

TECHNICAL INFORMATION

CITIZEN QUARTZ

Cal. No. 542❖❖



 **CITIZEN**

§1 OUTLINE

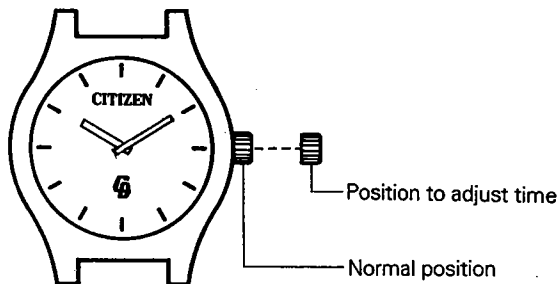
CAL 5420M and 5421A are ladies' two-hand analog quartz watches. The accuracy of the former is ± 15 sec/month and that of the latter is ± 20 sec/month. These watches are the same, except that the interval of the hands of the former is thinner than that of the latter.

§2 SPECIFICATIONS

Caliber No.		5420M-00	5421A-00
Type	Analog quartz watch (Without a second hand)		
Module size (mm)	ϕ 13.5 x 9 x 13.2 thickness: 1.9		
Accuracy (at normal temperature)	± 15 sec./month	± 20 sec./month	
Oscillation	32.768 HZ		
Integrated circuit	C/MOS-LSI (1 unit)		
Effective temp. range	-10 °C ~ +60 °C (14 °F ~ 140 °F)		
Converter	Bipolar step motor		
Adjustment of time rate	D.F.C (without adjustment terminal)		
Measurement of time rate	10 seconds		
Additional functions	Power saving switch	○	
Power cell	Part No.	280-75	
	Cell code	SR416SW	
	Size	ϕ 4.8 x 1.6	
	Voltage	1.55 V	
	Capacity	8.3 mAH	
	Lifetime	About 3 years	

(The above specifications are subject to change.)

§3 HANDLING METHOD



- Pull out the crown to the first click position to adjust the time.
- After the time is set, push back the crown to its normal position.

§4 POINTS OF DISASSEMBLY AND ASSEMBLY

1. Yoke (Parts No. 071)

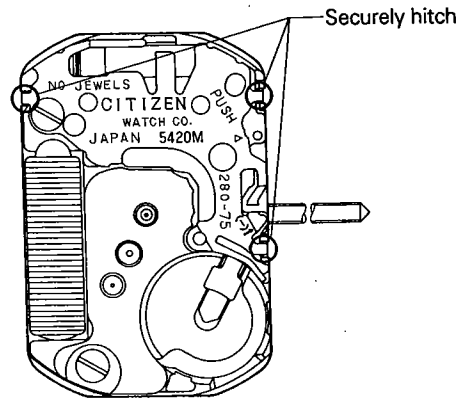
- Securely install the spring of the yoke to the spacer of the setting stem.
- Take care that the yoke will not be floated or removed.

2. Coil unit (Parts No. 246)

- Carefully handle the coil so that its wire will not be broken (especially when opening the case back).

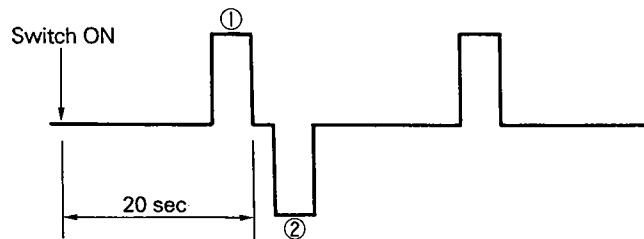
3. Power cell strap (Parts No. 234)

- When installing the power cell strap, securely hitch its hook to the plate.



§5 START OF HANDS

In case of this watch, a pair of the pulses ① and ② is output from the IC and the hands start 20 seconds after the crown is pushed back (switch is turned on) for the reason of the specification of the IC.



- a. When the magnetic poles of the rotor are matched to the phase of the pulse ①
The rotor starts rotation to move the hands at the pulse ①, and the rotor revolves further at the pulse ② to move the hands by the distance of 20 seconds.

Since the hands move by two steps at a time, they move 20 seconds ahead of the true time at first.

- b. When the magnetic poles of the rotor are not matched to the phase of the pulse ①
The rotor does not start rotation at the pulse ①, but revolves at the pulse ② to move the hands.

The hands are not deviated from the true time by this operation.

[The occurrence frequency of a and b above calculated on the timing is 50%.]

§6 MAIN DIFFERENCES FROM CAL. 543*

	543*	542*
Numbers of hand	3 hands	2 hands
Power cell life	Approx. 2 years	Approx. 3 years
(Parts) Rotor	Metal	Plastic
Center wheel and pinion	Not installed	Installed (Metal)
Third wheel and pinion	Installed (Metal)	Installed (Plastic)

§7 HANDLING OF PLASTIC PARTS

<Handling and washing methods of plastic parts>

Division	Division of plastic parts	Handling method	Washing method
1	Front train wheel (Examples: Third, fourth, fifth wheels and pinions)	Do not hold a gear or pinion directly with pincers etc. When installing gears, accurately mesh them.	Ultrasonic cleaning or washing with brush. Use benzine or alcohol to wash them. Do not use any other washing liquid. (Note 1)
2	Back train wheel (Examples: Minute wheel and pinion, hour wheel, date dial driving wheel)	Do not hold a gear or pinion directly with pincers etc. When installing gears, accurately mesh them.	Ultrasonic cleaning or washing with brush. Use benzine or alcohol to wash them. Do not use any other washing liquid. (Note 1)
3	Cocks and holders (Examples: Setting stem spacer, supporter for plate complete)	No special method.	Ultrasonic cleaning or washing with brush. Use benzine or alcohol to wash them. Do not use any other washing liquid. (Note 1)
4	Date dial Daily dial	No special method.	Do not wash these parts. Wipe them lightly with an applicator soaked in benzine.

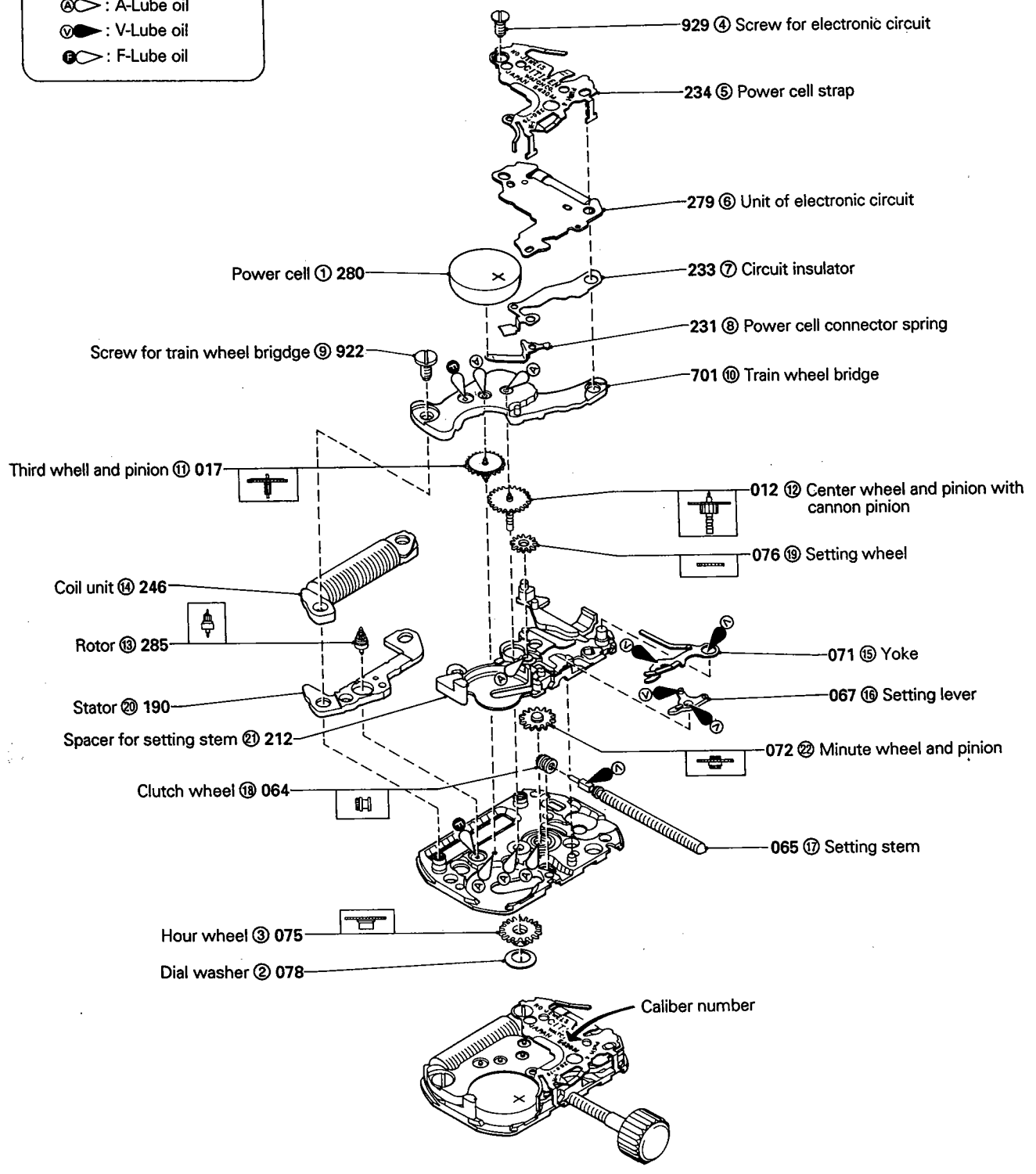
Note 1. Plastic parts may be dissolved in some kinds of washing liquid (Trichloroethylene, paint thinner, gasoline, etc). Accordingly, do not use those solvents, chemicals, etc. to wash the plastic parts.

§8 DISASSEMBLY AND ASSEMBLY OF THE MODULE

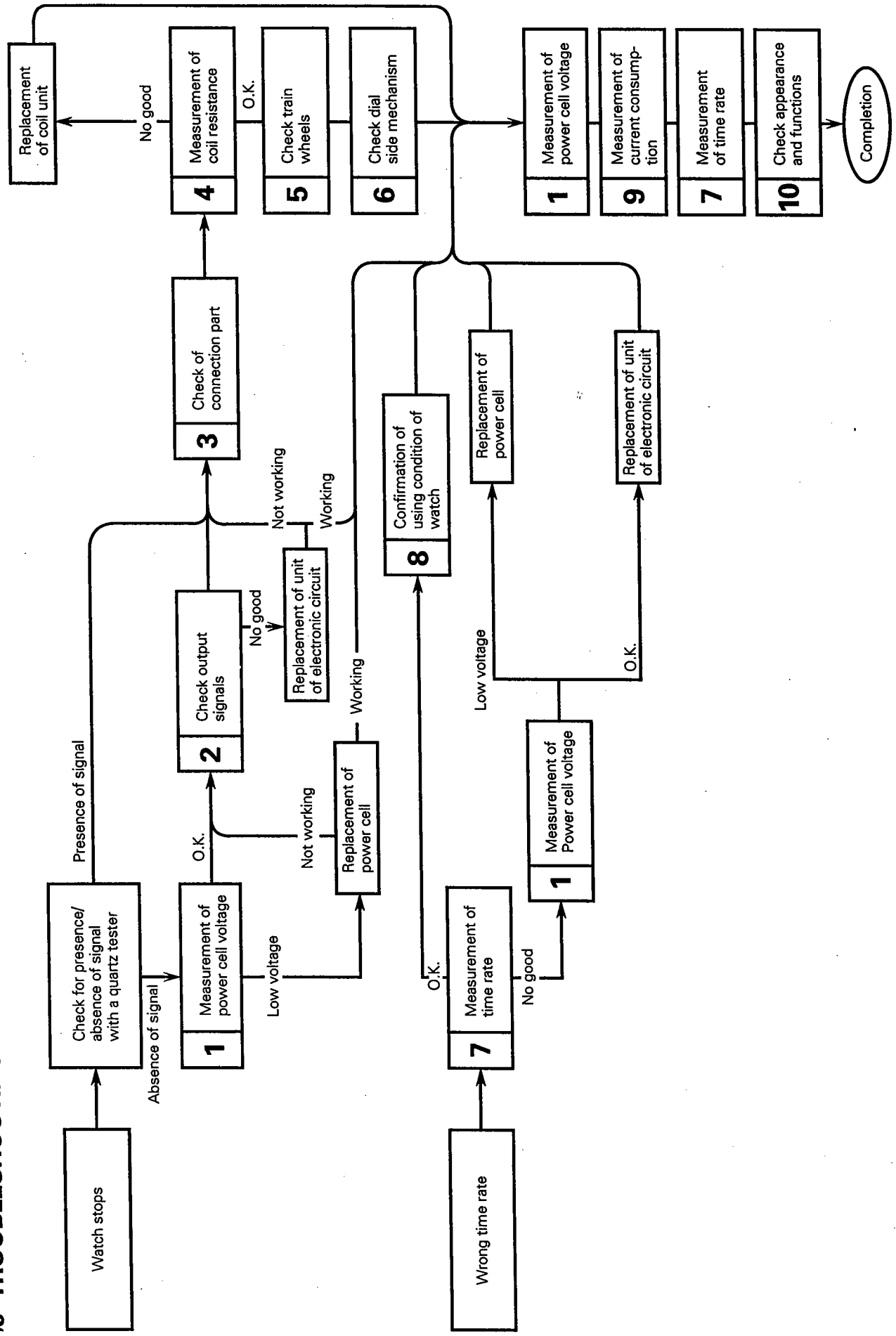
Disassemble procedure ① → ⑳
 Assemble procedure ㉓ → ①

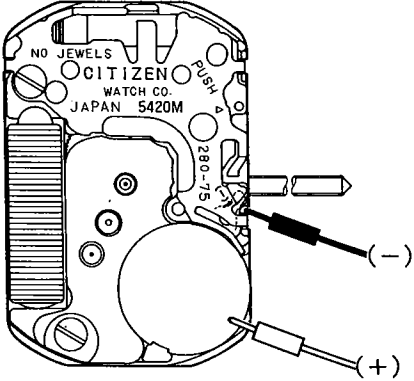
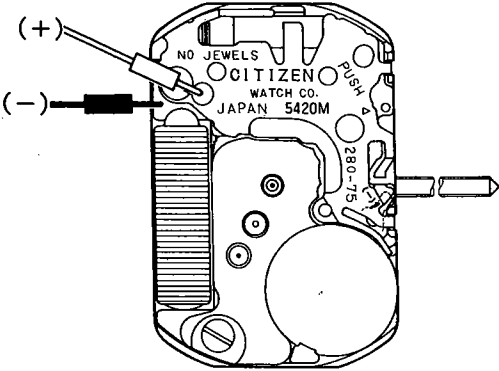
Lubrication markings

- Ⓐ : A-Lube oil
- Ⓥ : V-Lube oil
- ⓕ : F-Lube oil

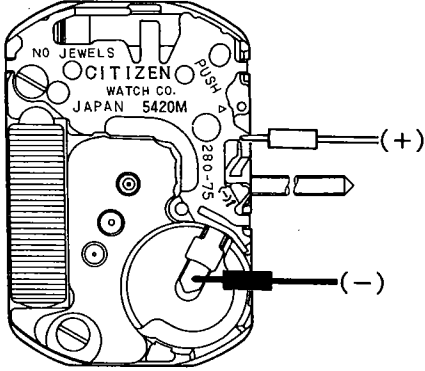


9 TROUBLESHOOTING AND ADJUSTMENT



Check points	How to check	Results and treatment
<p>① Measurement of power cell voltage</p>	<p>[Refer to Technical Manual, Basic Course II-1-a for the setting procedure of the tester.]</p> <p><Tester range: DC 3V></p> 	<p>Over 1.5 V → Normal</p> <p>Under 1.5 V → Replace the power cell</p>
<p>② Check output signals</p>	<p>[Refer to Technical Manual, Basic Course II-1-b for the setting procedure of the tester.]</p> <p><Tester range: DC 0.3 V></p>  <ul style="list-style-type: none"> • Since the hands of this watch move every 20 seconds, the tester pointer should swing to the right and left every 20 seconds. (The tester lead pins have no polarity) 	<p>The tester pointer swings every 20 seconds → Normal</p> <p>The tester pointer does not swing → Check the connections parts.</p> <p>The connections are normal → Replace the unit of electronic circuit</p>
<p>③ Check connection part</p>	<p>[Refer to Technical Manual, Basic Course II-2-a.] Check for looseness of screws, dust, dirt, etc.</p> <p>a) If the fixing screw of the unit of electronic circuit is loosened, the drive signals may not be transferred.</p> <p>b) If dust or dirt stick to the pattern of the coil of electronic circuit unit, the current may not flow sufficiently.</p>	

Check points	How to check	Results and treatment
<p>④ Measurement of coil resistance</p>	<p>[Refer to Technical Manual, Basic Course II-1-c for the setting procedure of the tester.]</p> <ul style="list-style-type: none"> Remove the unit of electronic circuit when measuring the coil resistance. Remove the power cell, power cell strap and unit of electronic circuit in order, then measure the resistance of the coil unit. <p style="text-align: center;"><Tester range: R x 10Ω></p> <p style="text-align: center;">(The tester lead pins have no polarity.)</p>	<p>1.5 kΩ ~ 1.9 kΩ → Normal</p> <p>Outside range of 1.5 kΩ ~ 1.9 kΩ → Replace coil unit</p>
<p>⑤ Check train wheels</p>	<p>[Refer to Technical Manual, Basic Course II-2-b.]</p> <ul style="list-style-type: none"> Check the appropriate clearance of each wheel and rotor for dust. This Cal. is designed that less current for low loads will be consumed, thus take care not to supply wrong oil or supply oil too much. Confirm excessive oil is not flowing out. 	
<p>⑥ Check dial-dise mecahnism</p>	<p>[Refer to Technical Manual, Basic Course II-2-c.]</p> <ul style="list-style-type: none"> Confirm that all parts are not deformed and oil is supplied correctly. If the dial washer is deformed or scratched, the watch may move slowly or stop. 	
<p>⑦ Measurement of time rate</p>	<p>[Refer to Technical Manual, Basic Course II-2-d.]</p> <ul style="list-style-type: none"> Since this watch has D.F.C. and does, not have adjustment terminals, thus the time rate cannot be adjusted in the customer's place. <p>(Measurement is made in a 10 second-ragne.)</p>	<p>The watch loses or gains substantial time → Replace the unit of electronic circuit</p>
<p>⑧ Confirmation of using condition</p>	<p>[Refer to Technical Manual, Basic Course II-2-e.]</p>	

Check points	How to check	Results and treatment
<p>⑨ Measurement of current consumption</p>	<p>[Refer to Technical Manual, Basic Course II-1-f for the setting procedure of the tester.]</p> <p style="text-align: right;"><Tester range: DC 12μA></p> <p>Set the battery to the adaptor.</p> <div style="text-align: center;">  </div> <p>a) This watch is equipped with the load compensation circuit. When the powercell is installed to adjust the drive output of the rotor, this function may work. If this function works, the current consumption may temporarily rise a little. In this case, make the measurement after pointer has returned to the normal level.</p> <p>b) When measuring the current consumption of the separate unit of electronic circuit, confirm the stamps of ⊕ and ⊖ on the circuit pattern, then measure the current similarly to the current consumption of the module.</p> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; margin-top: 20px;"> <p>Influence of light; Avoid measuring current consumption under an incandescent lamp or the direct rays of the sun, because it may cause the current value to increase.</p> </div>	<ul style="list-style-type: none"> • Current consumption of the module Under 0.35 μA → Normal Over 0.35 μA → Measure the unit of electronic circuit separately
<p>⑩ Check appearance conditions and functions</p>	<p>[Refer to Technical Manual, Basic Course II-2-f.]</p>	

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