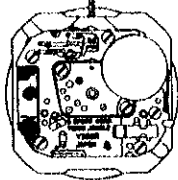



# PARTS CATALOGUE/TECHNICAL GUIDE

## Cal. Y301A Cal. Y302A

### [SPECIFICATIONS]

Cal. No.		Y301A	Y302A
Item			
Movement		The illustrations refer to Cal. Y302A. (x 1.0)	
Movement size	Outside diameter	ø20.0 mm 18.5 mm between 12 o'clock and 6 o'clock sides 15.4 mm between 3 o'clock and 9 o'clock sides	ø23.0 mm 19.0 mm between 12 o'clock and 6 o'clock sides 19.0 mm between 3 o'clock and 9 o'clock sides
	Casing diameter	ø19.5 mm 18.5 mm between 12 o'clock and 6 o'clock sides 15.0 mm between 3 o'clock and 9 o'clock sides	ø19.5 mm 19.0 mm between 12 o'clock and 6 o'clock sides 15.0 mm between 3 o'clock and 9 o'clock sides
	Height	1.6 mm	1.9 mm
Time indication	3 hands		
Driving system	Step motor (Load compensated driving pulse type)		
Additional mechanism	—		Date calendar Instant setting device for date calendar
	Train wheel setting device Electronic circuit reset switch Battery life indicator		Train wheel setting device Electronic circuit reset switch Battery life indicator
Loss/gain	Annual rate at normal temperature range: less than 10 seconds		Annual rate at normal temperature range: less than 20 seconds
Regulation system	Pattern cutting system		
Measuring gate by quartz tester	Use 10-second gate.		
Battery	SEIKO SR716SW, Maxell SR716SW, Matsushita SR716SW Battery life is approximately 3 years. Voltage: 1.55V		
Jewels	3 jewels		




SEIKO CORPORATION

# PARTS CATALOGUE

Cal. Y301A, Y302A

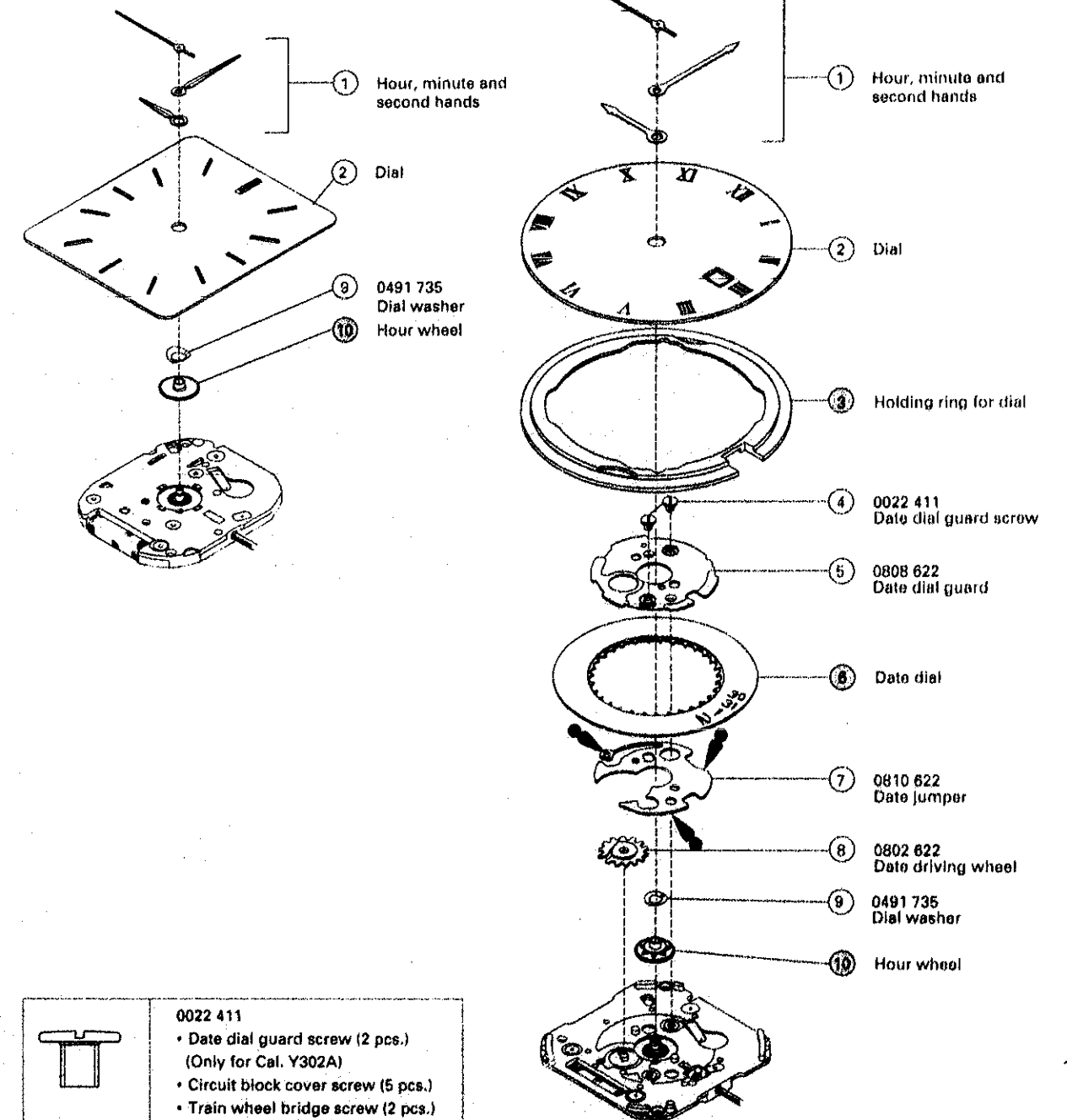
Disassembling procedures Figs. : ① → ③⑤

Reassembling procedures Figs. : ③⑤ → ①

Lubricating: Types of oil      Oil quantity  
 Moebius A       Normal quantity  
 SEIKO Watch Oil S-6

Ex.: Cal. Y301A

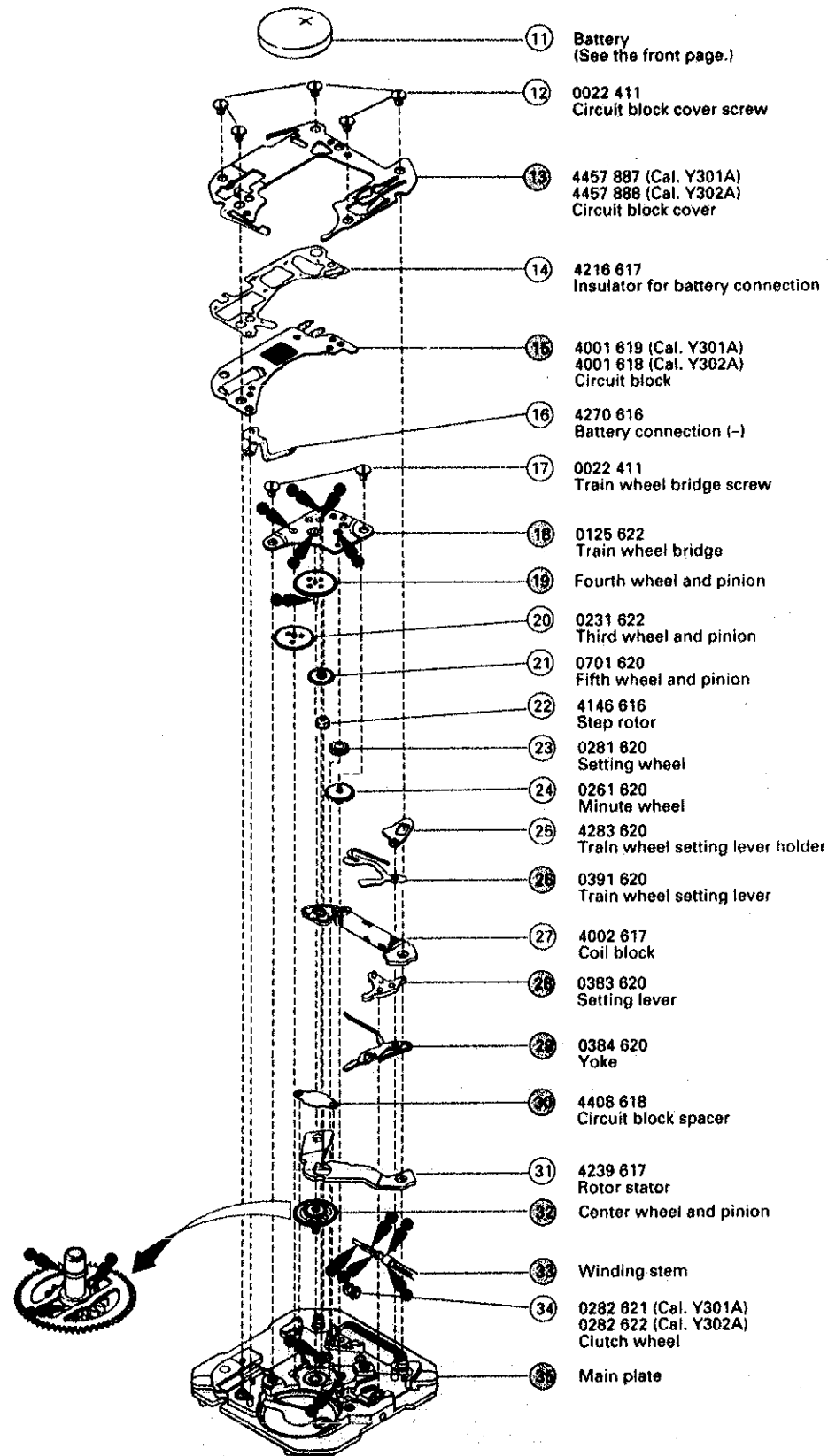
Ex.: Cal. Y302A



 Please see the remarks on the following pages.

# PARTS CATALOGUE

Cal. Y301A, Y302A



➡ Please see the remarks on the following pages.  
(Lubricating of some parts is shown in "II. REMARKS ON DISASSEMBLING AND REASSEMBLING")

# PARTS CATALOGUE

Cal. Y301A, Y302A

## Remarks:

- 3 Holding ring for dial (only for Cal. Y302A) 0866 621  
The type of holding ring for dial is determined based on the design of cases. Check the case number and refer to "PULSAR Casing Parts Catalogue" to choose a corresponding holding ring for dial.

- 6 Date dial (only for Cal. Y302A)

Part code	Position of crown and calendar frame	Color of figure	Color of background
0801 959	3 o'clock	Black	White

The type of date dial is determined based on the design of cases. Check the case number and refer to "PULSAR Casing Parts Catalogue" to choose a corresponding date dial.

- 10 Hour wheel
- 19 Fourth wheel and pinion
- 32 Center wheel and pinion
- 35 Main plate

## Combination:

Cal. Y301A and Cal. Y302A differ from each other in the following parts. Refer to the table below.

### [Cal. Y301A]

Discrimination		Center wheel and pinion	Fourth wheel and pinion	Hour wheel	Main plate (center pipe)
Height	Numeral for discrimination				
Extra long type	4	 0221 646	 0241 637	 0271 628	 0100 624

### [Cal. Y302A]

Discrimination		Center wheel and pinion	Fourth wheel and pinion	Hour wheel	Main plate (center pipe)
Height	Numeral for discrimination				
Extra long type	4	 0221 652	 0241 638	 0271 629	 0100 625

- 33 Winding stem 0351 624 (Cal. Y301A), 0351 625 (Cal. Y302A)

The type of winding stem is determined based on the design of cases. Check the case number and refer to "PULSAR Casing Parts Catalogue" to choose a corresponding winding stem.

## Part codes of the hole jewels

Part code	Part name
0011 325	Upper hole jewel for fourth wheel and pinion

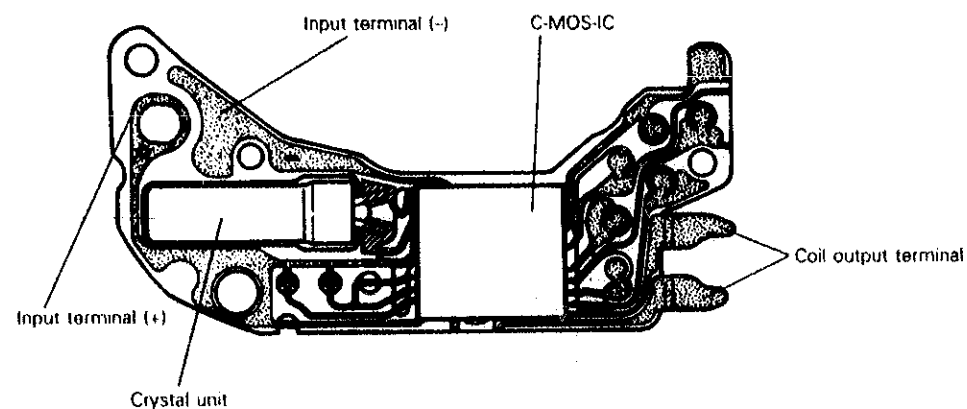
Part code	Part name
0011 568	Upper hole jewel for step rotor

# TECHNICAL GUIDE

Cal. Y301A, Y302A

- The explanation here is only for the particular points of Cal. Y301A and Y302A.
- For the repairing, checking and measuring procedures which are not described in this manual, refer to the "TECHNICAL GUIDE, GENERAL INSTRUCTIONS".
- Note on the environment for repair and measurement  
To maintain time accuracy, the work of disassembling, reassembling and time accuracy measurement should be made in the following environment.
  - Ambient temperature:  $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$
  - Ambient humidity: 50% ~ 60%

## I. STRUCTURE OF THE CIRCUIT BLOCK



## II. REMARKS ON DISASSEMBLING AND REASSEMBLING

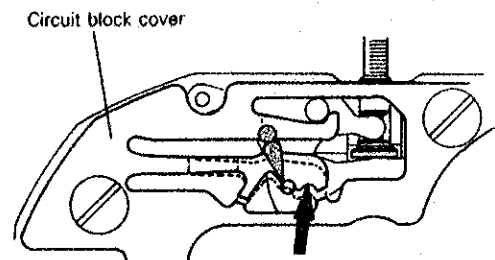
### 13 Circuit block cover

#### • How to install

- Tighten the circuit block cover screws, and then, push the spring portion of the yoke from the direction of the arrow as shown in the illustration at right to set the spring portion to the pin of the setting lever.

#### • Lubricating

- Lubricate the contact portion of the pin of the setting lever with the spring portion of the yoke.



### 15 Circuit block

- When handling the circuit block, observe the following to maintain the time accuracy of the watch.
- Do not hold the circuit block with bare hands.
  - Do not soil the circuit block.
  - Do not press down hard on the printed circuit board of the circuit block or do not bend it.
- \* If the circuit block is soiled, gently wipe it with a soft cloth soaked with alcohol. If the circuit block remains soiled, replace it with a new one.

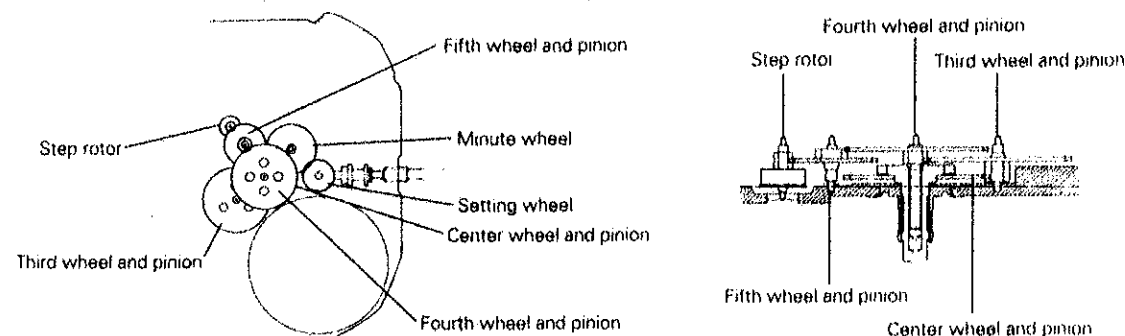
# TECHNICAL GUIDE

Cal. Y301A, Y302A

### 18 Train wheel bridge

#### • How to install

Refer to the illustrations below to check where to install the respective wheels.



### 26 Train wheel setting lever

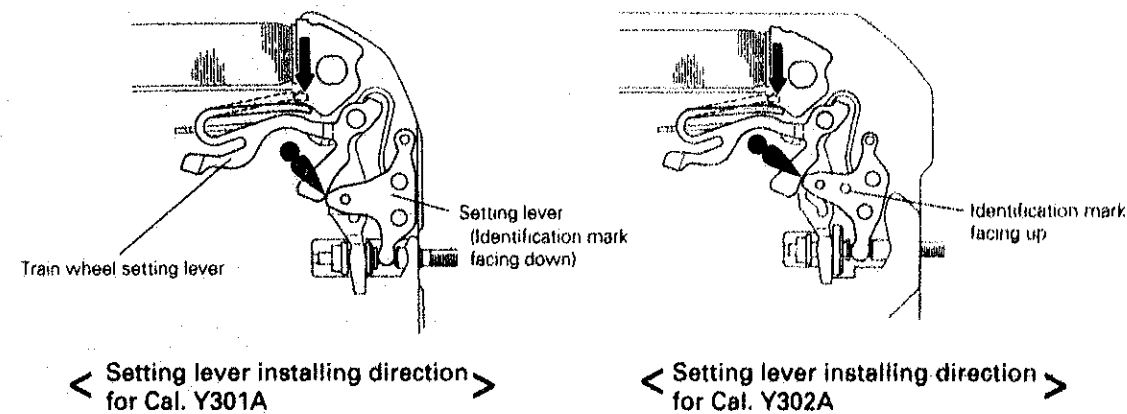
### 28 Setting lever

#### • How to install

- Push the spring portion of the train wheel setting lever from the direction of the arrow to set the train wheel setting lever. In doing so, take care not to cut the wire of the coil block or deform the rotor stator.
- The same type of setting levers are used in Cal. Y301A and Y302A, but they are installed in different directions. Refer to the illustrations below to set them properly.

#### • Lubricating

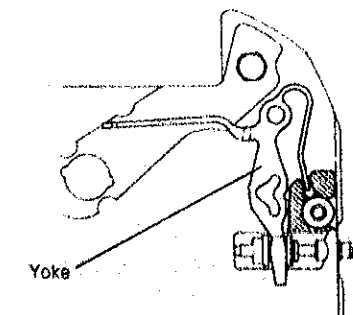
- Lubricate the contact portion of the setting lever with the train wheel setting lever.



### 29 Yoke

#### • How to install

Set the spring portion of the yoke to the groove of the main plate as shown in the illustration at right.



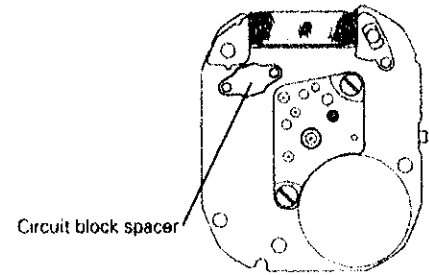
# TECHNICAL GUIDE

Cal. Y301A, Y302A

## 30 Circuit block spacer

### • How to install

Refer to the illustration at right.



### III. VALUE CHECKING

#### • Coil block resistance

3.2 K $\Omega$  ~ 3.9 K $\Omega$

#### • Current consumption

For the whole movement : Less than 1.2  $\mu$ A (with voltage supplied from a battery)  
For the circuit block alone: Less than 0.6  $\mu$ A (with voltage supplied from a battery)

#### Remarks:

When the current consumption exceeds the standard value for the whole movement but is within the standard value range for the circuit block alone, the watch is generating a driving pulse to compensate for the heavy load that may be applied to the gear train, etc.  
In this case, overhaul and clean the movement parts and then measure current consumption for the whole movement again.

#### • Time accuracy

(Time accuracy measurement should be made in an environment with the temperature at 23°C  $\pm$  2°C and humidity between 50% and 60%.)

Cal.	Normal loss/gain at a normal temperature (23°C)
Y301A (annual rate: less than 10 seconds)	$\pm$ 0.035 sec./day
Y302A (annual rate: less than 20 seconds)	$\pm$ 0.050 sec./day

# TECHNICAL GUIDE

Cal. Y301A, Y302A

## (1) How to measure time accuracy

### Cal. Y301A (Annual rate: less than 10 seconds)

Check loss/gain of the watch with the case back closed following the procedure below, and determine the method of adjustment and repair.

Measuring procedure	Measured loss/gain (-/+)	Method of adjustment/repair
<ol style="list-style-type: none"> <li>Set the gate of the quartz tester to "10" or a multiple of "10".</li> <li>Place the watch on the microphone with its 3 o'clock side up, and read the loss/gain.</li> </ol> <p><b>Notes:</b> The loss/gain indicated by the tester varies slightly from measurement to measurement. <u>Therefore, make several measurements to take an average loss/gain.</u></p>	Normal $\rightarrow$ 0 ~ 0.035 .....  Defective $\rightarrow$ 0.036 ~ 0.067 ..... $\rightarrow$ 0.068 or greater .....	Time accuracy adjustment is not necessary.  Adjust the time accuracy.  Replace the circuit block with a new one. ↓ Check the time accuracy. ↓ (Then, adjust the time accuracy.)

### Cal. Y302A (Annual rate: less than 20 seconds)

Check loss/gain of the watch with the case back closed following the procedure below, and determine the method of adjustment and repair.

Measuring procedure	Measured loss/gain (-/+)	Method of adjustment/repair
<ol style="list-style-type: none"> <li>Set the gate of the quartz tester to "10" or a multiple of "10".</li> <li>Place the watch on the microphone with its 3 o'clock side up, and read the loss/gain.</li> </ol> <p><b>Notes:</b> The loss/gain indicated by the tester varies slightly from measurement to measurement. <u>Therefore, make several measurements to take an average loss/gain.</u></p>	Normal $\rightarrow$ 0 ~ 0.050 .....  Defective $\rightarrow$ 0.051 ~ 0.082 ..... $\rightarrow$ 0.083 or greater .....	Time accuracy adjustment is not necessary.  Adjust the time accuracy.  Replace the circuit block with a new one. ↓ Check the time accuracy. ↓ (Then, adjust the time accuracy.)

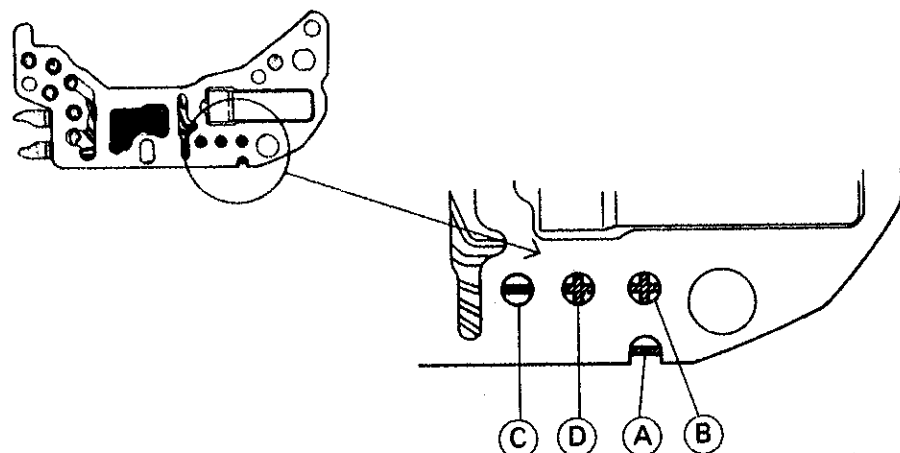
# TECHNICAL GUIDE

Cal. Y301A, Y302A

## IMPORTANT

### (2) How to adjust the time accuracy

- The time accuracy can be adjusted by cutting the four patterns of the circuit block ("A", "B", "C" and "D" in the illustration below) in several combinations.
- Adjustable amount of loss/gain : Adjustment of loss/gain can be made in two steps. One step adjusts the accuracy approximately 0.016 sec./day.



<Pattern cutting combination and adjustment range>

○: Connected ×: Cut

Step	+ ← ————— ● ————— → -				
	+2	+1	0	-1	-2
(A)	○	○	○	○	○
(B)	×	○	×	×	○
(C)	○	○	×	○	×
(D)	×	×	○	○	○
Amount of loss/gain from base accuracy	+0.032	+0.016	0.000	-0.016	-0.032
	+0.016		-0.016		

Base accuracy

\* When the watch is shipped from the factory, all the patterns "A", "B", "C" and "D" are connected.

- Notes:**
- Once the patterns are cut off, reconnecting them by soldering may not adjust the loss/gain by the amount specified in the table above and may change the temperature characteristics of the watch. Adjust the loss/gain, therefore, only by cutting the patterns.
  - Do not cut more than 2 patterns.
  - When cutting two patterns at a time or cutting a pattern for the second time, never make other combination of the patterns than specified in the table above. Only the eight combinations in the table are legitimate.

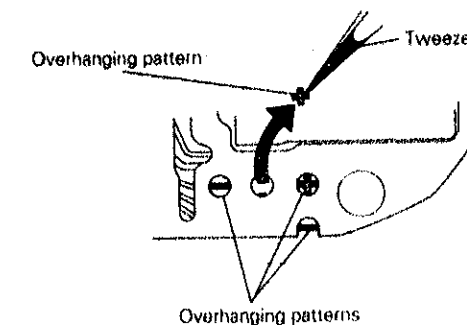
# TECHNICAL GUIDE

Cal. Y301A, Y302A

### (3) How to cut the patterns

Cut and remove the overhanging pattern with tweezers.

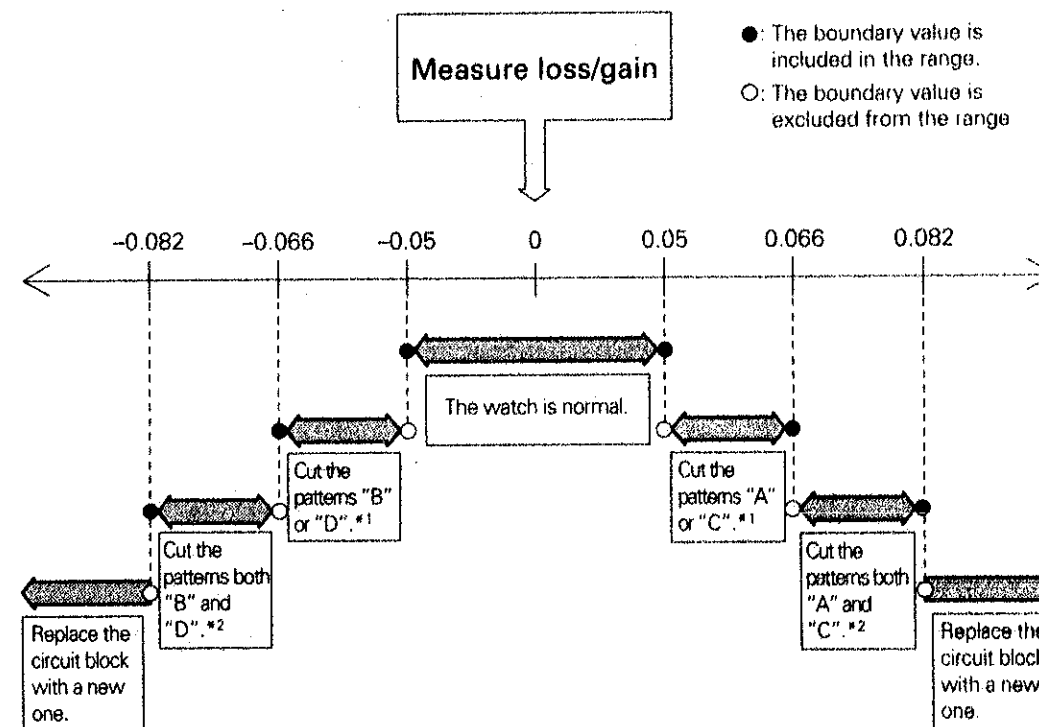
- Notes:**
- Hold and pry up the pattern with sharpened tips of the tweezers to cut and remove it. Please note that, for the "+" shaped pattern, only the vertical line is connected.
  - Take care not to have the cut pattern get inside the movement.



### (4) Example of the time accuracy adjustment

Cal. Y302A (Follow the same procedure for Cal. Y301A.)

- Step 1: Measure the loss/gain of the watch with the case back closed.  
 Step 2: Remove the circuit block and adjust the accuracy following the figure below.  
 Step 3: Install the circuit block you have adjusted, and measure the loss/gain of the watch with the case back closed to check if the obtained loss/gain is within the allowable range of  $\pm 0.050$  sec./day.



- \*1: If both patterns have already been cut, replace the circuit block with a new one.  
 \*2: If either of the patterns have already been cut, replace the circuit block with a new one.

**(5) Remarks on measuring the time accuracy**

- Measure the loss/gain at a temperature of  $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$  with humidity between 50% and 60%.
- If you hold the watch in your hand for a long time before measuring the accuracy, the temperature of the watch itself will rise and a stable measurement may not be obtained even in the environment specified above. In that case, leave the watch untouched in the above environment for a sufficient period of time, and then start the measurement.
- Use the quartz tester QT-2100 that can measure a loss/gain up to 0.001 sec./day.
- If the watch is subjected to a violent shock exceeding the guaranteed resistance or an extremely high humidity, this may change the temperature characteristics of the watch and affect the time accuracy even if the loss/gain obtained at a normal temperature is within the allowable range. In that case, measure the loss/gain at temperatures below and above the normal temperature to examine the time accuracy of the watch from a wider perspective.  
For allowable range of loss/gain at temperatures below and above the normal temperature, refer to the table below. If the measurement does not fall within this range, replace the circuit block with a new one.

Cal.	In low temperature (8°C)	In high temperature (38°C)
Y301A (Annual rate of loss/gain: less than 10 seconds)	$\pm 0.080$ sec./day	$\pm 0.065$ sec./day
Y302A (Annual rate of loss/gain: less than 20 seconds)	$\pm 0.140$ sec./day	$\pm 0.120$ sec./day