

***TECHNICAL  
INFORMATION***

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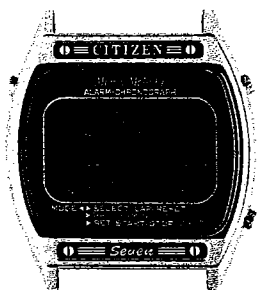
**CITIZEN QUARTZ**

**Cal. No. 957※※**

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## §1. OUTLINE



This is a multi-function digital quartz watch that is developed and completed through the Citizen's up-to-the-minute electronic technology. It incorporates a microcomputer-type LSI plus the Citizen's first "melody alarm" and "alphanumeric" in addition to the time and calendar displays plus the seven functions that can be operated at will by the user.

Thus this new watch will surely satisfy the multifarious needs of contemporary users.

## §2. FEATURES

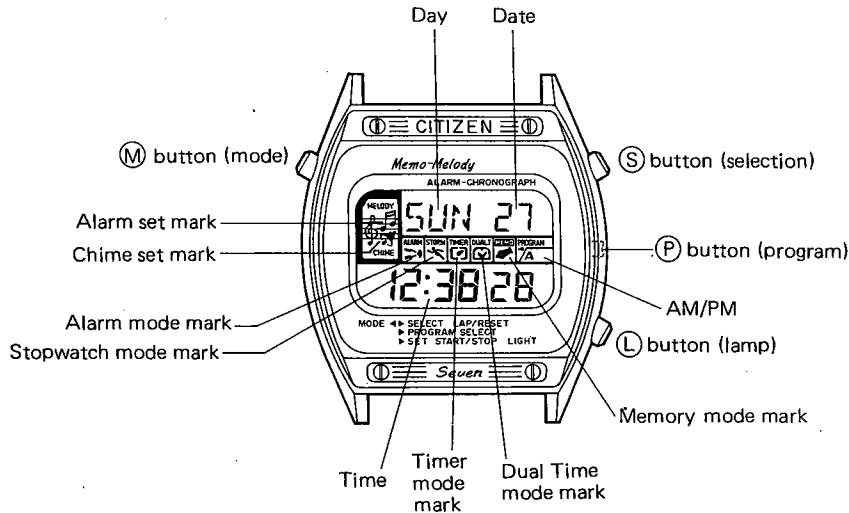
- 1) An advanced digital watch incorporating a watch-use microcomputer.
- 2) The unique melody alarm tells the time in a soft melody of music (Foster's "Oh Susanna".) ringing about 16 seconds.
- 3) The alphanumeric memory can store 12 digits of alphabet and figures in all: 10 digits of figures (capable of storing a telephone number including the toll number) plus 2 digits of alphabet (showing the initials of a name or the like).
- 4) In addition to the melody alarm, the normal alarm is also available in a selective use between a "daily alarm" and a "weekly alarm".
- 5) The three functions can be freely programmed (selected) among the normal alarm, the 1/100 sec. stopwatch, the timer, the dual time and the alphanumeric memory in addition to the melody alarm and the chime. Thus 125 different kinds of patterns (excluding the fixed functions) are available.
- 6) In the time display mode, the time and calendar are displayed simultaneously in two tiers. The days of the week are displayed by the liquid crystal in three alphabet letters like analog watches, which is the first adaption in the Citizen's digital watches.

## §3. SPECIFICATIONS

|                                |   |  |
|--------------------------------|---|--|
| Caliber No.                    | 9570A/B-00  |  |
| Type                           | Digital quartz crystal watch  |  |
| Size of module (mm)            | 27 $\phi$ (28 $\phi$ max.) x 5.15 <sup>t</sup> (6.2 <sup>t</sup> at power cell part)  |  |
| Accuracy                       | $\pm$ 20 sec./month at normal temperatures  |  |
| Oscillation                    | 32,768Hz  |  |
| Method of display              | FE-type nematic LC (Liquid Crystal) with 2-split multiplex driving  |  |
| Intergrated circuit            | C/MOS-LSI (1 unit)  |  |
| Effective temperature range    | $\pm$ 0°C ~ +55°C (32°F ~ 131°F)  |  |
| Adjustment of time rate        | By trimmer condenser  |  |
| Display functions              | Time  | Hour, minute, second, A/P, day & date  |
|                                | Melody alarm  | Hour, minute, OFF/ON, A/P & day*   |
|                                | Alarm   | Hour, minute, OFF/ON, A/P & day*   |
|                                | Stopwatch   | Minute, second & 1/100 sec. (60 min. or less)<br>Hour, minute & second (60 min. or more)<br>(Unit of count: 1/100 sec.; 24-hour count)   |
|                                | Timer   | Hour, minute & second (Unit of set: 1 min.; 24-hour count)   |
|                                | Dual time   | Hour, minute, second & A/P   |
|                                | Alphanumeric memory   | Alphabet letters (up to 2 digits) plus figures (up to 2 digits):<br>12 digits in all for storage   |
|                                | Chime   | Chime set mark   |
|                                |   | * Display of day (Alarm mode)<br>For the display of days of the week, a selection is possible between the "weekly" and "daily" (DLY) displays.<br>* The mode number is displayed for alarm, stopwatch, timer and dual time each. |
| Additional functions           | <ul style="list-style-type: none"> <li>● Illumination lamp</li> <li>● Instant manual return system</li> <li>● Alarm monitor</li> <li>● Melody monitor</li> <li>● 12-/24-hour switching function (Programming mode)</li> <li>● Fully automatic calendar (1980 ~ 2079)</li> </ul>       |  |
| Power cell (Silver oxide cell) | Parts No. : 280-15 (1 unit)<br>Cell code : SR1130W (Ag <sub>2</sub> O/KOH)<br>Nominal voltage: 1.55V<br>Size : 11.6 mm $\phi$ x 3.1 mm <sup>t</sup><br>Capacity : 80 mA <sup>H</sup><br>Lifetime : About 2 years (3 sec. lamp lighting, 40 sec. alarm & 24-time hourly chime per day) |  |
| Remarks                        | A : Silver color (Reflecting plate)<br>B : Gold color (Reflecting plate)  |  |

§4. HANDLING INSTRUCTIONS (The flashing area is shown by O.)

4-1. Nomenclature and Functions



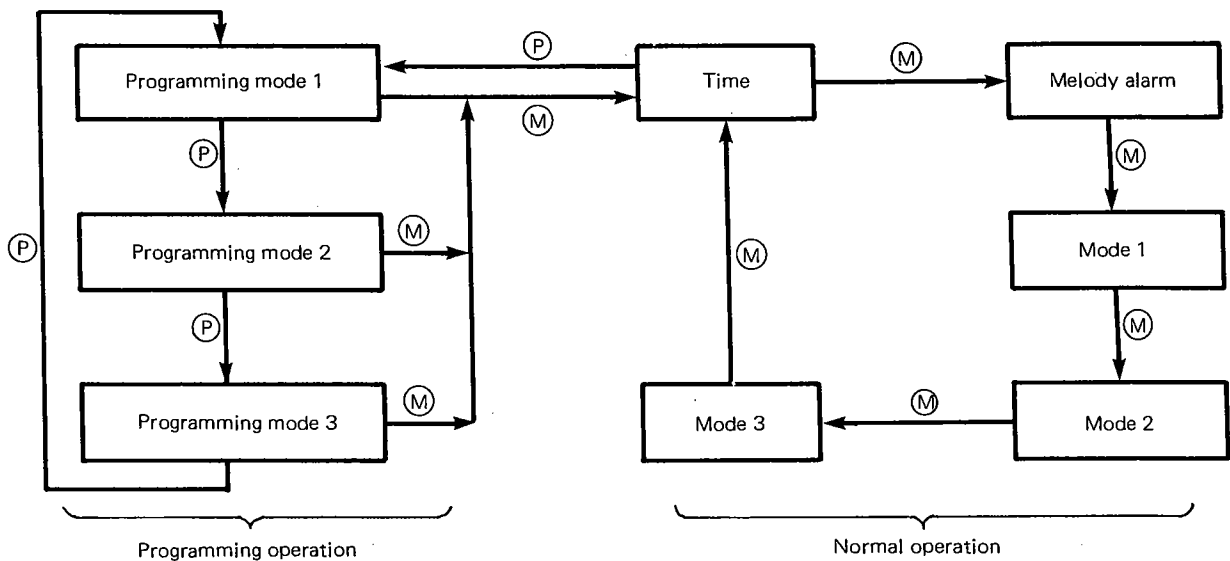
4-2. Out line of Operation

In this caliber, the three modes following the two basic modes (time & melody alarm) can be selected freely.

- ① Time/Melody alarm → Alarm → Stopwatch → Timer → Time
- ② Time/Melody alarm → Stopwatch → Alarm → Memory → Time
- ③ Time/Melody alarm → Timer → Memory → Dual time → Time

Thus 125 different types of set patterns are available excluding the basic modes since five modes can be selected (alarm, 1/100 sec. stopwatch, timer, dual time and alphanumeric memory).

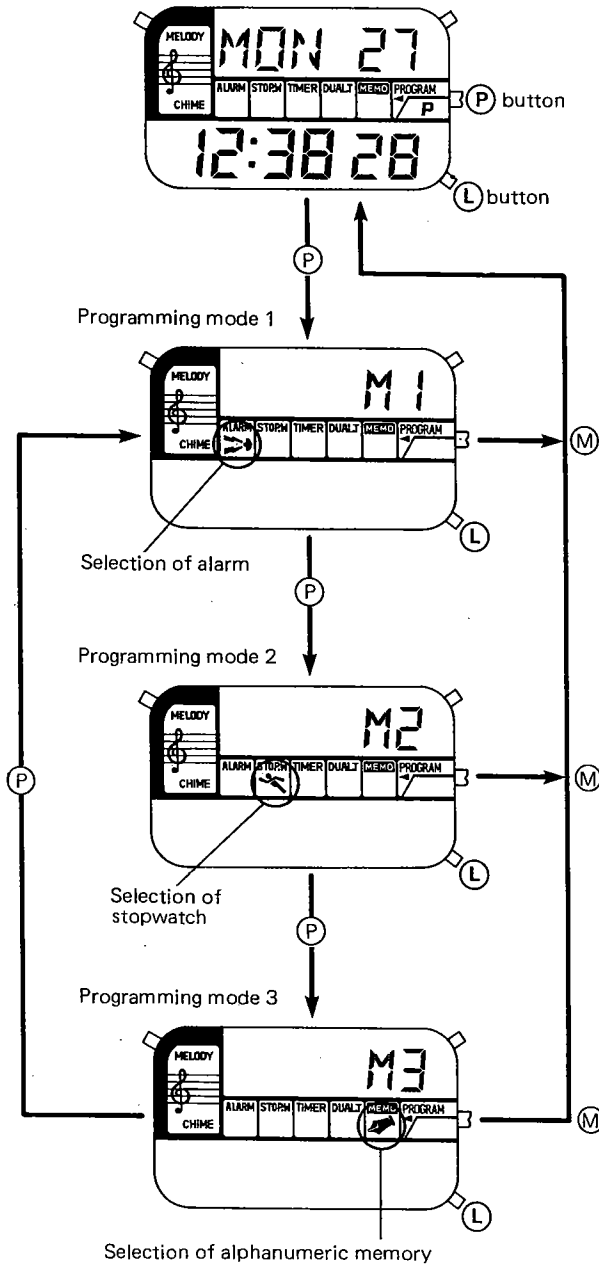
The operation in the programming mode is one of the major features of this caliber. The three functions are selected to be used properly in this mode. The basic system of operation is illustrated as follows.



(The function designated in the programming mode 1 appears in the mode 1.)

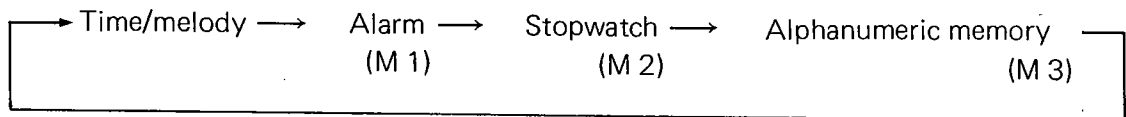
### 4-3. Programming Operation

The programming model 1 is obtained with push of (P) button in the mode of time display.



As shown in the diagram, M1 is displayed in the programming mode 1 with other digits suppressed. The selected function is flashing at this moment, and an alteration is given to the selection by (L) button. The (P) button is pushed when the mode desired mark to be selected has a flashing to shift to the programming mode 2. After this the operation is carried out in the same way and each programming mode number is displayed by M1~M3. With every push of (P) button, the mode varies as M1 → M2 → M3 → M1 and so on. With push of (M) button after an operation of programming, the mode is reset to the time display (Instant manual return).

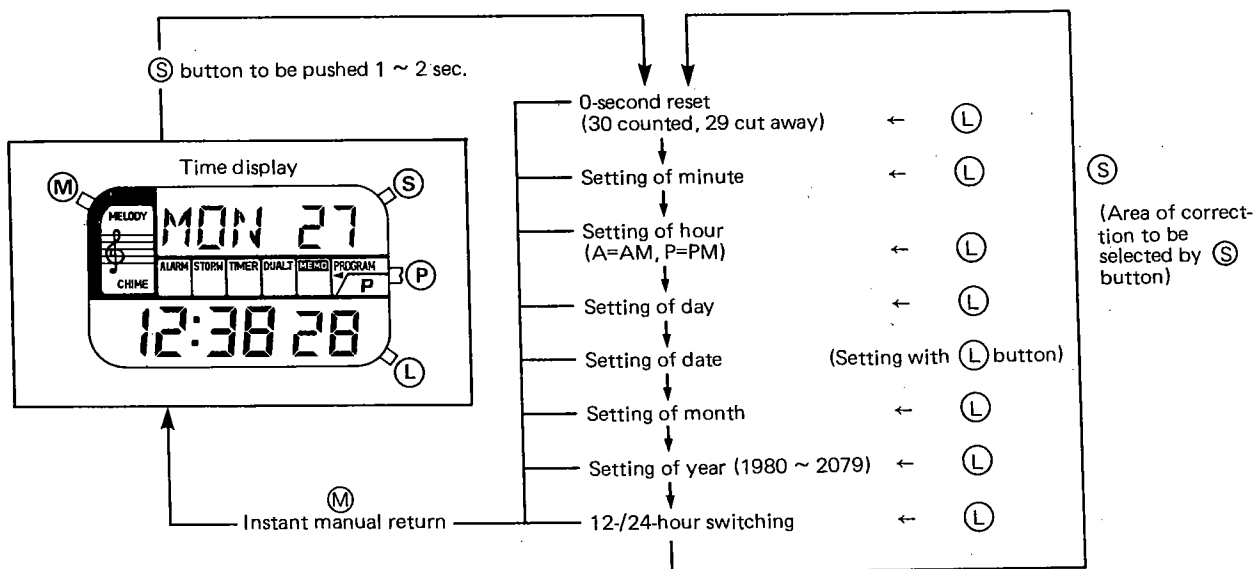
In the case of the above illustration, the mode changes as shown below.



#### 4-4. Correcting method

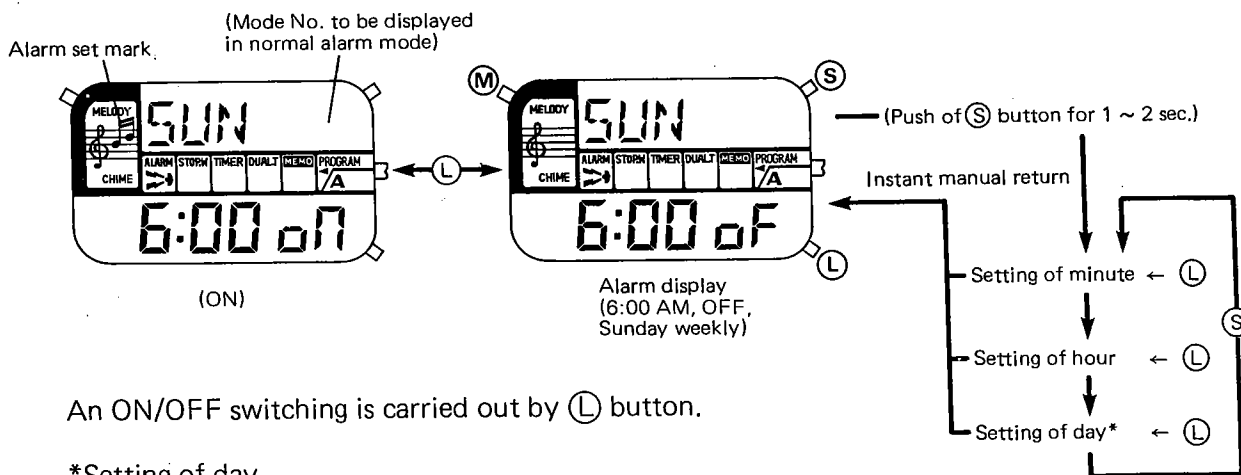
A correction mode is obtained by pushing **(S)** button for 1 ~ 2 seconds, and the correction is carried out by **(L)** button with call-out of the area of correction with push of **(S)** button. The correction mode is cancelled with push of **(M)** button (Instant manual return). The time is quickly advanced with a continuous push of **(L)** button. The above-mentioned procedures are available in common to all correcting operations of this caliber.

#### 4-5. Setting of Time



#### 4-6. Operation of Alarm

The operating procedure is identical between the melody alarm and the normal alarm. The mode number is displayed for the normal alarm.



An ON/OFF switching is carried out by **(L)** button.

\*Setting of day

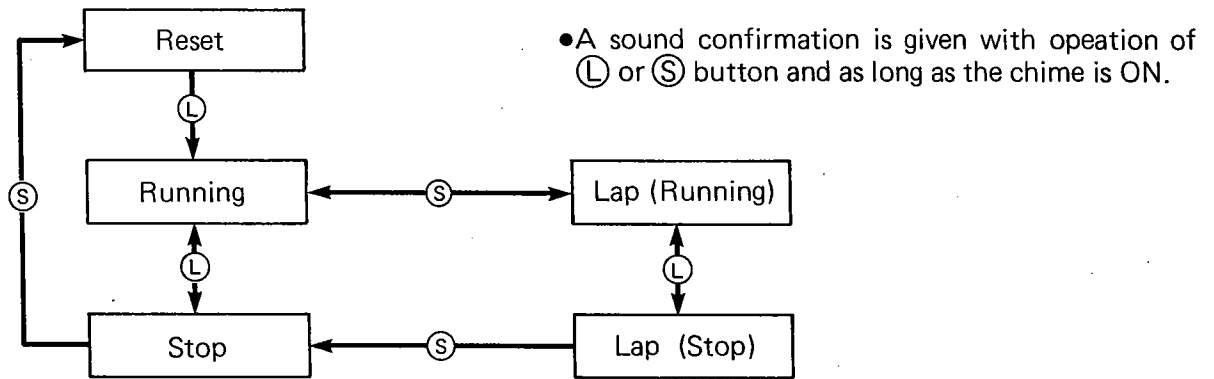
The days of the week are set in the following cycle.

SUN → MON → TUE → WED → THU → FRI → SAT →  
DLY → SUN → .....

The "weekly alarm" and the "daily alarm" are given by setting the day of the week and the DLY respectively.

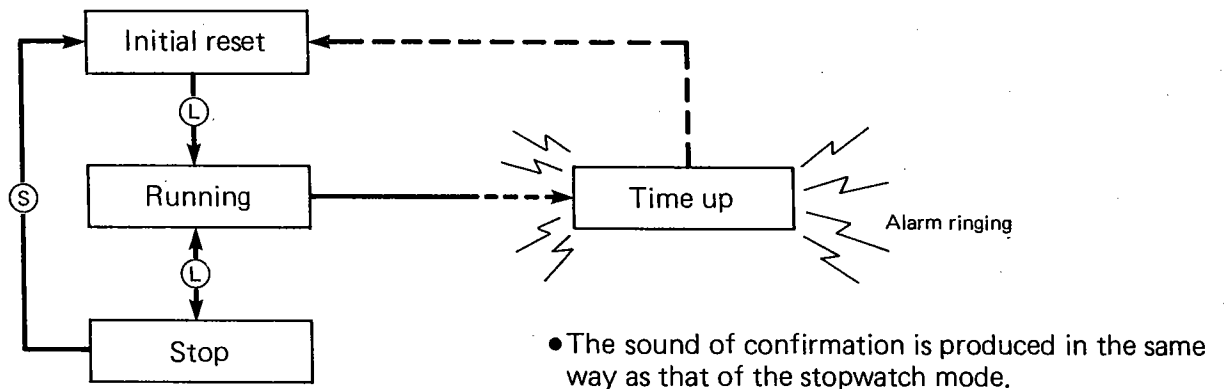
#### 4-7. Operation of Stopwatch

The operating procedure is identical to other conventional stopwatches except for a part of the form of display and the position of the buttons.



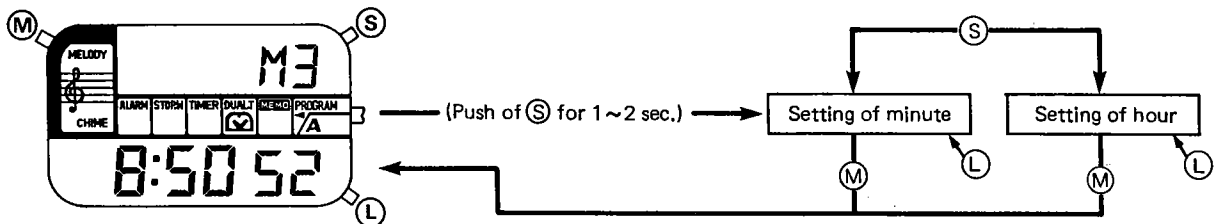
#### 4-8. Operation of Timer

The time is set in the same way as the setting of the alarm. After setting the time, an operation is given in the following procedure.

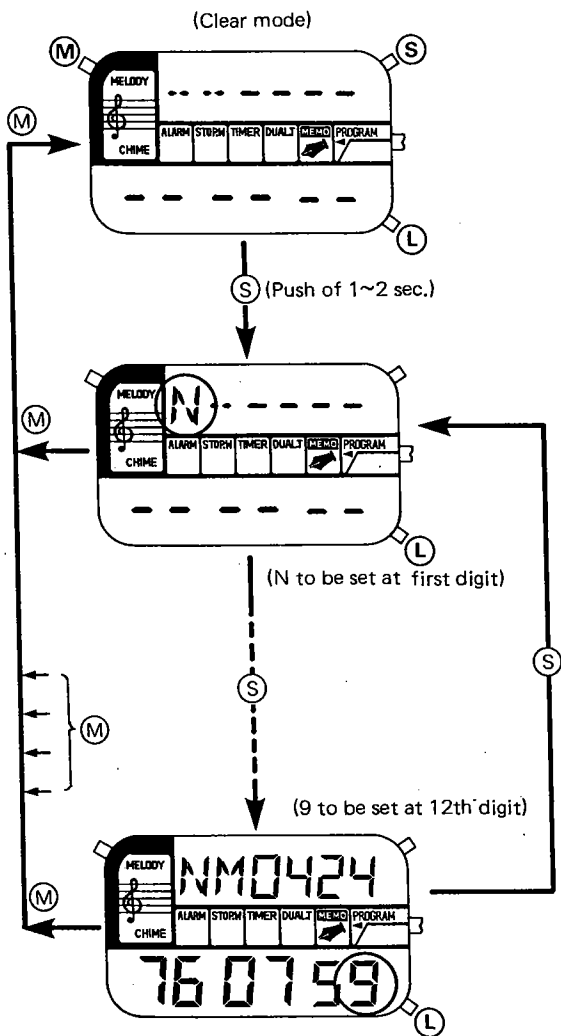


#### 4-9. Setting of Dual Time

The maximum three different types of watches can be set with this caliber. The setting procedure of time is identical to the normal time setting. And no setting is given to the second since the second is synchronous with the time.



4-10. Operation of Alphanumeric Memory



(Telephone number 0424-76-0759 stored for Mr. NM.)

The alphanumeric memory stores the figures or alphabet letters up to 12 digits and then reads them when necessary. In other words, this memory has a function of so-called "memo pad" or the like to store the maximum three telephone numbers.

The writing into this memory is carried out by S and L buttons. With push of S button for 1 ~ 2 seconds, the setting mode is obtained. Then the setting is carried out by L button, and the digit for setting is selected by S button. The selected digit shifts from the left to the right and from the upper tier to the lower tier, and this position of shift is shown by a flashing. An instant manual return is given with push of M button.

With a simultaneous push of S and L buttons, the display is cleared to give a bar (-) display to each digit.

Either alphabet letters or figures can be set at the 1st 2nd digits, and only figures are set at and after the 3rd digit. And no mode number is displayed in this memory mode.

- With push of L button for 1 ~ 2 seconds, the time is advanced quickly by 8Hz.

- The forms of display are shown below for the alphanumeric memory.

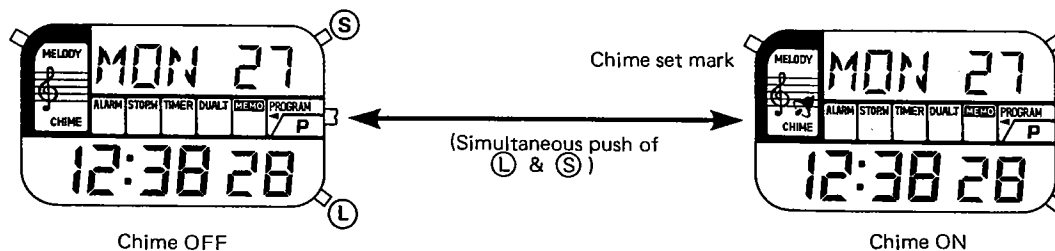
A B C D E F G H I J K L M N O P Q R S T

U V W X Y Z .. (bar display)



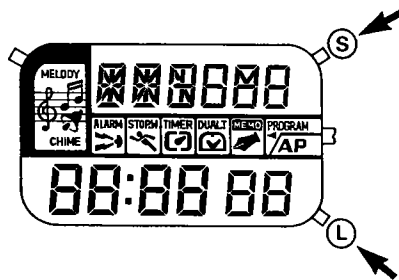
#### 4-11. Melody Monitor and ON/OFF of Chime

The melody alarm is given with a simultaneous push of (L) and (S) buttons in the mode of time display, and the ON and OFF of the chime vary alternately with every delivery of the melody alarm. And only the melody monitor is possible even in the mode of melody alarm display.



#### 4-12. Full-segment Glow

The all segments on the display screen glow by giving a simultaneous push to both (L) and (S) buttons during a switching between the 12- and 24-hour displays in a setting mode of time and calendar.

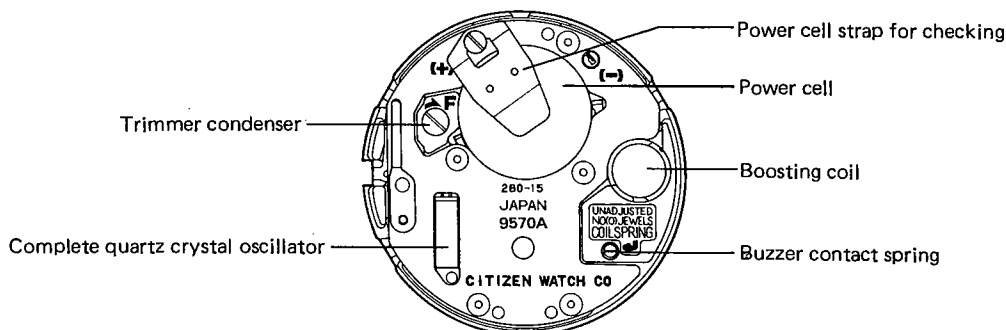


#### 4-13. Alarm Monitor

An alarm monitor is possible with a simultaneous push of (L) and (S) buttons in the alarm mode. This monitor is also possible by pushing (S) button while the alarm function mark is flashing in the programming mode.

### §5. STRUCTURE OF MODULE

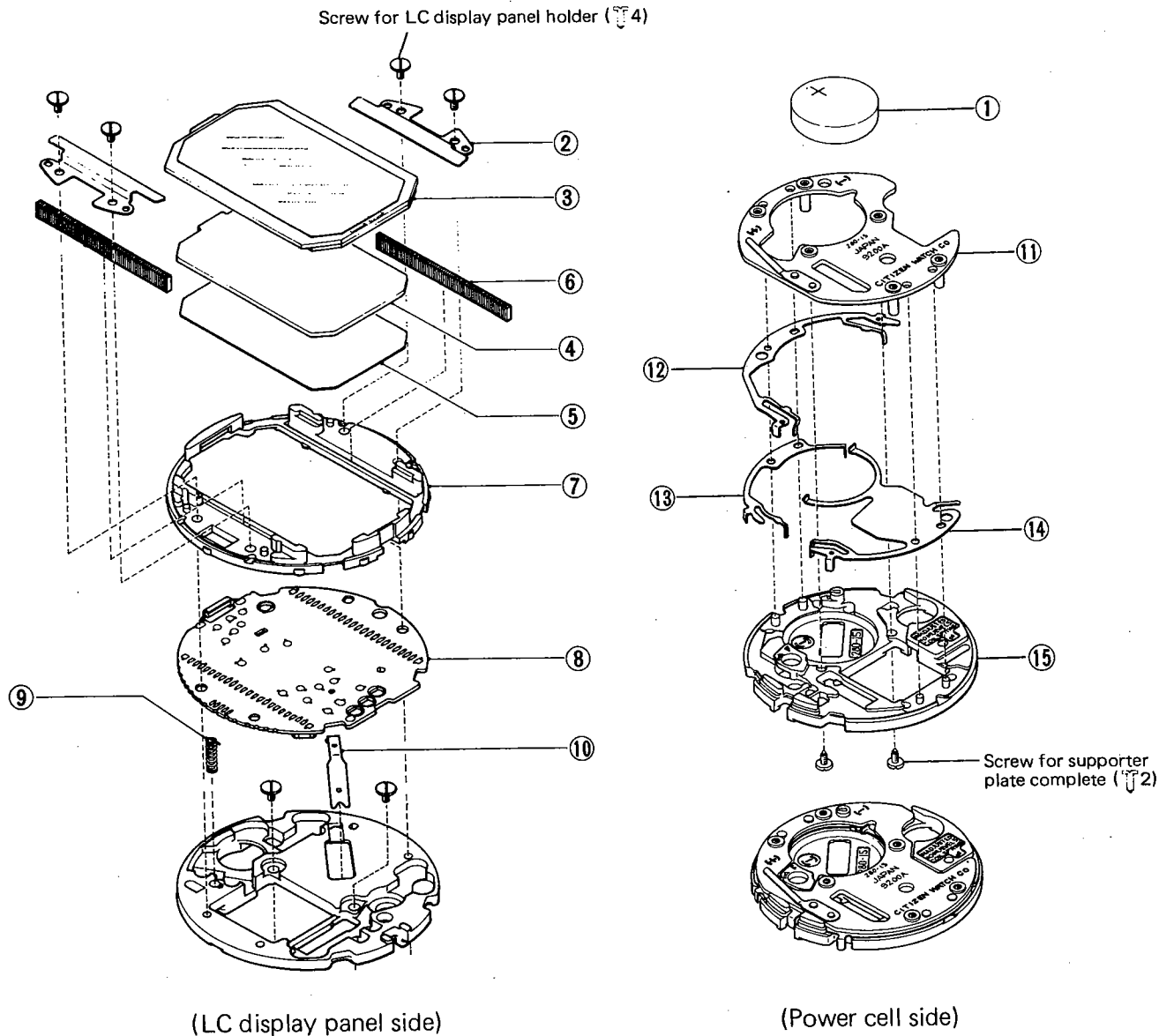
The structure of module of this caliber is completely identical to the Cal. No. 9200-series watches.



§ 6. DISASSEMBLY/ASSEMBLY OF MODULE

Disassembly: ① → ⑮  
 Assembly: ⑮ → ①

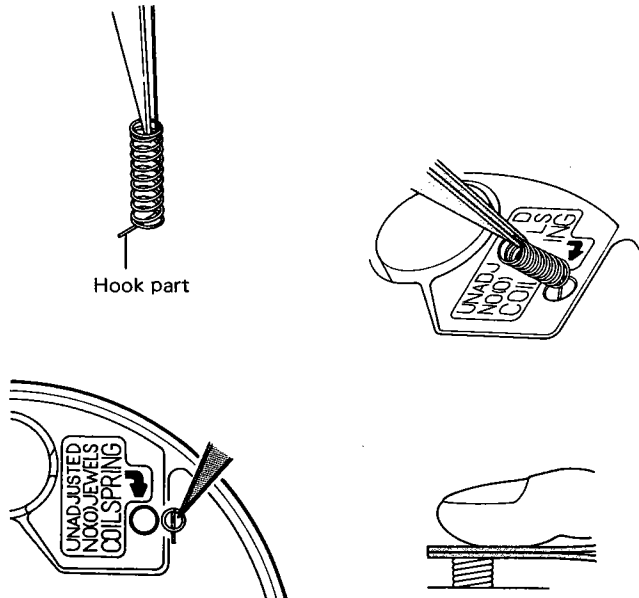
- Never fail to set the buzzer contact spring ⑨ last.
- Be careful of the top or rear surface of the light diffusing plate ④.



- |                           |                                      |                                 |
|---------------------------|--------------------------------------|---------------------------------|
| ① Power cell              | ⑥ LC display panel connection rubber | ⑪ Device cover                  |
| ② LC display panel holder | ⑦ LC display panel supporter         | ⑫ Digit selection switch spring |
| ③ LC display panel        | ⑧ Plate complete                     | ⑬ Lamp switch spring            |
| ④ Light diffusing plate   | ⑨ Buzzer contact spring              | ⑭ Setting switch spring         |
| ⑤ Reflecting plate        | ⑩ Power cell connector spring        | ⑮ Supporter for plate complete  |

## Note on Disassembly/Assembly

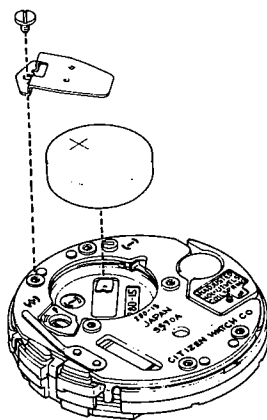
### 1) Setting of buzzer contact spring



- ① The module is turned over after proceeding the assembly up to the LC display panel holder.
- ② The buzzer contact spring is pinched by the tweezers with the hook part put downward.
- ③ The contact spring is put close to the hole indicated by an arrow mark. The hook part is turned to the opposite side to the arrow mark.
- ④ The contact spring is tilted slightly to be put into the hole with the hook part first.
- ⑤ The contact spring is pushed completely into the hole with the back of the tweezers as illustrated left.

Make sure that the contact spring is set completely by pulling it light for trial.

### 2) Power cell strap for checking

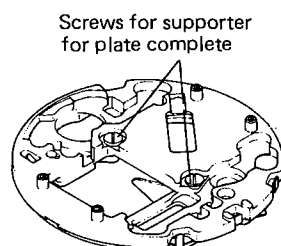


The power cell set into this watch springs up at the moment when the case back is opened.

In this connection, a power cell strap for checking is used to hold the power cell while giving a measurement of time rate and other inspections with the module removed out of the case. This strap is also counted as one of the component parts.

Note: Never fail to detach this power cell strap from the module when the module is put into a watch case.

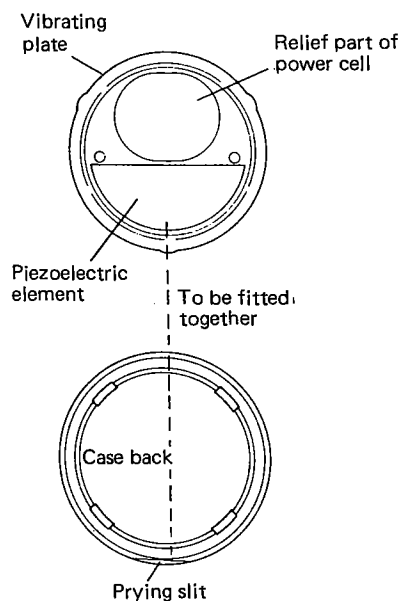
### 3) Setting of switch spring



The lamp switch spring, the digit selection spring and then the setting switch are set onto the supporter for plate complete.

After this, the device cover is put onto the supporter and the supporter is turned over to drive tight the two screws for supporter.

#### 4) Setting of vibrating plate



The form of the vibrating plate differs by the case.

The vibrating plate is first pushed light into the case back.

In this case, the prying slit of the case back is fitted to the side of piezoelectric element. Then the case back is closed by paying a special attention to the positioning of the case back so that the power cell is set steadily at the oval hollow area of the vibrating plate.

#### 5) LC display panel supporter

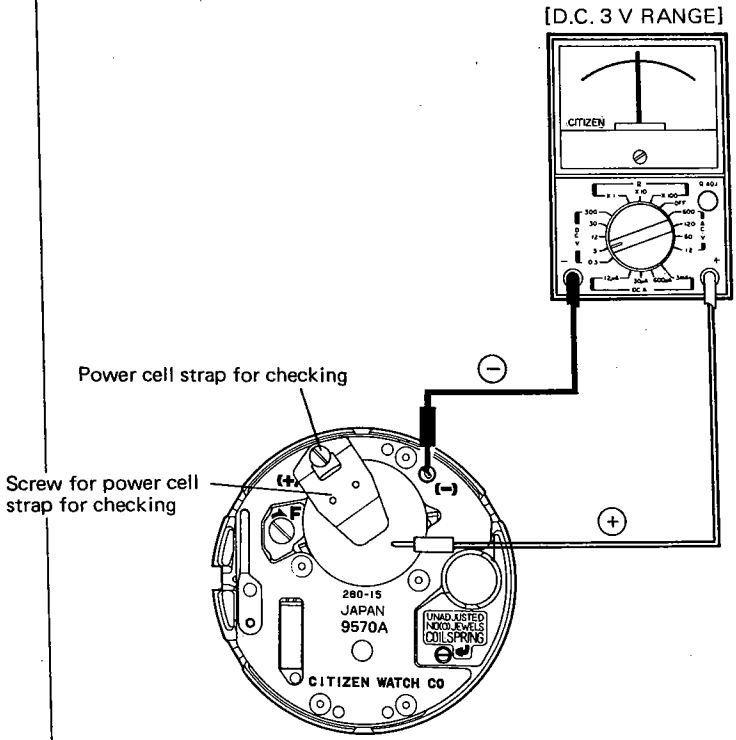
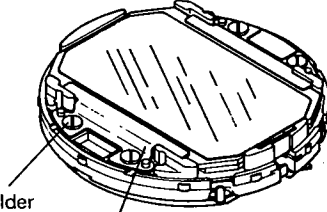
The LC display panel supporter of this caliber is very much like that of the Cal. No. 9200-series watches and can be set in a state of the module only.

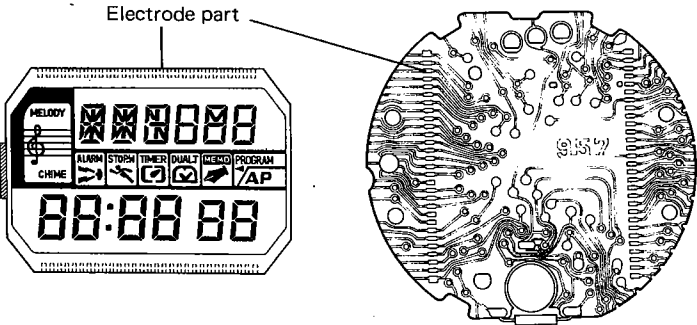
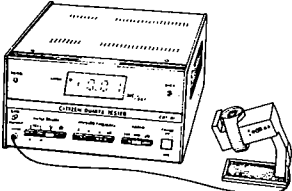
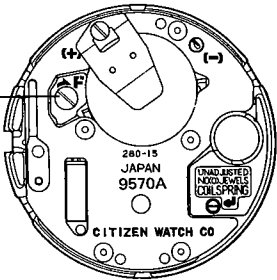
However, the positioning of module is impossible by the case when the LC display panel supporter of Cal. No. 9200 is used to this caliber.

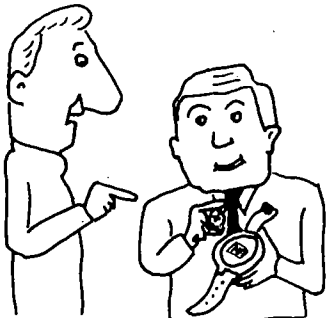
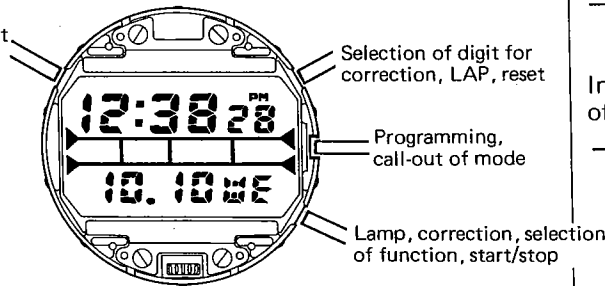
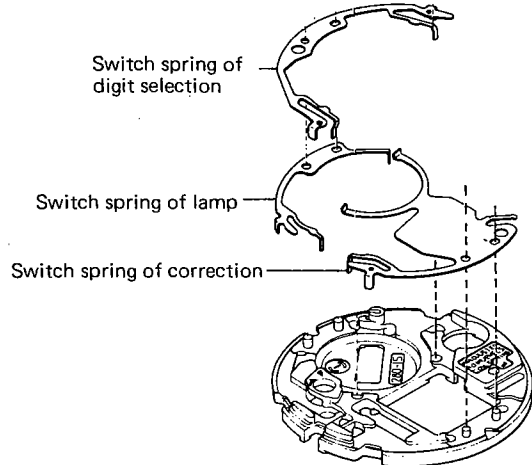
#### 6) Trouble of display after setting of power cell

It rarely occurs with this caliber that a defective display or no display is given after setting the power cell. Such trouble, however, can be dissolved by detaching once the power cell from the module and then setting the power cell again.



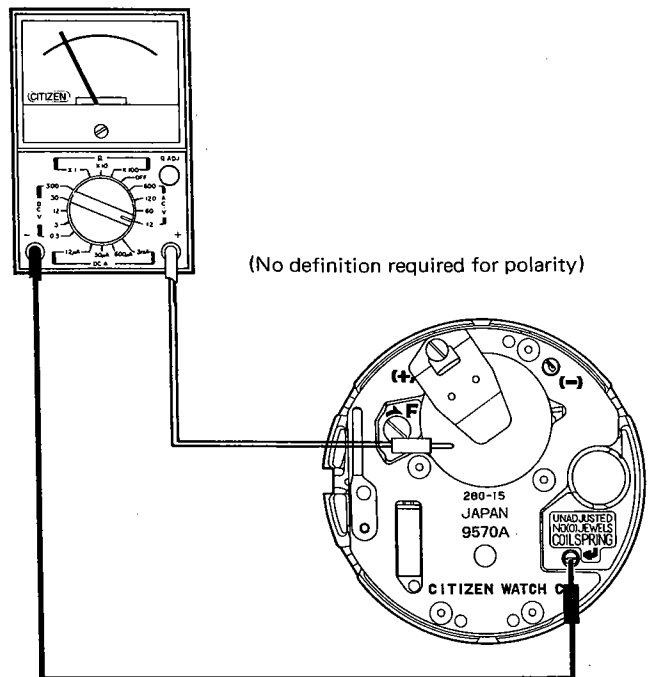
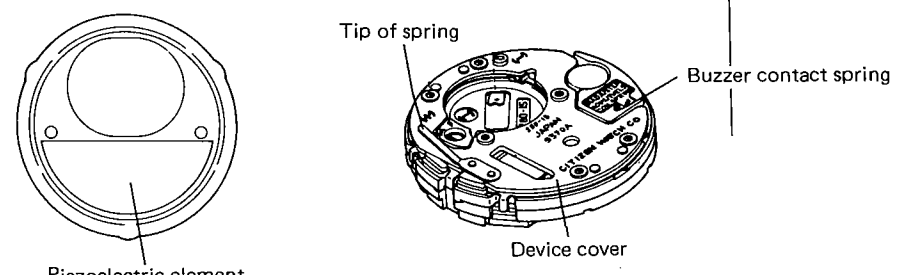
| Checking items   | How to check   | Results and treatment   |
|--|--|---|
| <p><b>1</b> Measurement of power cell voltage</p>            | <p>The measurement is carried out as illustrated below.</p>  <p>● Never fail to detach the power cell strap for checking when the module is put into the case.</p>  | <p><b>Over 1.5V</b><br/>→ O.K.</p> <p><b>Under 1.5V</b><br/>→ Replacement of power cell</p> |
| <p><b>2</b> Check of connection part of LC display panel</p> | <p>1. Check of LC display panel</p> <ol style="list-style-type: none"> <li>1) Looseness for screw for LC display panel holder → Retightening of screw</li> <li>2) Break of screw for LC display panel holder → Replacement of screw</li> <li>3) Incomplete setting of LC display panel and LC display panel supporter → Resetting of LC display panel</li> <li>4) Malformation of LC display panel → Replacement of LC display panel supporter</li> </ol>  <p>2. Check of LC display panel connection rubber</p> <ol style="list-style-type: none"> <li>1) Twist or wear of connection rubber → Replacement of rubber</li> <li>2) Incomplete setting of rubber → Resetting of rubber</li> <li>3) Dust or stains attached to rubber → Clear-away of dust or stains</li> </ol> |   |

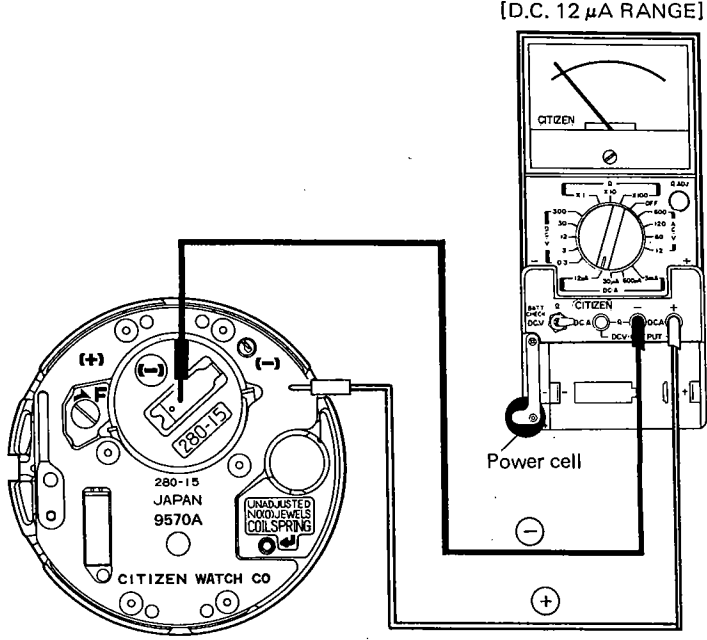
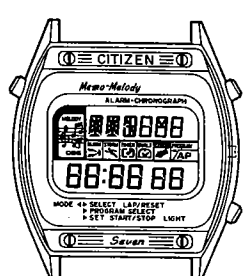
| Checking items                               | How to check   | Results and treatment   |
|--|--|---|
|  | <p>3. Check of electrode part</p> <p>1) Crack or break of electrode part of LC display panel</p> <p>2) Exfoliation of pattern on plate complete</p> <p>3) Dust or stains attached to electrode part</p>    | <p>→ Replacement of electrode part</p> <p>→ Replacement of plate complete</p> <p>→ Clear-away of dust or stains</p> |
| <p>3 Measurement/adjustment of time rate</p> | <p><b>a. Measurement of time rate</b><br/>           A variance may sometimes be caused if the time rate is measured with the "measure time" of 2 sec.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p><b>If the measurement is not easy, set the watch under the mode of melody alarm display or set the "measure time" at 4 sec. or 10 sec. Thus the value of measurement will become steady for an easy measurement.</b></p> </div>  <p><b>b. Adjustment of time rate</b><br/>           An adjustment must be given to the time rate after making sure an application of the normal voltage.</p>  <p>●Value of measurement beyond covering range of trimmer-→ Replacement of plate complete</p> |   |

| Checking items                                    | How to check   | Results and treatment   |
|---|--|---|
| <p>4 Confirmation of using condition of watch</p> | <p>The following points are checked and confirmed with the user of the watch.</p> <ol style="list-style-type: none"> <li>1. Handling of watch in a wrong way.</li> <li>2. Use of watch outside range of working temperatures.</li> <li>3. Time of the latest adjustment of time rate.</li> <li>4. Time of the latest replacement of power cells.</li> <li>5. Other factors and circumstances of use of watch.</li> </ol>              |   |
| <p>5 Check of switch mechanism</p>                | <p>1. Check of switch springs</p> <p>The operation is checked for the switch springs in a state of the module only.</p>  <p>2. Check of contact between switch spring and pattern of plate complete</p> <p>Make sure that a correct contact is secured between the contact area of the switch spring and the pattern on the plate complete.</p>  | <p>Malformation of spring<br/>→ Replacement of spring</p> <p>Incomplete setting of spring<br/>→ Resetting of spring</p> <p>Defect of spring<br/>→ Replacement of switch spring</p> <p>Defect of pattern<br/>→ Replacement of plate complete</p> |



| Checking items                                       | How to check  | Results and treatment  |
|--|---|--|
|  | <div data-bbox="381 346 1453 672" data-label="Diagram"> </div> <p data-bbox="462 714 738 745">3. Check of push-buttons</p> <p data-bbox="495 751 1161 808">In addition, make sure that the module is set into the case in a correct way.</p> <ul data-bbox="495 814 1161 871" style="list-style-type: none"> <li>● The silicone oil must be applied to the packing of each push-button.</li> </ul> <div data-bbox="657 892 966 1249" data-label="Image"> </div> | <div data-bbox="1209 751 1453 1018" data-label="List-Group"> <ul style="list-style-type: none"> <li>Malformation of push-button<br/>→ Replacement of push-button</li> <li>Dust or stains attached to button<br/>→ Clear-away of dust or stains</li> </ul> </div> |
| <p data-bbox="219 1312 381 1375">6 Check of lamp</p> | <p data-bbox="462 1312 1177 1365">A check is given to the break of filament with use of the adaptor of Citizen Multi-tester.</p> <p data-bbox="462 1375 1177 1428">No definition is required for the polarity between the two lead terminals.</p> <div data-bbox="479 1459 1161 1858" data-label="Diagram"> <p data-bbox="885 1816 982 1848">Power cell</p> </div>  | <div data-bbox="1209 1375 1453 1470" data-label="List-Group"> <ul style="list-style-type: none"> <li>No lighting of lamp<br/>→ Replacement of plate complete</li> </ul> </div>   |

| Checking items                           | How to check   | Results and treatment   |
|--|--|---|
| <p><b>7</b> Check of alarm mechanism</p> | <p>1. Confirmation of alarm output signals<br/>                     As illustrated by the diagram, the lead terminals of Citizen Multi-tester are applied to the corresponding areas of module along with use of the melody monitor. (See 4-11)<br/>                     Both the melody monitor and the alarm monitor ring about 16 seconds even with no continuous push of button.</p> <p>[A.C. 12 V RANGE]</p>  <p>2. Check of vibrating plate<br/>                     (The form of the vibrating plate may sometimes be different by the case.)</p>  <ul style="list-style-type: none"> <li>● Crack or break of piezoelectric element → Replacement of vibrating plate</li> <li>● Wear or malformation at tip of buzzer contact spring or device cover → Repair or replacement of spring or device cover</li> <li>● Be careful of the direction of the vibrating plate for setting.</li> </ul> | <p>No output<br/>                     → Replacement of plate complete</p> |

| Checking items                             | How to check   | Results and treatment  |
|--|--|--|
| <p>8 Measurement of power consumption</p>  | <p>In the case of <math>3.6\mu\text{A}</math> or more, the power consumption of the circuit side is measured with the LC display panel removed.</p>   | <p>In a state of module only<br/>         → Under <math>3.6\mu\text{A}</math></p> <p>Current consumption of circuit<br/>         → Under <math>3.0\mu\text{A}</math></p> <p>Defect of circuit<br/>         → Replacement of plate complete</p> <p>Defect at the side of LC display panel<br/>         → Check of connection part and then replacement of LC display panel if no defect detected at connection part</p> |
| <p>9 Check of appearance and functions</p> | <ol style="list-style-type: none"> <li>1) An inspection is given to the defects of display such as the break of segment, display of non-existing day and the like. The break of segment can be detected through a check of "full-segment glow"</li> <li>2) The operation is confirmed with each push-button concerning the force of press, smoothness of press and the like.</li> <li>3) Make sure that the alarm tone has no defect. If a correct and accurate setting is not given to the vibrating plate, no alarm tone is given or the loudness of tone is reduced much after the case back is closed. The alarm tone can be checked conveniently by means of the melody monitor and the like.</li> <li>4) Make sure that no dust nor stains attach to the area of each function.</li> </ol>  |  |

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