

***TECHNICAL  
INFORMATION***

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**CITIZEN QUARTZ**

**Cal. No. P130**

 **CITIZEN**

## 1. OUTLINE

CAL. P130, is a 2-tier display digital watch which has a 30 atmospheric pressure water-resistant constitution as well as shock-resistance.



## 2. SPECIFICATION

CAL. No.	P130	
Model	Digital Quartz Watch	
Module size (mm)	29.0 $\phi$ x 6.85 <sup>t</sup>	
Accuracy	$\pm$ 30 sec./month at normal temperature.	
Oscillation	32,768 Hz	
Display method	FE twist-type nematic LC (Liquid Crystal)	
Integrated circuit	C/MOS-LSI 1 unit	
Effective temperature range	0°C ~ +55°C (32°F ~ 131°F)	
Adjustment of time rate	By trimmer condenser	
Measurement of time rate	2 seconds	
Display function	Normal time	Hour, minute, second (12/ 4 hour switch function)
	Calendar	Month, day, date (year)
	Alarm I	AM/PM, hour, minute (12H/24H is coupled to the normal time mechanism.)
	Alarm II	AM/PM, hour, minute (12H/24H is coupled to the normal time mechanism.)
	Stopwatch	Minute, second (1/100 sec.) Up to 59 min. 59 sec. 99.
	Timer	Minute, second Up to 99 min.
	Dual time	AM/PM, hour, minute (12H/24H is coupled to the normal time mechanism.)
Additional function	<ul style="list-style-type: none"> <li>• Chime</li> <li>• Illumination lamp</li> <li>• Alarm monitor</li> <li>• Fully automatic calendar (1985 – 2035)</li> <li>• Instantaneous time return function</li> </ul>	
Power cell	Parts No.	280-205
	Cell code	CR2025
	Size	20.0 $\phi$ x 2.5 <sup>t</sup> (mm)
	Voltage	3V
	Capacity	120mAh
	Lifetime	Approx. 8 years. (on the condition that the illumination lamp is used 1 sec./day and alarm is used 20 sec./day.)
Current value	Under 1.8 $\mu$ A	
Remarks		

### ■3. HANDLING INSTRUCTIONS

#### 3-1. Nomenclature



#### Button names

- Ⓢ1 button; select, start/stop button
- Ⓢ2 button; Lead set button
- Ⓢ3 button; Illumination lamp button
- Ⓢ4 button; Mode button

#### 3-2. Switching Button Specifications

Model Button	Time		Alarm I		Alarm II		Stopwatch	Timer		Dual time	
	Normal	Correction	Normal	Correction	Normal	Correction		While being set	While not being set	Normal	Correction
Ⓢ1	Summoning correction mode	Selecting digits to be corrected	Summoning of correction mode	Selecting digits to be corrected	Summoning of correction mode	Selecting digits to be corrected	Start/Stop	Start/Stop		Summoning correction mode	Selecting digits to be corrected
Ⓢ2		Correction	Alarm ON/OFF	Correction	Alarm ON/OFF	Correction	Split/Reset	Correction of set time	Fly-back		Correction
Ⓢ3	Lamp		-		-		-		-		
Ⓢ4	Changeover to alarm mode I	Instant manual return	Changeover to alarm mode II	Instant manual return	Changeover to stopwatch mode	Instant manual return	Changeover to timer	Changeover to dual time		Changeover to time mode	Instant manual return
Ⓢ1 · Ⓢ2	Chime ON/OFF										
Ⓢ1 · Ⓢ2 · Ⓢ3 · Ⓢ4	All the displays are reset and illuminated										

#### 3-3. Changeover of the displays (changeover of mode)

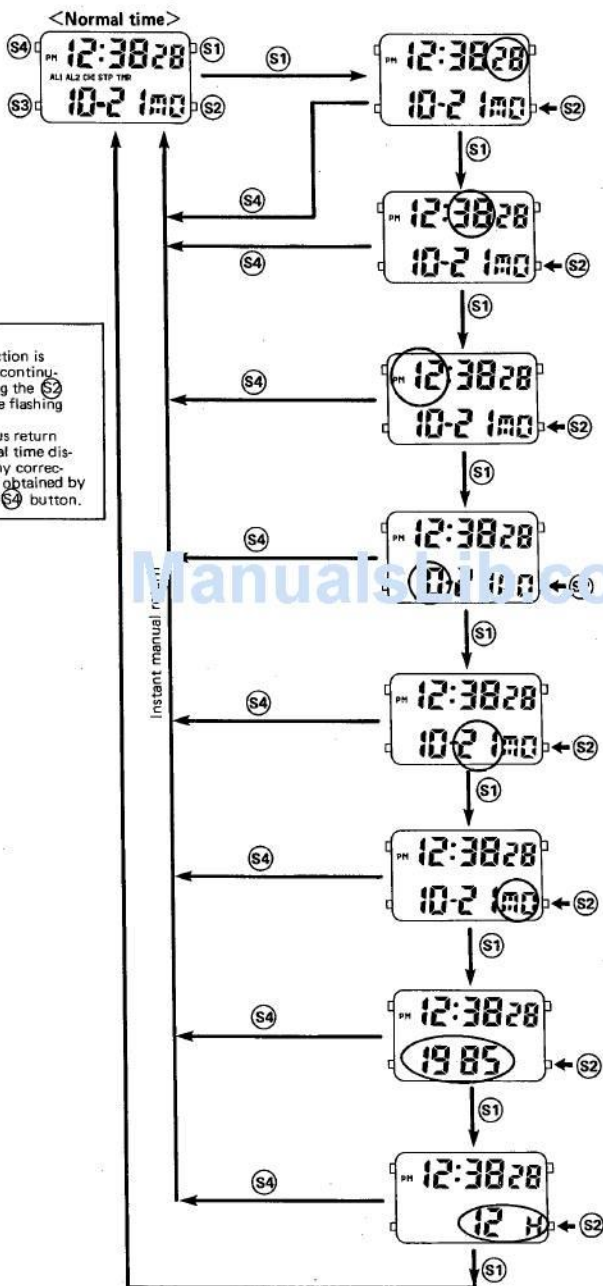


NOTE: Flashing parts are circled. (in correction mode)

### 3-4. Time & calendar correcting procedure

Normal time mode changes into the correction mode if the (S1) button is continuously pushed.

- (Notes)
1. Quick correction is obtained by continuously pushing the (S2) button in the flashing mode.
  2. Instantaneous return to the normal time display from any correction mode is obtained by pushing the (S4) button.



[Zero-resetting]  
Zero-resetting is obtained by pushing the (S2) button in the second correction mode.

The minute display will increase by one minute between 30 sec. and 59 sec.

[Correction of minutes]  
The correction of minutes is obtained by pushing the (S2) button in the minute correction mode.

[Correction of hours]  
The correction of hours is obtained by pushing the (S2) button in the hour correction mode.

[Correction of months]  
The correction of months is obtained by pushing the (S2) button in the month correction mode.

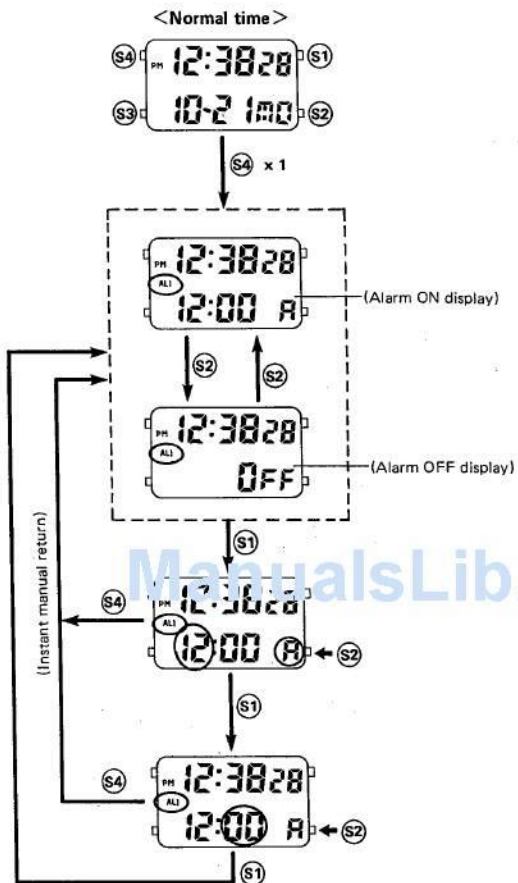
[Correction of dates]  
The correction of dates is obtained by pushing the (S2) button in the date correction mode.

[Correction of days]  
The correction of days is obtained by pushing the (S2) button in the day correction mode.

[Correction of years]  
The correction of years is obtained by pushing the (S2) button in the year correction mode.

[Selections of 12/24 hour display]  
The switching of 12/24 hour display is obtained by pushing the (S2) button in the 12/24 hour display switching mode.

### 3-5. Correction of alarm I time



By pushing the  $\text{S4}$  button in the normal display mode the calendar display changes into the alarm I display in the lower half of the display panel.

ON/OFF switching is obtained by pushing the  $\text{S2}$  button in the alarm I display mode (flashing).

**Alarm monitor:** Alarm monitor is obtained by continuously pushing the  $\text{S2}$  button when the alarm is ON.

By continuously pushing the  $\text{S1}$  button, in the alarm I display, the hour becomes flashing mode. Then hour correction mode is obtained by pushing the  $\text{S2}$  button.

The correction of minutes is obtained by pushing the  $\text{S2}$  button in the minute correction mode (flashing).

#### (Notes)

1. A quick correction is obtained by continuously pushing the  $\text{S2}$  button in a flashing mode (correction mode).
2. Alarm sounds for approx. 20 seconds, both alarm I or II.
3. Instant manual return is obtained by pushing the  $\text{S4}$  button in all alarm correction modes.
4. 12H/24H is coupled to the normal time display.
5. Alarm stops when any button is pushed.

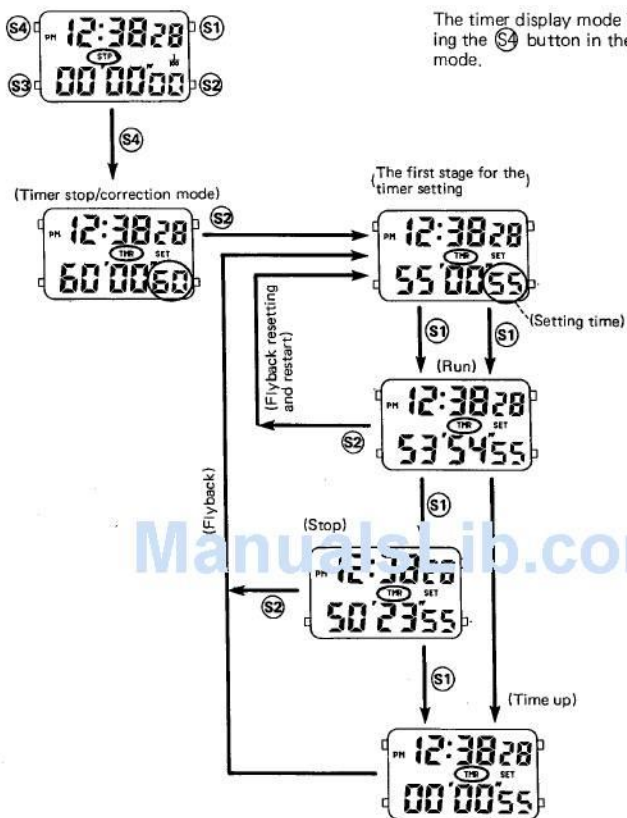
### 3-6. Correction of alarm II

If pushing the  $\text{S4}$  button in alarm I display mode, the alarm I display mode will change into the alarm II display.

Correction procedure of alarm II time is the same as alarm I.



### 3-8. Operation procedure of the timer



The timer display mode is obtained by pushing the S4 button in the stopwatch display mode.

Set the timer by pushing the S2 button. The set time is displayed in the right lower corner.

The timer returns to the operation mode and begins operation by pushing the S1 button.

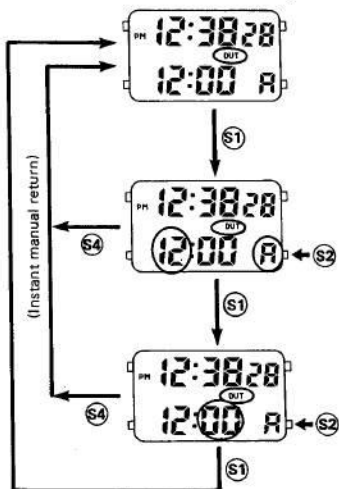
The run stop mode is obtained by pushing the S1 button.

The alarm sounds for 10 seconds, then automatically returns to the first set condition.

#### (Notes)

- Correction of the setting time is obtained by pushing the S2 button in the timer stop/correction mode. A quick correction is obtained by continuously pushing the S2 button in this mode. The maximum setting time is up to 99 minutes.
- The timer is returned to the first setting mode and begins operation by manually pushing the S2 button in the run modes.

### 3-9. Operation procedure of the dual time



The dual time display is obtained by pushing the  $S_1$  button in the timer display mode.

[Dual time display]  
Correction of hours (flashing) is obtained by continuously pushing for one or more seconds the  $S_1$  button.

[Correction of hours]  
Correction of hours is obtained by pushing the  $S_2$  button in the hours correction mode.

[Correction of minutes]  
Correction of minutes is obtained by pushing the  $S_2$  button in the minutes correction mode.

#### (Notes)

- 1. A quick correction is obtained by continuously pushing the  $S_2$  button in the correction mode.
- 2. In 24 hour display mode, the normal time display will switch automatically. (In the 24 hour display mode, A/P is not marked.)

### 3-10. Operation procedure of the chime

(Chime set OFF)



(Chime set ON)



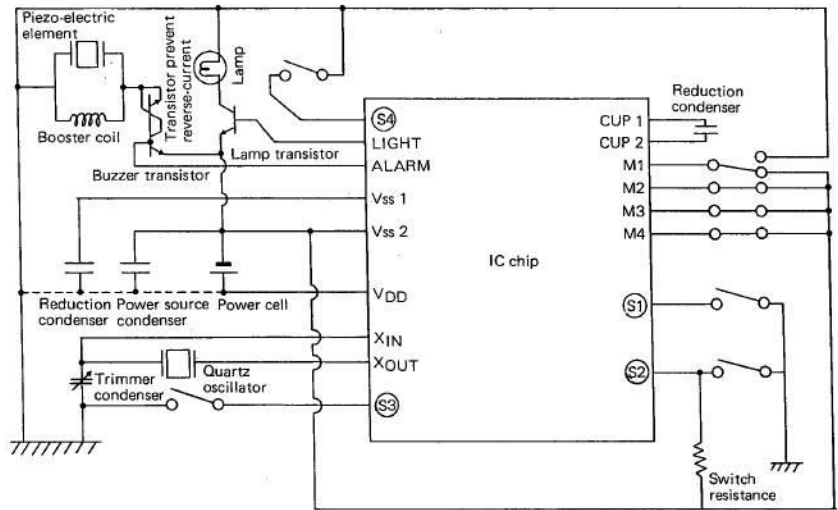
ON/OFF switching is obtained by simultaneously pushing the  $S_1$  and  $S_2$  buttons in the normal time display mode.

When the CH mark (chime set ON) is displayed, the alarm will sound every hour.

### 3-11. Operation procedure of the all-reset

After replacing the power cell the all-reset is obtained by simultaneously pushing all buttons ( $S_1$ ,  $S_2$ ,  $S_3$  and  $S_4$ ), which causes the displays to flash. A beep will sound at this time. (The all reset mechanism should be operated after replacing the power cell, otherwise it might not operate normally.)

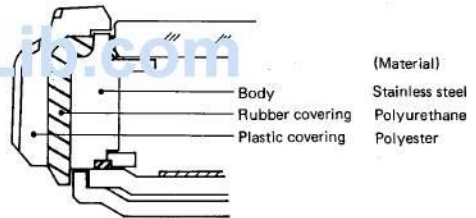
#### ■4. CIRCUIT CONSTITUTION DIAGRAM



#### ■5. EXPLANATION OF RELATED MATTERS

##### a) Using the special case constitution (triple constitution)

As a shock-resistant constitution, rubber/plastic coverings on the case body are used for absorbing shock and are fixed in the case with 4 screws.



##### b) Definition of a shock resistant watch by ISO (International organization for standardization) (aim/application range)

- To meet the following irreducible minimum of demands without submitting the watch to visible damage.
- Substitutional test: Dropping the watch accidentally on a horizontal surface of hard wood from 1 meter, examine how much damage the watch will receive.

(The irreducible minimum demand)

Remove the watch band and strike the watch with a resin hammer from 1 meter, the first from at 9 o'clock angle and the 2nd time perpendicular from the glass.

- This operation should not stop watch operation after transmitting the shock.
- Time rate should be within 2 seconds per day (in a quartz watch).
- No decrease in quality such as damage to function/appearance (for example; wrong display, removal of the hands, clash of glass, damage of buttons and so on).

##### c) Pressure level of pushing the buttons

The watch is stronger than usual so the button can not be thrust into the inner part by hydraulic pressure because it has a 30 atmospheric pressure water-resist function.

##### d) The all-reset

Do the all-reset operation by simultaneously pushing the  $S1$ ,  $S2$ ,  $S3$  and  $S4$  buttons after exchanging the power cells. If you do not do this the operation will not be correct. After the all reset, you will have the following display.

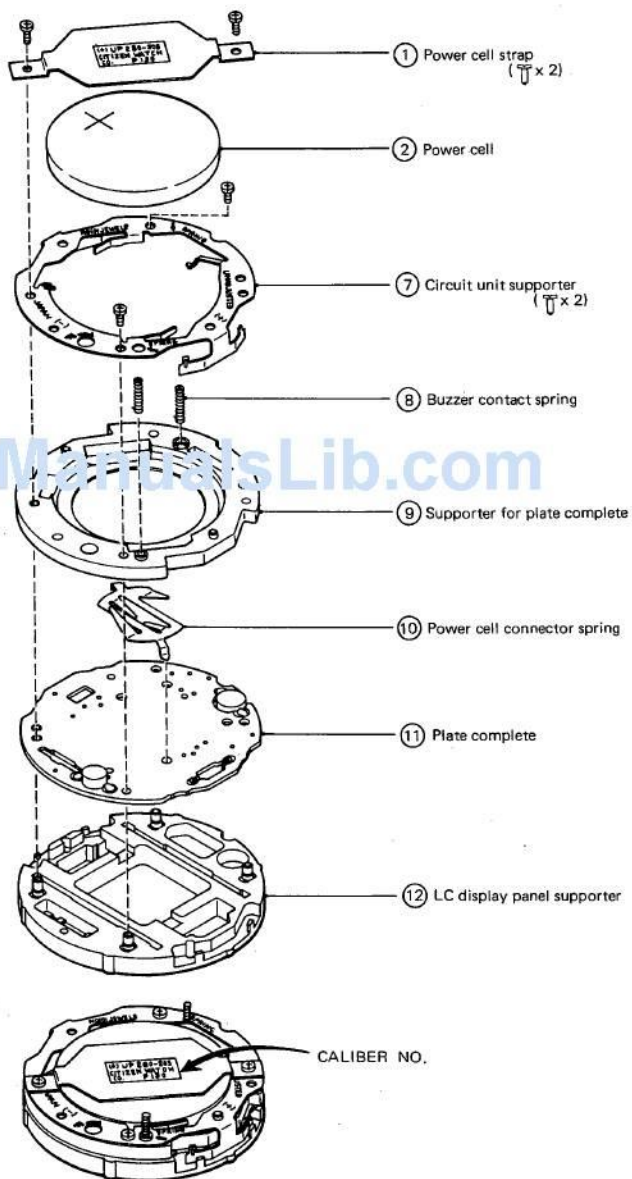
Normal time mode : AM 12 hr. 00 min. 00 sec.  
 Calendar mode : January 1st, Tuesday  
 Alarm I/II mode : OFF

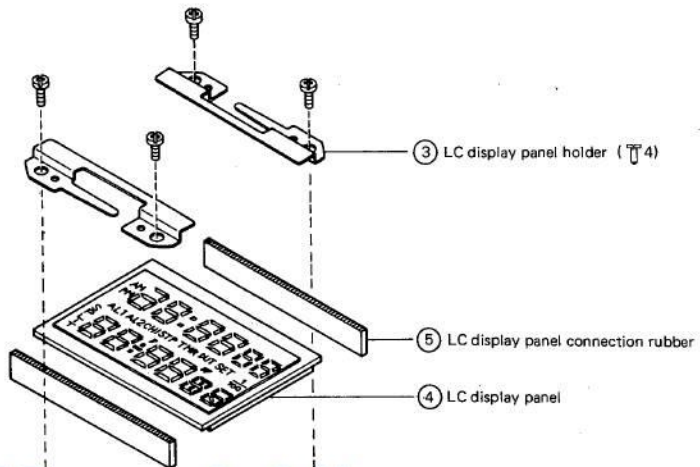
Stopwatch : 00 min. 00 sec. 00  
 Timer mode : 00 min. 00 sec.  
 Dual time : 12 hr. 00 min. A

## ■6. DISASSEMBLY/ASSEMBLY OF MODULE

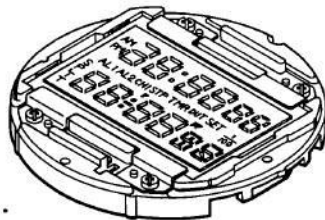
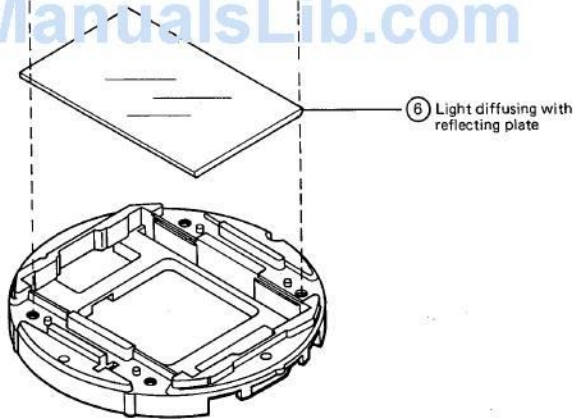
Disassembly module : ① → ⑭

Assembly module : ⑭ → ①

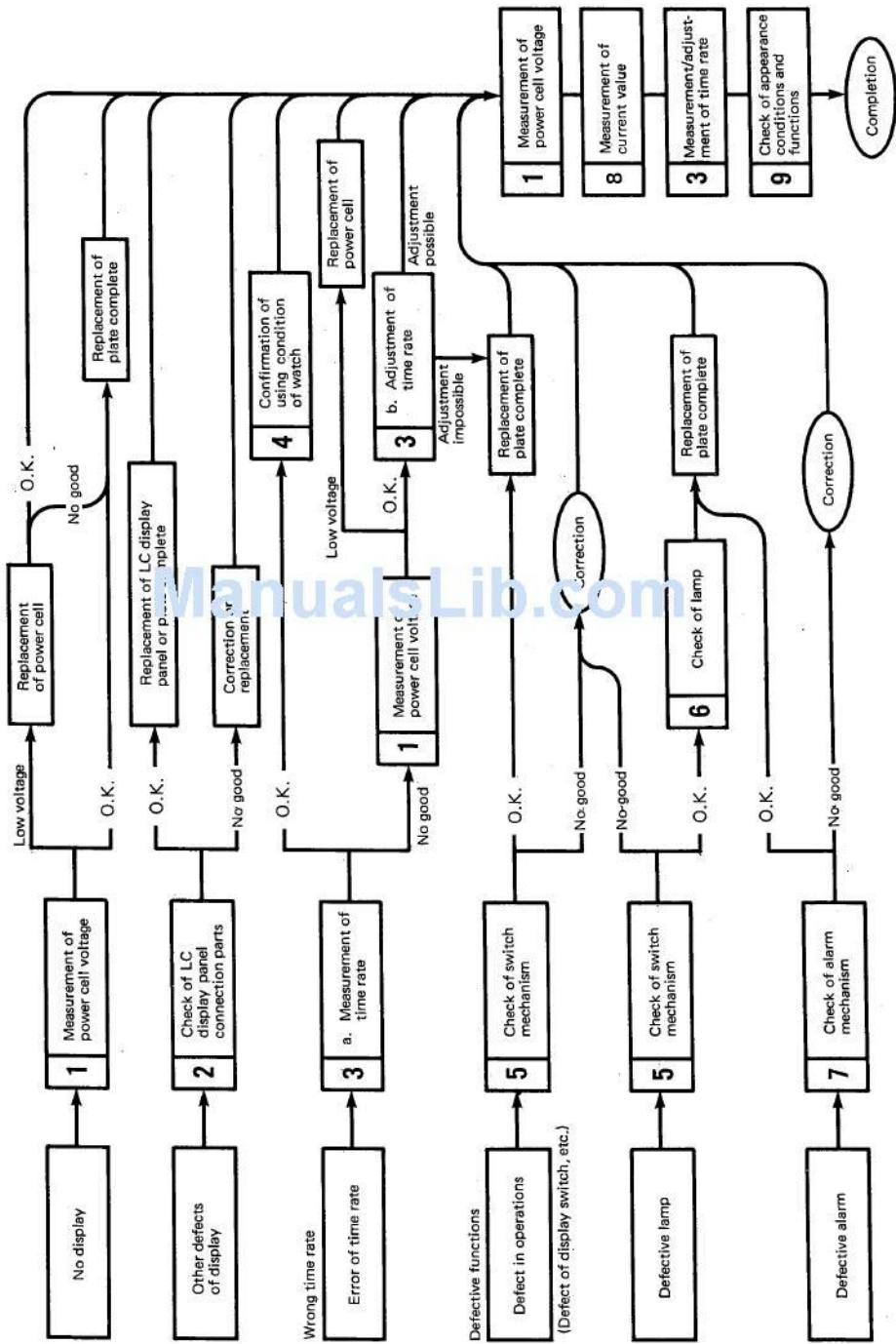


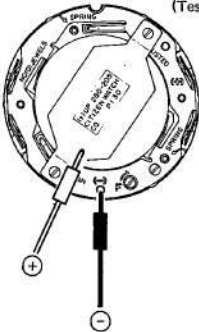



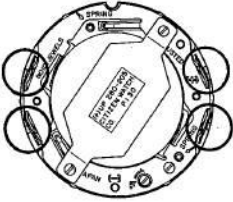
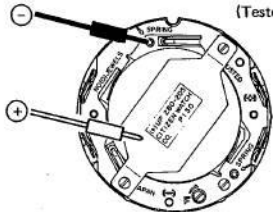
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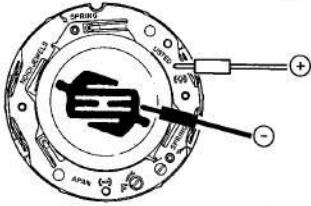


## 7. TROUBLESHOOTING AND ADJUSTMENT



Check points	How to check	Results & treatment
(1) Measurement of power cell voltage	<p>[Refer to Technical Manual Basic Course II-1-a for tester setting]</p>  <p>(Tester range DC12V)</p>	<p><b>Over 2.8V</b> → Nondefective</p> <p><b>Under 2.8V</b> → Replace the power cell</p>
(2) Check of LC display panel connection parts	<p>[Refer to Technical Manual Basic Course II-2-a-Digital Part]</p> <p>When all 10 segments; simultaneously push the S1, S2, S3 and S4 button, all segments are flashing while pushed.</p> <p>In the above condition, check for defective segments.</p> 	
(3) Measurement/ Adjustment of the time rate	<p>[Refer to Technical Manual Basic Course II-2-d]</p> <p>a) Measurement of the time rate Measurement of the time rate can be made with the "MEASURE TIME" set at a range of 2 seconds.</p> <p>b) Adjustment of the time rate Turn the trimmer condenser clockwise.</p>	<p>Enables adjustment → Nondefective</p> <p>Does not enable adjustment → Replace the plate complete</p>
(4) Confirmation of using conditions of watch	<p>[Refer to Technical Manual Basic Course II-2-e]</p> <p>Check to see if the handle is operating correctly or not.</p>	

Check points	How to check	Results & treatment
(5) Check of switch mechanism	<ul style="list-style-type: none"> <li>● Check whether the pattern of the plate firmly contacts the switch actuating spring.</li> <li>● Check whether the push buttons has not been deformed and has no dust or dirt on it.</li> </ul>  <p>*To maintain the waterproof of the watch and the smooth operation of the buttons, be sure to put silicone oil on the push button packing.</p>	
(6) Check of lamp	<p>[Refer to Technical Manual Basic Course II-1-e for tester setting]</p>	<p>Flashing        → Nondefective</p> <p>Not flashing        → Replace the plate complete</p>
(7) Check of alarm mechanism	<p>[Refer to Technical Manual Basic Course II-1-d for tester setting]</p> <ol style="list-style-type: none"> <li>Checking the piezo-electric element          If the white color piezo-electric element attached directly to the case back with adhesive, especially the part touching by the buzzer contact spring, have a defect or a crack, the alarm may not sound.</li> <li>Checking the buzzer contact spring          Check whether the buzzer contact spring is bent/deformed or not.</li> <li>Checking alarm output signal of plate complete          (You can check without removing the module from the case.)</li> </ol>  <p>(Tester range DC0.3V)</p> <ul style="list-style-type: none"> <li>● In the alarm monitor mode, (+) .. to the power cell surface (-) .. to the buzzer contact spring.</li> </ul>	<p>Hand oscillating        → Nondefective</p> <p>No oscillating        → Replace the plate complete</p>

Check points	How to check	Results & treatment
(8) Measuring the current value	<p>[Refer to Technical Manual Basic Course II-1-f for tester setting]</p> <p>(Tester range DC12<math>\mu</math>A)</p> 	<ul style="list-style-type: none"> <li>● Current value of the complete module</li> </ul> <p><b>Under 1.8<math>\mu</math>A</b> → Nondefective</p> <p><b>Over 1.8<math>\mu</math>A</b> Singularly measure the unit of the plate complete for current value</p> <ul style="list-style-type: none"> <li>● Current value of the plate complete</li> </ul> <p><b>Under 1.5<math>\mu</math>A</b> → Nondefective</p> <p><b>Over 1.5<math>\mu</math>A</b> → Replace the plate complete</p>
(9) Check of appearance and functions	<p>[Refer to Technical Manual Basic Course II-2-f]</p>	

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