

TECHNICAL INFORMATION

INFORMACION TECNICA

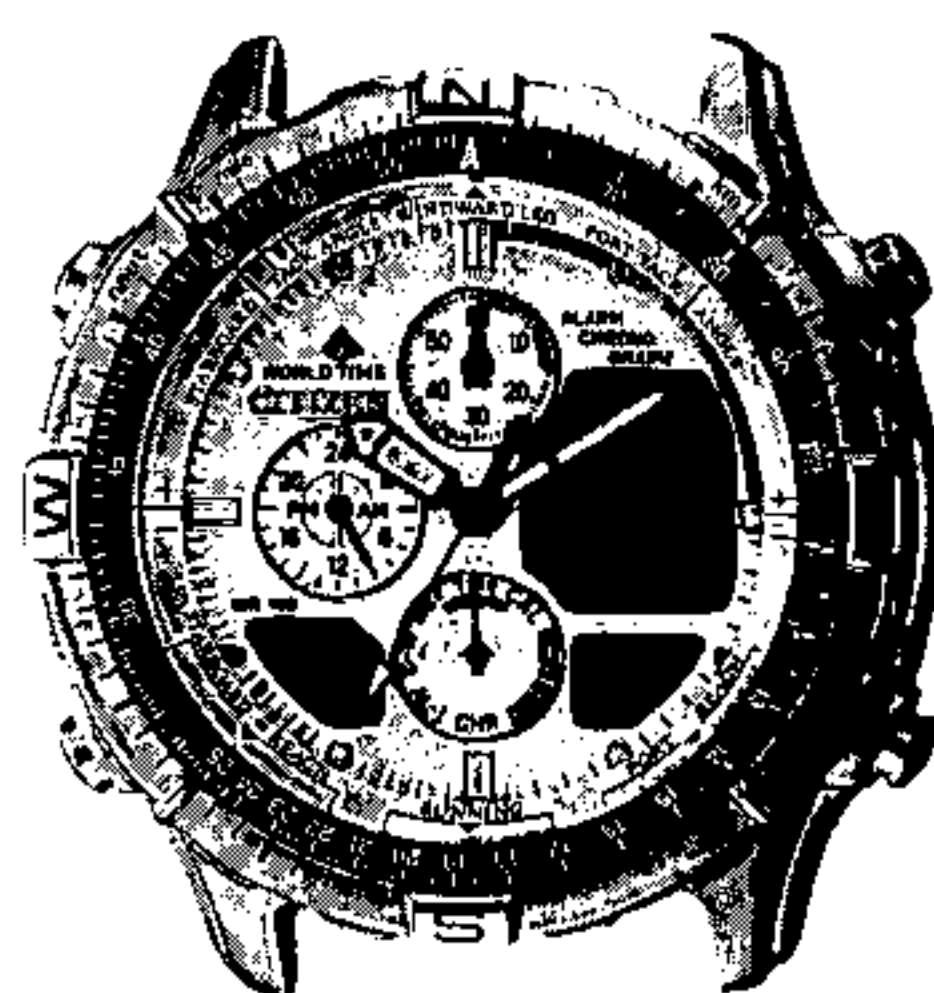
CITIZEN QUARTZ

Cal. No. C31 ※

Cal. No. C32 ※



(Cal. No. C310)



(Cal. No. C320)

 **CITIZEN**

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

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§1. OUTLINE

• CAL. C310

This is a combination quartz watch having chronograph and timer functions which are useful when the user watches races (auto races, motorcycle races, etc.)

• CAL. C320

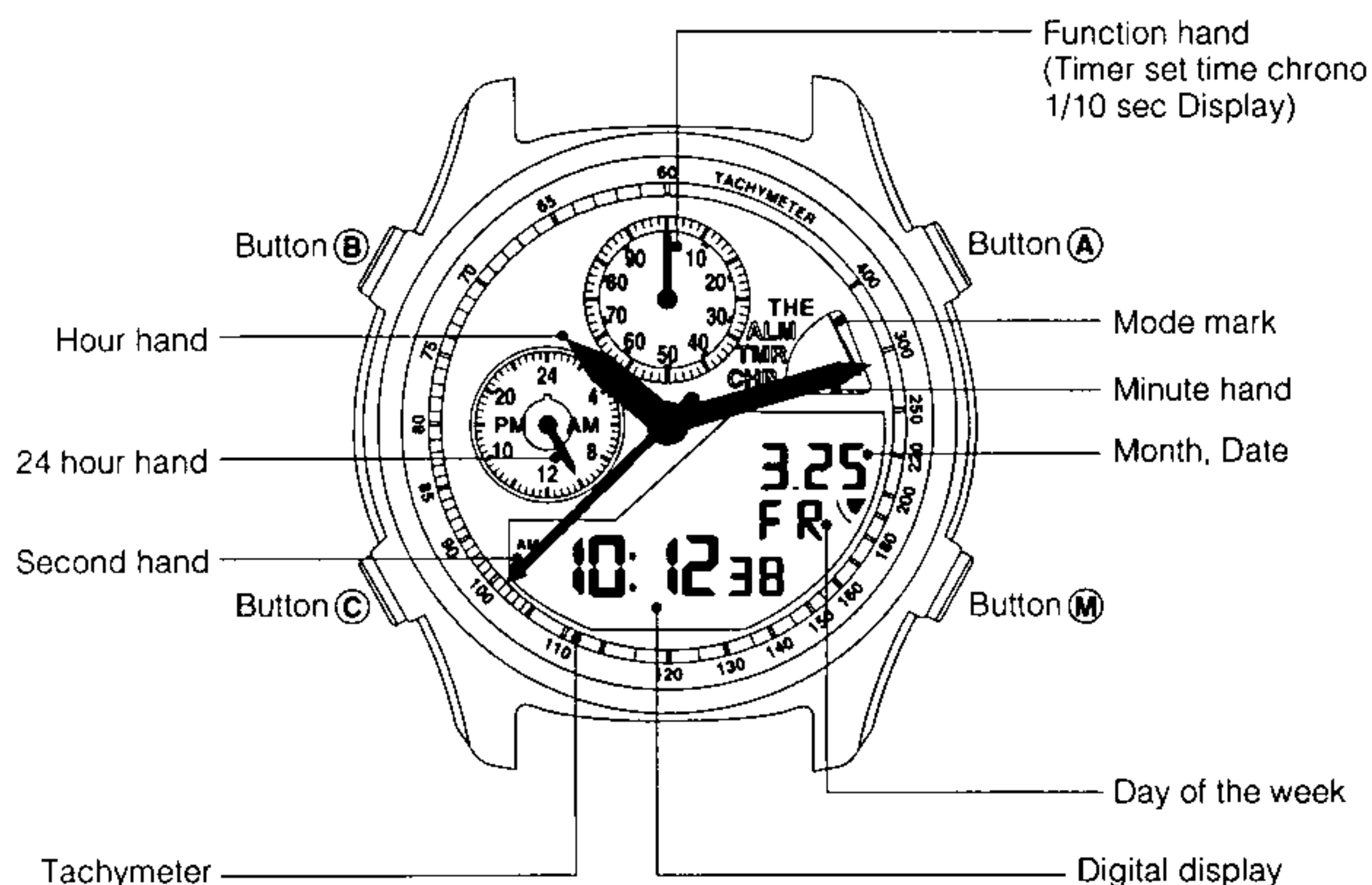
This is a combination quartz watch having a function to display the time/calendar of 23 cities in the world and a race timer function which is useful for yacht races, etc.

§2. SPECIFICATIONS

| Caliber No. | | | C310 | C320 |
|----------------------------------|---------|-------------|---|--|
| Type | | | Combination (Analog + Digital) quartz watch | |
| Movement size (mm) | | | 28.0 x 29.6 x ø31.8 (Thickness: 5.5mm) | |
| Accuracy (At normal temperature) | | | ±20 Sec/month (at 5°C~35°C/41°F~95°F) | |
| Operating temperature range | | | 0°C~+55°C (32°F~131°F) | |
| IC | | | C/MOS-LSI, 1 unit | |
| Converter | | | Bipolar step moter | |
| Time adjustment | | | Not installed | |
| Measurement time gate | | | 10 sec. | |
| Indicating function | Analog | Time | Hour, Minute, Second | Hour, Minute, Second |
| | Digital | Time | Hour, Minute, Second | Hour, Minute, Second, City name |
| | | Calendar | Month, Date, Day of the week | Month, Date, Day of the week, City name |
| | | Alarm 1 | Hour, Minute, ON/OFF | Hour, Minute, ON/OF, City name |
| | | Alarm 2 | — | Hour, Minute, ON/OF, City name |
| | | Timer 1 | Minute, Second, Set time (60 Minute system) | Minute, Second, Set time (60 Minute system) |
| | | Timer 2 | — | Minute, Second, Set time (60 Minute system) |
| | | Chronograph | Minute, Second, 1/1000 second (less than 60 minutes) (100-hour measurement) Racing (Rap time measurement, Speed calculation, Memo function) | Minute, Second, 1/100 second (100-hour measurement) Split time measurement |
| Battery | | Part. No. | 280-44 | |
| | | Code | SR927W | |
| | | Life time | Approximately 2 years (after installation of a new battery) <Approximate condition of use> • Alarm sounds: 15 seconds/day • Timer/Chronograph: once/week | |

§3. HANDLING INSTRUCTIONS (CAL. C310)

A. Name of Parts

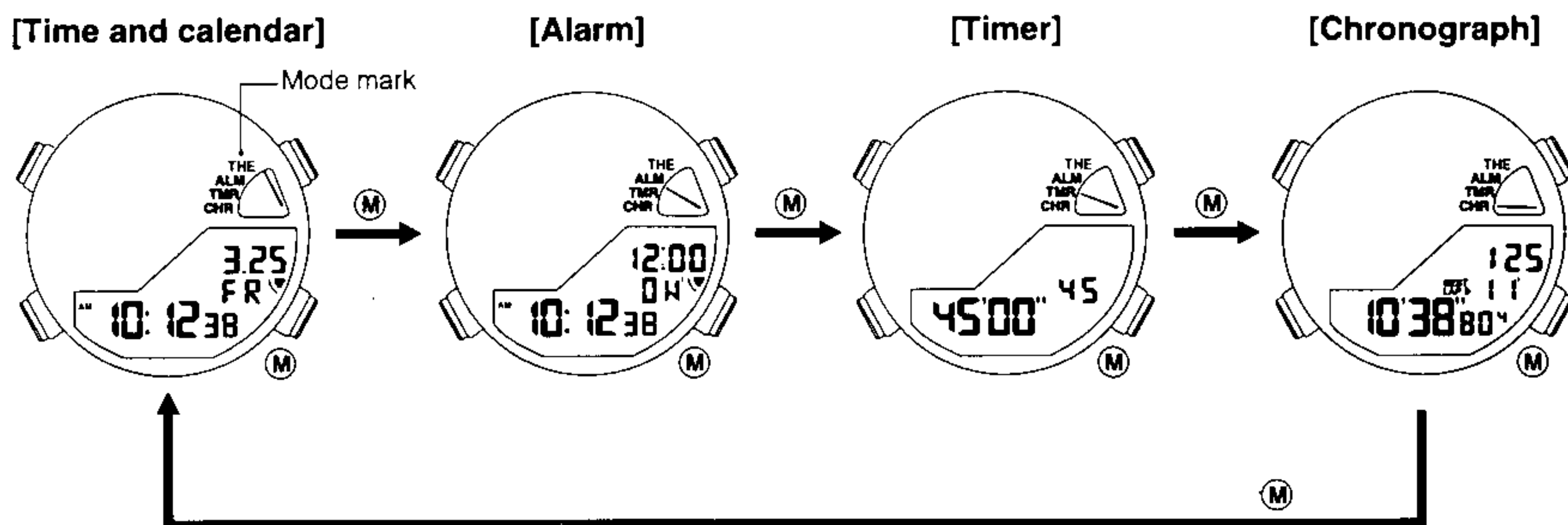


B. Switching the Mode

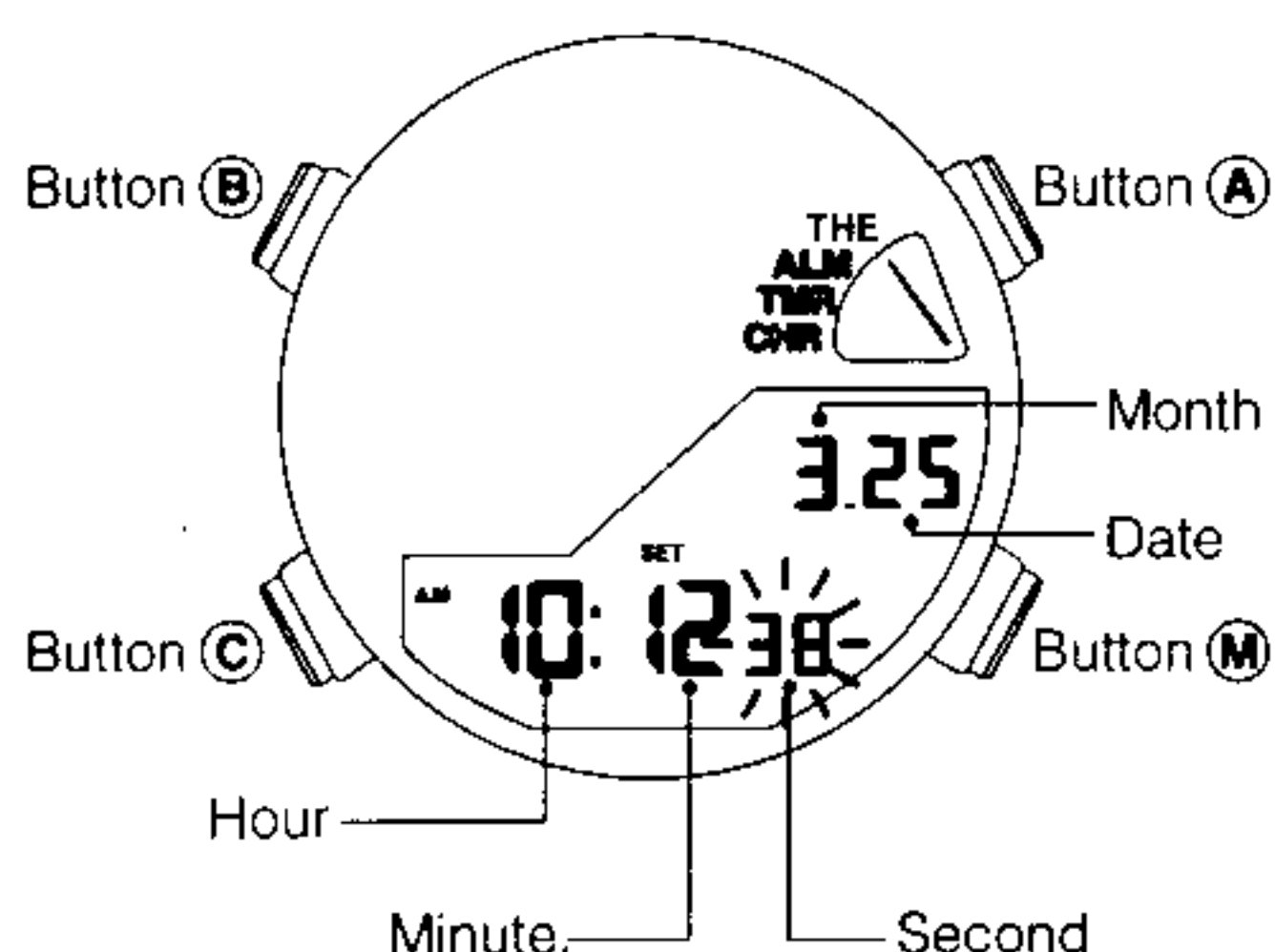
This watch has the following 4 main functions (modes) can be switched by pressing button (M).

<Note>

When changing modes, make sure you have pressed button (M) in properly to change modes.



C. Adjusting the Time and Calendar

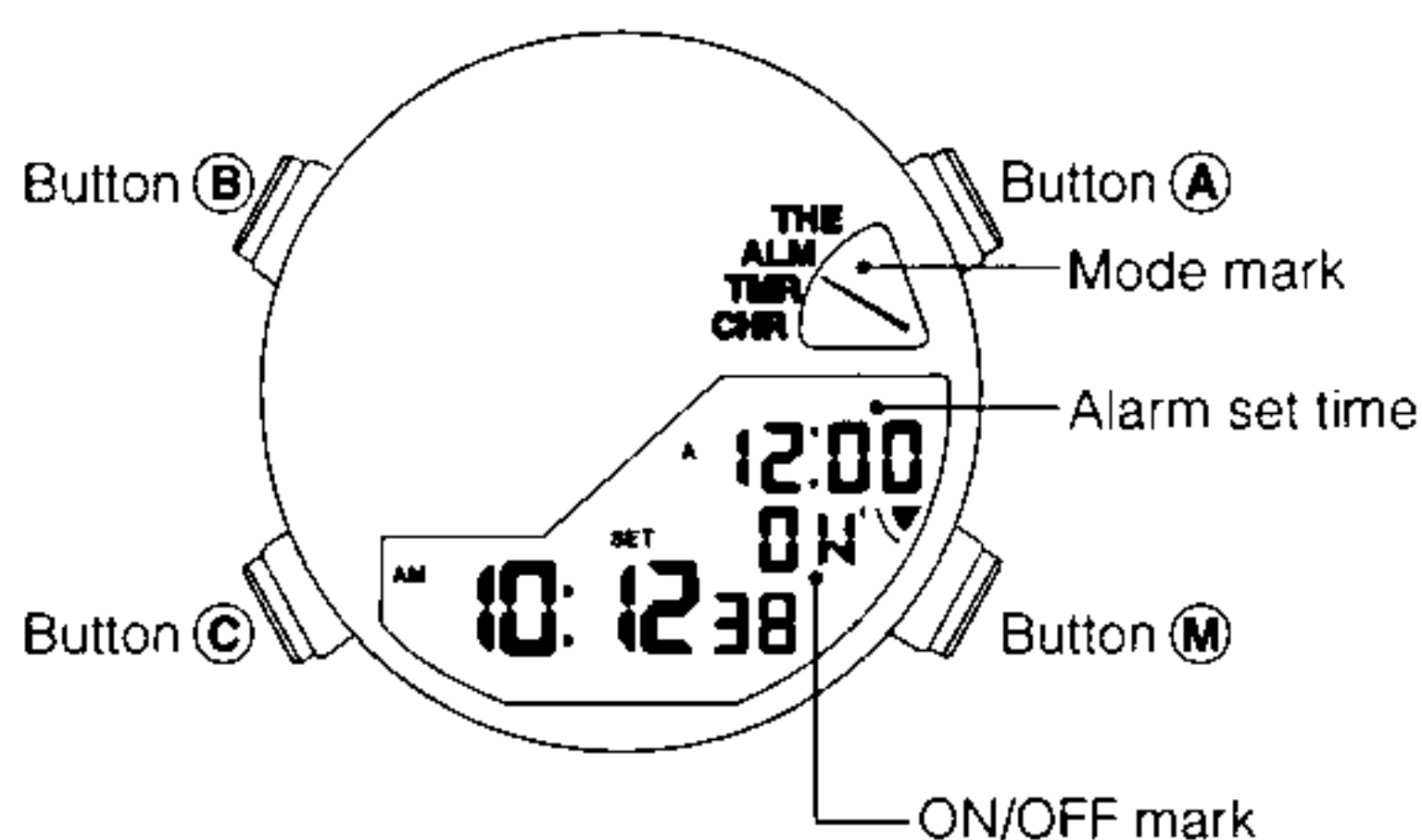


1. Set the mode to (Time/Calendar) mode by pressing button **(M)**.
2. Pull out button **(M)**.
 - The second hand will return to the "0" position.
 - The day of the week will disappear and the seconds will flash in the digital display.
 - "SET" will appear in the digital display.
 - * At that time, if the second hand doesn't return to the "0" position, please refer "Hands standard position setting" on page 9, and perform the operation.
3. Press button **(A)** to select the flashing digit you wish to adjust.
4. Adjust the flashing digit of the time with button **(C)**.

5. Push back button **(M)** to the normal position after complete the time adjustment.
 - All hands will move to the adjusted time automatically.
 - The digital display will return to the normal display.

The analog time and the digital time in this watch are synchronized. If you adjust the digital time, the analog time is adjusted automatically.

D. Alarm Function



Setting the alarm time

1. Press button **(M)** to set the digital mode mark to (ALM) mode.
2. Pull out button **(M)**. The hour digit in the digital display will flash for the alarm set time 'Set' will appear in the digital display.
3. Press button **(A)** to select the digit (Hour/Minute).
4. Press button **(C)** to set the alarm time.
5. Push back button **(M)** to the normal position after complete adjustment.
 - * Press any button to stop the alarm sound.

<Note>

The alarm sound may sometimes start and stop.

This is because when the watch hands move, the alarm sound is momentarily adjusted.

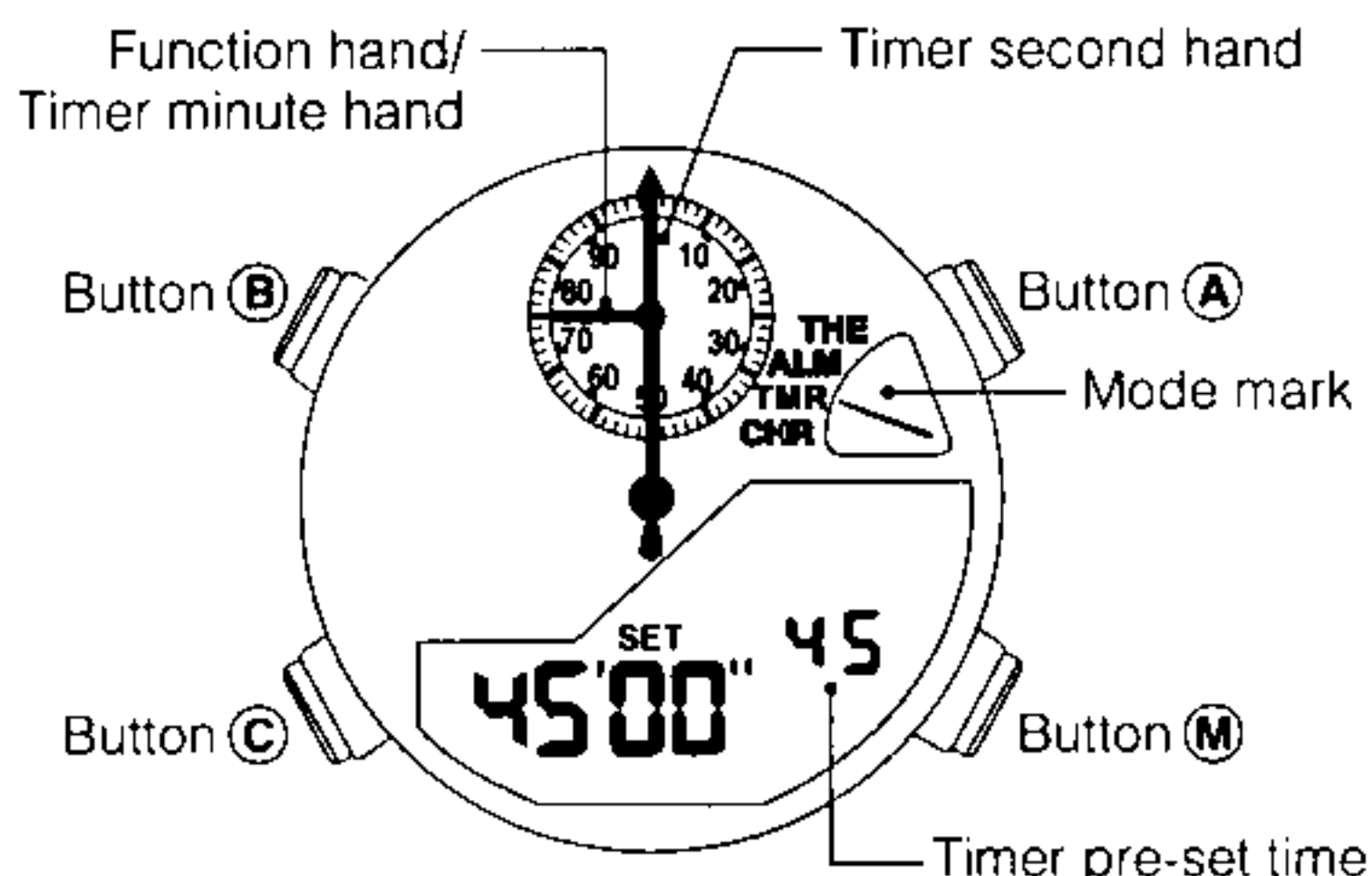
Switch the alarm 'ON/OFF' with button **(C)**.

The alarm time and normal time (12/24 hour system) are synchronized. When A/P is displayed, make sure AM/PM are set correctly.

E. Timer Function

This timer can be set to a maximum of 60 minutes in minute.

For the timer, by pressing button **(C)** you can select between "Analog display" or "Digital display". (You can not use both at the same time)



Timer setting

Both the analog and digital settings are the same way.

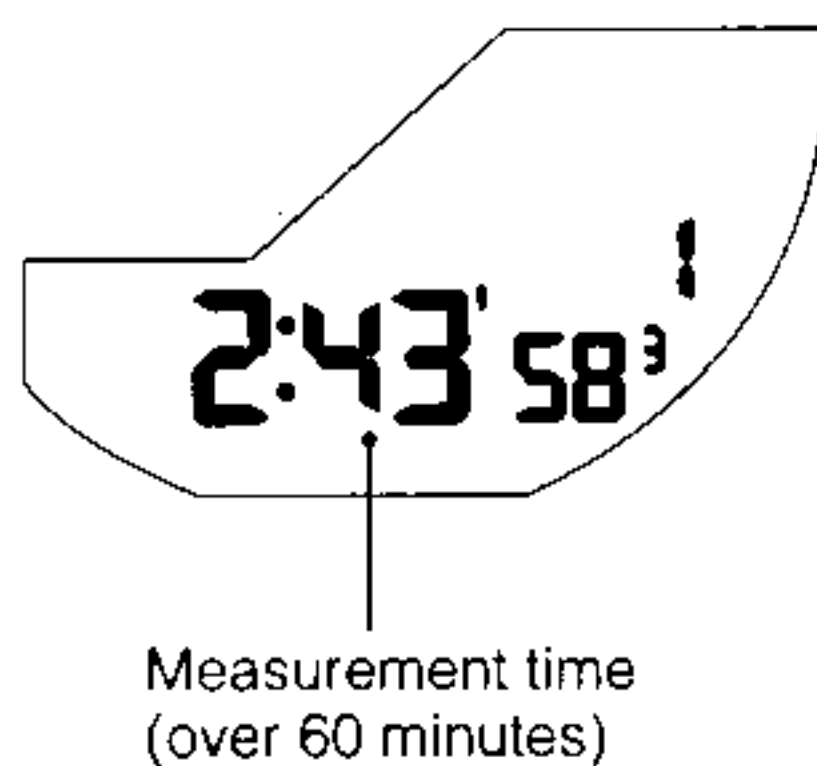
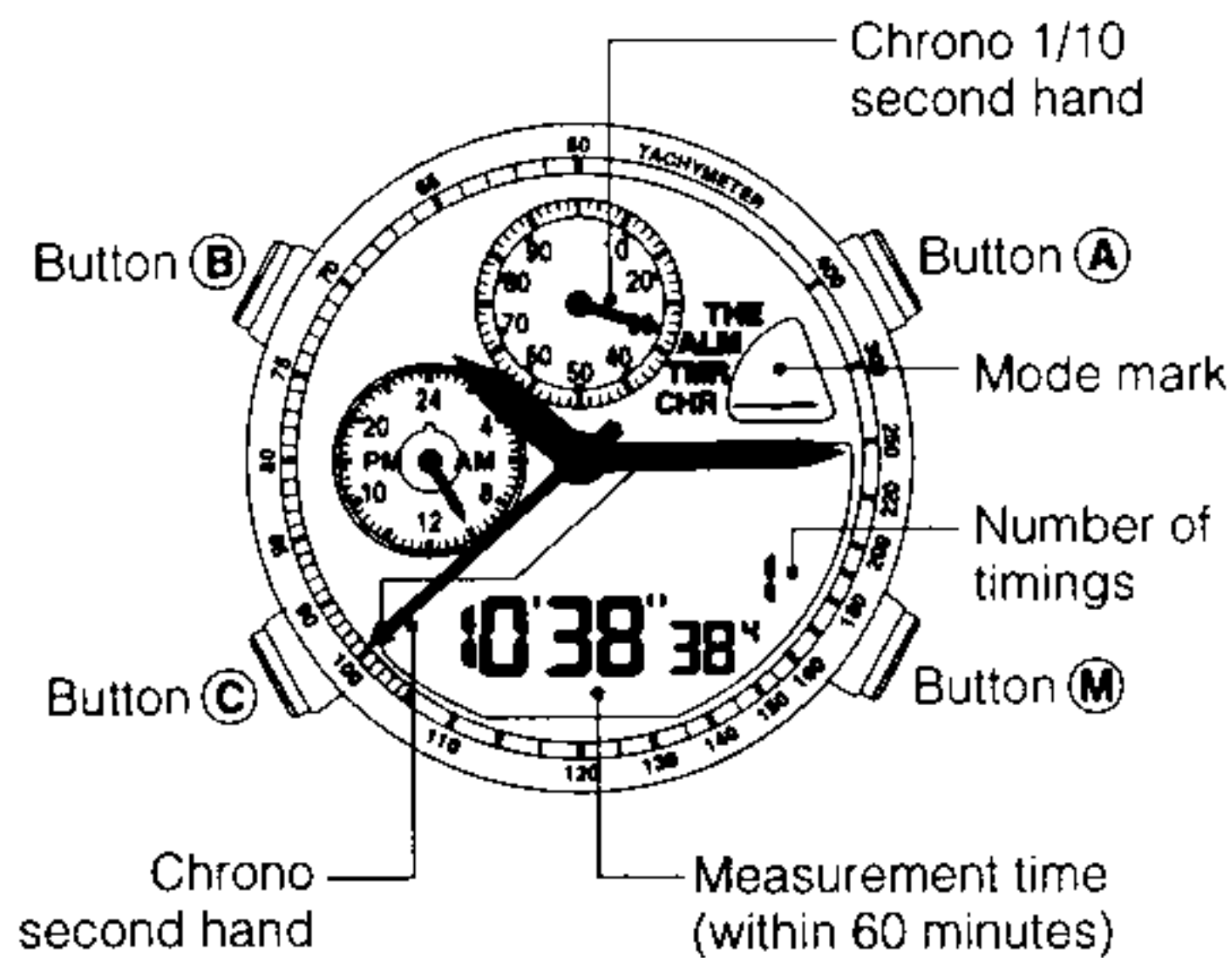
1. Press button **(M)** to set the mode mark to (TMR) mode.
 - The timer setting time will flash in the digital display.
 - "SET" will appear in the digital display
2. Pull out button **(M)**.
 - When using the analog hands for the timer, the function hand (a small hand on the 12 o'clock direction) will move according to the timer setting time.
3. Press button **(C)** to set the time.
 - When using the analog hands for the timer, the function hand (a small hand on the 12 o'clock direction) will move according to the timer setting time.
4. Push back the button **(M)** to the normal position.

Using the timer

1. Start/Stop
 - By pressing button **(A)**, the timer will start and stop.
2. Reset
 - When the timer is stop, press button **(C)** to return the timer to the set time.
3. Time up
 - Alarm will rings for 5 seconds.
 - While the alarm sounds, press any button (**(M)**, **(A)**, **(B)**, **(C)**) to stop.
4. Timer restart
 - When the timer is timing, press button **(C)** to return the timer to set time and the timer will restart timing again.

F. Chronograph Function 1

This chronograph can measure up to 99 hours 59 minutes 59 seconds 9. After that it will stop at 0 hours, 00 minutes, 00 seconds 000. Measurement time will display in the digital display. The analog hands will also show "Seconds" "1/10 seconds" hand will display only when the chronograph has been stopped. (While the chronograph is stopped or while checking the lap time) 1/10 second hand will stop at the 0 second position after 1 minute of timing. After that, it will point to the correct 1/10 second time when the chronograph has stopped. The chronograph will measurement in 1/1000 sec. units up till 60 minutes, and in 1/10 sec units from 60 minutes on.



Standard measurement

Press button (M) to set the digital mode mark to the (CHR) mode.

1. Press button (A) to start timing.
 - The chronograph's number of timings display changes from "0" to "1".
2. While timing press button (A) to stop.
 - "BEST LAP" etc. will appear in the digital display, however it is not required when operating the standard measurement.
3. Press button (A) again to restart the chronograph from "0 hour, 00 minute, 00.000 sec".
 - The chronograph number of timings display changes from "1" to "2".
4. In that way, with button (A) it is possible to repeat the start/stop operation.
 - The chronograph display gains "1" every time, until it reaches a maximum of "99". After that it will repeat from "0"
 - * The chronograph starts from "0 hour, 00 minute, 00.000 sec" every time it is started.
5. Press button (C) to reset after measurement.
 - The time and the number of timings will reset to "0".

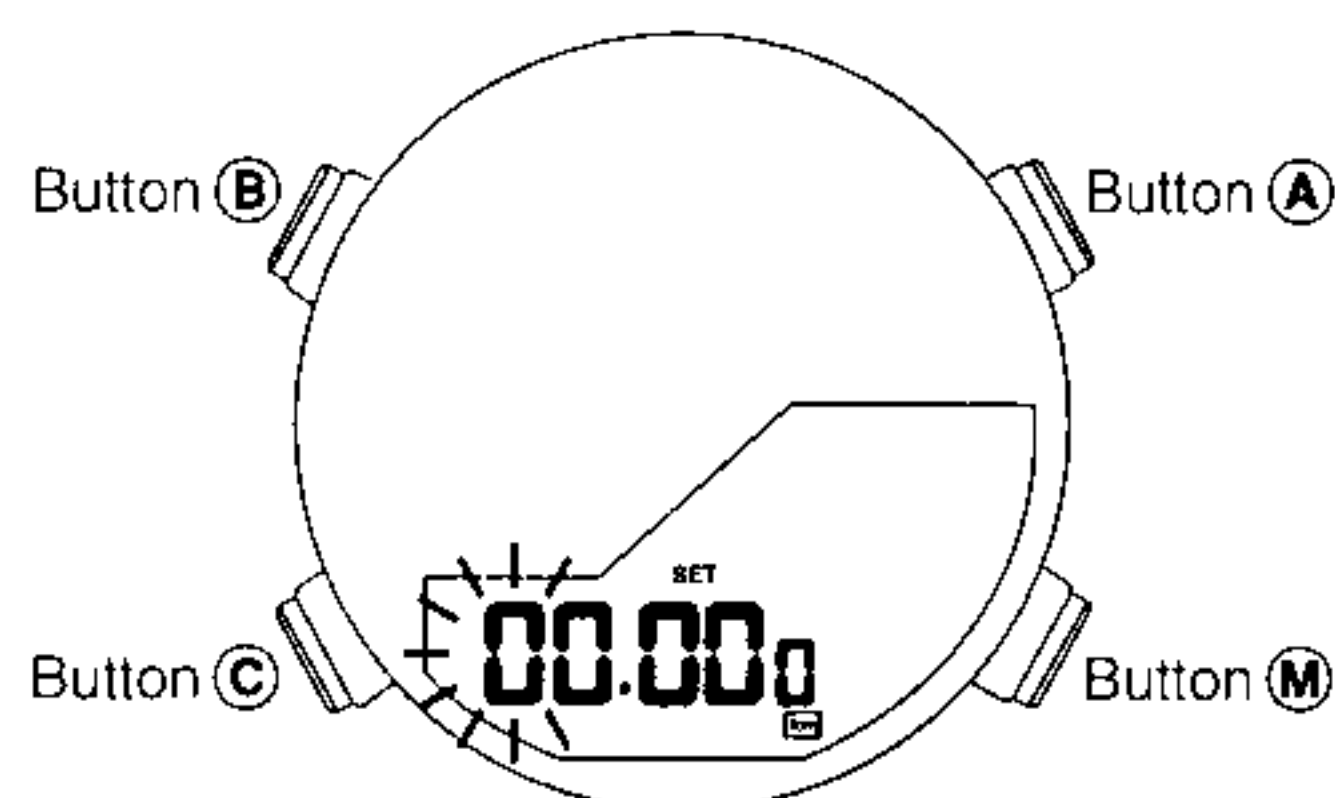
<Note>

When the alarm sounds, the hands may stop, but they will revert to the correct timing after the alarm sounds stop. The digital display continues timing correctly.

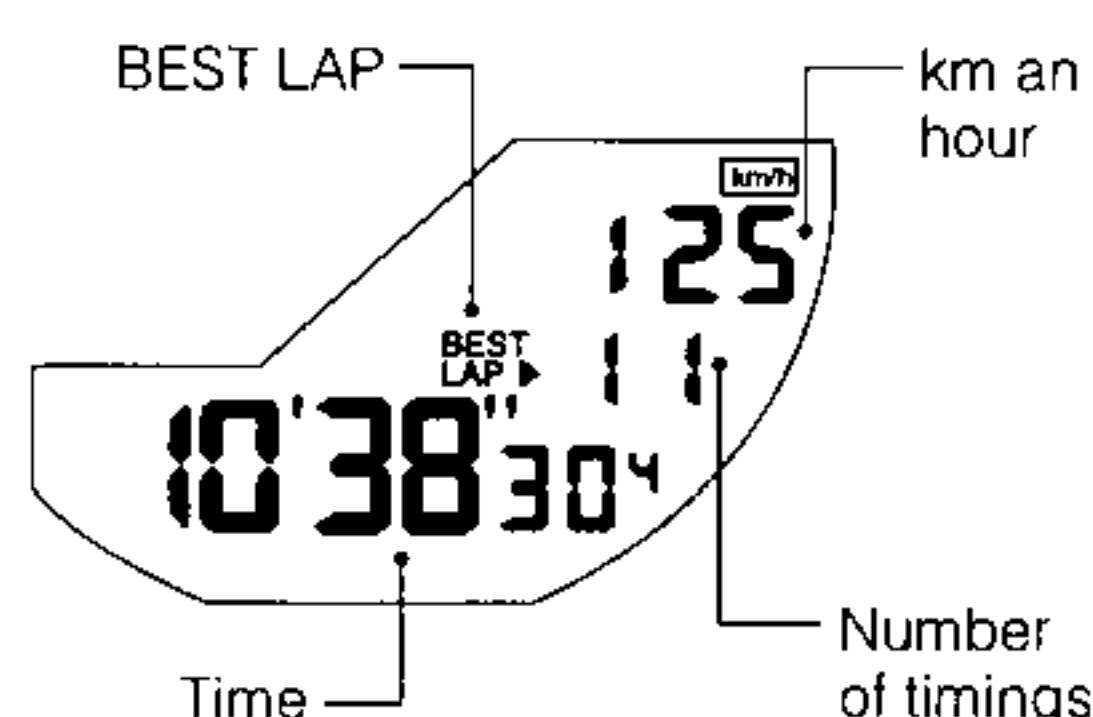
G. Chronograph Function 2 (Racing chronograph)

Setting the distance of one lap around the race circuit

When using the racing chronograph, in order to calculate the km per hour of the car, the distance of one lap around the race circuit must be input. So before you start timing, set the lap distance.



1. Reset the chronograph and then depressing button **(A)** for 2 seconds or more.
 - The chronograph will initially start, however after 2 seconds the display will switch to the lap distance setting display.
2. Distance setting
 - Setting range is "00.000" km ~ "99.999" km in "0.001" km (1 meter) units.
 - Select the digit you wish to set with button **(A)**, set the distance with button **(C)**.
 - Press button **(A)** to select "0.001" km digit then by pressing button **(A)** again, you can return from distance setting to the reset condition.



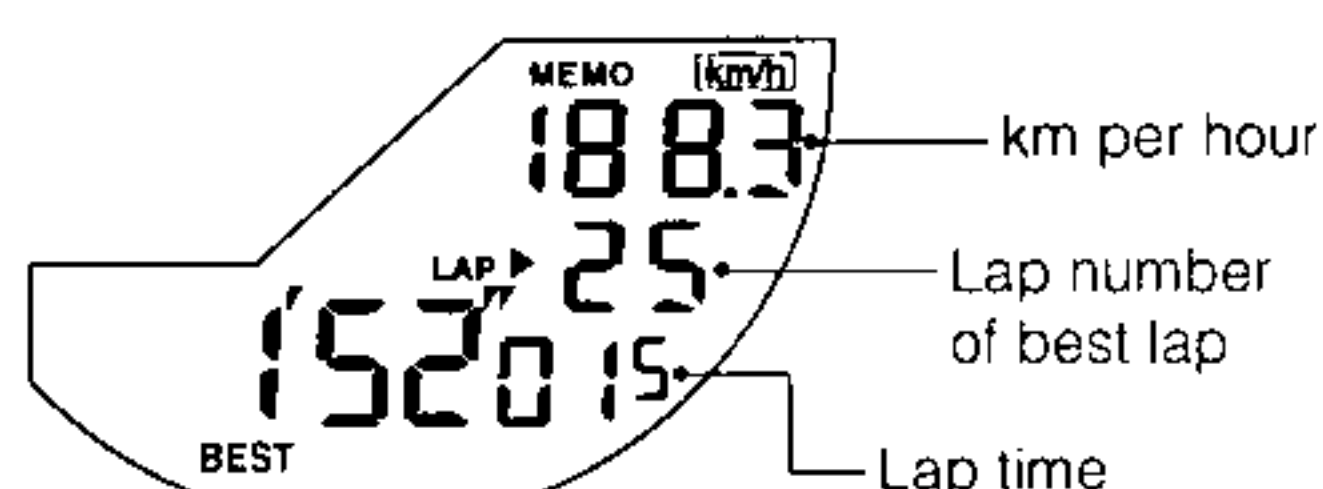
5. Press button **(A)** you can repeat the start/stop function.
 - The number of timings display is up to "99". After that it will continue from "0" again.
6. When one race has finished and you wish to time the next race, press button **(C)** to reset the chronograph.
 - The time, and number of timings will be reset to "0".

When timing one lap

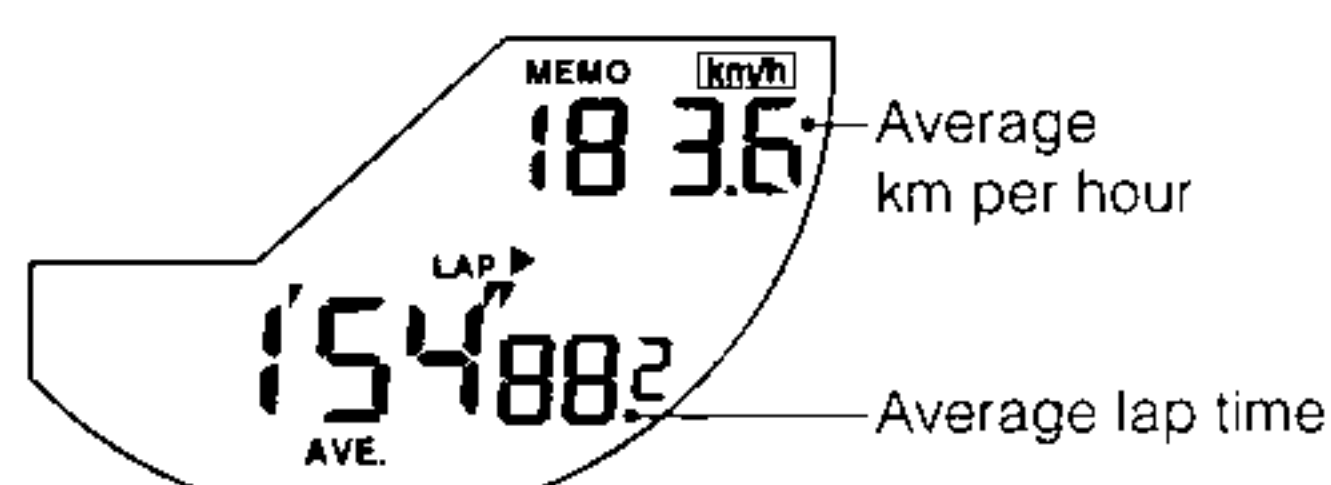
1. Press button **(A)** to start timing.
2. When the car you are timing completes one lap, press button **(A)** to stop timing.
 - In the digital display "BEST LAP" will appear.
 - km an hour of the lap will display. Only between "0.0 ~ 999.9" km per hour can be displayed.
 - Over 1000 km per hour "---.-" will display.
3. After several laps, to time other laps, or other cars, press button **(A)** again. The watch will start timing from "0" again.
4. When the car you are timing completes that lap press button **(A)**.
 - If the timing of the lap is faster than previous times "BEST LAP" in the digital display will appear. If the lap is slower, just "LAP" will appear.

When you time continuous laps

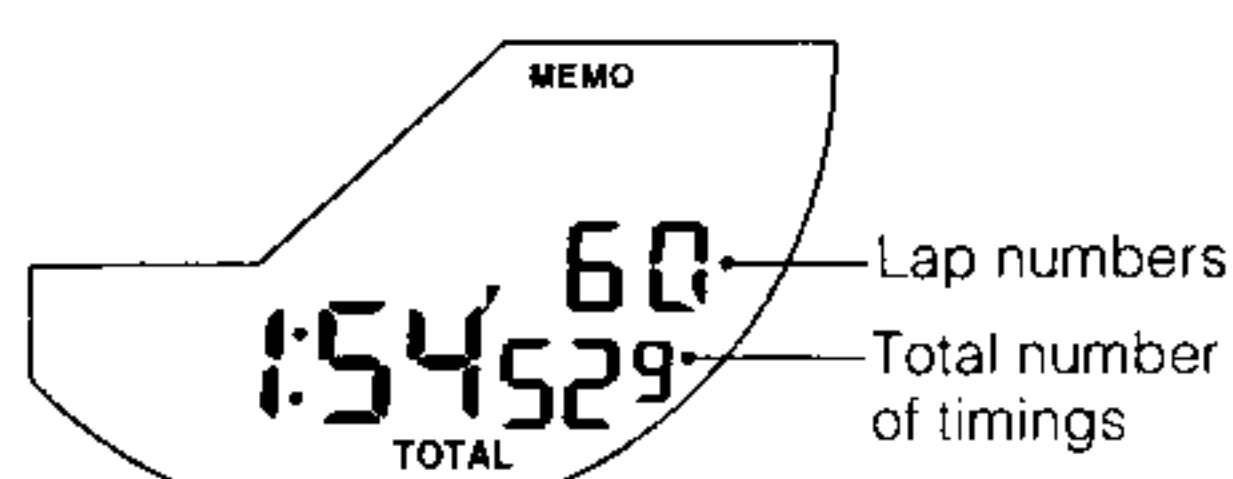
1. Press button **(A)** to start timing.
2. Press button **(C)** to measure the lap time of the present lap.
 - The lap time will display. (The watch automatically starts timing the next lap)
 - "BEST LAP" will display.
 - km an hour of this lap will display.
 - After displaying this data for 10 seconds, it will automatically change to the next lap timing display.
 - At that time, the number of timings display will change from "1" to "2".
3. Repeat this operation for every lap.
(Press button **(C)** to measure the lap time.)
 - When the lap is the fastest yet "BEST LAP" in the digital display will appear, in other cases "LAP" will appear.
 - The number of timings display is up to "99" after that is will continue counting from "0".
4. When the last lap of the race ends press button **(A)** to complete timing.
5. When you wish to measure time the next race, press button **(C)** to reset the chronograph.



[Best lap display]



[Average laptime display]



[Total time display]

Retrieving memorized data

Unit the chronograph is used again, the memory data can be retrieved. The memorized itmes are as follow.

- Best lap display
- Average laptime display
- Total time display

<Note>

If you reset the chronograph, then start timing all memorized data will be deleted. So if the data is needed, it would pay to make a memo. Calling up to chronograph memo.

Calling up to chronograph memo

1. Press button **(C)** to reset the chronograph.
 - All displays change to "0".
2. Press button **(C)** again
 - It changes to the best lap display.
3. Press button **(C)**
 - It changes to the average lap time display.
4. Press button **(C)**
 - It changes to the total time display.
5. Press button **(C)** again to return to the reset mode.

H. Convenient Function to Note

When the display is difficult to read due to the analog hands converting the display.

In that case it is possible to move the hands using the "Hands retractor function". Pressing button **(B)** for 2 seconds or more, hour, minute, second hands will continue to retract until the 12 o'clock position.

If you press button **(B)** while the hand is moving, the hand will stop at that position, and be in the hand retractor condition.

[Cancellation of the hands retractor function]

Press button **(B)**. The hands retractor function will cancel. The hour, minutes, second hands will fast forward to the correct time.

<Note>

When using the chronograph while the hands retractor function is operating, all hands are stationary.



Using the dual time

Setting the local time (to another city).

1. Set the watch to (Time/Calendar) mode.
2. Depress button **(A)** for 2 seconds or more.
 - The hour and minute hands advance only 30 minutes. (The time difference between other countries around the world are in 30 minute intervals.)
3. Depress button **(C)** for 2 seconds or more.
 - The Hour, Minute hands will backward 30 minutes.
4. Perform these operations (2 or 3) to adjust the local time.

[Cancellation of the local time]

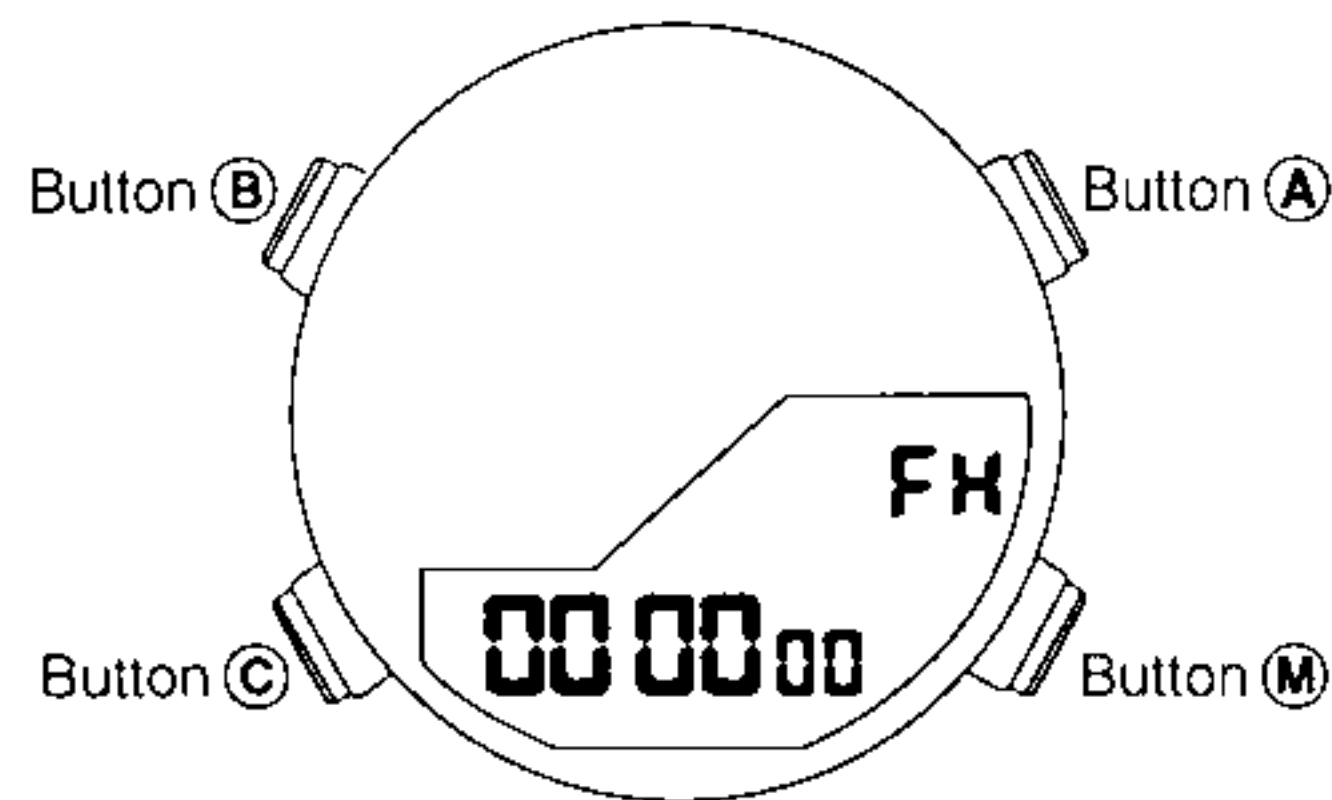
Cancellation of the local time, press button **(A)** and **(C)** simultaneously.

I. All Reset/Hands Standard Position Setting

After replacing the batteries, or when the watch receives a strong shock due to being accidentally dropped etc., the watch may show unusual characteristics (display disappears, alarm continuous sounding etc.).

In that case perform these three operations in this order.

1. All reset
2. Hands standard position setting
3. Time setting



"F.H" will appear at the right hand top of the digital display.

[All reset]

1. Pull out button (M).
2. Depress the button (A), (B), (C) simultaneously for 2 seconds or more. All digital segments will appear.
3. Push back button (M) to the normal position.
 - An alarm sound will ring twice, and the watch will start.

[Hands standard position setting]

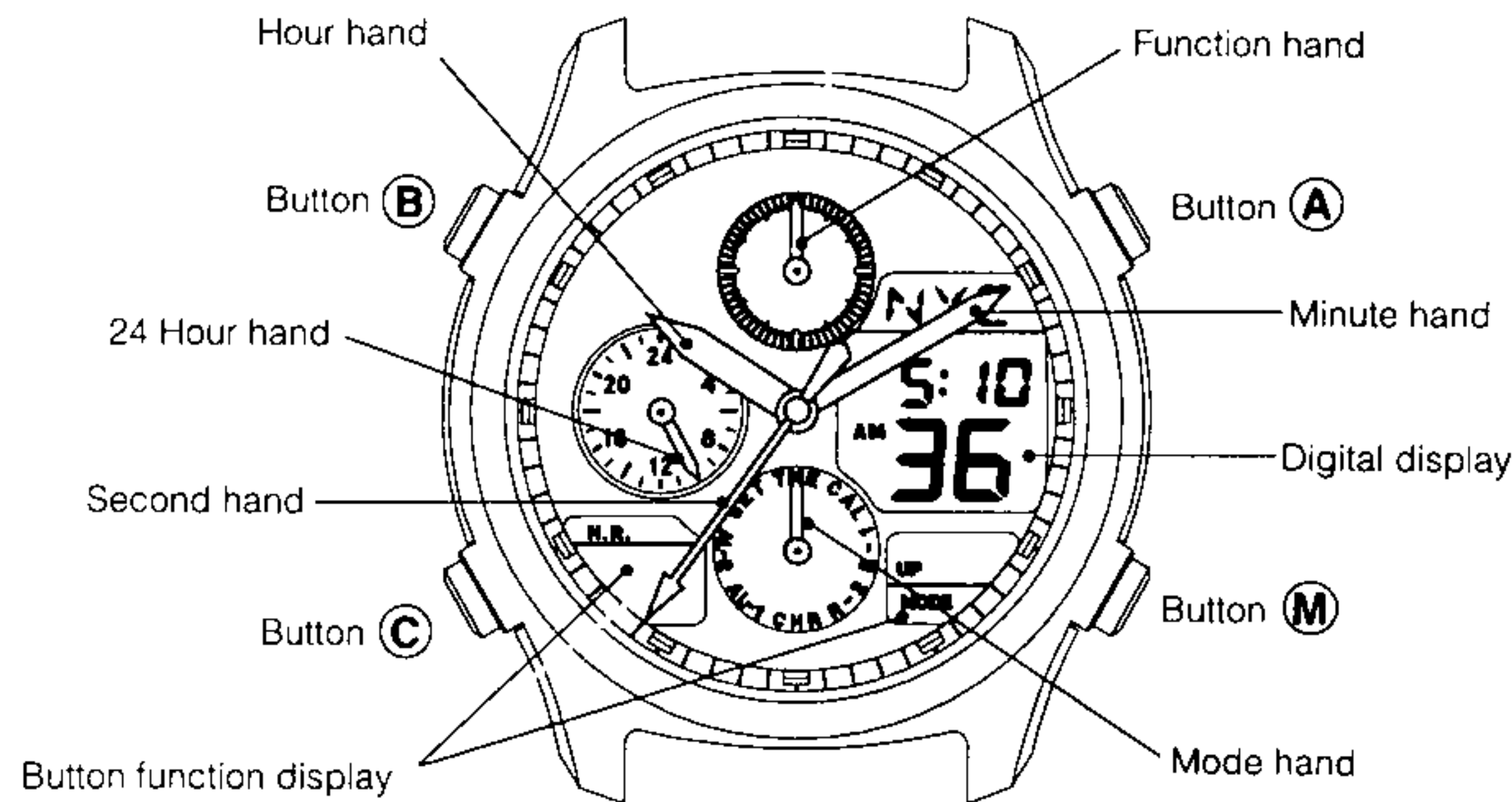
1. Press button (M) to set the watch to the (CHR) mode.
2. Pull out button (M).
3. Press button (A) or button (C) to set the function hand to on the 12 o'clock position.
4. Press button (B).
 - The display in the digital display will change from "F.H" to "H.R".
5. Press button (A) or button (C) to set the hour, minute hands, and 24 hour hand to the 12 o'clock position.
6. Press button (B) once.
 - The display in the digital display will change from "H.R" to "SEC".
7. Press button (A) or button (C) to set the second hand to the 12 o'clock position.
8. Push back button (M) to its normal position.

<Note>

The hands standard position setting is different from time adjustment. Set the time after this operation.

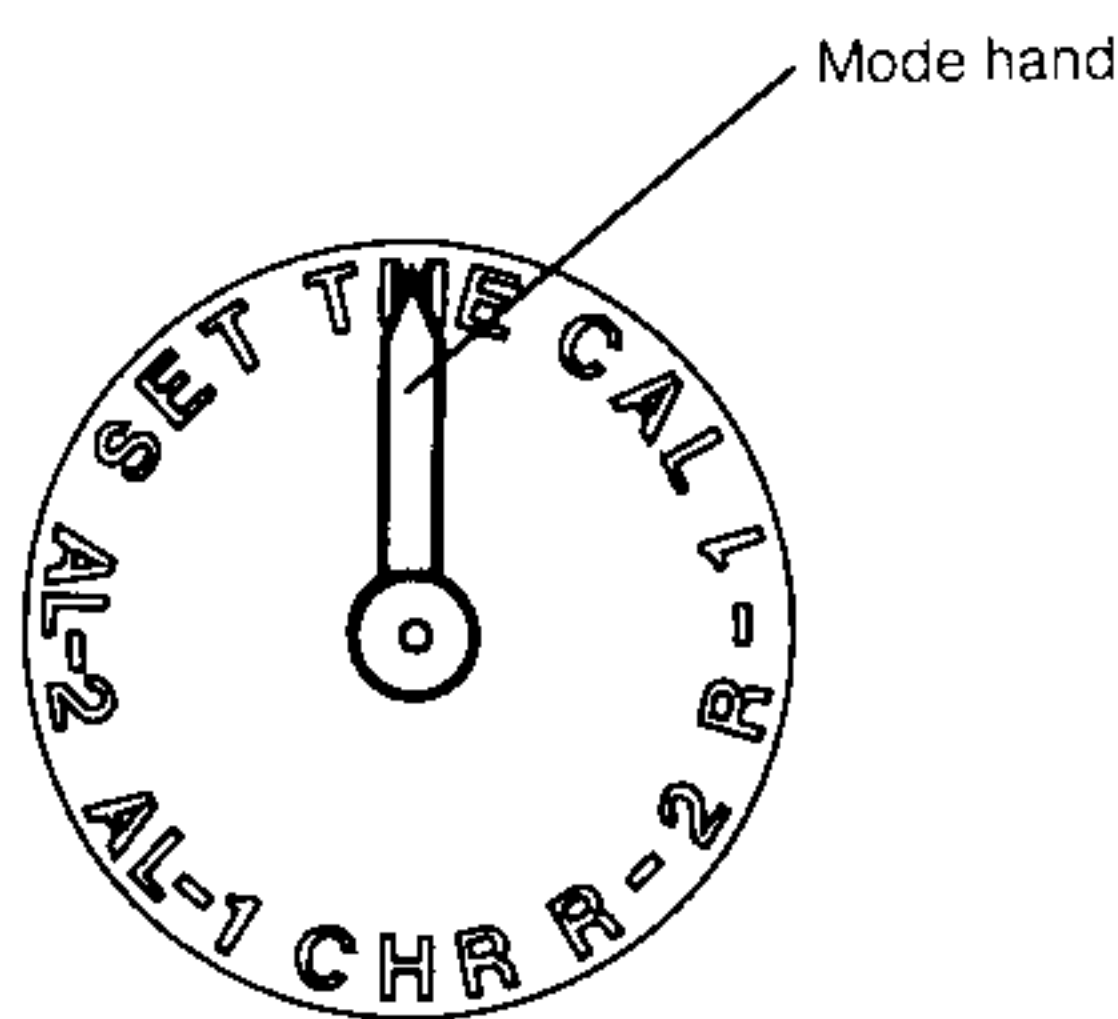
§3. HANDRING INSTRUCTIONS (CAL. C320)

A. Name of Parts



B. Switching Functions (Modes)

The mode changes each time button (M) is pressed. The mode hand indicates the current mode.



- TME : Normal time
- CAL : Calendar
- R-1 : Racing timer 1
- R-2 : Racing timer 2
- CHR : Chronograph
- AL-1 : Alarm 1
- AL-2 : Alarm 2
- SET : Zone setting

C. Greenwich Mean Time (UTC) and Time Difference

(Units: hours)

| NO | Displayed on watch | City name | Time difference | Used of daylight savings time | NO | Displayed on watch | City name | Time difference | Use of daylight savings time |
|----|--------------------|---------------------|-----------------|-------------------------------|----|--------------------|----------------|-----------------|------------------------------|
| 1 | UTC | Greenwich Mean Time | ±0 | — | 13 | TYO | Tokyo | +9 | X |
| 2 | LON | London | ±0 | O | 14 | SYD | Sydney | +10 | O |
| 3 | PAR | Paris | +1 | O | 15 | NOU | Noumea | +11 | X |
| 4 | ROM | Rome | +1 | O | 16 | AKL | Auckland | +12 | O |
| 5 | IST | Istanbul | +2 | O | 17 | HNL | Honolulu | −10 | X |
| 6 | MOW | Moscow | +3 | O | 18 | ANC | Anchorage | −9 | O |
| 7 | DXB | Dubai | +4 | X | 19 | LAX | Los Angeles | −8 | O |
| 8 | KHI | Karachi | +5 | X | 20 | DEN | Denver | −7 | O |
| 9 | DAC | Dhaka | +6 | X | 21 | CHI | Chicago | −6 | O |
| 10 | BKK | Bangkok | +7 | X | 22 | NYC | New York | −5 | O |
| 11 | SIN | Singapore | +8 | X | 23 | CCS | Caracas | −4 | X |
| 12 | HKG | Hong Kong | +8 | X | 24 | RIO | Rio de Janeiro | −3 | O |

(Date shown as of 1994)

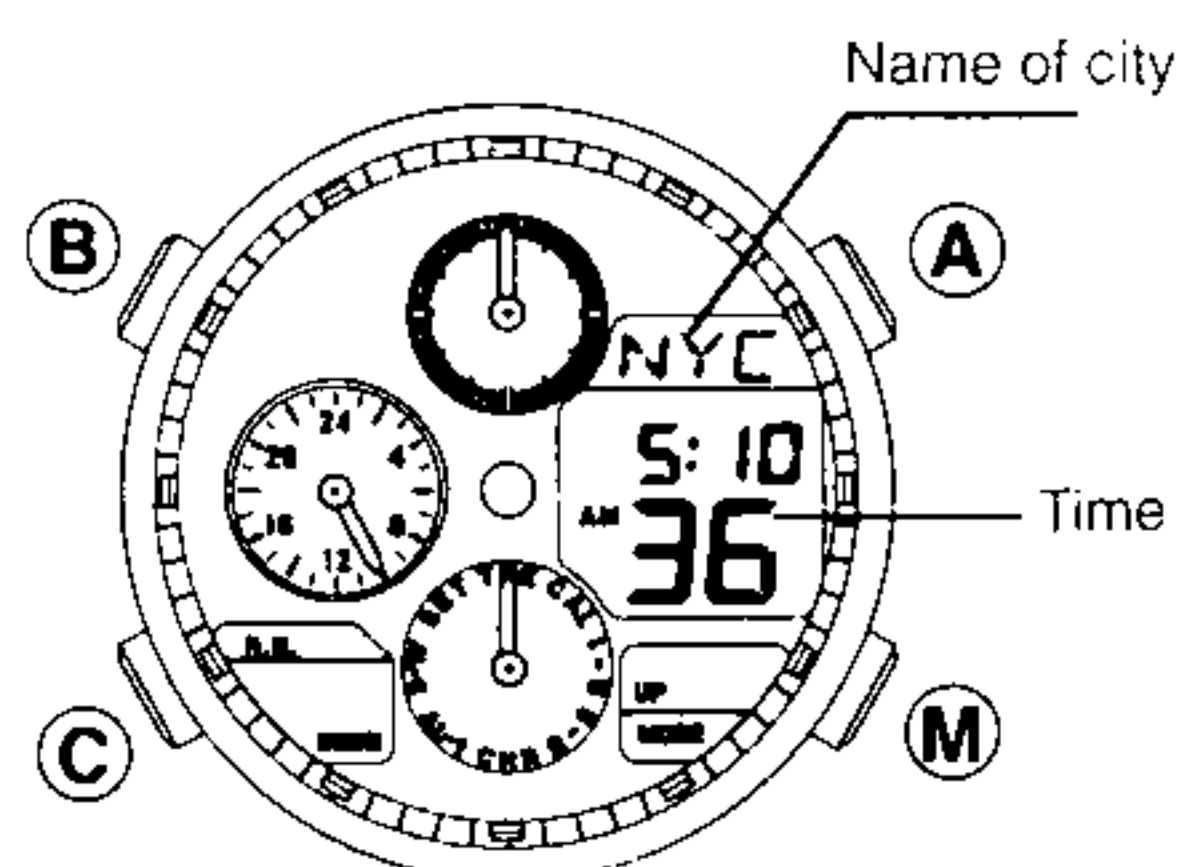
- Those cities (regions) that use Daylight Savings Time are indicated with a circle, while those cities (regions) that do not are indicated with an X.
- The time differences and use of Daylight Savings Time in each country are subject to change in accordance with the Regulations in that country.

D. Setting the Time

Digital Time Setting (TME)

When the time is set for any city, the times in other cities are set automatically.

[Normal Time display]



1. Press button **(M)** and set the watch to the TME mode.
 2. Press button **(A)** or **(C)**, and display the name of the city for which the time is to be set.
 3. Pull out button **(M)**. The hours, minutes and seconds of the digital display will start to flash.
 - * The time can be switched to Daylight Savings Time at this time. Press button **(C)** to switch to Daylight Savings Time for that city. When the Daylight Savings Time is displayed, the word "SUMMER" will be displayed.
 4. Each time button **(A)** is pressed, the display will change in the order of SUMMER, seconds, minutes, hours and 12H/24H (12 hour or 24 hour display). Since the flashing digit of the display changes each time button **(A)** is pressed, press button **(A)** until the digit of the display you want to correct flashes.
 5. Press button **(C)** to set the flashing digit of the display (continuously pressing button **(C)** will cause the number displayed to advance rapidly).
 - When setting to a 12 hour display, make sure the display for AM/PM is correct.
 6. Push button **(M)** back into the normal position, completing the digital time setting.
- ☆ Daylight Savings Time can be set independently for each city.

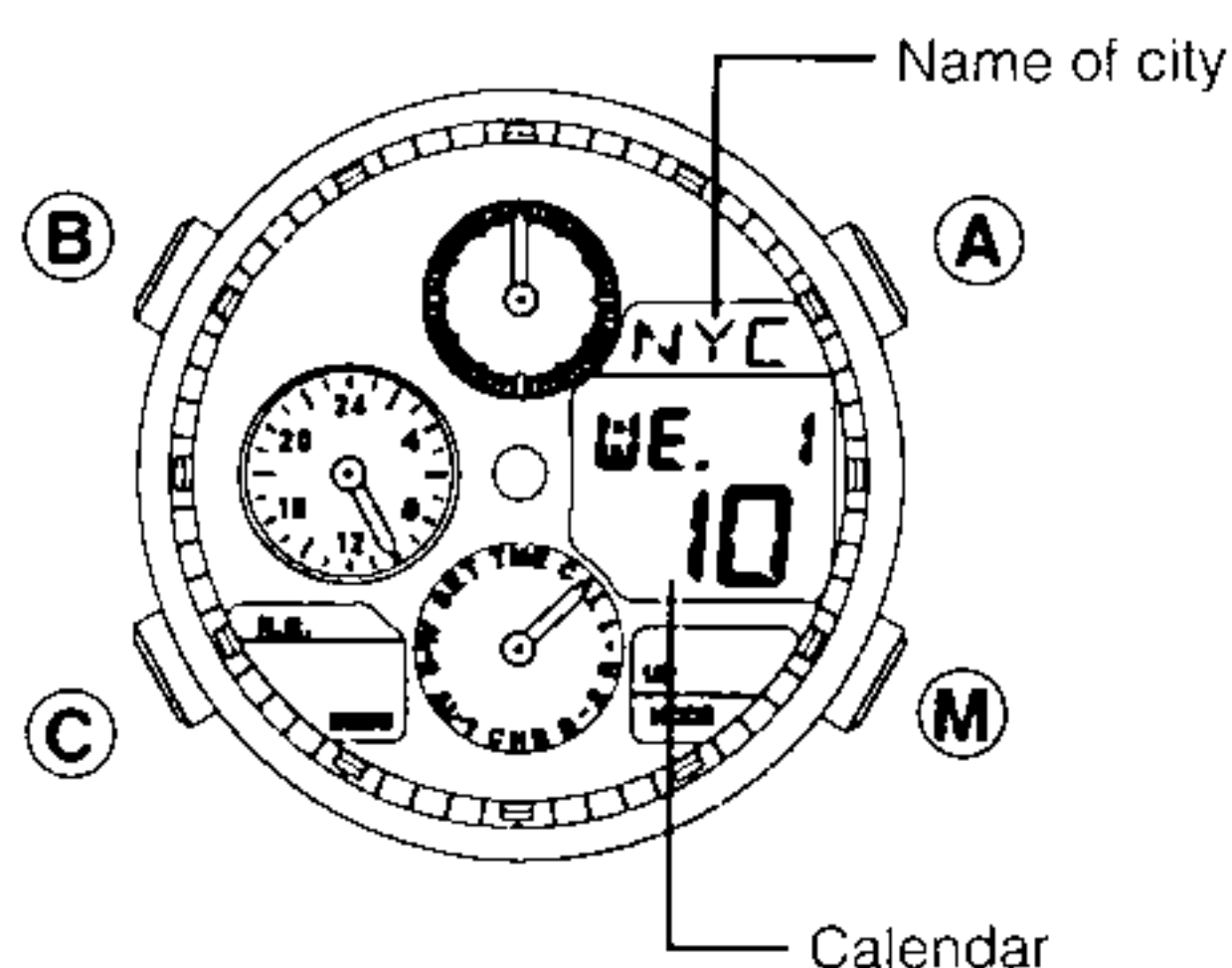
Analog Time Setting

Analog time cannot be set alone. However, analog time can be set by switching the digital and analog display. Refer to section F entitled, "Switching Between Analog Time and Digital Time".

E. Setting the Calendar

When the calendar is set for any city, the calendar for the other cities are set automatically.

[Normal Calendar display]

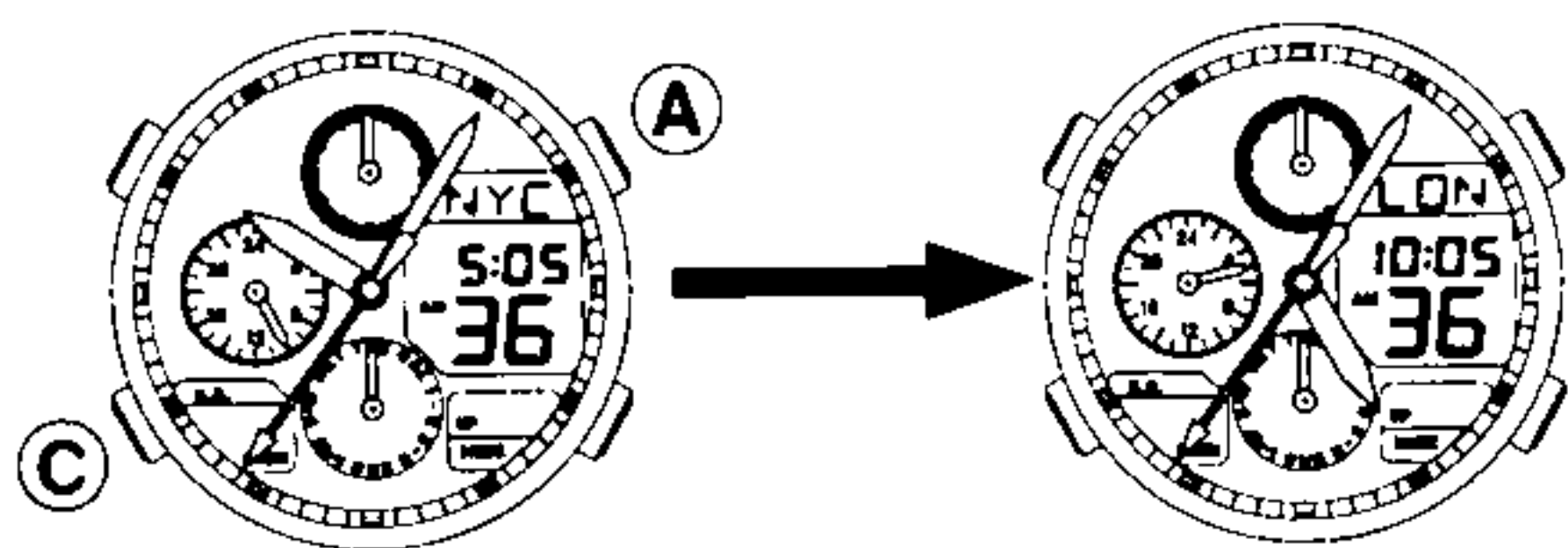


1. Press button **(M)** and set the watch to the CAL mode.
2. Press button **(A)** or button **(C)** to display the city for which you want to set the calendar.
3. Pull out the **(M)** button. The "month" of the digital display will start to flash.
4. Since the flashing digit of the display will change each time button **(A)** is pressed in the order of month, date, day and year, press button **(A)** until the digit of the display you want to correct flashes.
5. Press button **(C)** to correct the flashing digit of the display (continuously pressing button **(C)** will cause the number displayed to advance rapidly).
6. Push button **(M)** back into the normal position, completing the calendar setting.

- The year can be set from the years 1995 to 2099.
- Since this watch is equipped with an auto-calendar function, there is no need to correct the date at the end of the month.
- When the date has been set to a date that does not exist (such as February 30), the watch will automatically correct the date to the 1st of the following month when return to the normal display.

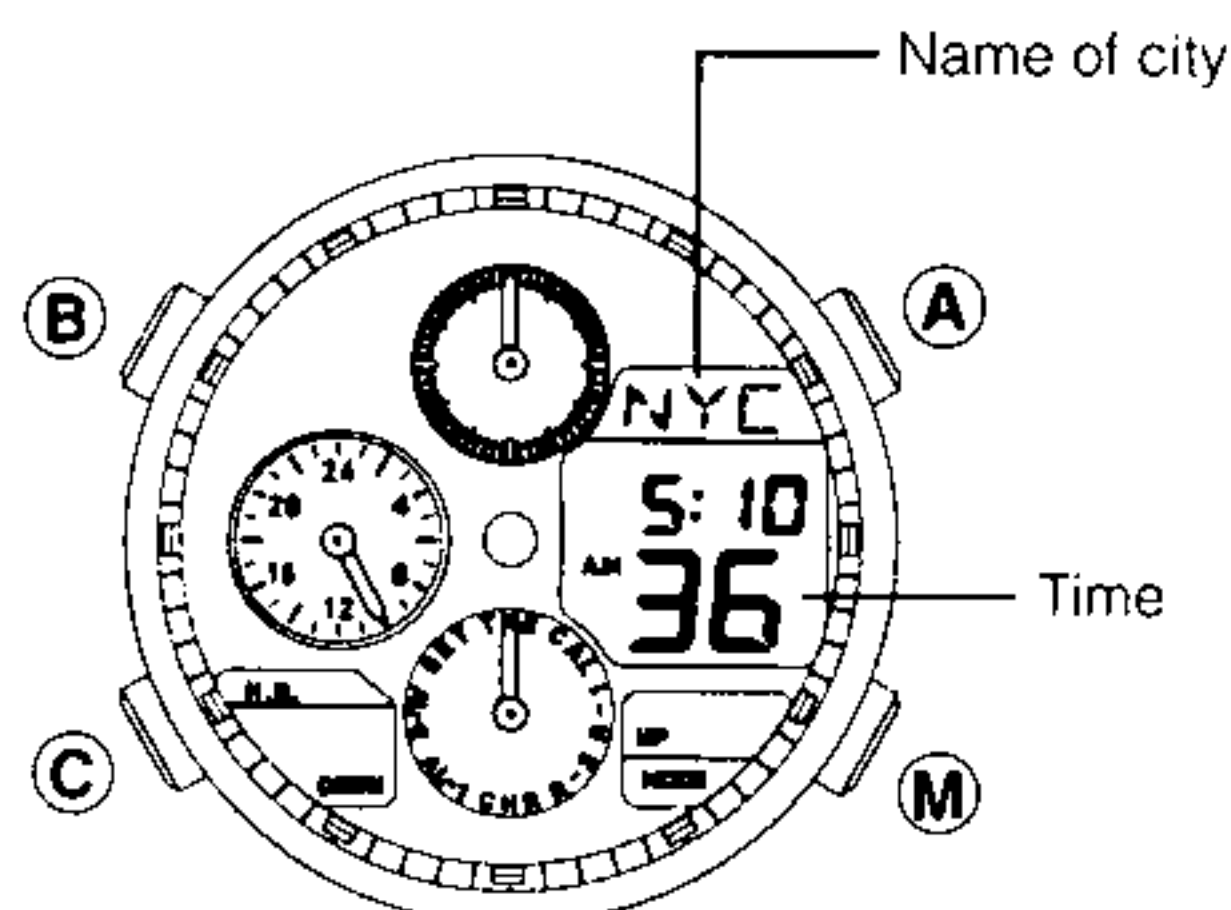
F. Switching Between Analog Time and Digital Time

This watch is designed for simple switching between digital and analog displays for cities and calendars.



1. Press button **(M)** and set the watch to the TME or CAL mode.
2. Press button **(A)** (to advance the name of the cities forward) or button **(C)** (to advance the names of the cities backward) to display the desired city.
3. Simultaneously press buttons **(A)** and **(C)**. A confirming beep will be produced indicating that the times (calendar) of the cities designated for digital and analog display have been interchanged.

G. Displaying Time and Calendar of Major Cities of the World

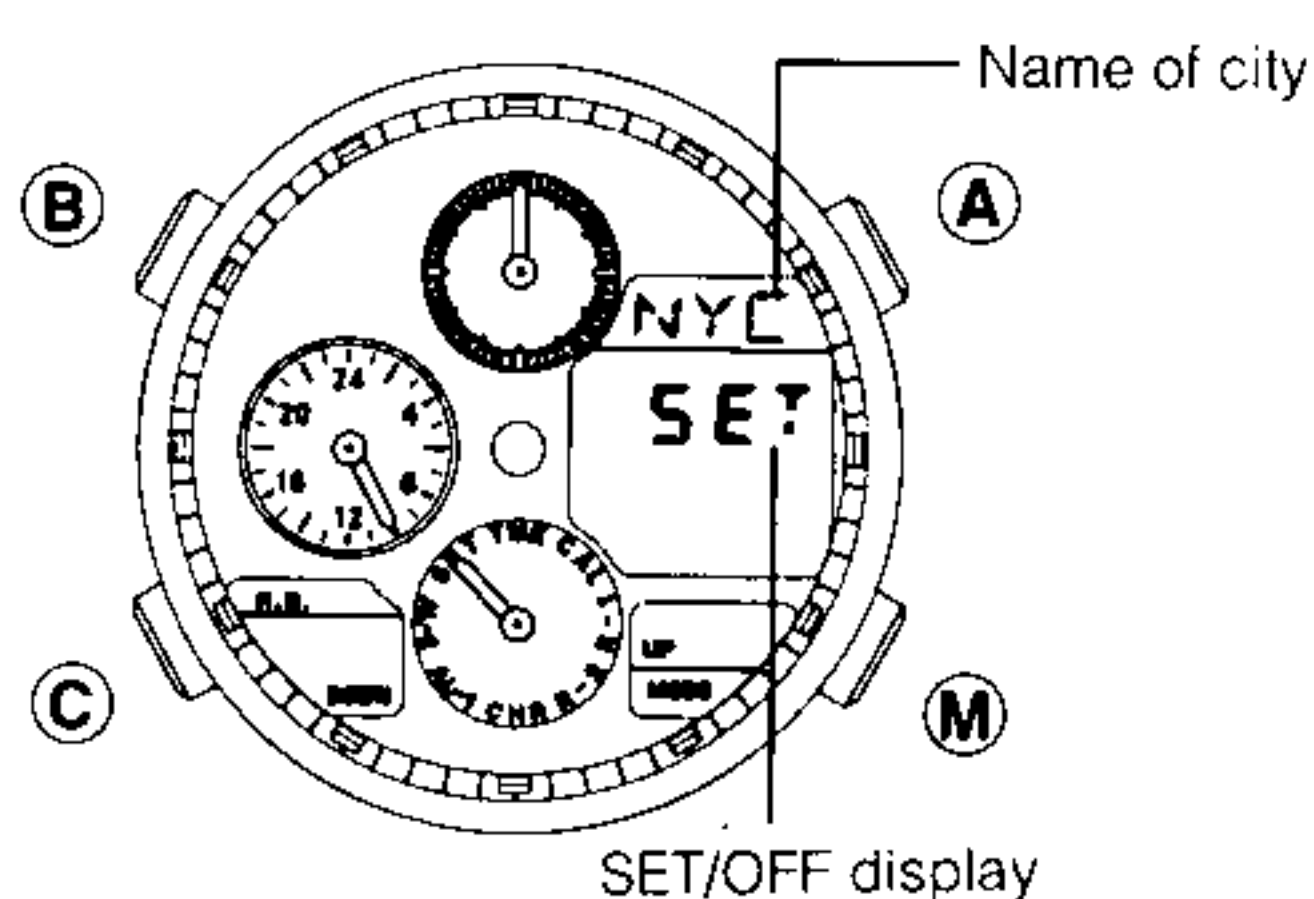


1. Press button **(M)** and set the watch to the TME or CAL mode.
2. Press button **(A)** (to advance the name of the cities forward) or button **(C)** (to advance the names of the cities backward) to display the desired city.

H. Use of Zone Setting (SET)

In the zone setting function, only the cities selected "SET" can be retrieved and displayed in each mode easily.

[Zone Setting Mode]



Zone Setting

1. Press button **(M)** and set the watch to the SET mode.
2. Press button **(A)** or button **(C)** to display the city that you want to set.
3. Pull out button **(M)**. The name of the city and the word "SET" of the digital display will begin to flash. At this time, select "SET" or "OFF" for display of the city by pressing button **(B)**.
 - When setting other cities, first press button **(A)** or **(C)** to display the city desired to be corrected, and then set for each city using button **(B)**.
4. After completing settings for each city, push in button **(M)** to the normal position to complete the setting procedure.

I. Use of Racing Timer (R-1/R-2)

This watch has the following two kinds of race timer, which are convenient for yacht races etc.

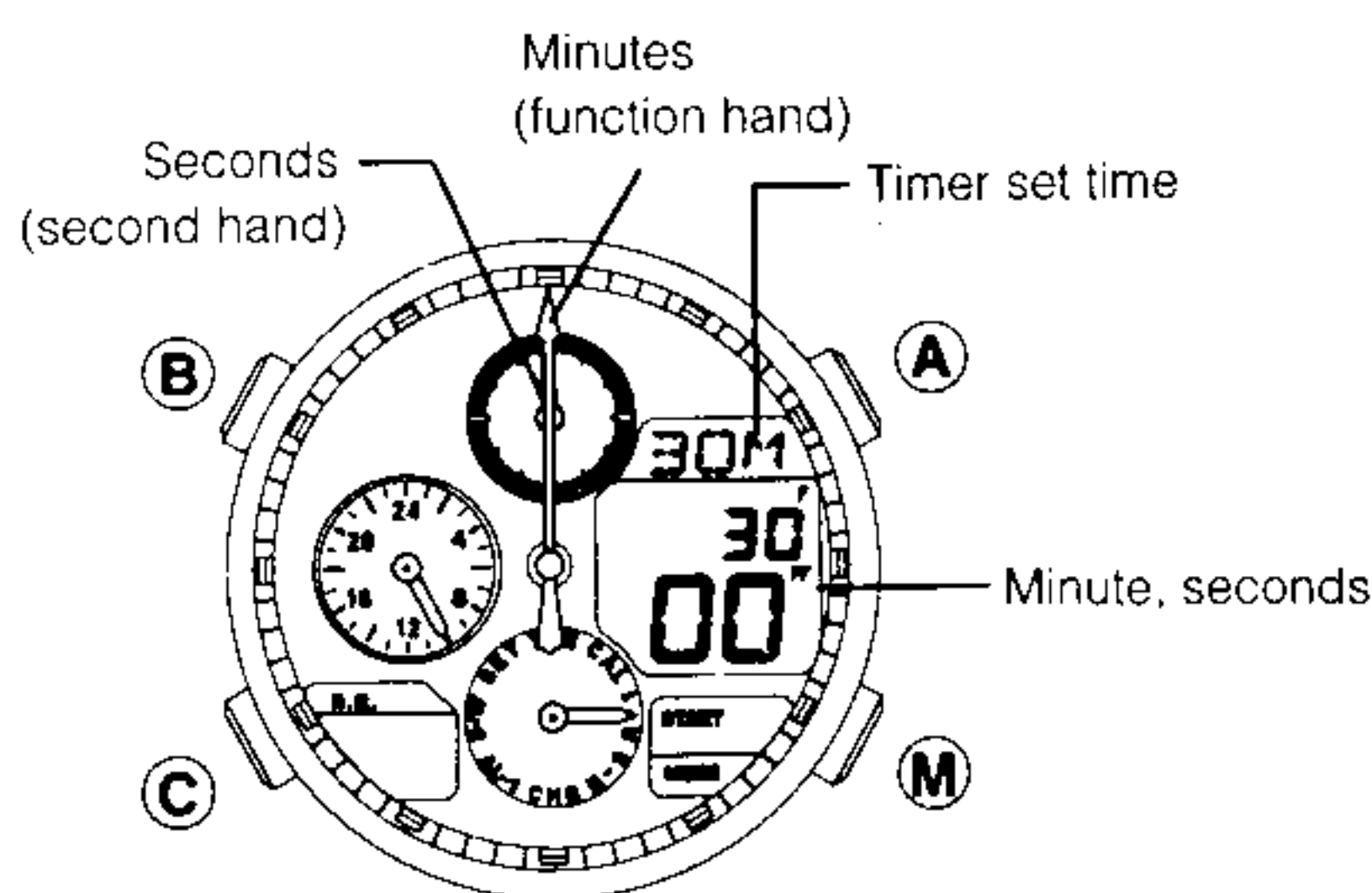
1. Race Timer 1 (R-1)

: It has an auto-repeat function which repeats timing from the set time to time up three times automatically. This is convenient for repeating the starting practices etc.

2. Race Timer 2 (R-2)

: It has an auto-chrono function which after time up, chronograph timing starts automatically, and you can measure the passed time since time up.

[Timer Mode]



Setting Procedure (Same for R-1 and R-2)

- Race timer can be set from 60 minutes to 10 minutes in 5 minutes interval, and set to 6, 5, 3, 1 minute.
1. Press button **(M)** and set the watch to either the R-1 or R-2 mode.
 2. Pull out button **(M)**. The minutes digit of the digital display will start to flash. At this time, press button **(C)** until the time you want to set is flashing on the display (continuously pressing button **(C)** will cause the number displayed to advance rapidly).
 3. Push in button **(M)** to the normal position to complete the setting procedure.

☆ Both the digital display and analog display are shown during timer timing and auto-chronograph measurement. However, the maximum analog display during auto-chronograph measurement is 59 minutes and 59 seconds. The second hand and function hand will stop at the 00 minute 00 second position after that time.

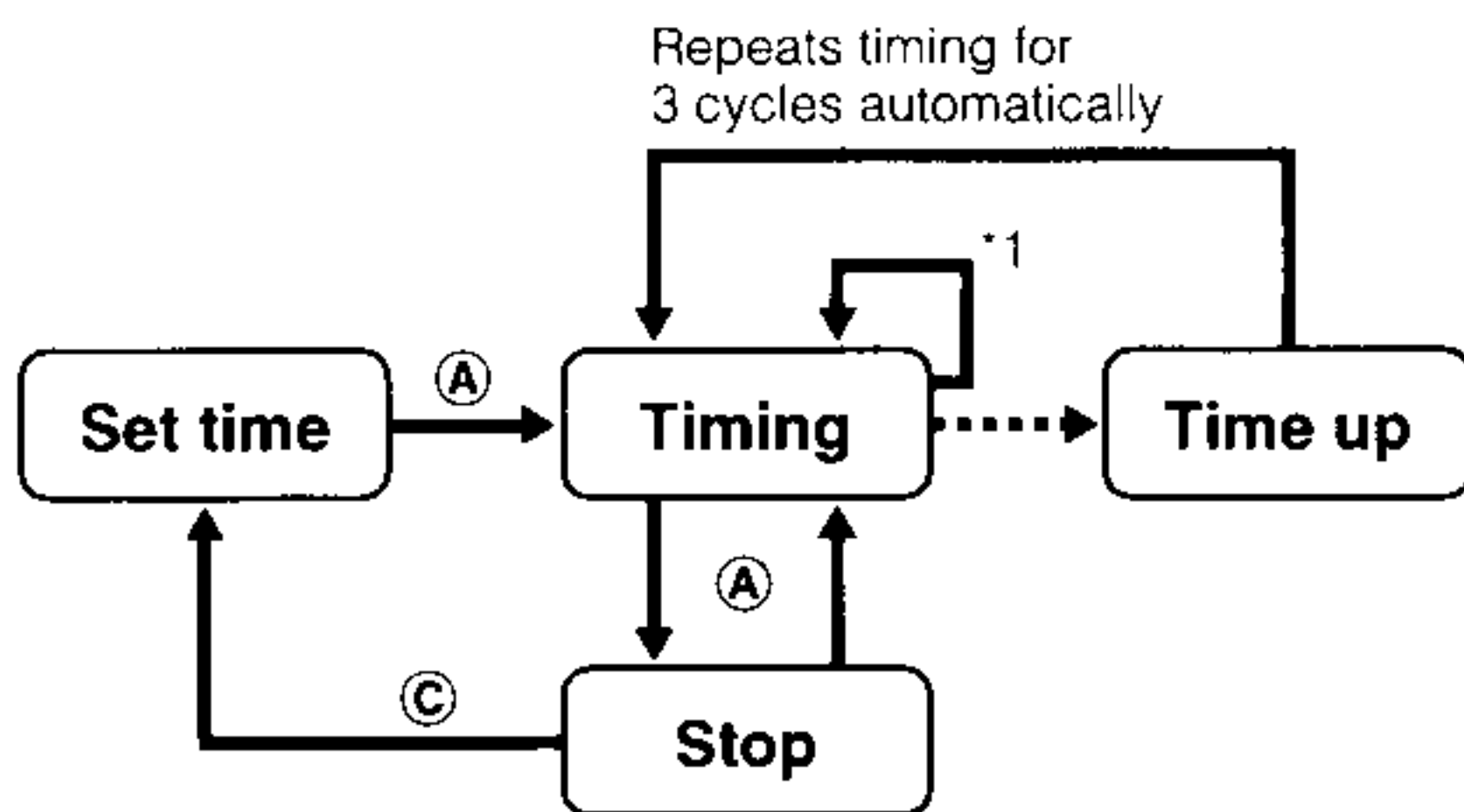
Time sound

When the timer has finished, a time up sound rings for about 5 seconds.

Also an alarm sounds every one minute between 10 ~ 1 minute and 50, 40, 30, 20, 10, 5, 4, 3, 2, 1 second to indicate the remaining time till time up.

Use of Racing Timer 1 (R-1)

- This race timer repeats the timer from set time to time up three times automatically. Then returns to set time and stops.



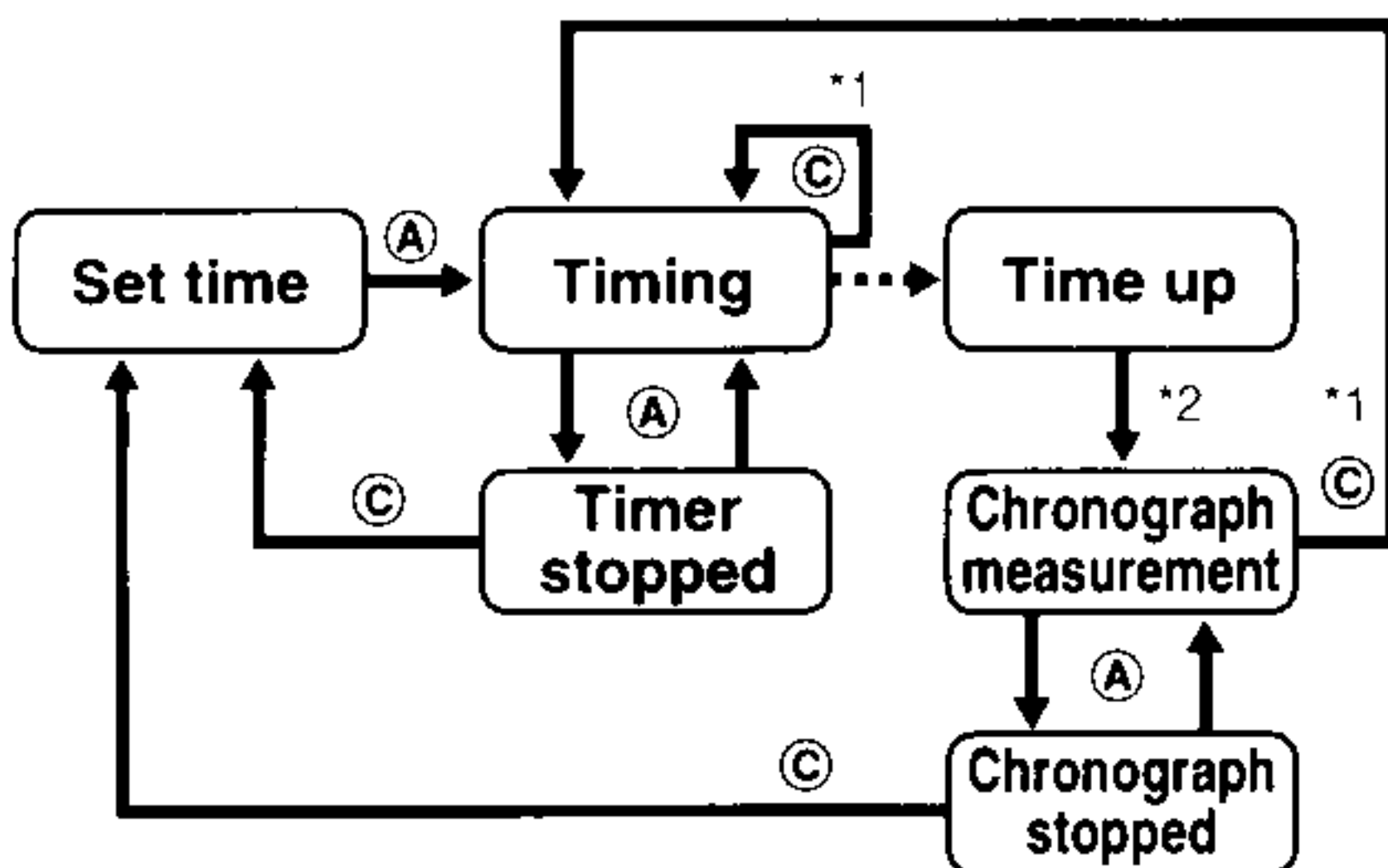
- When button **A** is pressed, the timer will start to measure time from the set time
- The timer is stopped by pressing button **A** during timing.
 - Press button **A** again to restart timing.
- When the timer is stopped, pressing button **C** returns the timer to the set time.

*1. Timer Fly bak (Restart) Function

When button **C** is pressed during timing, the timer will return to the set time and restart timing automatically.

Use of Racing Timer 2 (R-2)

This racing timer is equipped with an auto-chronograph function in which operation automatically switches to chronograph measurement simultaneous to time elapsing on the timer. The auto-chronograph function measures time for 24 hours and following completion of chronograph measurement, the timer returns to the set time and stops.



- When button **A** is pressed, the timer will start to measure time from the set time.
- The timer timing or auto-chronograph measurement is stopped by pressing button **A**.
- When the timer or auto-chronograph is stopped, pressing button **C** returns the timer to the set time.

*1. Timer Fly back (Restart)

When button **C** is pressed during timing, or time measurement with the auto-chronograph function, the timer will return to the set time and restart timing automatically.

*2. Starting of Auto-Chronograph Measurement:

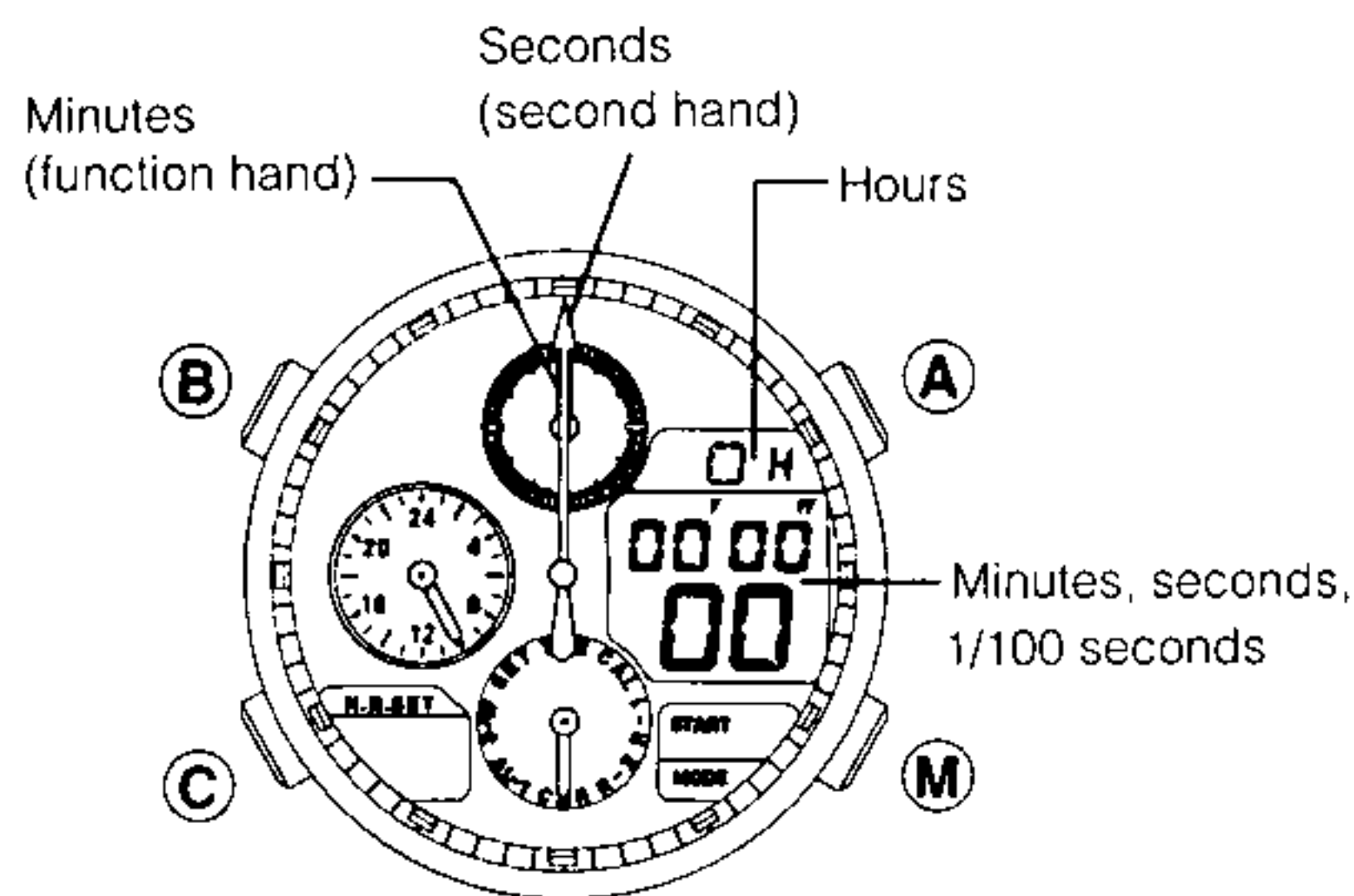
Time measurement with the auto-chronograph will start automatically simultaneous to time elapsing on the timer.

J. Use of Chronograph (CHR)

This chronograph can measure and display time in 1/100 second units for a maximum of 23 hours 59 minutes 59 seconds. Following completion of measurement for 24 hours, it returns to the reset state and stops.

In addition, it is also able to measure split time.

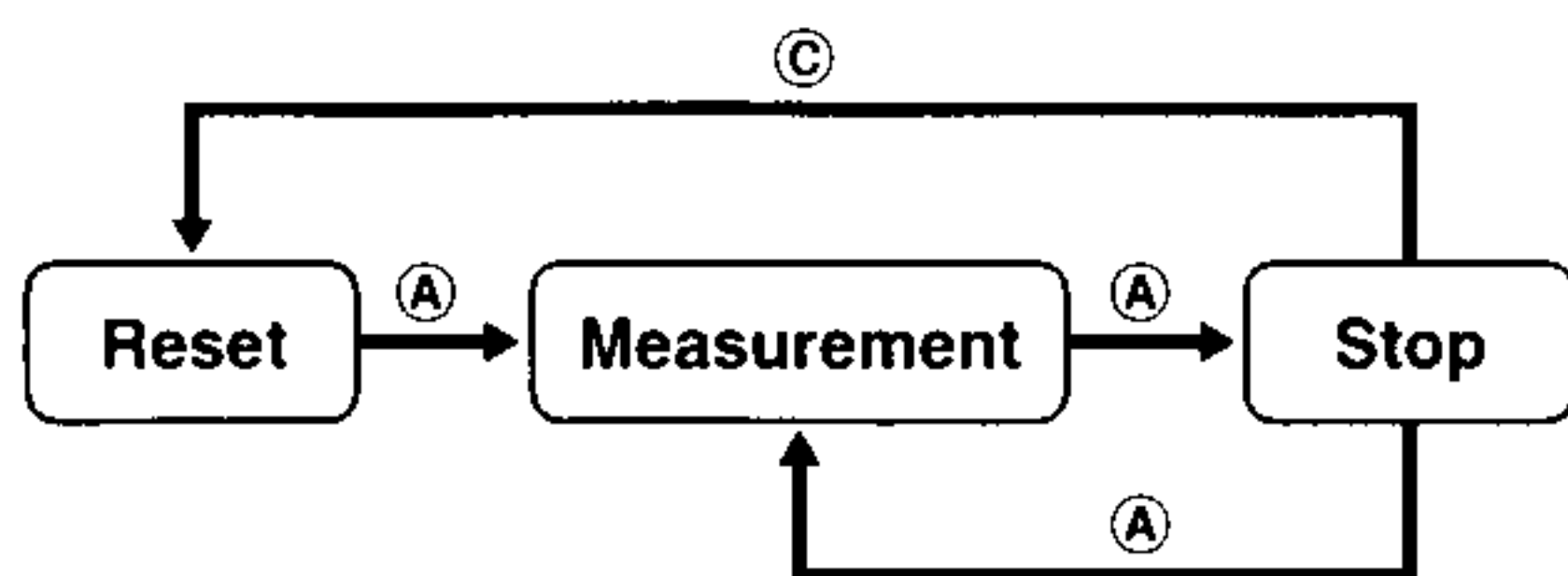
[Chronograph Mode]



☆ Both the digital display and analog display are shown during chronograph measurement. However, the maximum analog display is 59 minutes and 59 seconds. The second hand and function hand will stop at the 00 minute 00 second position after that time.

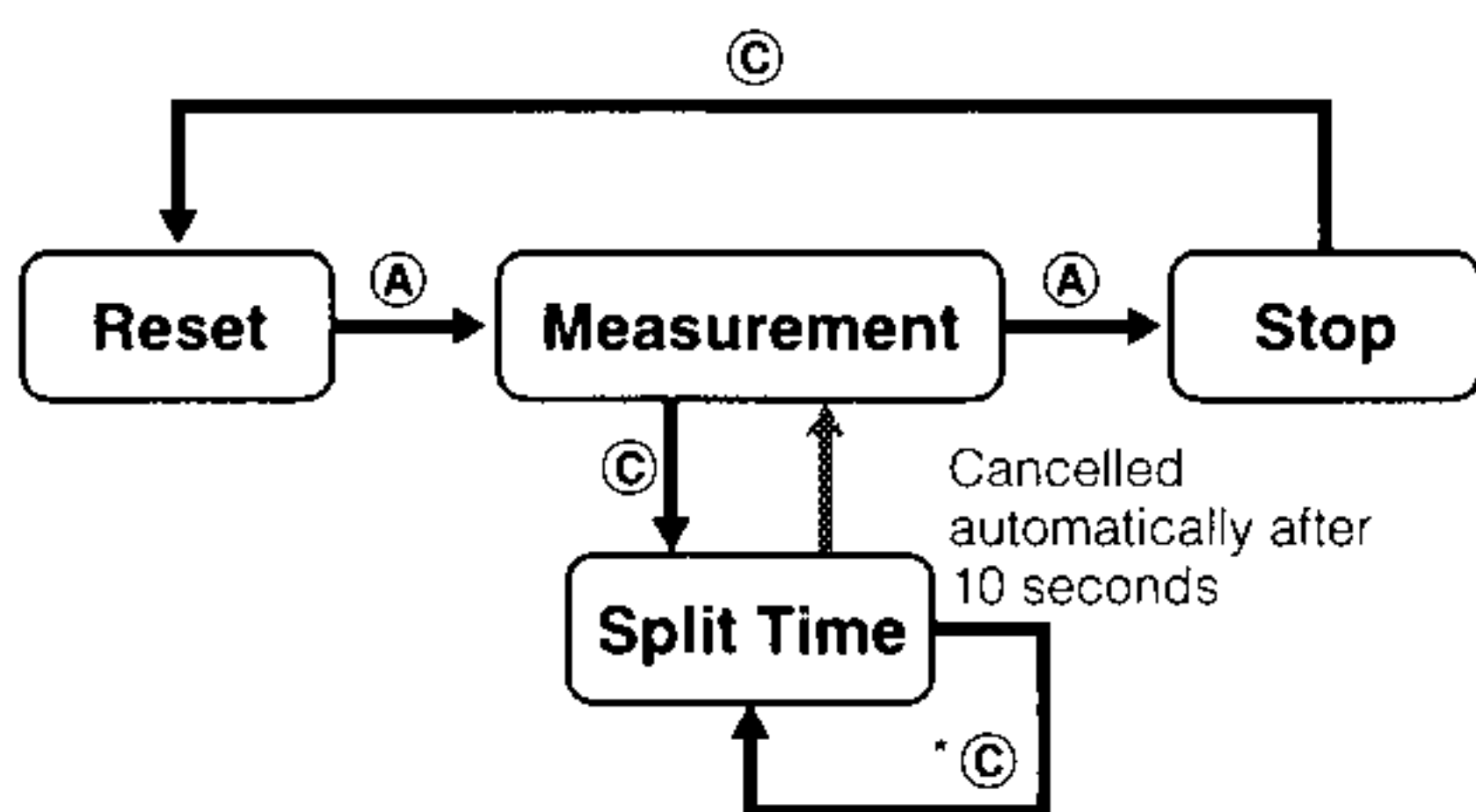
Accumulative Time Measurement

1. The chronograph is started and stopped with button **A**. (Measurement can be started and stopped repeatedly as often as desired by repeatedly pressing button **A** during measurement.)
2. The chronograph can be reset by pressing button **C** when it is stopped.



Split Time Measurement

1. The chronograph is started and stopped with button **A**.
2. When button **C** is pressed during measurement, the split time will be displayed for 10 seconds. (The word "SPLIT" will flash during display of the split time.) Split time can be measured and displayed as many times as desired.
3. The chronograph can be reset by pressing button **C** when it is stopped.

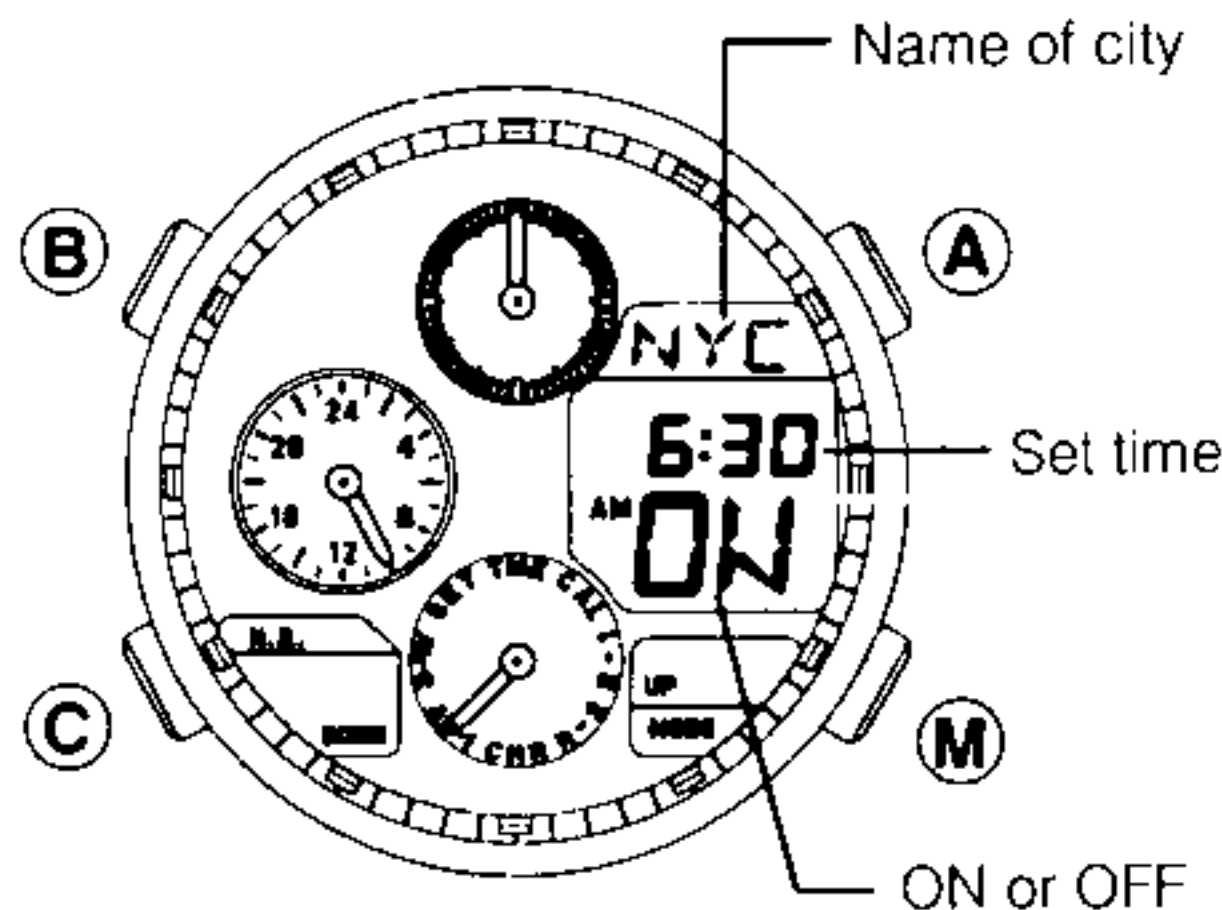


* When button **C** is pressed during display of the split time, the next split time will be displayed.

K. Use of Alarms 1 and 2 (AL-1/AL-2)

The procedure for setting the alarm for alarm 1 and alarm 2 is exactly the same. Only the beeping tone is different. Once set (turned ON), the alarm will sound for 15 seconds at the same time every day.

[Alarm ON Display]



Setting Procedure

1. Press button **(M)** and switch the watch to the "AL-1" or "AL-2" mode.
2. Press button **(A)** or **(C)** to display the name of the city for which you want to set the alarm.
3. Pull out button **(M)**. the mark "ON" or "OFF" will flash on the digital display. At this time, press button **(C)** to select either ON or OFF.
4. Press button **(A)** until the digit of the display you want to set flashes.
5. Press button **(C)** to set to the correct setting (continuously pressing button **(C)** will cause the display to advance rapidly).
6. Push in button **(M)** to the normal position.

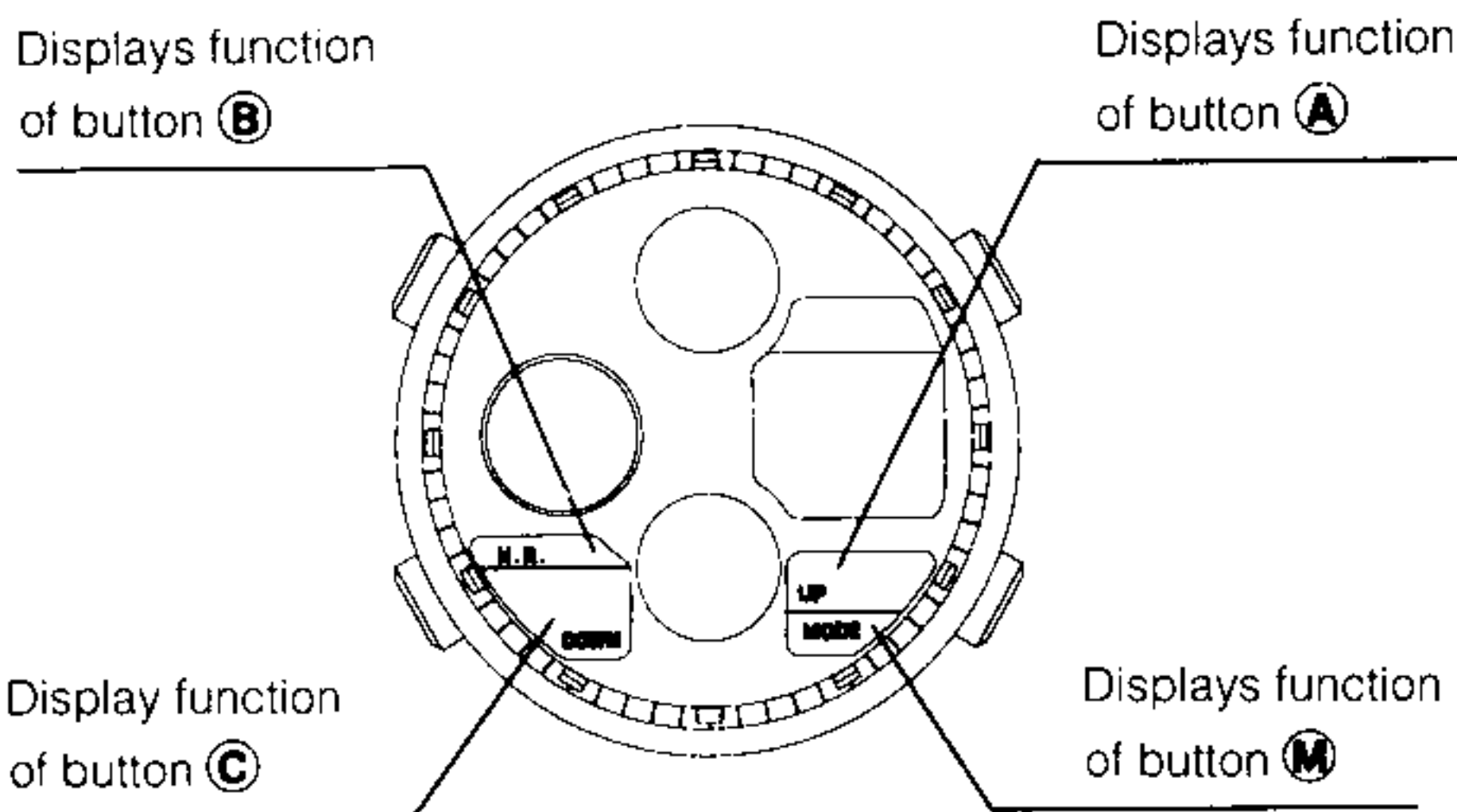
Turning Off the Alarm

Pressing any of buttons **(A)**, **(B)** or **(C)** will turn off the alarm sound.

- You can hear to the sound of the alarm at any time by pressing buttons **(A)** and **(C)** simultaneously when the watch is in the alarm mode (alarm sound monitor).
- Since a 12 hour display will also be used for the alarm mode when the time mode is set to a 12 hour display, make sure that AM and PM are set correctly.

L. Display of Button Functions

This watch is provided with a digital display that indicates the function of each button. Refer to this display when desiring to know the function of a particular button.



| Button | Display | Button function |
|--------|----------------|---|
| Ⓜ | MODE | Switches mode |
| | START | Starts time measurement |
| | STOP | Stops time measurement |
| | UP | Advances forward the name of the city displayed. |
| ⓐ | SELECT | Selects the area of the display to be set. |
| | H.R. | Retracts the hour and minute hands to return them to the 12:00 position (hand retract function) |
| | SET | Changes the zone setting |
| ⓒ | FLYBACK | Activates the timer restart function |
| | RESET | Resets watch functions |
| | SPLIT | Displays the split time |
| | DOWN | Advances backward the name of the city displayed |
| | SET | Sets the selected area of the display |

M. Convenient Functions

When display becomes illegible due to overlapping of digital display and analog hands:

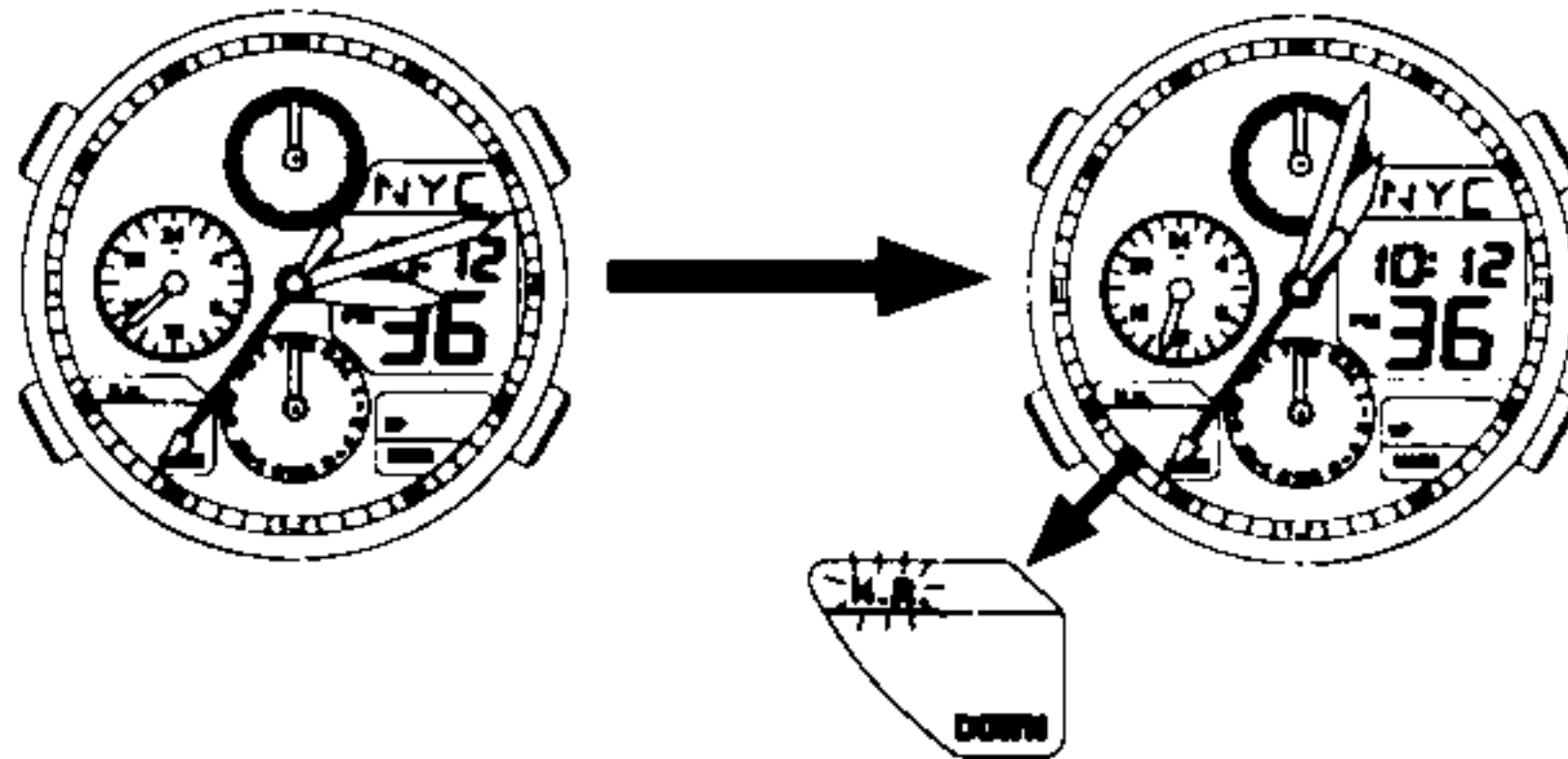
- This watch allows the hour and minute hands to be retracted when the display becomes difficult to see as a result of the hour and minute hands overlapping the digital display (hand retract function).

Procedure

1. Press button ⓑ for at least 2 seconds when "H.R." is displayed on the digital display for the function of button ⓑ. The hour and minute hands will begin to move toward the 12:00 position.
2. Once the hour and minute hands have moved to a location that does not obstruct the view of the digital display, press button ⓑ again and stop the movement of the hands. (If button ⓑ is not pressed, the hands will continue to move until they reach the 12:00 position.)

Cancellation of Hand Retract Function

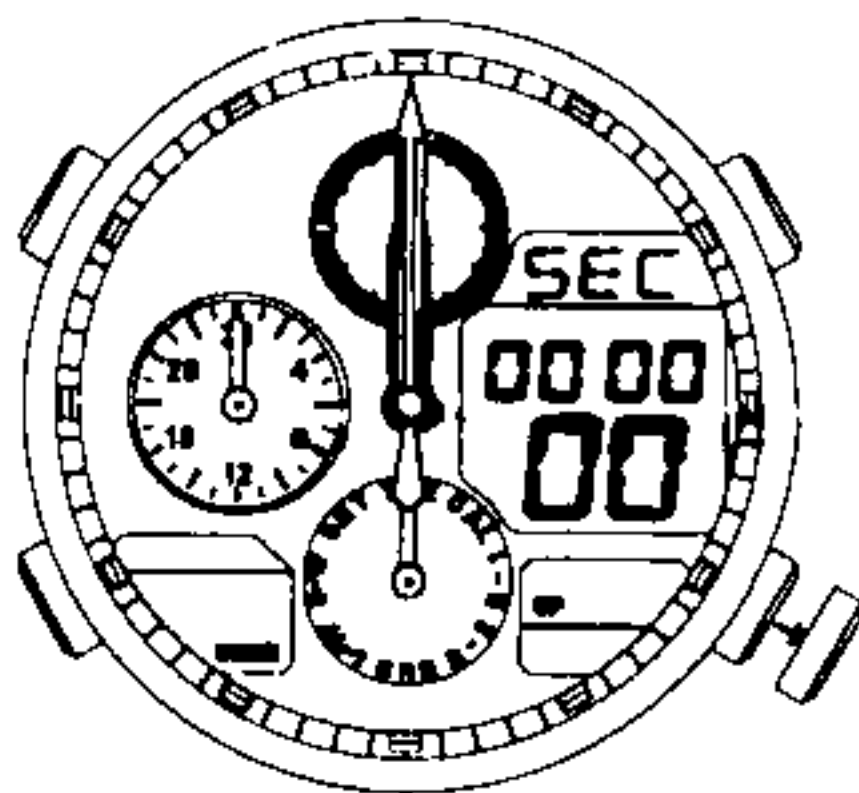
- Press button **(B)** one more time
- ☆ The letters "H.R." will flash during the hand retract function is activated.
- ☆ H.R. is the abbreviation for "Hand Retract".



When the watch shows unusual display

- When there appears to be a malfunction or abnormality in the display or operation of the watch (such as a portion of the display not being shown or the alarm continuing to sound), perform the full reset and hand zero positioning procedure described below.

N. All-Reset/Hand Zero Positioning Procedure

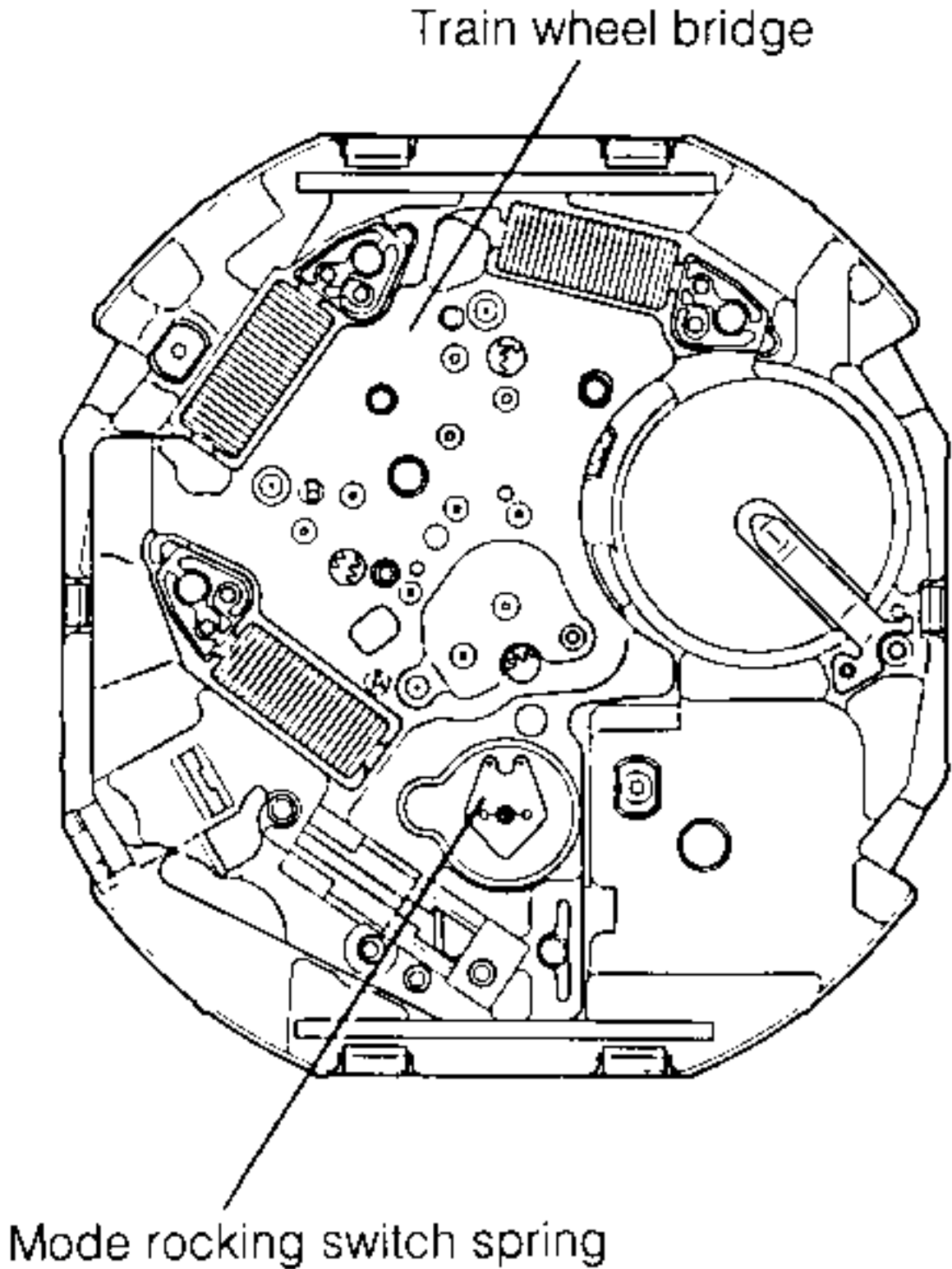
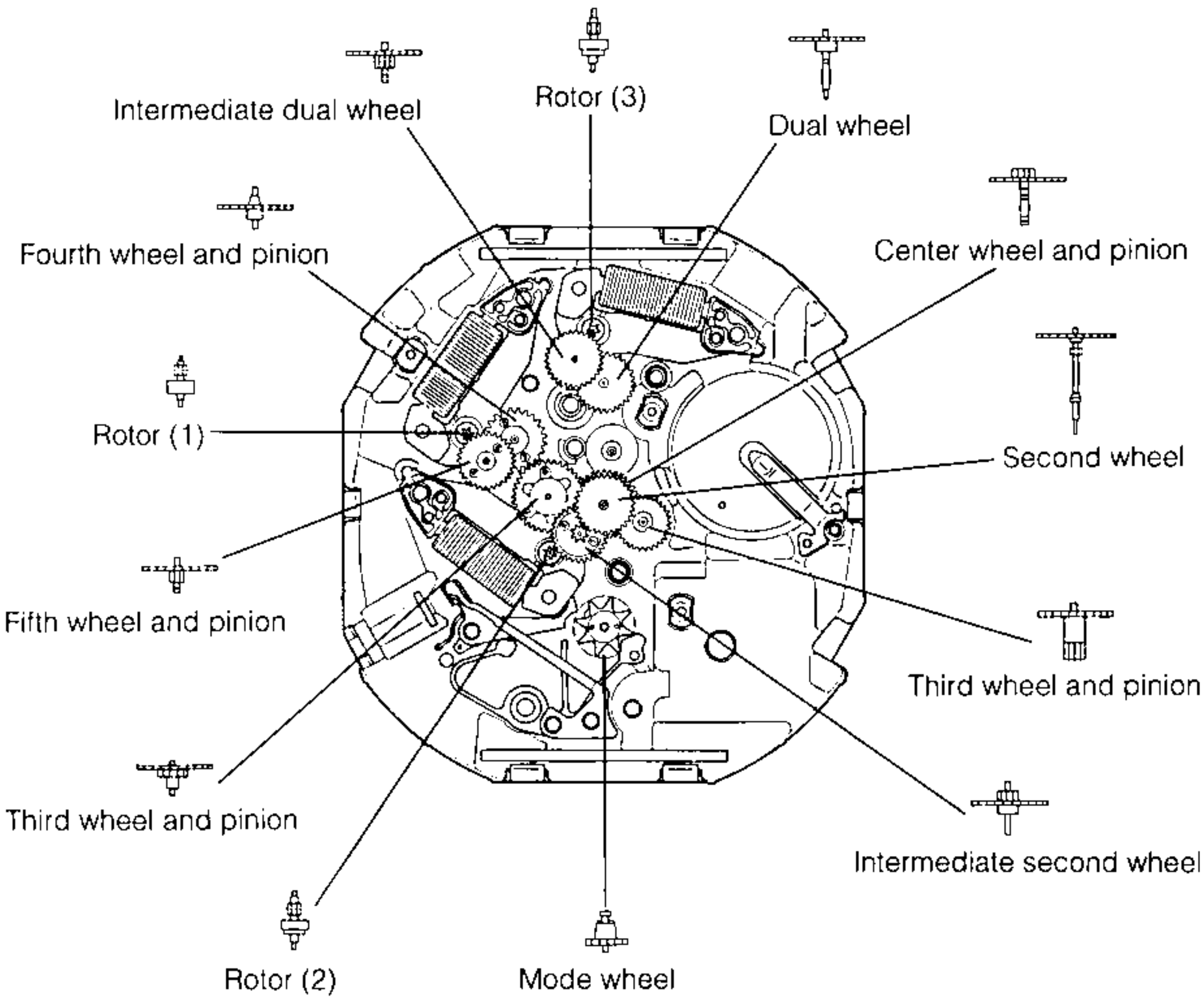
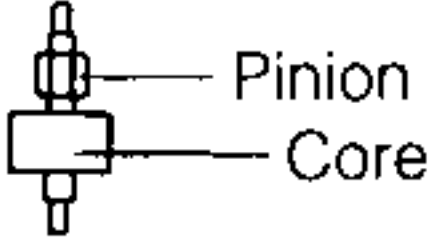


1. Press button **(M)** to switch to the "CHR" mode.
 2. Pull out button **(M)**.
 3. Simultaneously press buttons **(A)**, **(B)** and **(C)** for at least 2 seconds. (The display will no longer be shown when these buttons are pressed.)
 4. Release the buttons. (The entire digital display will flash.)
 5. Push in button **(M)** to the normal position.
 6. Pull the **(M)** button out again. At this time, digital display indicate "F_H."
 7. Each time button **(B)** is pressed, the digital display will change in the order of "F_H", "H.R." and "SEC".
 - "F_H": Allows zero positioning of function hand.
 - "H.R": Allows zero positioning of hour, minute and 24 hour hands.
 - "SEC": Allows zero positioning of second hand.
 8. Press button **(A)** or **(C)** and set each of the hands to the 24 hour 00 minute 00 second position.
 - Button **(A)** : Setting by clockwise rotation of the hands
 - Button **(C)** : Setting by counter-clockwise rotation of the hands
 9. Push in button **(M)** to the normal position. Reset each mode to the proper time settings.
- ☆ The hands of the watch will not display time correctly unless the hands are properly aligned at the zero position.

§5. HAND INSTALLATION PROCEDURE

| Step | C310 | C320 |
|--|--|--|
| ① All-reset operation | (1) Pull out the M button. (2) Press and hold the A , B and C buttons simultaneously for 2 seconds. (3) Push in the M button to the normal position. | (1) Pull out the M button. (2) Press and hold the A , B and C buttons simultaneously for 2 seconds. (3) Push in the M button to the normal position. |
| ② Confirmation of display of <TME> mode | (1) Press the M button and find out the <TME> mode and check the display. (Time/Calendar is displayed on the digital section.) | (1) Press the M button and find out the <TME> mode and check the display. (Time/Calendar is displayed on the digital section.) |
| ③ Mounting of mode hand (For only Cal. C320) | | Mount the mode hand to the center of print of "TME". |
| ④ Positioning | (1) Press the M button and set the watch in the <CHR> mode. (2) Pull out the M button. | (1) Press the M button and set the watch in the <CHR> mode. (2) Pull out the M button. |
| ⑤ Mounting of each hand | Mount each hand. <ul style="list-style-type: none"> • Function hand: 0 position (12-o'clock position) • 24-hour hand: 24-hour position • Hour and minute hands: 12:00 position • Second hand: 00-second position (12-o'clock position) After mounting the hands, press the M button into the normal position. | Mount each hand. <ul style="list-style-type: none"> • Function hand: 0 position (12-o'clock position) • 24-hour hand: 24-hour position • Hour and minute hands: 12:00 position • Second hand: 00-second position (12-o'clock position) After mounting the hands, press the M button into the normal position. |
| ⑥ Confirmation of 0 position | (1) Set the watch in the <CHR> mode. (2) Pull out the M button. If any hand is not at the 0 position, correct it by operating the buttons. | (1) Set the watch in the <CHR> mode. (2) Pull out the M button. If any hand is not at the 0 position, correct it by operating the buttons. |

§6. PRECAUTIONS FOR DISASSEMBLY AND ASSEMBLY

| Explanatory illustration | Precautions |
|---|---|
| <div><p>Train wheel bridge</p><p>Mode rocking switch spring</p></div> | <p>The "Mode rocking switch spring" is set to the two dowels of the mode wheel when assembling, confirm that the two holes of the "Mode rocking switch spring" are set to the two dowels of the mode wheel.</p> |
| <div><p>Intermediate dual wheel</p><p>Rotor (3)</p><p>Dual wheel</p><p>Center wheel and pinion</p><p>Second wheel</p><p>Third wheel and pinion</p><p>Intermediate second wheel</p><p>Mode wheel</p><p>Rotor (2)</p><p>Third wheel and pinion</p><p>Fifth wheel and pinion</p><p>Rotor (1)</p><p>Fourth wheel and pinion</p></div> | <p>I Take every care when handling plastic parts.</p> <p><Cal. C310> Rotor (1): Pinion: White, Core: Gold Rotors (2) (3): Pinion: White, Core: White</p> <div><p>Pinion</p><p>Core</p></div> <p>Coil unit (1) (3): Red Coil unit (2): Blue Stator (1) (2) (3): All of common</p> <p><Cal. C320> Rotor (1): Pinion: White, Core: White Rotor (2) (3): Pinion: White, Core: Gold Coil unit (1) (3): Blue Coil unit (2): Red Stator (1) (2) (3): All of common.</p> |

§7. DISASSEMBLY AND ASSEMBLY OF MOVEMENT

Disassembly procedure: ① → ③⑨

Assembling procedure: ③⑨ → ①

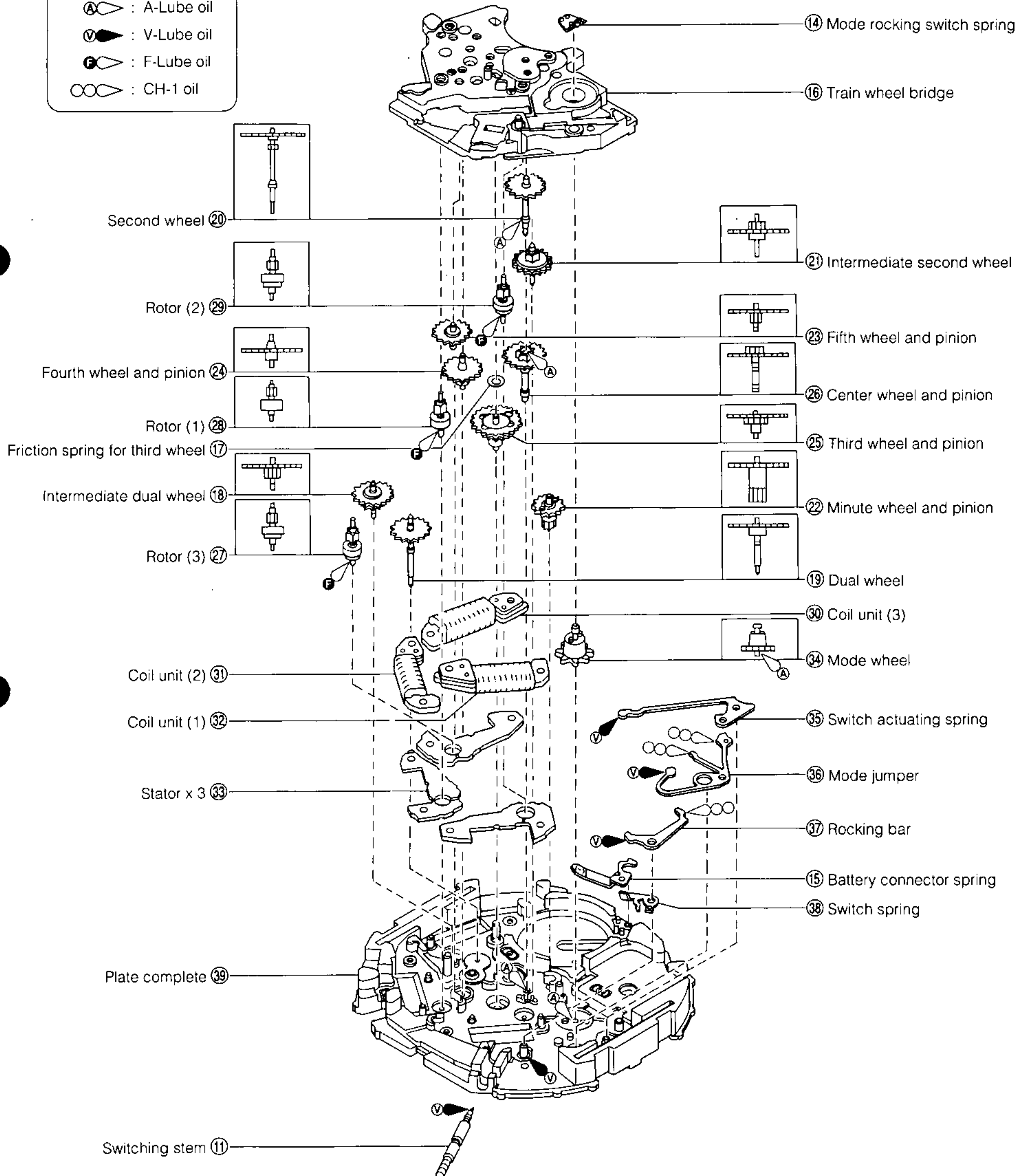
● Lubrication mark

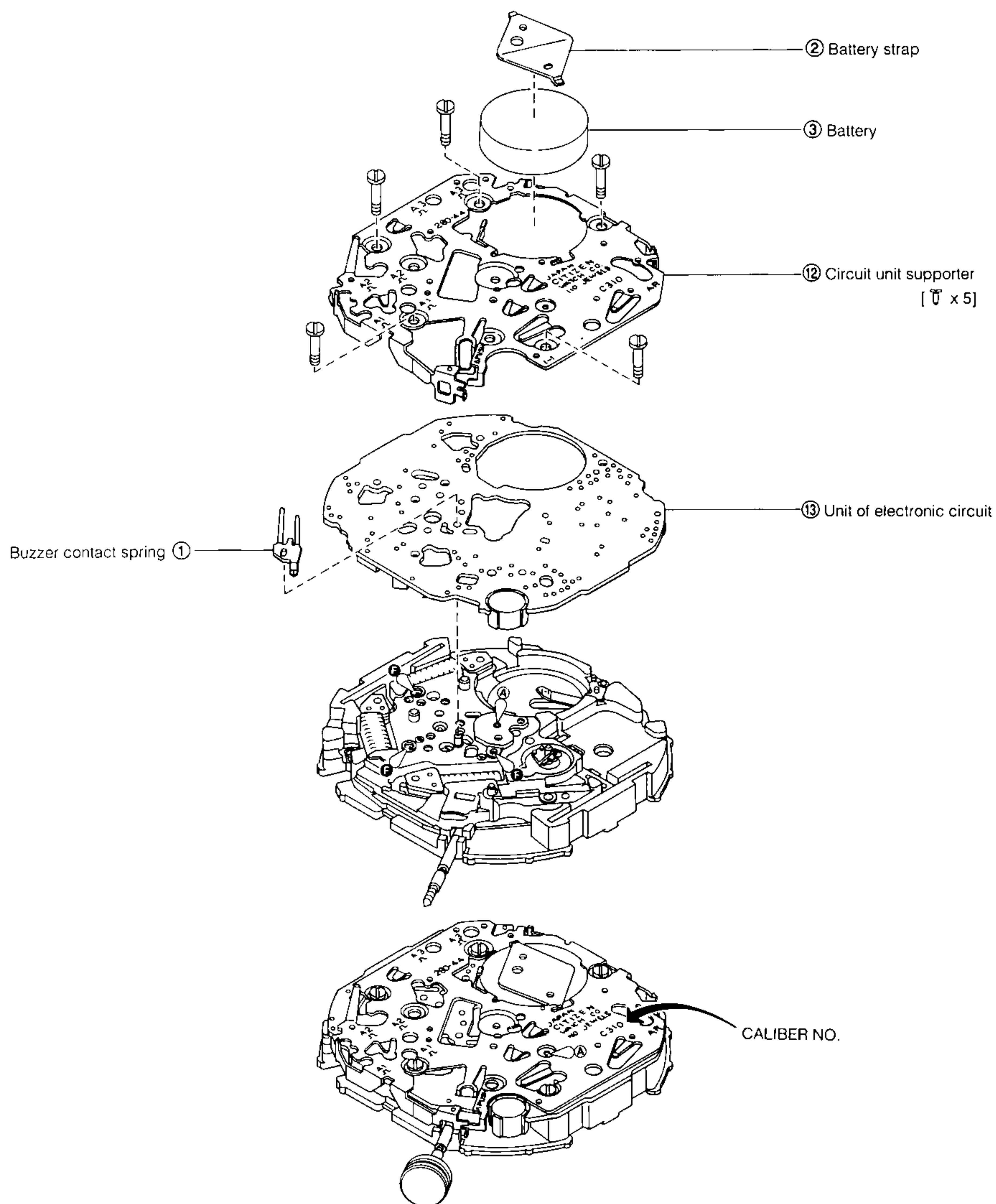
Ⓐ : A-Lube oil

Ⓥ : V-Lube oil

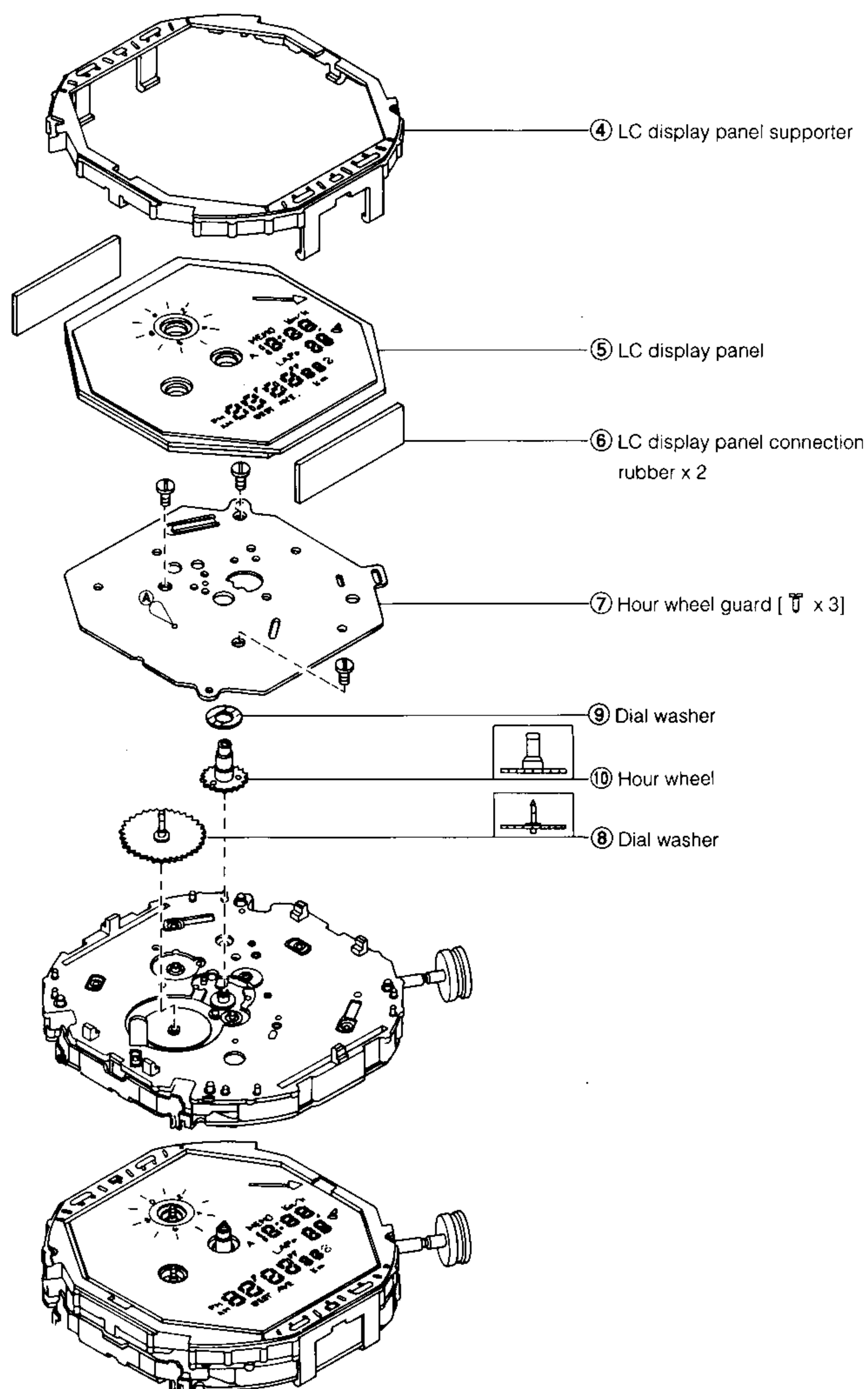
Ⓕ : F-Lube oil

⊙ : CH-1 oil

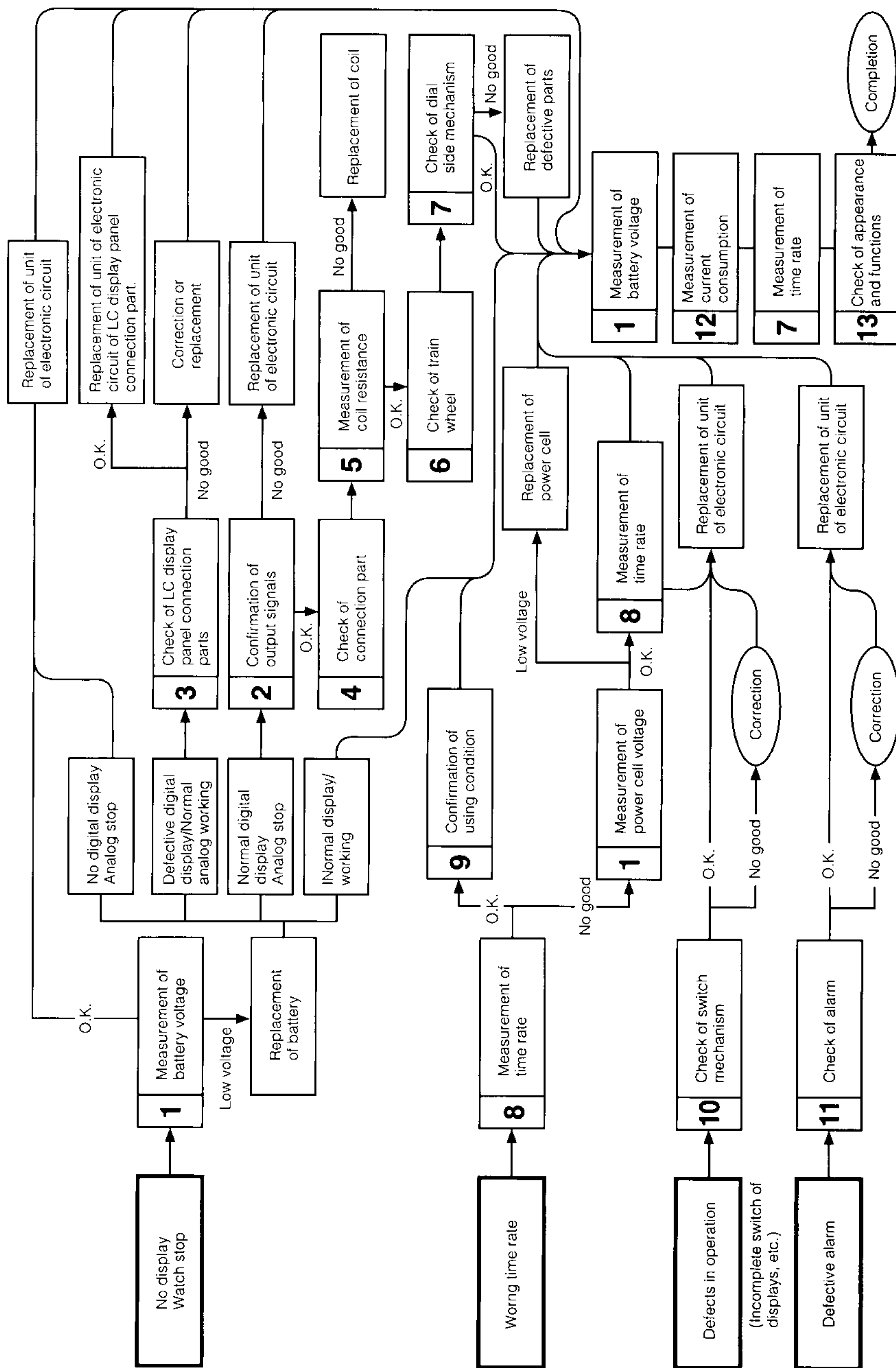


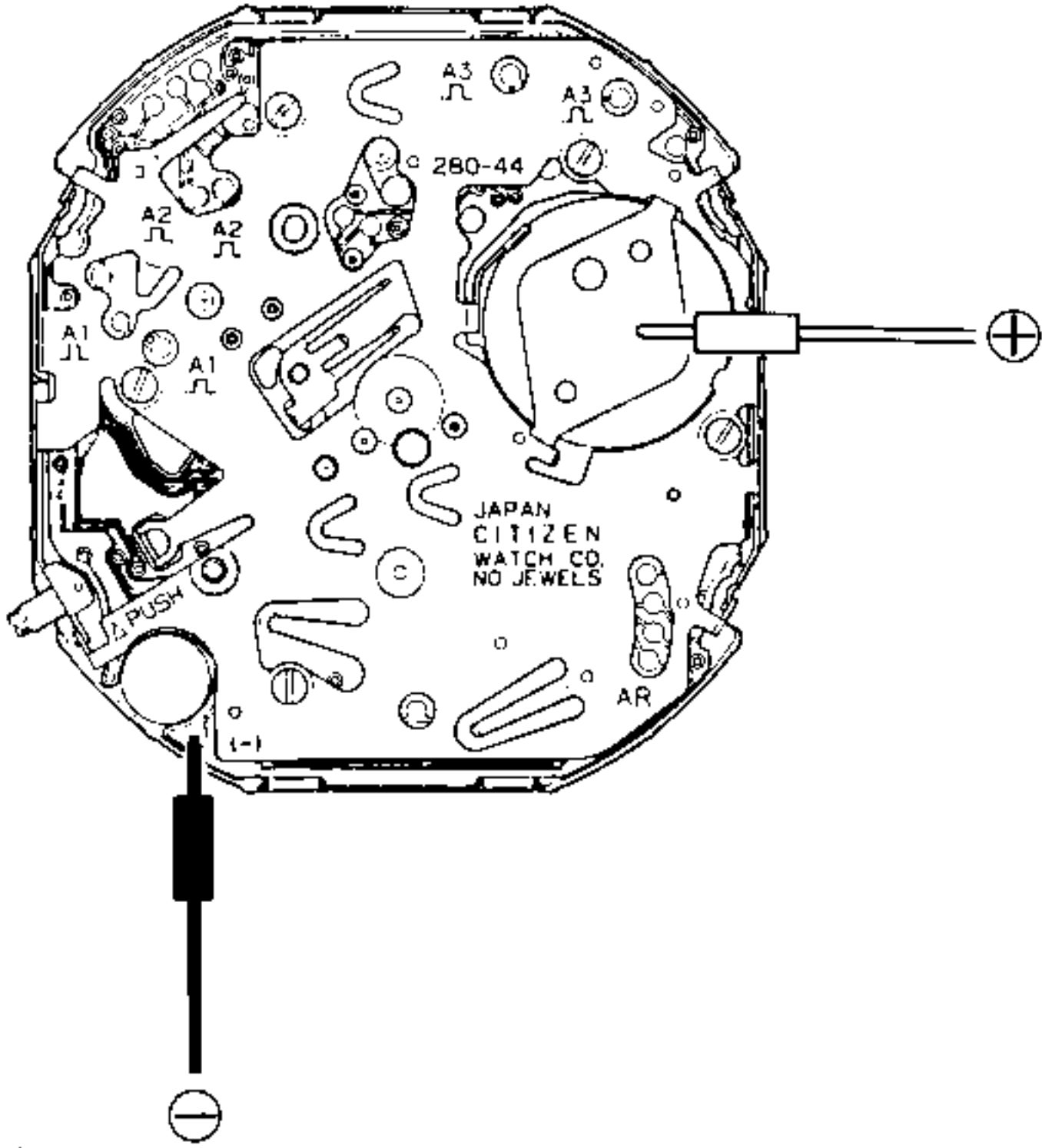
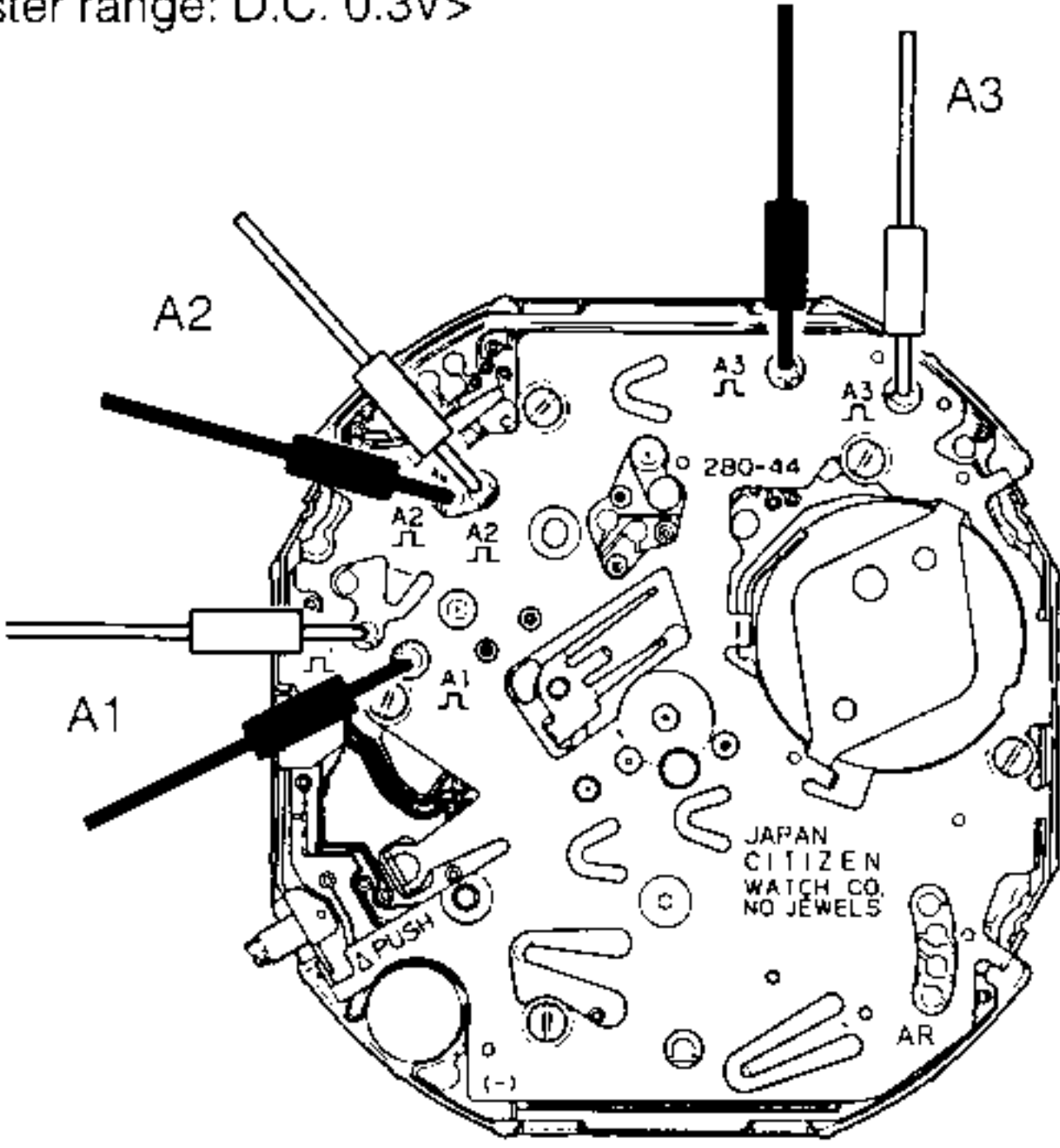


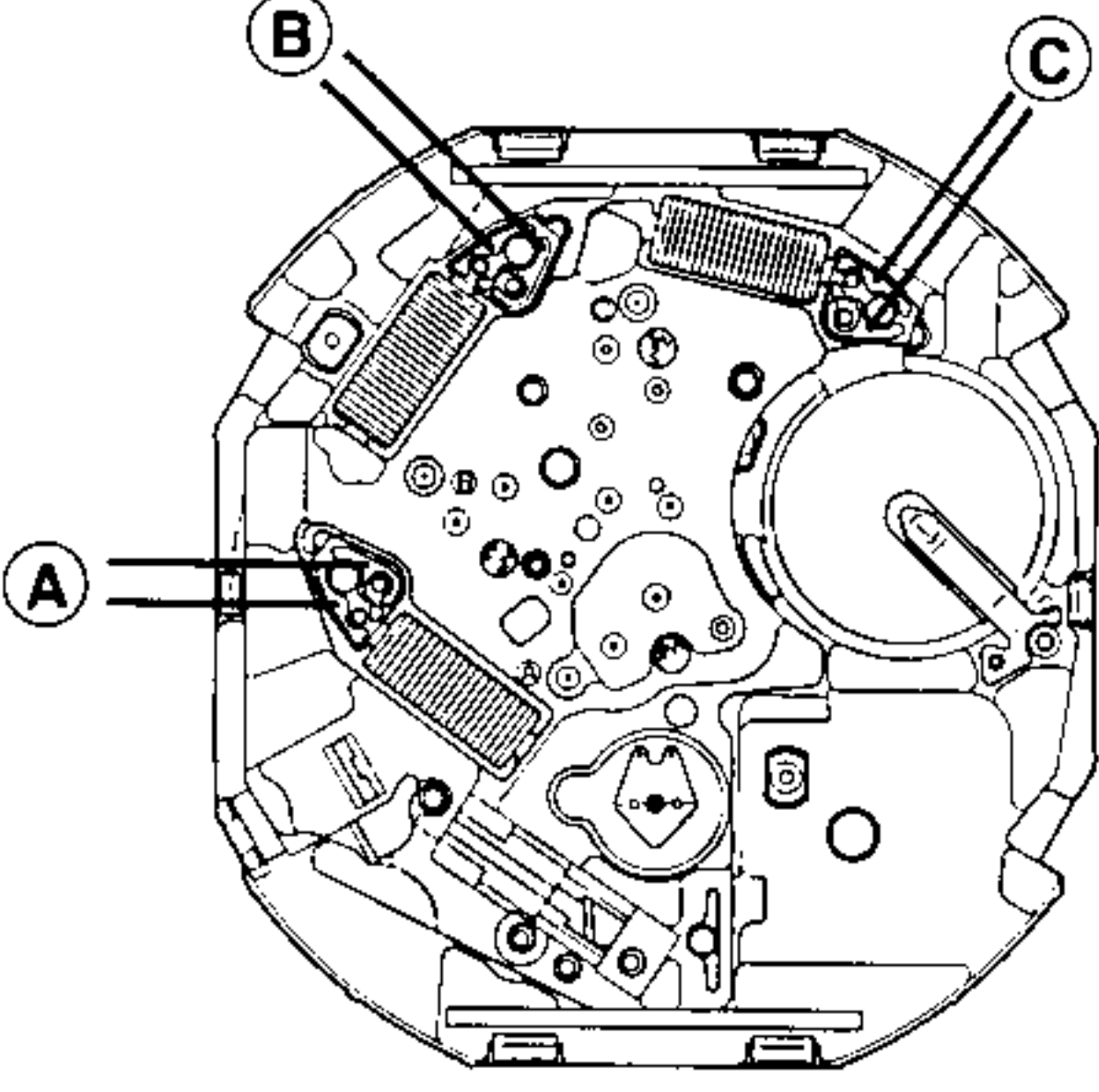
- Use the movement holder Cal. C30.



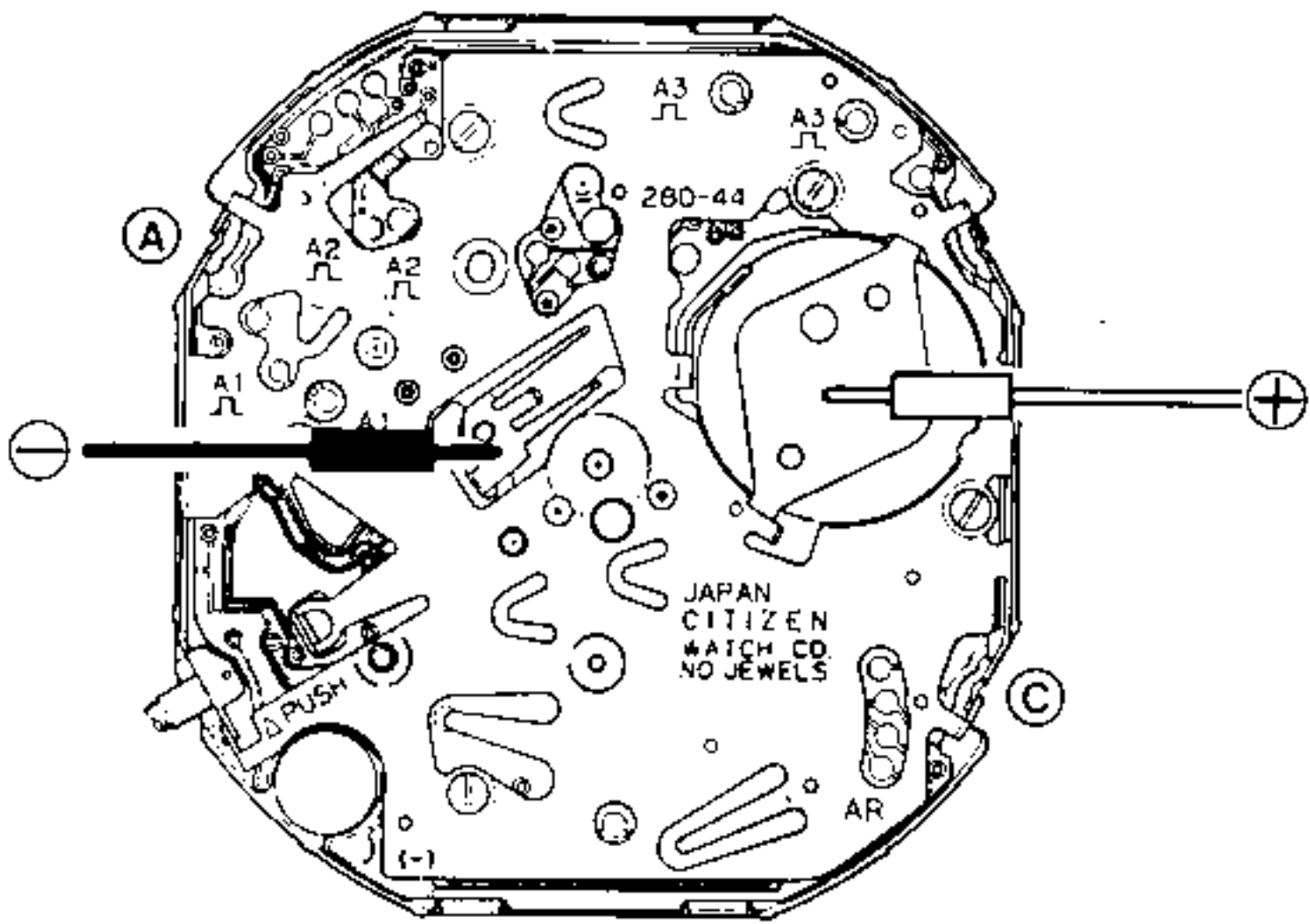
§8. TROUBLESHOOTING AND ADJUSTMENT

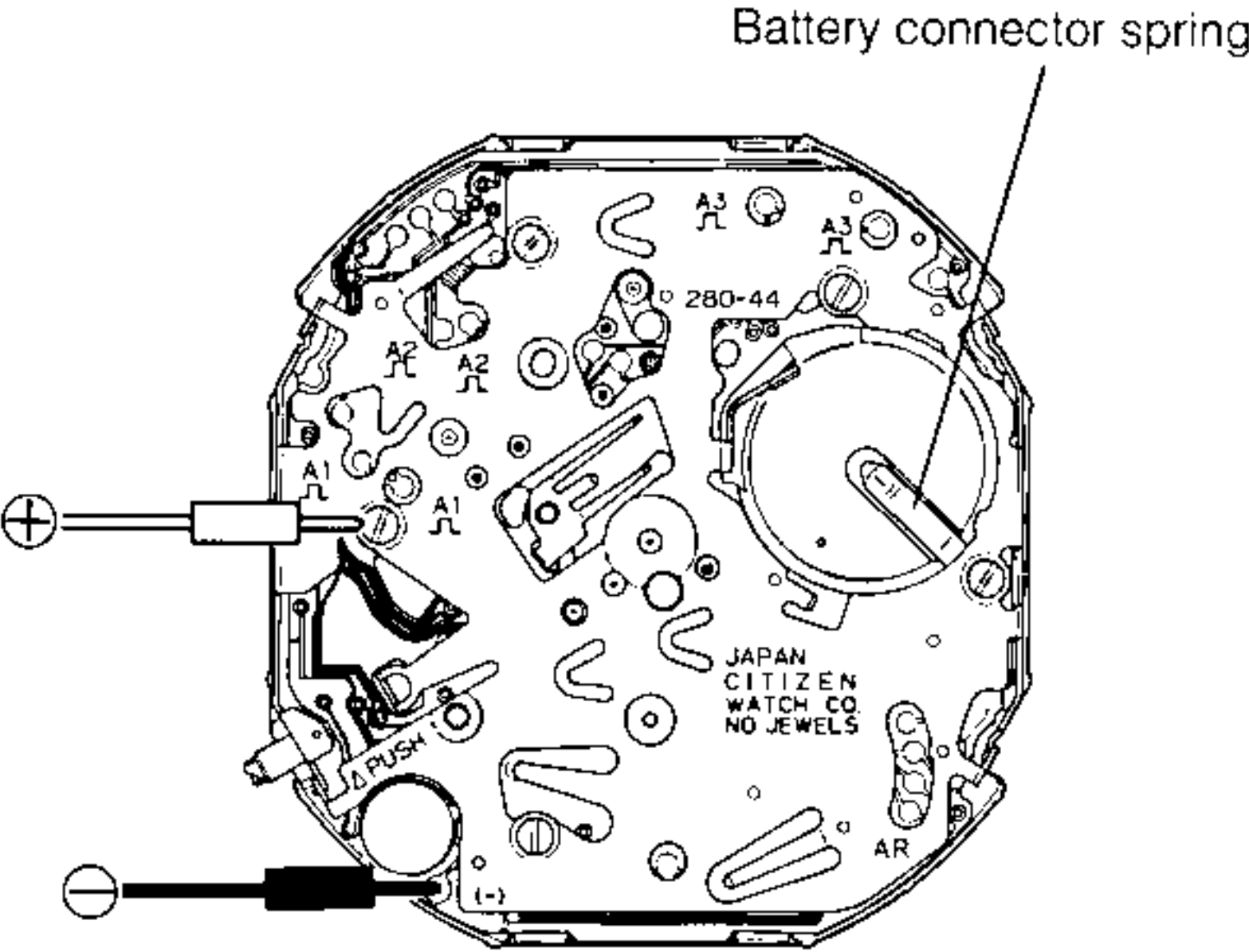
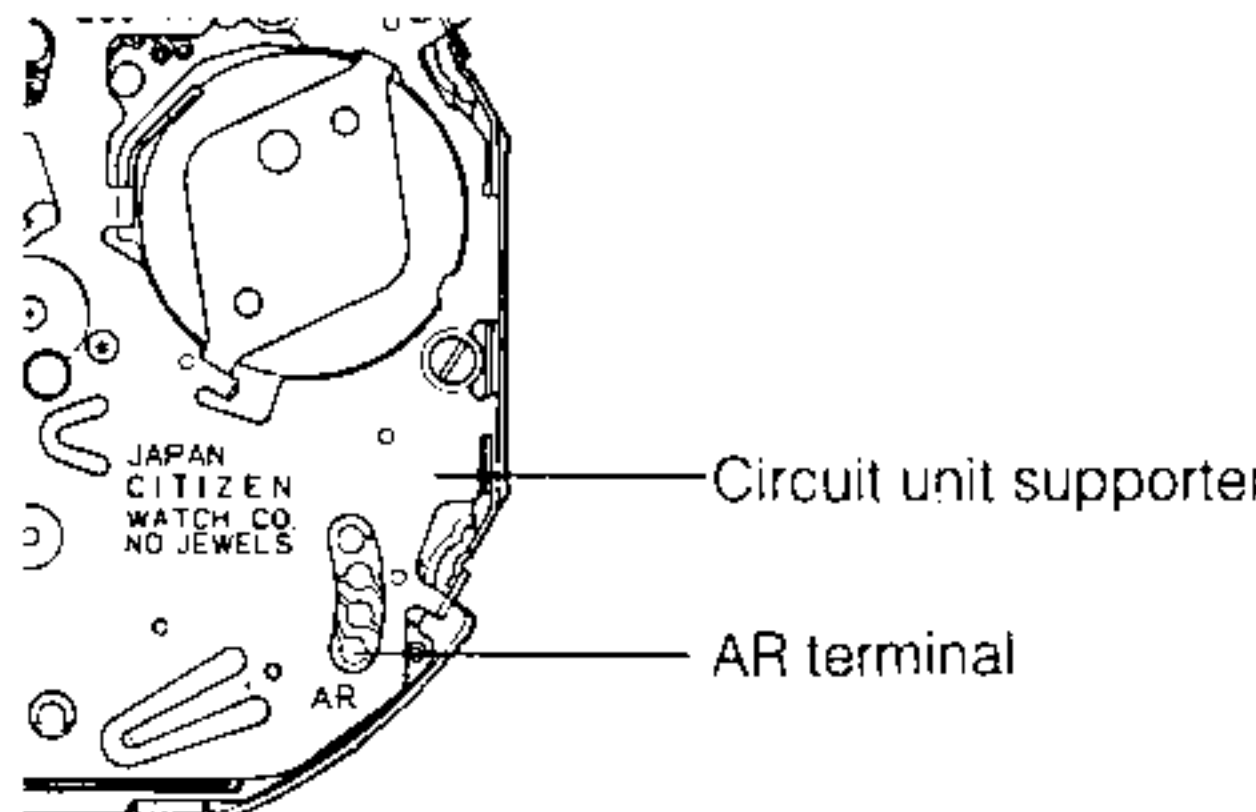


| Check Items | How to Check | Results and Treatment |
|---|--|--|
| <p>① Measurement of battery voltage</p> | <p>* Refer to Technical Manual Basic Course II-1-a. <Tester range: D.C. 3V></p> <ul style="list-style-type: none"> • Common to CAL. C310 and C320  | <p>Over 1.5 V → Non defective</p> <p>Under 1.5 V → Replace the battery</p> |
| <p>② Confirmation of output signal</p> | <p>* Refer to Technical Manual Basic Course II-1-b. <Tester range: D.C. 0.3V></p> <ul style="list-style-type: none"> • Common to CAL. C310 and C320 <p>Confirmation of A1 and A2 output signals</p> <ol style="list-style-type: none"> ① Press the M button and set the watch in the "TME" mode. ② Confirm the output signals by the A1 and A2 patterns shown in the figure below. A1: Output signal of second hand motor (1 time/sec) A2: Output signal of hour/minute hand motor (1 time/20 sec) <p>Confirmation of A3 output signals</p> <ol style="list-style-type: none"> ① Press the M button and set the watch in the "CHR" mode. ② Press the A button to start the chronograph. ③ Confirm the output signal by the A3 pattern shown in the figure below. A3: Output signal of function hand motor (Continuous output: Within 1 minute after start) <p><Tester range: D.C. 0.3V></p>  <p>(The tester lead pins have no polarity)</p> | <p>Tester pointer swings. → Non defective</p> <p>Tester pointer does not swing. → Check of connection part</p> |

| Check Items | How to Check | Results and Treatment |
|---|--|---|
| ③ Check of LC display panel connection parts | <p>• Refer to Technical Manual Basic Course II-2-a, Digital section.</p> <p>— Preparation for check —</p> <p>Pull the (M) button and press the (A), (B) and (C) buttons at the same time, and all the segments light up. (If the (M) button is returned, this condition is reset.)</p> <p>— Check —</p> <ul style="list-style-type: none"> • Check of all segments Check all the segments for a defect. • Check of continuity of LC display panel, its connection rubber and plate complete Check each part for stain, breakage, etc. | <ul style="list-style-type: none"> • The LC display panel, its connection rubber or plate complete is not installed normally → Re-install • There is dirt or stain → Remove dirt and stain • A part is cut, broken or scratched → Replace defective parts |
| ④ Check of connection part | <p>• Refer to Technical Manual Basic Course II-1-a, Analog section.</p> | |
| ⑤ Measurement of coil resistance | <p>• Refer to Technical Manual Basic Course II-1-c.</p> <p>— Preparation for measurement —</p> <ul style="list-style-type: none"> • Remove the electronic circuit to measure the coil resistance. <p>— Measurement —</p> <ul style="list-style-type: none"> • The tester lead pins have no polarity.  <p style="text-align: center;"><Tester range: R x 10></p> | <p>Cal. C310</p> <ul style="list-style-type: none"> • Resistance of each of coils (A) and (C) is 1.9 kΩ ~ 2.3 kΩ → Nondefective • Resistance of coil (B) is 1.1 kΩ ~ 1.6 kΩ → Nondefective • Out of above range → Replace the coil unit. <p>Cal. C320</p> <ul style="list-style-type: none"> • Resistance of each of coils (A) and (C) is 1.1 kΩ ~ 1.6 kΩ → Nondefective • Resistance of coil (B) is 0.5 kΩ ~ 0.9 kΩ → Nondefective • Out of above range → Replace the coil unit. |
| ⑥ Check of train wheel | <p>• Refer to Technical Manual Basic Course II-2-b.</p> <ul style="list-style-type: none"> • Check the gears and rotors for dust and oil. • Check the plastic parts and pinions for crashing, deformation, bend of shaft, etc. | |

| Check Item | How to Check | Results and Treatments |
|-----------------------------------|--|---|
| ⑦ Check of dial-side mechanism | <ul style="list-style-type: none"> * Refer to Technical Manual Basic Course II-2-c. • Check the parts for deformation and confirm that they are lubricated well. | |
| ⑧ Measurement of time rate | <ul style="list-style-type: none"> * Refer to Technical Manual Basic Course II-2-d. <Measurement range: Analog 10 seconds> • The time rate cannot be adjusted. | <p>This time gains or loses largely.</p> <p>→ Replace the electronic circuit unit.</p> |
| ⑨ Confirmation of using condition | <ul style="list-style-type: none"> * Refer to Technical Manual Basic Course II-2-e. | |
| ⑩ Check of alarm mechanism | <p>① Check of movement</p> <ul style="list-style-type: none"> • Push the switch return spring of the circuit unit supporter with tweezers, etc. to bring it contact with the pattern of the plate complete to confirm the switching function. • Check for removal of the pattern from the electronic circuit and the switch return spring for deformation. <p>② Check of push buttons</p> <ul style="list-style-type: none"> • Check the push buttons for deformation and dirt. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Caution: Apply silicone oil to the packings of the push buttons without fail. It is necessary for maintenance of water resistance and smooth operation.</p> </div> | <ul style="list-style-type: none"> • No problems in switch mechanism → Check the push buttons • Any push button is dirty or deformed → Clean or replace the push button |

| Check Item | How to Check | Results and Treatments |
|--------------------------|---|---|
| 11 Check of alarm | <p>* Refer to Technical Manual Basic Course II-1-d.</p> <p>— Preparation for check —</p> <p>① Set the movement in the case with the case back removed.</p> <p>② Press the (M) button to select "ALM" mode.</p> <p>— Check —</p> <p>③ Apply the positive \oplus lead pin to the battery surface and the negative \ominus lead pin to the buzzer contact spring, and push and hold the (A) and (C) buttons simultaneously. (In the case of Cal. C310, press and hold the (C) button.)</p>  <p style="text-align: right;"><Tester range: D.C. 0.3V></p> <p>④ If the alarm output is normal, perform the following checks.</p> <ul style="list-style-type: none"> • Check the piezo-electric element of the vibrating plate for cracking and breakage. • Check the buzzer contact spring for bend and deformation. | <ul style="list-style-type: none"> • Tester pointer does not swing → Replace the unit of electronic circuit • Tester pointer swings → Nondefective <p style="text-align: center;">↓ Go to ④. ↓</p> <p>If no defects are found, install the buzzer contact spring correctly.</p> |

| Check Item | How to Check | Results and Treatments |
|---|--|---|
| <p>⑫ Measurement of current consumption</p> | <p>* Refer to Technical Manual Basic course II-1-f.</p> <p>— Preparation for measurement —</p> <ol style="list-style-type: none"> ① Set the battery to the tester. ② Press the (M) button to select "TME" mode. ③ Set the test lead pins to the movement.  <p>* Use the minus pattern of the movement. If the battery connector spring is pushed too strongly, it will be shorted to the 24-hour wheel and current consumption cannot be measured correctly.</p> <p>— Measurement —</p> <ul style="list-style-type: none"> • Short the AR terminal to the circuit unit supporter to perform the all-reset operation. <p><Tester range: D.C. 10μA></p>  <p>* Precautions for measurement of current consumption.</p> <ol style="list-style-type: none"> ① When the tester lead pins are applied, abnormally large current flows and the meter exceeds the maximum point for a moment. This does not indicate a trouble. In this case, start the measurement with the tester at a higher range, then change the range one step by one. ② If the movement is exposed to the light of an incandescent lamp or the sun, more current may be consumed and the watch may not function normally. | <p><Common to CAL. C310 and C320></p> <ul style="list-style-type: none"> • Current consumption of the movement <p>Under 3.0 μA → Non defective</p> <p>Over 3.0 μA → Check and clean the train wheel and dial-side mechanism.</p> <p style="text-align: center;">↓</p> <ul style="list-style-type: none"> • Current consumption measured again <p>Over 3.0 μA → Replace the electronic circuit.</p> |
| <p>⑬ Check of appearance and functions</p> | <p>* Refer to Technical Manual Basic course II-2-f.</p> <ul style="list-style-type: none"> • Check the inside of the case for dirt. • Confirm that each correcting switch works normally. • Confirm that all the segments are normal. | |

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