

# ***TECHNICAL INFORMATION***

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**CITIZEN QUARTZ**

**Cal. No. 374✧**



 **CITIZEN**  
CITIZEN IS A REGISTERED TRADEMARK OF CITIZEN WATCH CO., JAPAN.

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## §1. OUTLINE

The CAL. 374\*\* series is an analog diver's watch equipped with an electronic depth meter and a chronograph function.

### <Restrictions on repair of CAL. 374\*\* series>

The CAL. 374\*\* series is resistant to a water pressure up to 200 m.

To ensure the water resistant performance after repair of watch, any repair of the CAL. 374\*\* series should be done by our authorized CITIZEN SERVICE CENTERS only.

Any repair of the CAL. 374\*\* series by NOT authorized shops are absolutely prohibited.

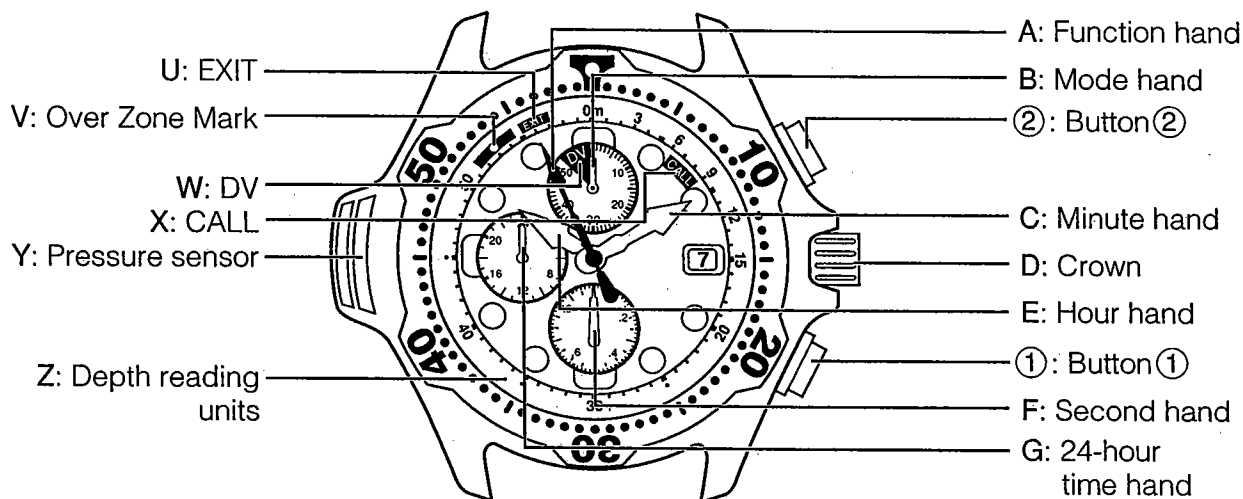
And any repair (including the replacement of battery) of the CAL. 374\*\* series by retail stores are absolutely prohibited.

## §2. SPECIFICATIONS

Cal. No.		3740-04	3745-04	
Model		Analog depth meter with chronograph		
Module size (mm)		ø30.8 x 5.0t		
Time accuracy		±20 seconds/month		
Depth meter display unit		Meter (m)	Feet (ft)	
Accuracy of depth readings		1 m ~ 10 m ±1 m 11 m ~ 50 m ±2 m	5 ft ~ 25 ft ±5 ft 27.5 ft ~ 125 ft ±7.5 ft	
Assured accuracy temperature range		10°C (50°F) ~ 40°C (104°F) Accuracy of depth reading is affected by surrounding temperature		
Integrated circuit		C/MOS-LSI		
Effective temperature range		-10°C ~ +60°C/50°F ~ 104°F		
Adjustment of time rate		Impossible		
Display functions	Normal time	Hour, minute, second, 24-hour		
	Calendar	Date		
	Chronograph	Minute, second, 1/20 second (A maximum 50 minutes display)		
	Dive display system	Present depth indicator	1 m ~ 50 m (1 m increments)	5 ft ~ 125 ft (2.5 ft increments)
			Depth less than 1 m (5 ft) indicated as 0 m (0 ft)	
	Depth over display	When depth more than 50 m	When depth more than 125 ft	
Maximum depth memo	1 m ~ 50 m	5 ft ~ 125 ft		
Additional functions		<ul style="list-style-type: none"> <li>• Low battery warning function</li> <li>• Prevention of function during malfunction state</li> <li>• Second hand stopping device</li> </ul>		
Power cell		Part No.	280-44 (SR927W)	
		Life time	Approximately 2 years Estimated conditions of use <ul style="list-style-type: none"> <li>• Number of dives ..... 30 dives/year</li> <li>• Duration of dive ..... 1 hour/dive</li> <li>• Chronograph measurement ..... 1 hour/day</li> </ul>	

Appearance	Structure	Case	GN-4 type
		Pressure sensor	GN-4 type
		Resister ring	Can be turned only in the counterclockwise with click sound
	Remarks	<ul style="list-style-type: none"> <li>• Magnetic ..... More than 60 gauss (based upon I.S.O. Standards)</li> <li>• Water resistance ..... Water resistant 200 m (based upon I.S.O. Standards)</li> </ul>	

### §3. NAME OF PARTS



\* **Never manipulate the crown or press the buttons during a dive.**

This illustration shows a watch using meters to indicate depth readings.

### §4. OPERATING INSTRUCTIONS

Please read the instructions below while referring to the foldout watch diagram.

**This watch has three modes: Time Mode, Diving Mode, and Chronograph Mode.**

#### [Names of Parts]

Name	Time Mode	Diving Mode	Chronograph Mode
A : Function hand	Points to EXIT	Indicates depth	Chronograph second hand
B : Mode hand	Points to 0	Points to DV	Chronograph minute hand
C : Minute hand	Always displays minutes		
D : Crown	Used to set time and date		
E : Hour hand	Always displays hours		
F : Second hand	Displays seconds		Chronograph 1/20 second hand
G : 24-hour time hand	Always displays 24-hour time in conjunction with the hour hand		
①: Button ①	Used to switch modes, etc.		
②: Button ②	Used to call Maximum depth and for chronograph measurements, etc.		

**U : EXIT** ... The function hand points to EXIT in the Time Mode.

**V : Over Zone Mark** ... The function hand points to this mark (at the 53 minute position) at depths over than 50 meters (125 ft).

**W : DV** ... "DV" means "diving". The mode hand points to DV when in the Diving Mode.

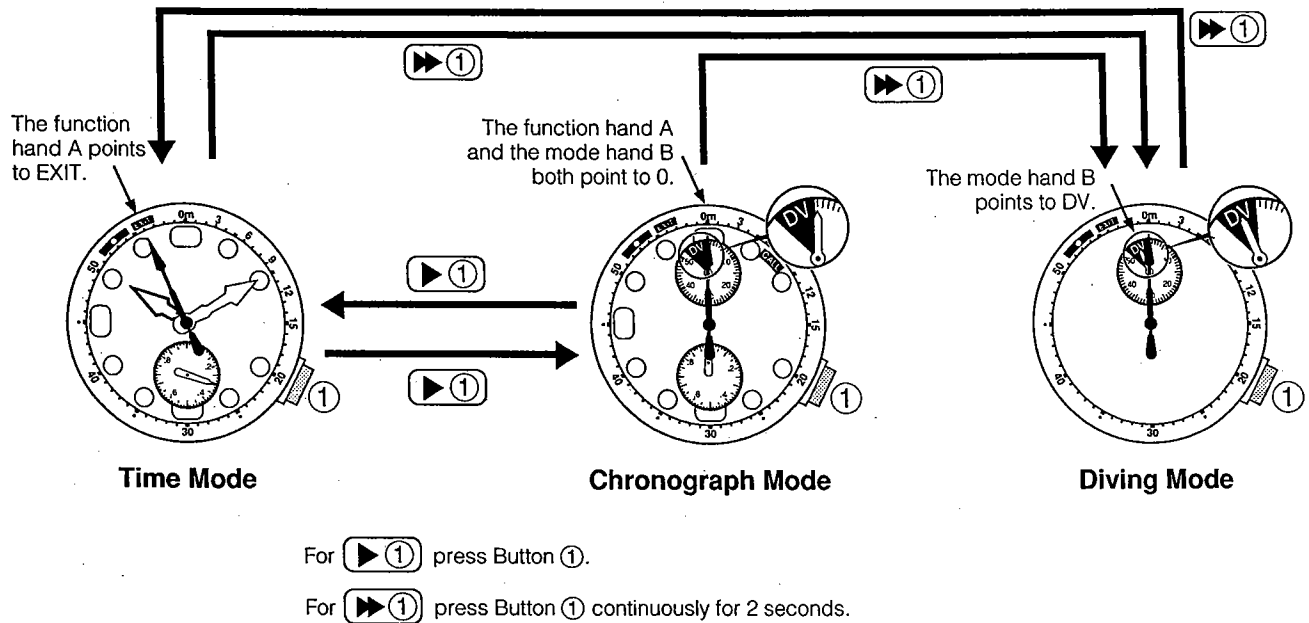
**X : CALL** ... Pressing button ② will display the maximum depth memo.

**Y : Pressure sensor** ... Measures depth by sensing water pressure.

**Z : Depth reading units** ... Depth readings are indicated in meters or feet, depending on the model.

## [Switching modes]

Switch between the three modes simply by pressing button ①

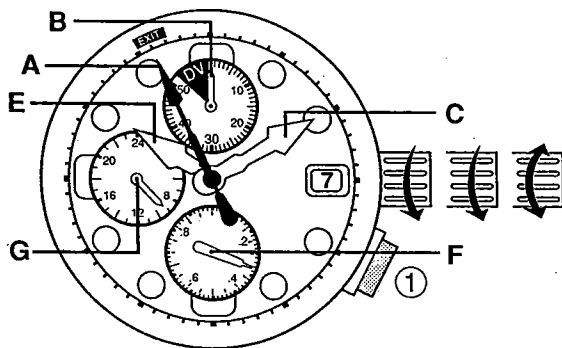


## §5. TIME MODE

Switch to the Time Mode from the Diving Mode by pressing button ① continuously for 2 seconds. Switch to the Time Mode from the Chronograph Mode by pressing button ① once.

### About the Time Mode

1. The Time Mode displays both 12 and 24-hour time.
2. With the exception of the second hand, the time may be read even while using the other modes.



### Display in the Time Mode

- A - Points to EXIT
- B - Points to 0
- C - Minute hand
- E - Hour hand
- F - Second hand
- G - 24-hour time hand

## [Setting the time and date]

Make sure that the watch is in the Time Mode by confirming that the function hand A is pointing to EXIT.

### <Setting the time>

1. Unscrew the crown in the indicated direction to release it, and pull it out two steps. The second hand F will spin rapidly and stop at 0.
2. Set the hours and minutes by turning the crown. Check the 24-hour time hand to confirm whether the hands are set appropriately to AM or PM.
3. Push the crown back to its original position.
4. Hold the crown down and turn it to screw lock it back in place.

### <Setting the date>

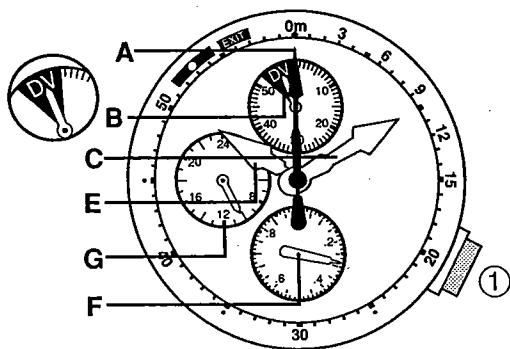
1. Unscrew the crown in the indicated direction to release it, and pull it out one step.
2. Set the date by turning the crown.  
(If the crown is turned in the wrong direction there will be no effect.)
3. Push the crown back to its original position.
4. Hold the crown down and turn it to screw lock it back in place.
  - \* Setting the date between the hours of 9 PM and 5 AM may result in the date not changing by the next day.
  - \* Do not attempt to set the time or date when in a mode other than the Time Mode.

## §6. DIVING MODE

From the Time Mode, or the Chronograph Mode, switch to the Diving Mode by pressing button ① continuously for 2 seconds.

### About depth readings

1. After switching to the Diving Mode, depth readings will commence automatically when diving begins.
2. The depth will be measured and displayed in 1 meter (2.5 ft) increments up to 50 meters (125 ft).



### Display in the Diving Mode

- A – Depth indicator hand (function hand)
- B – Points to DV
- C – Minute hand
- E – Hour hand
- F – Second hand
- G – 24-hour time hand

\* If the hands A, B do not point to the correct position, please readjust them according to the "ALL RESET" instructions on page 10.

## Reading the Depth

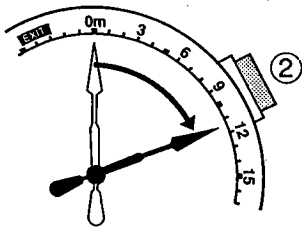
While diving, the number indicated by the depth indicator hand A (the function hand) is the present diving depth. The depth indicator hand begins to function at a depth of 1 meter (5 ft). It registers depths less than 1 meter (5 ft) as 0. At depths over 50 meters (125 ft), the hand stops on the Over Zone Mark (53 minutes) and remains there until returning to depths less than 50 meters (125 ft).

## Measurements and Range

Display range: 0 m (0 ft) to 50 m (125 ft)  
Display increment: 1 meter (2.5 ft)  
Measurement interval: Once/second

## [Maximum depth memo function]

This watch automatically records the maximum depth reached during a dive (in 1 meter [2.5 ft] increments). This memo is retained until the watch is set to the Diving Mode again and a depth of 1 meter (5 ft) or more is reached.



## Calling the maximum depth memo

1. While in the Time Mode or Diving Mode (a depth of 0 is displayed) press button ②. The function hand A will display the maximum depth.
2. Pressing button ② a second time or leaving the memo displayed continuously for 30 seconds will release the maximum depth memo display.

- NOTE:**
1. A depth less than 1 meter (5 ft) is not recorded.
  2. The data in the maximum depth memo will be cleared when the battery reaches the end of its life. Be sure to record necessary memo information in a log book.
  3. The first time this function is used, it may display data that was used in product testing.
  4. Depths over 50 meters (125 ft) will be recorded as the Over Zone Mark.



### **Additional functions**

#### **<Auto return system>**

The watch automatically returns to the Time Mode if the function hand remains at 0 meter (0 ft) for longer than 30 minutes in the Diving Mode.

#### **<Abnormal activation prevention function>**

If the depth meter is functioning abnormally for some reason, the function hand will point to the Over Zone mark when the watch is switched to the Diving Mode, and depth measurement will not be possible. In such a case, switch back to the Time Mode.

### **[Making accurate depth readings]**

1. Switch the watch to the Diving Mode shortly before diving.
2. When there is a great difference between the air and water temperature, immerse the watch in the water for 2–3 minutes before switching it to the Diving Mode.
3. Confirm that the mode hand points to DV and the function hand points to 0 when the watch is switched to the Diving Mode. If the hands are in the wrong position please refer to ALL RESET on page 10.
4. Avoid too rapid descents and ascents when diving. The function hand will not adjust quickly enough during descents or ascents faster than about 1 meter (2.5 ft) per minute. Slowdown or stop in order to obtain an accurate depth reading.

**\* Never pull out or turn the crown or press the buttons while diving. Doing so may cause water to penetrate the case.**

### **[High altitude & freshwater diving]**

When the Diving Mode is activated, the depth is calibrated at 0 meter (0 ft) based on the surrounding air pressure. This enables the watch to be used while diving at high-altitudes and/or in lakes, as long as the Diving Mode is activated at that altitude.

However, an accurate measurement is not possible at altitudes over 4,000 meters (13,124 ft). Do not use this watch when diving in such places. Further, this watch displays changes in depth based on a standard of seawater (density 1.025). Depths indicated in fresh water will actually be about 2.5% over indicated.

Be sure to complete appropriate safety training before diving in fresh water or at high altitudes.

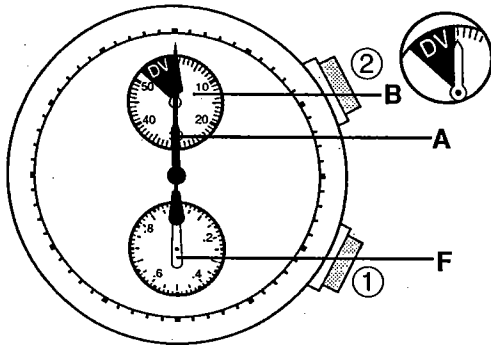
(Example) 20 meters (50 ft) (indicated depth)  $\times$  1.025 = 20.5 meters (51.25 ft) (actual depth)

## §7. CHRONOGRAPH MODE

Switch from the Time Mode to the Chronograph Mode by pressing button ① once.

### About chronograph measurements

1. A maximum of 50 minutes may be measured by the chronograph. After 50 minutes (1/20 second = 0.05 second increments) measurement will stop automatically and chronograph will return to the reset position.
2. The chronograph 1/20 second hand will move for 30 seconds, after which it will return to stand-by at the 0 position. The time measured will be displayed when chronograph measurement is stopped.



### The chronograph display

- A – Chronograph second hand
- B – Chronograph minute hand
- F – Chronograph 1/20 second hand

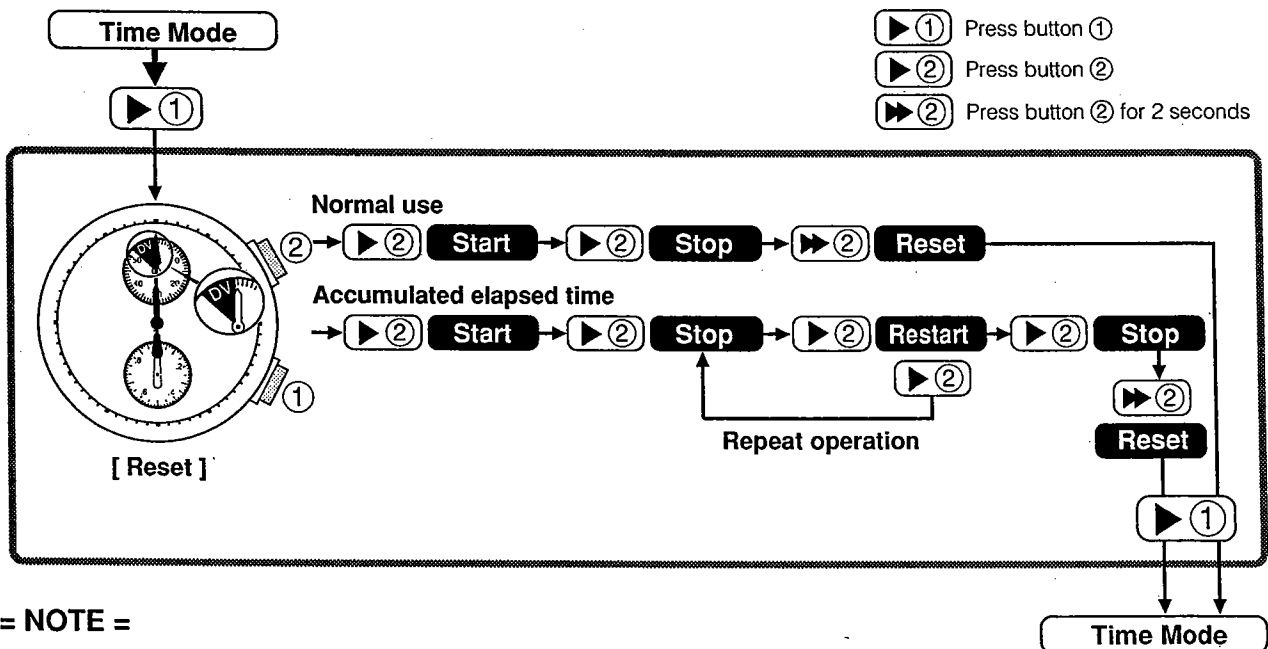
\* When the watch has been switched to the Chronograph Mode but the hands A, B, and F do not point to 0, please readjust them as indicated in the ALL RESET instructions on page 10.

### Additional functions

#### <Auto return system>

The watch automatically returns to the Time Mode if the chronograph reset display remains for longer than 3 minutes.

### [Operating the Chronograph Mode]



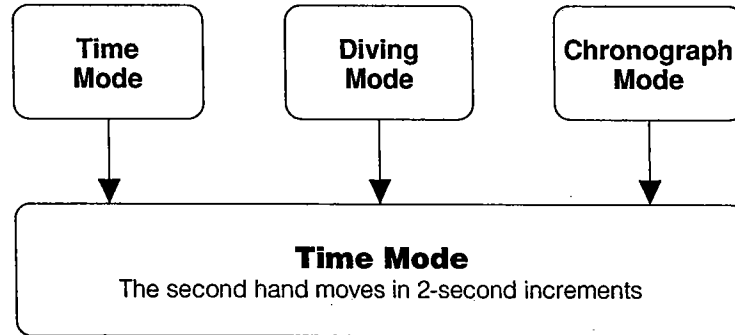
#### = NOTE =

The mode cannot be changed during a chronograph measurement.  
Change the mode after stopping measurement.  
Changing the mode will delete the data.

## §8. IN THESE CASES...

### [When the second hand moves in 2-second increments]

When the battery is low, the low-battery warning indicator causes the second hand to move in 2-second increments. The Diving Mode and the Chronograph Mode will return to the Time Mode. Replace the battery soon.

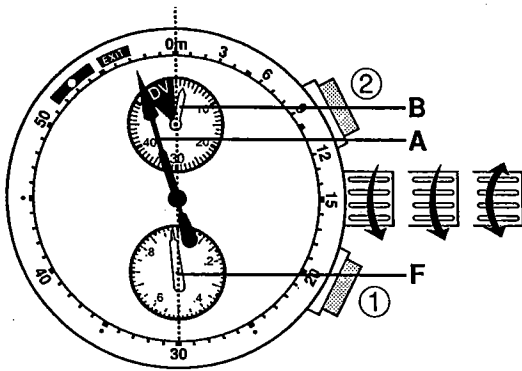


= NOTE =

When the low-battery warning indicator is activated, the watch cannot be switched into the Diving or Chronograph Mode.

### [After the battery is replaced or if the hands are in the wrong position]

Use the following ALL RESET operation to adjust the position of the hands if:



- In the Time Mode**  
The function hand A does not point to EXIT.  
The mode hand B does not point to 0.
- In the Diving Mode**  
The function hand A does not point to 0.  
The mode hand B does not point to DV.
- In the Chronograph Mode**  
The chronograph minute hand B does not point to 0.  
The chronograph second hand A does not point to 0.  
The chronograph 1/20 second hand F does not point to 0.
- The display is abnormal in any other way.**

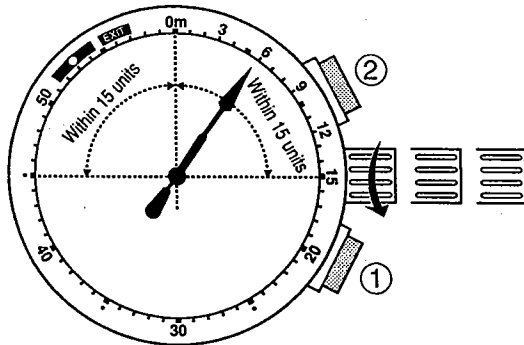
### [Using ALL RESET and Adjusting the position of the hands]

1. Unscrew the crown to release it, and pull it out two steps.
2. Simultaneously press button ① and button ② and then release them. ALL RESET is complete if the function hand moves slightly.
3. Pressing button ② will allow the mode hand B and the function hand A to move simultaneously. Set both of these to the 0 position. Move the two hands forward rapidly by pressing button ② continuously.
4. Align the second hand F in the 0 position by pressing button ①. Move it forward rapidly by pressing button ① continuously.
5. Set the correct time. Refer to page 5 for instructions on setting the time and date.
6. Push the crown back to its original position, press down and turn it to screw lock it back in place. The watch will restart in the Time Mode.

### [When the function hand is in the wrong position]

- \* If, when switching from the Time Mode to the Diving Mode, the function hand does not point to 0.
- \* If, when switching from the Time Mode to the Chronograph Mode, the function hand does not point to 0.

In these cases, use the crown and buttons as follows to adjust the position of the hand.



1. Unscrew the crown in the indicated direction to release it, and pull it out two steps.
2. If the hand is to the left of the 0 position, press button ② to move it forward to the 0 position. If it is to the right of the 0 position press button ① to move it back to the 0 position.
3. Push the crown back to its original position then press down and turn it to screw lock it back in place.

### [Automatic time adjustment function]

Be sure to complete the hand position adjustment within four minutes. If so, the hands will spin rapidly to display correct time when you complete the adjustment. However, take care not to turn the crown at this time as it may cause the incorrect time to be set.

#### = NOTE =

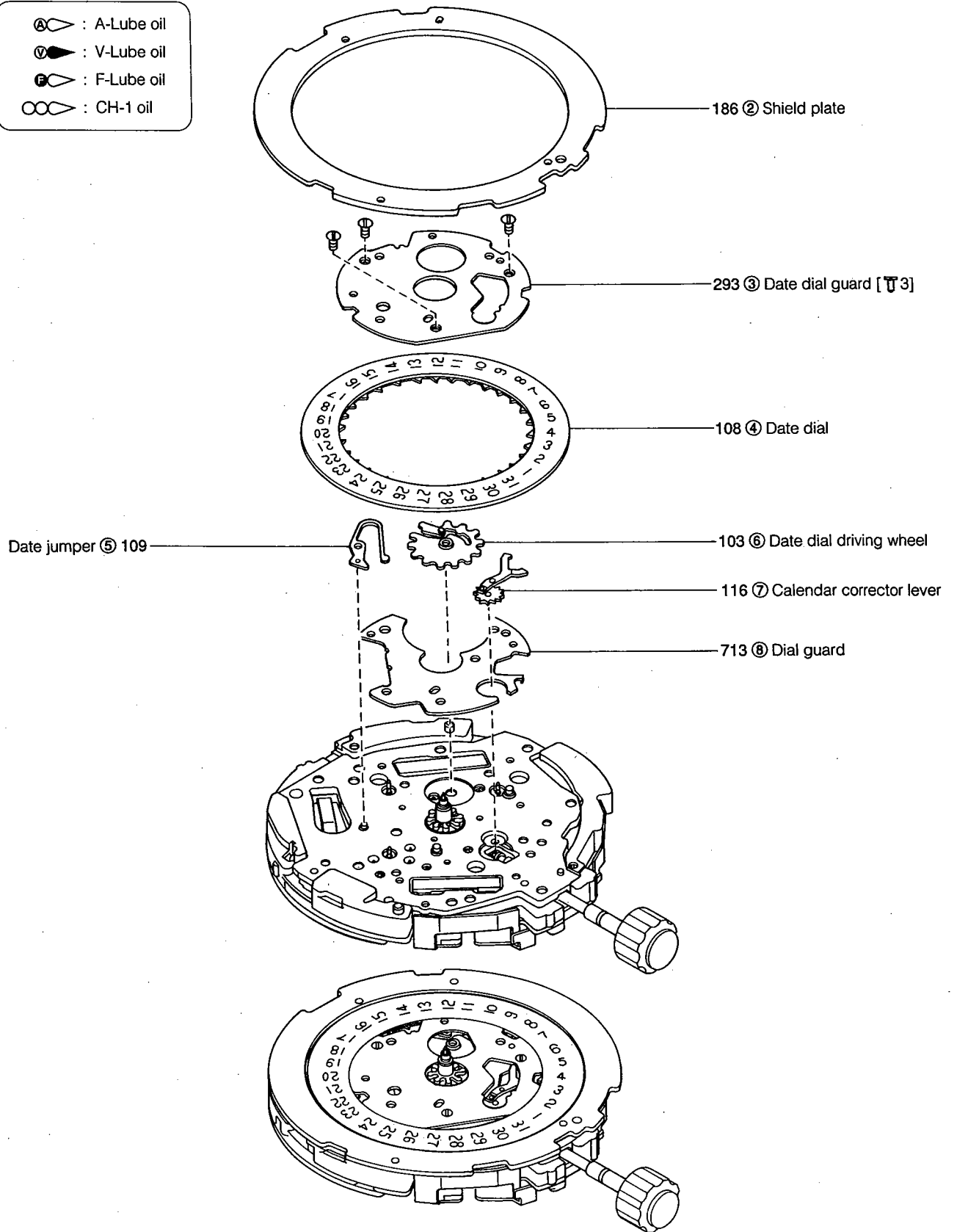
1. When pulling the crown out two steps, be sure to do so on dry land when the watch is dry.
2. This adjustment may be performed when the function hand is within 15 units of the 0 position. Otherwise, please refer to the ALL RESET instructions on page 10.

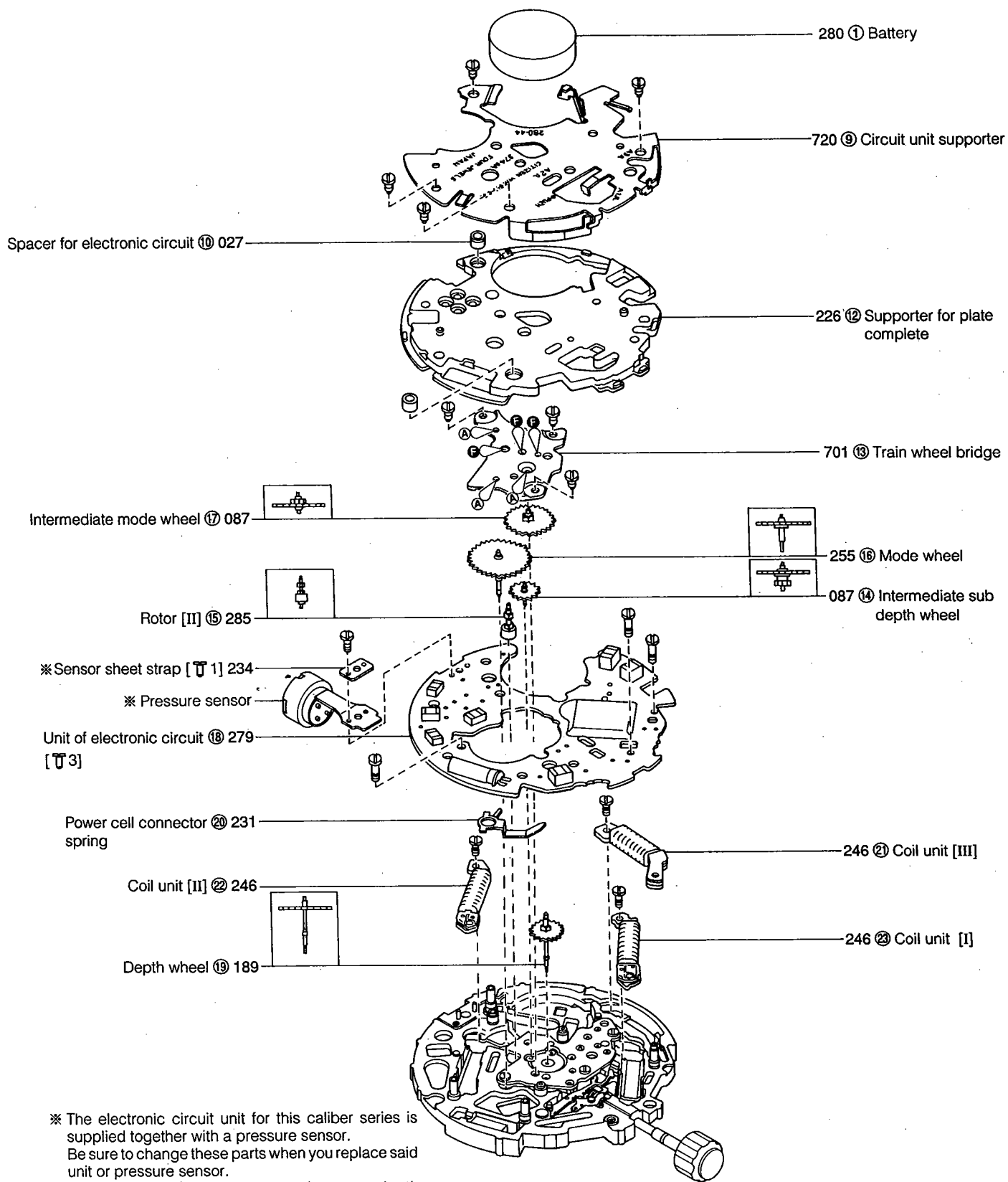
# §9. DISASSEMBLY AND ASSEMBLY OF THE MODULE

Disassemble procedure ① → ④⑧  
 Assemble procedure ④⑧ → ①

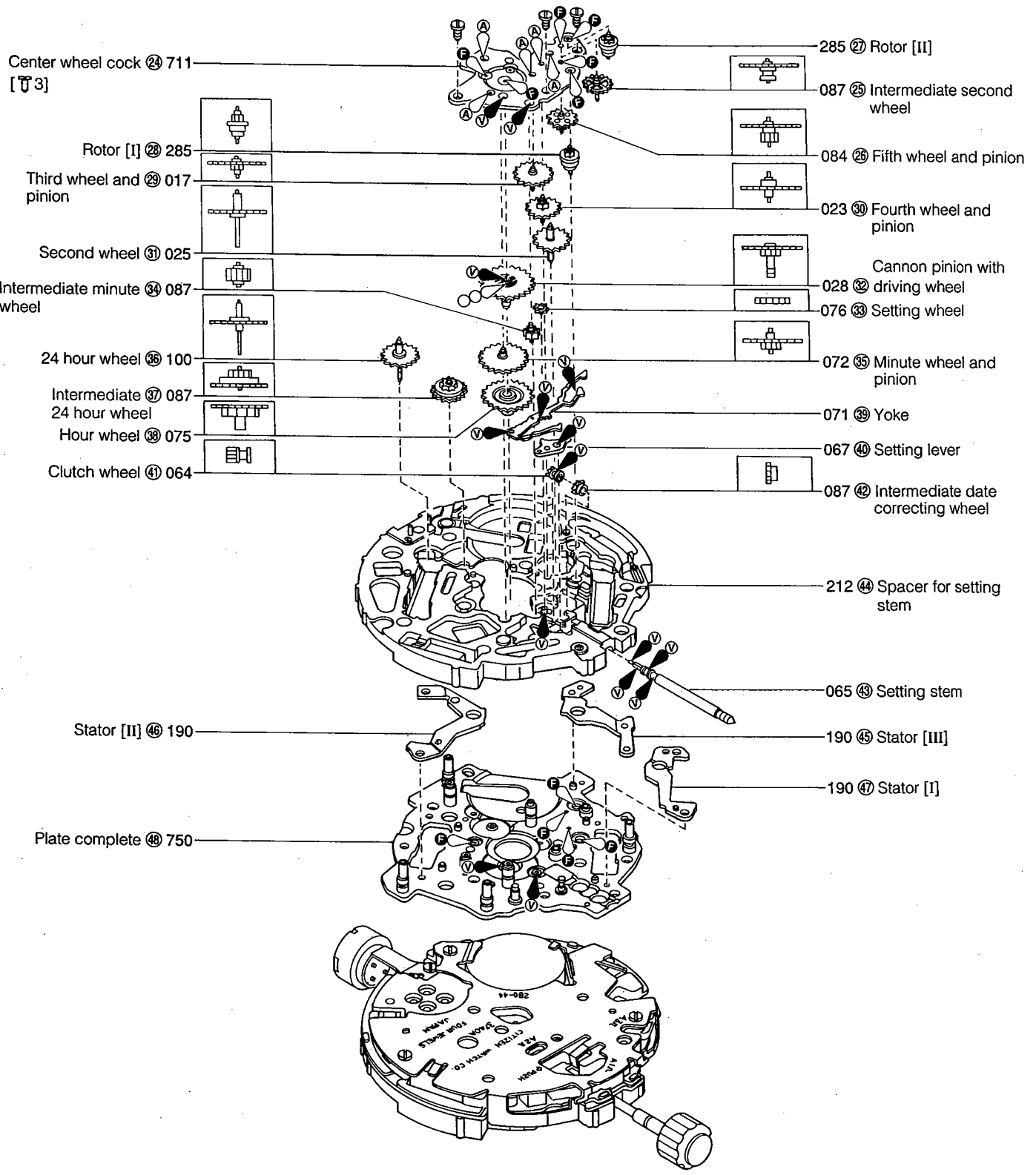
● Lubrication mark

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



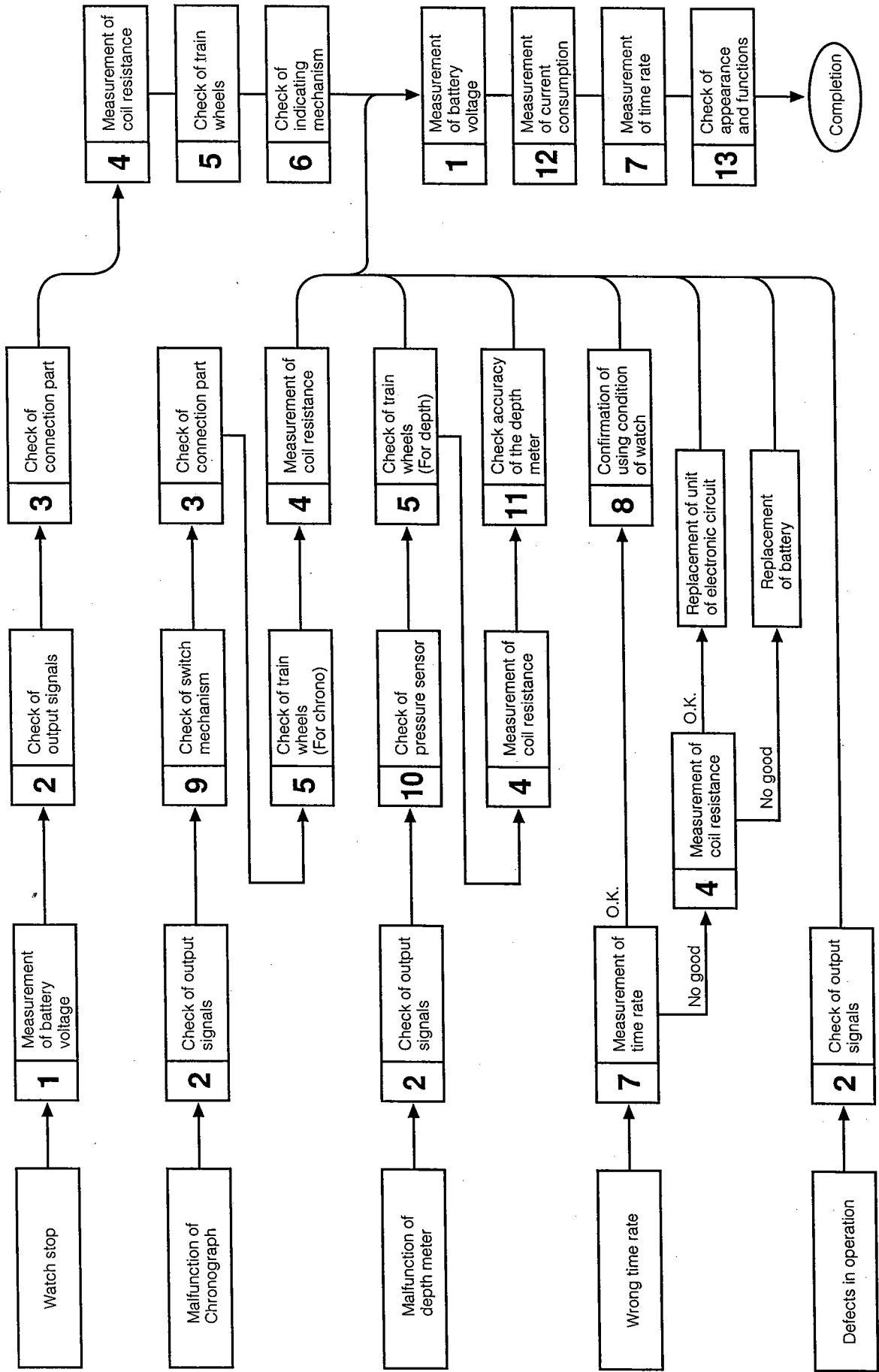


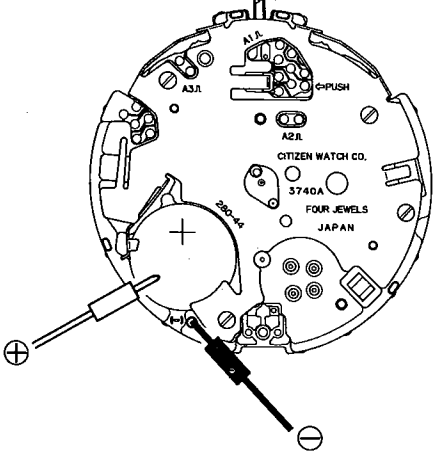
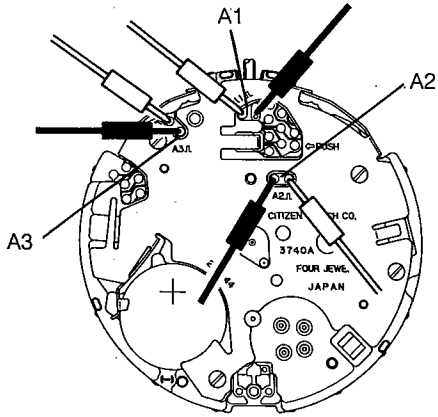
※ The electronic circuit unit for this caliber series is supplied together with a pressure sensor. Be sure to change these parts when you replace said unit or pressure sensor. This is because the accuracy in water depth measurement is maintained by the combined function of these two parts, that is, electronic circuit unit and pressure sensor, in a watch of this series. Pressure sensor and sensor sheet strap are assembled after mount the module in the case.

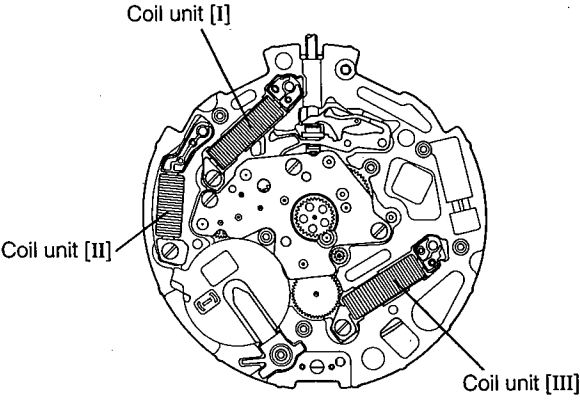




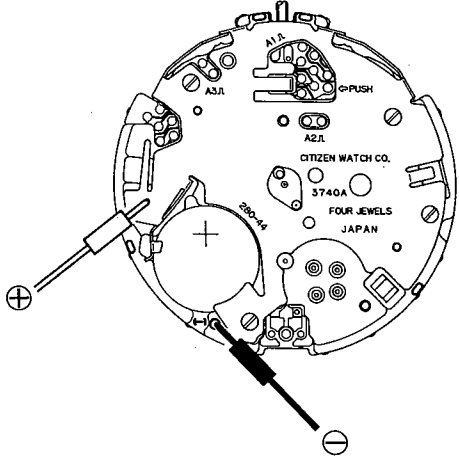
# §10. TROUBLESHOOTING AND ADJUSTMENT



Check items	How to check	Results and treatments
<p>① Measurement of battery voltage</p>	<p>* Refer to Technical Manual Basic Course II-1-a.</p> 	<ul style="list-style-type: none"> <li>• <b>More than 1.5V</b> → OK</li> <li>• <b>Less than 1.5V</b> → Replace the battery</li> </ul>
<p>② Check of output signals</p>	<p>* For the setting procedures of the tester, refer to Technical Manual Basic Course II-1-b.</p> 	<p>This watch has 3 step motors.</p> <p>A1 (time, hour, minute) A2 (depth and chrono measurement) A3 (time, second, chrono 1/20 second)</p> <p>When measuring A3, change to the chrono running mode.</p> <ul style="list-style-type: none"> <li>• The tester pointer swings right and left around the 0V every second → Non-defective</li> <li>• The tester pointer does not swing at all → Check the connection</li> </ul>
<p>③ Check of connection part</p>	<p>* Refer to Technical Manual Basic Course II-2-a, Analog Section.</p>	

Check items	How to check	Results and treatments
<p>④ Measurement of coil resistance</p>	<p>* For the setting procedures of the tester, refer to Technical Manual Basic Course II-1-c.</p> 	<p>1) Coil unit [I] • 1.8 kΩ ~ 2.5 kΩ → OK</p> <p>2) Coil unit [II] • 1.1 kΩ ~ 1.8 kΩ → OK</p> <p>3) Coil unit [III] • 1.8 kΩ ~ 2.6 kΩ → OK</p> <p>• Beyond the above range → Replace the coil unit</p>
<p>⑤ Check of train wheel</p>	<p>* Refer to Technical Manual Basic Course II-2-b.</p>	
<p>⑥ Check of indicating mechanism</p>	<p>* Refer to Technical Manual Basic Course II-2-c.</p>	
<p>⑦ Measurement of time rate</p>	<p>* Refer to Technical Manual Basic Course II-2-d.</p> <p>• Since this watch has D.F.C and does not have time adjustment terminals, thus the time rate cannot be adjusted. (Measurement is made in a 10 second-range)</p>	
<p>⑧ Confirmation of using condition of watch</p>	<p>* Refer to Technical Manual Basic Course II-2-e.</p>	
<p>⑨ Check of switch mechanism</p>	<p>To find which is faulty, push buttons or the module, check the module alone first.</p> <ul style="list-style-type: none"> <li>• Check the switch function while pushing the switch spring with tweezers.</li> </ul> <p>Next, check the push button.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Be sure to apply silicon oil to the push button packing. When replacing the power cell, replace the push button packing together with the case back packing.</li> </ul>	<ul style="list-style-type: none"> <li>• The switch function is not defective → Check the push button.</li> <li>• The switch function is defective → Check the push button.</li> <li>• Dust or dirt on the push button → Remove it.</li> <li>• The push button has been deformed → Replace the push button.</li> </ul>

Check items	How to check	Results and treatments
<p>⑩ Check of pressure sensor</p>	<p>Check the following points.</p> <ol style="list-style-type: none"> <li>1) Sand or dust have not entered the pressure sensor.</li> <li>2) There is no dust or dirt on the connection part of the sensor contact spring. (Each pattern of the pressure sensor and electronic circuit unit.)</li> <li>3) There are no scratches or cuts on the pressure sensor.</li> </ol> <p>* Even though either the pressure sensor or the electronic circuit unit can be defective, replace both together.</p> <p>This is because depth measurement accuracy is adjusted by these parts.</p>	<ul style="list-style-type: none"> <li>• Sand or dust or dirt → Remove it.</li> <li>• Scratches or cuts → Replace the parts.</li> <li>• If the above phenomena are not found, replace the electronic circuit unit.</li> </ul>
<p>⑪ Check accuracy of the depth meter</p>	<p>Check the accuracy using the master watch and water-resistance tester. (CW-50A)</p> <ul style="list-style-type: none"> <li>• Refer to water-resistance tester (CW-50A) handling procedure.</li> </ul> <p>The checking procedures are as follows.</p> <ol style="list-style-type: none"> <li>1) Remove the respective bands from the master watch and the watch to be repaired.</li> <li>2) Changing from the time display mode into the dive display mode in both watches. Call the depth meter display.</li> <li>3) Make sure that the case back has been firmly screwed on place.</li> <li>4) Put both watches in the water-resistance tester, apply 5 atmospheric pressures to them.</li> <li>5) After finishing above test, take them out of the water-resistance tester. Then call the maximum depth memory display and compare the two watches. At this time confirm the difference between the two watches.</li> </ol> <p>* Accuracy of depth meter is adjusted based on sea water level (Specific gravity: 1.025)</p> <p>Depending on the pressure accuracy of the water-resistance test, 50m of depth value may not be measured when applying 5 atmospheric pressure. It is therefore necessary to check the watch by comparison with the master watch.</p>	<ul style="list-style-type: none"> <li>• There is substantial display difference between the two watches → Check the depth sensor and replace the electronic circuit unit.</li> <li>• There is no substantial display difference → Confirmation of using condition of watch.</li> </ul>

Check items	How to check	Results and treatments
<p>12 Measurement of current consumption</p>	<p>* Refer to Technical Manual Basic Course II-1-d.</p>  <p>The diagram shows the internal components of a watch movement. A positive terminal (+) is indicated on the left, and a negative terminal (-) is indicated at the bottom. The movement is labeled with 'CITIZEN WATCH CO.', '3740A', and 'FOUR JEWELS JAPAN'. Other components labeled include 'A3.J', 'A2.J', 'A1.J', 'CP-PUSH', and '260-44'.</p>	<p>Current consumption <b>under 2.7 <math>\mu\text{A}</math></b>  → Nondefective</p> <p><b>over 2.7 <math>\mu\text{A}</math></b>  → After over-hauling the module, measure the current consumption once again.</p> <p>If the current consumption over 2.7 <math>\mu\text{A}</math>, replace the electronic circuit unit.</p>
<p>13 Check of appearance and functions</p>	<p>* Refer to Technical Manual Basic Course II-2-f.</p>	