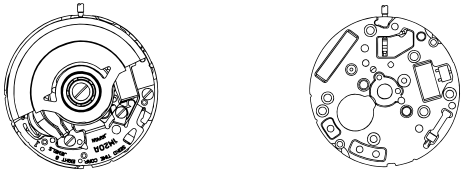


# PARTS CATALOGUE / TECHNICAL GUIDE

## Cal. 1M20A

### [SPECIFICATIONS]

Item		Cal. No.	1M20A
Movement			
		(x 1.0)	
Movement size	Outside diameter	ø20.0 mm	
	Casing diameter	ø19.4 mm	
	Height	3.4 mm	
Indication system		Two hands (Moves at 20-second intervals)	
Driving system		Step motor (Load compensated driving pulse type)	
Additional mechanism		<ul style="list-style-type: none"> <li>• Automatic generating system</li> <li>• Overcharge prevention function</li> <li>• Start-up indicator</li> <li>• Electronic circuit reset switch</li> </ul>	
Loss/gain		Monthly rate at normal temperature range : less than 15 seconds	
Regulation system		Nil	
Measuring gate by quartz tester		Use 10-second gate.	
Power supply	Power generator	Automatic generating system	
	Electricity Storage Unit (E.S. Unit)	Titanium lithium ion secondary battery	
Operating voltage range		0.45V ~ 2.20V	
Duration of charge		From full charge to stoppage : Approx. 3 months	
Jewels		8 jewels	

# PARTS CATALOGUE

Cal. 1M20A

Disassembling procedures Figs. : ① → ④③

Reassembling procedures Figs. : ④③ → ①

**Lubricating:** Types of oil



Moebius A



Moebius F



Silicone oil 500,000 c.s.

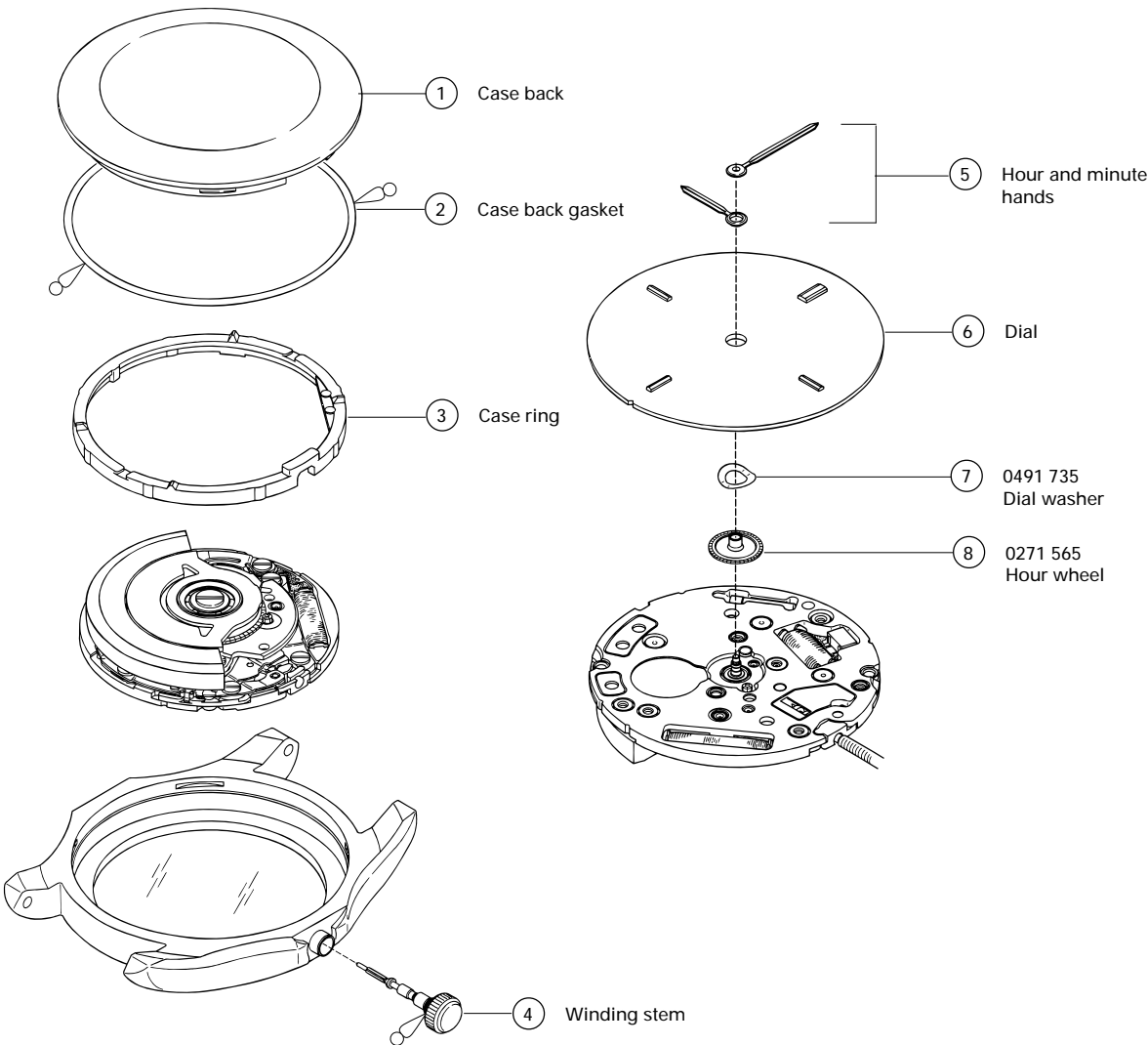
**Oil quantity**





Normal quantity



Liberal quantity



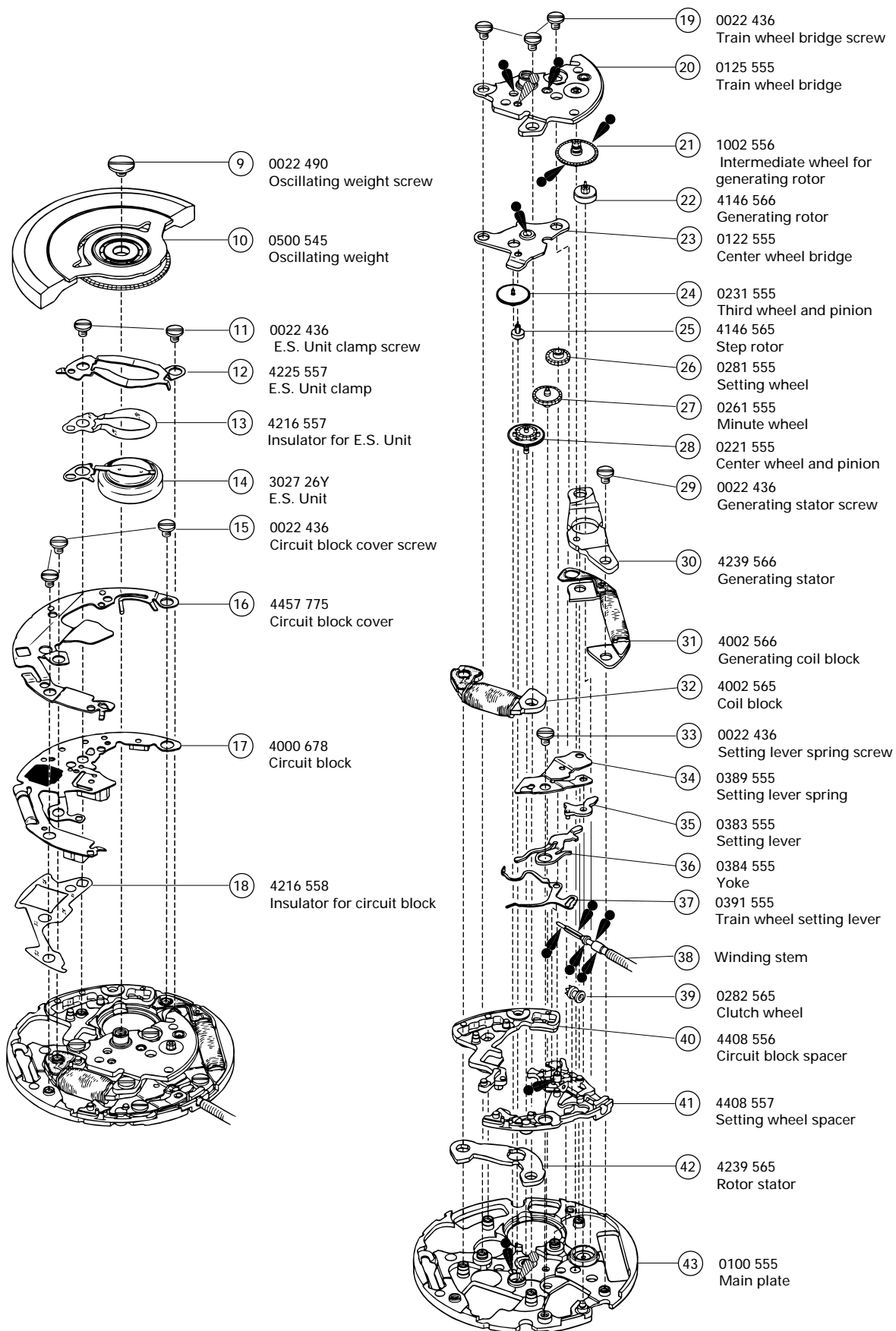
	<b>0022 436</b> <ul style="list-style-type: none"><li>• E.S. Unit clamp screw (2 pcs.)</li><li>• Circuit block cover screw (3 pcs.)</li><li>• Train wheel bridge screw (3 pcs.)</li><li>• Generating stator screw (1 pc.)</li><li>• Setting lever spring screw (1 pc.)</li></ul>
	<b>0022 490</b> <ul style="list-style-type: none"><li>• Oscillating weight screw (1 pc.)</li></ul>



Please see the remarks on the following pages.

# PARTS CATALOGUE

Cal. 1M20A



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

## Remarks:

(38) Winding stem 0351 555

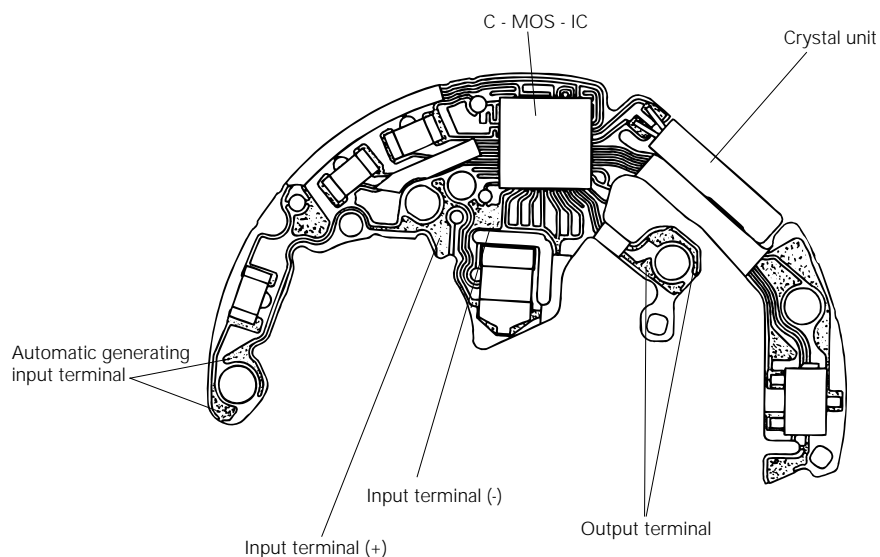
\* The type of winding stem is determined based on the design of cases. Check the case number and refer to "SEIKO Casing Parts Catalogue" to choose a corresponding winding stem.

# TECHNICAL GUIDE

Cal. 1M20A

- The explanation here is only for the particular points of Cal. 1M20A.
- For the repairing, checking and measuring procedures, refer to "TECHNICAL GUIDE, GENERAL INSTRUCTIONS."

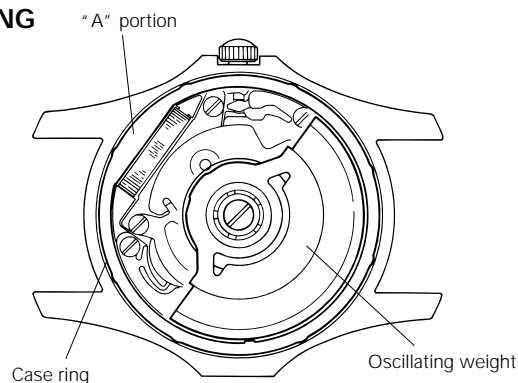
## I. STRUCTURE OF THE CIRCUIT BLOCK



## II. REMARKS ON DISASSEMBLING AND REASSEMBLING

### ③ Case ring

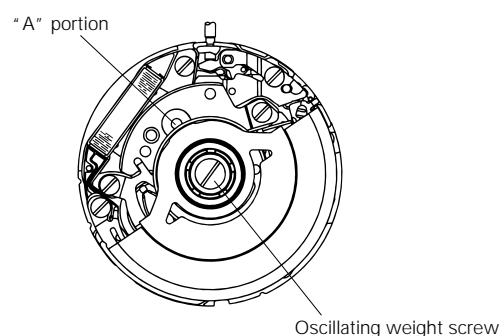
To remove or install the case ring, move the oscillating weight to the opposite side of the protrusion of the case ring ("A" portion in the illustration at right).



### ⑨ Oscillating weight screw

- Before tightening the oscillating weight screw, check "A" portion in the illustration at right to see if the gear wheel of the oscillating weight mates with the pinion of the generating rotor.
- Tighten the oscillating weight screw firmly, applying more force than you usually use to tighten screws.

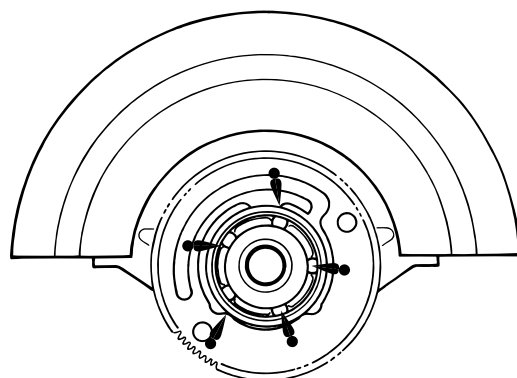
**Note** : When tightening the oscillating weight screw, be careful not to press down the screwdriver with undue force to avoid causing damage to the movement.



### ⑩ Oscillating weight

#### • Lubricating

Lubricate the spring portions and the ball-bearings as specified in the illustration at right.



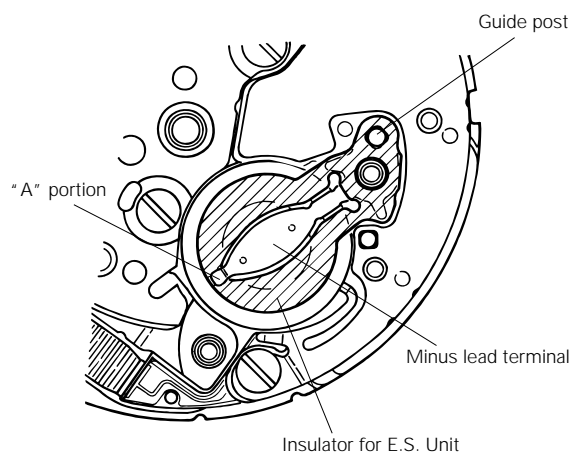
### ⑬ Insulator for E.S. Unit

#### • How to remove

Detach the insulator for E.S. Unit from the guide post by lifting it up, and slide it toward "A" portion of the minus lead terminal to release the insulator from the protrusion that holds it.

#### • How to install

Have the insulator for E.S. Unit catch the protrusion of the minus lead terminal ("A" portion), and then, set it to the guide post.



## ⑭ E.S. Unit

### • How to remove

Hold "A" portion of the minus lead terminal indicated in the illustration at right with tweezers, and lift up the E.S. Unit to remove it.

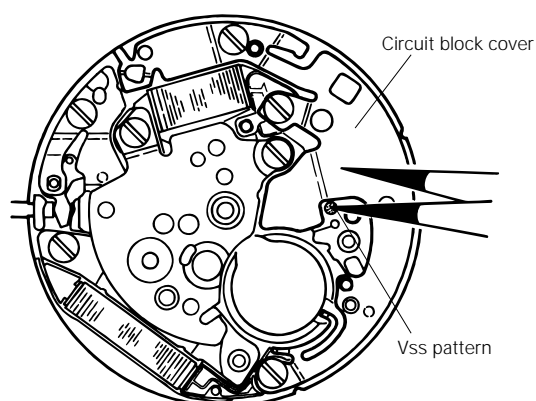
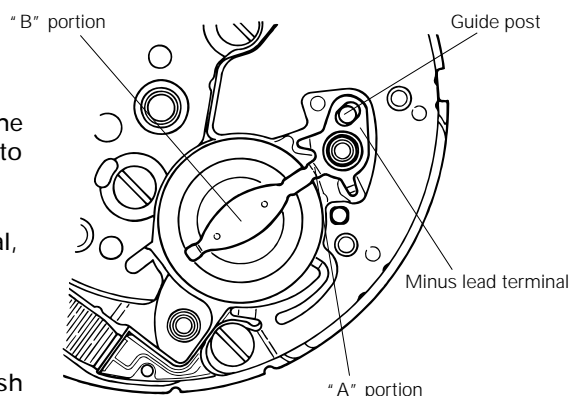
**Note** : Never apply undue force to the minus lead terminal, otherwise it will be deformed.

### • How to install

Set the minus lead terminal to the guide post, and push vertically down "B" portion in the illustration so that it is well seated in position.

### Notes :

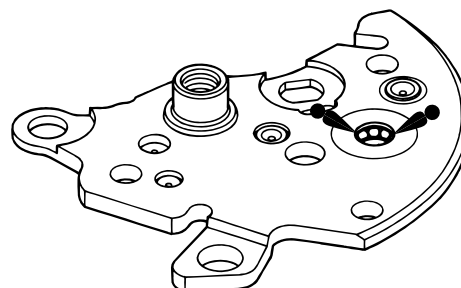
- Even after the E.S. Unit is removed, electricity stored in the auxiliary capacitor will keep the watch continually operating for about 1 minute.
- When re-installing the E.S. Unit while the watch is driven by the auxiliary capacitor, short-circuit the Vss pattern and the circuit block cover with tweezers. Otherwise, the time accuracy may be affected.



## ⑳ Train wheel bridge

### • Lubricating

Lubricate the ball-bearings of the train wheel bridge as specified in the illustration at right.

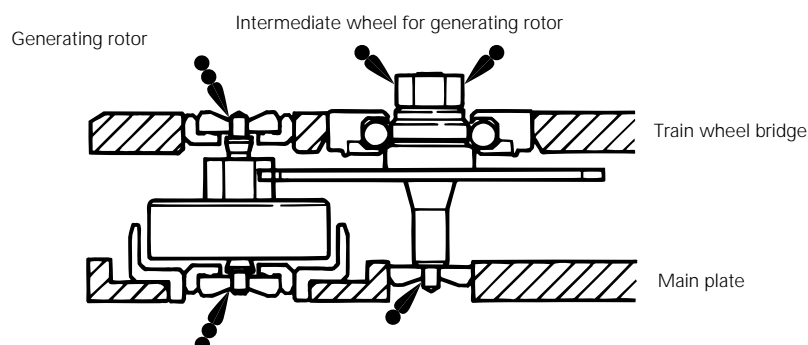


## ㉑ Intermediate wheel for generating rotor

## ㉒ Generating rotor

### • Lubricating

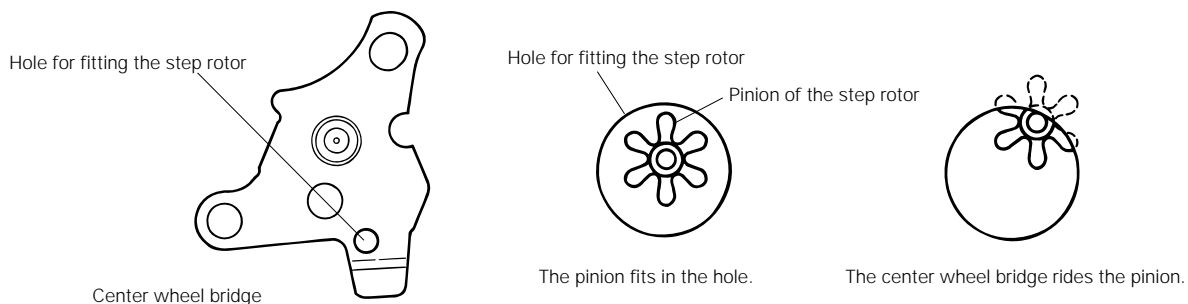
- When lubricating the intermediate wheel for generating rotor and the generating rotor, be sure to observe the lubricating positions and quantity specified in the illustration below.



## 23 Center wheel bridge

### • How to install

- When setting the center wheel bridge, check that the center wheel bridge does not ride the pinion of the step rotor.
- If it does, move the pinion with tweezers or the like to fit it into the hole of the center wheel bridge.



## 24 Third wheel and pinion

## 25 Step rotor

## 26 Setting wheel

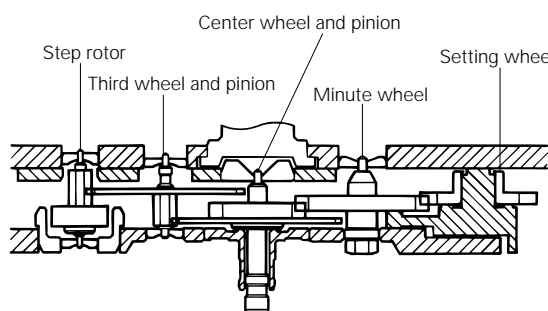
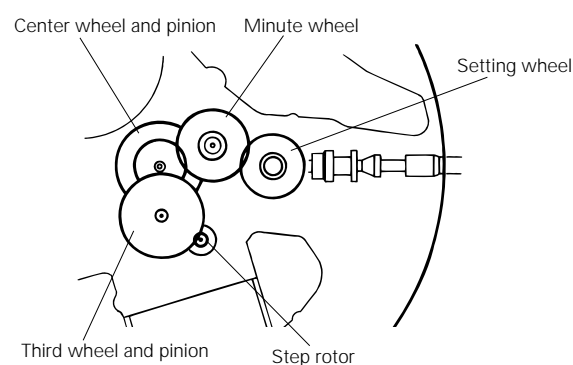
## 27 Minute wheel

## 28 Center wheel and pinion

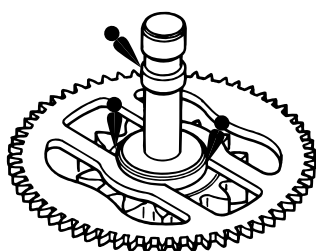
### • Setting position and lubricating

- Refer to the illustrations below for the setting position and lubrication of each wheel.

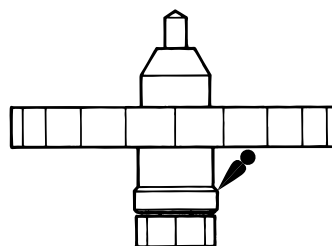
**Note** : Install the setting wheel as shown in the illustration on the right-hand side below. Be sure the setting wheel is not placed upside down.



- Lubricate the center wheel and pinion at the portions indicated in the illustration below.



- Lubricate the lower pivot of the minute wheel as shown in the illustration below. The lubrication should be made before installing it to the main plate.

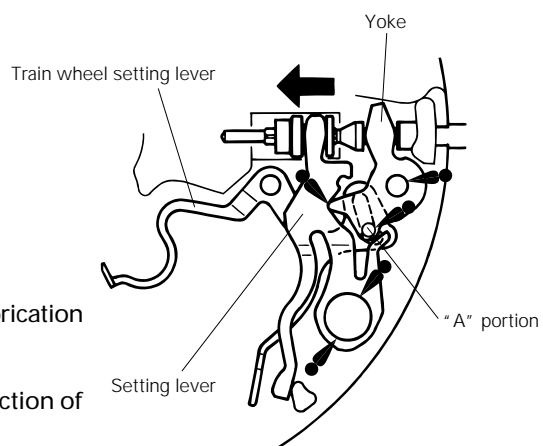


- (35) Setting lever
- (36) Yoke
- (37) Train wheel setting lever

## • Setting position and lubricating

- Refer to the illustration at right for the setting position and lubrication of each part.
- When installing the setting lever, move the yoke in the direction of the arrow to engage it with the setting lever.

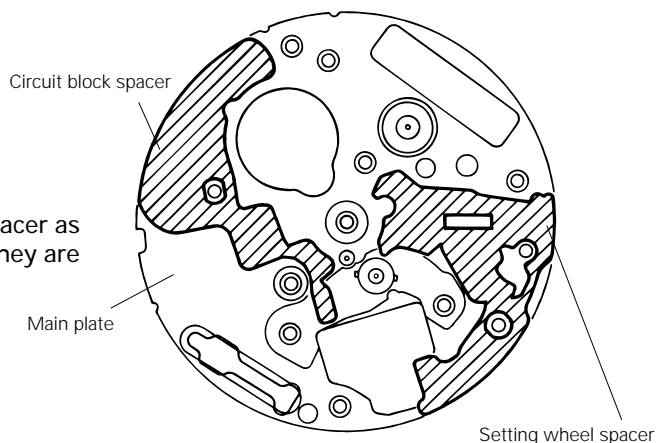
**Note** : Check that the post on the rear of the setting lever ("A" portion in the illustration at right) is securely set inside the slot of the train wheel setting lever.



- (40) Circuit block spacer
- (41) Setting wheel spacer

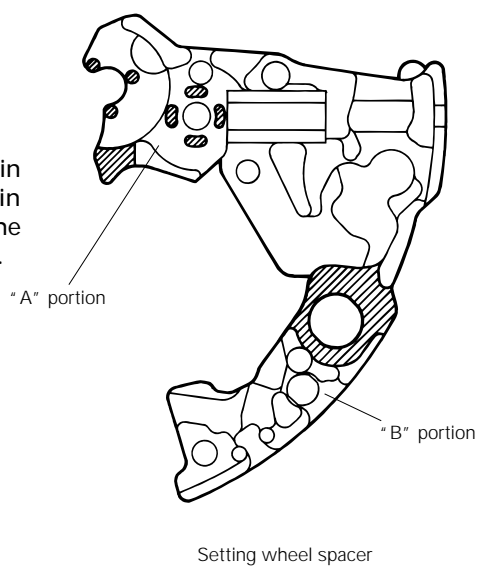
## • How to install

- Set the circuit block spacer and setting wheel spacer as shown in the illustration at right, checking that they are seated well in position.



- To install the setting wheel spacer, push "A" and "B" portions in the illustration at right.

**Note** : When installing the setting wheel spacer on the main plate, take care not to deform the shaded portions in the illustration at right with tweezers, etc., so that the proper clearance will be secured between the parts.



## III. VALUE CHECKING AND ADJUSTMENT

- **Coil block resistance**

1.5K $\Omega$  ~ 1.9K $\Omega$

- **Generating coil block resistance**

730  $\Omega$  ~ 830  $\Omega$

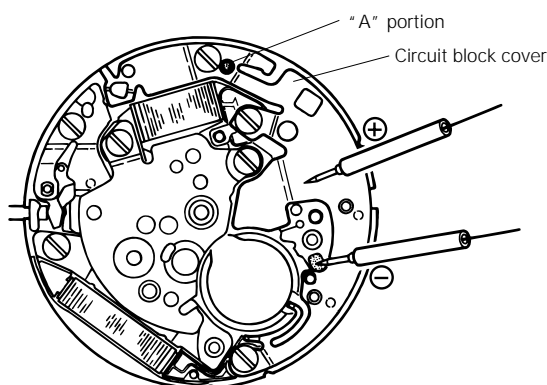
- **Current consumption**

For the whole movement : less than 0.19  $\mu$ A  
(with voltage of 1.55V supplied from a battery)

For the circuit block alone : less than 0.16  $\mu$ A  
(with voltage of 1.55V supplied from a battery)

- **Measuring the current consumption for the whole movement**

1) Apply the probes of the tester to the movement as shown in the illustration.



2) While the tester is connected, the start-up indicator is kept activated. Ten (10) seconds after the tester probes are connected in Step 1, short-circuit the pattern ("A" portion in the illustration above) and the circuit block cover with tweezers to deactivate the start-up indicator and reset the circuit.

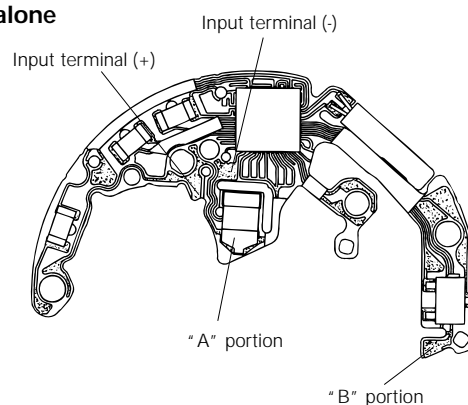
3) Before starting the measurement, be sure that the tester probes are connected for more than 5 minutes continuously in Step 2, then wait until a stable measurement is obtained. If the tester probes are connected for less than 5 minutes, an incorrect measurement will be obtained.

- **Measuring the current consumption for the circuit block alone**

1) Apply the probes of the tester to the input terminals (+) and (-) of the circuit block, respectively.

2) 10 seconds after connecting the tester, short-circuit "A" and "B" portions in the illustration at right to reset the circuit.

3) Start the measurement, checking that a stable measurement is obtained.



**Note** : When measuring the current consumption, do not expose the movement and circuit block to strong light. An abnormal measurement may be obtained. In particular, when measuring the current consumption for the circuit block alone, shut off the light completely.

- **Checking the automatic generating system**

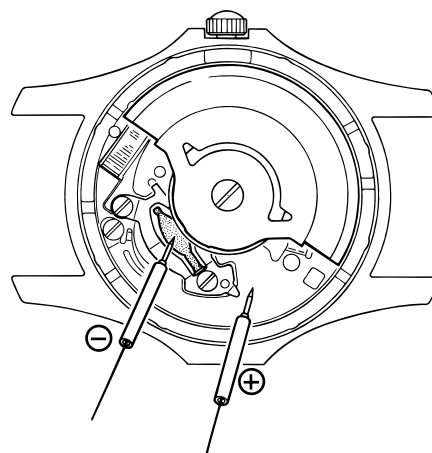
\* The 1M20A is equipped with a start-up indicator function. After the watch is swung several times for charging, the minute hand moves quickly to show that it has started operating. If the automatic generating system is checked while the watch is not operating, the start-up indicator is kept activated and incorrect checking will result.

When the watch stops completely, swing the watch 50 to 100 times to charge it. After checking that the start-up indicator has been activated, pull out and then push in the crown to reset the circuit. Check that the watch is operating normally, and start checking the automatic generating system.

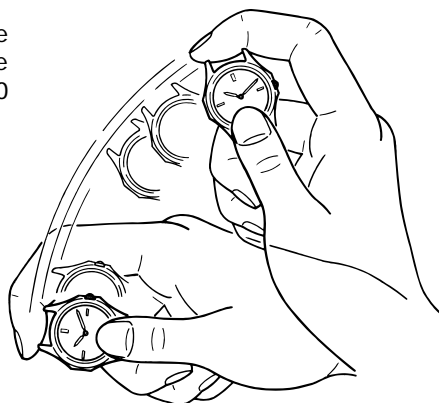
- 1) Apply the probes of the tester to the E.S. Unit as shown in the illustration to measure the voltage.  
(The voltage obtained is called the initial voltage)

Notes :

- When applying the (-) probe of the tester to the E.S. Unit, take utmost care not to contact the E.S. Unit clamp or oscillating weight to cause a short-circuit.
- If a short-circuit is caused, leave the watch untouched for more than 10 minutes, and then, measure the voltage again.



- 2) Close the case back, and swing the watch from side to side rhythmically at a rate of 2 to 3 times a second with a snap of the wrist as shown in the illustration. Swing it approximately 200 times.



- 3) Within 3 minutes after having swung the watch 200 times, measure the voltage of the E.S. Unit in the same manner as in step 1 above.
- 4) According to the value of the initial voltage, follow the corresponding guideline specified in the table on the next page determine whether the automatic generating system is normal or defective.

[ Guidelines on the quality of the automatic generating system according to the initial voltage ]

Initial voltage	Guideline of quality
0.50 ~ 1.00V	After charging, the voltage of the E.S. Unit is 1.10V or higher.
1.01 ~ 1.30V	After charging, the voltage of the E.S. Unit has increased 0.03V or more from the initial value.

\* The guidelines specified in the table above are valid as long as the voltage of the E.S. Unit is within the range between 0.5V and 1.3V.

• **Remarks on measuring the time accuracy**

- If the quartz tester will not pick up the signals of the watch clearly, adjust its sensitivity, and change the position and direction of the watch on the microphone until it can receive the signals without fail.
- When the measured values are not stabilized even if the watch signals are accurately picked up, keep the watch on the microphone for more than 5 minutes and measure the time accuracy again.

<Recharging information>

• **Number of swings and power reserve**

- The table below provides the general guideline of the relationship between the number of swings and the power reserve until the watch stops operating.

Number of swings	400	700	1000	After 1000 swings, 300 swings will accumulate an additional one day of power.
Duration of charge	Approx. 1 day	Approx. 2 days	Approx. 3 days	

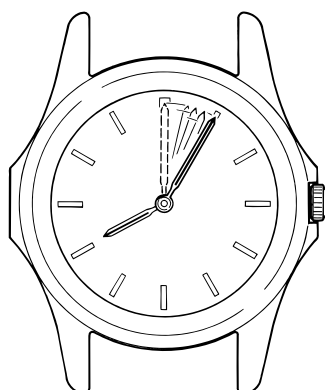
\* The number of swings in the table above refers to the total number of swings required to accumulate the corresponding power reserve starting from when the watch completely stops.  
When the watch is operating, 300 swings will accumulate an additional one day of power.

• **Remarks on the start-up indicator**

- Cal.1M20A is a two-hand model without a second hand, and the minute and hour hands move at 20-second intervals. You may not tell at a glance whether the watch is operating or not.  
When you swing the watch for charging after it stops completely, it is also difficult to decide whether the watch has started operating, causing inconvenience in setting the time.  
For this reason, Cal.1M20A is equipped with a start-up indicator function whereby quick movement of the minute hand indicates that the watch has started operating after it is swung several times for charging.

<The start-up indicator - quick movement of the minute hand>

- The minute hand moves about 80 times as quickly as the normal movement to show that the watch has started operating.
- The duration of the quick movement of the minute hand varies depending on the number of times the watch is swung to charge, but it lasts for at least a few seconds. If you find it keeping turning around the dial, pull out the crown to stop it, and then, set the time.  
(Ex. When the watch stops completely, 50 continuous swings will advance the minute hand 10 to 20 minutes from where it was.)



- If you have found either of the following after swinging the watch several times, you can decide that the start-up indicator function has been activated.
  - 1) The minute hand is moving quickly.
  - 2) The minute hand has advanced more than 5 minutes from where it was.
- After the minute hand moves quickly, the normal hand movement will resume automatically.

**Note:**

- The start-up indicator function will be activated only if both of the following two conditions are fulfilled.
  - Condition 1 : The watch stops completely before it is swung for charging, and the crown is at the normal, pushed-in position.
  - Condition 2 : By swinging the watch for charging, the electric energy stored in the E.S. Unit has exceeded a certain amount.

The start-up indicator function will not be activated if the watch has been operating and/or the crown is in the pulled-out position.