TECHNICAL INFORMATION

CITIZEN QUARTZ

Cal. No. C470

CITIZEN

Contents

§1. MAIN FEATURES

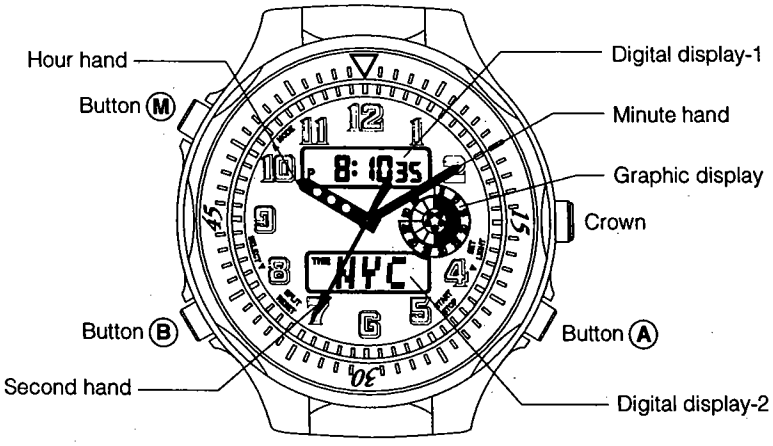
This is a combination quartz watch with a full range of functions such as Football Timer that can calculate the loss time during a game, Alarm and Chronograph. Zone Set that allows you to easily call out the time and calendar of 30 cities, and EL light for reading time at dark are also added.

§2. SPECIFICATIONS

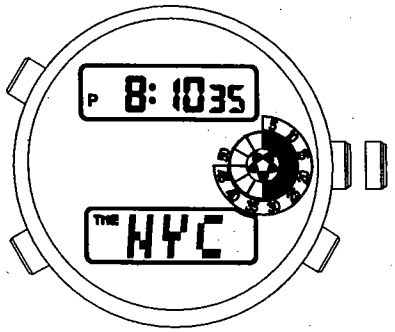
Caliber NO.			**C470**
Type			Combination watch
Movement size (mm)			ø30.8 x 5.21t
Accuracy			Within ±20 seconds/month (when worn at normal temperatures range of +5°C to 35°C/+41°F to +95°F)
Operating temperature range			Operating temperature range of watch: 0°C ~ +55°C (+32°F ~ +131°F)
Converter			Boipolar step motor
Time adjustment			No adjustment terminal for use in market
Measurement gate			10 sec.
Display function	Analog		Time: Seconds, Minutes, Hours
	Digital	Time	Seconds, Minutes, Hours, Name of City, Summertime, A/P
		Calendar	Month, Date, Day, Name of City, Year (displayed only at adjustment)
		Alarm 1	Hours, Minutes, A/P, Name of City, ON/OFF
		Alarm 2	Hours, Minutes, A/P, Name of City, ON/OFF
		Football Timer	Can be set from 45 to 5 minutes in the units of 5 minutes. Loss time measuring
		Timer	Remaining timer minutes, Remaining timer seconds, set minutes (Timer setting range: Can be set from 60 to 1 minute in units of 1 minute.)
		Chronograph	24-hour measurement, 1/100 second unit (1/100 second reading is displayed only under Stop, Split or Reset mode), Split Time Measurement
		Zone setting	UTC + 30 city name display/no display setting, Summertime ON/OF setting of each city
Additional functions			EL Light function
Battery			Battery No.: 280-44 (SR927W) Battery Life: About 2 years. (Based on assumed use of alarm buzzer 20 seconds/day, Chronograph 24H/week and EL Light 3 seconds/day.)

* These specifications are subject to change, for product improvement, without prior notice.

§3. COMPONENTS PARTS



§4. SETTING THE ANALOG TIME



(1) Pull the crown one step to stop the second hand.

(2) Rotate the crown and set the correct time.

(3) After setting time, return the crown to the normal position to start operating.

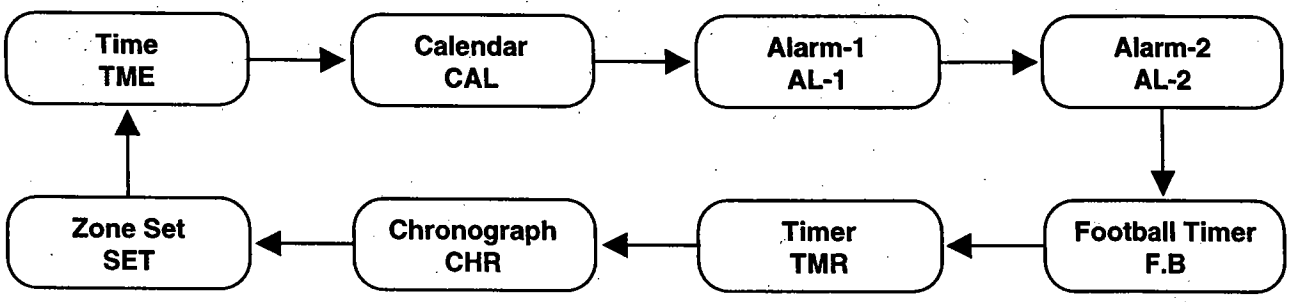
[How to Set Time Correctly]

To exactly set time, hold the second hand at the 0 second postion, advance the minute hand 4 to 5 minutes ahead and return it oppositely. Then set the correct time and push in the crown.

§5. SWITCHING DIGITAL FUNCTIONS (MODES)

This watch is equipped with two types of Alarms and Football Timer, Timer and Chronograph modes, as well as Time and Calendar. Press button Ⓜ to switch the mode. Confirm the current mode with the mode mark.

<Switching of Modes>



Note

If no button operation is done for 2 minutes or longer in the normal display of Alarm 1, 2 and Zone Set, the watch will automatically return to the nomal Time display.

§6. HOW TO CALL OUT THE TIME OR CALENDAR OF EACH CITY IN THE WORLD

You can easily call out the time or calendar of each of the cities previously registered in this watch by button operations.

<To Call Out Time or Calendar>

(1) Press button Ⓜ and set to Time [TME] or Calendar [CAL] mode.

(2) Press button Ⓑ. Each time you press the button, the time or calendar of the cities is displayed in UP direction (the direction along which time difference increases).

(3) When you press button Ⓐ while pressing button Ⓑ, the time or calendar of the cities is displayed in DOWN direction (the direction along which time difference decreases).

- Press and hold button Ⓑ to return to the adjustment mode.

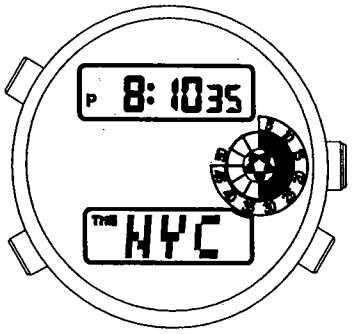
<Cities Previously Registered in This Watch and Time Difference from UTC>

DOWN direction ↓ / ↑ UP direction

Watch display	Name of City	Time difference	Summer-time	Watch display	Name of City	Time difference	Summer-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
DEL	New Delhi	+5.5	X	NYC	New York	−5	O
DAC	Dacca	+6	X	YUL	Montreal	−5	X
BKK	Bangkok	+7	X	CCS	Caracas	−4	X
SIN	Singapore	+8	X	RIO	Río de Janeiro	−3	O
HKG	Hong Kong	+8	X	BUE	Buenos Aires	−3	X
PEK	Beijing	+8	X				

O: City using summertime
X: City not using summertime

§7. SETTING THE DIGITAL TIME



(1) Press button Ⓜ and set to Time [TME] mode.

(2) Press button Ⓑ, or press button Ⓐ while pressing button Ⓑ, and display the name of the city for adjustment.
- Press and hold button Ⓑ to return to the adjustment mode.

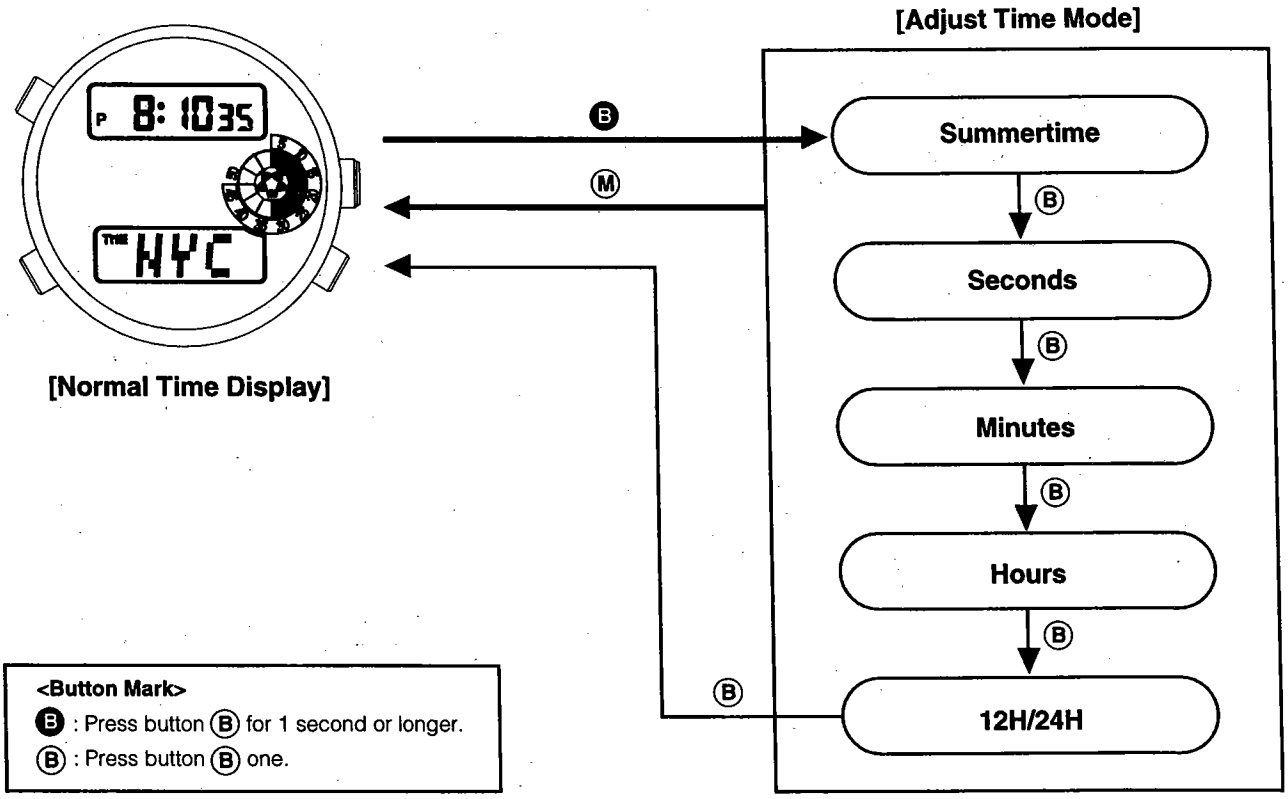
(3) When button Ⓑ is pressed for 1 second or longer, the "SMT" mark and "ON" or "OF" flash and display the summertime adjustment mode.

(4) Each time you press button Ⓑ, the adjustment mode is switched and starts flashing. Display the adjustment position.

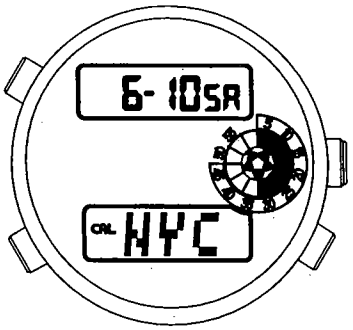
(5) Press button Ⓐ and adjust the flashing position.
- In the summertime adjustment, "ON/OF" is switched each time you press button Ⓐ. When "ON" is set, the time display is added with 1 hour.
- In the "second" adjustment, pressing button Ⓐ resets the display to 0. Pressing button Ⓐ when the display is between 30 and 59 seconds, the minute display is added with 1 minute.
- When adjusting "minute" or "hour," press and hold button Ⓐ for rapid adjustment.
- The 12H/24H display is switched each time button Ⓐ is pressed. When the 12H display is on, set time by paying attention to A (A.M.)/P (P.M.).

(6) When adjusting time under 12H/24H mode, press button Ⓑ to return to the normal Time display.

(Notes)
- When you set the time of a city, times of other cities, including the UTC time, are also adjusted automatically.
- In each adjustment mode, press button Ⓜ to forcibly return to the normal Time display.
- If no button operation is done for 2 minutes or longer in each adjustment mode, the watch will automatically return to the normal Time display.



§8. SETTING THE CALENDAR



(1) Press button Ⓜ and set to Calendar [CAL] mode.

(2) Press button Ⓑ, or press button Ⓐ while pressing button Ⓑ, and display the name of the city for adjustment.
- Press and hold button Ⓑ to return to the adjustment mode.

(3) When button Ⓑ is pressed for 1 second or longer, the "Month" flashes and displays the Calendar adjustment mode.

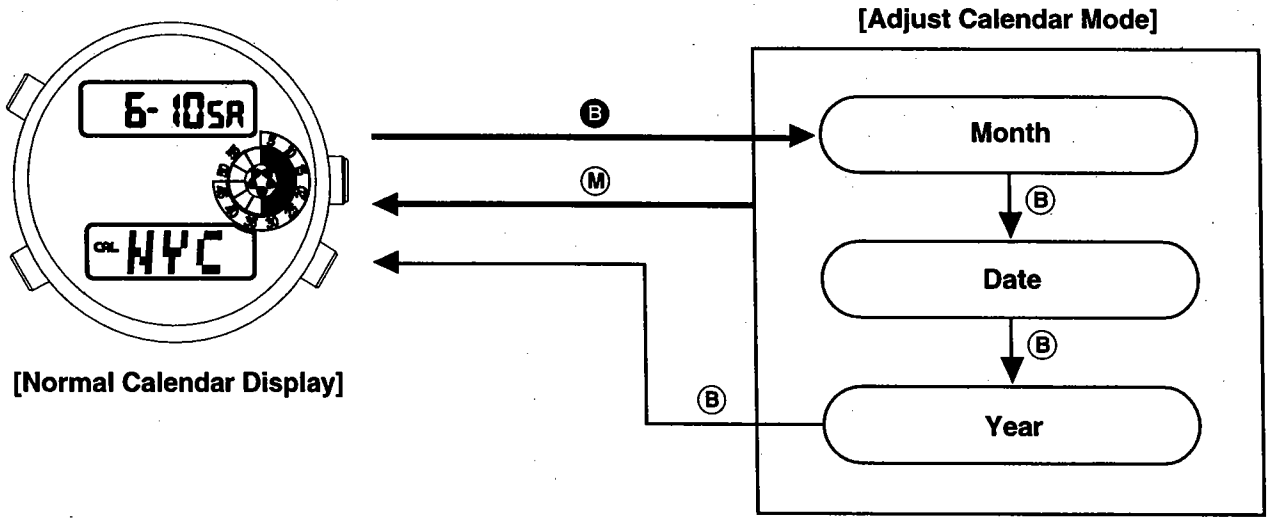
(4) Each time you press button Ⓑ, the adjustment mode is switched. Display the adjustment position with flashing.

(5) Press button Ⓐ and adjust the flashing position
- Press and hold button Ⓐ for rapid adjustment in each adjustment mode.

(6) When adjusting "Year", press button Ⓑ to return to the normal Calendar display.

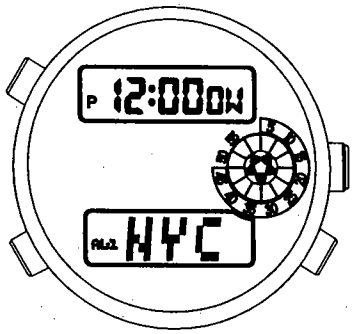
Notes

- When you set the calendar of a city, calendars of other cities, including the UTC time, are also ajusted automatically.
- In each adjustment mode, press button Ⓜ to forcibly return to the normal Calendar display.
- If no button operation is done for 2 minutes of longer in each adjustment mode, the watch will automatically return to the normal Calendar display.
- Years can be set from 2000 through 2099.
- Days of the week are set automatically by setting the year, month and day.
- In the calendar adjustment, when Calendar is set to a non-existent date (e.g., February 30), display will automatically show the first day of next month when returned to normal mode.



§9. USING THE ALARM

Alarm 1 and 2 differ in sound only, and setting operations are the same.
The alarm sounds for 15 seconds once a day when the set time is reached. To stop the alarm while it is sounding, Press either of buttons Ⓐ, Ⓑ or Ⓜ.



<How to Set Alarm Time>

(1) Press button Ⓜ and set to Alarm 1 [AL-1] or 2 [AL-2] mode.

(2) Press button Ⓑ, or press button Ⓐ while pressing button Ⓑ, and display the name of the city for adjustment.
- Press and hold button Ⓑ to switch to the adjustment mode.

(3) When button Ⓑ is pressed for 1 second or longer, the "Hour" flashes and displays the Alarm adjustment mode.

(4) Each time you press button Ⓑ, the adjustment position is switched between "hour" and "minute." Display the adjustment position with flashing.

(5) Press button Ⓐ and adjust the flashing position.
- Press and hold button Ⓐ for rapid adjustment in each adjustment mode.

Notes

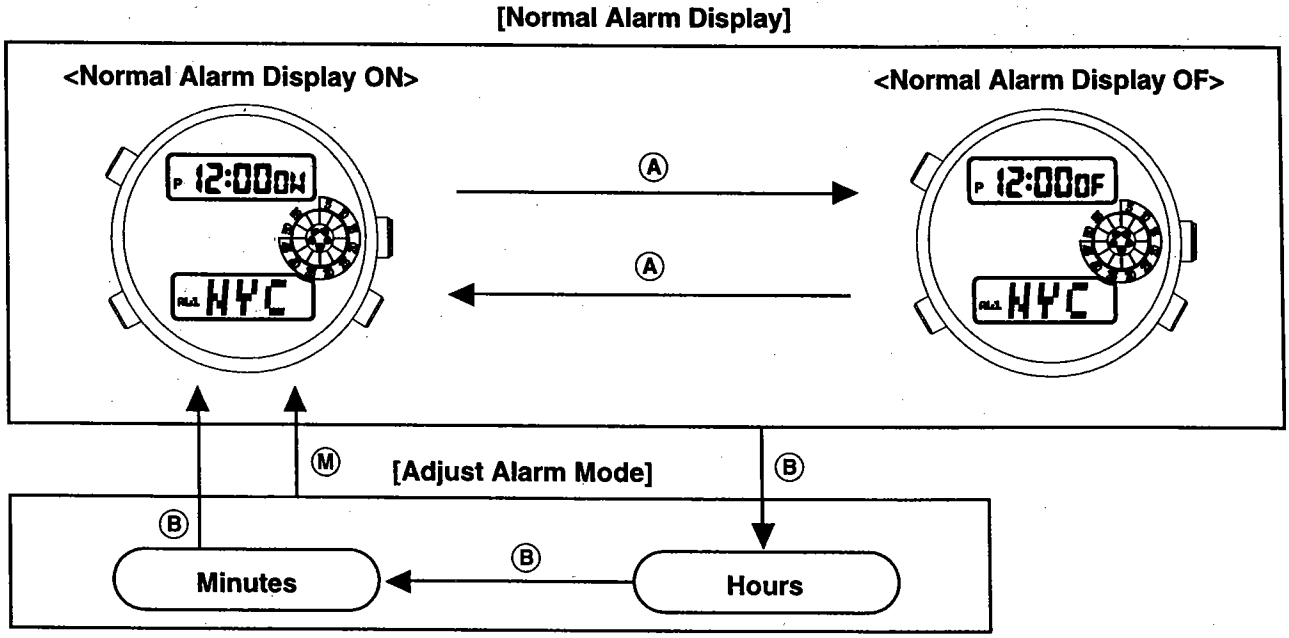
- When Time mode is 12H, Alarm is also set to 12H display. Set the alarm time by paying attention to A (A.M.)/P (P.M.).
- In each adjustment mode, press button Ⓜ to forcibly return to the normal Time display.
- If no button operation is done for 2 minutes or longer in each adjustment mode, the watch will automatically return to the normal Alarm display.

<To Switch Alarm ON/OF>

In the normal Alarm display, Alarm ON/OF is switched each time you press button Ⓐ.

<Alarm Sound Monitor>

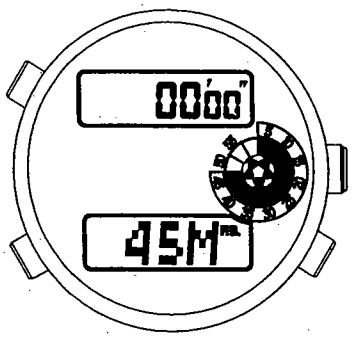
When you press button Ⓐ with the normal Alarm display, the alarm sounds while the button is pressed, allowing you to confirm the sound.



§10. USING THE FOOTBALL TIMER

Football Timer can be set from 45 to 5 minutes in the units of 5 minutes.
When Football Timer is on, you can measure the loss time without interrupting the measurement.

[Normal Football Timer Display]

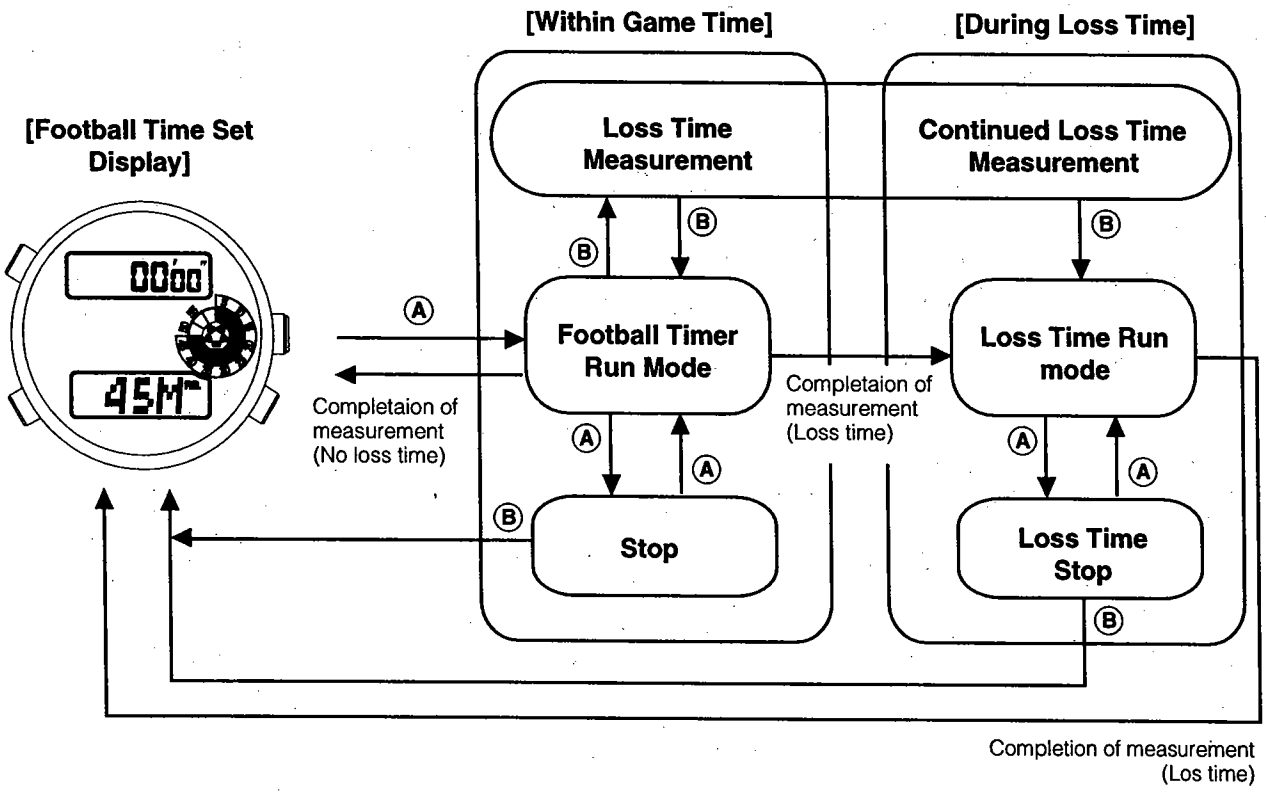


<How to Set Football Timer>

(1) Press button Ⓜ and set to Football Timer [F.B.] mode.

(2) Pressing button Ⓑ adjusts the time minus 5 minutes. Display the time you want to adjust.
- Press and hold button Ⓑ for rapid adjustment in minus 5 minutes.

45 → 40 → 35 → • • • • • 10 → 5



<How to Use Football Timer>

(1) Set the time of Football Timer and press button Ⓐ. The display goes to the Timer Run and start measuring. Each the button Ⓐ is pressed, Timer Run and Stop are repeated.

(2) Press button Ⓑ under the Stop mode to return to Football Timer Set.

(3) Press button Ⓑ under the Timer Run mode, "LOS" flashes and starts measuring the loss time. Press button Ⓑ again to end the loss time measurement, and the accumulated loss time is displayed for 5 seconds.

(Note)

You can do loss time measurement repeatedly, but the measurable accumulated loss time is 15 minutes at most. When the accumulated time reaches 15 minutes, the loss time measurement is automaticaly reset and the display goes to the Football Timer Run.

(4) When the set time of Football Timer ends, the game over sound is given for 2 seconds and then the display goes to the Loss Time Run.
(Note)
After shifting to the Loss Time Run mode, it is not possible to newly measure a loss time.

(5) When measurement (Football Timer set time + loss time) ends, the time-up sound is given for 5 seconds and it returns to the Football Time Set.

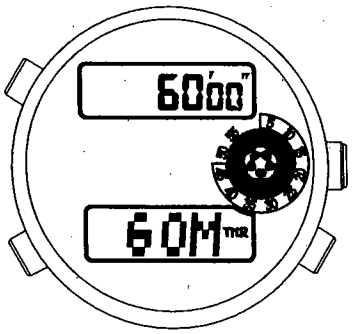
(6) Press button Ⓐ in the Loss Time Run mode to shift to the Loss Time Stop. Run and Stop are repeated each time you press button Ⓐ.

(7) Press button Ⓑ in the Loss Time Stop mode to return to the Football Timer Set.

§11. USING THE TIMER

You can set Timer up to 60 minutes in units of 1 minute. After measurement, the time-up sound is given for approx. 5 seconds and the watch will return to the Timer Initial Setting mode.

[Initial Timer Setting]



<How to Set Timer>

(1) Press button Ⓜ and set to Timer [TMR] mode.

(2) Press button Ⓑ to adjust the time minus 1 minute. Display the time you want to adjust.
- Press and hold button Ⓑ for rapid adjustment in units of minus 1 minute.

60 → 59 → 58 → • • • • • 3 → 2 → 1

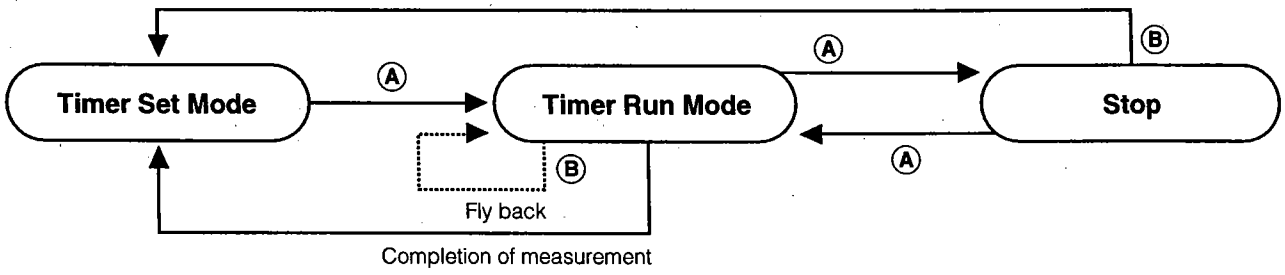
<How to Use Timer>

(1) Set the Timer time and press button Ⓐ to shift to the Timer Run. Each time you press button Ⓐ, Timer Run and Stop are repeated.

(2) Press button Ⓑ in the Stop mode to return to the Timer Set.

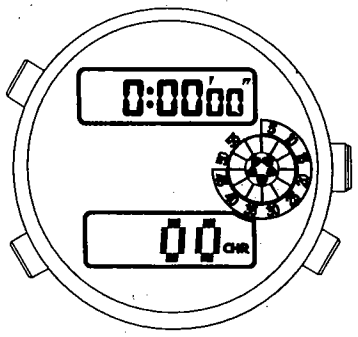
(3) Press button Ⓑ in the Timer Run mode to return to the Timer Set and resumes measuring (fly back).

(4) Press button Ⓑ in the Timer Stop mode to return to the Timer Set.



§12. USING THE CHRONOGRAPH

Chronograph measures in units of 1/100 of a second, up to "23 hours, 59 minutes 59 seconds". On reaching 24 hours of elapsed time, it resets to 00 seconds and stops.



<How to Measure>

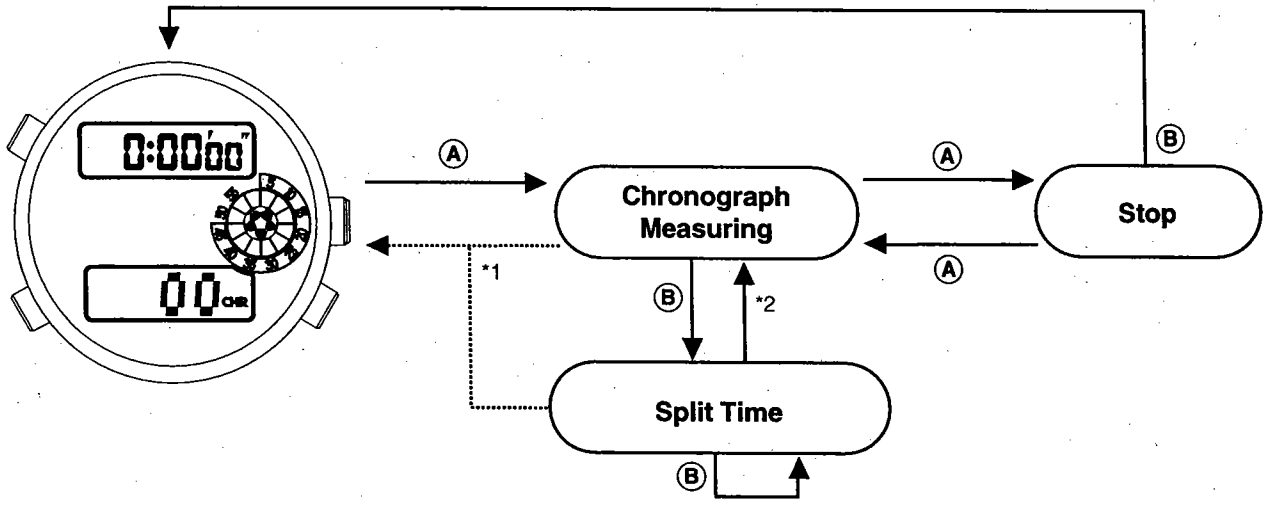
(1) Press button Ⓜ and set to Chronograph mode.

(2) Press button Ⓐ to start measuring.
- Each time you press button Ⓐ, measurement and stop are repeated.
- During measuring, "RUN" flashes on digital display 2. When stopped, digital display 2 shows the measurement reading to 1/100 second.

(3) When button Ⓑ is pressed during measuring, the watch shifts to the Split status for 10 seconds.
- When the Split mode is set, "SPL" and the "1/100-second measurement of split time" are displayed by turns.

(4) Press button Ⓑ in the Stop mode to reset to the display to 00 second.

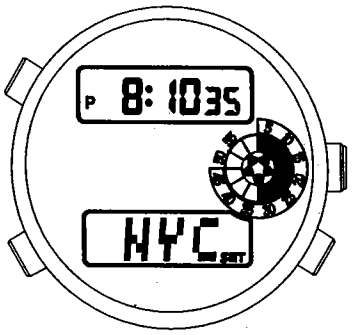
[Chronograph Reset Position]



*1: Auto-Return after 24 hours
*2: Auto-Return after 10 seconds

§13. USING THE ZONE SET

In the Zone Set function, the UTC (Universal Time Coordinated) and 30 city names are set and only the cities set "ON" can easily be called out (displayed). It is also possible to set summertime to each city.



<Zone setting>

(1) Press button Ⓜ and set Zone Set [SET] mode (City Selection status).

(2) Press button Ⓑ, or press button Ⓐ while pressing button Ⓑ, and display the name of the city for adjustment.
Press and hold button Ⓑ to switch to the adjustment mode.

(3) When button Ⓑ is pressed for 1 second or longer, "city name" and "ON/OF" flash.

(4) Press button Ⓐ and set "ON" (city name display) or "OF" (no city name display).

(5) When button Ⓑ is pressed, "SMT" and "ON/ OF" flash to set in the Summertime setting mode.

(6) Press button Ⓐ and set "ON" (summertime setting) or "OF" (no summertime setting).

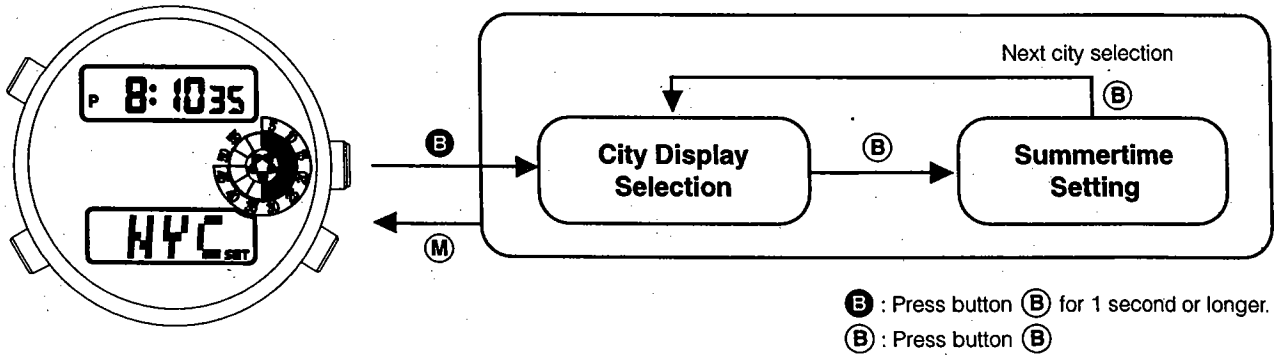
(7) Press button Ⓑ, or press button Ⓐ while pressing button Ⓑ, and you can get the next city name on the display.

(8) Press button Ⓜ in the set mode to return to Zone Set [SET] (City Selection mode).

Note

If no button operation is done for 2 minutes or longer in the set mode, the watch will return to the City Selection.

[City Selection Mode]



<How to Confirm the Set City Name>

(1) Press button Ⓑ, or press button Ⓐ while pressing button Ⓑ in Zone Set [SET] mode, the name of city and ON/OF are displayed.

- Press and hold button Ⓑ to switch to the time adjustment mode.
- Only the cities that ON is displayed can be called out under Time, Calendar or Alarm mode.

§14. ALL RESET FUNCTION

Use All Reset function after replacing the battery or if your watch shows abnormal operation (the alarm sounds continuously) or display (no display) due to static electricity or a hand impact, as follows:

<How to Set All Reset>

(1) Pull out the crown one step and press three buttons Ⓐ, Ⓑ and Ⓜ at the same time to apply All Reset.
- All digital displays turn on.

(2) Release all the buttons and return the crown to the normal position, so that with the confirmation sound all the displays that are lit are released.
- From 12:00:00 AM UTC, digital time starts ticking by 12H system.

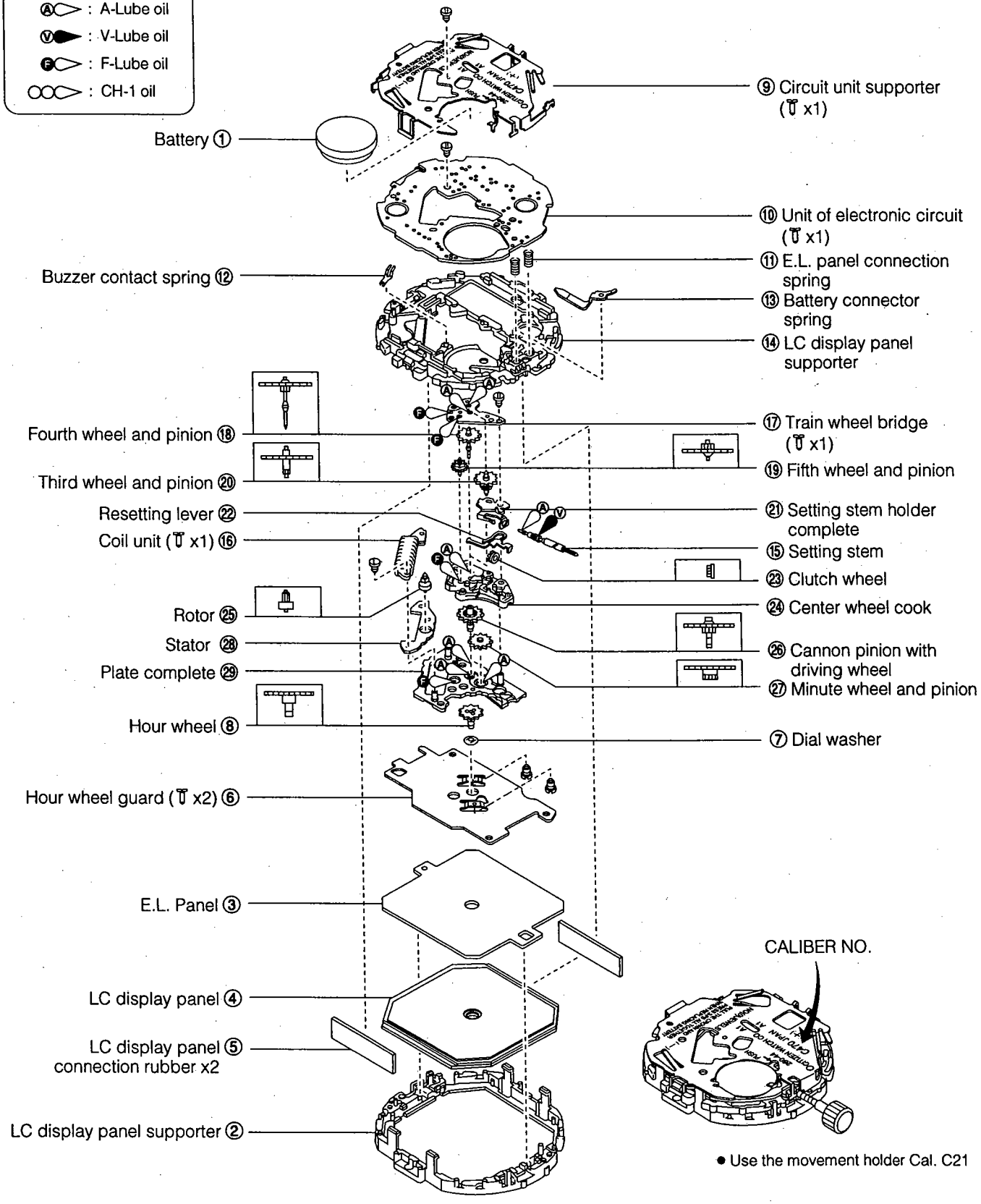
(3) Correctly set each function, including Time and Calendar, before using the watch.

§15. DISASSEMBLY AND ASSEMBLY OF MOVEMENT

Disassemble the parts in order of ① → ㉙
Assemble the part in order of ㉙ → ①

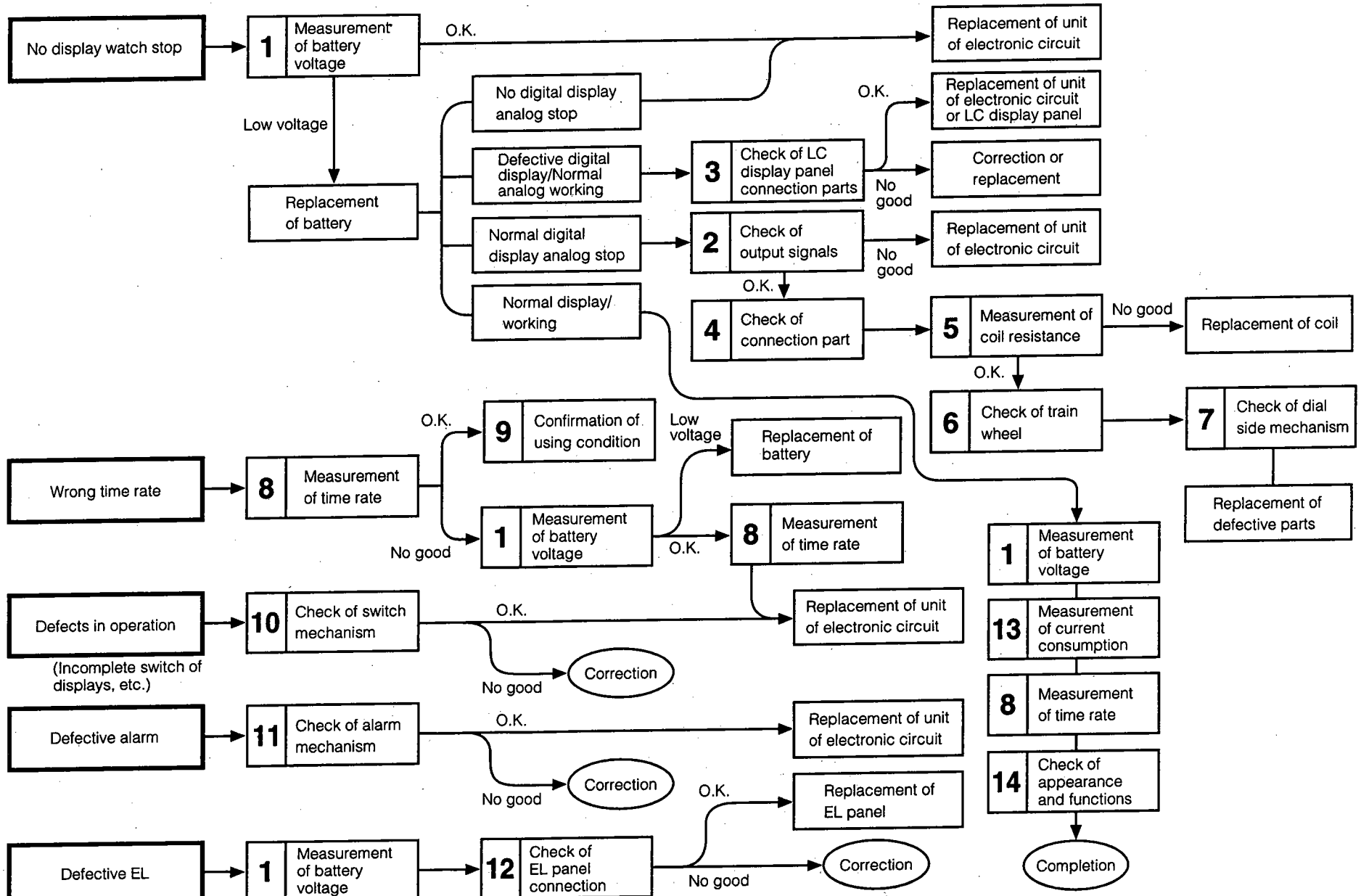
● Lubrication mark

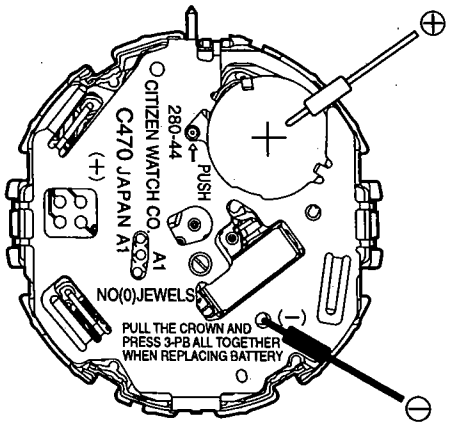
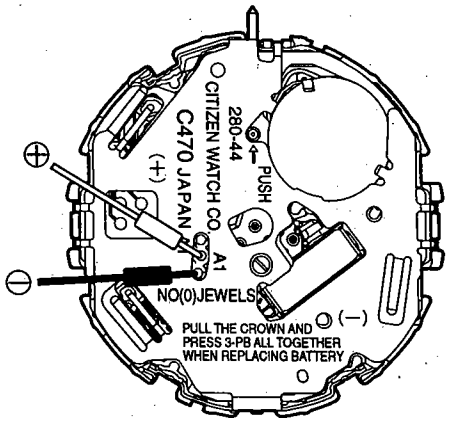
Ⓐ : A-Lube oil
Ⓥ : V-Lube oil
Ⓕ : F-Lube oil
: CH-1 oil



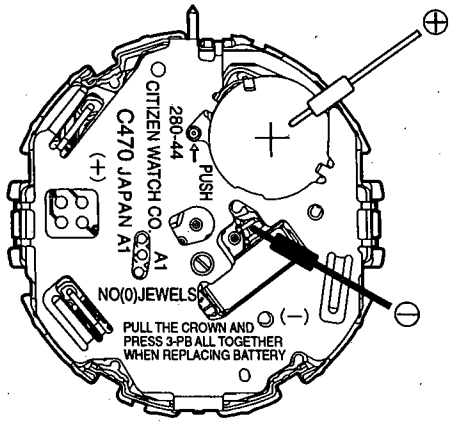
● Use the movement holder Cal. C21

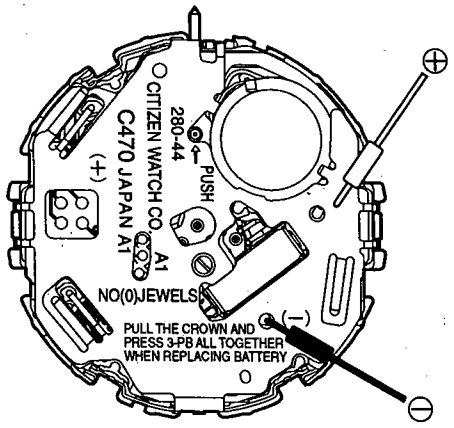
§16. TROUBLESHOOTING AND ADJUSTMENT



Check Points	How to Check	Results and Treatments
❶ Measurement of • baterry voltage	[Refer to Technical Manual, Basic Course II-1-a] <Tester range: DC 3V>  	• **Over 1.5 V** → Normal • **Under 1.5 V** → Replace the baterry.
❷ Check of output signals	[Refer to Technical Manual, Basic Course II-1-b] <Tester range: DC 0.3V>  (The tester lead pins have no polarity.)	• The tester pointer swings every 1 second. → Normal • The tester pointer does not swing. → Check the connections parts. ⬇ • The connections are normal. → Replace the unit of electronic circuit.
❸ Check of LC display panel and connection parts	[Refer to the Digital Section of Technical Manual, Basic Course II-2-a] • Inspection of all segments Pull out the crown and push the three buttons at the same time to turn on all the segments, and check for defective ones. (Refer to §14. ALL RESET FUNCTION) • Continuity test on LC display panel, cell connection rubber and plate . Check the parts for stain, breakage, etc.	• LC display panel, connection rubber or metal plate is not installed correctly. → Install correctly. • Parts are stained or dirty. → Remove stain and dirt. • Parts are cut broken or scratched. → Replace parts.
❹ Check of connection part	[Refer to Analog Section of Technical Manual, Basic Course II-2-a]	

Check Points	How to Check	Results and Treatments
❺ Measurement of coil resistance	[Refer to Technical Manual, Basic Course II-1-c] • Remove the unit of electronic circuit, then measure the resistance of coil. • The tester lead pins have no polarity. <Tester range: R x 10Ω>	• **1.9 kΩ ~ 2.3 kΩ** → Nomal • Outside range of **1.9 kΩ ~ 2.3 kΩ** → Replace coil unit.
❻ Check of train wheel	[Refer to Technical Manual, Basic Course II-2-b] • Check clearance of each wheel. Check rotor for dust and oil.	
❼ Check of dial-side mechanism	[Refer to Technical Manual, Basic Course II-2-c] • Confirm all parts are not deformed and are lubricated properly.	
❽ Measurement of time rate	[Refer to Technical Manual, Basic Course II-2-d] • Since this watch uses the D.F.C. (digital frequency control) method and has no control terminal, there is no way of adjusting its time rate in the field. (Measurement is made in a 10-second range.)	The watch loses or gains a substantial amount of time. → Replace the unit of electronic circuit.
❾ Confirmation of using condition	[Refer to Technical Manual, Basic Course II-2-e]	
❿ Check of switch mechanism	1. Inspection of movement. • Press the switch spring of circuit unit supporter with tweezers, etc. to contact it to plate complete, and confirm the switching function. • Check for removal of pattern of electronic circuit unit, deformation of switch return spring, etc. 2. Inspection of push button • Check push button for deformation, stain, etc. **(Note)** Be sure to apply silicone oil to the packing of push button for waterproofness and smooth operation.	• Switching function is normal. → Inspect push button. • Pattern is removed or deformed. → Replace defective parts. • Push button is stained or deformed. → Remove stain, or replace push button.

Check Points	How to Check	Results and Treatments
⓫ Check of alarm mechanism	[Refer to Technical Manual, Basic Course II-1-d] *1. Set the movement in the case, and check output of alarm signal with the case back removed. (1) Set the watch in alarm mode. (2) Apply ⊕ lead pin to battery surface and ⊖ lead pin to pattern of buzzer contact spring, them press Ⓐ button. <Tester range: DC 0.3V>  *2. If the output of alarm is normal, perform the following inspection. • 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 dust and stain.	• Tester pointer does not swing. → Replace the electronic circuit unit. ⬇ • Tester pointer swings. → Normal ⬇ • Perform inspection in *2. ⬇ Normal indication. → O.K.
⓬ Check of EL panel connection	1. Confirmation of battery voltage 2. Check of EL panel connection • Check the EL panel for breakage. Particularly check the electrode pattern on the back side for stain, breakage, etc. which can lower electrical continuity. • Confirm that the EL connection spring is in contact with the EL panel and electrode pattern normally. If any cause is not found by inspections 1 and 2, the EL panel must have been deteriorated. Replace the EL panel.	• **Over 1.5 V** → Check EL panel connection. • **Under 1.5 V** → Replace battery. • **Trouble of EL panel** → Replace EL panel. • **Deformation of EL connection spring** → Repair or replace.

Check Points	How to Check	Results and Treatments
⓭ Measurement of current consumption	[Refer to Technical Manual, Basic Course II-1-f] (1) Set the battery to tester. (2) Set the lead bars of the tester to the module. Pull the crown and push the three buttons at the same time, them push the crown (The all-reset operation procedure). Then, measure the current consumption. <Use the tester range: DC 10μA>  ★ Precautions for measurment 1. Be sure to measure according to the above procedure. If measurement is not performed according to the above procedure, the watch may indicate and operate abnormally and the current power consumption cannot be measured correctly. 2. When the lead bars are applied to the measurement parts, the meter reading may exceeds the maximum value. In this case, wait for about 30 seconds, then measure again. **Influence of light** **Avoid taking measurements under an incandescent lamp or direct sunshine, because this may cause the current value to increase.** **The light of a fluorescent lamp has no influence on current consumption.**	• Current consumption of the movement **Under 3.0 μA.** → Nomal **Over 3.0 μA.** → Inspect train wheel and dial side mechanism, and remove dust and stain and oil. • Pull the crown to measure the current consumption under the reset state. **Under 2.4 μA.** → Nomal **Over 2.4 μA.** → Electronic circuit unit is defective. ⬇ Replace the electronic circuit unit.
⓮ Check of appearance and functions	[Refer to Technical Manual, Basic Course II-2-f] • Check inside of case for dust and stain. • Check operation of setting switches for normality. • Check segment for normality (See ❸ Check of LC display panel and connection part.) * Be sure to apply silicone oil to packing of each push button. It is necessary for water resistance and smooth operation.	