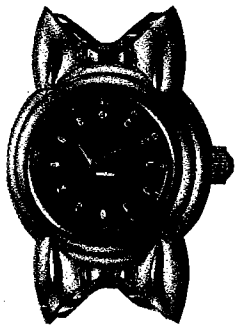
TECHNICAL INFORMATION

CITIZEN QUARTZ

Cal. No. 4520※



CITIZEN

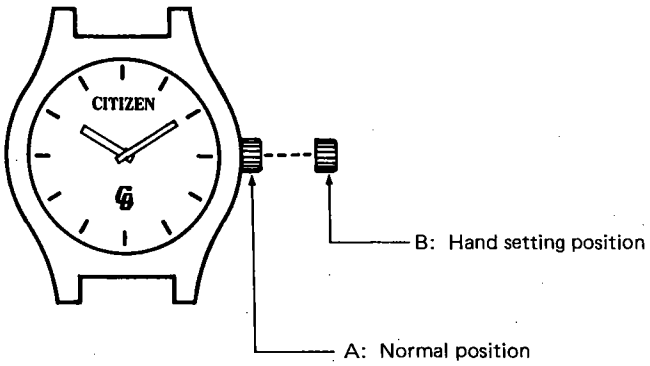
§1. OUTLINE

This watch is a two-hand analog watch for ladies which has a newly developed module for a very small bracelet.

§2. SPECIFICATIONS

Caliber No.		4520A-02
Type		Analog quartz watch (without a second hand)
Module size (mm)		ϕ9.5 x 9.0 Thickness: 2.8 t (including the power cell section)
Accuracy		±15 sec./month at normal temperature
Oscillation		32,768Hz
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		DFC (Without a control terminal)
Measurement of time rate		10 seconds
Power cell	Part No.	280-68
	Cell code	SR512SW
	Size (mm)	ϕ5.8 x 1.2
	Voltage	1.55V
	Capacity	5.5mAH
	Lifetime	Approx. 2 years
Current value (consumption)		0.3μA
Coil resistance		1.6 ~ 2.0kΩ
Remarks		

§3. HANDLING INSTRUCTIONS



- The hands are set with the crown pulled out to the first click position, in the same manner as an ordinary analog watch.
- When the hands have been set to the correct time, be sure to push the crown back to the normal position.

  This watch contains a resetting switch. When the crown is pulled out to the hand-setting position, the resetting switch functions under the control of the IC to stop the driving pulse and the hour and minute hands immediately stop.

  The moment the crown is pushed back, the circuit starts counting and, because the watch has a function for compensating rotor phases, the hands begin to run normally after 20 seconds.

§4. NOTES ON DISASSEMBLY AND ASSEMBLY

1) Structure of module

To reduce the diameter of the module, the unit of electronic circuit is installed to the bottom (under the metal plate) for the first time.

When it needs to be removed for the repair of other parts, remove the train wheel first.

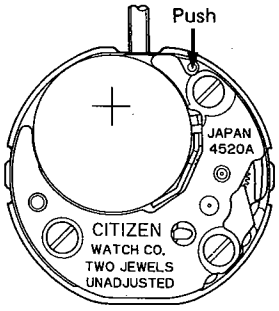
2) Effects of light on unit of electronic circuit

The IC installed in the unit of the electronic circuit is not shielded with (molded in) resin, thus it may consume more current if it is exposed to light. When measuring the current consumption of the electronic circuit unit, protect it from being exposed to the sunlight and the light from a incandescent lamp.

The IC is not affected by light as long as the complete module or the case is installed.

3) How to pull out the setting stem

Pull out the setting stem while it is pushed in the ordinary. Push the part pointed by the arrow in the figure at right and pull out the setting stem.



4) Lubrication

To use a small cell and lengthen its life, the module is so designed that it will consume less current. If incorrect oil is supplied to improper parts, current consumption is increased and the life of a new cell may be shortened. (See the Page 4 development drawing.)

5) Handling of plastic parts

Handling of plastic parts in the module

<Handling and washing method of plastic parts>

Section	Plastic parts section	Handling method	Washing method
1	Upper train wheel (e.g. third, fourth and fifth wheels and pinions)	Do not hold gears and pinions directly with tweezers, etc. when assembling, mesh the gears correctly.	Clean by means of ultrasonic washing or with a brush. Use volatile oil (benzine) or alcohol. Do not use any other cleaning liquid (Note 1).
2	Lower train wheel (e.g. minute wheel and pinion, hour wheel, date dial driving wheel)	↑	↑
3	Spacer and holders (e.g. spacer for setting stem, circuit unit supporter)	No. special handling method is required.	↑
4	Date dial and day dial	↑	Do not wash these parts. Soak volatile oil in deerskin stick and lightly wipe these parts with it.

Note 1: The plastic parts are dissolved in certain washing fluids (e.g. Trichlorethylene, paint thinner, gasoline, etc). Do not use the solvents and chemicals of this kind.

6) Others; engraving on case back

Since there is not a sufficient space on the case back, the higher three figures of the manufacture No. are indicated by two letters on the case back.

Example: 711※※※ —— 7X※※※

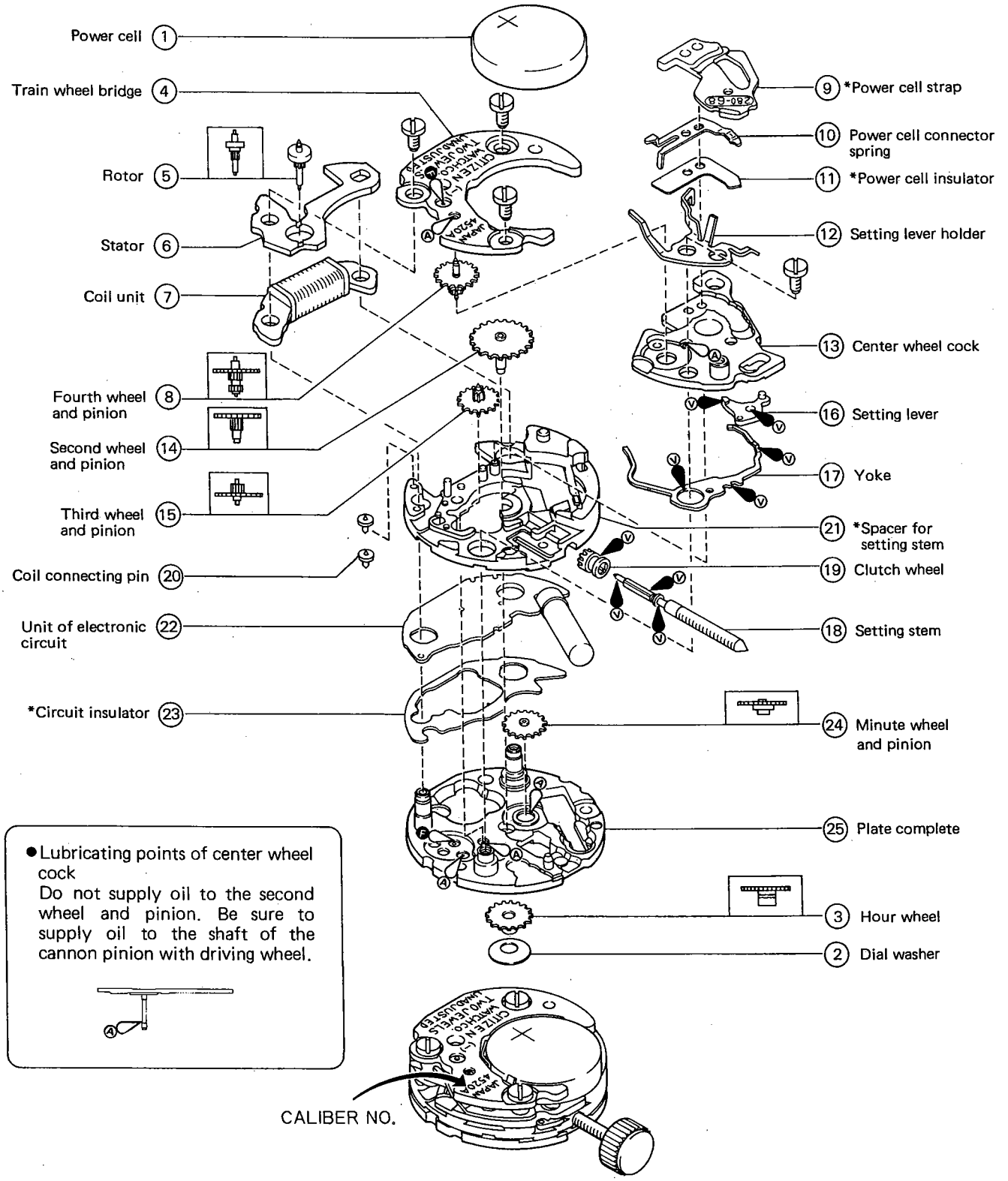
- 711: 1987, November
- 7X: O: October, X: November, Y: December

§5. DISASSEMBLY, ASSEMBLY AND LUBRICATION OF MODULE

Disassemble procedure : (1) → (25)

Assemble procedure : (25) → (1)

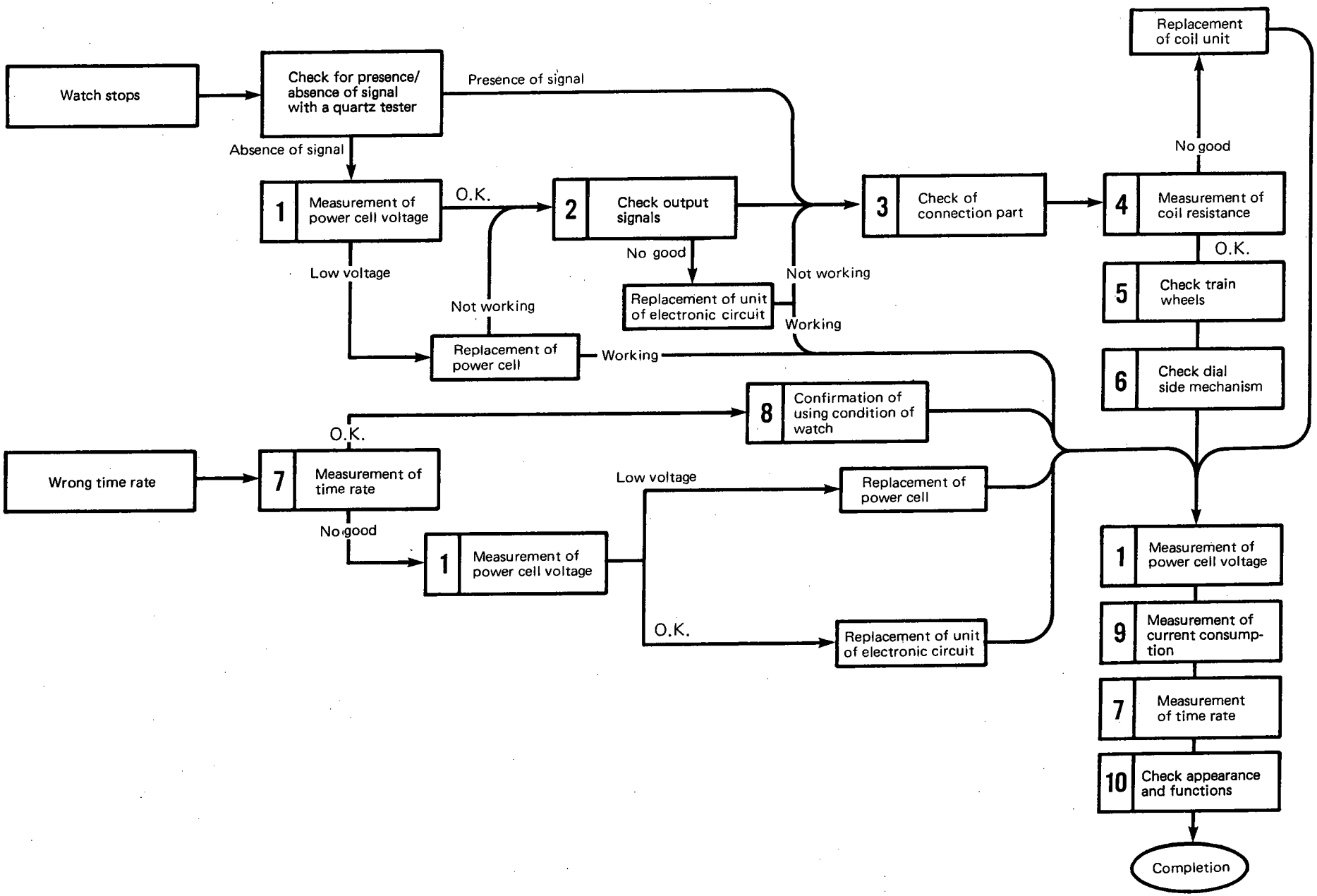
● Lubrication mark
- Ⓐ A-lube
- Ⓥ V-lube
- Ⓕ F-lube
- CH-1

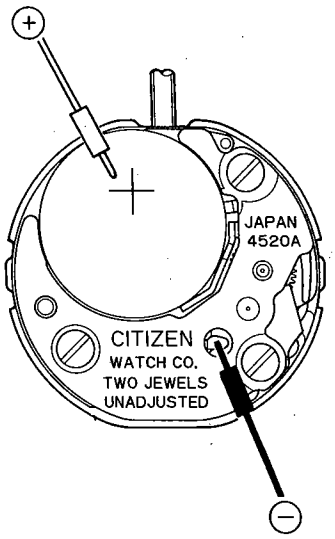
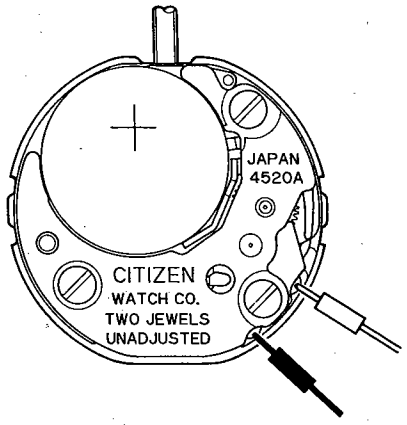


● Lubricating points of center wheel cock
Do not supply oil to the second wheel and pinion. Be sure to supply oil to the shaft of the cannon pinion with driving wheel.

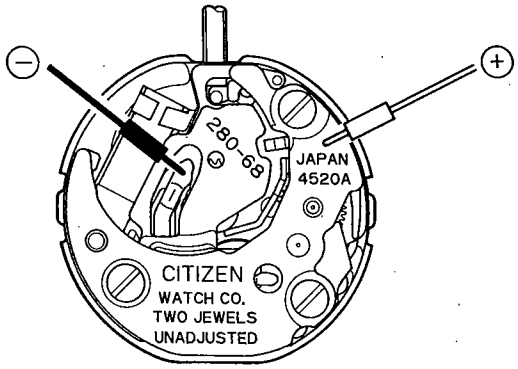
Note: Parts marked * are plastic parts.

§6. TROUBLESHOOTING AND ADJUSTMENT



Check items	Check method	Results and treatment
❶ Measurement of power cell voltage	[Refer to Technical Manual, Basic Course Ⅱ-1-a for the setting procedure of the tester.] <Tester range: DC 3V>  	**Over 1.5V** → Normal **Under 1.5V** → Replace the power cell
❷ Check output signals	[Refer to Technical Manual, Basic Course Ⅱ-1-b for the setting procedure of the tester.] <Tester range: DC 0.3V>  ●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)	The tester pointer swings every 20 seconds → Normal The tester pointer does not swing → Check the connections The connections are normal → Replace the electronic circuit unit
❸ Check connection part	[Refer to Technical Manual, Basic Course Ⅱ-2-a.] Check for looseness of screws, dust, dirt, etc. a) If the fixing screw of the electronic circuit unit is loosened, the drive signals may not be transferred. b) If dust or dirt stick to the pattern of the coil or electronic circuit unit, the current may not flow sufficiently.	

Check items	Check method	Results and treatment
❹ Measurement of coil resistance	[Refer to Technical Manual, Basic Course Ⅱ-1-c for the setting procedure of the tester.] <Tester range: R x 10Ω> Remove the train wheel bridge, rotor, stator and coil unit in order, and measure the resistance of the disconnected coil unit. (The tester lead pins have no polarity)	**1.6 kΩ ~ 2.0 kΩ** → Normal Outside range of **1.6 kΩ ~ 2.0 kΩ** → Replace coil unit
❺ Check train wheels	[Refer to Technical Manual, Basic Course Ⅱ-2-b.] ●Check the appropriate clearance of each wheel and rotor for dust. ●This Cal. is so designed that less current will be consumed, thus take care not to supply wrong oil or supply oil too much. Confirm excessive oil is not flowing out.	
❻ Check dial-side mechanism	[Refer to Technical Manual, Basic Course Ⅱ-2-c.] ●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.	
❼ Measurement of time rate	[Refer to Technical Manual, Basic Course Ⅱ-2-d.] ●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. (Measurement is made in a 10 second-range.)	The watch loses or gains substantial time → Replace electronic circuit unit.
❽ Confirmation of using condition	[Refer to Technical Manual, Basic Course Ⅱ-2-e.]	

Check items	Check method	Results and treatment
⑨ Measurement of current consumption	[Refer to Technical Manual, Basic Course Ⅱ-1-f for the setting procedure of the tester.] <Tester range: DC 12μA> Set the battery to the adapter.  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 be increased to about 2 – 3μA. In this case, pull out the crown, then return it to the ordinary position, and the current consumption is stabilized. Set the power cell with the crown pushed in. b) When measuring the power consumption of the separate electronic circuit unit, confirm the stamps of ⊕ and ⊖ on the circuit pattern, then measure the current similarly to the current consumption of the module. **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 increas.**	●Current consumption of the module **Under 0.3μA** → Normal **Over 0.3μA** → Measure the electronic circuit unit separately. ●Measurement of the separate electronic circuit unit **Under 0.2μA** → Normal **Over 0.2μA** → Replace electronic circuit unit When the current value of the module shows a high value, but that of the separate electronic circuit unit is normal. There may be a problem somewhere outside the circuit. Therefore, inspect the watch for stains, lubrication conditions and deformed parts, and remove the cause of the high load.
⑩ Check appearance conditions and functions	[Refer to Technical Manual, Basic Course Ⅱ-2-f.]	

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