

TECHNICAL INFORMATION

CITIZEN QUARTZ
ManualsLib.com

Cal. No. C650

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§1. FEATURES

This watch is a combination solar-powered watch that contains a solar cell in its face that drives the watch hands, alarm, chronograph, timer and numerous other functions by converting light energy into electrical energy.

It is also equipped with convenient functions including three power save modes that reduce power consumption when light is not shining on the solar cell, and a "charge indicator" that roughly indicates how much the secondary battery is charged.

§2. BEFORE USING

This watch is a solar-powered watch. Before using, allow light to shine onto the watch so that it is sufficiently charged.

If the manual power save function has been activated, cancel it before charging. (Refer to p.19 for information on the procedure for canceling the manual power save function.)

A secondary battery is used in this watch to store electrical energy. This secondary battery is a clean energy battery that does not contain mercury or other toxic substances. Once fully charged, the watch will continue to run for a maximum of 4 years without additional charging (when in the power save 2 mode).

[Proper Use of this watch]

To use this watch comfortably, make sure to recharge it before it stops running completely. There is no risk of overcharging the watch no matter how often it is recharged (Overcharging Prevention Function).

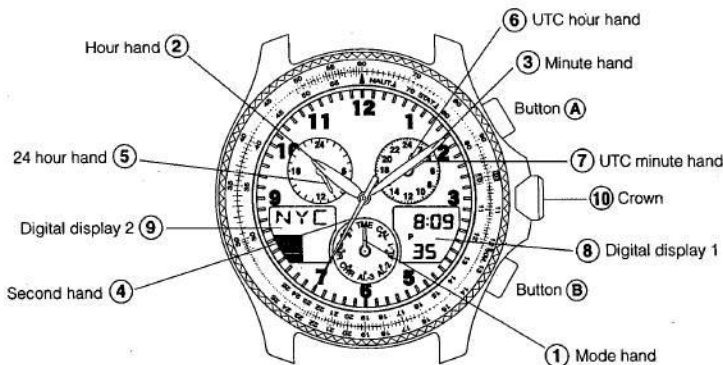
It is recommended that the watch be recharged everyday.

§3. SPECIFICATIONS

Caliber NO.		C650-00A	
Type		Combination solar-powered watch	
Movement size (mm)		ø31.8 x 6.49t	
Accuracy		Within ±15 seconds per month (when worn at normal temperatures of 5°C to 35°C/41°F to 95°F)	
IC		1 unit of C/MOS-LSI	
Operating temperature range		Watch operating temperature range: 0°C to +55°C (32°F to 131°F)	
Time adjustment		No adjustment terminal for use in market	
Measurement gate		10 sec.	
Display function	Analog display	Time: Second, minutes, hours, 24 hours, UTC minutes, UTC hours, mode	
	Digital display	Time	Seconds, minutes, hours, city name, daylight savings time, A/P
		Calendar	Month, date, day, city name
		Alarm 1	Hours, minutes, A/P, city name, ON/OFF
		Alarm 2	Hours, minutes, A/P, city name, ON/OFF
		Alarm 3	Hours, minutes, A/P, city name, ON/OFF
		Chronograph	Chronograph hours, chronograph minutes, chronograph seconds, chronograph 1/100 seconds, SPL, 24 hour measurement
		Timer	Timer remaining minutes, timer remaining seconds, set minutes (timer setting range: 99 minutes to 1 minute in 1 minute units)
Zone setting	City name (SET/OFF), daylight savings time (ON/OFF), display setting and cancellation for each city, setting of ON/OFF for daylight savings time for each city		
Additional functions		<ul style="list-style-type: none"> • Switching between main time (analog) and sub-time (digital) • Power save 1: Automatically stops second hand movement and liquid crystal display • Power Save 2: Automatically stops watch functions • Manual Power Save: Enables watch functions to be stopped arbitrarily (forcibly) • Power indicator: Approximate indication of secondary battery charging level • Insufficient charging warning function • Time setting warning function • Overcharging prevention function 	
Continuous running times		Fully charged to stopped: Roughly 4 years (when Power Save 2 function is operating) Two-second interval movement to stopped: Roughly 1.5 days	
Battery		Secondary battery	

* Specifications are subject to change without notice.

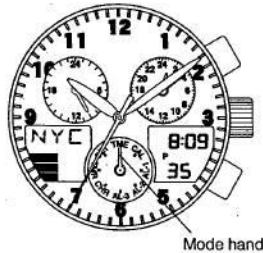
§4. NAMES OF COMPONENTS AND MAJOR FUNCTIONS



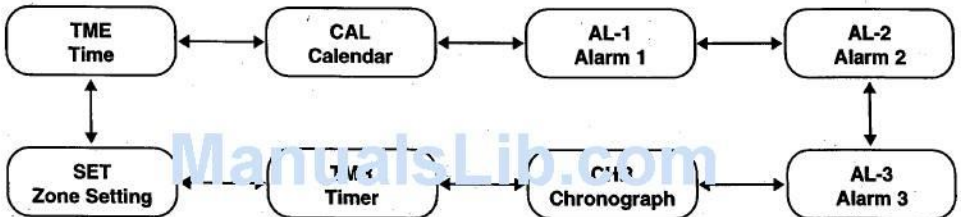
Name/Mode	Time	Calendar	Alarm 1	Alarm 2	Alarm 3	Chronograph	Timer	Zone setting
① Mode hand	TME	CAL	AL-1	AL-2	AL-3	CHR	TMR	SET
② Hour hand	Always indicates "hours"							
③ Minute hand	Always indicates "minutes"							
④ Second hand	Always indicates "seconds"							
⑤ 24 hour hand	Always indicates "24 hours"							
⑥ UTC hour hand	Always indicates "UTC hours"							
⑦ UTC minute hand	Always indicates "UTC minutes"							
⑧ Digital display 1	Hours, minutes, seconds, A/P, SMT (when set to daylight savings time)	Month, date, day, SMT (when set to daylight savings time)	Hours, minutes, A/P, alarm (ON/OFF)			Measured time (seconds, minutes, 1/100 seconds)	Remaining time display (minutes, seconds)	City name (SET/OFF) SMT (ON/OFF)
⑨ Digital display 2	City name					Measured time (hours)	Set time (minutes)	City name
	Charge indicator							
⑩ Crown	Normal position	Mode switching						
	1st click	_____						Changing the city
	2nd click	Time correction	Date correction	Alarm time correction		0-position setting	Set time correction	City name, time difference setting
Button A	Normal position	Changing the city				Start/stop		Changing the city
	1st click	_____						Switching city name (SET/OFF)
	2nd click	Switching location to be corrected					_____	Switching location to be corrected
Button B	Normal position	Changing the city				Split, reset	Reset	Changing the city
	1st click	_____		Switching alarm (ON/OFF)		_____		Switching SMT (ON/OFF)
	2nd click	Switching SMT (ON/OFF) Switching between "seconds" correction and "24 hour time" correction	_____		Switching alarm (ON/OFF)		_____	

§5. SWITCHING THE MODE (DISPLAY FUNCTIONS)

In addition to the time and date modes, this watch is also equipped with three additional modes consisting of the alarm, chronograph and timer modes. The mode can be switched by turning the crown. Check the current mode with the mode hand.



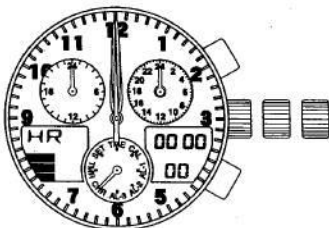
<Switching the Mode>



§6. CHECKING 0-POSITION OF EACH HAND

Before using this watch, check that the 0-position (based position of each hand) is set correctly to ensure that the functions of the watch operate properly by performing the following procedure.

<0-Position Check>



1. Turn the crown while in the normal position to set the mode hand to the chronograph [CHR] mode.
2. Pull the crown out to the second click (0-position correction position).
 - The second hand, minute hand, hour hand, 24 hour hand, UTC hour hand and UTC minute hand rapidly advance to the 0-position (12:00 position).

Note:

- When each hand is not at the 0-position, perform the "0-position correction" procedure. If this 0-position is out of alignment, each hand will not indicate the correct position.

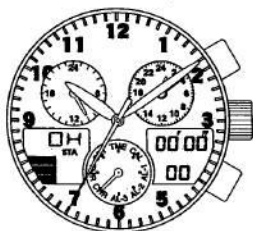
<0-Position Correction (Setting to the Watch Base Position)>

When setting the 0-position of each hand, always make sure to turn the crown forward (clockwise) to set each hand to its 0-position in the clockwise direction.

1. Turn the crown while in the normal position to set the mode hand to the chronograph [CHR] mode.
2. Pull the crown out to the second click (0-position correction position).
 - The second hand, minute hand, hour hand, 24 hour hand, UTC hour hand and UTC minute hand rapidly advance to the position stored in memory.
 - "HR" lights during digital display 2 indicating that the watch is in the correction state.
3. Turning the crown forward (clockwise) allows correction to be made in the positive direction. Turning the crown continuously allows the 0-position to be corrected continuously.
4. Pressing button (A) switches the correction location between "MIN" (minute hand) and "SEC" (second hand) each time it is pressed.
5. Turn the crown forward (clockwise) to align each hand at the 0-position at each correction location. Although correction can be made in the negative direction by turning the crown backward (counter-clockwise), always make sure to set the 0-position by turning the crown forward to ensure that the 0-position is set correctly.
 - The 24 hour hand is corrected in conjunction with the hour hand.
 - The UTC hour and minute hands are corrected in conjunction with the minute hand.
 - The second hand can only be corrected in the forward (clockwise) direction only.
6. After correcting, return the crown to the normal position.
 - After correcting the 0-position of each hand, reset the time, calendar and other modes before using the watch.

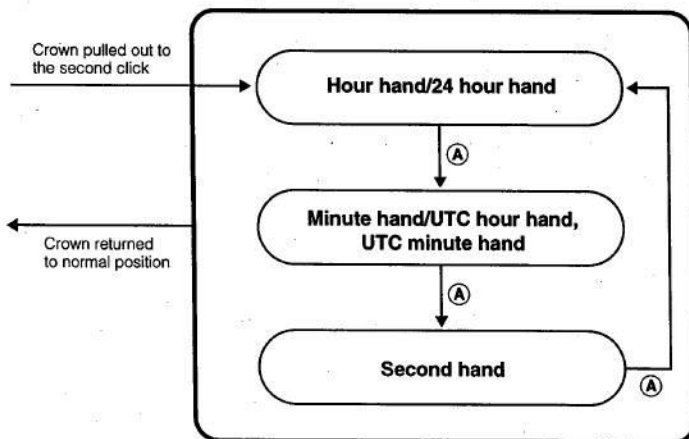
Note:

- None of the buttons on the watch operate during movement of each hand. Operate the buttons only after the hands have stopped moving.



<Normal Chronograph Display>

<0-position (Base Position) Correction State>



§7. ACCESSING TIMES OR DATES OF MAJOR CITIES

The time or date of major cities pre-registered in this watch can be easily accessed by pressing the buttons.

<Access Procedure>

1. Turn the crown to set the mode hand to the time [TME] or calendar [CAL] mode.
2. When button (A) is pressed, the times or dates of major cities are displayed while scrolling up each time it is pressed.
3. When button (B) is pressed, the times or dates of major cities are displayed while scrolling down each time it is pressed.
 - Pressing button (A) or (B) continuously causes the display to advance rapidly.

<Cities and UTC Time Difference Pre-registered in this Watch>

Display on watch	City name	Time difference	Daylight savings time	Display on watch	City name	Time difference	Daylight savings time
UTC	Universal time constant	±0	—	TYO	Tokyo	+9	X
LON	London	±0	O	SYD	Sydney	+10	O
PAR	Paris	+1	O	NOU	Nouméa	+11	X
ROM	Rome	+1	O	AKL	Auckland	+12	O
CAI	Cairo	+2	O	HNL	Honolulu	-10	X
IST	Istanbul	+2	O	ANC	Anchorage	-9	O
MOW	Moscow	+3	O	LAX	Los Angeles	-8	O
KWI	Kuwait	+3	X	DEN	Denver	-7	O
DXB	Dubai	+4	X	CHI	Chicago	-6	O
KHI	Karachi	+5	X	MEX	Mexico City	-6	X
DAC	Dacca	+6	X	NYC	New York	-5	O
BKK	Bangkok	+7	X	YUL	Montreal	-5	O
SIN	Singapore	+8	X	CCS	Caracas	-4	X
HKG	Hong Kong	+8	X	RIO	Río de Janeiro	-3	O
PEK	Beijing	+8	X	BUE	Buenos Aires	-3	X

* Cities (regions) in which daylight savings time is used are indicated with a O, while those in which it is not are indicated with an X.

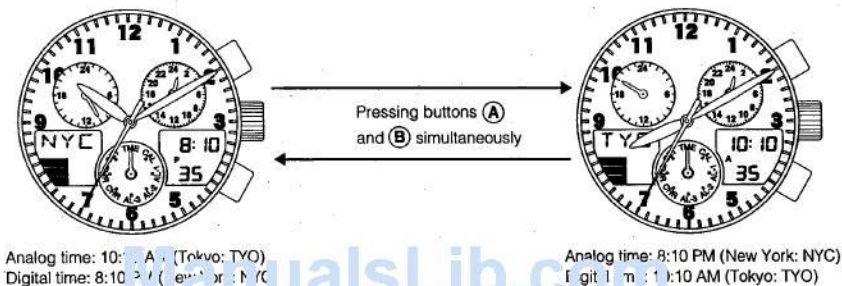
* The time difference and use of daylight savings time of each city are subject to change by the particular country.

§8. SWITCHING ANALOG TIME AND DIGITAL TIME

This watch is able to switch between analog time display and digital time display.

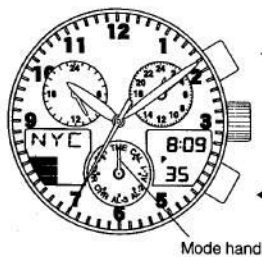
<Switching Procedure>

1. Turn the crown to set the mode hand to the time [TME] mode.
2. Press button **(A)** and **(B)** simultaneously.
3. After a confirmation tone sounds, the watch switches the time of the city displayed by analog display and the time of the city displayed by digital display.
 - If buttons **(A)** and **(B)** are simultaneously pressed when in the calendar [CAL] Mode, the watch switches the date of the city displayed by analog display and the date of the city displayed by digital display (the times are switched at this time as well).



§9. SETTING THE TIME (TIME IS CORRECTED BY DIGITAL DISPLAY)

- When digital time is corrected, the second, minute, hour, 24 hour and UTC hour and minute hands of the analog time are corrected automatically in conjunction with digital time.
1. Turn the crown and set the mode hand to the time [TME] mode.
 2. Press either button **(A)** or button **(B)** to access the city to be corrected.
 3. When the crown is pulled out to the second click (time setting position), the watch enters the time correction state.
 4. When button **(A)** is pressed, the location to be corrected changes each time it is pressed. Select the location to be corrected. (The location that is flashing is the location that can be corrected.)
 - When button **(B)** is pressed in the [SMT] daylight savings time correction state daylight savings time can be set (ON) or canceled (OF).
 - "Seconds" return to zero when button **(B)** is pressed in the "seconds" correction state.
 - When the crown is turned forward (clockwise) in the "hour" or "minute" correction states, correction is made in the positive direction. Turning the crown continuously allows "hours" or "minutes" to be corrected continuously. Although correction can be made in the negative direction when the crown is turned backward (counter-clockwise), always make sure to turn the crown forward to ensure that the time is set correctly.
 - Switching "12H/24H time" is performed by pressing button **(B)**.
 5. After corrections have been completed, return the crown to the normal position.



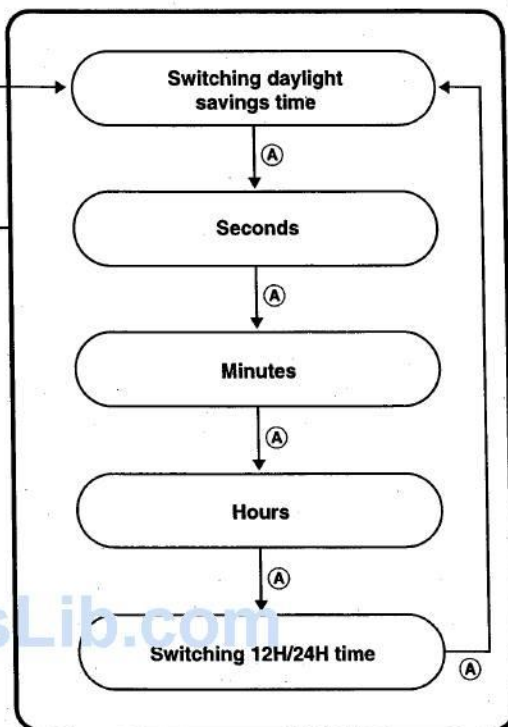
<Normal Time Display>

Crown pulled out to the second click

Crown returned to normal position

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<Time Correction State>

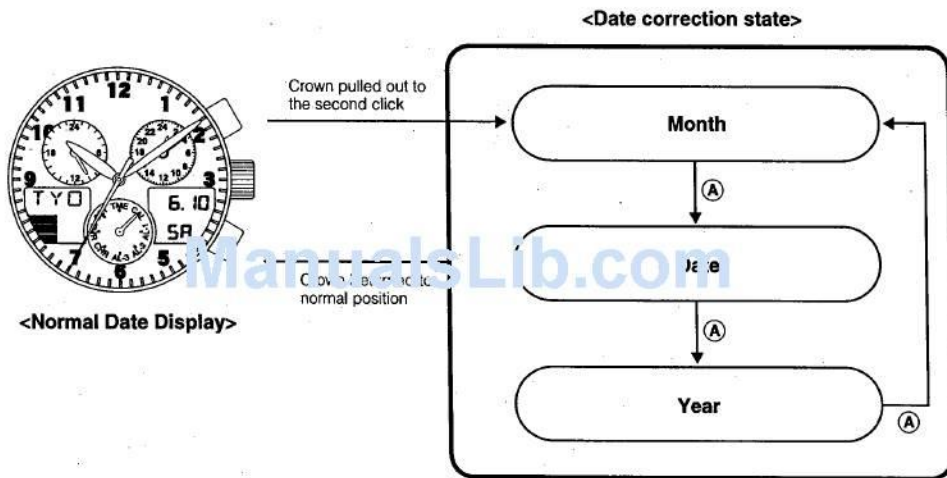


Notes:

1. Daylight savings time can be set for each city.
2. When the time is set for any one city, the times of other cities, including UTC time, are corrected automatically.
3. When changing the time, the crown and buttons do not respond even if operated. Ensure that the required procedures have been performed correctly by first checking that the time has changed.

§10. SETTING THE DATE (DATE IS CORRECTED BY DIGITAL DISPLAY)

1. Turn the crown and set the mode hand to the calendar [CAL] mode.
2. Press either button **(A)** or button **(B)** to access the city to be corrected.
3. When the crown is pulled out to the second click (date setting position), the watch enters the date correction state.
4. When button **(A)** is pressed, the location to be corrected changes each time it is pressed. Select the location to be corrected so that it is flashing.
 - When the crown is turned forward (clockwise), correction is made in the positive direction.
 - When the crown is turned backward (counter-clockwise), correction is made in the negative direction. Turning the crown continuously allows corrections to be made rapidly.
5. After corrections have been completed, return the crown to the normal position.



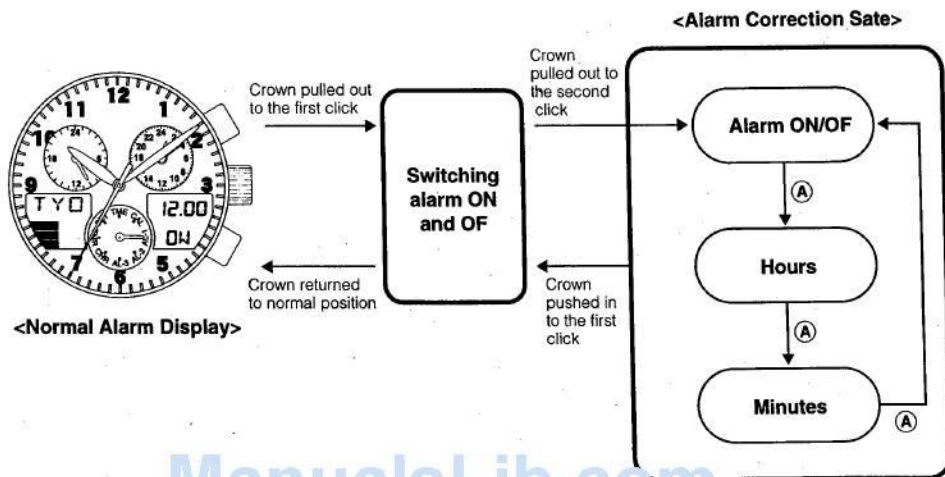
Notes:

1. When the date is set for any one city, the dates of other cities, including UTC time, are corrected automatically.
2. The year can be set from 2000 to 2099.
3. The day is corrected automatically when the year, month and date are set.
4. Since this watch is equipped with an auto-calendar function, it is not necessary to correct the date at the end of the month.
5. When the date has been set to a non-existent date, the watch automatically displays the 1st day of the following month when the watch is returned to the normal display.

§11. USING THE ALARM MODE

The alarm setting procedure and other procedures for alarm use are the same for Alarm 1, 2 and 3. Only the tone that sounds is different.

The alarm sounds for 15 seconds when the set time is reached once a day. When the alarm is sounding, it can be turned off by pressing button **(A)** or **(B)**.



<Setting the Alarm Time>

1. Turn the crown and set the mode hand to either the Alarm 1, 2 or 3 [AL-1, 2 or 3] mode.
2. Press either button **(A)** or button **(B)** to access the city to be corrected.
3. When the crown is pulled out to the second click (alarm time setting position), the watch enters the alarm correction state.
4. When button **(A)** is pressed, the location to be corrected changes each time it is pressed. Select the location to be corrected so that it flashes.
 - The alarm can be set (ON) or canceled (OF) by pressing button **(B)** when the watch is in the alarm ON/OFF correction state.
 - When the crown is turned forward (clockwise) in the "hours" or "minutes" correction state, correction is made in the positive direction. When the crown is turned backward (counter-clockwise), correction is made in the negative direction.
 - Turning the crown continuously allows corrections to be made rapidly.
5. After corrections have been completed, return the crown to the normal position.

Note:

1. When the time mode is set to the 12 hour time display, the alarm time also uses a 12-hour time display. Pay attention to AM and PM when setting the alarm time.

<Switching Alarm ON and OF>

The alarm can be switched ON and OF by pulling out the crown to the first click even when not in the alarm correction state.

1. Pull out the crown to the first click in the alarm mode to allow the alarm to be switched ON and OF.
2. Pressing button **(B)** switches the alarm ON and OF each time it is pressed.
3. Return the crown to the normal position after the alarm has been set to ON or OF.

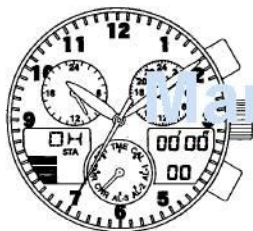
<Alarm Monitor>

1. Pressing button **(A)** and **(B)** simultaneously during the normal alarm display causes the alarm to sound for as long as they are pressed.

§12. USING THE CHRONOGRAPH

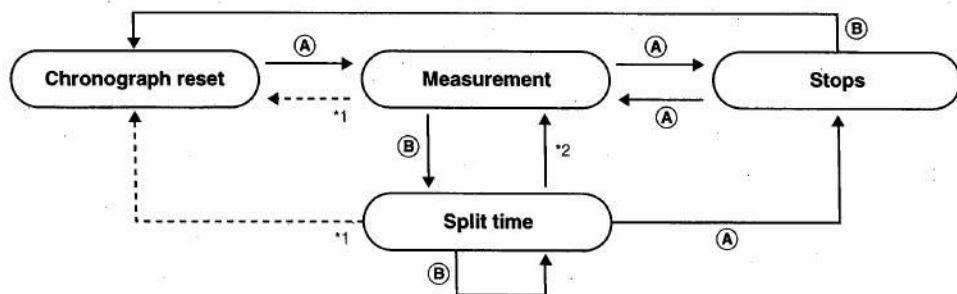
The chronograph is able to measure and display time up to a maximum of 23 hours, 59 minutes, 59.99 seconds in 1/100th second units. After 24 hours have elapsed, the chronograph automatically returns to the chronograph reset display (00'00"00) and stops.

<Normal Chronograph Display>



<Chronograph Measurement>

1. Turn the crown to set the mode hand to the chronograph [CHR] mode.
 2. Pressing button **(A)** repeatedly starts and stops the chronograph each time it is pressed.
 3. Split time is displayed for 10 seconds when button **(B)** is pressed during chronograph measurement.
- The "SPL" mark flashes during split time display.
4. Pressing button **(B)** while the chronograph is stopped returns the chronograph to the chronograph reset display.



*1: Returns automatically after timing for 24 hours

*2: Returns automatically after 10 seconds

§13. USING THE TIMER

The timer can be set to a maximum of 99 minutes in 1 minute units. When the set time has elapsed, a tone indicating that the set time is up sounds for about 5 seconds, after which the timer returns to the timer initial setting display.

<Timer Initial Setting Display>

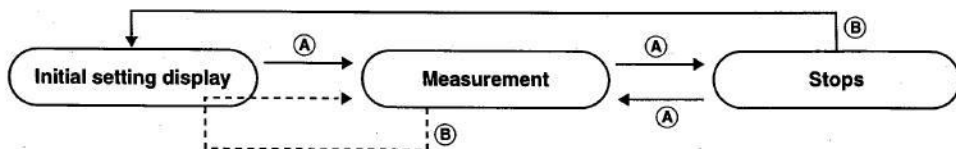


<Setting the Timer>

1. Turn the crown to set the mode hand to the timer [TMR] mode.
2. Pull out the crown to the second click (timer setting position) to enter the "minutes" correction state.
3. When the crown is turned forward (clockwise) in the "hours" or "minutes" correction state, correction can be made in the positive direction. When the crown is turned backward (counter-clockwise), correction can be made in the negative direction.
4. After setting, return the crown to the normal position.

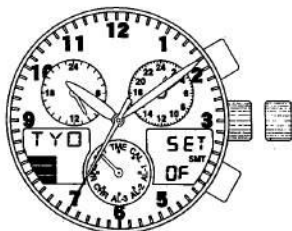
<Using the Timer>

1. Press button (A) to start the timer.
2. Pressing button (A) again during measurement stops the timer.
3. Pressing button (A) during measurement returns the watch to the timer initial setting display and resumes measurement.
4. Pressing button (B) when the timer is stopped returns the watch to the timer initial setting display.



§14. USING ZONE SETTING

The zone setting function enables only those cities for which "SET" has been selected to be easily accessed (displayed) in each mode. Daylight savings time can be also set for each city. In addition, the user is also able to arbitrarily register one city and time difference.



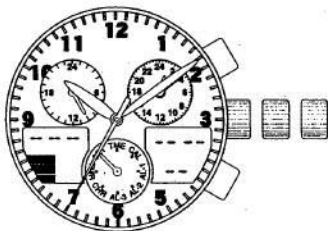
<Using Zone Setting>

1. Turn the crown while in the normal position and set the mode hand to the mode setting [SET] mode.
2. The city can be changed by pulling out the crown to the first click (for changing cities between SET and OF and for setting the location for switching to daylight saving time).
3. Turn the crown to access the city to be set.
 - Turning the crown continuously causes the cities to advance rapidly.
4. Press button (A) to set the city and press button (B) to set daylight savings time.
5. After setting, return the crown to the normal position.

<Confirming Set Cities>

1. When button (A) or button (B) is pressed when the watch is in the zone setting [SET] mode (with the crown in the normal position), the city name and SET or OF are displayed each time the button is pressed.
 - Only those cities for which SET is displayed can be accessed from each mode.

<Registration of Arbitrary City and Time Difference>



1. Turn the crown while in the normal position and set the mode hand to the zone setting [SET] mode.
2. When the crown is pulled out to the second click (city setting position), the watch enters the correction state for the third letter of the city name.
3. Turning the crown displays those characters that are used for city names.
 - Turning the crown continuously causes the characters to advance rapidly.
4. The correction location changes each time button (A) is pressed.
5. When button (A) is pressed during the correction state of the first character of the city name, the watch enters the correction state for the time difference from UTC.

6. Turn the crown to display the time difference.
7. After setting, return the crown to the normal position.

<Characters and Symbols Used in City Names>

- Letters of the alphabet (A to Z)
- Numbers (0-9)
- Symbols (--: hyphens, ☐: blank spaces)

<Display Sequence>

When the crown is turned forward (clockwise), the display changes in the order of letters (A-Z), numbers (0-9) and then symbols (☐: blank spaces, --: hyphens).

When the crown is turned backward (counter-clockwise), the display sequence is opposite that when turning the crown forward.

<Order in which Registered Cities and Displayed>

The location having the same time difference among the 30 cities pre-registered in this watch is displayed first. However, a city is not displayed if the time difference of a registered city has not been set.

<Canceling Registered Cities>

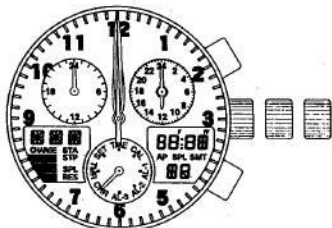
1. Turn the crown to set the mode hand to the zone setting [SET] mode.
2. When the crown is pulled out to the second click (city setting position), the watch enters the city name correction state.
3. Turn the crown to cancel the registration of the city name.
4. After canceling registration, return the crown to the normal position.

§15. ALL-RESET

When this watch indicates an abnormal display or does not function properly (no display, alarm continues to sound, etc.) as a result of being subjected to the effects of static electricity or strong impact and so forth, perform the all-reset procedure described below.

When performing the all-reset procedure, first make sure that the watch is sufficiently charged and that the charge indicator is lit.

<All-Reset Procedure>



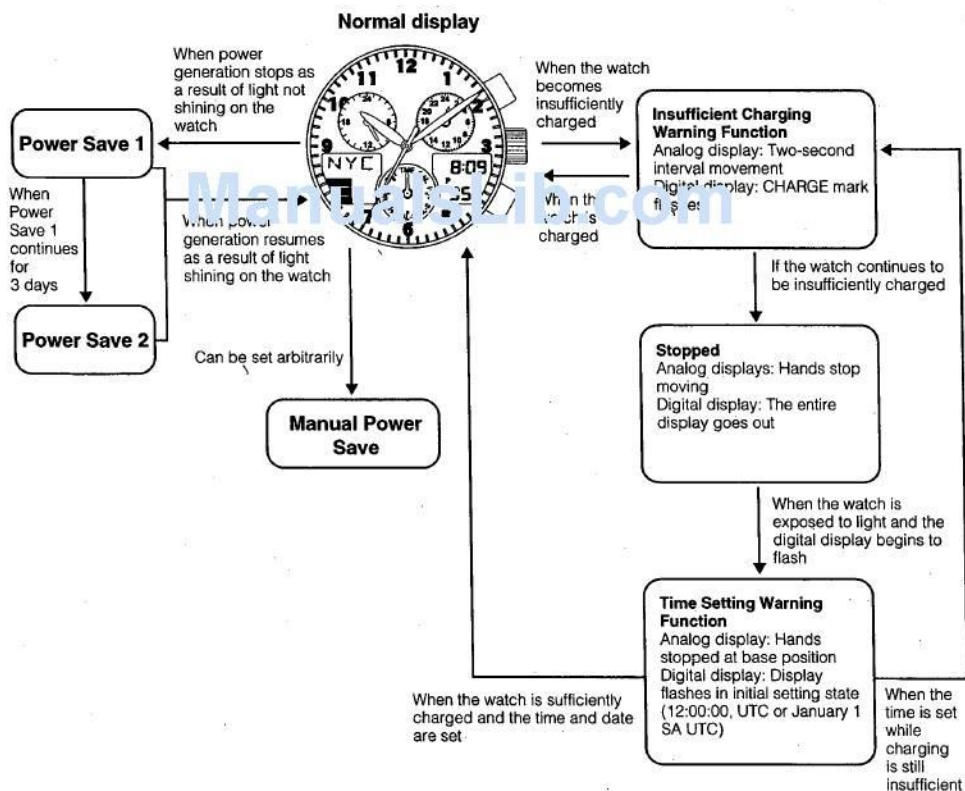
1. Turn the crown to set the mode hand to the chronograph [CHR] mode.
2. Pull out the crown to the second click (0-position correction mode).
 - The second hand, minute hand, hour hand, 24 hour hand, UTC hour hand and UTC minute hand rapidly advance to the 0 position stored in memory.
3. Press buttons **A** and **B** simultaneously and then release.
 - All segments of the digital display are shown when either of the buttons is released.

4. This fully lit display is canceled when the crown is returned to the normal position.
- After canceling, a confirmation tone is sounded after which each of the hands perform a demonstration movement in the order of the second hand, minute hand, UTC minute hand, UTC hour hand and 24 hour hand to indicate that the all-reset procedure is finished.
 - After the demonstration movement, pull the crown out to the second click to switch the watch to the watch base position setting state. Always make sure to set the 0 position (base position) for the hour hand, minute hand, second hand, 24-hour hand and UTC hour and minute hands while referring to "5. Checking 0-Position of Each Hand <0-Position Correction>".

Note:

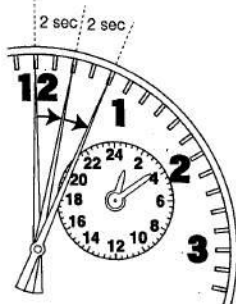
- After setting the 0 position (base position) for each hand, correctly reset the time, calendar and other modes before using the watch.

§16. FUNCTIONS UNIQUE TO SOLAR-POWERED WATCHES



[Insufficient Charging Warning Function]

(Analog Display)



Two second interval movement

Regardless of the display (mode) of the watch at the time, when the watch becomes insufficiently charged, the watch changes to the time display and the second hand begins to move at two-second interval movement. Although the 24 hour hand, hour hand and minute hand continue to keep the correct time, the watch stops after about 1.5 days have elapsed after the insufficient charging warning function is activated. When this happens, charge the watch by exposing to light so that it returns to one-second interval movement.

However, if the watch again becomes insufficiently charged without setting the time after it has been sufficiently charged by exposing to light as a result of having stopped due to being insufficiently charged, it will not return to the normal display unless the time is set after again sufficiently charging.

(Digital Display)

"CHARGE" flashes on digital display area 2 in all modes.

<Digital Display

- The watch displays the normal time display regardless of the position of the crown (pulled out to the first or second click) in each mode except for the calendar mode.
- When the watch is in the calendar mode, the normal date display is displayed regardless of the position of the crown.

Notes:

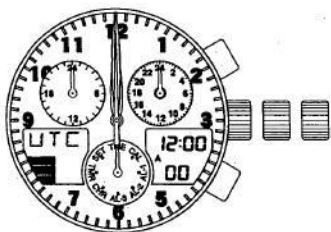
- Crown operations do not function <except for mode switching (with the crown in the normal position)> in any of the modes.
- Button operations do not function, except for changing the city name (UP/DOWN), in any of the modes.
- The alarm tone does not sound even if it is set.
- The chronograph is interrupted and reset even if measurement is in progress.
- Timing by the timer is immediately interrupted even if timing is in progress
- In the case the watch switches to the insufficient charging warning function as a result of being insufficiently charged, it takes a minimum of 30 minutes for the watch to return to the normal operating state even if sufficiently exposed to light.

<When the Insufficient Charging Warning Function is Canceled>

When the insufficient charging warning function is canceled as a result of exposing the watch to light and sufficiently charging, the watch returns to the mode indicated by the mode hand.

[Time Setting Warning Function]

(Analog Display)



The watch stops when insufficient charging continues for about 1.5 days. When the watch is charged by exposing to light after having stopped due to insufficient charging, each hand is rapidly advanced to the base position and stops. Each hand remains stopped until the time is reset.

(Digital Display)

The initial setting display (12 hours, 00 minutes, 00 seconds, UTC or January 1 SA) flashes in the time or calendar mode.

<Canceling the Time Setting Warning Function>

1. Set the mode hand to the time mode and pull the crown out to the second click to set the time. Flashing of the digital display is only canceled in the time mode. After correcting the time, return the crown to the normal position.
2. Set the mode hand to the calendar mode and pull the crown out to the second click to set the date. Flashing of the digital display is only canceled in the calendar mode.
3. After correcting the date, return the crown to the normal position.

Note:

- The time setting warning function will not be canceled unless the time is first set followed by setting the date.
- It takes a minimum of 30 minutes until the watch switches to the time setting warning display after the watch has stopped due to insufficient charging even if the watch is exposed to light.

[Overcharging Prevention Function]

The overcharging prevention function is activated when the secondary battery is fully charged so that it is not charged further. This allows the user to charge the watch without any risk of overcharging.

[Power Save 1]

When power is not generated as a result of the solar cell not being exposed to light, the second hand stops when it reaches the zero seconds position and the watch automatically enters the power save state to inhibit power consumption of the secondary battery.

(Analog Display)

- The second hand stops at the base position (12:00).
- Other hands continue to keep the correct time.

(Digital Display)

- In coordination with the analog second hand stopping at the zero seconds position, the entire digital display goes out. However, the alarm, chronograph and other functions continue to measure time internally even though there is no display.

<Canceling Power Save 1>

Power Save 1 is canceled when power generation resumes as a result of exposing the solar cell to light.

- The second hand rapidly advances to the current time and begins one-second interval movement.
- The digital display reappears simultaneous to resumption of power generation.

Notes:

- During the secondary battery is fully charged and the overcharging prevention function is activated, the power save function is not activated even if power generation is interrupted as a result of the solar cell not being exposed to light. In addition, the power save function is similarly not activated when the solar cell is exposed to intense light and temporarily becomes fully charged.

[Power Save 2]

When the Power Save 1 state continues for about 3 days and the minute hand reaches the base position (12:00), the watch automatically enters the Power Save 2 state.

(Analog Display)

- The minute and second hands stop at the base position (12:00).
- Other hands stop moving at their current locations.

(Digital Display)

- The digital display remains completely out in continuation from the Power Save 1 state.

Notes:

- Crown and button operations do not function in any mode.
- The alarm tone does not sound even if it is set.
- The tone indicating that time is up does not sound in the timer mode.

<Canceling Power Save 2>

Similar to Power Save 1, Power Save 2 is canceled when power generation resumes as a result of exposing the solar cell to light.

- Each hand rapidly advances to the current time and begins to move.
 - The digital display reappears simultaneous to resumption of power generation. However, the chronograph returns to the reset state and the timer switches to the initial setting display.
-

[Manual Power Save]

When not using the watch for an extended period of time, activating the manual power save function after first charging the watch until all three bars of the graphic display of the secondary battery charge indicator are lit enables the watch to be stored for a longer period of time. Furthermore, do not charge the watch while the manual power save function is activated. First cancel the manual power save function before charging.

<Setting Manual Power Save>

- The manual power save function is activated by setting the city name to "C65" and the time difference to "0" while following the procedure described in <Registration of Arbitrary City and Time Difference> in section 14 on Using Zone Setting, and then returning the crown to the normal position.

(Analog Display)

- Each hand stops moving at its current location.

(Digital Display)

- The entire digital display is not lit.

Notes:

- None of the button operations function in any mode.
- The mode does not change even when the mode hand is attempted to be moved by turning the crown.

<Canceling Manual Power Save>

Each hand rapidly advances to the current time and Manual Power Save is canceled when the crown is pulled out to the second click.

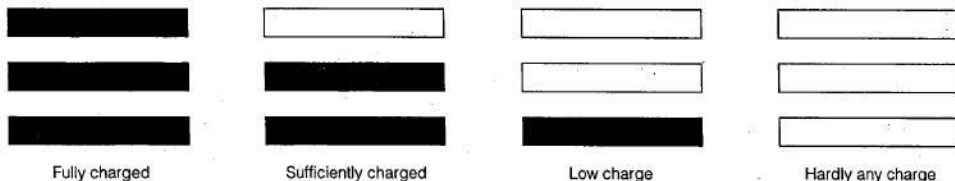
Return the crown to the normal position after canceling the manual power save function.

- Each hand rapidly advances to the current time and begins to move.
- The digital display reappears simultaneous to resumption of power generation, and the alarm sounds for the set duration. However, the chronograph returns to the reset state and the timer switches to the initial setting display.

[Charge Indicator]

The charge indicator provides a simple graphic indication in digital display area 2 of the amount of charge remaining in the secondary battery.

<Interpretation of Secondary Battery Charge Levels>



When none of the bars of the graphic display are lit, the secondary battery has essentially become completely discharged and the second hand begins two-second interval movement. Since the watch will stop due to insufficient charging if this state continues for about 1.5 days, sufficiently charge the watch by exposing to light.

§17. GENERAL REFERENCE FOR CHARGING TIMES

The time required for recharging varies according to the model of the watch (color of the dial, etc). The following times are shown below to serve only as a reference.

* Recharging time refers to the amount of time the watch is continuously exposed to light.

Illuminance (lx)	Environment	Charging Time		
		Charging time for 1 day of operation	Charging time from the stopped state to one-second interval movement	Charging time from stopped state to fully charged
500	Inside an ordinary office	2 hours 30 minutes	15 hours	182 hours
1,000	60-70cm (24-28 in.) under fluorescent light (30W)	1 hour	8 hours	87 hours
3,000	20cm (8 in.) under fluorescent light (30W)	20 minutes	3 hours	29 hours
10,000	Outdoors, cloudy weather	6 minutes	1 hour 30 minute	9 hours
100,000	Outdoors, summer, under direct sunlight	3 minutes	50 minutes	5 hours

Full recharging time: Time required for recharging the watch from the stopped state to full charged.

Charging time for 1 day of operation: Time required for recharging the watch to run for 1 day at one-second interval movement.

§18. NOTES REGARDING HANDLING OF THIS WATCH

<Try to keep the watch charged at all times>

- Please note that if you routinely wear long sleeves, the watch can easily become insufficiently charged as a result of it being concealed and unable to be exposed to light.
- When you take the watch off, try to place it in as bright location as possible to ensure that it always keeps the correct time.

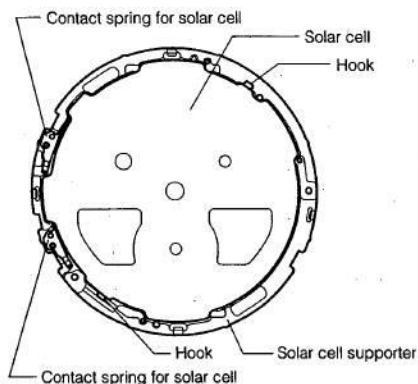
Notes: Charging Precautions

- Avoid recharging at high temperature (over about 60°C/140°F) since this may result in damage to the watch as a result of reaching excessively high temperatures.
Examples: Charging the watch in close proximity to an incandescent lamp, halogen lamp or other light source that can easily reach high temperatures, charging the watch in a location that reaches high temperatures such as on a car dashboard.
- When charging the watch with an incandescent lamp, always make sure the watch is at least 50 cm (20 in.) away from the lamp so that it does not reach excessively high temperatures during charging.

§19. PRECAUTIONS FOR DISASSEMBLY AND ASSEMBLY

<Fitting of solar cell supporter>

Fit the "solar cell" and "contact spring for solar cell" to the "solar cell supporter" first, then fit them to the movement.



Fitting procedure

1. Place the "solar cell supporter" with the lower side up.
2. Fit the "contact spring for solar cell".
3. Fit the "solar cell" to the "solar cell supporter".
 - Hitch the hooks (at two places) of the "solar cell supporter" to the "solar cell".

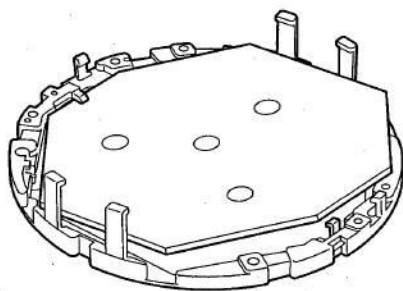
Note

Check the solar cell for dirt and take care not to damage the solar cell.

4. Fit the "solar cell supporter" to the movement.
 - Hitch the outside hooks (at four places) of the solar cell supporter securely to the movement.

<Fitting of LC display panel supporter>

Fit the "LC display panel" to the "LC display panel supporter" first, then fit them to the movement.



Fitting procedure

1. Place the "LC display panel supporter" with the lower side up.
2. Fit the "LC display panel" to the "LC display panel supporter".
 - Hitch the hooks (at two places) of the "LC display panel supporter" to the "LC display panel".

Note

Check the LC display panel for dirt and take care not to damage the LC display panel.

3. Fit the "LC display panel supporter" to the movement.
 - Hitch the outside hooks (at two places of 12-o'clock position and 6-o'clock position) of the LC display panel supporter securely to the movement.

<Method of fitting hands>

Fit the hands in the "CHR" mode.

1. Turn the crown at the normal position to display the "CHR" mode.
2. Pull the crown to the second click and press the **(A)** and **(B)** buttons simultaneously to perform the all-reset operation.
3. Return the crown to the normal position and turn off the full-segment glow.
4. Pull the crown to the second click again.
5. Fit the mode hand to the "CHR" position.
Fit the other hands to the 12-o'clock position.
6. Fit the movement to the case and "check the 0 position".
 - If any hand is not at the 0 position, "adjust the 0 position".
7. After "checking the 0 position" and "adjusting the 0 position", set the time, calendar and other modes correctly.

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§20. DISASSEMBLY AND ASSEMBLY OF MOVEMENT

Disassembly procedure: ① → ⑥7

Assembly procedure: ⑥7 → ①

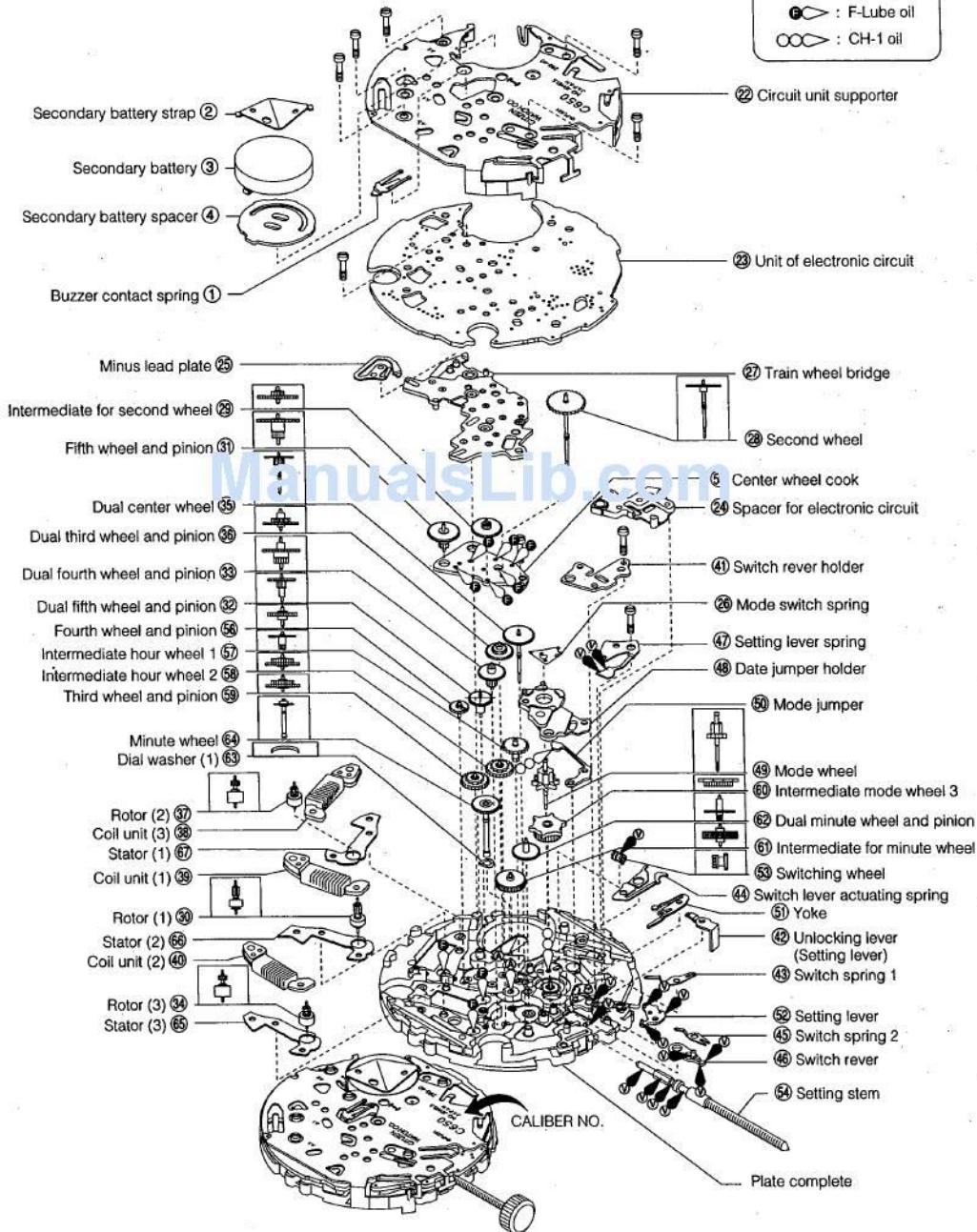
● Lubrication mark

⊖ : A-Lube oil

∇ : V-Lube oil

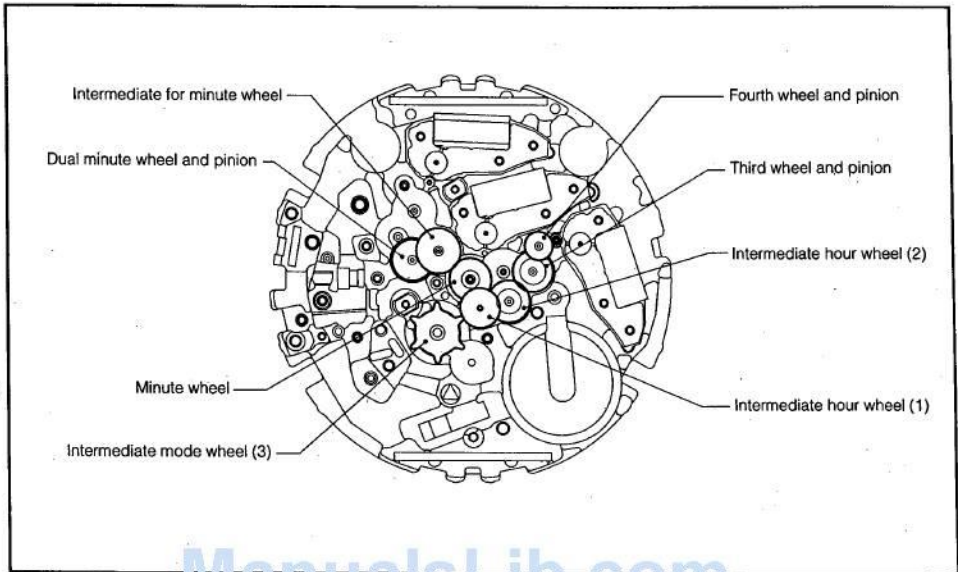
⊕ : F-Lube oil

○ : CH-1 oil

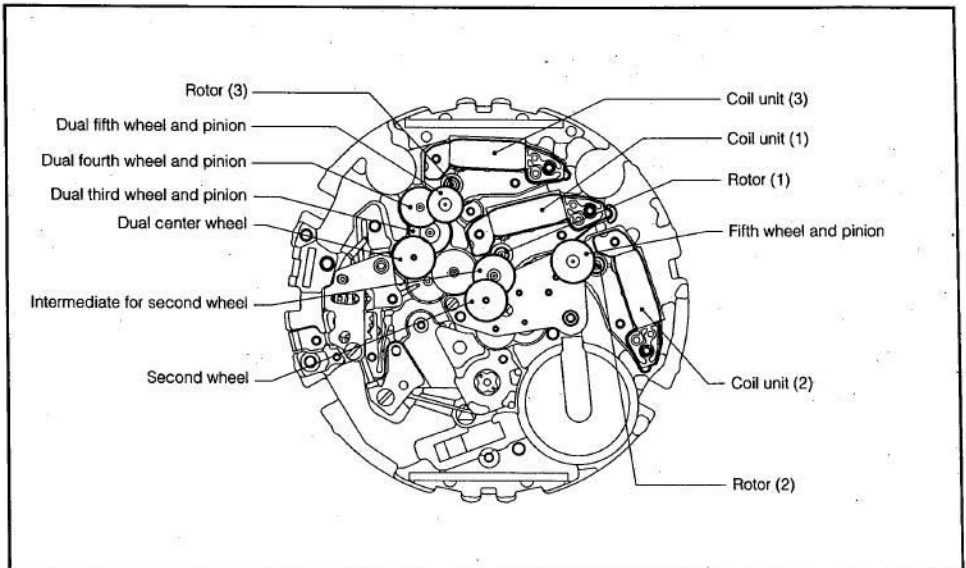


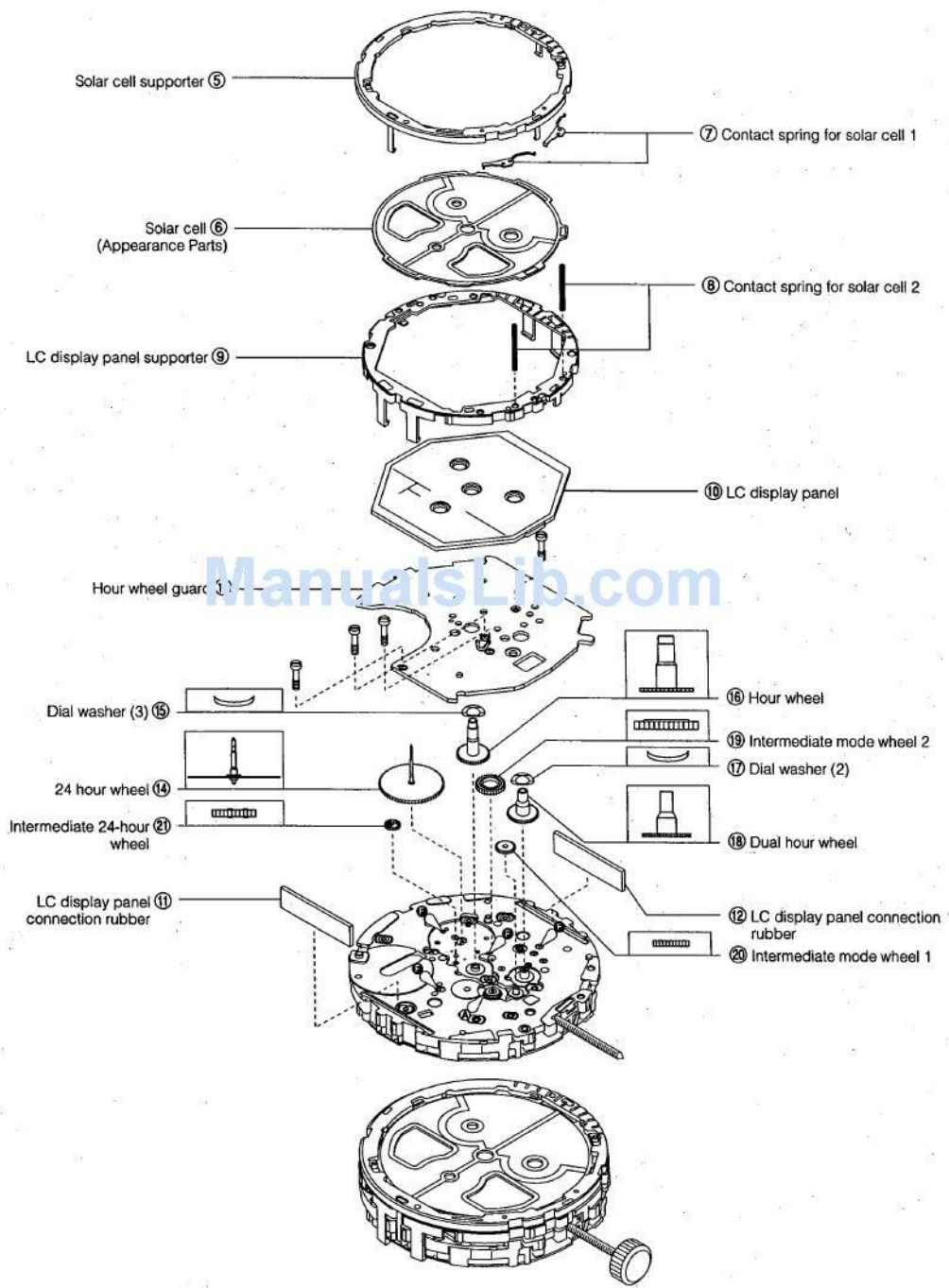
[Assembly drawing for train wheel]

<From minute wheel to fourth wheel and pinion>

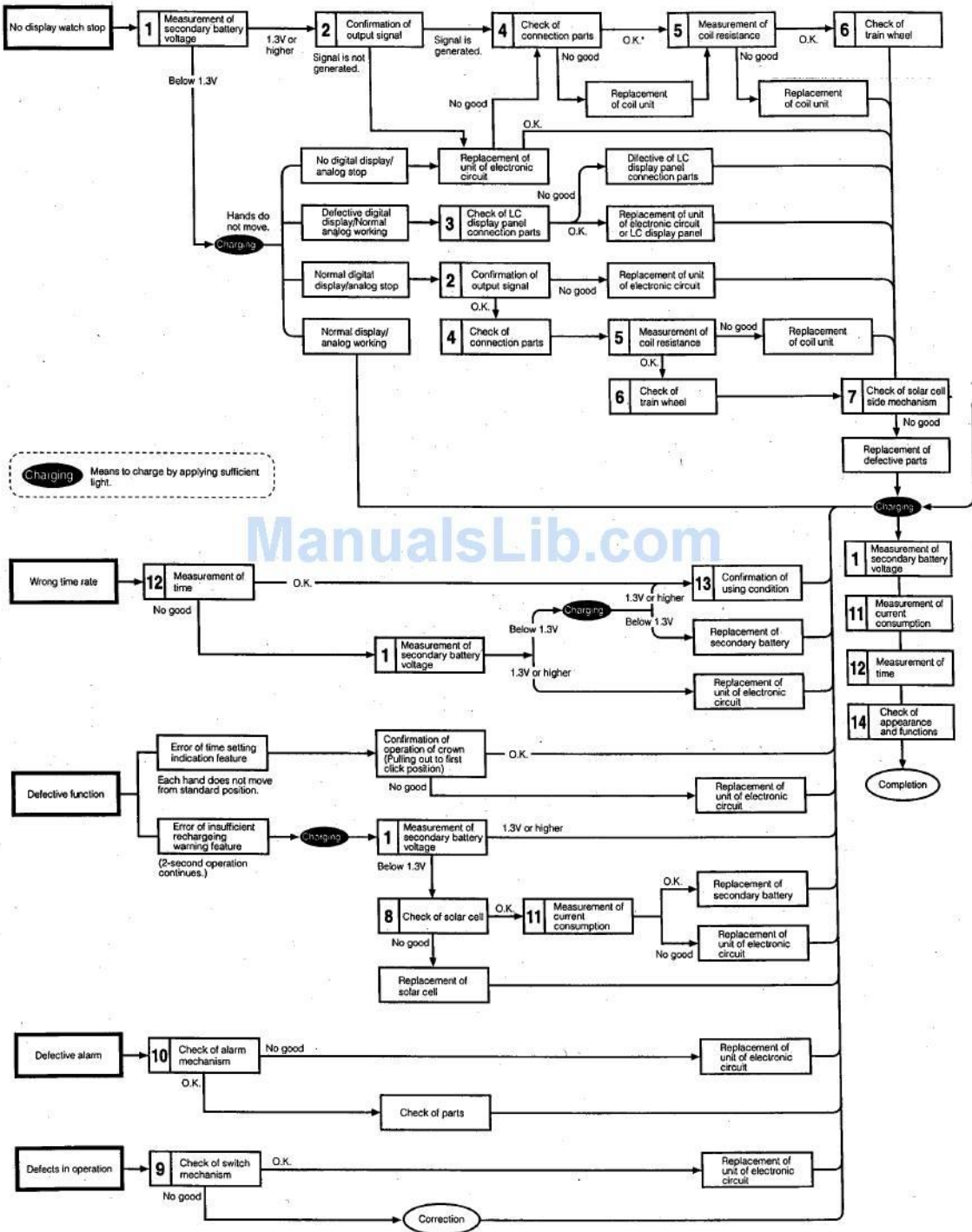


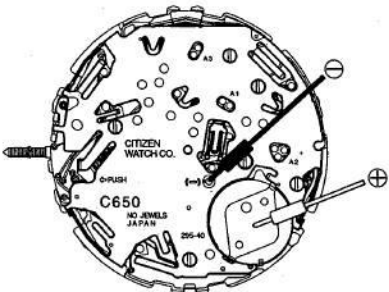
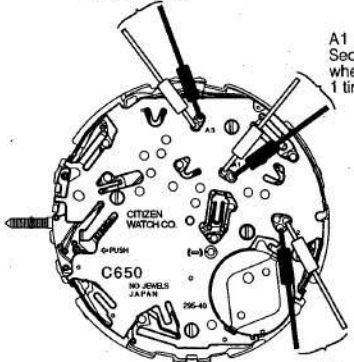
<From rotor (1) to coil unit (3)>

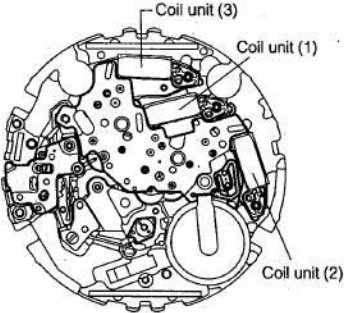


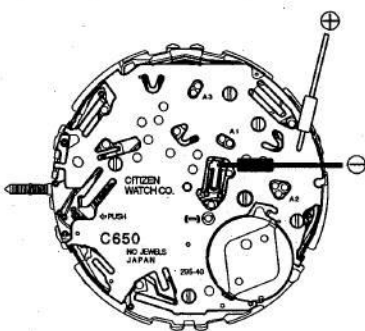


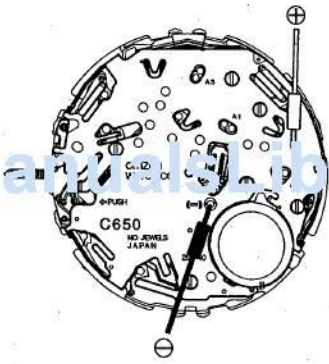
§21. TROUBLESHOOTING AND ADJUSTMENT METHOD



Check Items	How to Check	Result and Treatment
<p>① Measurement of secondary battery voltage</p>	<p>• For the method of setting the tester, refer to Technical Manual, Basic Course II-1-a.</p> <p style="text-align: center;"><Tester range: DC 3V></p>  <p>• 0.9V - 1.3V: Two-second step running mode</p> <p>• 1.3V - 2.6V: One-second step running mode</p> <p>• If each hand is still stopped at the standard position (12-o'clock position) even after the battery is charged with light, the "Time setting warning feature" must be working to notify that the watch has stopped because of insufficient charge. Accordingly, this condition is kept until the time setting procedure is completed.</p>	<p>• 1.3V or higher → Normal</p> <p>• Below 1.3V → Charge.</p> <p style="text-align: center;">↓</p> <p>Re-measurement after charging</p> <p>• 1.3V or higher → Check connection parts.</p> <p>• Below 1.3V → Check solar cell and connection parts.</p>
<p>② Confirmation of output signal</p>	<p>• For the method of setting the tester, refer to Technical Manual, Basic Course II-1-b.</p> <p style="text-align: center;"><Tester range: DC 0.3V></p> <p>A3 Minute train wheel: 1 time in 15 sec</p>  <p>A1 Second train wheel: 1 time in 1 sec</p> <p>A2 Hour train wheel: 1 time in 120 sec</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Confirmation of A2 and A3 output signals These signals can be confirmed easily in the "CHR" mode.</p> <p>• Pull the crown to the second clicks in the "CHR" mode, each hand moves quickly to the standard position. If the signals are measured at this time, the tester pointer vibrates finely over 0.</p> </div>	<p>In TME mode,</p> <p>• A1 output signal Tester pointer moves to right and left every second. → Normal</p> <p>Tester pointer does not move. → Check connection parts.</p> <p>• A2 output signal Tester pointer moves every 120 seconds. → Normal</p> <p>Tester pointer does not move. → Check connection parts.</p> <p>• A3 output signal Tester pointer moves every 15 seconds. → Normal</p> <p>Tester pointer does not move. → Check connection parts.</p> <p>If any connection part is defective, replace electronic circuit unit.</p>

Check Items	How to Check	Result and Treatment
<p>③ Check of LC display panel connection parts</p>	<ul style="list-style-type: none"> Refer to Technical Manual, Basic Course II-2-a, Digital Section. Inspection of all segments Pull the crown to the second clicks in the "CHR" mode and press (A) and (B) buttons simultaneously, and all digital segments are turned on. Check the LC display panel, LC display panel connection rubber, electronic circuit unit, etc. for discontinuity, dirt, breakage, etc. 	<ul style="list-style-type: none"> LC display panel, connection rubber, electronic circuit unit, etc. are not installed correctly. → Install correctly. Solar cell pattern or circuit pattern is dirty. → Remove dirt. Solar cell pattern is removed or circuit pattern is removed, broken, or scratched. → Replace parts.
<p>④ Check of connection parts</p>	<ul style="list-style-type: none"> Refer to Technical Manual, Basic Course II-2-a, Analog Section. Check for looseness of screws, dust, stain, etc. <p>(1) If the train wheel bridge screw is loosened, the drive signal may not be transferred.</p> <p>(2) If the coil or electronic circuit unit is covered with dirt or stained, continuity is lowered.</p>	<ul style="list-style-type: none"> Dirt or stain → Remove dirt and stain. Screw is loosened. → Retighten.
<p>⑤ Measurement of coil resistance</p>	<ul style="list-style-type: none"> Refer to Technical Manual, Basic Course II-1-c. <p>Remove the electronic circuit unit and measure the coil resistance.</p> <p><Tester range: R x 10Ω></p>  <p><The tester lead pins have no polarity></p>	<ul style="list-style-type: none"> 1.9 - 2.4kΩ → Normal Out of range of 1.9 - 2.4kΩ → Replace coil unit.
<p>⑥ Check of train wheel</p>	<ul style="list-style-type: none"> Refer to Technical Manual, Basic Course II-2-b. Check around the gears and rotors for dirt. Check the parts for deformation and confirm that they are lubricated normally. 	
<p>⑦ Check of solar cell side mechanism</p>	<ul style="list-style-type: none"> Refer to Technical Manual, Basic Course II-2-c. 	

Check Items	How to Check	Result and Treatment
<p>⑧ Check of solar cell</p>	<p>Check the solar cell for breakage and stain, and check its electrode for stain and flaking.</p>	<ul style="list-style-type: none"> • Breakage of solar cell → Replace solar cell • Stain → Remove stain. • Flaking of electrode → Replace solar cell.
<p>⑨ Check of switch mechanism</p>	<p>1. Inspection of movement</p> <ul style="list-style-type: none"> • Press the switch section of the circuit unit supporter with tweezers, etc. to contact it to the pattern of the electronic circuit unit and confirm the switching function. • Check for removal of pattern of electronic circuit unit and deformation of switch spring of the circuit unit supporter. <p>2. Inspection of push button</p> <ul style="list-style-type: none"> • Check the push button for deformation and stain. <p>Note Be sure to apply silicone oil to the packing of push button for waterproofness and smooth operation.</p>	<ul style="list-style-type: none"> • Pattern of electronic circuit unit is removed. → Replace electronic circuit unit. • Parts are fatigued or deformed. → Replace defective parts. • Switching function is normal. → Inspect push button. <p style="text-align: center;">↓</p> <ul style="list-style-type: none"> • Push button is stained or deformed. → Remove stain or replace push button.
<p>⑩ Check of alarm mechanism</p>	<p>1. Set the movement in the case and check the alarm output.</p> <p>(1) Turn the crown to set the watch in the "ALM" mode.</p> <p>(2) Apply the ⊕ lead pin to the top of the circuit unit supporter and apply the ⊖ lead pin to the buzzer contact spring, then press (A) and (B) buttons simultaneously.</p> <div style="text-align: center;">  </div> <p>2. If the alarm output is normal, perform the following inspection.</p> <ul style="list-style-type: none"> • Check the piezo-electric element of vibrating plate for cracks and breakage. • Check the buzzer contact spring for bend and deformation. • Check the pattern of electronic circuit unit for dirt and stain. 	<ul style="list-style-type: none"> • Tester pointer does not swing. → Replace electronic circuit unit. • Tester pointer swings. → Normal. • Perform inspection in ⑩-2. → If result if normal, alarm mechanism is normal.

Check Items	How to Check	Result and Treatment
<p>① Measurement of current consumption</p>	<ul style="list-style-type: none"> * Refer to Technical Manual, Basic Course: II-1-f. <div style="text-align: center;"><Tester range: DC 10μA></div> • This watch uses a secondary battery block instead of an ordinary battery. Accordingly, prepare a silver battery (1.5V or higher), then measure the current consumption according to the following procedure. <ol style="list-style-type: none"> (1) Turn the crown to set the watch in the "TME" mode. (2) Remove the "secondary battery strap" and "secondary battery" (3) Referring to Technical Manual, Basic Course, set the silver battery (1.5V or higher) to the tester adapter. (4) Set the tester. <ul style="list-style-type: none"> • Apply the test pins \oplus and \ominus to the patterns of the electronic circuit unit. • The tester indicates a high value at first. Wait until the tester pointer is stabilized, then start measurement. <div style="text-align: center;">  </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: When measuring the current consumption, do not apply any light to the solar cell. If any light is applied, the voltage changes and correct current consumption cannot be measured.</p> </div>	<ul style="list-style-type: none"> • Current consumption by module Below 3.0μA → Good 3.0μA or higher → Measurement of electronic circuit unit. • Measurement of unit of electronic circuit. Below 0.2μA → Good 0.2μA or higher → Replace electronic circuit unit. <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p>Current consumption by module is high but that the electronic circuit unit is normal. → A part other than circuit seems to have a trouble. Check for stain, bad lubrication, deformation of parts, and remove causes of load.</p> </div>
<p>② Measurement of time</p>	<ul style="list-style-type: none"> * Refer to Technical Manual, Basic Course: II-2-d. • Since DF measurement is applied, measure the time rate in the 10-second range. The time rate cannot be adjusted, however. The time rate cannot be measured accurately while the watch is in the 2-second operation mode or the hands are stopped at the standard positions because of the time setting warning feature. In this case, apply light to the watch until the second hand moves in the 1-second operation mode, then measure the time rate. 	<ul style="list-style-type: none"> • Watch gains or loses much. → Replace electronic circuit unit.

Check Items	How to Check	Result and Treatment
<p>13 Confirmation of using condition</p>	<ul style="list-style-type: none"> * Refer to Technical Manual, Basic Course: II-2-e. • Since this watch is energized by light, it should receive light as much as possible. If the watch is placed near a light source which generates heat (over above 60°C/140°F) such as an incandescent lamp, a halogen lamp, etc., however, its functions and parts may be deteriorated or deformed by the heat. Accordingly, take care when apply light to it. <p>When the watch is hidden under a long sleeve or the customer works in a dark place, it needs to be exposed to light on purpose.</p>	
<p>14 Check of appearance and functions</p>	<ul style="list-style-type: none"> * Refer to Technical Manual, Basic Course: II-2-f. • Check inside of case for dust and stain. • Check operation of setting switches for abnormality. • Check segments for breakage. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Be sure to apply silicone oil to the packing of each push button. It is necessary for water resistance and smooth operation.</p> </div>	

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