

# ***TECHNICAL INFORMATION***

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## **CITIZEN QUARTZ**

### **Cal. No. C390**



**CITIZEN**

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

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## §1. FEATURES

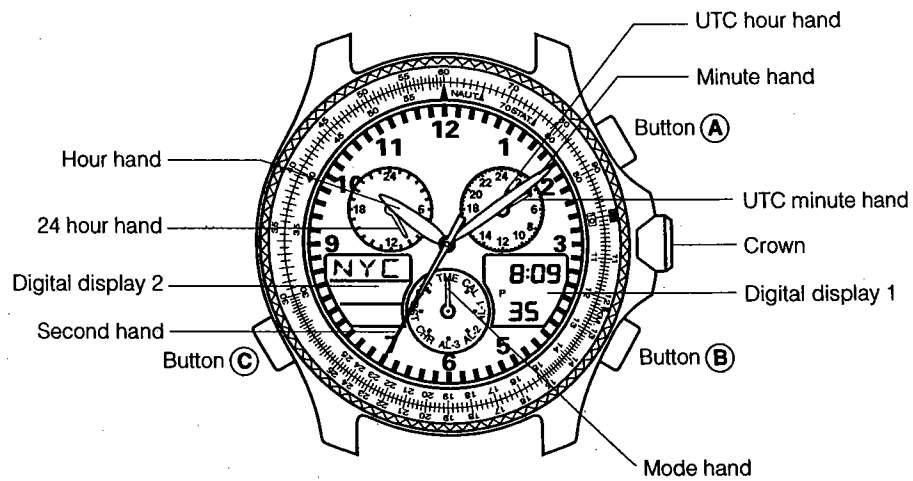
This watch is a combination watch equipped with numerous functions, including time, calendar, alarm and chronograph functions, a destination timer that is able to measure the amount of time remaining until a destination is reached, and a zone setting function that enables easy access to the times and dates in 30 cities, including UTC. In addition, it is also provided with EL internal illumination that allows the time to be read even in dark locations.

## §2. SPECIFICATIONS

<b>Caliber NO.</b>		<b>C390</b>	
Type		Combination watch	
Movement size (mm)		ø31.8 x 6.49t	
Accuracy		Within ±20 seconds per month (when worn at normal temperatures of +5°C to +35°C/41°F to 95°F)	
Operating temperature range		Watch operating temperature range: 0°C to +55°C (32°F to 131°F)	
Converter		Bipolar step motor 3 units	
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
		Destination Timer	City name, remaining time until arrival, set time, set month, day and year
		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"> <li>• Switching between main time (analog) and sub-time (digital)</li> <li>• Low battery warning function</li> <li>• EL internal illumination function</li> </ul>	
Battery		280-74: Battery Code: SR936W	
Battery life		Approx. 2 years (when using the alarm 6 times/day, the chronograph for 24 hours per measurement/week, the destination timer once/week, and EL 6 times/1 day)	

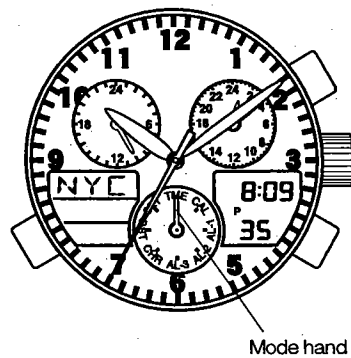
\* Specifications are subject to change without notice.

### §3. NAMES OF COMPONENTS

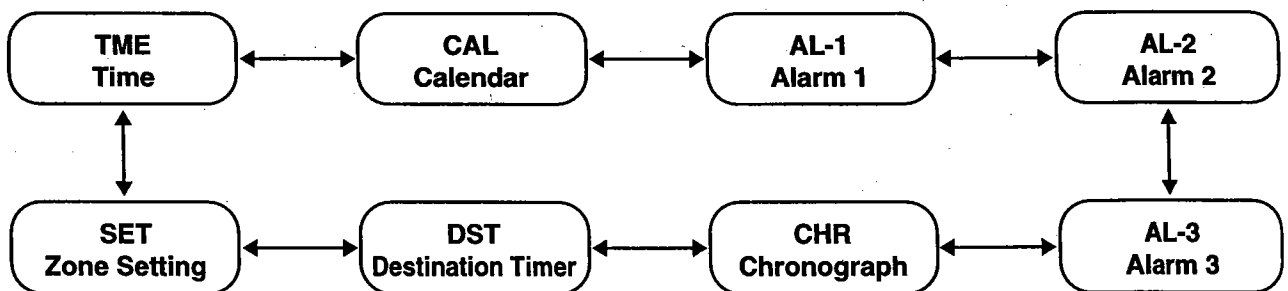


### §4. SWITCHING THE MODE (DISPLAY FUNCTIONS)

The mode can be switched by turning the crown. Check the current mode with the mode hand.



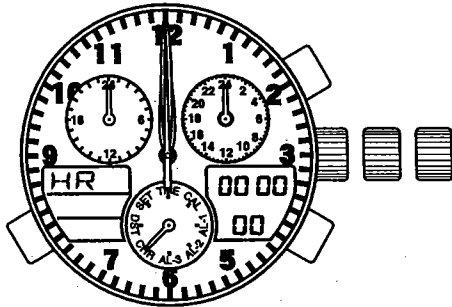
#### <Switching the Mode>



## §5. CHECKING 0-POSITION OF EACH HAND

Before using this watch, check that the 0-position (base 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.
  - 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).
3. After “checking the 0-position” of each hand, be sure to return the crown to the normal 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.

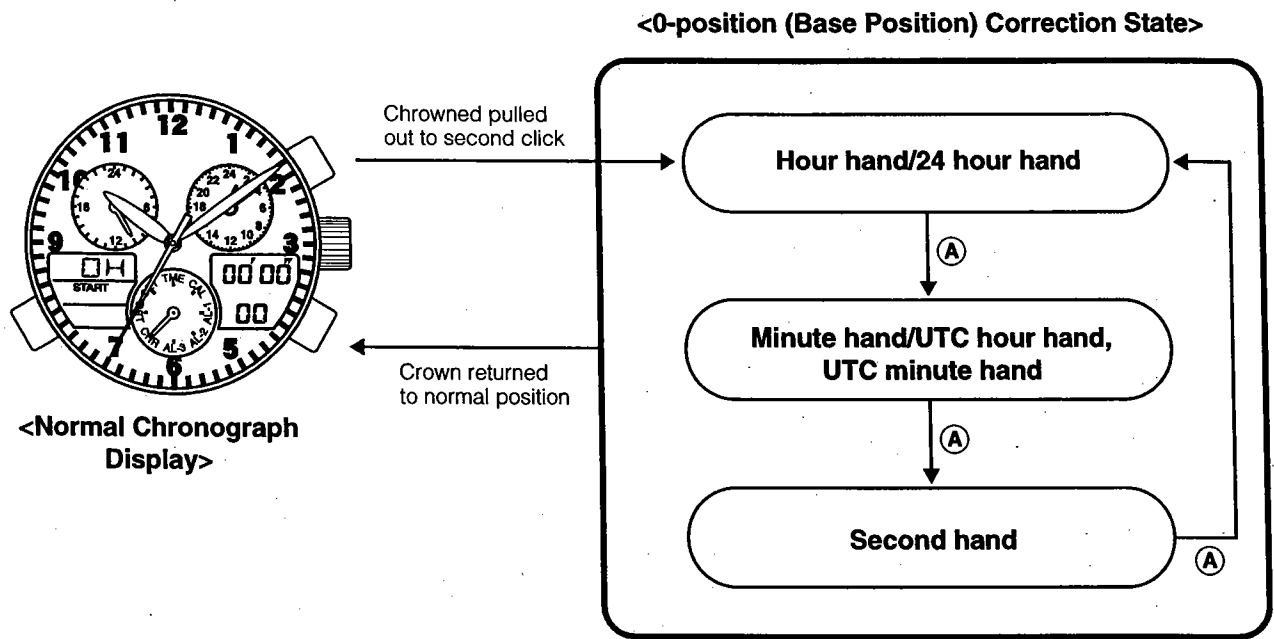
### <0-Position Correction (Setting to the Watch Base Position)>

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.



## §6. ACCESSING TIMES OR DATES OF MAJOR CITIES

The time of 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 [CAL] calendar 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	Rio de Janeiro	-3	O
PEK	Beijing	+8	X	BUE	Buenos Aires	-3	X

Scrolling DOWN ↑  
Scrolling UP ↓

\* 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.

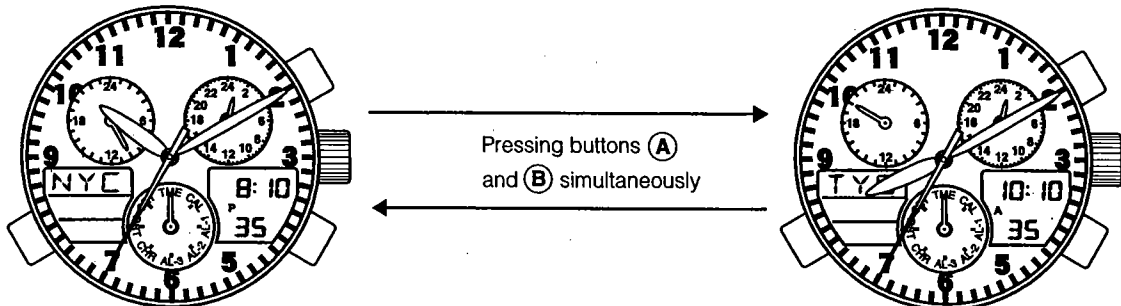
\* The time difference and use of daylight savings time of each city are subject to change by the particular country.

## §7. 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).

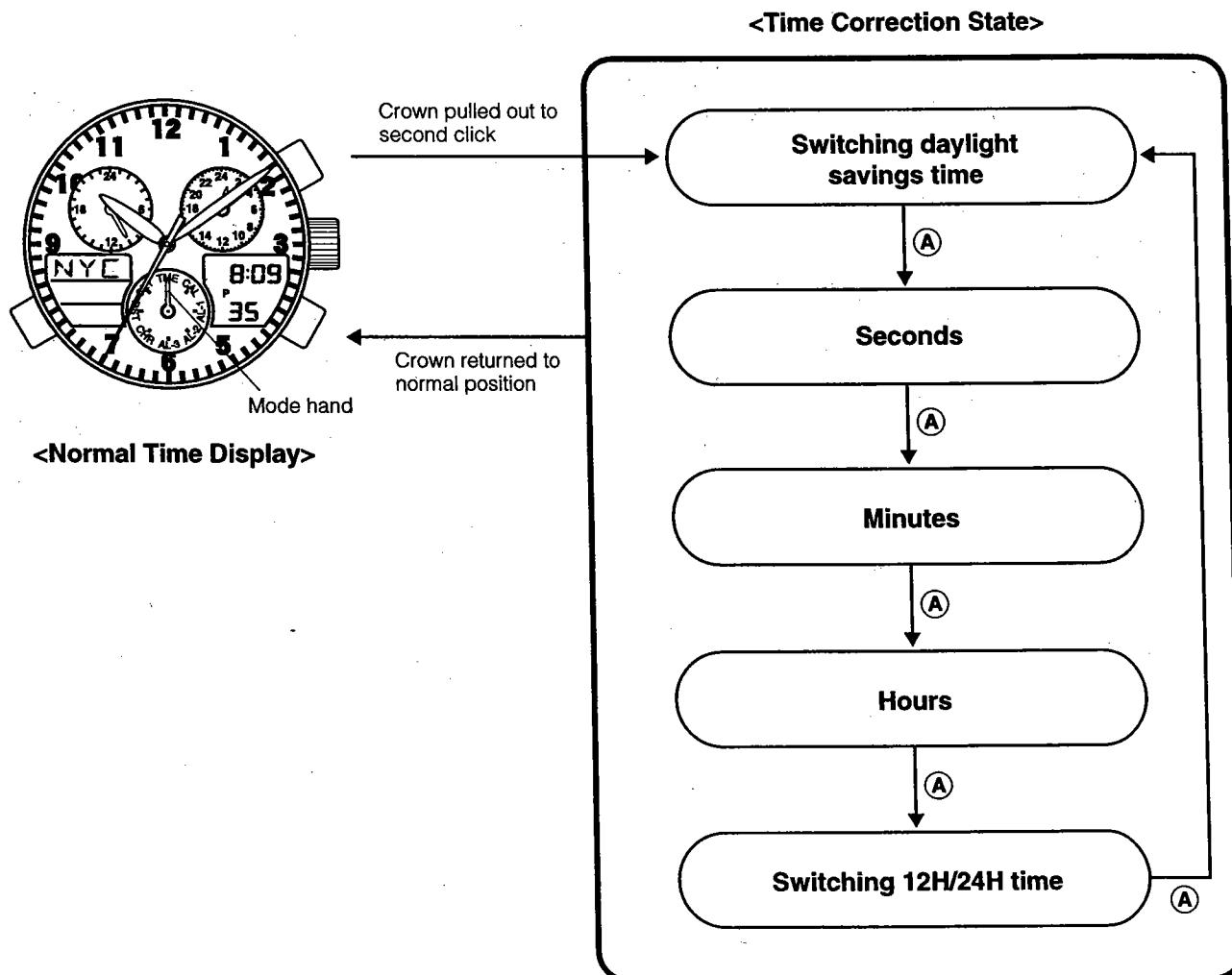


Analog time: 10:10 AM (Tokyo: TYO)  
Digital time: 8:10 PM (New York: NYC)

Analog time: 8:10 PM (New York: NYC)  
Digital time: 10:10 AM (Tokyo: TYO)

## §8. 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.
    - Continuously turning the crown, allows for continuous correction. When stopping it, rotate the crown either to the left or to the right.
    - Switching "12H/24H time" is performed by pressing button **(B)**.
  5. After corrections have been completed, return the crown to the normal position.



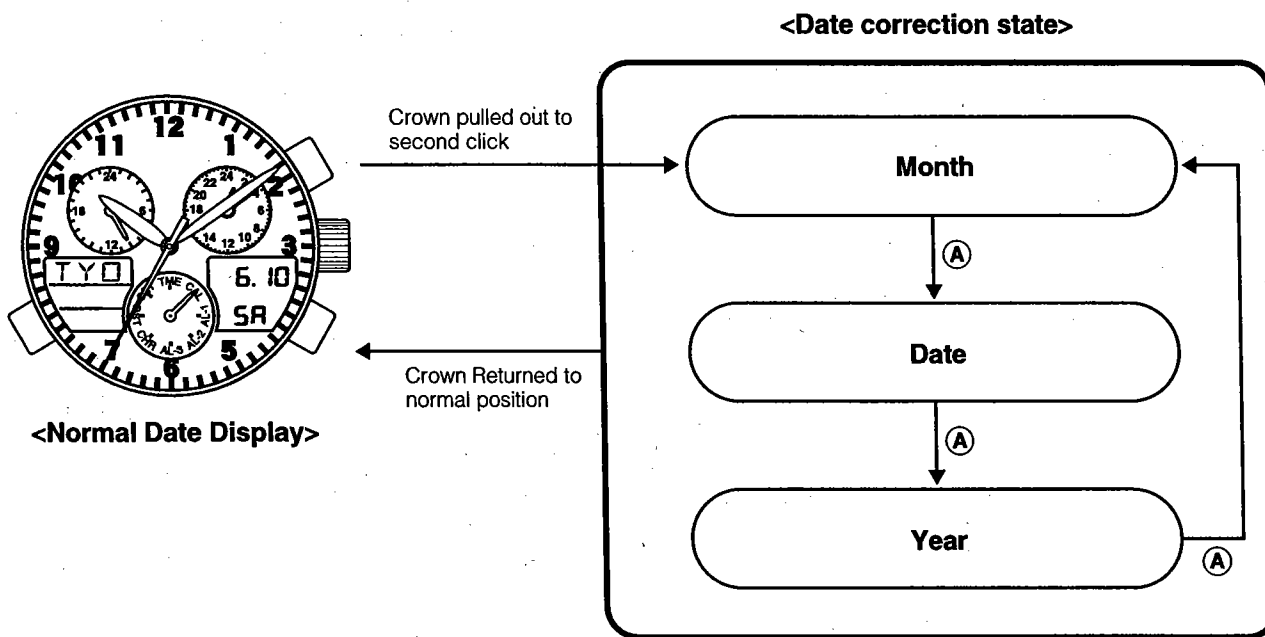


**Notes:**

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.

**§9. 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, 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. When stopping it, rotate the crown either to the left or to the right.
5. After corrections have been completed, return the crown to the normal position.



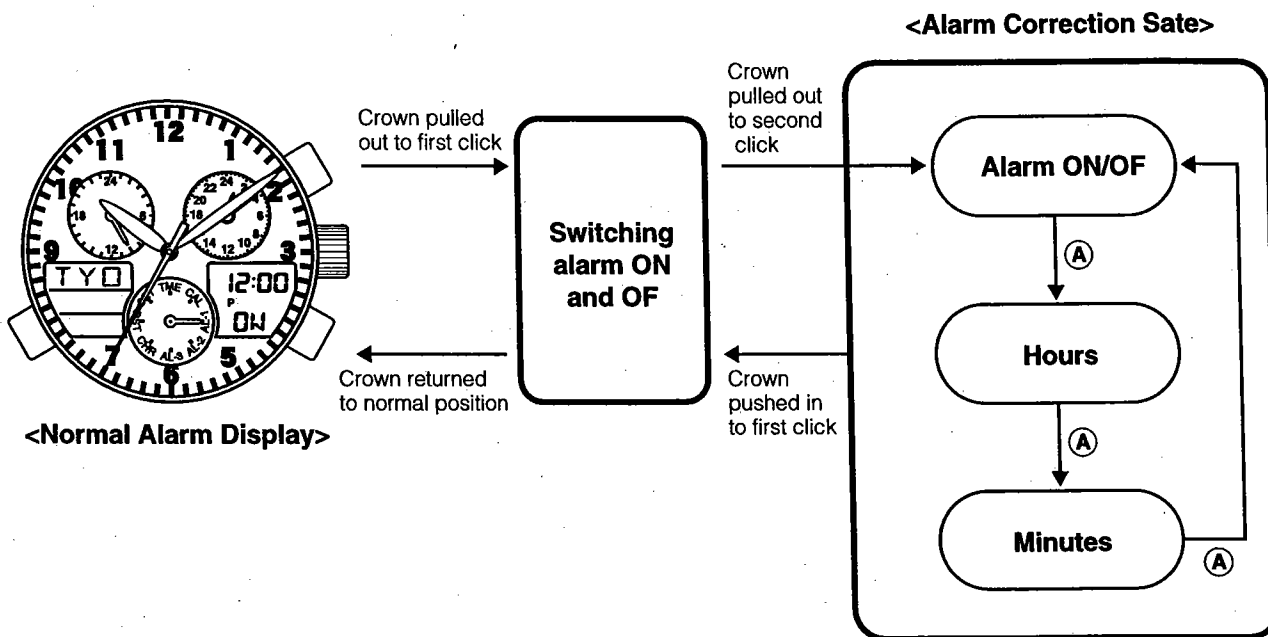
**Notes:**

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.

## §10. 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 any of button **(A)**, **(B)** or **(C)**.



### <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, 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/OF 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 (counterclockwise), correction is made in the negative direction.
  - Turning the crown continuously allows corrections to be made rapidly. When stopping it, rotate the crown either to the left or to the right.
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.

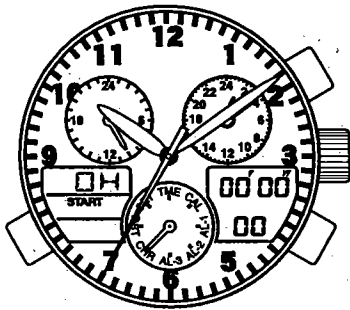
### <Alarm Monitor>

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

## §11. USING THE CHRONOGRAPH

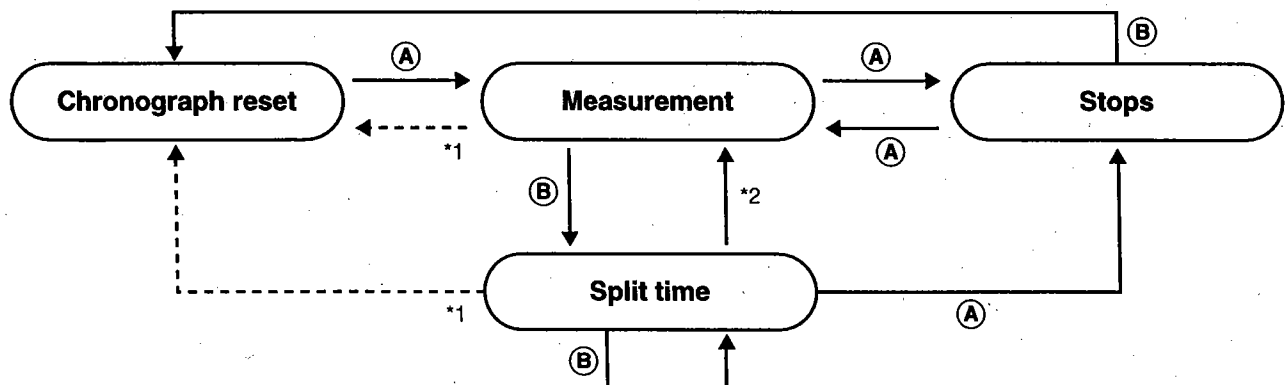
The chronograph is able to measure and display time up to a maximum of 23 hours, 59 minutes, 59.99 seconds in 1/100th second units. After 24 hours have elapsed, the chronograph automatically returns to the chronograph reset display (00'00"00) and stops.

### <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.



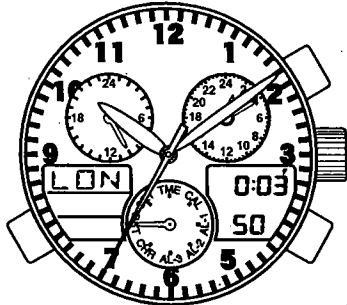
\*1: Returns automatically after timing for 24 hours

\*2: Returns automatically after 10 seconds

## §12. USING THE DESTINATION TIMER

The destination timer calculates and display the amount of time remaining until a destination is reached after setting the name of the destination city, time of arrival and date of arrival. When the remaining time reaches 0 seconds, a tone sounds indicating that the time is up. After the time is up, the timer changes to a display of elapsed time.

### <Initial Setting State>



### <Setting Procedure>

1. Turn the crown to align the mode hand to the destination timer [DST] mode.
2. When the crown is pulled out to the 2nd click, the destination timer can be switched between "RUN (operating)" and "STP (not operating)".
3. Pressing button **(B)** switches the destination timer between RUN and STP each time it is pressed.
4. Pressing button **(A)** changes the location that can be corrected each time it is pressed. Press button **(A)** until the location to be corrected flashes.
5. Turn the crown and set the name of the destination city, time, date and so forth.
  - Turning the crown continuously causes the display to advance continuously.
  - Turn the crown to the right or left to stop the display from advancing.
6. When the crown is returned to the normal position, and the destination timer has been set to RUN, measurement begins automatically and the city name and amount of time remaining until arrival are displayed.  
When the destination timer is set to "STP", "---" is displayed on digital displays 1 and 2.

### Note:

1. Only those cities for which "SET" is selected with the zone setting function are displayed for the city name.
2. In the case daylight savings time has been set with the time or zone setting function, the remaining time is displayed after adding in daylight savings time.

### <Interpretation of Arrival Time and Arrival Date>

1. When button **(A)** is pressed in the destination timer mode, the set arrival time is displayed on digital display 1.
2. When button **(B)** is pressed while arrival time is displayed, the set month, day and year (last two digits) are displayed.

### <Setting Range and Display Range>

Setting range: From 12:00 AM on January 1, 2000 to 11:59 PM on December 31, 2099

City names that can be set: Those cities that have been set to "ON" with the zone setting function

Display range:

When displaying remaining time:

- Remaining time is displayed from 99 hours, 59 minutes and 59 seconds to 0 hours, 00 minutes and 00 seconds. "ER" is displayed when the remaining time exceeds 100 hours.

When displaying elapsed time:

- Elapsed time is displayed from 0 hours, 00 minutes and 00 seconds to 99 hours, 59 minutes and 59 seconds. The display changes to "ER" when the elapsed time exceeds 100 hours.

#### Note:

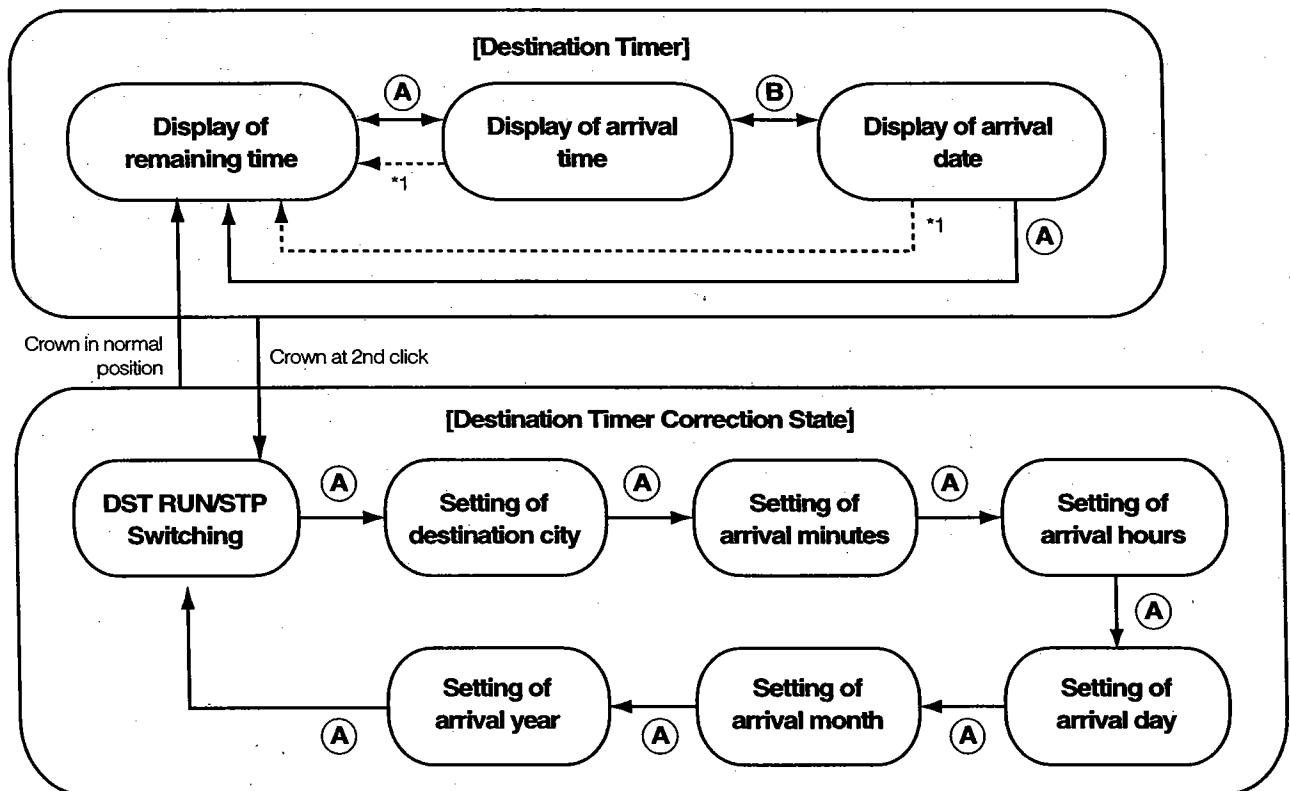
1. Time is continued to be measured inside the watch even when "ER" is displayed.

### <Changing Destination City Name, Arrival Time and Arrival Date>

1. When the city name, arrival time and arrival date are changed once they have been set, the remaining time is recalculated and displayed based on the new city name, arrival time and arrival date.

#### Note:

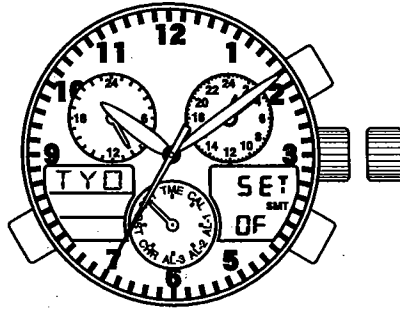
1. If the city name set with the destination timer is set to "OFF" with the zone setting function and the watch is again returned to the destination timer, "ER" is displayed and the next city name (in the UP direction) is displayed for the city name,



\*1: Returns automatically after 10 seconds.

## §13. 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 be set for each city. In addition, the user is also able to arbitrarily register one city and time difference.



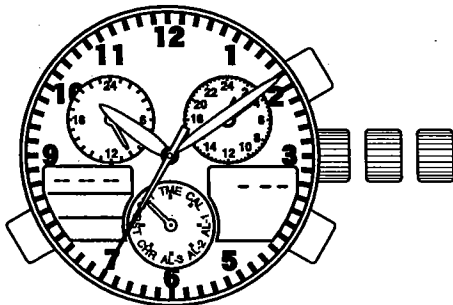
### <Using Zone Setting>

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 OFF 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 OFF 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, 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 change the display of the registered city name to "-- -- --".
4. After canceling registration, return the crown to the normal position.

## §14. LOW BATTERY WARNING FUNCTION

When battery capacity becomes low, the second hand begins to move two graduations (two seconds) at a time to inform the wearer that the battery has nearly reached the end of its life. Replace the battery promptly when this happens.

### [Analog Display]

- When the low battery warning function is activated, the second hand begins two-second interval movement regardless of the display (mode) of the watch. However, the 24-hour hand, hour hand and minute hand continue to keep the correct time.

### [Digital Display]

#### <Digital Display in Each Mode>

- When the low battery warning function is activated, the watch enters the normal time display regardless of the position of the crown (1st or 2nd click) in any mode other than the calendar mode.
- When the watch is in the calendar mode, the watch enters the normal date display regardless of the position of the crown.

#### Notes:

- The crown can only be operated to change the mode (crown 0 click position)
  - The buttons can only be used to change the city name (UP/DOWN).
  - The EL light is not illuminated even if the button is pressed.
  - The alarm tone does not sound even if the alarm is set.
  - The chronograph stops measuring time even if measurement is in progress and is reset.
  - Although the destination timer tone does not sound even if measurement is completed, measurement continues.
-

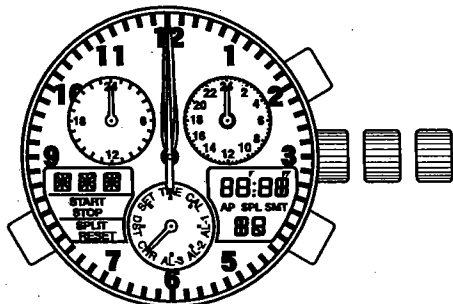
## §15. EL INTERNAL ILLUMINATION

EL, which is the abbreviation for electroluminescence, is a phenomenon in which light is emitted following the application of a voltage. This watch employs a method whereby light is emitted by incorporating an EL substance in the panel. EL illumination is turned on by pressing button ③.

## §16. 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.

### <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.
  - 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 ①, ② and ③ 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, the hour hand, and the 24 hour hand to indicate that the all-reset procedure has been completed.
  - After the demonstration movement, pull the crown out to the second click to switch the setting 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:

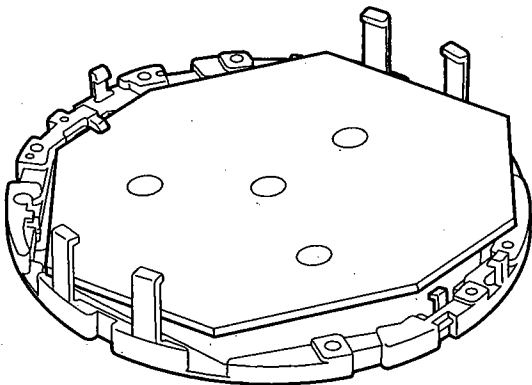
- After setting the 0 position (base position) for each hand, correctly reset the time, calendar and other modes before using the watch.



## §17. PRECAUTIONS FOR DISASSEMBLY AND ASSEMBLY

### <Fitting of LC display panel supporter>

Fit the "LC display panel" and "E.L. 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 "E.L. panel" to the "LC display panel supporter".
4. 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 in the normal position to set the watch in the "TME" mode.
  - The "Hour, minute, second, and A/P" are displayed on the digital display unit.
2. Fit the mode hand to the center of the "TME" mode mark.
3. Turn the crown in the normal position to set the watch in the "CHR" mode.
4. Pull out the crown to the second click and press the (A), (B), and (C) button simultaneously to perform the all-reset operation.
5. Return the crown to the normal position to turn off full-segment glow.
6. Pull out the crown to the second click again.
  - The train wheel revolves for about 30 seconds. Wait until it stops.
7. Fit the UTC hour hand, UTC minute hand, and 24-hour hand to the 24-hour position.
8. Fit the hour hand, minute hand, and second hand to the 12-o'clock position.
9. Set the movement in the case and perform the "0-position check".
  - If each hand is not at the 0 position, perform the "0-position correction".
10. After performing the "0-position check" and "0-position correction", set the time, calendar, and other mode correctly.

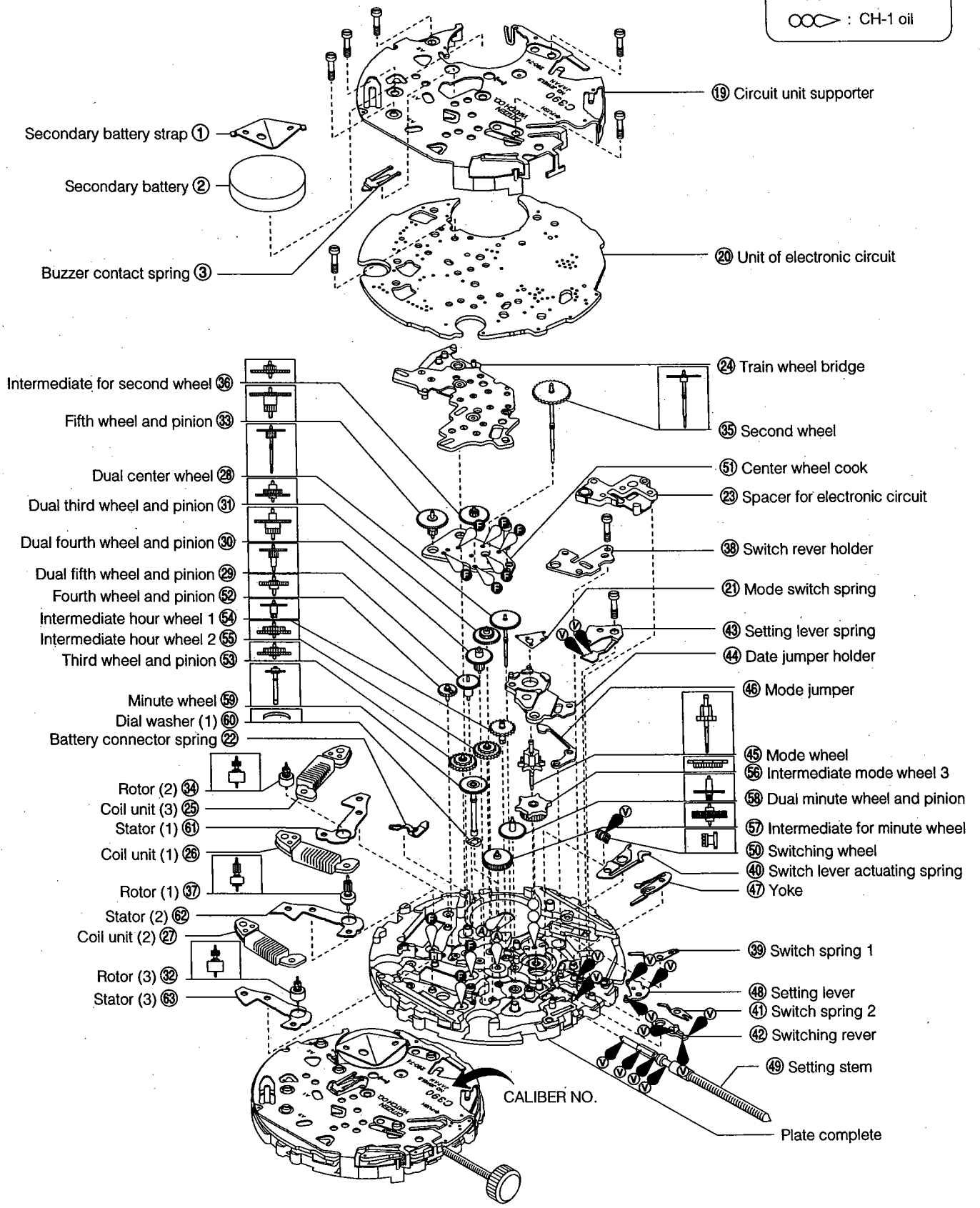
# §18. DISASSEMBLY AND ASSEMBLY OF MOVEMENT

Disassembly procedure: ① → ⑥③

Assembly procedure: ⑥③ → ①

● Lubrication mark

- ⊙ : A-Lube oil
- ∇ : V-Lube oil
- ⊖ : F-Lube oil
- : CH-1 oil



Secondary battery strap ①

Secondary battery ②

Buzzer contact spring ③

⑱ Circuit unit supporter

⑳ Unit of electronic circuit

Intermediate for second wheel ③⑥

Fifth wheel and pinion ③③

Dual center wheel ②⑧

Dual third wheel and pinion ③①

Dual fourth wheel and pinion ③⑦

Dual fifth wheel and pinion ②⑨

Fourth wheel and pinion ⑤②

Intermediate hour wheel 1 ⑤④

Intermediate hour wheel 2 ⑤⑤

Third wheel and pinion ⑤③

Minute wheel ⑤⑨

Dial washer (1) ⑥①

Battery connector spring ②②

Rotor (2) ③④

Coil unit (3) ②⑤

Stator (1) ⑥①

Coil unit (1) ②⑥

Rotor (1) ③⑦

Stator (2) ⑥②

Coil unit (2) ②⑦

Rotor (3) ③②

Stator (3) ⑥③

⑲ Train wheel bridge

⑳ Second wheel

⑤① Center wheel cook

⑲③ Spacer for electronic circuit

③⑧ Switch rever holder

⑲① Mode switch spring

④⑨ Setting lever spring

④④ Date jumper holder

④⑥ Mode jumper

④⑤ Mode wheel

⑤⑥ Intermediate mode wheel 3

⑤⑧ Dual minute wheel and pinion

⑤⑦ Intermediate for minute wheel

⑤⑩ Switching wheel

④⑩ Switch lever actuating spring

④⑦ Yoke

③⑨ Switch spring 1

④⑧ Setting lever

④① Switch spring 2

④② Switching rever

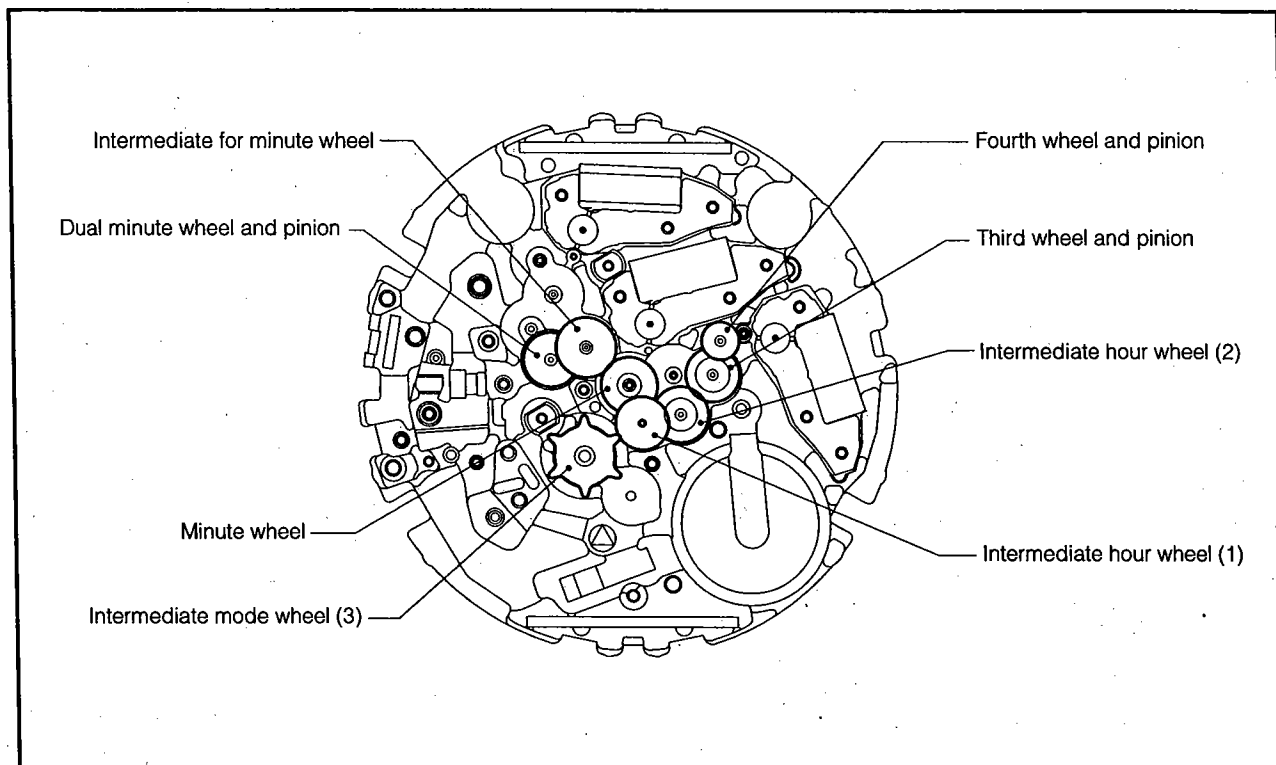
④⑨ Setting stem

Plate complete

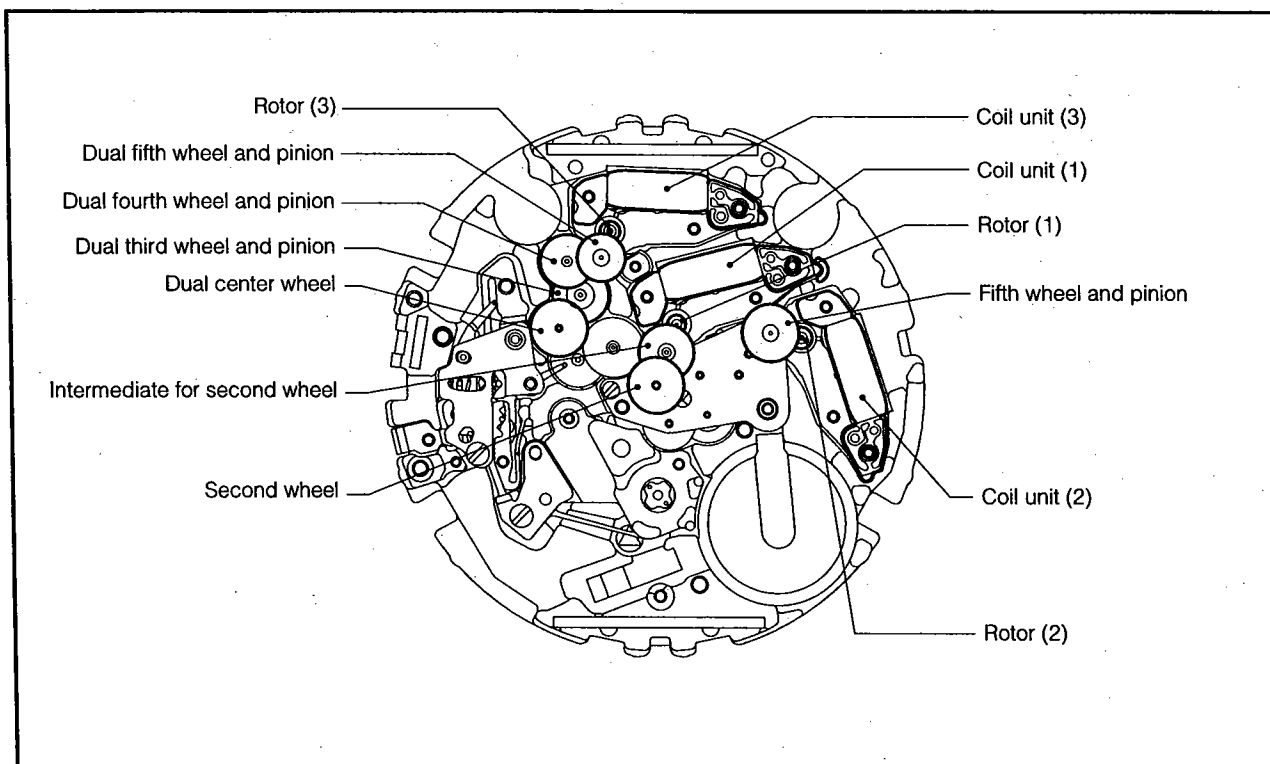
CALIBER NO.

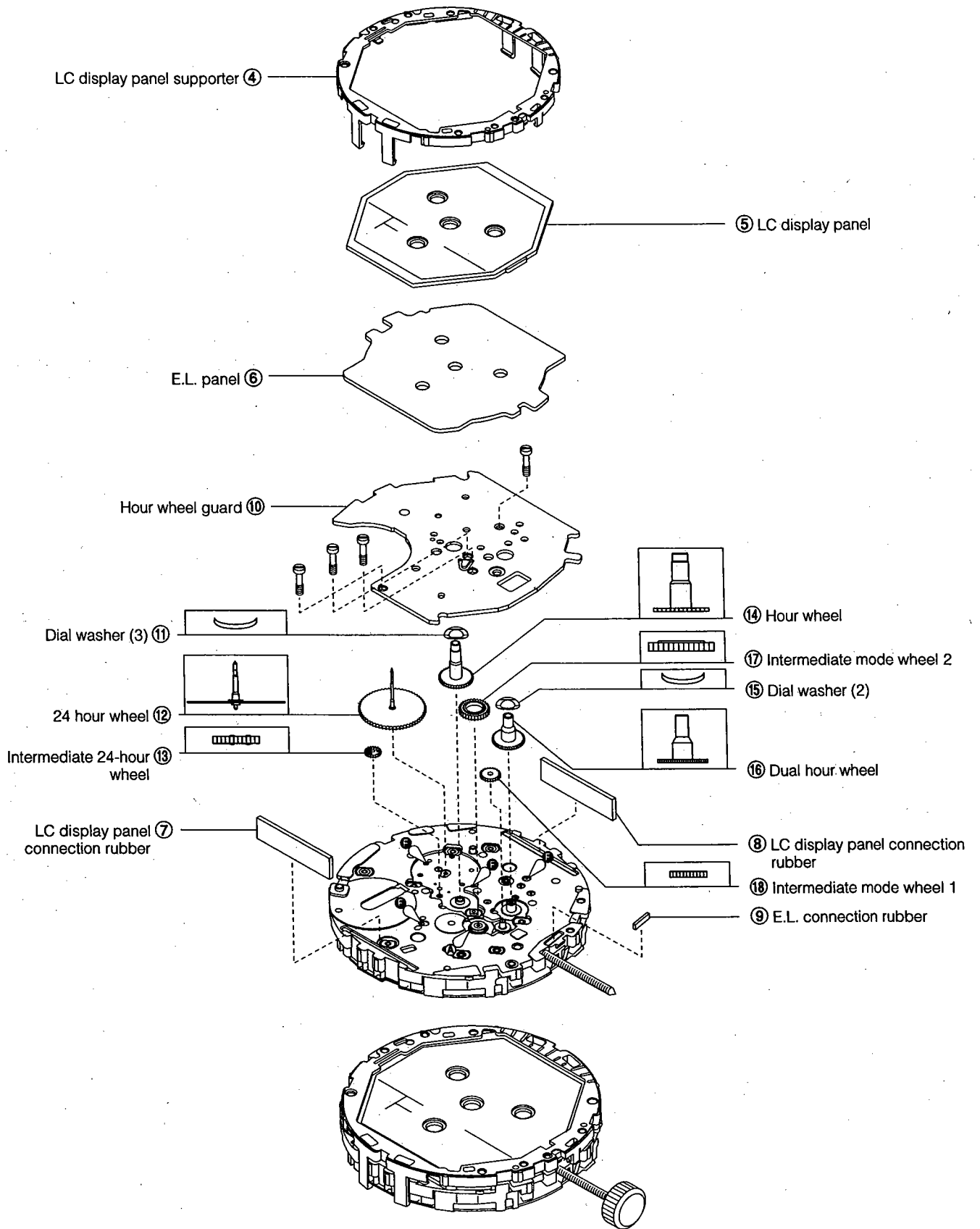
## [Assembly drawing for train wheel]

<From minute wheel to fourth wheel and pinion>

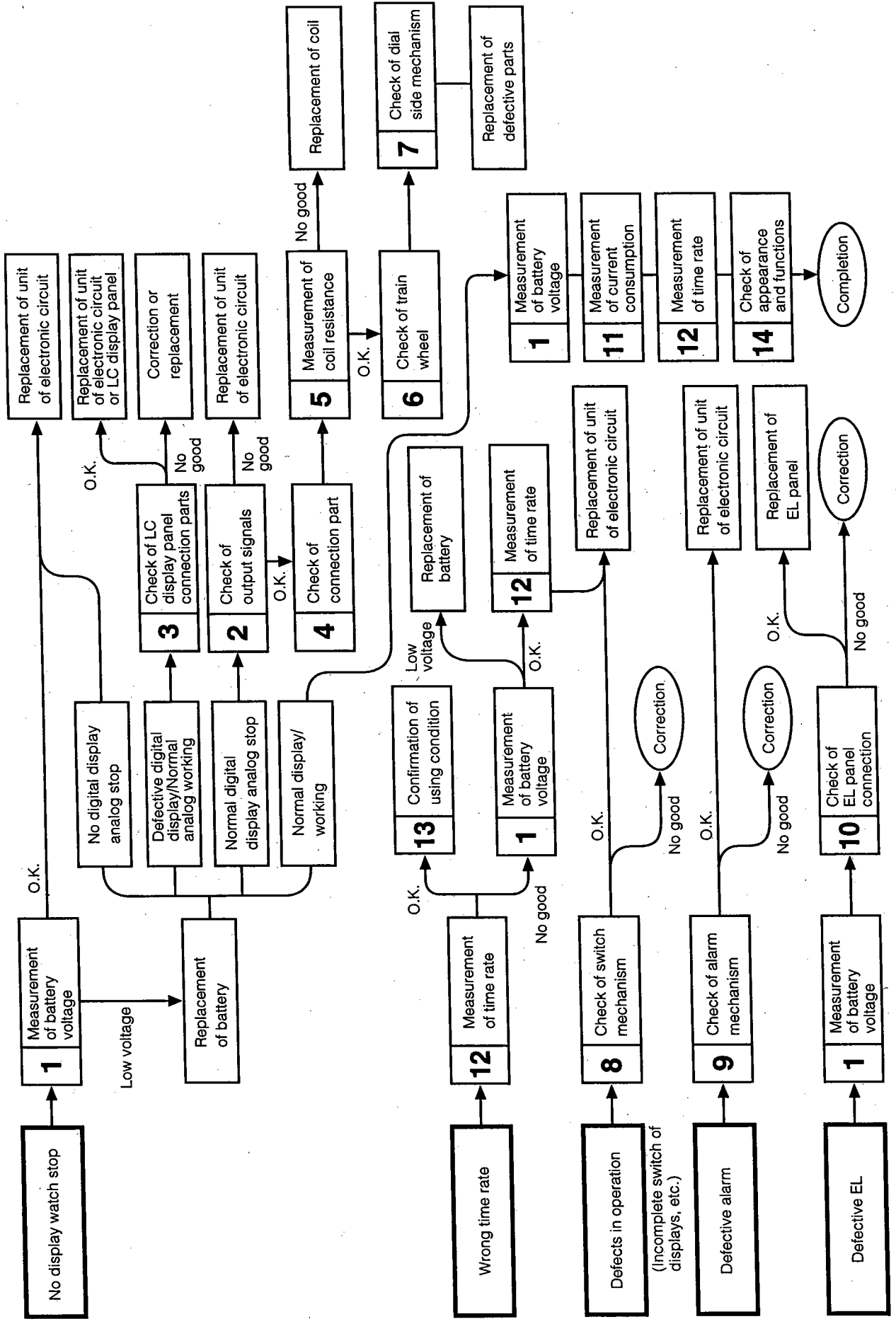


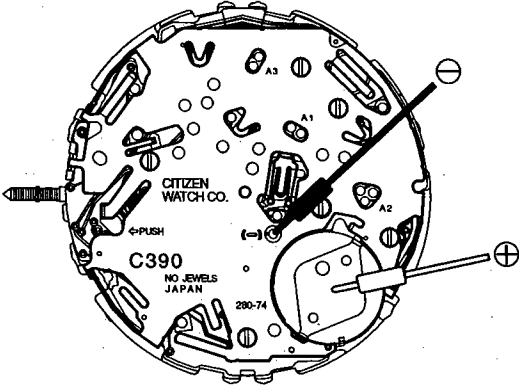
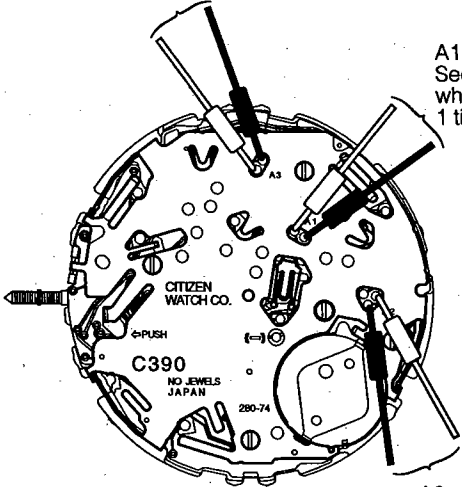
<From rotor (1) to coil unit (3)>

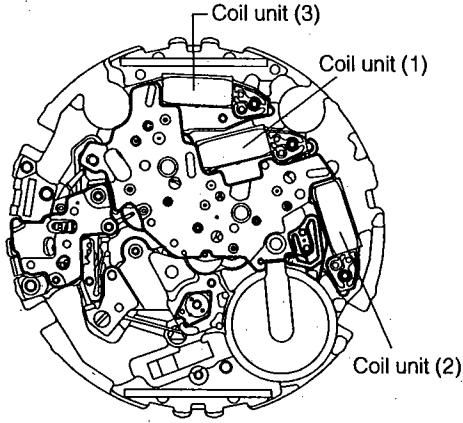




# \$19. TROUBLESHOOTING AND ADJUSTMENT METHOD



Check Items	How to Check	Result and Treatment
<p>① Measurement of 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: right;">&lt;Tester range: DC 3V&gt;</p> 	<ul style="list-style-type: none"> <li>• <b>1.5V or higher</b> → Normal</li> <li>• <b>Below 1.5V</b> → Replace the battery.</li> </ul>
<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: right;">&lt;Tester range: DC 0.3V&gt;</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="609 892 787 955"> <p>A3 Minute train wheel: 1 time in 15 sec</p> </div> <div data-bbox="950 997 1096 1102"> <p>A1 Second train wheel: 1 time in 1 sec</p> </div> </div>  <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div data-bbox="868 1438 1031 1522"> <p>A2 Hour train wheel: 1time in 120 sec</p> </div> </div> <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> <ul style="list-style-type: none"> <li>• 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.</li> </ul> </div>	<p>In TME mode,</p> <ul style="list-style-type: none"> <li>• A1 output signal Tester pointer moves to right and left every second. → Normal</li> <li>Tester pointer does not move. → Check connection parts.</li> <li>• A2 output signal Tester pointer moves every 120 seconds. → Normal</li> <li>Tester pointer does not move. → Check connection parts.</li> <li>• A3 output signal Tester pointer moves every 15 seconds. → Normal</li> <li>Tester pointer does not move. → Check connection parts.</li> </ul> <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>	<p>* Refer to Technical Manual, Basic Course II-2-a, Digital Section.</p> <ul style="list-style-type: none"> <li>• Inspection of all segments Pull the crown to the second clicks in the "CHR" mode and press <b>A</b> and <b>B</b> buttons simultaneously, and all digital segments are turned on.</li> <li>• Check the LC display panel, LC display panel connection rubber, electronic circuit unit, etc. for discontinuity, dirt, breakage, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• LC display panel, connection rubber, electronic circuit unit, etc. are not installed correctly. → Install correctly.</li> <li>• Parts are stained or dirty. → Remove stain and dirt.</li> <li>• Parts are cut broken or scratched. → Replace parts.</li> </ul>
<p>④ Check of connection parts</p>	<p>* Refer to Technical Manual, Basic Course II-2-a, Analog Section.</p> <ul style="list-style-type: none"> <li>• Check for looseness of screws, dust, stain, etc.</li> </ul> <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"> <li>• Dirt or stain → Remove dirt and stain.</li> <li>• Screw is loosened. → Retighten.</li> </ul>
<p>⑤ 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 electronic 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> <p style="text-align: center;">&lt;The tester lead pins have no polarity&gt;</p>	<p>Coil unit (1)</p> <ul style="list-style-type: none"> <li>• <b>1.9 - 2.3kΩ</b> → Normal</li> <li>• <b>Out of range of 1.9 - 2.3kΩ</b> → Replace coil unit.</li> </ul> <p>Coil unit (2), (3)</p> <ul style="list-style-type: none"> <li>• <b>1.0 - 1.3kΩ</b> → Normal</li> <li>• <b>Out of range of 1.0 - 1.3kΩ</b> → Replace coil unit.</li> </ul>
<p>⑥ Check of train wheel</p>	<p>* Refer to Technical Manual, Basic Course II-2-b.</p> <ul style="list-style-type: none"> <li>• Check around the gears and rotors for dirt.</li> <li>• Check the parts for deformation and confirm that they are lubricated normally.</li> </ul>	
<p>⑦ Check of dial side mechanism</p>	<p>* Refer to Technical Manual, Basic Course II-2-c.</p> <ul style="list-style-type: none"> <li>• Confirm all parts are not deformed and are lubricated properly.</li> </ul>	

Check Items	How to Check	Result and Treatment
<p>⑧ Check of switch mechanism</p>	<p>1. Inspection of movement</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Check for removal of pattern of electronic circuit unit and deformation of switch spring of the circuit unit supporter.</li> </ul> <p>2. Inspection of push button</p> <ul style="list-style-type: none"> <li>• Check the push button for deformation and stain.</li> </ul> <p><b>Note</b> Be sure to apply silicone oil to the packing of push button for waterproofness and smooth operation.</p>	<ul style="list-style-type: none"> <li>• Pattern of electronic circuit unit is removed. → Replace electronic circuit unit.</li> <li>• Parts are fatigued or deformed. → Replace defective parts.</li> <li>• Switching function is normal. → Inspect push button.</li> </ul> <p style="text-align: center;">↓</p> <ul style="list-style-type: none"> <li>• Push button is stained or deformed. → Remove stain or replace push button.</li> </ul>
<p>⑨ Check of alarm mechanism</p>	<p>* Refer to Technical Manual, Basic Course II-1-d.</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) busstons simultaneously.</p> <div data-bbox="544 997 1023 1417" style="text-align: center;"> </div> <p>2. If the alarm output is normal, perform the following inspection.</p> <ul style="list-style-type: none"> <li>• Check the piezo-electric element of vibrating plate for cracks and breakage.</li> <li>• Check the buzzer contact spring for bend and deformation.</li> <li>• Check the pattern of electronic circuit unit for dirt and stain.</li> </ul>	<ul style="list-style-type: none"> <li>• Tester pointer does not swing. → Replace electronic circuit unit.</li> <li>• Tester pointer swings. → Normal.</li> <li>• Perform inspection in ⑨-2. → If result if normal, alarm mechanism is normal.</li> </ul>



Check Items	How to Check	Result and Treatment
<p>⑫ Measurement of time</p>	<ul style="list-style-type: none"> <li>* Refer to Technical Manual, Basic Course: II-2-d.</li> <li>• 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.)</li> </ul>	<ul style="list-style-type: none"> <li>• Watch gains or loses much. → Replace electronic circuit unit.</li> </ul>
<p>⑬ Confirmation of using condition</p>	<ul style="list-style-type: none"> <li>* Refer to Technical Manual, Basic Course: II-2-e.</li> </ul>	
<p>⑭ Check of appearance and functions</p>	<ul style="list-style-type: none"> <li>* Refer to Technical Manual, Basic Course: II-2-f.</li> <li>• Check inside of case for dust and stain.</li> <li>• Check operation of setting switches for abnormality.</li> <li>• Check segments for breakage.</li> </ul> <div style="border: 1px solid black; border-radius: 10px; 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>	