TECHNICAL GUIDE
AND
PARTS LIST

CAL. Y590

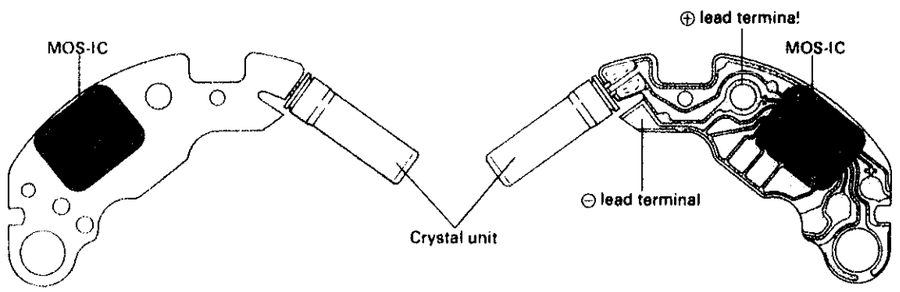
ANALOGUE QUARTZ

CONTENTS

I. SPECIFICATIONS

Item \ Cal. No.	Y590
Time indication	2-hand
Loss/gain	Loss/gain at normal temperature range Monthly rate: less than 20 seconds
Maximum diameter	13.0 (3H-9H) × 15.55 mm (6H-12H)
Casing diameter	13.0 × 15.15 mm
Height	2.8 mm (including battery: 3.05 mm max.)
Regulation system	None
Quartz tester	Use 10-second gate
Battery	Silver oxide battery Toshiba Maxell SR621SW Battery life: approx. 2 years Voltage: 1.55V
Jewels	2 jewels

II. CIRCUIT SCHEMATIC



III. LIST OF SCREWS USED

All screws used in Y590 are the same.

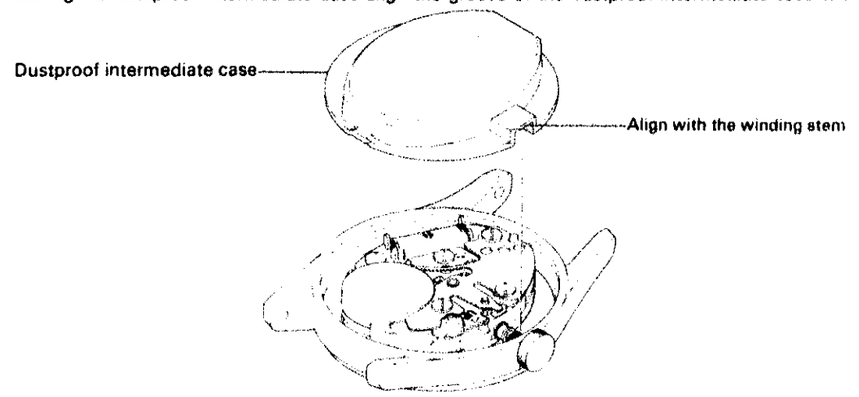
Code No.: 022484

Train wheel bridge screw: 1 pc.
Battery connection ⊕ screw: 3 pcs.
Coil block screw: 1 pc.

IV. DISASSEMBLING, REASSEMBLING AND LUBRICATING

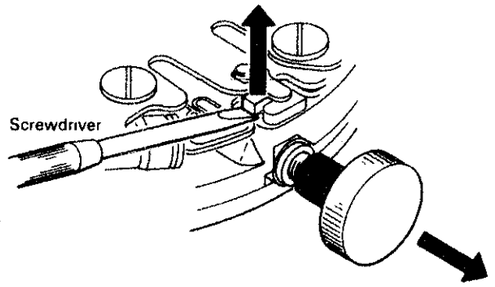
(1) Notes on casing

• The shape of the Y590 dustproof intermediate case differs from that of the former one. The Y590 dustproof intermediate case covers whole movement.
When installing the dustproof intermediate case align the groove of the dustproof intermediate case with the winding stem.

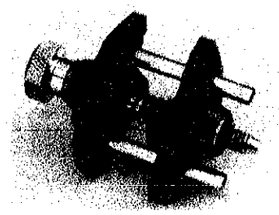


(2) Removing winding stem

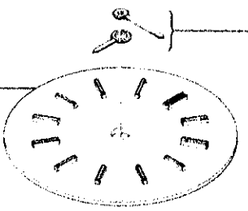
Lift the guide plate for winding stem and remove the winding stem.



• Lubricating
Disassembling procedures Figs.: ① – ㉓ Moebius A
Reassembling procedures Figs.: ㉓ – ① Moebius V
Used movement holder: Universal movement holder

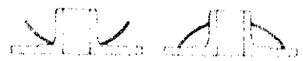


(3) Disassembling/reassembling minute hand ~ hour wheel



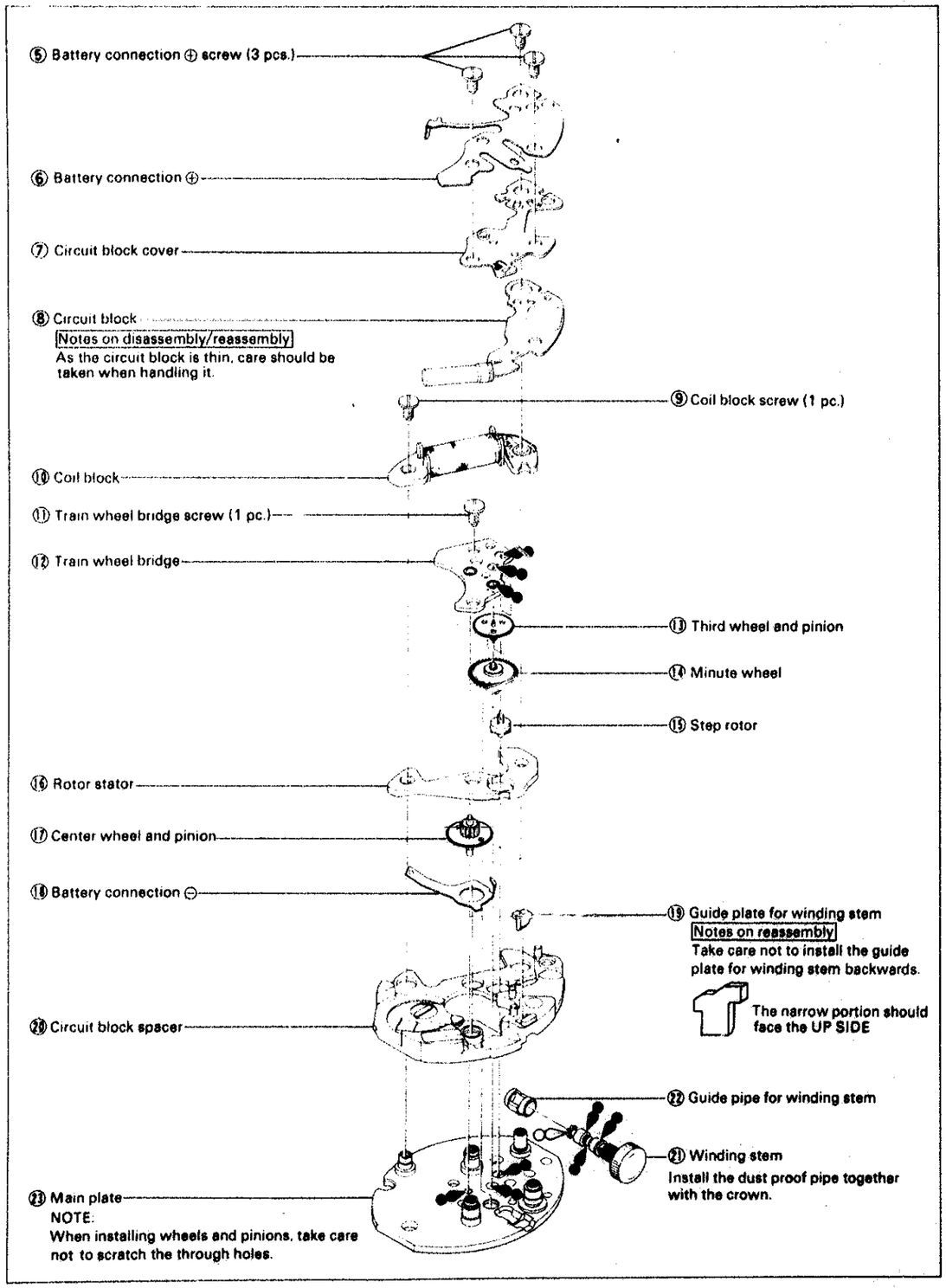
Notes on disassembly
• The dial is clamped between the circuit block spacer and dial foot. To remove the dial, insert a screwdriver into the space at 5 and 11 o'clock position and pry the dial out.

Notes on reassembly



Take care not to install the dial washer backwards.

(3) Disassembling, reassembling and lubricating the gear train, coil block and circuit block



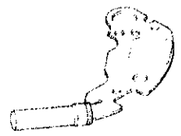
V. CLEANING

- Clean the parts in accordance with the method shown in the table below.

1. How to clean

Part name	Cleaning	Drying	Solution	Remarks
Plastic parts (circuit block spacer) Step rotor	Rinse or wash with a soft brush.	Warm air drying	Benzine, Diaflon S-3 or alcohol	•Use a clean solution as the step rotor is magnetized and may attract foreign metal particles. Any foreign matter which cannot be removed by cleaning should be removed with rodico. •When cleaning with benzine, the cleaning time should be minimized.
Other parts (excluding parts that must not be cleaned.)	Clean with a cleaner, rinse or wash with a soft brush	Warm or hot air drying	Benzine, alcohol or trichloroethylene	

2. Parts that must not be cleaned


Circuit block


Coil block


Battery

- Be sure to clean only stain on the conductive portions (circuit block, etc.) with a cloth moistened with benzine, or alcohol and dry them with warm air.

3. Cleaning condition

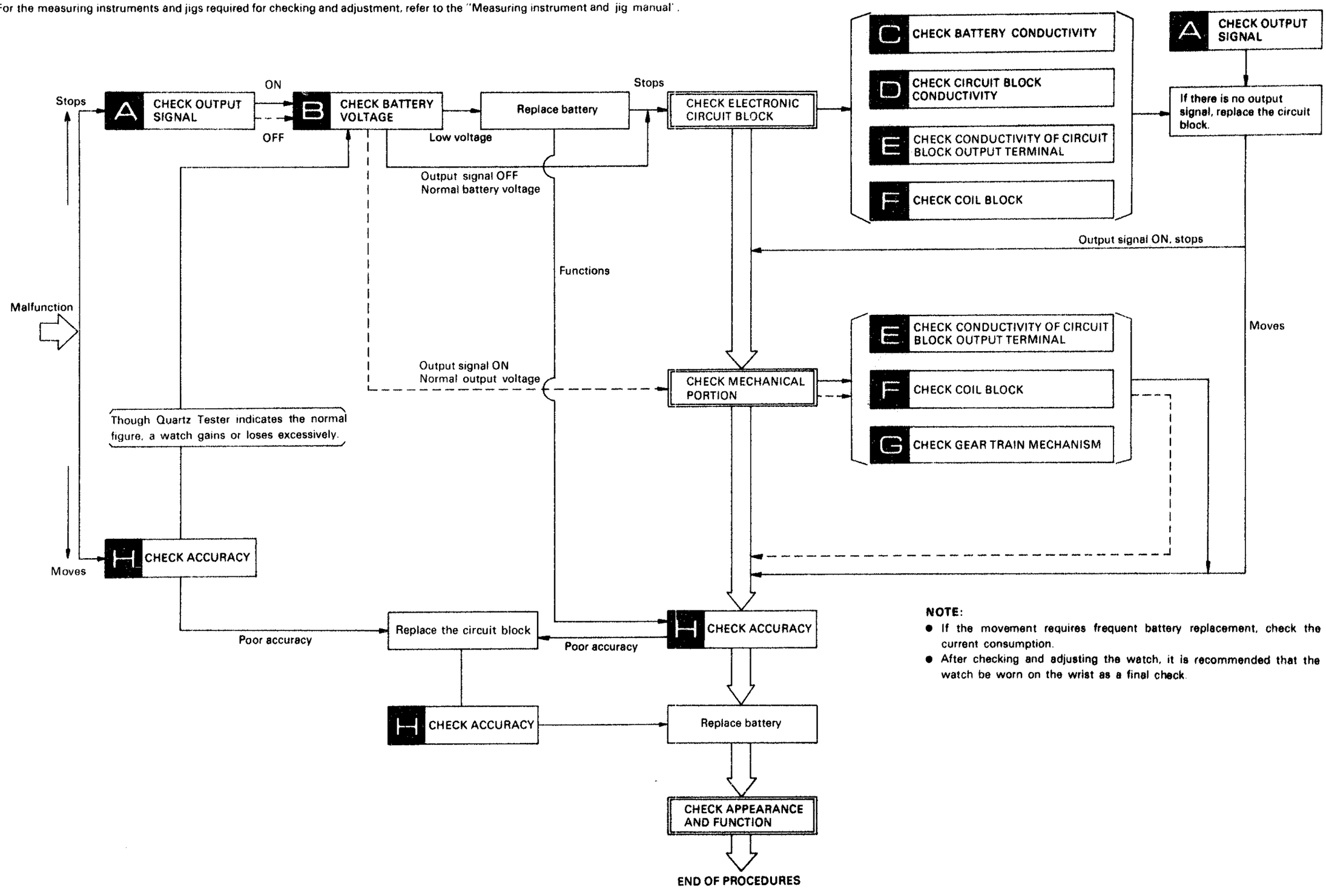
- Be sure to clean the parts in a room that is well ventilated. Do not leave the container of the cleaning solution uncapped for hours in a poorly ventilated room. The vapor of the cleaning solution is slightly toxic. Prolonged breathing of the vapor may induce drowsiness, provoke nausea or make you feel dizzy.

VI. CHECKING AND ADJUSTMENT

Be sure to use the static electricity protector when handling the module.

1. Guide table for checking and adjustment

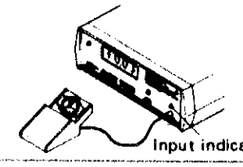
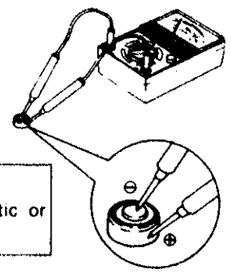
For the measuring instruments and jigs required for checking and adjustment, refer to the "Measuring instrument and jig manual".

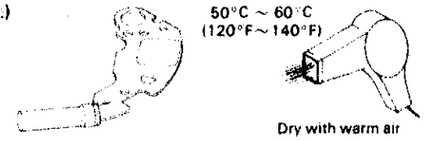
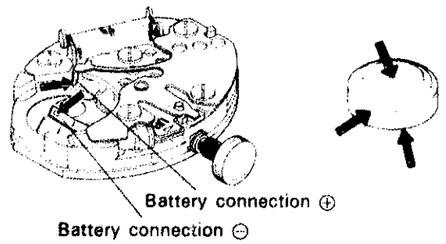
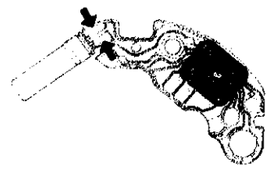


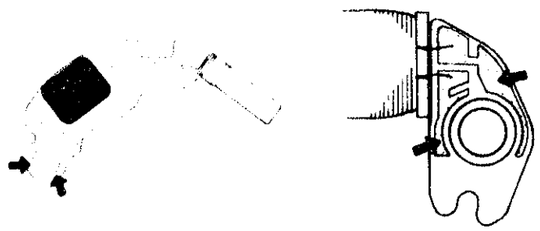
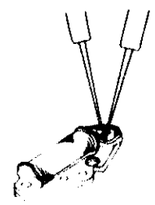
NOTE:

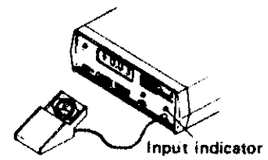
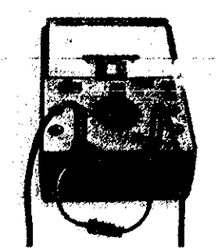
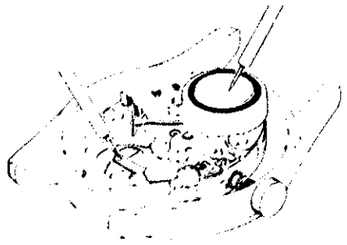
- If the movement requires frequent battery replacement, check the current consumption.
- After checking and adjusting the watch, it is recommended that the watch be worn on the wrist as a final check.

2. Procedure for checking and adjustment

	Procedure	Adjustment and repair
A CHECK OUTPUT SIGNAL	Check for output signal of the watch by checking to see if the input indicator links. 1. Set up the quartz tester. 2. Check for blinking input indicator.  Input indicator NOTE Check the output signal with the crown in the normal position. For checking the output signal of Case No. Y590-5286, refer to page **.	Blinking: Normal → Proceed to B No blinking: Defective
B CHECK BATTERY VOLTAGE	Check battery voltage. 1. Set up the volt-ohm-meter. Range to be used: DC3V 2. Measuring Red probe ⊕...Battery surface ⊕ Black probe ⊖...Battery surface ⊖  **NOTE:** When handling the battery use plastic or bamboo tweezers or fingercots. If battery electrolyte leakage occurs, clean the watch as described below.	1.5V or more: Normal • Proceed to "CHECK MECHANICAL PORTION" if the input indicator blinks correctly in A. • Proceed to "CHECK CIRCUIT BLOCK" if defects are found in A. Less than 1.5V: Defective If the watch moves after battery replacement, proceed to H. If the watch stops after battery replacement, proceed to "CHECK CIRCUIT BLOCK:.
HOW TO REPAIR THE MOVEMENT WHEN BATTERY ELECTROLYTE LEAKAGE OCCURS	Procedure 1. Remove the movement from the case. 2. Disassemble the movement. 3. Wipe off battery electrolyte on the circuit block. 1. Wipe off battery electrolyte on the circuit block with a cloth moistened with distilled water. If distilled water is not available, use tap water.  *Be sure to clean the connecting portions such as battery connection ⊖. *If the circuit block is badly contaminated with battery electrolyte, replace the circuit block with a new one.	

	Procedure	Adjustment and repair
HOW TO REPAIR THE MOVEMENT WHEN BATTERY ELECTROLYTE LEAKAGE OCCURS	2. Wipe off with a cloth moistened with alcohol. 3. Dry with warm air by using a dryer. (If the cleaned portions remain wet with water, they will corrode with rust.)  50°C ~ 60°C (120°F~140°F) Dry with warm air 4. Clean the other parts. (Battery connection ⊖, etc.) 1. Wash out battery electrolyte on the other parts with a soft brush with distilled water. (If distilled water is not available, use tap water.) (If the battery electrolyte leaks extremely and the parts are rusted, replace the parts with new ones.) 2. Rinse with alcohol. 3. Dry with warm air by using a dryer. 5. Reassemble the movement. (Replace the battery with a new one.) 6. Check to see if the watch functions and the current consumption is normal.	
C CHECK BATTERY CONDUCTIVITY	Check to see if the battery current flows to the circuit block is normal. • Check for any contamination on the battery surface, battery connection ⊕ and battery connection ⊖.  Battery connection ⊕ Battery connection ⊖	Uncontaminated: NORMAL Proceed to D. Contaminated: Defective Wipe off any foreign matter.
D CHECK CIRCUIT BLOCK CONDUCTIVITY	Check for short circuit and defective conductivity of the conductive portions of the circuit block. • Remove the circuit block and check the conductivity at the points indicated by the arrows with a microscope. 	No defective conductivity: Normal Proceed to E. Defective conductivity: Defective Replace the circuit block.

	Procedure	Adjustment and repair
E CHECK CONDUCTIVITY OF CIRCUIT BLOCK OUTPUT TERMINAL	Check for any contamination on the circuit block output terminal and coil lead terminal. 	Uncontaminated: Normal Proceed to **I**. Contaminated: Defective Wipe off any foreign matter.
F CHECK COIL BLOCK	Check for broken coil wire and short circuit of the coil block. 1. Set up the volt-ohm-meter. Range to be used: OHMS × 100 Be sure to make a zero-adjustment. 2. Checking *Apply the red and black probes of the volt-ohm-meter to the two lead terminals of the coil block. *Either red or black probe will do.  Note: *Apply the probe of the volt-ohm-meter to the pattern of the coil lead terminal. If the probe of the volt-ohm-meter is applied to the end of the coil wire for the coil lead terminal, it may cut the coil wire. *Be sure to check with the volt-ohm-meter set up close to the movement. If the volt-ohm-meter is set up far from the movement, you may cut the coil wire by poor handling of the probe.	Within the specified value (1.5 – 2.5V): Normal To check the circuit block, proceed to **A**. To check the mechanism, proceed to **G**. Less than 1.5kΩ: Defective (short-circuit) More than 2.5kΩ: Defective (Broken coil wire) Replace the coil block.
G CHECK GEAR TRAIN MECHANISM	Check the gear train mechanism for the following points. 1. Check for dust, lint or chips. 2. Check the lubrication. 3. Check the play of wheels and pinions.	Functions correctly: Normal Contaminated or does not function correctly: Defective Clean or correct.

	Procedure	Adjustment and repair
H CHECK THE ACCURACY	Check gain and loss of time by using the quartz tester. 1 Set up the quartz tester. 2 Check gain and loss.  Note: For checking accuracy of Case No. Y590-5289, refer to page **.	Doesn't gain or loss: NORMAL Gain or loss: Defective Replace the circuit block. Gain or loss of this watch is less than 20 seconds/Month.
CHECK CURRENT CONSUMPTION	• If frequent battery change is required, a current consumption test is recommended. • Measure the current consumption with the volt-ohm-meter or micro tester. 1. Volt-ohm-meter 1 Range to be used: Set to minimum current measuring range. 2 Set up the condenser kit of 200 – 500μF. 3 Place the battery on the movement with its plus side down. 4 Apply the probes of the volt-ohm-meter to the battery and the battery connection ⊖. • Red probe ⊕...Battery connection ⊖ • Black probe ⊖...Battery surface ⊖. 5 Read the value.   Note: If the pointer of the volt-ohm-meter swings over the maximum value when DC12μA is used, change the range to a greater one where the pointer does not run over the maximum value while applying the probes to the respective portions. Then, after two or three seconds, return the range to DC12μA again for measuring. The above procedures must be followed since a large amount of current may flow to some part of the circuit after the power is turned on and before the crystal oscillator starts oscillating. If the pointer of the volt-ohm-meter still swings over the maximum value after following the above procedures, there may be a short-circuit. Check once again.	Less than 1.0μA: Normal 1.0μA or more: Defective Replace the circuit block.

All procedures of Disassembling, Reassembling, Checking and Adjustment are completed.

VII. PARTS LIST

Cal. Y590 A			
PART NO.	PART NAME	PART NO.	PART NAME
125 705	Train wheel bridge	* 4271 700	Battery connection ⊕
221 705	Center wheel and pinion	4408 705	Circuit block spacer
231 705	Third wheel and pinion	4457 705	Circuit block cover
238 705	Guide pipe for winding stem	022 484	Train wheel bridge screw
261 705	Minute wheel	022484	Battery connection ⊕ screw
271 705	Hour wheel	022 484	Coil block screw
354 •••	Winding stem	011542	Upper hole jewel for step rotor
711 705	Guide plate for winding stem	011 542	Lower hole jewel for step rotor
491 546	Dial washer	027 101	Tube for train wheel bridge
4001 705	Circuit block	027 102	Tube for battery connection ⊕ screw
4002 705	Coil block	027 103	Tube for battery connection ⊕ screw
4146 705	Step rotor	027 104	Tube for battery connection ⊕ screw
4239 705	Rotor stator	027 105	Tube for coil block screw
4270 705	Battery connection ⊖	• MAXELL SR621SW	Silver oxide battery
4225 730	Battery clamp	• SEIKO (SEIZAIKEN) TR621SW	

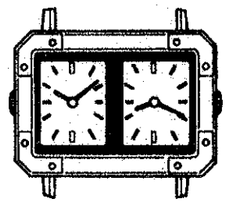
Remarks:

*Battery connection(+) for Pulsar Watches

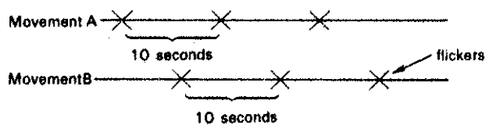
4271701 (Pulsar marking)

CHECKING THE ACCURACY AND OUTPUT SIGNALS OF Y590-5289 (TWIN WATCH)

The Y590-5289 twin watch is equipped with two identical movements and each functions as an independent watch.
Therefore, when the watch is placed on the Quartz Tester to measure the accuracy or output signal, it is not possible to know which movement is measured.
To check the accuracy and output signals, proceed as follows.



(Outer view of Y590-5289)

	Procedures	Adjustment and repair
CHECK ACCURACY	1) Remove the case back. 2) Remove the battery from the movement whose accuracy and output signal are not to be measured. ● The movement is not equipped with a battery holder. When the case back is removed, the battery pops out and power is not supplied. To prevent this, proceed as follows. (1) Install the case back so that power is supplied. (2) Use an external power supply. (3) Place the watch on the Quartz Tester and hold the battery with a finger. 3) Place the watch on the Quartz Tester and measure the accuracy. (Measuring gate; 10-second) 4) Perform steps 2) and 3) above for the other movement.	● The monthly loss/gain of this watch is less than 20 seconds. No loss/gain: Normal Loss or gain: Defective Replace the circuit block.
CHECK OUTPUT SIGNAL	As signals are output from both movements, proceed as follows. 1) Place the watch on the Quartz Tester. 2) Check to see if the output signal lamp of the Quartz Tester lights up for each movement every 10 seconds. 	Two signals are output every 10 seconds: Normal No signal output or one signal output every 10 seconds: Defective Remove one of the batteries as shown above and check whose movement is defective. Proceed to ■ of the Technical Guide for Cal. Y590.