

***TECHNICAL
INFORMATION***

**CITIZEN QUARTZ
Cal. No. 950※※**

 **CITIZEN**

CONTENTS

§1. OUTLINE	P. 1
§2. FEATURES	P. 1
§3. SPECIFICATIONS	P. 2
§4. HANDLING INSTRUCTIONS	P. 3
§5. DISASSEMBLY/ASSEMBLY OF MODULE	P. 9
§6. NOTES ON DISASSEMBLY/ASSEMBLY	P. 10
§7. TROUBLE SHOOTING AND ADJUSTMENT	P. 11

§1. OUTLINE







This is a multi-function digital quartz watch for gentlemen, which is developed to follow the Cal. No. 942-series watches.

§2. FEATURES

- 1) Power cell lifetime of over 5 years.
A long period of lifetime is realized for the power cell with application of a lithium cell.
- 2) Independent working of light button.
A light button is provided independently for an exclusive use of the illumination lamp.
- 3) No adjustment required for time rate
Owing to adaption of the DFC (Digital Frequency Control) method, no adjustment is required for the time rate on the market. An adjustment is already given completely to the time rate in the factory.

§3. SPECIFICATIONS

Caliber No.		9500A/B	
Type		Digital quartz crystal watch	
Measurement of module		Size: 27.00mm ϕ Thickness: 4.98mm (incl. power cell part)	
Accuracy		± 20 sec./month at normal temperatures	
Oscillation		32,768Hz	
Display method		FE-type nematic LC (liquid crystal) 2-split multiplex driving	
Integrated circuit		C/MOS-LSI (1 unit)	
Effective temperature range		0°C ~ +55°C (32°F ~ 131°F)	
Adjustment of time rate		DFC method (Unit time of measurement: 10 sec. with no terminal of adjustment)	
Display functions	Time	Upper side: Display to be switched by selection of function Lower side: Constant display of "hour", "minute" & "second"	
	Displays at upper side	Calendar	Month, date & day
		Alarm	ON :  & set time OFF:  & OFF
		Stopwatch	 , minute, second & 1/100 sec. with lap function (60 min. count)
		Dual time	 , hour, minute & A/P
Additional functions		<ul style="list-style-type: none"> • Chime • 12-/24-hour switching function • Quick setting in correction mode • Alarm monitor • Illumination lamp • Fully automatic calendar (1980 ~ 2019) • Auto-return system • Instant manual return system 	
Power cell (Lithium cell)		Part No. : 280-204 (1 unit) Maker code : CR2016 (Li/MnO ₂) Size : 20.0mm ϕ x 1.6mm Nominal voltage: 3V Capacity : 65mAH Lifetime : About 5 years (3 sec. lighting of lamp, 20 sec. ring of alarm & 24 hourly chimes every day)	

(Note 1) The difference of the caliber Nos. between A and B is due to the difference of the colors of the light diffusing plates as follows.

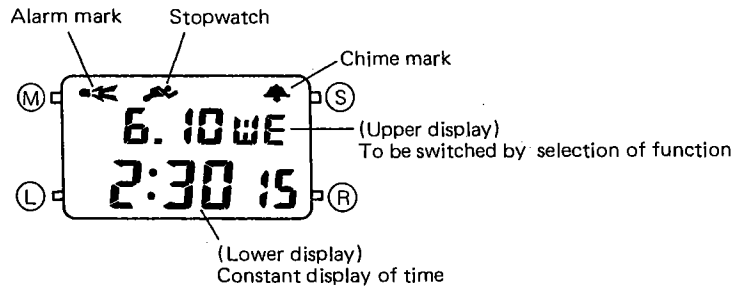
A: Silver color

B: Gold color

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

1) Nomenclature and functions

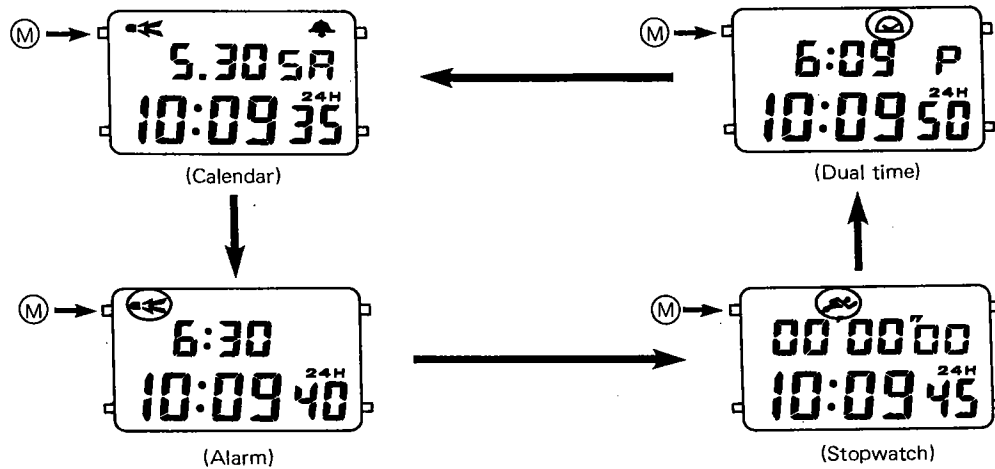
(Ex.) 2 : 30'15" (12-hour display)
 Wednesday, June 10
 Alarm & chime : ON
 Stopwatch: Running (Lap run) mode



(Note) The illumination lamp goes on in any mode of display by pushing (L) button.

2) Switching of displays

The displays are changed in the following sequence with every push of (M) button.



(Note) Instant manual return system

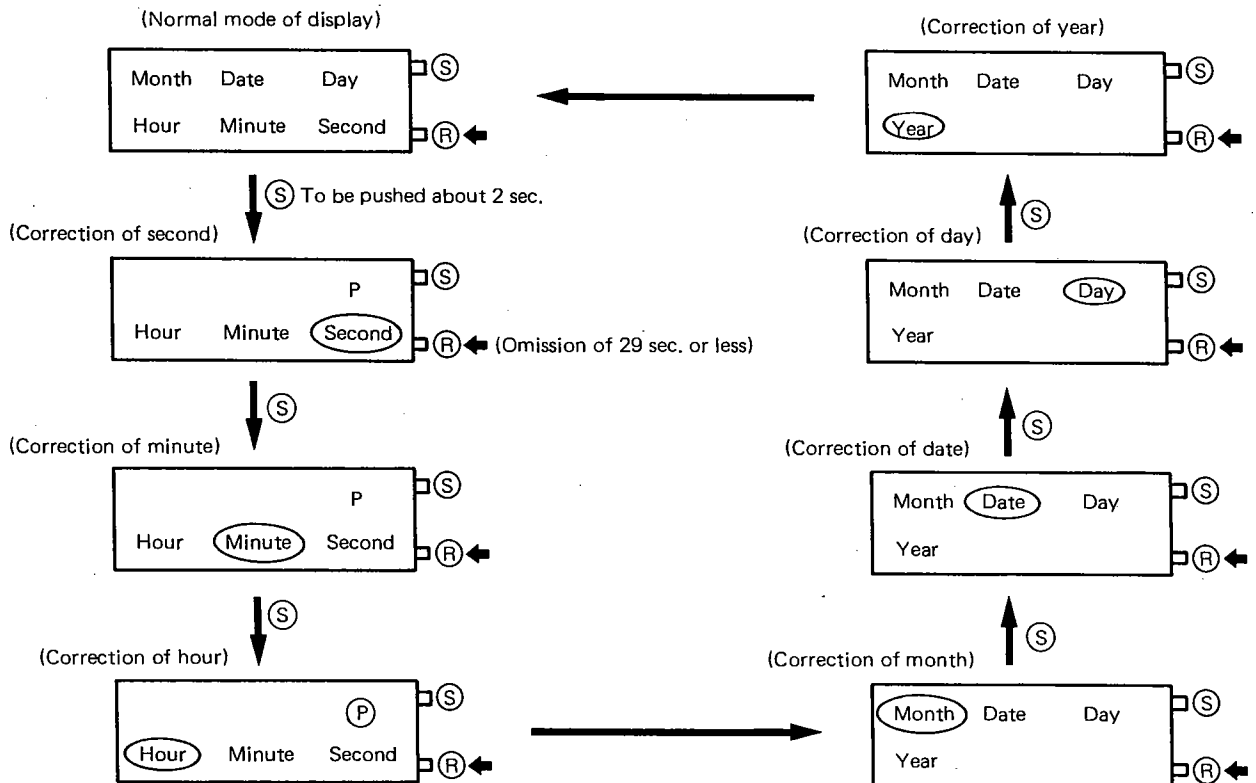
The calendar display is reset by pushing consecutively (M) button for about 2 seconds in any display mode. (including the correction mode)

3) Operation for calendar display

(1) Setting of time

The digit to be corrected is called out with push of (S) button, and then a correction is carried out by (R) button.

The (S) button is pushed consecutively for about 2 seconds only when the second correction mode is called out.



(Note 1) The normal display mode is reset with push of (M) button in each correction mode. (Instant manual return system)

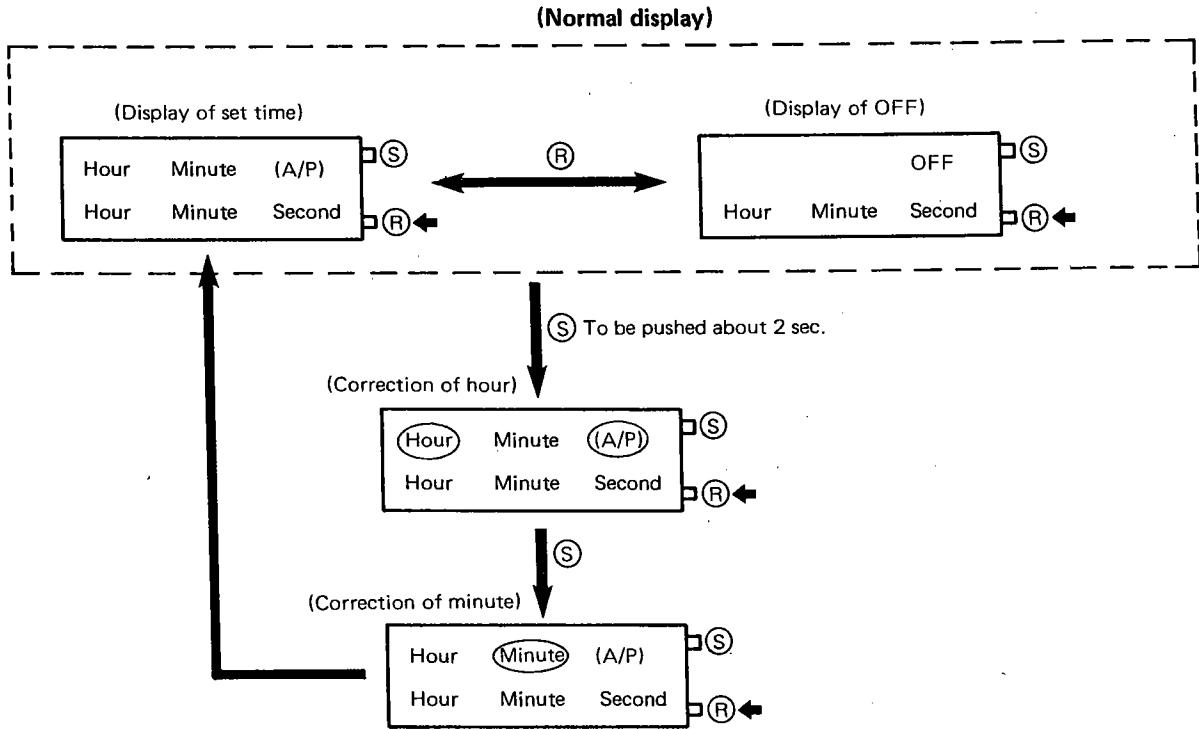
(Note 2) The normal display mode is reset automatically in 1 ~ 2 minutes in each correction mode if no operation is given to a push-button. (Auto-return system)

Other functions in time correction:

- ① A quick setting (8Hz) is possible by pushing (R) button consecutively for a second or longer in a correction mode. The same quick setting is also possible when the time is corrected in both the alarm and dual time modes.
- ② A non-existing date, if set, can be corrected automatically to the first day of the following month when the normal mode of display is reset.

4) Operation of alarm

(1) Setting of alarm time



(Note 1) The alarm mark (←) blinks at all times.

(Note 2) Additional functions:

- Instant manual return system
- Auto-return system
- Quick setting in each correction mode

(2) ON-OFF switching of alarm

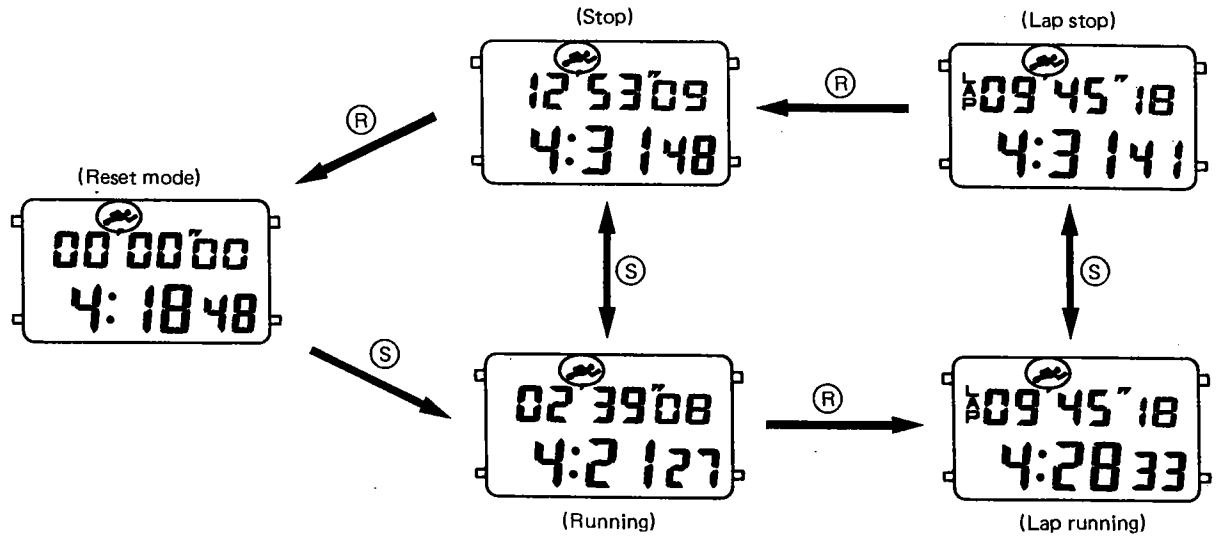
The ON and OFF of alarm are switched alternately with every push of (R) button in the non-correction mode of alarm display.

a) Alarm ON

- Display of set time
- The alarm tone rings for 20 seconds.

5) Operation of stopwatch

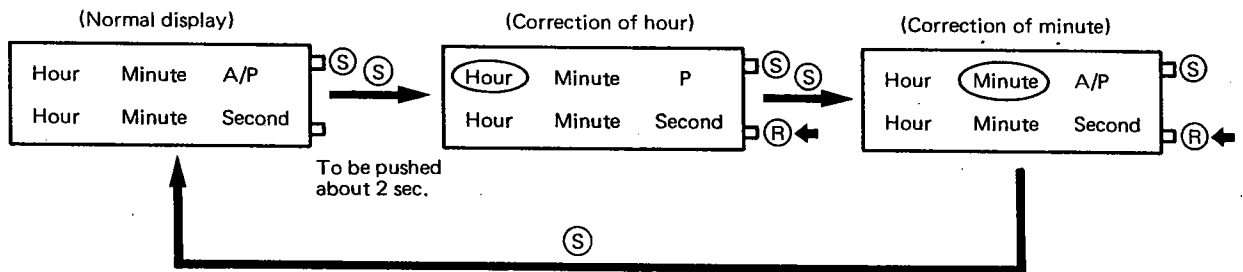
- Unit of counting: 1/100 sec.
- Maximum time of count: 59'59"99 (60 min. count)



(Note) A tone of confirmation is heard at a moment of start/stop of the stopwatch.

6) Operation of dual time

(1) Setting of dual time



(Note 1) A correction of minute is carried out in the 10-minute digit.

(Note 2) The dual time mark () blinks at all times.

(Note 3) Additional functions:

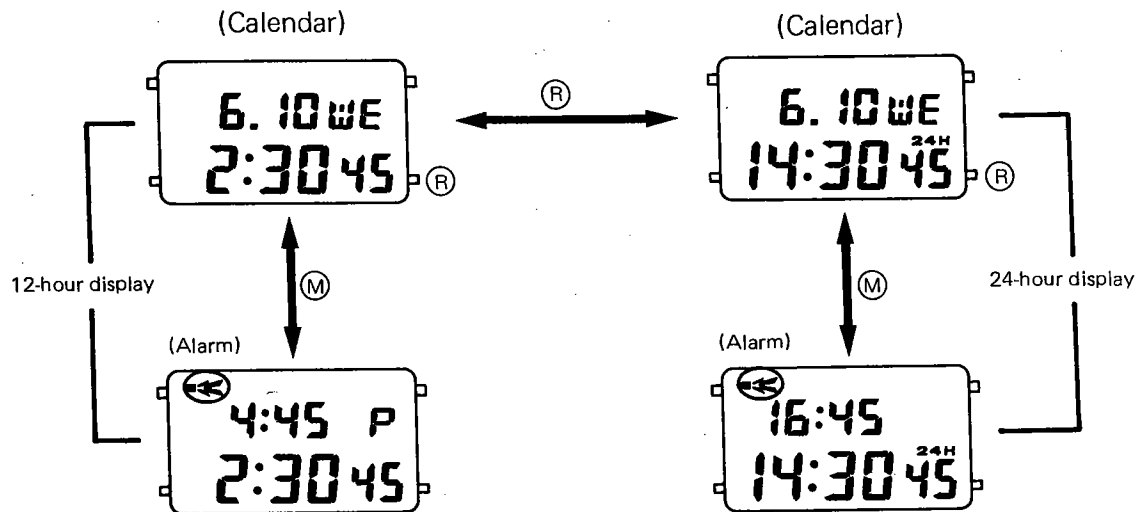
- Instant manual return system
- Auto-return system

7) Switching of 12 /24-hour displays

A switching is possible between the 12-hour and 24-hour displays in both the time display (calendar display) mode and dual time display mode. This time display system has a linkage between the normal time and alarm time displays.

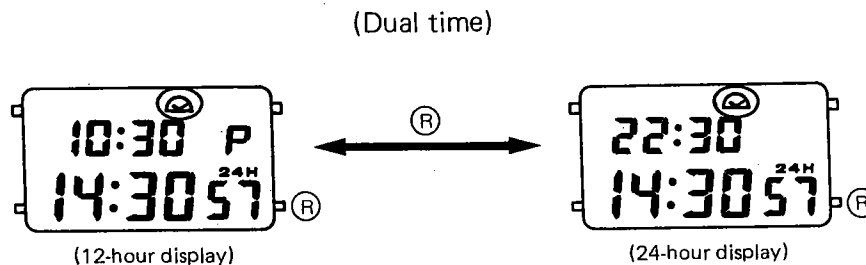
(1) Calendar/Alarm display

The displays are changed in the following sequence by pushing (R) button about 2 seconds.



(2) Dual time display

A dual time switching is done by pushing (R) button consecutively for about 2 seconds after obtaining the dual time mode with push of (M) button.




(Note) The time display system of the normal time mode is kept as it is and regardless of a switching of the dual time.

8) ON/OFF of chime and alarm monitor

The ON and OFF of the chime can be switched alternately with every simultaneous push of both (R) and (S) buttons in the normal mode of display.

(1) Chime ON

- The chime mark () glows only in the normal calendar display mode.
- The chime tone is heard twice and every hour on the hour.
- A monitor tone of chime is heard while both the (R) and (S) buttons are pushed simultaneously.

(2) Chime OFF

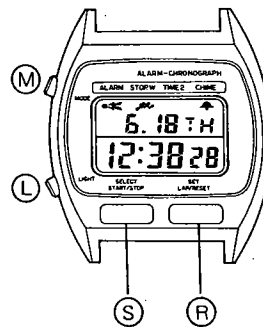
- The chime mark is turned off.
- No chime tone is heard.
- A monitor tone of alarm is heard while both the (R) and (S) buttons are pushed simultaneously.

Positions of buttons:

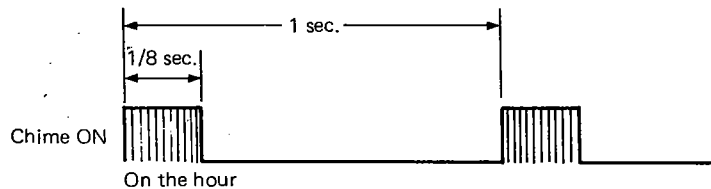
As shown in the diagrams below, the positions of push-buttons differ in two types of this caliber.

(Side position of buttons)

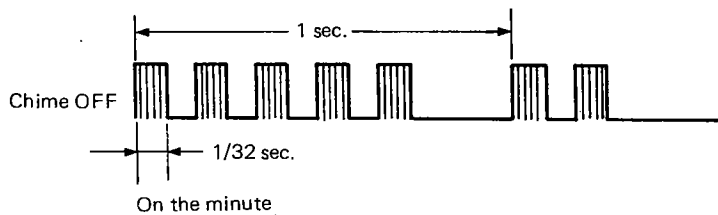
(Upper surface position of buttons)



(Note 1) Monitor of chime tone

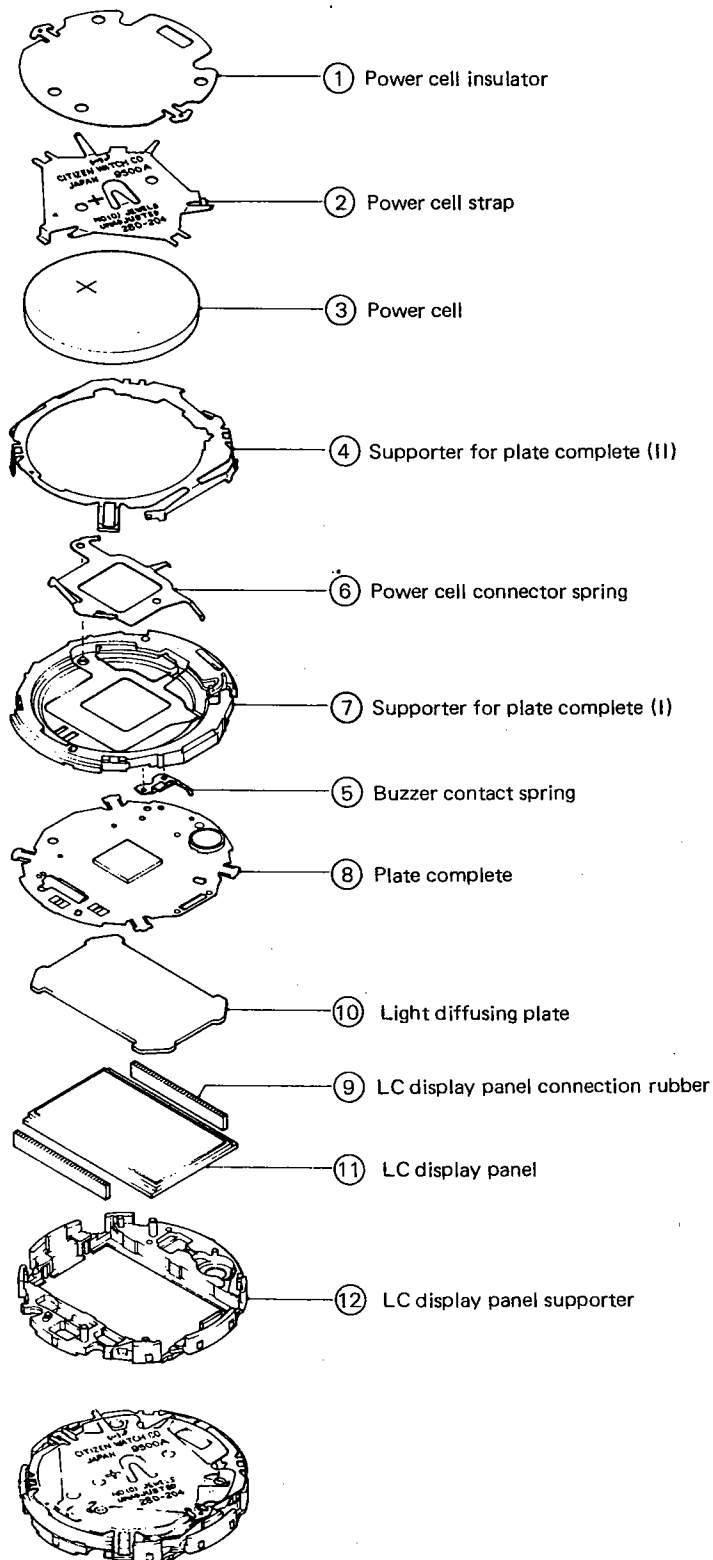


(Note 2) Monitor of alarm tone



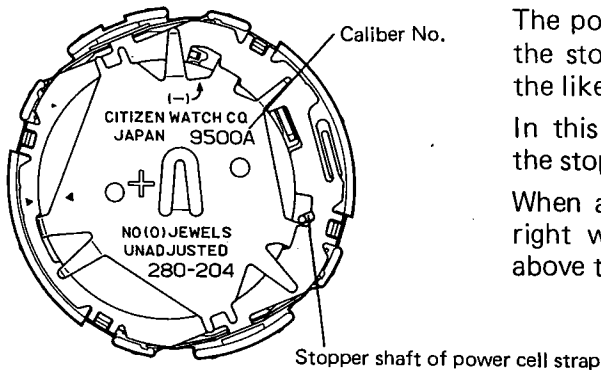
§ 5. DISSASSEMBLY/ASSEMBLY OF MODULE

Disassembling procedure : ① → ⑫
 Assembling procedure : ⑫ → ①



§6. NOTES ON DISASSEMBLY/ASSEMBLY

- 1) Follow the procedure described below for an attachment and detachment of the power cell strap.

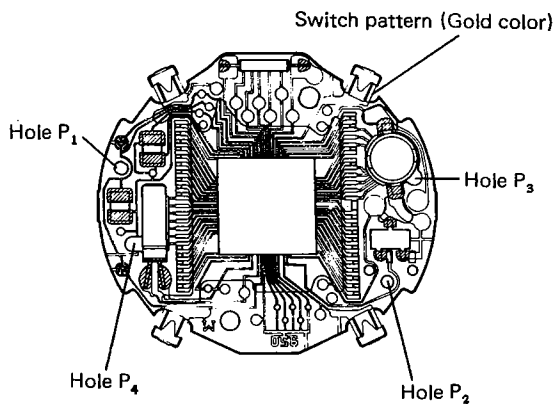


The power cell strap is slid left for detachment while the stopper shaft is pushed up light with a tweezers or the like.

In this case, a good care must be given not to damage the stopper shaft.

When attaching the power cell strap, the strap is slid right while the tip of the strap is pressed down from above the stopper shaft.

- 2) Note the following points for an attachment and detachment of the plate complete.



- 1) The plate complete is positioned by holes P_1 and P_2 . The holes P_3 and P_4 are provided to secure a correct fixing between the plate complete and the LC display panel supporter.

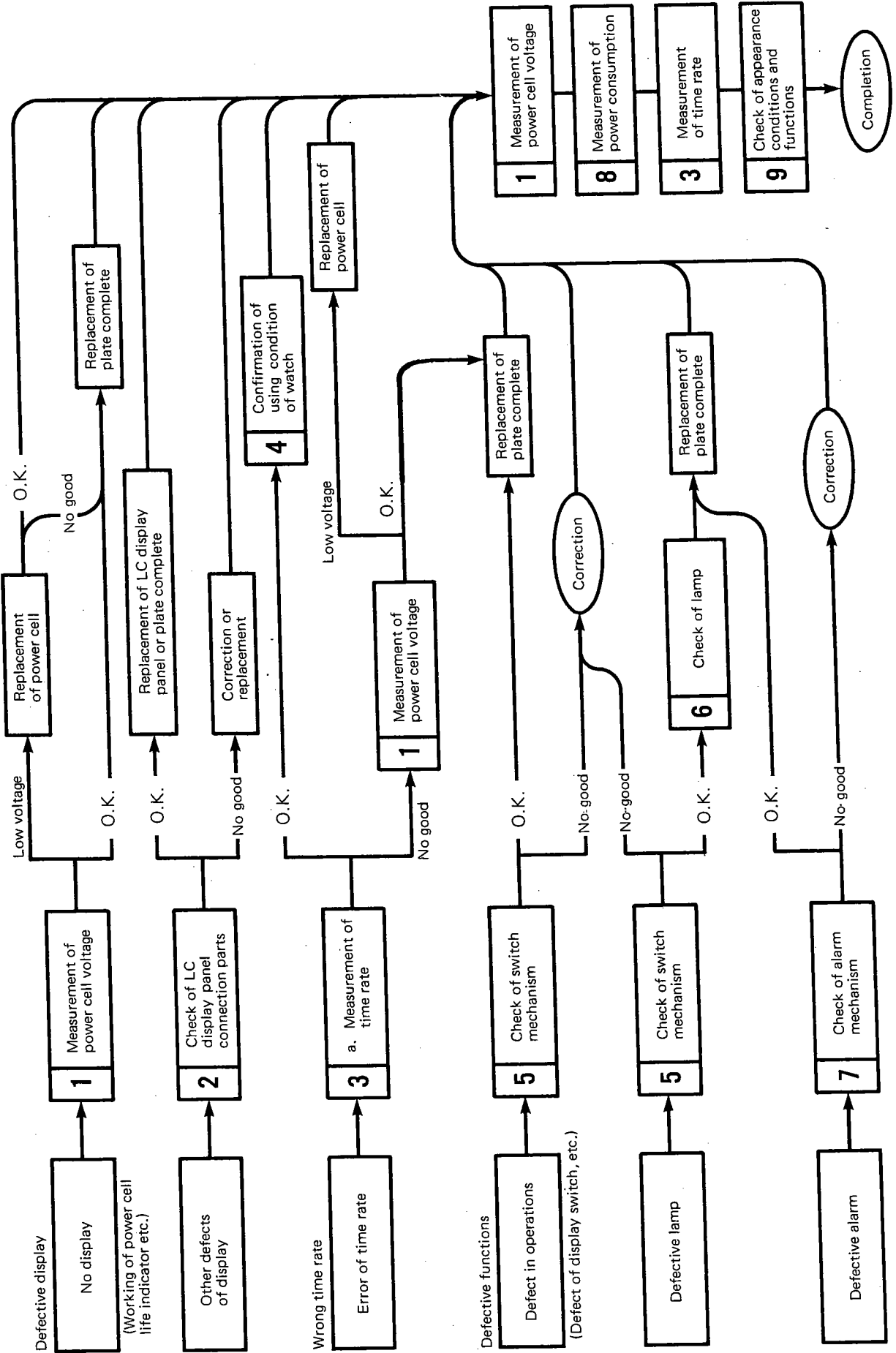
Avoid applying a large amount of force to the LC and other parts when setting these holes.

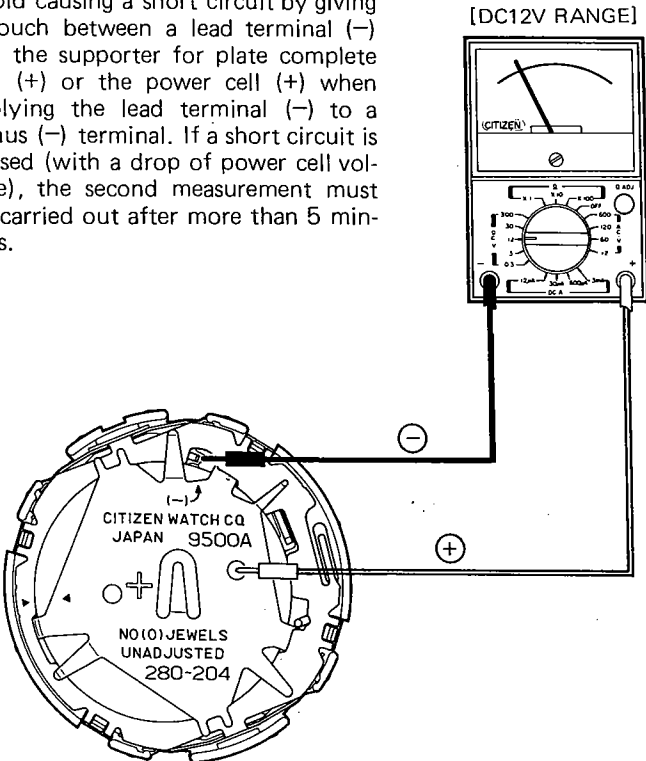
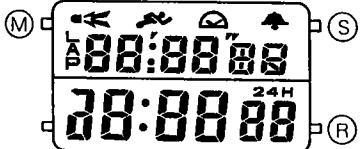
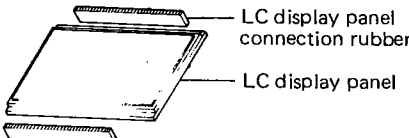
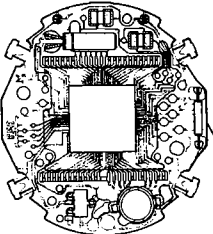
If a correct and complete fixing is not secured between the plate complete and the LC display panel supporter, the switch pattern may be broken when the supporter for plate complete (I) is attached.

- 2) Avoid touching the switch pattern part with a tweezers or the like.

§8. TROUBLESHOOTING AND ADJUSTMENT

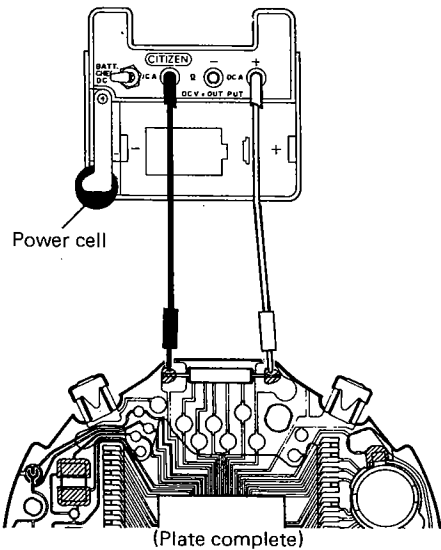
Flow chart of troubleshooting and adjustment

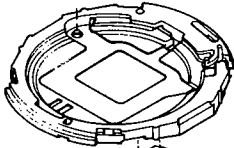
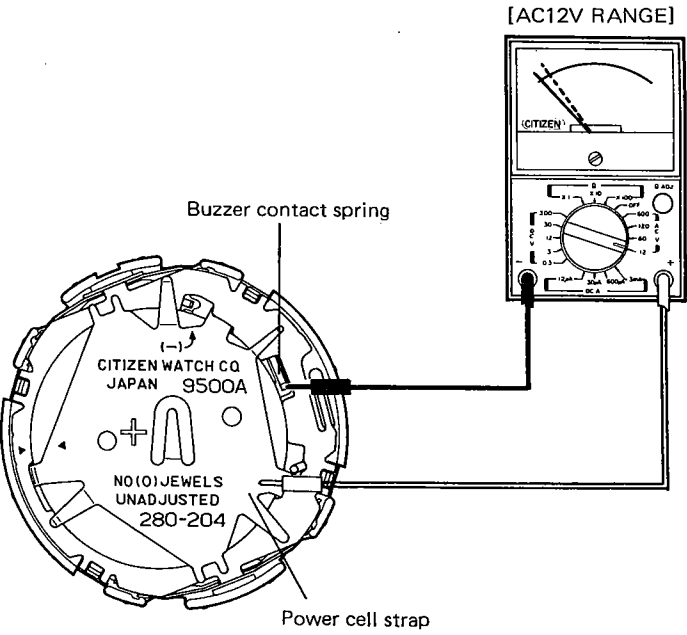


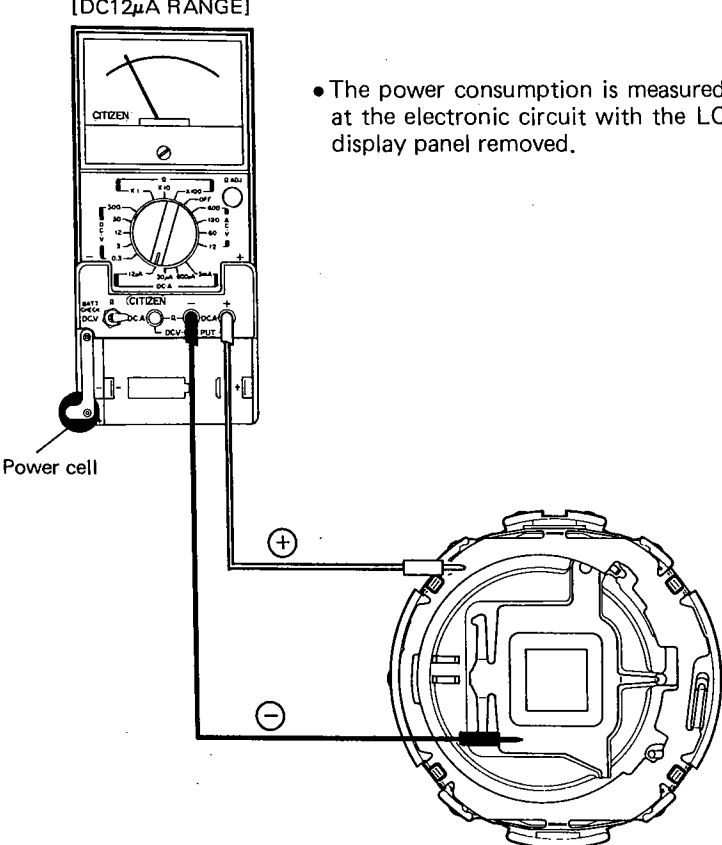
Checking Items	How to check	Result and treatment
<p>1 Measurement of power cell voltage</p>	<p>(Note) Avoid causing a short circuit by giving a touch between a lead terminal (-) and the supporter for plate complete (II) (+) or the power cell (+) when applying the lead terminal (-) to a minus (-) terminal. If a short circuit is caused (with a drop of power cell voltage), the second measurement must be carried out after more than 5 minutes.</p> 	<p>Over 2.8V → Nothing wrong</p> <p>Under 2.8V → Replacement of power cell</p>
<p>2 Check of connection areas of LC display panel</p>	<ul style="list-style-type: none"> • The all segments of display glow with a simultaneous push of (S), (R) and (M) buttons. • Check the defective segments under a full-segment glow state. <p>* The full-segment glow state is changed to the normal display mode with push of either one of the four push-buttons.</p>  <p>(Full-segment glow check)</p> <p>(Connection check among LC display panel, LC display panel connection rubber and plate complete)</p>  	<p>Rubber twisted or worn out → To be replaced</p> <p>Dust or stains → To be cleared off</p> <p>LC display panel cracked → To be replaced</p> <p>No defect detected through above checking → Replacement of LC display panel</p> <p>Correction impossible yet → Replacement of plate complete</p>

Checking Items	How to check	Result and treatment
<p>3 Measurement of time rate</p>	<p>The measurement unit time must be set to "10 sec." or its integer-fold value. Otherwise the measurement may be erroneous.</p> <p>This is due to the fact that a signal is emitted every ten seconds within the I.C. to give adjustment to the time rate.</p> <p>In case a big error is detected in the time rate, the plate complete must be replaced with new one.</p>	<p>Big error detected in time rate → Replacement of plate complete</p> <p>Normal time rate → 4 Confirmation of using condition of watch</p>
<p>4 Confirmation of using condition of watch</p>	<p>The following points must be confirmed in case the time is inaccurate although no fault is detected through checking of the time rate, along with a measurement test.</p> <ol style="list-style-type: none"> 1. Some misoperation has been given to the watch. 2. The watch has been used at an extremely high or low temperature. <div data-bbox="683 1104 954 1373" style="text-align: center;"> </div>	

Checking Items	How to check	Result and treatment
<p>5 Check of switch mechanism</p>	<p>1. Make sure whether each function has a correct operation by pressing via a tweezers the switch spring corresponding to each push-button in the state of a module only.</p> <p>2. Check of push-buttons In case no defective operation is detected through the above check, the push-button may have some defect.</p> <div data-bbox="646 642 948 905" data-label="Image"> </div> <p>(The silicon oil must be applied to the O-ring of the push button.)</p> <ul style="list-style-type: none"> ● Whether some dust or stains are sticking to the push-button or the area of the case where the push-button is removed. ● Whether the push-button has some malformation or breakage. ● Make sure whether a smooth operation is secured after setting the push-button to the case. <p>3. Check of switch spring mechanism</p> <ul style="list-style-type: none"> ● Whether each switch spring or switch patten has some malformation or breakage. <div data-bbox="574 1339 854 1528" data-label="Image"> </div> <div data-bbox="591 1591 1078 1885" data-label="Image"> </div>	<p>Nothing wrong with operation (No trouble in module)</p> <p>→ 2. Check of push-buttons</p> <p>Something wrong with operation</p> <p>→ 3. Check of switch spring mechanism</p> <p>No lighting of lamp</p> <p>→ Check of lamp</p> <p>Dust or stains</p> <p>→ To be removed</p> <p>Push-button deformed or broken</p> <p>→ To be replaced</p> <p>Spring or pattern deformed or broken</p> <p>→ To be replaced</p> <p>No defect detected</p> <p>→ Replacement of plate complete</p>

Checking Items	How to check	Result and treatment
<p>6 Check of lamp</p>	 <p>(Plate complete)</p> <p>All illustrated above, the leads from terminal OUTPUT of the tester's adaptor are applied to both ends of the lamp. In this case no distinction is required between the plus and minus polarities.</p>	<p>Lighting</p> <p>→ Nondefective</p> <p>No lighting</p> <p>→ Replacement of plate complete</p>

Checking Items	How to check	Result and treatment
<p>7 Check of alarm mechanism</p>	<p>A white piezoelectric element is adhered directly to the case back with use of a special adhesive.</p> <p>Owing to this special adhesive, the ringing function of the alarm is not affected virtually except for the contact part with the buzzer contact spring although the piezoelectric element has some crack, break or the like defect.</p> <p>1) Check of buzzer contact spring</p>  <p style="text-align: center;">Buzzer contact spring</p> <p>2) Confirmation of alarm output signal of plate complete</p> <p>It is possible to confirm the output signals with a complete module put into a case.</p> <p>a) Setting of module side</p> <p>The alarm monitor mode is obtained by pushing simultaneously both (S) and (R) buttons.</p> <p>The alarm tone monitor is set by turning off the chime mark (▲). (Normal display of calendar)</p>  <p style="text-align: center;">Buzzer contact spring</p> <p style="text-align: center;">Power cell strap</p> <p>Apply the lead terminals soft to avoid a malformation of the buzzer contact spring.</p>	<p>Crack or break of piezoelectric element at contact part of buzzer contact spring</p> <p>→ Replacement of case</p> <p>Malformation or breakdown of buzzer contact spring</p> <p>→ Correction or replacement of spring</p> <p>Check the movement of the tester pointer</p> <p>No swinging of pointer</p> <p>→ Replacement of plate complete</p> <p>Pointer swinging</p> <p>→ Nondefective</p>

Checking Items	How to check	Result and treatment
<p>8 Measurement of power consumption</p>	<ul style="list-style-type: none"> • The measurement must be carried out in the mode of the normal time display. <p>[DC12μA RANGE]</p>  <ul style="list-style-type: none"> • The power consumption is measured at the electronic circuit with the LC display panel removed. 	<p>Under 1.6μA → Nondefective</p> <p>Over 1.6μA → Measurement of power consumption with plate complete only</p> <p>Under 1.1μA → Replacement of LC display panel</p> <p>Over 1.1μA → Replacement of plate complete</p>
<p>9 Check of appearance and functions</p>	<p>When all above checks are over, the appearance conditions and functions are inspected as follows.</p> <ul style="list-style-type: none"> • The operation is correct and smooth for each function. • All marks of display are given in a correct way. • Some dust or stains are sticking to each function part. • And other factors. 	

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