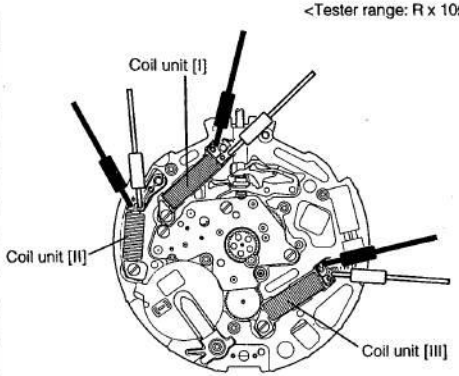



Center wheel cock ㉕
[x 3]
Rotor ㉙
Third wheel and pinion ㉚
Second wheel ㉜
Intermediate for minute wheel ㉟
24 hour wheel ㊲
Intermediate for 24 hour wheel ㊳
Hour wheel ㊴
Clutch wheel ㊷
㉘ Second rotor
㉖ Intermediate for second wheel
㉗ Fifth wheel and pinion
㉛ Fourth wheel and pinion
㉝ Cannon pinion with driving wheel
㉞ Setting wheel
㊱ Minute wheel and pinion
㊵ Yoke
㊶ Setting lever
㊸ Intermediate for date correcting wheel
㊹ Spacer for setting stem
⑩ Setting stem
㊺ Second stator
㊼ Stator
Altitude stator ㊻
Plate complete ㊽

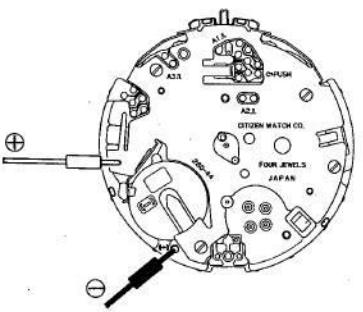

③ Shield plate
④ Date dial guard [x 3]
⑤ Date dial
Date jumper ⑥
⑦ Date dial driving wheel
⑧ Calendar corrector lever
⑨ Lower plate

§5. TROUBLESHOOTING AND ADJUSTMENT



Check Points	How to Check	Results and Treatments
❶ Measurement of battery voltage	* Refer to Technical Manual, Basic Course: II-1-a. <Tester range: D.C. 3V>  	• **Over 1.5V** → Non defective. • **Under 1.5V** → Recharging.
❷ Check of output signal	* Refer to Technical Manual, Basic Course: II-1-b. <Tester range: D.C. 0.3V>  	• The tester pointer does not swings. → Check the connection parts. • The connections are normal. → Replace the circuit.
❸ Check of connection parts	* Refer to Technical Manual, Basic Course: II-2-a.	
❹ Measurement of coil resistance	* Refer to Technical Manual, Basic Course: II-1-c. <Tester range: R x 10Ω>  	• Coil unit [I], [II] **1.8 kΩ ~ 2.5 kΩ** → Non defective. • Coil unit [II] **1.1 kΩ ~ 1.8 kΩ** → Non defective. • Outside range of above value. → Replace the coil unit.

Check Points	How to Check	Results and Treatments
❺ Check of train wheel	* Refer to Technical Manual, Basic Course: II-2-b. • Check the appropriate clearance of each wheel and rotor for dust.	
❻ Check of dial side mechanism	* Refer to Technical Manual, Basic Course: II-2-c.	
❼ Measurement of time rate	* Refer to Technical Manual, Basic Course: II-2-d.	
❽ Confirmation of using condition	* Refer to Technical Manual, Basic Course: II-2-e.	
❾ Check of switch mechanism	To find which is faulty, push button or the movement, check the movement alone first. • Check the switch function while pushing the switch spring with tweezers. Next, check the push button. • Check that there is no dust or dirt on the case's push button and also check that the push button has not been deformed. * Be sure to apply silicon oil to the push button packing. When replacing the battery, replace the push button packing together with the case back packing.	• The switch function is not defective. → Check the push button. • The switch function is defective. → Remove dust or dirt on each connection. • Dust or dirt on the push button. → Remove it. • The push button has been deformed. → Clean or replace the push button.
❿ Check of pressure sensor	Check the following points. 1) Sand or dust have not entered pressure sensor. 2) There is no dust or dirt on the connection part of the sensor sheet. <Each pattern of the pressure sensor and electronic circuit) 3) There no scratches or cut on the pressure sensor. **Note:** Even though either the pressure sensor or the electronic circuit unit can be defective, replace both together. This is because alutitude measurement accuracy is adjusted by these parts.	• Sand dust or dirt. → Remove it. • Scratches or cuts. → Replace the parts. • If the above phenomena are not found, replace the electronic circuit unit.

Check Points	How to Check	Results and Treatments
⓫ Measuring of current consumption	* Refer to Technical Manual, Basic Course: II-1-f. When measuring current consumption, be sure to perform all-reset operation. 1. Pull the crown out. 2. Set the test lead to the movement, then press the Ⓐ, Ⓑ, and Ⓜ buttons, and the all functions are reset. 3. Push the crown to the normal position. 4. Under this condition, measure the current consumption.  Influence of light Avoid measuring current consumption under an incandescent lamp of the direct rays of sun, because it may cause the current value to increase.	• Current consumption of the movement. **Under 2.7μA** → Non defective **Over 2.7μA** → Check train wheel → Remove dirt. Movement is non defective, but current consumption is **over 1.8μA.** ⬇ Replace set of electronic circuit unit and sensor.
⓬ Check of appearance and functions	* Refer to Technical Manual, Basic Course: II-2-f. • Make sure that there is no dust or dirt inside the watch. • Make sure that each button functions correctly. • Make sure that all the segments have been provided. • Make sure that the alarm monitor operates in an expected manner.	→ See the section of all-reset operation.