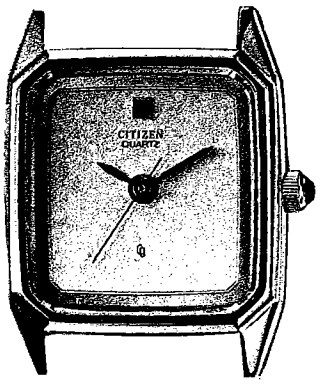
TECHNICAL INFORMATION

CITIZEN QUARTZ

Cal. No. 29※※※

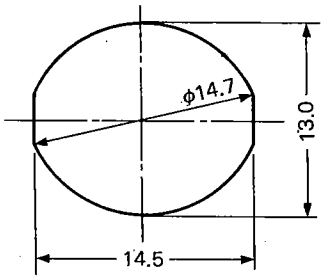


CITIZEN

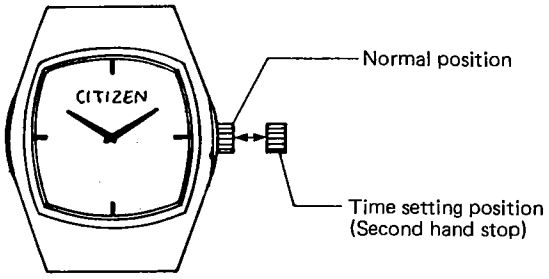
■1. OUTLINE OF NEW PRODUCT

This is an analog quartz watch with center second for ladies and based on the mechanism of precedent Cal. No. 11-series watches. It has a shorter length than Cal. No. 11 in the 12-6 o'clock direction with reduced thickness of the movement. Owing to the small thickness of the structure, a variety of designs is possible to comply with the high and modern liking of the contemporary ladies.

■2. SPECIFICATIONS

Caliber No.		2930E-07	2931A-07
Type		Analog quartz watch with center second	
Size of movement (mm)		 (Thickness) 2930E: 2.1 (incl. power cell part) 2931A: 2.1 (power cell part 2.3)	
Oscillation		32,768Hz	
Effective temp. range		-10°C ~ +60°C (14°F ~ 140°F)	
Converter		Bipolar step motor	
Integrated circuit		C/MOS-LSI (1 unit)	
Accuracy		±15 sec./month at normal temp.	
Adjustment of time		DFC method (w/control terminal; unit of measurement time 10 sec.)	
Additional functions		●Second hand stopping device (Power saving switch) ●Power cell life indicator	
Power cell (Silver oxide)	Parts No.	280-107	280-59
	Maker code	TR516HSW	SONY379
	Nominal voltage	1.85 ~ 1.55V	1.55V
	Capacity	11.5mmAH	13.0mmAH
	Life time	About 2 years	About 2 years
	Size (mm)	5.8φ x 1.65	5.8φ x 2.15

■3. HANDLING INSTRUCTIONS



- The second hand stops at an optional position with a push of the crown. (Power saving mode) The second hand starts again in a second after the crown is pushed back to its normal position.
- When the life of the power cell comes near its end, the normal 1-second step movement of the second hand changes to a 2-second step movement. (Power cell life indicator)

■4. DISASSEMBLY/ASSEMBLY OF MOVEMENT

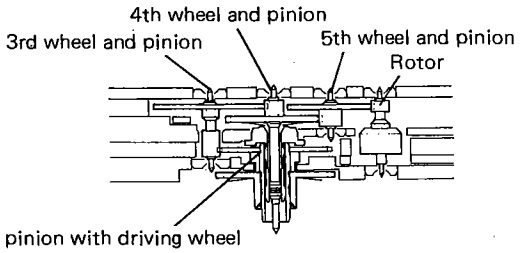
Disassembling procedure: ① → ㉗

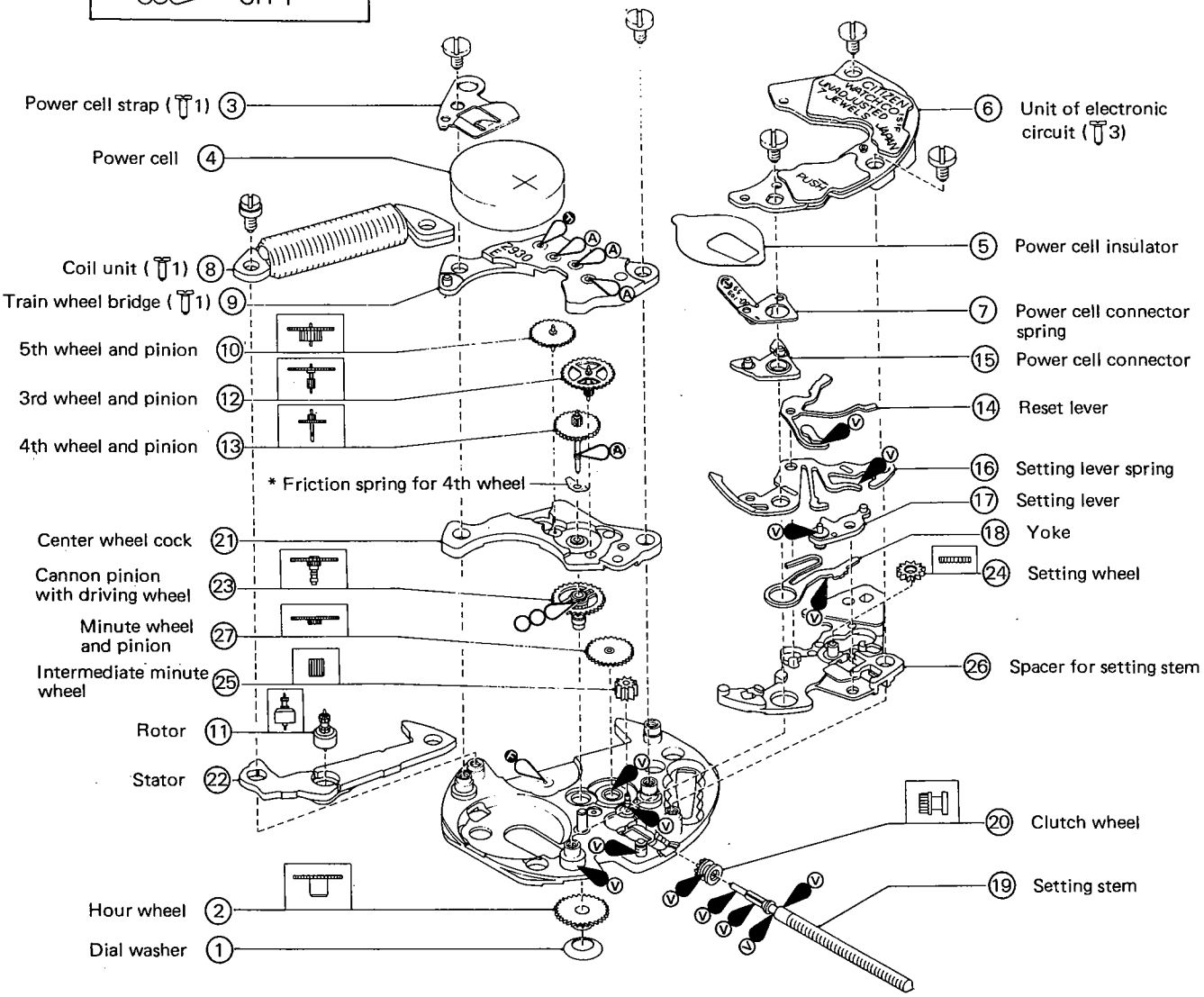
Assembling procedure: ㉗ → ①

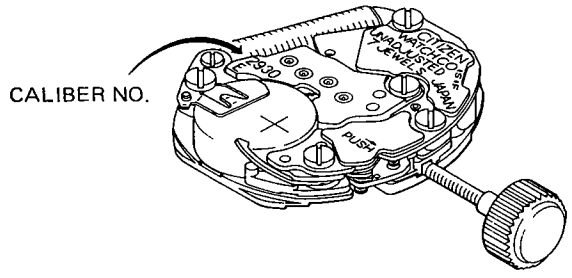
Marks of lubrication:

- Ⓐ A
- Ⓥ V
- Ⓕ F
- CH-1

Cross section of train wheels

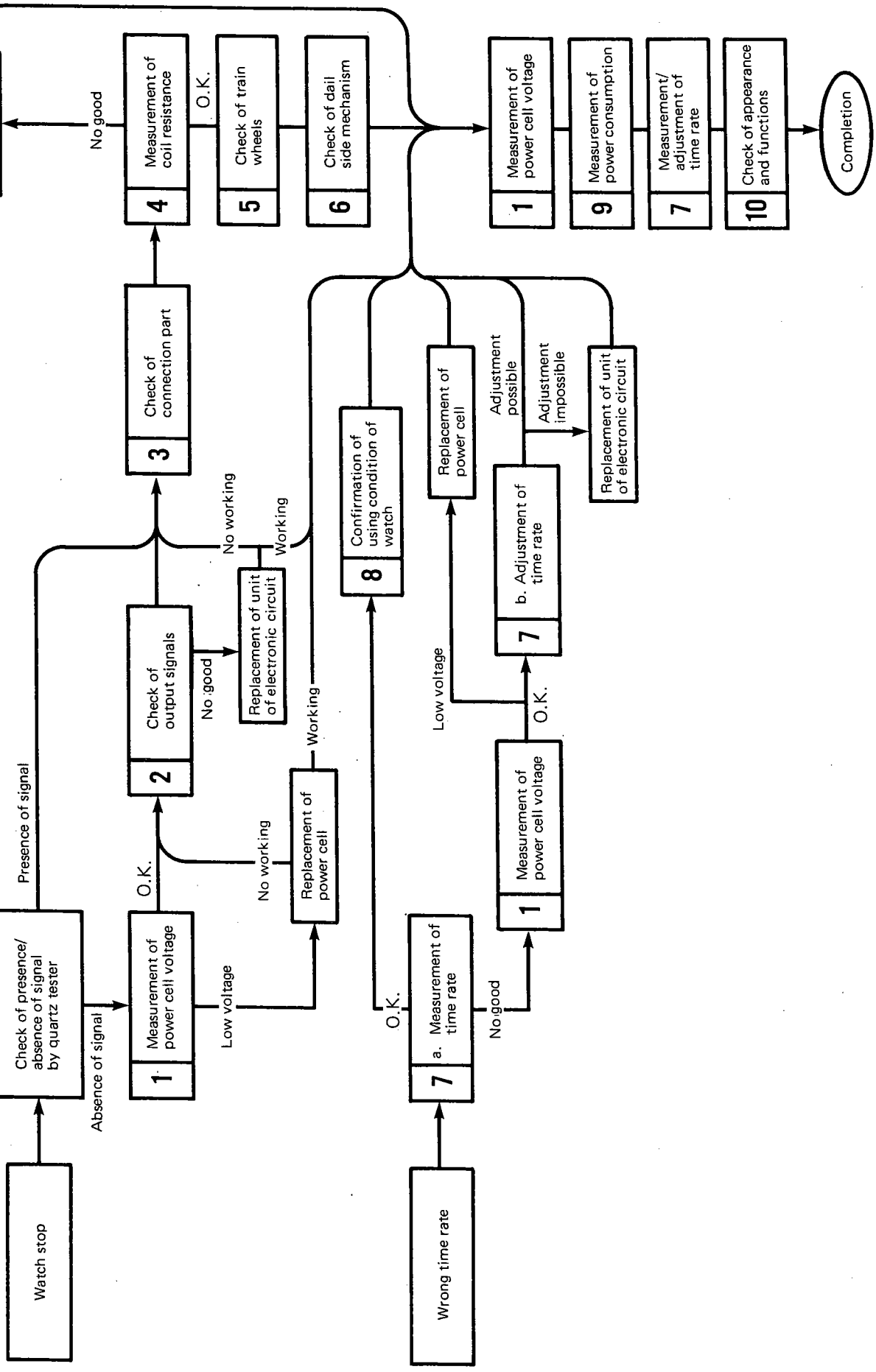


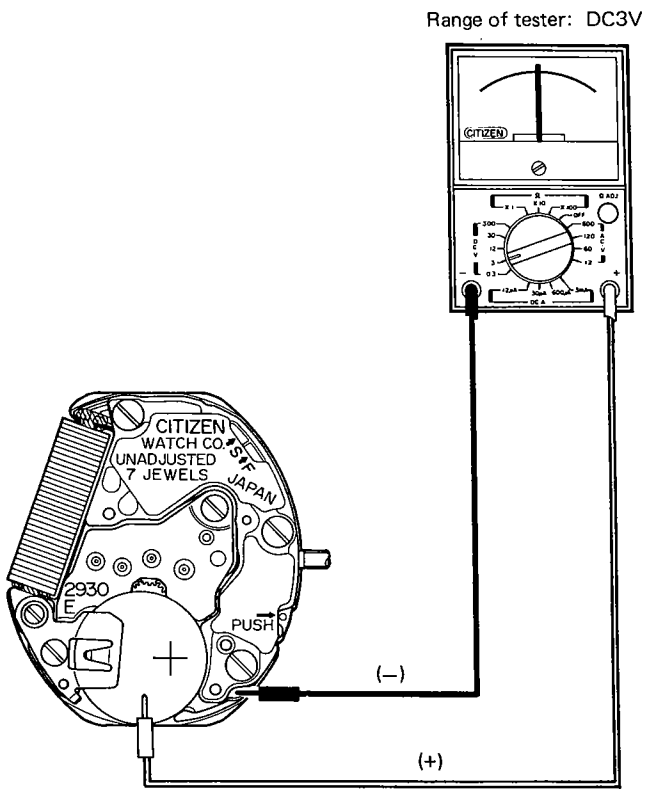
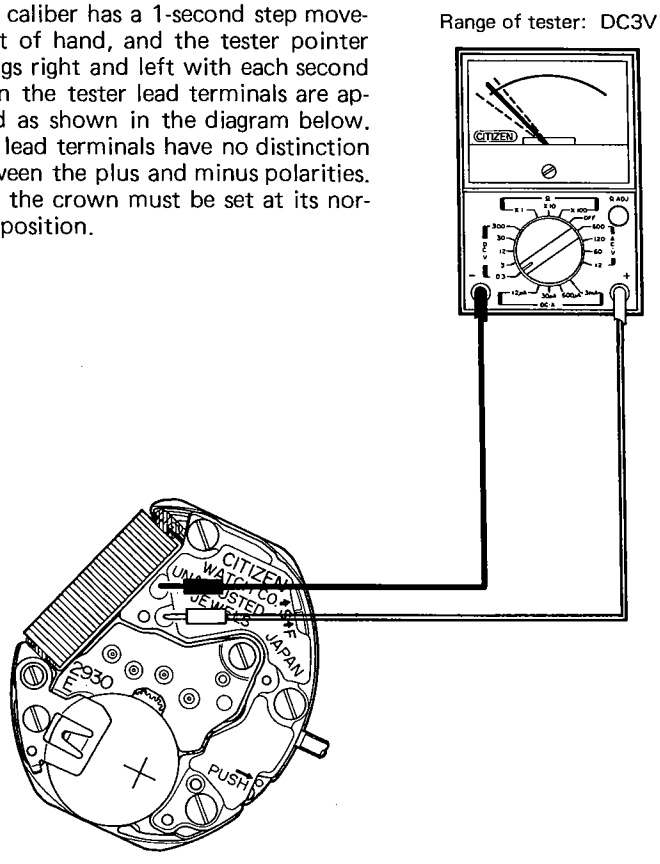


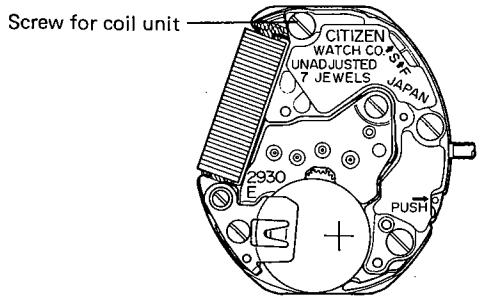
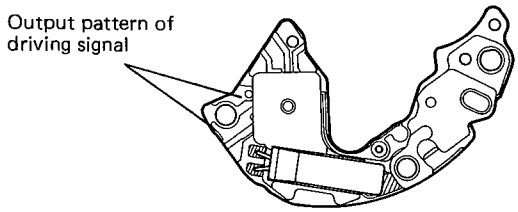
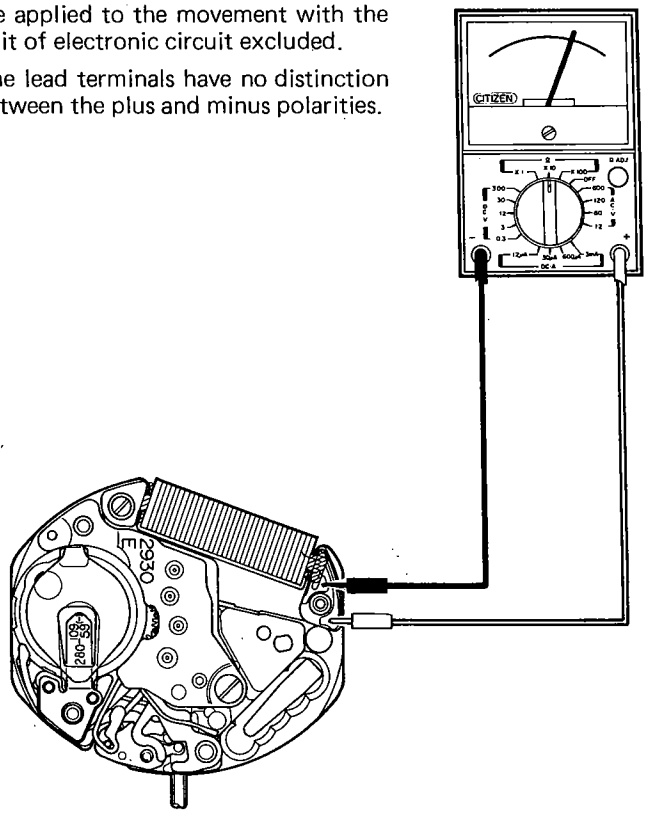


*Friction spring for 4th wheel
This spring is exclusive for Cal. No. 2930E only and disassembled and assembled after and before the 4th wheel and pinion respectively.

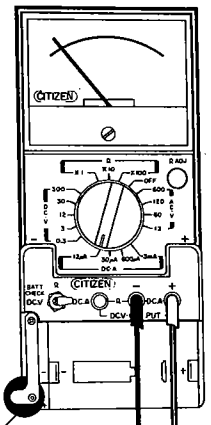
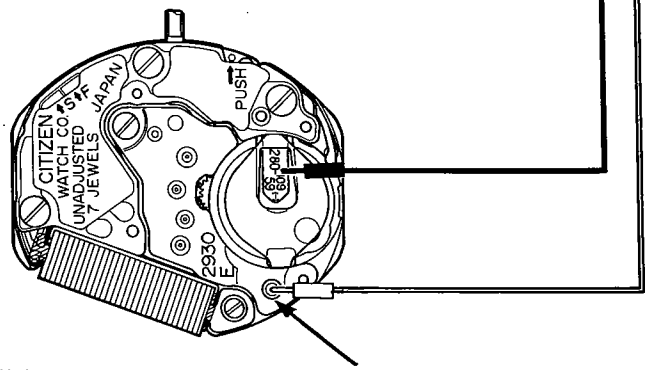
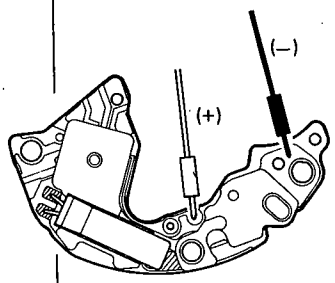
■6. TROUBLESHOOTING AND ADJUSTMENT



Checking items	How to check	Results and treatment
1 Measurement of power cell voltage	Range of tester: DC3V 	**Over 1.5V** →Nondefective **Under 1.5V** →Replacement of power cell
2 Confirmation of output signal	This caliber has a 1-second step movement of hand, and the tester pointer swings right and left with each second when the tester lead terminals are applied as shown in the diagram below. The lead terminals have no distinction between the plus and minus polarities. And the crown must be set at its normal position. Range of tester: DC3V 	Tester pointer swinging with each second →Nondefective No swinging of tester pointer →Replacement of unit of electronic circuit

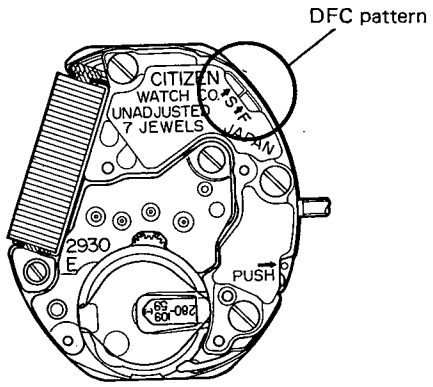
Checking items	How to check	Results and treatment
3 Check of connection parts	The driving signal is not sometimes transmitted if the screw for coil unit is loose.  	Screw loosened → To be driven tight
	The connection is faulty if the output pattern of the driving signal has some soil at the coil terminal or the unit of electronic circuit.  Rear side of unit of electronic circuit	Soil on pattern → To be cleared away
4 Measurement of coil resistance	As illustrated below, the lead terminals are applied to the movement with the unit of electronic circuit excluded. The lead terminals have no distinction between the plus and minus polarities. Range of tester: X10Ω  	**2.6 ~ 3.2kΩ** → Nondefective **Outside 2.6 ~ 3.2kΩ** → Replacement of coil unit

Checking items	How to check	Results and treatment
5 Check of train wheels	●Make sure that the transmission is smooth with each gear with an appropriate clearance and with no backlash. ●Make sure that no dust or other foreign matters are mixed among the gear's and especially that no cuttings stick at the rotor part. ●Make sure that the lubrication is satisfactory with no shortage of oil, soil of oil, overflow of oil, etc. ●Make sure that each hole jewel has no break, no inclination, etc.	Improper clearance ⟶Adjustment of clearance Backlash ⟶Replacement of gear Dust and other foreign matters ⟶To be removed Soil or oil ⟶To be washed away
6 Check of dial-side mechanism	●Check the turning condition of hands with the crown pulled out by one click. ●In this case, the unit of electronic circuit must be incorporated in order to avoid the displacement of the yoke, setting lever spring, etc. ●Make sure that the transmission is smooth with each gear with an appropriate clearance and with no backlash. ●Make sure that the joggle has no bend. ●Make sure that no dust nor cuttings are mixed among the gears. ●Make sure that the lubrication is satisfactory.	Backlash ⟶Replacement of gear Improper clearance ⟶Adjustment of clearance Dust and other foreign matters ⟶To be removed Insufficient lubrication ⟶Lubrication again
7 Measurement and adjustment of time rate	●Measurement of time rate This caliber uses the DFC method, and the unit time of measurement must be set at 10 seconds or its integer-fold value. ●Adjustment of time See 7. Adjustment of Time Rate on page 9.	
8 Confirmation of using condition of watch	The following points are confirmed with the user of the watch. ●The watch was used at an extreme temperature outside its working temp. range. ●The watch was put close to an intensive magnetic field of the magnetic health appliances, etc. ●When dit the watch receive the latest replacement of its power cell? ●The watch was handled in a wrong way.	

Checking items	How to check	Results and treatment
9 Measurement of power consumption	As illustrated below, the power consumption of the watch is measured. As the value of power consumption is very small, the following tow points must be kept in your mind to avoid an error of measurement. ● Make sure that the tester pointer is at 0 (0-adjustment). ● The measured value must be read at the position right above the scale of the tester. Range of tester: DC12μA  Power cell  With complete movement Screw for train wheel bridge set before measurement to avoid dislocation of train wheel bridge	a) Measurement with complete movement **Under 0.9μA** → Nondefective **Over 0.9μA** → Measurement with unit of electronic circuit only b) Measurement with unit of electronic circuit only **Under 0.3μA** → Overhaul of movement **Over 0.3μA** → Replacement of unit of electronic circuit  Unit of electronic circuit only in the same way as the above left diagram for measurement
10 Check of appearance and functions	The following points are checked when the troubleshooting and adjustment are all through. ● The surface of the dial is free from any dust or stains. ● The crown is operated in a smooth and assured way. ● The second hand stops instantaneously when the crown is pulled out and then starts again in a second after the crown is pushed back.	

■7. ADJUSTMENT OF TIME RATE

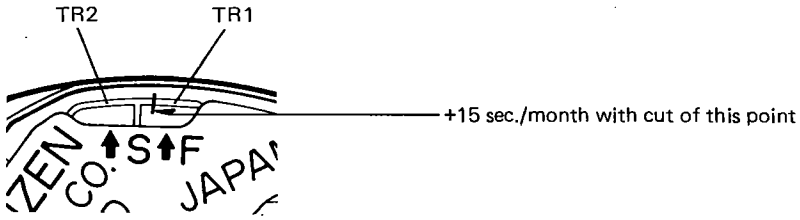
A DFC pattern for market is incorporated in this caliber and the adjustment of time rate is possible on the market.



As shown in the left diagram, two terminals TR1 and TR2 are provided on the unit of electronic circuit.

- Cut of "↑F" (TR1) pattern ..... +15 sec./month
- Cut of "↑S" (TR2) pattern ..... -15 sec./month
- Cut of both "↑F" and "↑S" patterns ..... -30 sec./month

As mentioned above, the desired pattern is cut softly with a cutter, a knife or the like.



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