

# ***TECHNICAL INFORMATION***

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## **CITIZEN QUARTZ**

**Cal. No. B740**

**Cal. No. B741**

**This watch needs to be repaired by the manufacturer,  
when it has any trouble.**

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## §1. OUTLINE

This watch is an analog solar powered diver's watch into which an electronic depth meter function and chronograph function and chronograph function are built. The solar power generation function transforms solar energy into electrical energy to run the watch.

- Since solar energy is used as the power source of this watch, it has no need of regular replacement of the battery unlike the general diver's watches using the mercury cell, etc. (Solar power function)
- The built-in depth meter function automatically measures the depth in diving with the watch worn on the wrist. (Depth meter function)
- The maximum depth in diving is automatically memorized. (Maximum depth memorizing function)
- The chronograph function measures the time in units of one second for 50 minutes at maximum.

## §2. SPECIFICATIONS

<b>Caliber NO.</b>		<b>B740M / B741M</b>
Type		Analog solar power watch
Movement size (mm)		ø30.8 x 6.6t
Watch Accuracy (At normal temperature)		±15 sec/month (5°C~35°C/41°F~95°F)
Depth gauge accuracy		At depth of 1 to 10m/5.0 to 25.0ft: within ±1m/±5.0ft At depth of 11 to 50m/27.5 to 125.0ft: within ±2m/±7.5ft On the condition that the water temperature is constant and error in reading is excluded. • Temperature range for guaranteed accuracy: +10°C to +40°C/50°F to 104°F Depth gauge accuracy is influenced by changes in surrounding temperature.
Operating temperature		-10°C to +60°C/14°F to 140°F
IC		1 unit of C/MOS-LSI
Time adjustment		Non
Measurement gate		10 sec.
Display functions	Time	Hour, Minute, Second, 24-hour, Charge level
	Calendar	Date
	Chronograph	Minute, Second (50-minute system)
	Depth gauge	1m to 50m/5ft to 125ft Reading in units of 1m/5ft Depth less than 1m/5ft is indicated as 0m/0ft. Depth more than 50m/125ft is indicated as overzone.
Maximum depth to be memorized		1m to 50m/5ft to 125ft
Additional functions		<ul style="list-style-type: none"> <li>• Charge level indication function</li> <li>• Insufficient charge warning indication</li> <li>• Stop warning function</li> <li>• Time reset warning function</li> </ul>
Continuous operating time		<ul style="list-style-type: none"> <li>• From full charge to stopping: Approx. 2 months</li> <li>• From full charge to NG indication: Approx. 1 month</li> <li>• From insufficient charge warning to stopping: Approx. 2 days</li> </ul>
Secondary battery	Part NO.	295-40
	Remarks	Secondary battery block (With welded lead plate)
Remarks		CAL. B740: Depth indication in meters CAL. B741: Depth indication in feet

### §3. SOLAR-POWERED WATCH

"Battery" means a secondary battery (rechargeable battery) in this technical manual.

A secondary battery is used in this watch to store electrical energy. If the battery is fully charged once, the watch will continue running for about two months. When the watch is used for diving (about two hours a week), it will run for about one month (until NG is indicated).

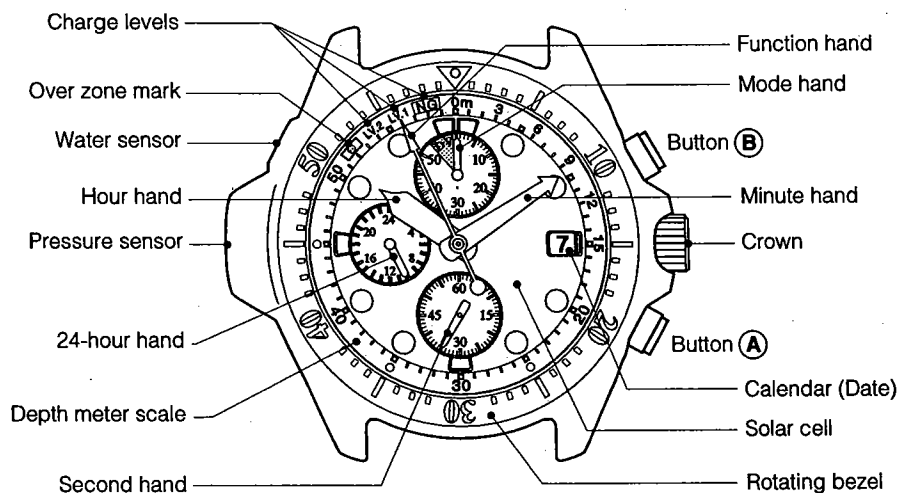
**<How to use this watch properly>**

It is recommended that you recharge the battery everyday. To insure that this watch demonstrates its depth meter function and chronograph function besides the timekeeping function, always keep it sufficiently charged. If the battery is not sufficiently charged or the battery power is very low, the depth meter function and chronograph function cannot be activated. The battery of this watch is protected from overcharge.

\* For recharging the battery, expose the solar cell (the face of the watch) to light.

### §4. HANDLING THE WATCH

#### A. Name of Parts



- Charge levels .....Charge level of the battery (battery power) is indicated as follows (LV.1, LV.2, NG) by the function hand. These guidelines indicate whether the depth meter function is usable or not.
- Overzone mark .....When the diving depth exceeds 50 meters (125 feet) or there is something abnormal in the depth meter function, the function hand points to the overzone mark.
- Depth meter scale.....The diving depth is indicated by the function hand on this depth meter scale.
- Pressure sensor .....Measures the depth by sensing the water pressure.
- Water sensor.....When the water sensor gets wet, the watch is automatically shifted to the diving mode.
- Rotating bezel.....The diver can know the elapsed time of diving by using this rotating bezel.
- Solar cell .....Electric energy necessary for running the watch is generated by this solar cell when it is exposed to enough light for charging the battery.

## B. Warning Function of this Solar Powered Watch

With decline of the battery power of this watch, its warning function is activated to change the indication.

### [Normal indication (Time mode)]

Function hand: Points at LV.2, LV.1 or NG.

### [Insufficient charge warning indication]

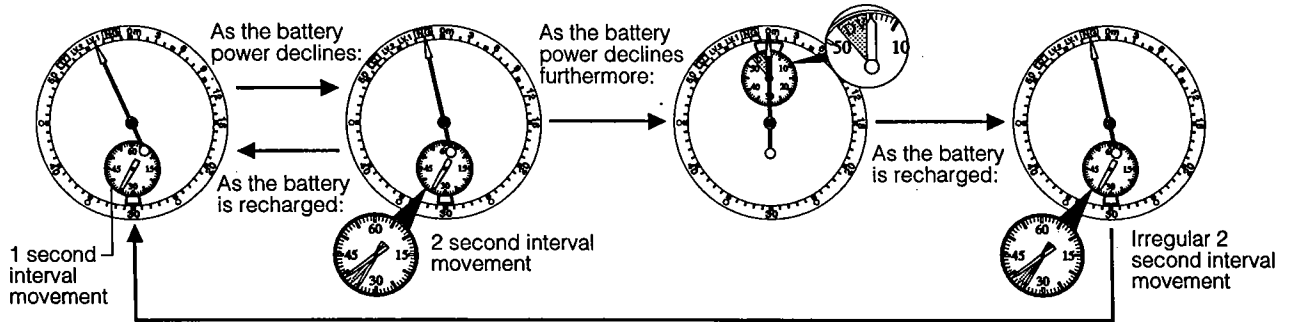
Function hand: Points at NG.

### [Stop warning indication]

Function hand: Points at "0".  
Mode hand: Points at "0".

### [Time reset warning indication]

Function hand: Points at NG.

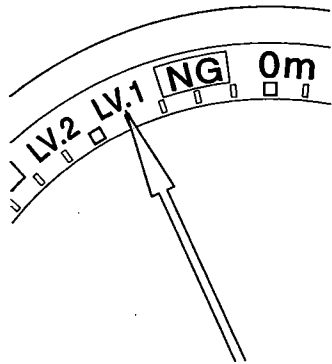


When the battery is sufficiently charged and the time is correctly set:

## Charge Level Indication

The function hand indicates the charge level as follows (LV.1, LV.2 and NG) to let the user know whether the watch can be used for diving or not.

In the diving mode, consumption of battery power is considerably increased because the pressure sensor and water sensor are actuated. Before using this watch for diving, charge the battery sufficiently and confirm the charging level which is indicated by the function hand.

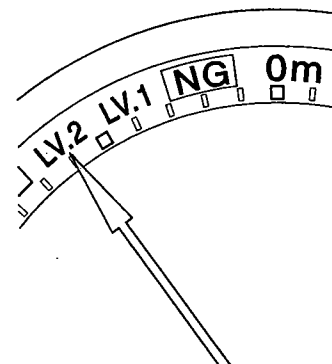


### <When the function hand points at LV.1 (at 56-seconds position)>

The watch is securing battery power enough for sports diving at the depth of 20m (66ft) or so for about an hour.

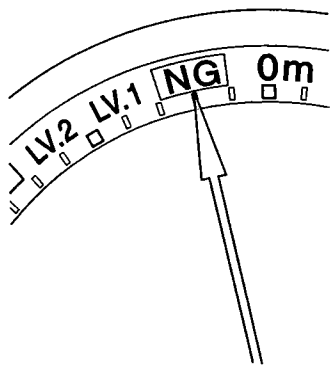
\* However, when the function hand points at LV.1 as a result of charging the battery after it was once depleted (after the status that the function hand indicated NG), be sure to charge the battery with a lighting of 3000 lux (20 cm under a fluorescent lamp) for at least 10 minutes before diving.

\* If diving continues for more than one hour, pay careful attention to the indication of the function hand, because the indication may change to NG from LV.1 during the diving and the watch may discontinue measuring the depth.



### <When the function hand points at "LV.2" (54 seconds)>

The battery is almost fully charged. Accordingly, the watch can be used reliably for diving.



### <When the function hand points at “NG” (58 seconds)>

The watch will not shift to the diving mode because of insufficient charging. When the watch is in this status, it cannot be used for diving because its depth meter function won't be activated.

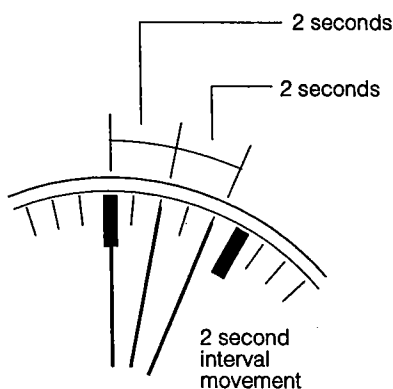
If the function hand points to “NG” during a dive, immediately stop using relying on the watch for depth measurement.

### ⚠ CAUTION

- Use the indication of the charge level as a reference only.
- If the watch is exposed to strong light for charging the battery, the function hand may temporarily indicate “LV.1” or “LV.2” despite insufficient charging. If the function hand goes to “LV.1” or “LV.2” from “NG” position in a short time, you need to pay careful attention to charging conditions.

It is recommended that you keep the battery sufficiently charged all the time but especially before using the watch for diving. Always check the indication of charge level carefully just before diving. (For details of charging time, refer to “C. Time Required for Charging”.)

### Insufficient charge warning function



### Insufficient charge warning indication

– Mode hand: DV position, Function hand: NG position –

Whenever the battery power becomes insufficient for operation, the watch is automatically shifted to the Time mode regardless of the currently set mode and the second hand goes for 2 second interval movement. (Insufficient charge warning indication)

If the watch is left in this condition without recharging for another two days, the watch will stop.

- \* If the watch falls into such condition, the time measurement will be discontinued in the chronograph mode.
- \* While the watch is falling into the insufficient charge warning indication, all button operations are ineffective except the max. depth operation.

Since the watch continues accurate indication of the date and time even in the insufficient charge warning indication, the watch will recover normal operation if it is exposed to light for sufficiently charging the battery. For using the watch for diving, sufficiently charge the battery until the function hand indicates “LV.1” or “LV.2” on the charge level.

## Stop warning function

### Stop warning indication

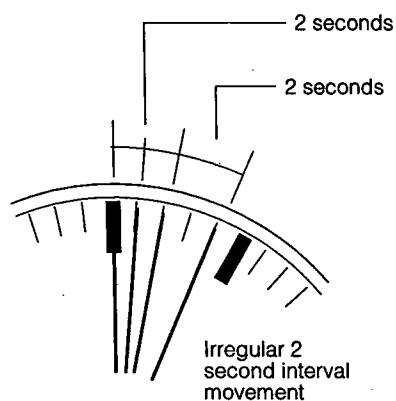
– Mode hand: “0” position, Function hand: “0” position –

If the watch is left in the insufficient charge warning indication for two days, both the mode hand and function hand will move to “0” position respectively, If the watch falls into this condition, it indicates that the watch has stopped operation completely. (Stop warning indication)

\* All functions of the watch are inactivated in this indication.

When the battery is charged in this condition, the watch restarts operation as it is switched to the time reset warning indication.

## Time reset warning function



### Time reset warning Indication

– Mode hand: DV position, Function hand: NG position –

With progress in charging the battery as the watch is exposed to light, the watch starts running but shows incorrect time. In this condition the second hand moves irregularly every two seconds to show that the time is incorrect. (Time reset warning indication)

To change the watch to the time mode, reset the watch correctly after sufficiently charging the battery.

\* In the case the battery is sufficiently charged but the watch has not been reset to the correct time, the second hand continues to go irregularly every two seconds.

## Overcharge prevention function

This watch has an overcharge prevention function. When the secondary battery is fully charged, this function is activated to protect the battery from overcharge by cutting of power supply. This function relieves you from worry about overcharge.

## C. Time Required for Charging

Since time required for recharging the battery varies according to model (depending on the dial color, etc.), refer to the following table as a rough guideline for charging the battery.

Illuminance (lux)	Environment	Time required for charging		
		Charging time for one-day operation	Charging time required to make the second hand move normally from the watch stop status.	Charging time required for fully charging
500	Under indoor lighting	2 hours	16 hours	134 hours
1000	60-70cm (24-28in.) under a fluorescent light (30W)	50 minutes	6 hours 30 minutes	57 hours
3000	20cm (8in.) under a fluorescent light (30W)	16 minutes	2 hours 30 minutes	18 hours
10000	Cloudy outdoor	4 minutes	1 hour	5 hours
100000	Under bright sunlight in summer	2 minutes	45 minutes	2 hours 30 minutes

\* Each time required for charging means a duration in which the watch is continuously exposed to the light indicated.

Charging time required for fully charging:

Time required for fully charging the battery, starting from the state that the watch has stopped operation (in the stop warning indication).

Charging time for one-day operation:

Time required for charging the battery enough for running the watch for one day, starting from the state that the second hand normally goes every second.

**(Note)** For using the watch for diving (one-hour diving a day), time required for charging must be extended 1.5 times as long as the time appearing in the table.

## D. Special Care for this Solar Powered Watch

**<Always take care to charge the battery of the watch.>**

- Mind that the battery power is apt to decline if you wear a jacket or a longsleeved shirt, because the watch is usually shaded by such clothes and the battery is insufficiently charged as a result.
- Try to put the watch in a well-lighted place, as far as circumstances permit, when you take it off. If you do, the watch will continue normal running.

**— Notes on charging —**

- Avoid charging in a hot place where the ambient temperature is +60°C/140°F or more, because an extreme rise in temperature may cause a breakdown of the watch.  
Examples: Charging near a hot light source such as an incandescent lamp, halogen lamp, etc.  
Charging in a place that easily becomes hot such as on a car dashboard, etc.
- When the watch is exposed to an incandescent lamp for charging, carefully keep the watch 50 cm (20 in.) or more apart from it so as not to get the watch hot.



— **Note on handling the secondary battery** —

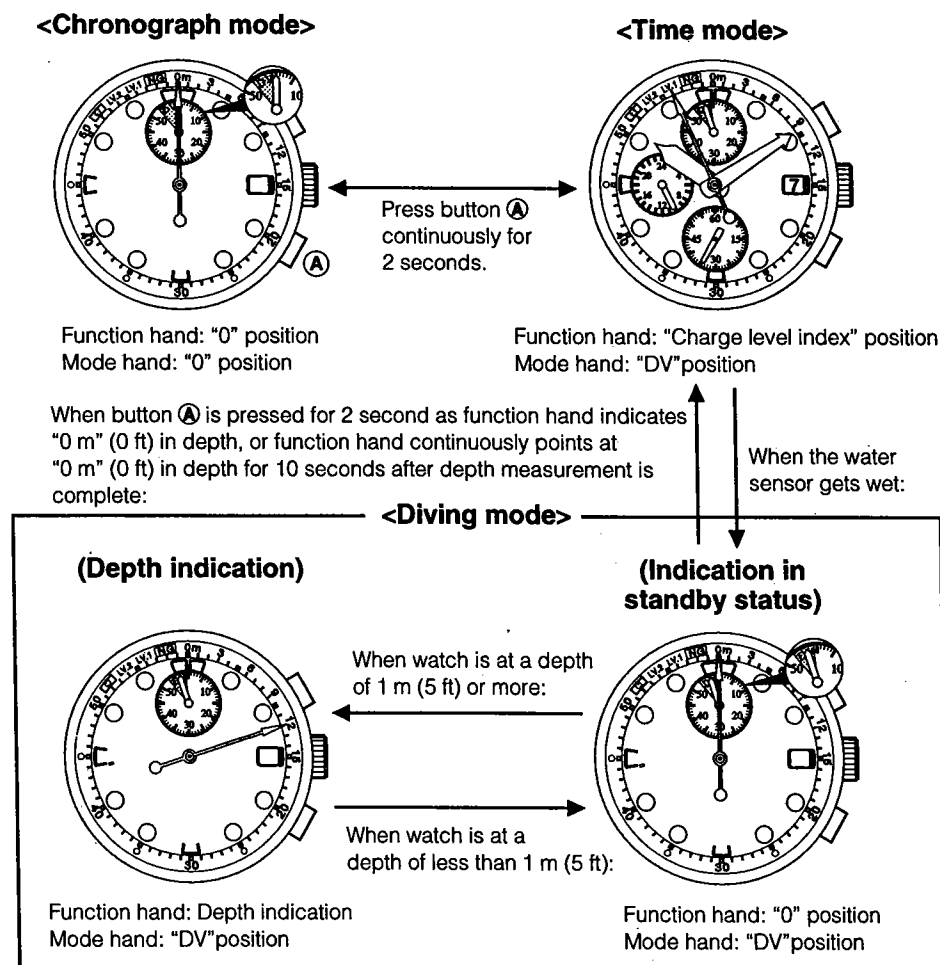
- The user should not remove the secondary battery from the watch. If you remove the battery from the watch for unavoidable reasons, be sure to keep it outside the reach of a child to prevent him/her from swallowing it.
- If a child swallows the secondary battery by mistake, immediately consult a doctor for treatment.

— **Use the specified secondary battery only** —

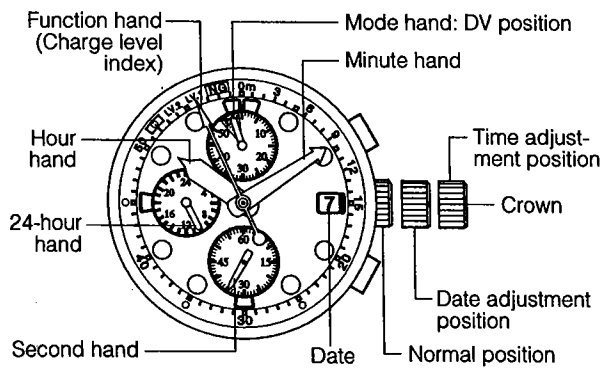
- Never use any battery other than the specified secondary battery. This watch is so designed that it does not run with any battery other than the specified secondary battery. However, if another battery such as a mercury battery for example, is forcibly set in the watch and it is charged, the battery will not only be overcharged and burst, but if worst comes to worst, it will resultingly damage the watch and injure the user and other people.  
To repeat the warning, use the specified secondary battery only without fail whenever the secondary battery needs replacement.

**E. Switching Between Modes**

- Each time button (A) is pressed for two seconds, the mode is switched from the time mode to the chronograph mode and vice versa.
- If the water sensor gets wet while the watch is in time mode, the mode is switched over to the diving mode. However, this mode shift is not performed when the function hand indicates "NG" on the charge level index.



## F. Adjusting Time and Date (Time mode)



The watch shows time and date in the Time mode.

Besides time and date, the function hand indicates the battery power at three levels.

Time (shown by hour, minute, second and 24-hour hands) and date can be checked any time regardless of the mode.

### Manner to adjust time

Time can be adjusted in the Time mode.

- (1) After turning the crown counterclockwise to unscrew it, pull the crown out to the time adjustment position (the second click stop position), the second hand will stop running.
- (2) Set the watch for the correct time by turning the crown.
- (3) Press the crown in to the normal position and the watch (second hand) starts running.
- (4) Turn the crown clockwise to screw it tightly against the case.

\* When the crown is pulled to the time adjustment position, the function hand points at the "0" second position.

If the function hand does not point at the "0" second position, correct the hand position referring to "J. Setting Function Hand at "0" Position.

### How to adjust date

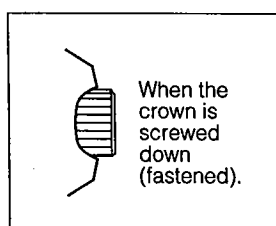
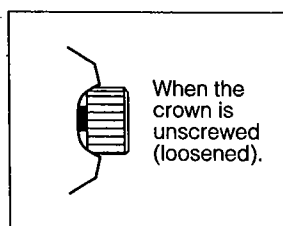
- (1) After turning the crown counterclockwise to unscrew it, pull the crown out to the date adjustment position (the first click stop position).
- (2) Set the watch for the correct date by turning the crown.
- (3) Press the crown in to the normal position.
- (4) Turn the crown clockwise to screw it tightly against the case.

**Note:** If date is adjusted when the watch shows a time between 9:00 pm and 1:00 am, the watch may not advance the date indication the next morning.

### <Note on operation of the crown>

The crown of this watch is designed to be screwed down to secure the water-resistance of the watch.

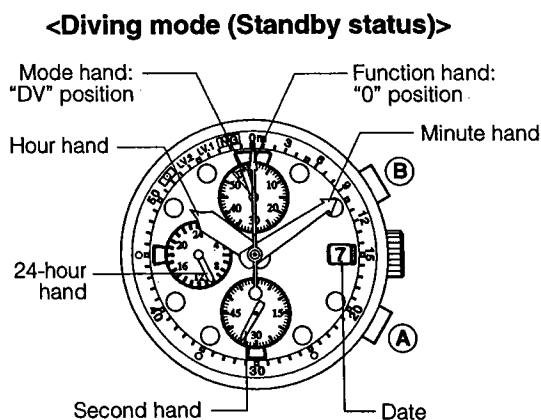
- For pulling out the crown for adjustment, unscrew it to get it loose first.
- After adjustment with the crown, press it in to the normal position and then screw it down without fail.
- Do not operate any button while the crown is being pulled out.  
If a button is operated in such the status, it may cause some change in the indication or disorder of some hand(s).



- Do not pull out or turn the crown when the watch gets wet or is in the water. Otherwise, the watch loses water-resistance and the inside of the watch gets wet.

## G. Diving Mode

When the watch is immersed in the water, while it is set in the Time mode and the battery is charged enough for diving, the water sensor senses the water and switches the watch to Diving mode to measure the depth. In the Diving mode, the watch automatically memorizes the maximum depth of the last dive and the user can recall it after the dive.



\* If the function hand and mode hand don't point to their respectively specified positions (mode hand: "DV" position, function hand: "0" position) when the watch enters the Diving mode (standby status), adjust the hand positions referring to "I. Measures against possible problems".

### <Depth indication>

Indication range: 0 to 50 m (0 to 125 ft) deep (measured every second)

Indication unit: 1 m/5 ft (Decimals of five and above in the first decimal place are rounded up and anything under five in the first decimal place is rounded down.

Depth less than 1 m/5 ft is indicated as 1 m/0 ft.)

### <Manner to read depth indication>

When the watch reaches the depth of 1 m/5 ft or more in diving, it starts measuring the depth. In diving, the indication by the function hand represents the depth.

- When the depth is less than 1 m/5 ft, the function hand indicates 0 m/0 ft.
- When the depth exceeds 50 m (125 ft), the function hand stops at the overzone mark (52-seconds position) to show that the depth is out of the indication range. As the diver ascends in the water and the depth is less than 50 m (125 ft), the watch again indicates the depth.

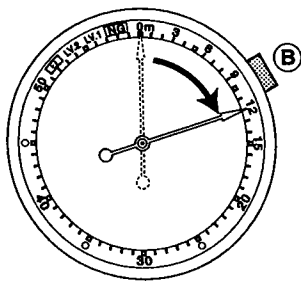
### <How to cancel the Diving mode>

- (1) Press button **A** for 2 seconds after diving or in the water where it is less than 1 m (5 ft) deep (depth indication: 0 m/0 ft). The Diving mode is canceled and the watch returns to the Time mode.
- (2) When the watch is left for 10 minutes after diving or in the water where it is less than 1 m (5 ft) deep (depth indication: 0 m/0 ft), the watch automatically returns to the Time mode with cancellation of the Diving mode. If the watch is again immersed in the water 1 m (5 ft) or more deep within 10 minutes after the last dive, the new dive is regarded as a continuation of the last dive and the watch continues to measure depth.

#### \* Wet detection error indication

If the diving standby mode (water sensor is in action) continues for 1 hour or more, the function hand points at the overzone mark.

If the watch remains in this status for a long time, refer to "I. Measures against possible problems".



### <How to recall the memorized maximum depth>

(1) Press button **(B)** in the Time mode or Diving mode (when depth indication is 0 m/0ft). The function hand indicates the memorized maximum depth.

(2) To cancel the maximum depth indication, press button **(B)** again.

\* Indication of the memorized maximum depth continues for 30 seconds and is automatically canceled after that.

\* The memory of the maximum depth of the last dive is held until the watch is used in the next dive.

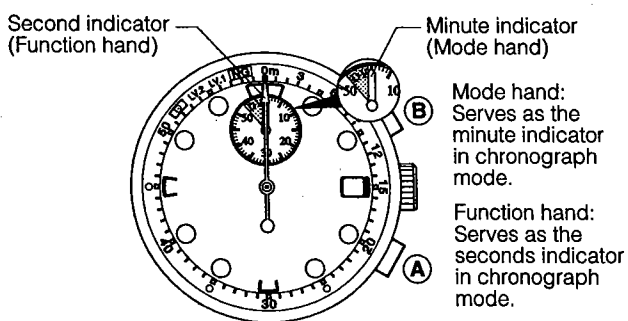
\* If the maximum depth in diving is less than 1 m (5 ft), it is not memorized. On the other hand, if the maximum depth exceeds 50 m (125 ft) it is memorized as an overzone depth.

\* When the watch is used in diving for the first time, it occasionally shows data stored during inspection prior to shipment.

## H. Chronograph Mode

The chronograph function enables this watch to measure time in units of 1 second for a maximum of 49 minutes 59 seconds. When it has reached 50 minutes, since a time measurement was started, the chronograph stops measuring time and the hands move to the reset position.

### <Chronograph indication – Reset position –>



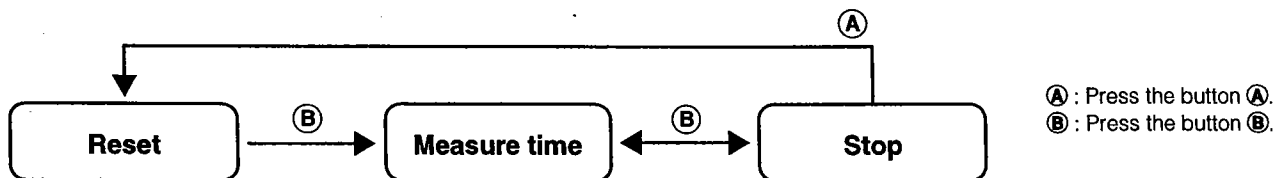
\* If the watch is left in reset status in the chronograph mode for 3 minutes, it automatically switches to the Time mode.

### <How to measure time>

(1) In the Time mode, press and hold button **(A)** for 2 seconds or more to switch the watch to the Chronograph mode. As a result, both the function hand and mode hand quickly go to their respective "0" positions and then stop.

(2) Each time button **(B)** is pressed, both the hands start and stop alternately.

(3) If button **(A)** is pressed while both the hands are stopped, the chronograph switches to the reset status.



\* The watch cannot be switched to the Chronograph mode from the Diving mode.

\* If the function hand or/and mode hand do not reset to their respective "0" positions when the watch enters the Chronograph mode or the chronograph is reset, adjust the hand(s) to the "0" position referring to "I. Measures Against Possible Problems".

\* The mode cannot be changed while the time is being measured in the Chronograph mode. If the mode is changed while in the stop state of the Chronograph mode, then indication is cleared.

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## I. Measures Against Possible Problems

If the solar powered watch is insufficiently charged or its battery power is considerably consumed, the watch functions are limited to a certain range and the watch warns the user of its status by various means such as abnormal indications.

To avoid such a power failure, always try to charge the battery sufficiently.

### ● Some hand is out of the correct position.

If a strong shock or static electricity is given to the watch by careless handling, the hands may show an incorrect indication.

- Adjust the function hand (chronograph second indicator) when it is out of the "0" position (the mode hand functions normally) in the following conditions referring to "J. Setting Function Hand at "0" Position".
  - 1) When the watch is in the reset status of the Chronograph mode
  - 2) When the watch is set to the time adjustment mode (the crown is pulled to the second click stop position)
  - 3) When the watch is in the diving mode (standby status).
- In the case the function hand and/or the mode hand are out of their respective "0" position in other modes, adjust the hand(s) referring to "K. All Reset/Adjusting Hand Position".

### ● The second hand jumps 2 seconds every 2 seconds.

Note this as the insufficient charge warning that warns the of a decline in the battery power. If it occurs, immediately recharge the battery sufficiently.

\* For details, refer to "B. Warning Functions of this Solar Powered Watch".

### ● The second hand moves irregularly every 2 seconds.

Note this as the time setting warning that warns of incorrect time indication caused by a temporary stoppage of the watch. In such a case, sufficiently charge the battery, then set the watch for the correct time.

\* For details, refer to "B. Warning Functions of this Solar Powered Watch".

### ● The modes cannot be switched.

If the battery power drops, the modes cannot be switched under the following conditions.

- When the function hand points to "NG", the watch cannot be switched over to the Diving mode even if the water sensor gets wet.
  - When the watch is in the insufficient charge warning status, the mode cannot be switched over to the Chronograph mode.  
In such a case, sufficiently charge the battery.
- \* For details, refer to "B. Warning Functions of this Solar Powered Watch".

### ● The watch does not switch to the Time mode from the Diving mode (depth indication mode).

When the user climbs to a high place or is on a flight, the watch may unexpectedly be shifted to the Diving mode because of a sharp change in the atmospheric pressure (pressure change equivalent to the depth of 1 m/5 ft). If it occurs, the watch may fail to switch from the Diving mode after the user goes back to the ground level, because the depth meter function didn't reset the depth indication to "0 m (0 ft)". Besides the aforementioned case, the watch may enter the Diving mode because the water sensor is activated by sweat or other moisture.

If the depth indication is less than 4 m (15 ft), press button **A** for 2 seconds or more to switch to the Time mode. If the depth indication is more than 4 m (15 ft), adjust the watch according to "K. All Reset/Adjusting Hand Position".

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● **The function hand continues to indicate the overzone mark.**

If the water sensor gets dirty or wet, it is activated even when the watch is not wet and the wet detection error indication (the function hand points to the overzone mark) appears.

In case the watch falls into this status, carefully clean the water sensor part and wipe out moisture completely.

\* If careful cleaning results in failure in recovering the watch from the above-mentioned status, it is possible that the pressure sensor is faulty. In that case, immediately stop using the watch and consult the Citizen Service Center.

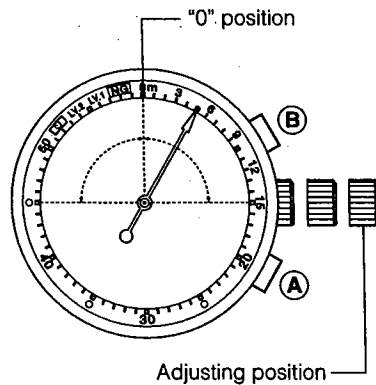
● **The watch malfunctions otherwise or shows abnormal reading.**

If a strong shock or static electricity is given to the watch, the watch may come into abnormal running that is out of explanation of this instruction manual.

If the watch falls into such a status, adjust it following the instructions of "K. All Reset/Adjusting Hand Position".

## J. Setting Function Hand at "0" Position

Within  $\pm 15$  graduations before/after the "0" point.



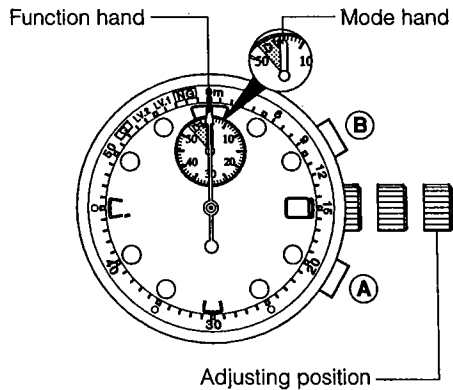
- (1) Set the watch to the Time mode or Chronograph mode.  
Turn the crown to loosen it and pull it out to the second click stop position.
- (2) Press button **A** or **B** to set the function hand to the "0" position.
- (3) press the crown in to the normal position and turn it until it is tightly screwed against the case.

- \* The aforementioned procedure is effectual only when the hand is located within  $\pm 15$  graduations before/after the "0" point. When the hand is located outside the adjustable range, correct the "0" position of the hand referring to "K. All Reset/Adjusting Hand Position".
- \* If the watch has been left without any operation for 3 minutes or longer as the crown is pulled to the second click stop position, the function hand does not move regardless of button operation. If the watch falls into such the condition, press the crown into the normal position and make a fresh start to adjust the hand position.
- \* Before unscrewing and pulling out the crown, make sure that the crown is not wet.

### Automatic time correction function

If it takes 4 minutes or less to adjust the position of the function hand in the Chronograph mode, the watch automatically sets the hour, minute and second hands for the correct time immediately after the adjustment by the automatic time correction function. Therefore, if adjustment is finished within 4 minutes, the watch has no need of manual time correction. However, if the crown is turned during adjustment, the watch will not indicating a correct time. If adjustment is not complete within 4 minutes, you will need to not only adjust the "0" position of the second indicator (function hand) in the Chronograph mode but also to set the correct time.

## K. All Reset/Adjusting Hand Position



- (1) Unscrew the crown and pull it out to the second click stop position.
- (2) Press buttons **A** and **B** simultaneously. If the function hand moves slightly, the watch is reset in whole.
- (3) Press button **A** or **B** to set the function hand and mode hand to their respective "0" positions.  
Button **A**: For adjustment counterclockwise.  
Button **B**: For adjustment clockwise.  
\* The function hand and the mode hand move interlocking with each other.
- (4) Correct the time indication by turning the crown. (Refer to "F. ADJUSTING TIME AND DATE (Time mode)".)
- (5) Press the crown in to the normal position and screw it down tightly against the case.  
As the crown is pressed into the normal position, the watch returns to the Time mode and starts running.  
\* After the watch is reset, the function hand points at "NG" position regardless of remaining battery power. Approximately 1 hour after resetting, the function hand will indicate the charge level. (While the function hand is indicating "NG", the watch cannot be switched to the Diving mode.)  
\* If the ALL RESET/ADJUSTING HAND POSITION fails in clearing away the trouble, consult the Citizen Service Center about the trouble.

Note that the maximum depth memorized during the last dive is cleared simultaneously during ALL RESET.

## §5. RELATIONSHIP BETWEEN CHARGE LEVEL INDICATION AND RUNNING PERIOD OF WATCH

**[LV.2 on the charge level indication (function hand) indicates that charging is completed (the battery is fully charge).]**

The charge level indication (function hand) indicates the charge level of the battery with three marks of LV.1, LV.2, and NG.

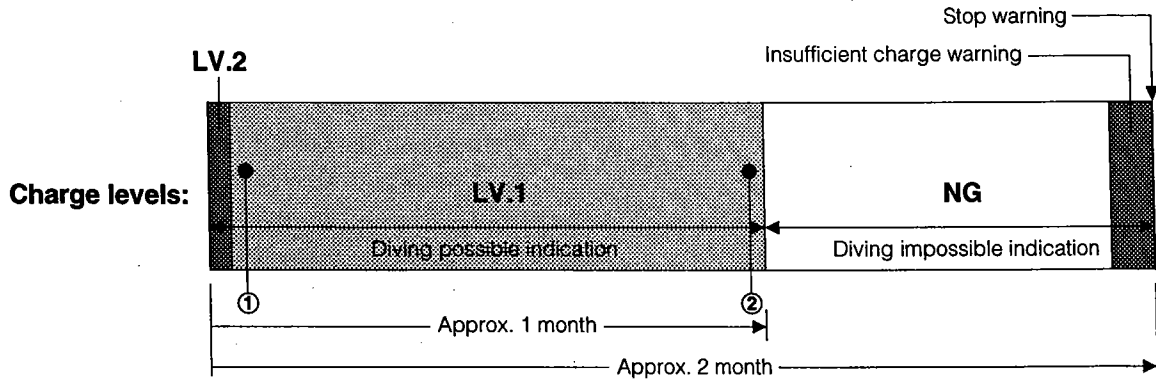
The relationship between these levels and the running period of the watch is shown below. After the battery is fully charged, LV.1 is indicated for about one month in which the watch can be used for diving.

If the battery is fully charged, function hand indicates LV.2. In several hours - one day after charging is stopped, the scale indicates LV.1 again. (The time when LV.2 changes to LV.1 after the battery is fully charged depends on the intensity of the light used for charging and the length time taken to charge the battery fully.)

Then, function hand keeps indicating LV.1, then indicates NG to inform that the watch cannot be used for diving.

### <Remark>

As explained above, LV.1 indicates the range from condition ① that the battery is almost fully charged and the watch can be used for diving sufficiently to condition ② that the watch can be used for at least "one diving about one hour long" and NG appears soon. Accordingly, the condition of LV.1 is explained as the condition that "the watch can be used for one diving about one hour long" on the instruction manual (explanation of the charge level indication), considering the safety and assuming the worst condition.



## §6. NOTE ON SECONDARY BATTERY

The secondary battery used in this watch is a clean energy battery that incorporates no toxic substance such as mercury inside. The secondary battery has no need of periodical replacement because it is capable of repeated charging and discharging.

## §7. PRECAUTION FOR DIVING

Advise the customer to understand the precautions on use of this watch and how to use it in advance.

### <Before using this watch for diving>

- For using this watch as an auxiliary depth gauge, the user must not only receive general training and instructions in diving but also follow various rules.
- The user should not use this watch without a good knowledge and understanding of the proper way to handle and operate it and the precautions on it. If this watch is improperly used, it may result in malfunction or breakdown of the watch.

### <Regarding the depth meter function>

- Since the depth meter function of this watch is not approved as an official depth gauge, use this function as an auxiliary means to measure a depth.
- Read the depth meter indication of this watch as a rough guideline.



### **<For safe diving>**

- When diving, obey the rules of the buddy system\*1 every time.
- For safety, it is advised that you enjoy sports diving in the depths around 20 m (60 ft).
- Before diving with this watch, fully charge the battery without fail. When the battery is not sufficiently charged (the function hand points at "NG"), the depth meter function cannot be used. If battery power declines considerably during diving, the depth meter function to measure depth is discontinued.
- After diving, take a good rest following safety rules. If you take a plane or move to a high place without a sufficient rest after diving, you may suffer from decompression sickness (caisson disease).

\*1: Buddy system means that two divers pair with each other for safe diving.

### **<Circumstances that prohibit use of this watch in diving>**

Don't use this watch for diving under the following circumstances.

- When the function hand indicates "NG" on the charging level index.  
...When the function hand indicates "NG" on the charging level, the watch will not measure the depth. If the function hand points at "NG" on the charging level during diving, immediately stop using the depth meter function of the watch since the watch discontinues depth measurement in this condition.
- When the watch stops running or malfunctions. (Be careful not to knock the watch against hard things such as diving apparatus, rocks, etc.)
- When the water temperature is out of the guaranteed range for measuring depth.  
...The accuracy of the depth meter function is guaranteed under the condition that water temperature is between +10°C and +40°C (50°F and 104°F).
- For the purpose of knowing a risk of a behavior or situation.  
...This watch is not designed to serve as a drowning prevention instrument or an emergency instrument.
- In the environment filled with helium gas (saturated diving, etc.).  
...Use of the watch in such conditions may cause failure or breakdown of the watch.

### **<Matters that require attention to the watch before/during/after diving>**

#### **<Before diving>**

- Check to see if the watch is set to the time mode. (When the watch is set to the chronograph mode, it will not shift to the diving mode.)
- Check the indication of the function hand (on the charging level index).  
When the function hand points to "NG", the watch will not shift to the diving mode because of insufficient battery power. If the function hand points to "NG", charge the battery sufficiently so that the hand indicates "LV.2" or "LV.1".
- Check to see if the function hand (serving as the depth indicator) points to "0 m (0 ft)" position when the water sensor is activated and the watch enters the diving mode.
- Check to see if the crown is completely pressed in and screwed down tightly.
- Check to see if the watchband and the watch are tightly fastened to each other.
- Check to see that there are no cracked, damaged or broken parts on the watchband and glass.
- Check to see if the rotating bezel rotates normally.
- Check to see if the time and date are set correctly.

### <During diving>

- Avoid quick ascending, otherwise you may suffer from submarine sickness or a functional disorder in some way. Whenever you ascend in water, carefully keep a safe speed.
- Don't disturb any push buttons or the crown except button **B** (for knowing the memorized maximum depth) throughout the dive, otherwise the watch may fail in water-resistance.

### <After diving>

- After confirming that the crown is screwed down tightly, wash out seawater, mud, sand, etc. sticking to the watch, with fresh water. Then, wipe off water and moisture with a dry soft cloth.
- Neither remove the sensor cover nor pick at it with a sharp-point in order to remove particles of dust, etc. collected in the sensor. If the sensor part is packed with dust, etc., wash it out with fresh water. In case it is difficult to wash out dust, consult the nearest Citizen Service Center about the trouble.

### <Regarding diving at high altitudes or in fresh water>

- If you intend to use this watch for diving in a high place or in fresh water, be sure to have a special education in safe diving beforehand.
- Don't use the depth meter function of this watch in a high place 4,000 m (13,120 ft) or more above sea level, because the watch gives incorrect measurement of depth in such a place.
- This watch indicates a depth based on the specific gravity (1.025) of seawater. Therefore, if the watch is used in fresh water, the real depth is 2.5% less than the indication of the watch.  
Example: 20 m (65 ft) (indicated depth)  $\times$  1.025 = 20.5 m (67 ft) (real depth)

When the watch is shifted to the diving mode, the pressure sensor regards the ambient pressure as that on the sea level (0 m/0 ft in depth or altitude). If the watch is shifted to the diving mode in a high place, it regards the pressure on the surface of the water as that on the sea level (namely 0 m/0 ft in depth/altitude). In short, the watch always regards the surface of the water as the sea level (0 m/0 ft) except in a place 4,000 m (13,120 ft) or more above sea level. Therefore, you are advised not to use the depth meter function of this watch in a high place 4,000 m (13,120 ft) or more above sea level for the reason that the watch gives incorrect measurement of depth in such a place as mentioned previously.

## §8. REPAIR OF THIS WATCH

This watch shall be repaired by the manufacturer (handled by CITIZEN SERVICE CENTER), since it needs special technologies and equipment for final adjustment and check after it is repaired.

Accordingly, if this watch has any trouble and needs to be repaired and adjusted, ask CITIZEN SERVICE CENTER.

The information on repair, trouble, and inspection is described for only reference.

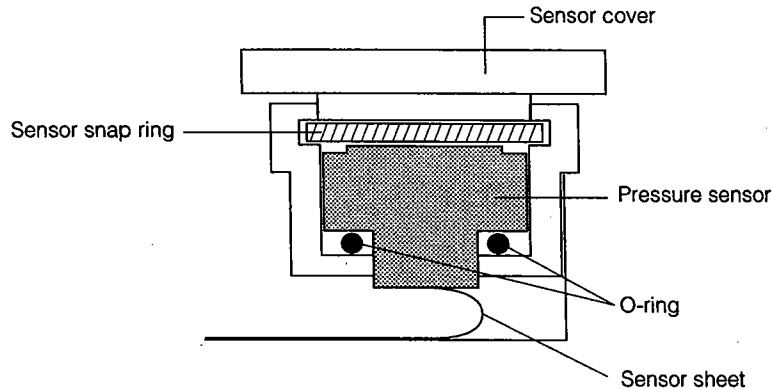
## §9. HANDLING METHOD OF PRESSURE SENSOR



### CAUTION

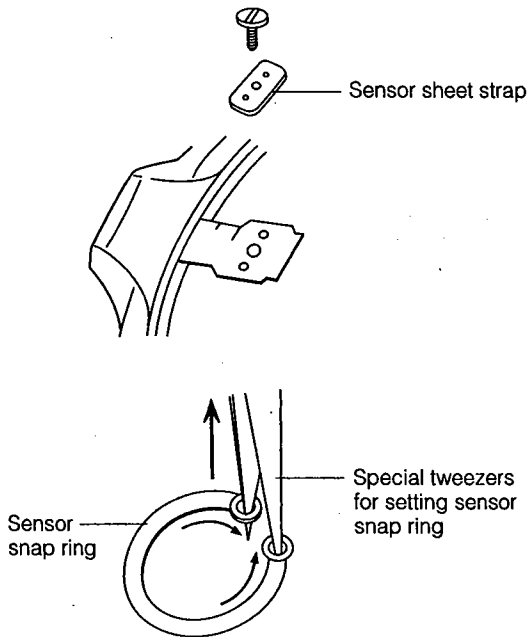
When removing and installing the pressure sensor, take care not to touch or prick the molded part (black) of the pressure sensor with tweezers or a screwdriver.

### A. Structure of Pressure Sensor



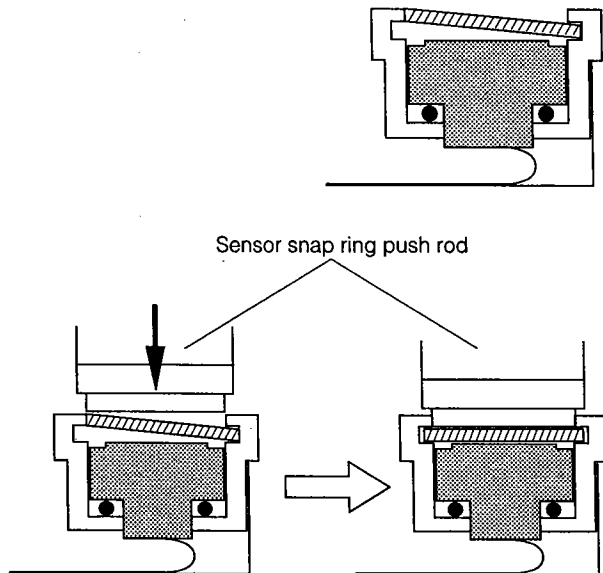
When removing and installing the pressure sensor, use the pressure sensor snap ring setting jig (CTA-028) for Cal. C52\*.

### B. How to Remove Pressure Sensor



- (1) Remove one screw, and remove the sensor sheet strap from the movement. Then, remove the sensor sheet from the dowel of the movement.
- (2) Insert a screwdriver under the sensor cover to remove it.
- (3) Remove the sensor snap ring with the special tweezers for it. Insert both tips of the tweezers in the two holes of the snap ring perpendicularly, then hold the snap ring and lift it up.
- (4) Hold the pressure sensor with the tweezers by the 3 o'clock and 9 o'clock parts, and remove it.
- (5) Remove the O-ring from the pressure sensor.

## C. How to Install Pressure Sensor



Install the pressure sensor with the movement removed from the case.

- (1) Set the O-ring to the pressure sensor.
- (2) Install the pressure sensor to the case, taking care of its direction.
- (3) Hold the sensor snap ring with the special tweezers for the snap ring, and set it as shown at left (It may be set in any direction.)
- (4) Push the top of the sensor snap ring with the sensor snap ring push rod to the specified position.
- (5) Stick the sensor cover to the case.

### <Note: Replacement of pressure sensor>

Since the pressure sensor and electronic circuit unit are adjusted as a set for higher accuracy, be sure to replace them as a set.

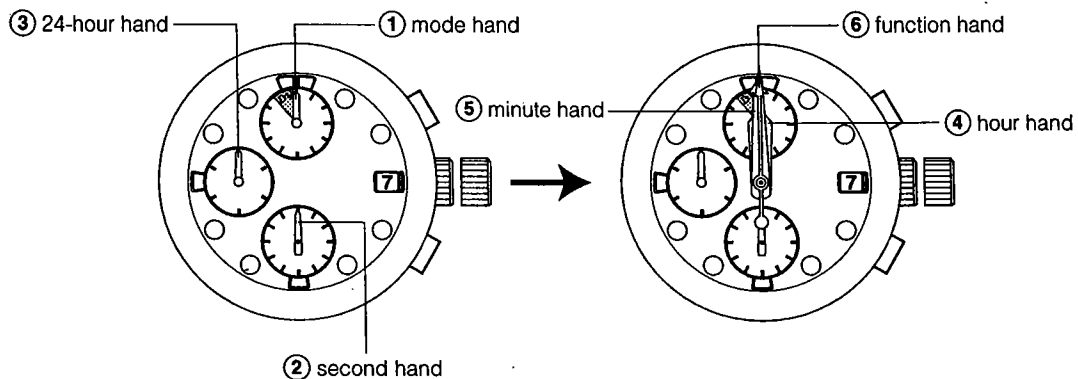
## §10. HANDS FITTING PROCEDURE

When fitting the hands to this watch, be sure to perform the all-reset operation and set the watch to the zero-resetting state (pull out the crown).

### <Procedure>

1. Pull out the crown and press the **(A)** button and **(B)** button at the same time. Do not push in the crown until the mode hand and function hand are fitted.
2. Fit the mode hand to the zero position (12 o'clock position). If it is deviated, correct it with the **(A)** button (to turn counterclockwise) or **(B)** button (to turn clockwise).
3. Fit the second hand, 24-hour hand, hour hand, and minute hand to the 12 o'clock position.
4. Fit the function hand to the zero position.
5. Push in the crown to the normal position, and the mode hand moves to the DV position and the function hand indicates the charge levels (LV.1/LV.2/NG).

\* After fitting the hands, check that the mode hands and function hands indicate correctly. If they are deviated, remove the all hands and fit them again correctly from the first step.



# §11. DISASSEMBLY AND ASSEMBLY FOR MOVEMENT

Disassembly procedure: ① → ⑤⑩

Assembly procedure: ⑤⑩ → ①

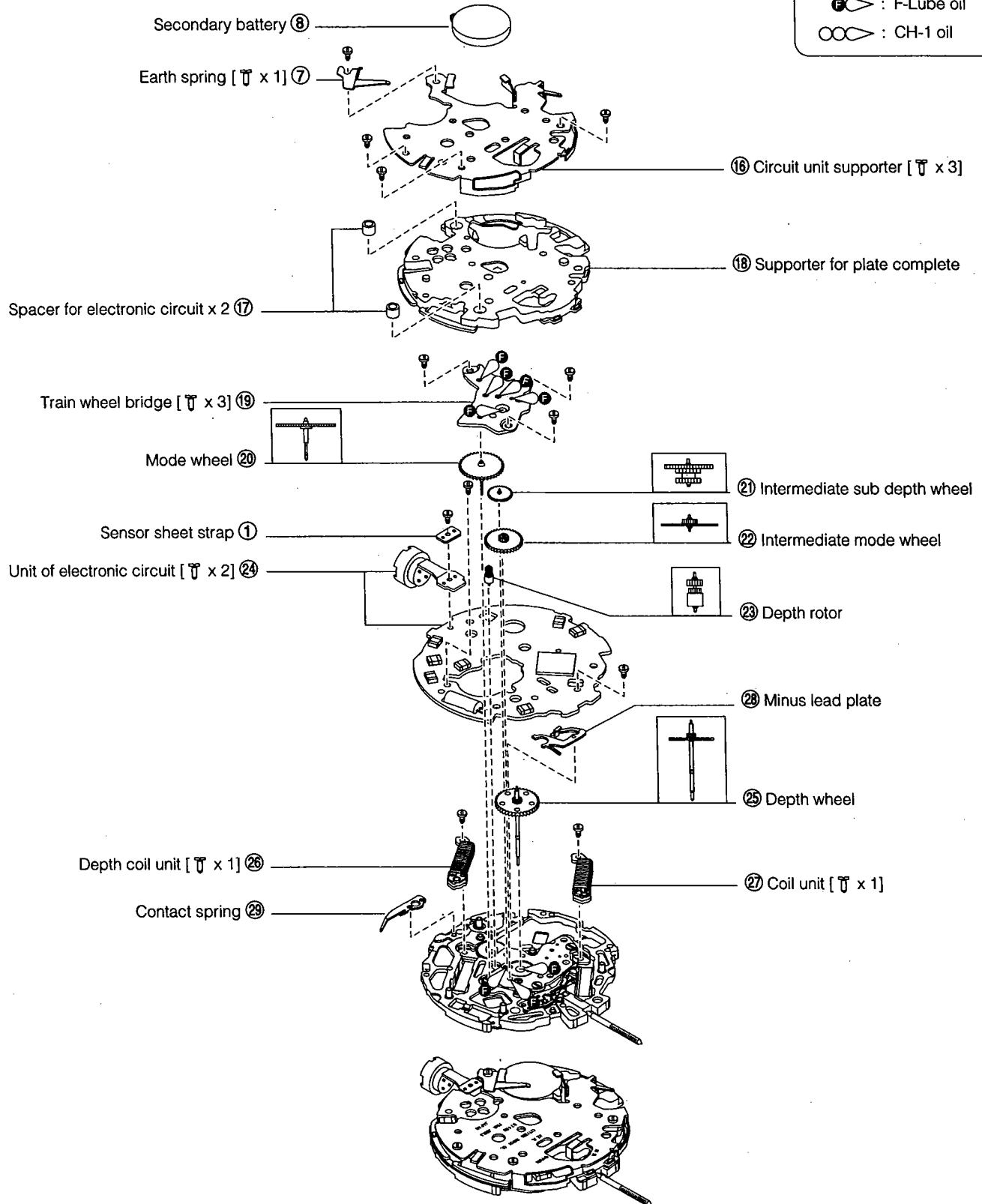
● Lubrication mark

Ⓐ : A-Lube oil

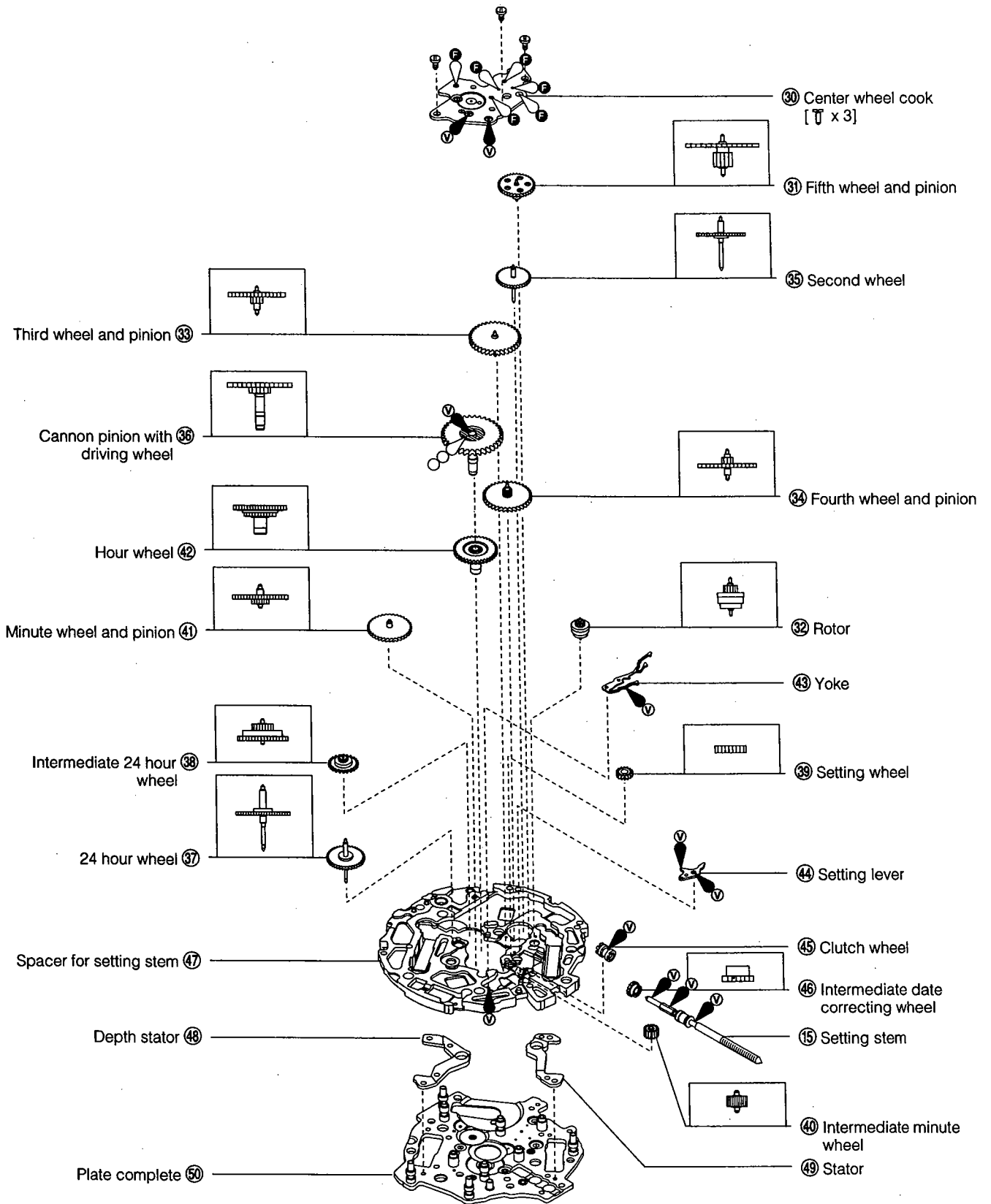
Ⓥ : V-Lube oil

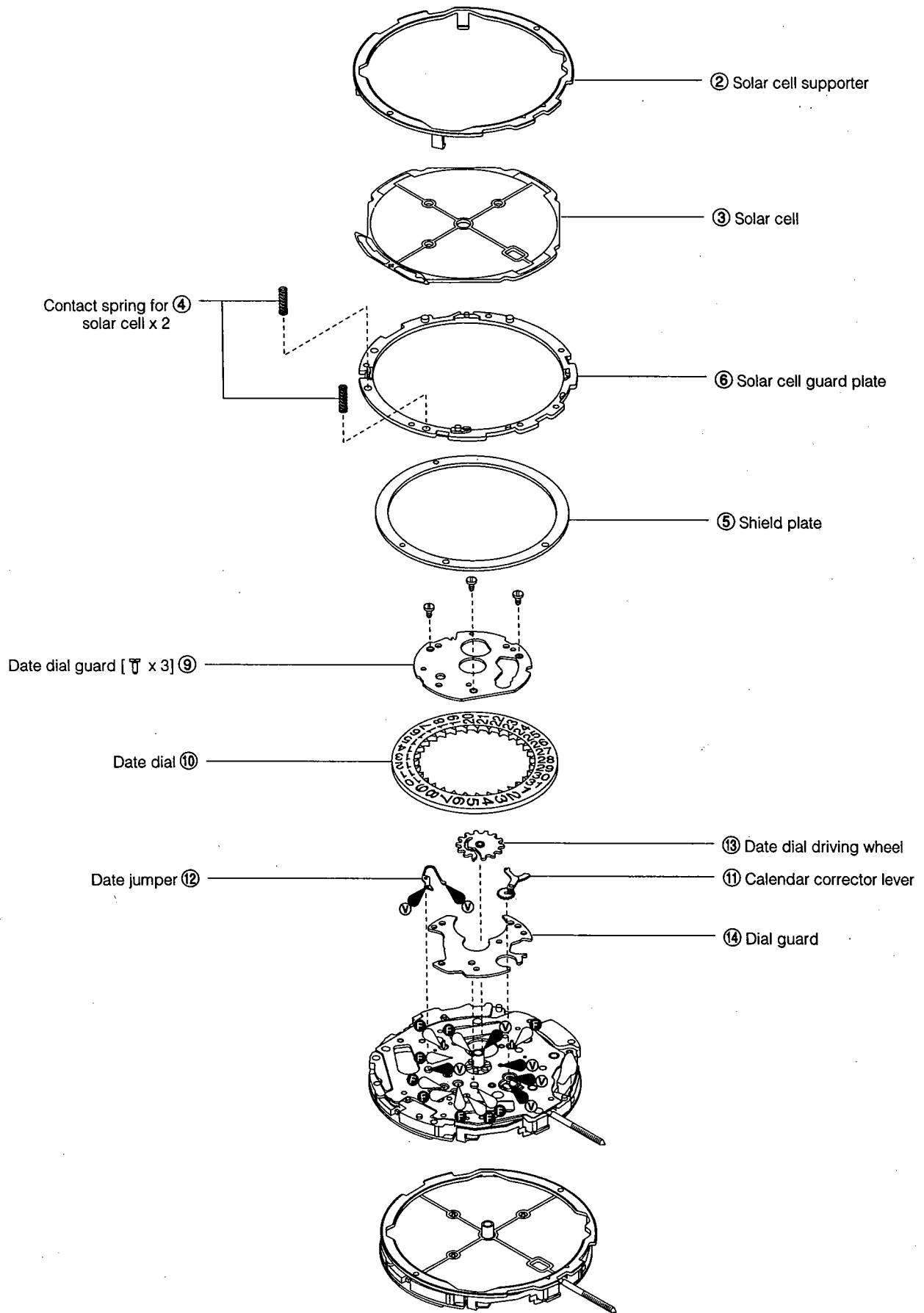
ⓕ : F-Lube oil

⊖ : CH-1 oil

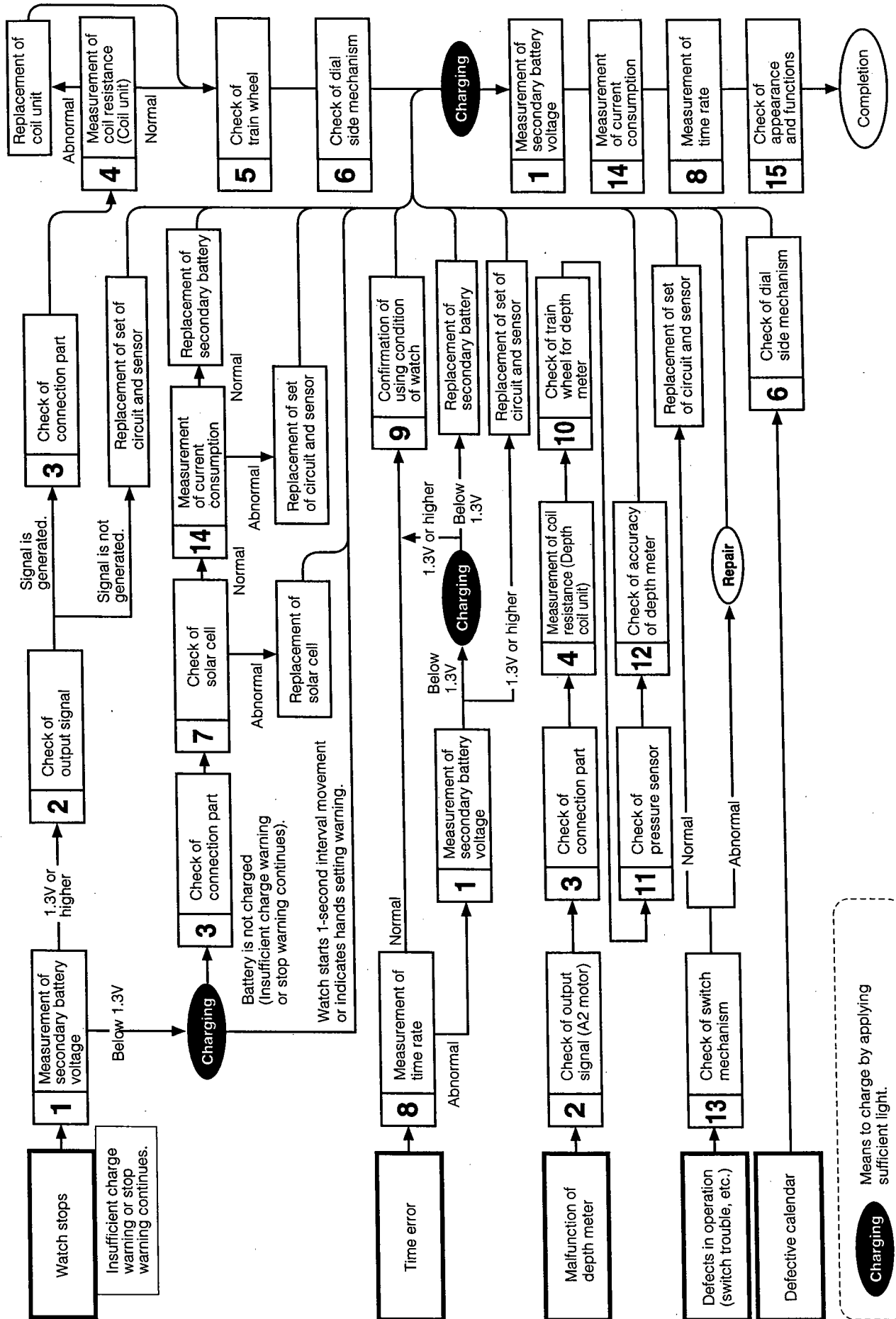


\* Use the movement holder No. B74 for disassembly and assembly.

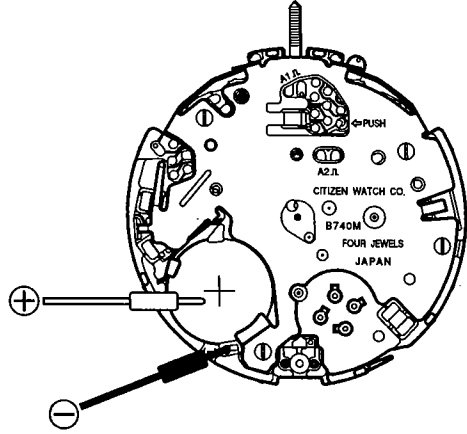
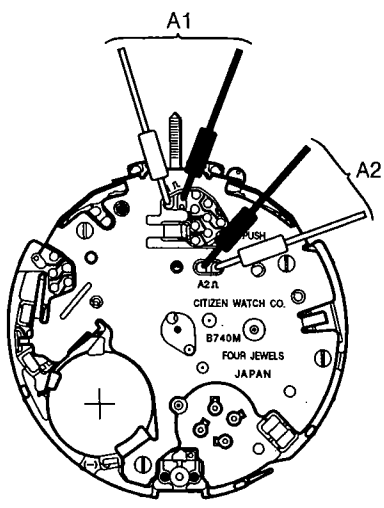


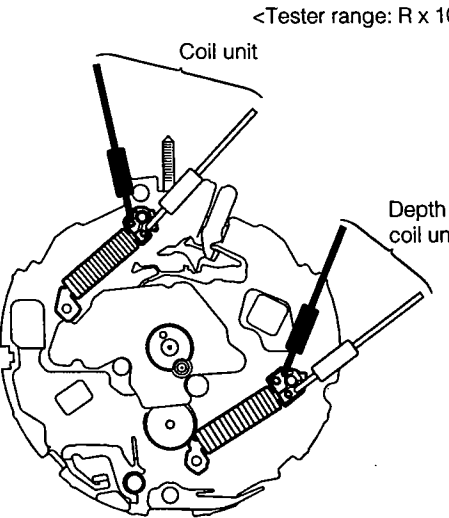


# \$12. TROUBLESHOOTING AND ADJUSTMENT

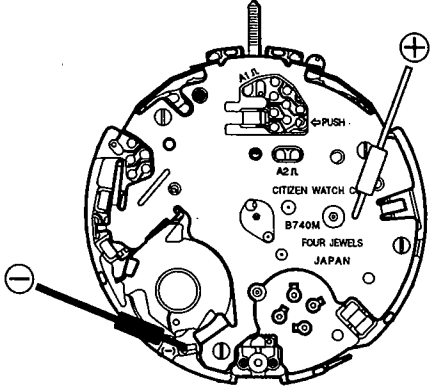





Check Items	How to Check	Results and Treatments
<p>① Measurement of secondary battery voltage</p>	<p>* Refer to Technical Manual Basic Course II-1-a.</p> <p>&lt;Tester range: D.C. 3V&gt;</p>  <p>If the function hand (charge level) indicates LV.1 or LV.2, the secondary battery voltage is 1.3V or more.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>&lt;Caution&gt;</b> When measuring, take care not touch (short) the circuit unit supporter with the negative ⊖ tester pin.</p> </div>	<ul style="list-style-type: none"> <li>• Over 1.3V → OK</li> <li>• Under 1.3V → Charge</li> </ul> <p>* For charging time, see "C. Time Required for Charging (P6)".</p>
<p>② Check of output signal</p>	<p>* Refer to Technical Manual Basic Course II-1-b.</p> <p>&lt;Tester range: D.C. 0.3V&gt;</p> <p>This watch has two step motors.</p> <ul style="list-style-type: none"> <li>• A1: For time (hour, minute, second, 24-hour hand)</li> <li>• A2: For measurement of chronograph/water depth (Function hand, mode hand)</li> </ul> <p>When checking the output of A2, check it while the chronograph is measuring.</p>  <p>&lt;The tester lead pins have no polarity.&gt;</p>	<ul style="list-style-type: none"> <li>• Tester pointer swings → OK</li> <li>• Tester pointer does not swing at all → Check connection part</li> </ul> <p style="text-align: center;">↓</p> <ul style="list-style-type: none"> <li>• Connection part is normal → Replace set of pressure sensor and electric circuit unit</li> </ul>

Check Items	How to Check	Results and Treatments
<p>③ Check of connection part</p>	<p>* Refer to Technical Manual Basic Course II-2-a, Analog Section.</p> <ul style="list-style-type: none"> <li>• Check for loosened screws, dust, and dirt.</li> <li>• Check for dirt on the solar cell patterns (2 places), removal of pattern, deformation of connecting spring, removal of welded lead plate of secondary battery, dirt of circuit pattern, and disconnection of each part.</li> </ul> <p>If the depth meter is defective, check the following items.</p> <ul style="list-style-type: none"> <li>• Check that the sensor terminal sheet are set normally.</li> <li>• Check the sensor terminal sheet and electric circuit pattern for dust and dirt.</li> <li>• Check the screws for looseness.</li> </ul>	<ul style="list-style-type: none"> <li>• Dust or dirt → Remove it</li> <li>• Removal of solar cell pattern or circuit pattern, removal of welded lead plate of secondary battery, deformation of part → Replace defective part</li> <li>• Dust or dirt → Remove it</li> <li>• Deformation or wire breakage of sensor terminal sheet → Replace set of pressure sensor and electric circuit unit</li> <li>• Loosened screw → Retighten screw</li> </ul>
<p>④ Measurement of coil resistance</p>	<p>* Refer to Technical Manual Basic Course II-1-c.</p> <ul style="list-style-type: none"> <li>• Remove the electric circuit unit, and measure the coil resistance.</li> </ul> <p style="text-align: center;">&lt;Tester range: R x 10Ω&gt;</p> <div style="text-align: center;">  </div>	<ul style="list-style-type: none"> <li>• Resistance of coil unit <b>1.9 kΩ - 2.3 kΩ</b> → OK</li> <li>• Resistance of depth meter coil unit <b>1.3kΩ - 1.6kΩ</b> → OK</li> <li>• Beyond above range → Replace coil unit</li> </ul>
<p>⑤ Check of train wheel</p>	<p>* Refer to Technical Manual Basic Course II-2-b.</p>	
<p>⑥ Check of dial side mechanism</p>	<p>* Refer to Technical Manual Basic Course II-2-c.</p> <ul style="list-style-type: none"> <li>• Check the parts for deformation, and check that they are lubricated normally.</li> </ul>	
<p>⑦ Check of solar cell</p>	<ul style="list-style-type: none"> <li>• Check the solar cell for breakage and dirt. Check the solar cell electrodes for dirt and removal.</li> </ul>	<ul style="list-style-type: none"> <li>• Breakage of solar cell or removal of electrode → Replace solar cell</li> <li>• Dirt → Remove it</li> </ul>

Check Items	How to Check	Results and Treatments
<p>⑧ Measurement of time rate</p>	<p>* Refer to Technical Manual Basic Course II-2-d.</p> <p style="text-align: center;">&lt;Measurement range: 10 second-analog&gt;</p> <ul style="list-style-type: none"> <li>• The time rate cannot be adjusted.</li> <li>• The time rate cannot be measured while the secondary battery is not charged sufficiently and insufficient charge warning or stop warning is indicated. In this case, expose the solar cell to light until the watch starts 1-second interval movement.</li> </ul>	<ul style="list-style-type: none"> <li>• Time rate is very fast or slow → Replace set of electric circuit unit and pressure sensor.</li> </ul>
<p>⑨ Confirmation of using condition of watch</p>	<p>* Refer to Technical Manual Basic Course II-2-e.</p> <ul style="list-style-type: none"> <li>• The energy source of this watch is light. Accordingly, it must be so used that it will receive light as much as possible. If it is brought too near a light source such as an incandescent lamp, halogen lamp, etc. which generates heat (Temperature of +60°C or higher), its parts may be deteriorated or deformed by the heat.</li> </ul> <p>Example: If the user often puts on long-sleeve shirt or works in a dark place, the watch needs to be exposed to light positively.</p> <ul style="list-style-type: none"> <li>• Check if the charging method is correct (if the user knows that this is a solar-powered watch), and show the user correct using method.</li> </ul>	
<p>⑩ Check of train wheel for depth meter</p>	<ul style="list-style-type: none"> <li>• Check the depth wheel and intermediate sub dept wheel for a defect.</li> </ul> <ol style="list-style-type: none"> <li>1) Check for dust and dirt.</li> <li>2) Check the lubricating condition.</li> <li>3) Check the wheel and pinions for deformation.</li> </ol>	
<p>⑪ Check of pressure sensor</p>	<p>* Refer to this Technical Information, §9. Handling method of pressure sensor.</p> <ul style="list-style-type: none"> <li>• Check the following items.</li> </ul> <ol style="list-style-type: none"> <li>1) Sand or dust have not entered the pressure sensor.</li> <li>2) There is not abnormality in the connection part of the pressure sensor and electric circuit unit.</li> <li>3) There are not scratches or cuts on the pressure sensor.</li> </ol> <p>* <b>Even through either the pressure sensor or the electric circuit unit is defective, replace them as a set. If they are not replaced as a set, water depth cannot be measured accurately.</b></p>	<ul style="list-style-type: none"> <li>• Sand or dust or dirt → Remove it</li> <li>• Abnormality of pressure sensor → Replace set of pressure sensor and electric circuit unit</li> </ul>
<p>⑫ Check of accuracy of depth meter</p>	<ul style="list-style-type: none"> <li>• The accuracy of the water depth meter is adjusted with the set of the pressure sensor and electric circuit unit. If the accuracy is very low, either the pressure sensor or the electric circuit unit may be defective. In this case, replace them as a set.</li> </ul>	

Check Items	How to Check	Results and Treatments
<p>13 Check of switch mechanism</p>	<p>1. Check of movement</p> <ul style="list-style-type: none"> <li>• Press the switch spring of the circuit unit supporter with tweezers, etc. to bring it in contact with the electric circuit pattern to check the switch mechanism.</li> <li>• Check the electric circuit for removal of the pattern and deformation of the switch spring.</li> </ul> <p>2. Check of push button</p> <ul style="list-style-type: none"> <li>• Check the push button for deformation and dirt.</li> </ul> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>* Be sure to apply silicon oil to the push button packing to keep water resistance and smooth operation.</p> </div>	<ul style="list-style-type: none"> <li>• Switch mechanism is normal → 2. Check of push button</li> <li>• Removal of pattern or deformation of spring → Replace defective part</li> <li>• Dirt or deformation of push button → Remove dirt or replace push button</li> </ul>
<p>14 Measurement of current consumption</p>	<p>* Refer to Technical Manual Basic Course II-1-f.</p> <p>This watch uses a secondary battery. Accordingly, prepare a silver battery (1.55V) and measure the current consumption according to the following procedure.</p> <p><b>&lt;Preparation for measurement&gt;</b></p> <ul style="list-style-type: none"> <li>• Remove the earth spring and secondary battery.</li> <li>• Pull out the crown.</li> </ul> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>☆ <b>Caution</b> When measuring the current consumption, stick a sheet of paper, etc. to the KG surface to prevent the solar cell from receiving light. If the solar cell receives light, the voltage changes and the current consumption cannot be measured accurately.</p> </div> <p><b>&lt;Measurement&gt;</b></p> <ol style="list-style-type: none"> <li>1) Set the silver battery (1.55V) to the tester.</li> <li>2) Set the tester. <ul style="list-style-type: none"> <li>• At first, set the tester range to 10mA.</li> </ul> </li> <li>3) Press the (A) button and (B) button at the same time, then push in the crown to the normal position (All-reset operation). <ul style="list-style-type: none"> <li>• Lower the tester range to 10μA.</li> </ul> </li> <li>4) When the tester pointer is stabilized, read the current consumption.</li> </ol> <div style="text-align: center; margin-top: 20px;">  </div> <p style="text-align: center; margin-top: 10px;">&lt;Tester range: DC 10μA&gt;</p>	<ul style="list-style-type: none"> <li>• Current consumption by movement <b>Under 1.8 μA</b> → OK</li> <li>• <b>Over 1.8 μA</b> → Check train wheel and dial side mechanism → Remove dust and dirt</li> </ul> <div style="text-align: center; margin: 10px 0;">  </div> <ul style="list-style-type: none"> <li>• Re-measured current consumption <b>1.8μA or more</b> → Replace set of electric circuit unit and pressure sensor</li> </ul>

Check Items	How to Check	Results and Treatments
	<div style="border: 1px solid black; padding: 5px;"> <p><b>Effects of light</b>            Do not measure the current consumption in a place where light of an incandescent lamp or the direct sunlight is applied to the watch. If the current consumption is measured in such a place, it may increase. Light of a fluorescent lamp has no effects on the measurement.</p> </div>	
<p>15 Check of appearance and functions</p>	<p>* Refer to Technical Manual Basic Course II-2-f.            Perform the following checks.</p> <ul style="list-style-type: none"> <li>• Check that the case back is tightened securely.</li> <li>• Check the water resistance.</li> </ul>	