
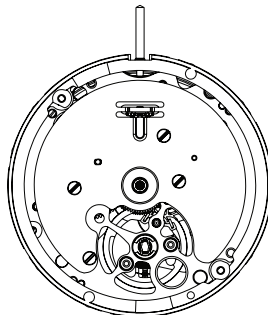
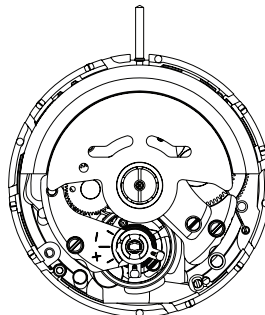


PARTS LIST / TECHNICAL GUIDE

Automatic Open-heart Cal. 4R38A/4R39A

[SPECIFICATIONS]

Item		Cal. No.	4R38A/4R39A				
		(The figures below are Cal. 4R39A.)					
						<div>Movement size<ul style="list-style-type: none">Diameter<ul style="list-style-type: none">Outside: Ø 27.4 mmCasing: Ø 27.0 mmHeight: 5.32 mm</div>	
<div><ul style="list-style-type: none">3 hands (hour, minute and second hands)24 hour indicator (4R39A only)</div>							
Movement size	Outside diameter	4R38A		4R39A			
	Casing diameter	Ø 27.4 mm		Ø 27.4 mm			
	Height	Ø 27.0 mm		Ø 27.0 mm			
Driving system		Automatic winding with manual winding mechanism					
Time indication		3 hands (Hour, Minute, and Small second hands)		3 hands (Hour, Minute, and Second hands) 24 hour indicator (Cal. 4R39A only)			
Additional function		Second hand stop function		Second hand stop function			
Crown operation	Normal position	Manual winding (clockwise only)		Manual winding (clockwise only)			
	1st click position	Time setting with Second hand stop					
Vibration per hour		21,600 (5 beats per second)					
Loss/Gain	Daily rate worn on the wrist at temperature range between 5 °C and 35 °C)	Between +45 and -35 seconds					
	Standard rate for measurement	Mainspring wind up status	Fully wind up			After 24 hours from fully wind up	
		Testing positions	Dial upward: T0 (CH)	6 o'clock at the top	9 o'clock at the top	Dual upward: T24 (CH)	
		Measurement (daily rate in seconds: s/d)	± 20 s/d	± 30 s/d	± 30 s/d	(Isochronism fault: T24-T0) ± 30 s/d	
Regulation system		ETACHRON System					
Lift angle of the escapement		53 °					
Power reserve		From fully wound to stoppage: Approximately 40 hours					
Number of jewels		24 jewels					

SEIKO WATCH CORPORATION

FEATURES

SEIKO Automatic Open-heart Cal.4R38A and 4R39A have been developed based on the Cal.4R36A.

The movement is both automatic and hand-winding with a power reserve of 41 hours.

The heart of the movement with its gold plated balance wheel is visible through the dial at the nine o'clock position, and the whole movement, with its specially engraved rotor, can be seen through the see-through case back. The three time-of-day hands are complemented by a 24-hour hand set into a subdial at the 11 o'clock position (Cal. 4R39A only).

CHARACTERISTICS OF A MECHANICAL WATCH

1. This mechanical watch operates using power obtained from a mainspring.
2. While loss/gain of a quartz watch is indicated by a monthly or annual rate, accuracy of a mechanical watch is normally indicated by a daily rate (loss/gain per day).
3. Normal usage accuracy of a mechanical watch varies according to conditions of use (time period that the watch is worn on the wrist, temperature environment, hand movement, and winding state of the mainspring).
4. When the watch is affected by strong magnetism, it temporarily gains or loses time. If the watch encounters a strong magnetic field, the parts of the watch may be magnetized. In this case, repairs such as removal of magnetism are required.




PARTS LIST

Cal. 4R38A/4R39A



Disassembling procedures Figs. : ① → ④⑤

Reassembling procedures Figs. : ④⑤ → ①

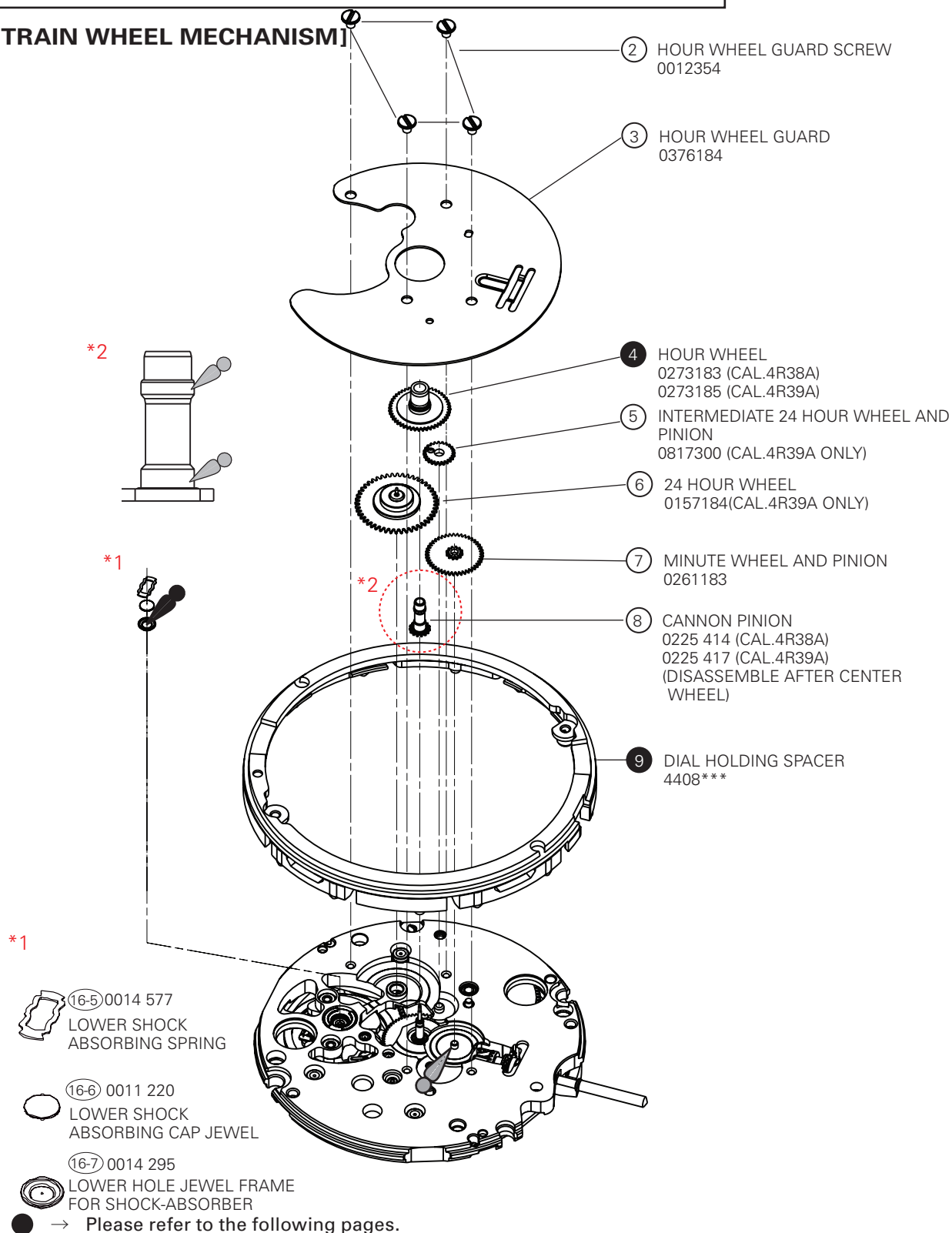
Lubricating: Types of oil

-  AO-3 (Moebius A)
-  SEIKO Watch Oil S-6
-  SEIKO Watch Oil S-4

Oil quantity

-  Liberal quantity
-  Normal quantity

[TRAIN WHEEL MECHANISM]






PARTS LIST

Cal. 4R38A/4R39A

[BALANCE AND ESCAPEMENT]

Lubricating: Types of oil

-  AO-3 (Moebius A)
-  SEIKO Watch Oil S-6
-  SEIKO Watch Oil S-4

- ① OSCILLATING WEIGHT WITH BALL BEARING
Refer to SEIKO Web Parts Catalogue.
0509***



- ⑩ AUTOMATIC TRAIN BRIDGE SCREW
0012 354

- ⑪ AUTOMATIC TRAIN BRIDGE
0191 183

- ⑮ BALANCE BRIDGE SCREW
0012 420

*1

- ⑯ BALANCE COCK
0171 353

- ⑫ SECOND REDUCTION WHEEL AND PINION
0514 183

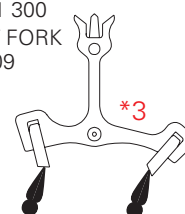
- ⑬ RATCHET WHEEL SCREW
0012 919

- ⑭ RATCHET WHEEL
0285 051

- ⑰ PALLET BRIDGE SCREW
0012 354

- ⑱ PALLET BRIDGE
0161 300

- ⑲ PALLET FORK
0301 009



- ⑯-1 BALANCE COMPLETE WITH STUD
0310 198

*1

- ⑯-2 UPPER SHOCK ABSORBING SPRING

- ⑯-3 UPPER SHOCK ABSORBING CAP JEWEL

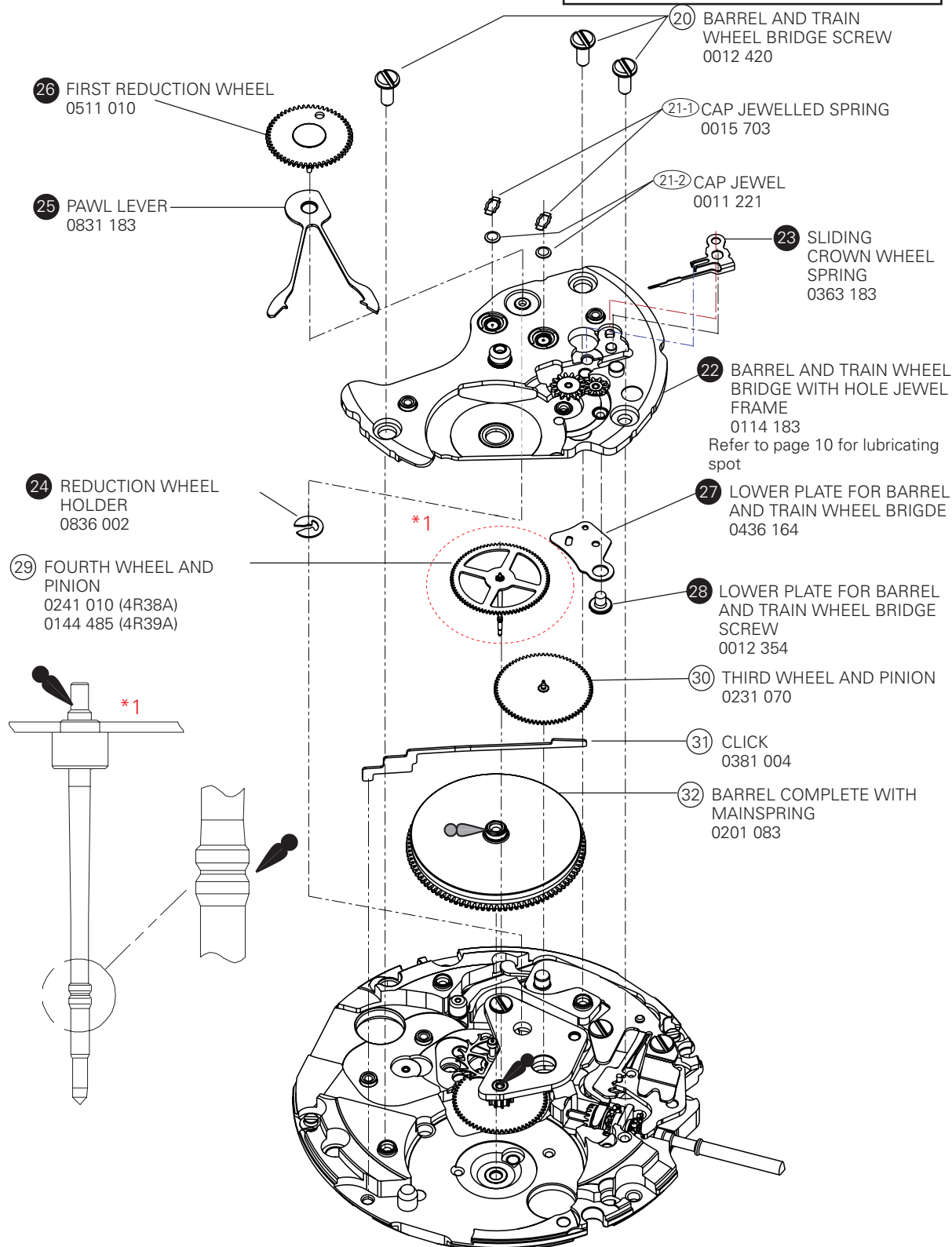
- ⑯-4 UPPER HOLE JEWEL FRAME FOR SHOCK-ABSORBER

● → Please refer to the following pages.

PARTS LIST

Cal. 4R38A/4R39A

[WINDING MECHANISM]






● → Please refer to the following pages.

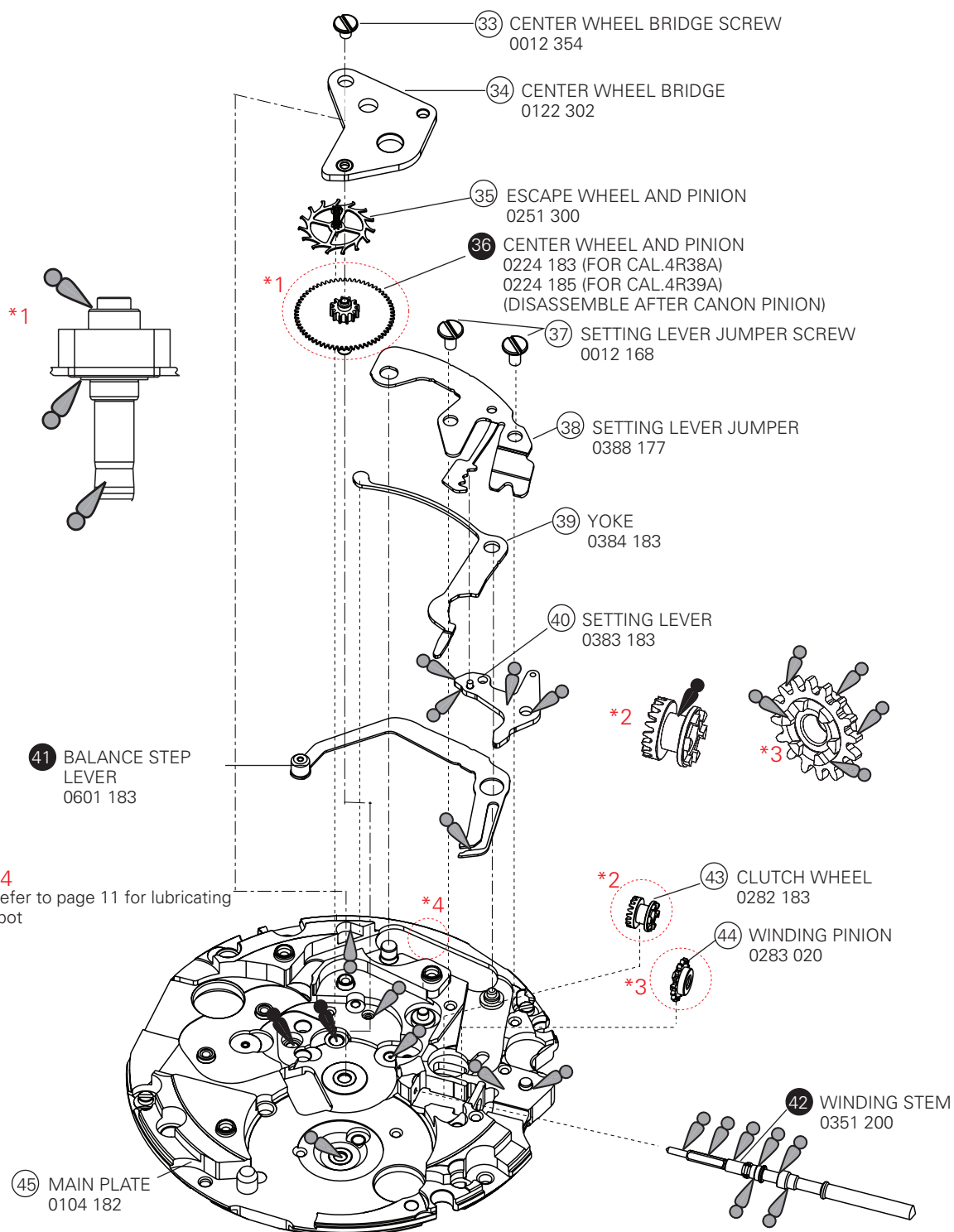
PARTS LIST

Cal. 4R38A/4R39A

[SETTING MECHANISM]

Lubricating: Types of oil

-  AO-3 (Moebius A)
-  SEIKO Watch Oil S-6
-  SEIKO Watch Oil S-4



● → Please refer to the following pages.

PARTS LIST

Cal. 4R38A/4R39A

REMARKS

● How to find the correct parts, if not determined by 4 digit caliber number

Following parts are determined based on the design of watches, such as hands height, dial color, and design of cases. Please refer to the SEIKO WATCH PARTS CATALOGUE in order to choose corresponding parts.

① OSCILLATING WEIGHT 0509**

The type of OSCILLATING WEIGHT is determined based on the design of cases. Check the case number and refer to the "SEIKO WATCH PARTS CATALOGUE" to choose corresponding OSCILLATING WEIGHT.

⑧ CANNON PINION 0225 ***

The type of CANNON PINION is determined based on the design of cases. Check the case number and refer to the "SEIKO WATCH PARTS CATALOGUE" to choose corresponding CANNON PINION.

⑨ DIAL HOLDING SPACER 4408 ***

If the DIAL HOLDING SPACER is used, the type of DIAL HOLDING SPACER is determined based on the design of cases. Check the case number and refer to the "SEIKO WATCH PARTS CATALOGUE" to choose corresponding DIAL HOLDING SPACER. If no DIAL HOLDING SPACER is used, a DIAL HOLDING RING is used, which is listed at the exterior parts of "SEIKO WATCH PARTS CATALOGUE".

②⑨ FOURTH WHEEL AND PINION ***

The type of FOURTH WHEEL AND PINION is determined based on the design of cases. Check the case number and refer to the "SEIKO WATCH PARTS CATALOGUE" to choose corresponding FOURTH WHEEL AND PINION.

③⑥ CENTER WHEEL AND PINION

The type of CENTER WHEEL AND PINION is determined based on the design of cases. Check the case number and refer to the "SEIKO WATCH PARTS CATALOGUE" to choose corresponding CENTER WHEEL AND PINION.

④② WINDING STEM 0351 ***

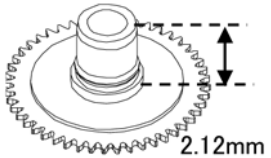
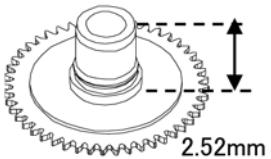
The type of WINDING STEM is determined based on the design of cases. Check the case number and refer to the "SEIKO WATCH PARTS CATALOGUE" to choose corresponding WINDING STEM.

PARTS LIST

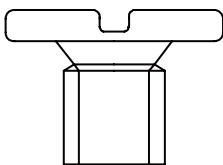
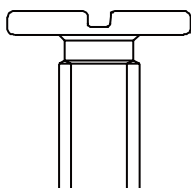
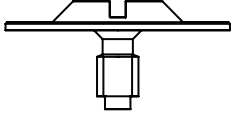
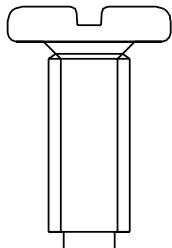
Cal. 4R38A/4R39A

● How to discriminate resembled parts

Wheels

No.	Cal.	Parts code	Parts name	Parts form
④	4R38A	0273 182	Hour wheel	
	4R39A	0273 183		

Screws

 0012354	② HOUR WHEEL GUARD SCREW (4 pcs.) ⑩ AUTOMATIC TRAIN BRIDGE WHEEL (2 pcs.) ⑰ PALLET BRIDGE SCREW (2 pcs.) ② LOWER PLATE FOR BARREL AND TRAIN WHEEL BRIDGE SCREW (1 pce.) ③③ CENTER WHEEL BRIDGE SCREW (1 pce.)
 0012168	③ SETTING LEVER JUMPER SCREW (2 PCS.)
 0012919	⑬ RATCHET WHEEL SCREW (1 pce.)
 0012420	⑮ BALANCE BRIDGE SCREW (1 pce.) ⑳ BARREL AND TRAIN WHEEL BRIDGE SCREW (3 pcs.)

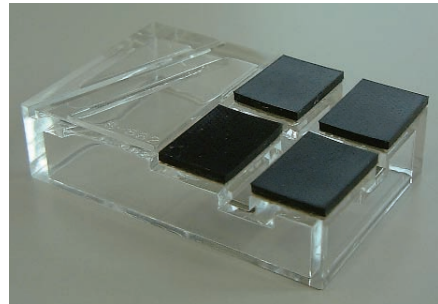
PARTS LIST

Cal. 4R38A/4R39A

● Tools and consumables required for disassembling/reassembling

• Movement holder

UNIVERSAL MOVEMENT HOLDER (S-682)



• Watch oils

SEIKO watch grease S-6 and S-4. watch oil AO-3 (or Moebius A)

S-6



AO-3



S-4



REMARKS ON DISASSEMBLING AND REASSEMBLING THE MOVEMENT

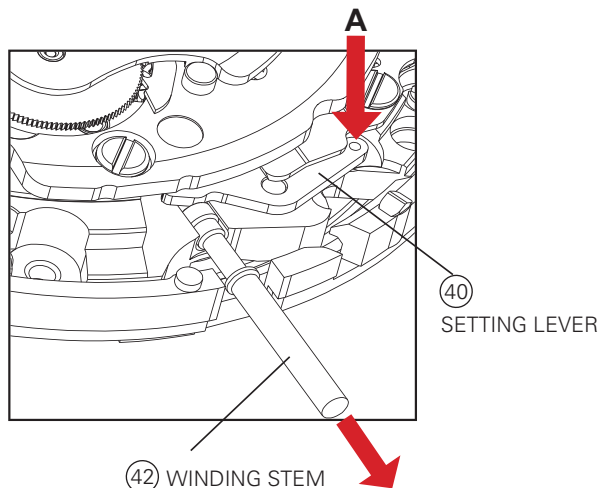
● How to remove the SETTING STEM before dismantling the movement

Crown position: NORMAL

Push the A portion on the SETTING LEVER gently (refer to the picture on the right) in order to disengage it from the WINDING STEM.

Then pull out the crown with the stem completely.

- * After dismantling the movement from the case, push back the crown with the WINDING STEM to the movement.



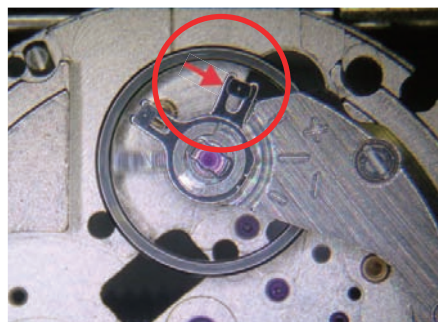
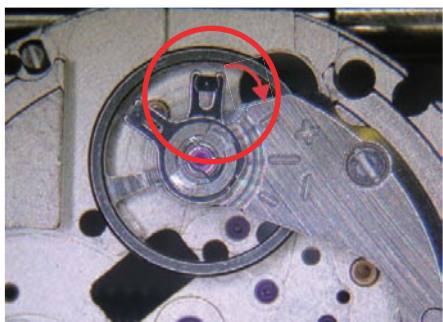
● Balance and escapement

How to disassemble/reassemble the BALANCE and BALANCE COCK

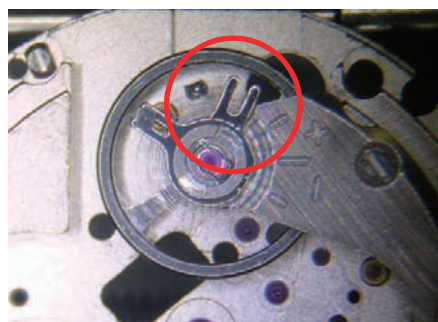
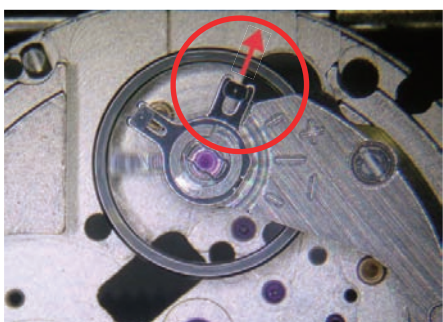
• Disassembling

- 1) Rotate the STUD SUPPORT until it touches to the BALANCE COCK.

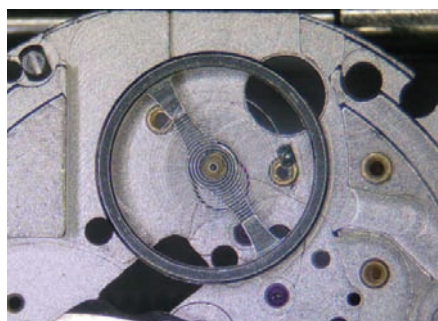
When doing so, make sure that the second bend of the balance-spring does not touch the REGULATOR PIN.



- 2) Push out the stud parallel to the slit of the STUD SUPPORT (the direction also shown by the red arrow in the illustration) in order to remove it from the STUD SUPPORT.



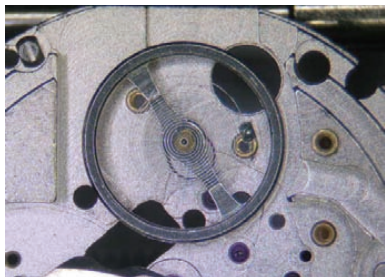
- 3) Unscrew the BALANCE COCK SCREW and remove the BALANCE COCK WITH REGULATOR.



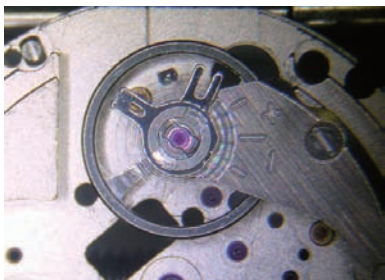
- 4) Remove the BALANCE COMPLETE WITH STUD.

- **Reassembling**

- 1) Install the BALANCE COMPLETE WITH STUD to the MAIN PLATE.

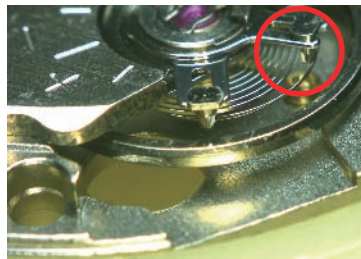
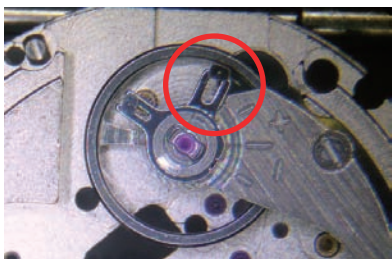


- 2) Set the BALANCE COCK WITH REGULATOR and tighten the BALANCE COCK SCREW.

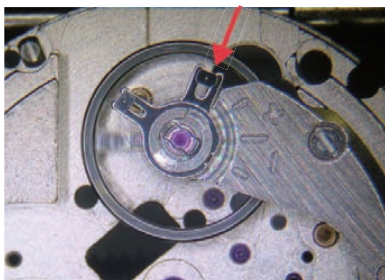


- 3) Temporarily set the stud to the STUD SUPPORT.

Do not engage the balance-spring to the REGULATOR PIN. The balance-spring passes outside of the REGULATOR-PIN at this stage.



- 4) Push back the stud parallel to the slit of the STUD SUPPORT.



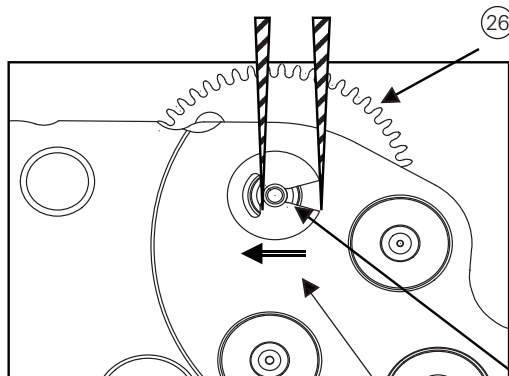
- 5) Engage the balance-spring with the slit of the REGULATOR PIN.



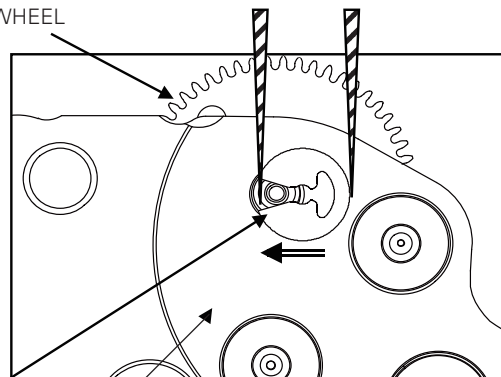
* When assembling the BALANCE COMPLETE, pay great attention not to deform the balance-spring, especially at the second bend.

● First reduction wheel holder

• Disassembling



• Reassembling



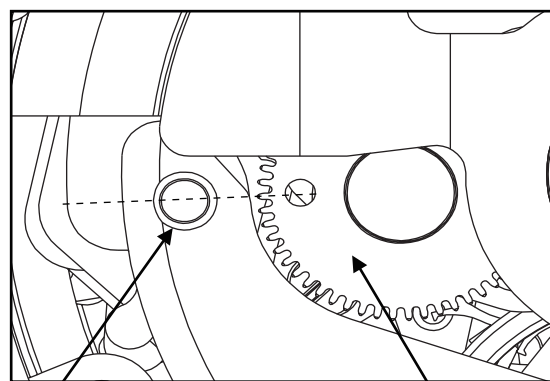
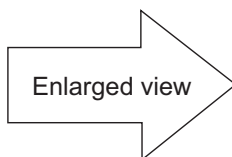
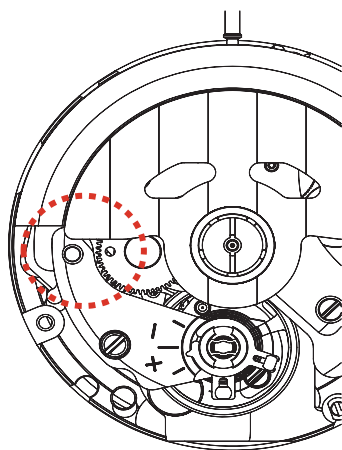
(26) FIRST REDUCTION WHEEL

(24) REDUCTION WHEEL HOLDER

(22) BARREL AND TRAIN WHEEL BRIDGE (BACK SIDE)

● Oscillating weight

When fixing the OSCILLATING WEIGHT, an alignment with the FIRST REDUCTION WHEEL is necessary in order to wind the MAINSPRING most efficiently. Rotate the FIRST REDUCTION WHEEL manually until its hole aligns with the gilt dot on the BALANCE COCK and set the OSCILLATING WEIGHT vertically at the stem side, and then tighten the screw. Refer to the figure below.



BALANCE BRIDGE GUIDE PIN

(26) FIRST REDUCTION WHEEL

● Barrel and train wheel bridge with hole jewel frame

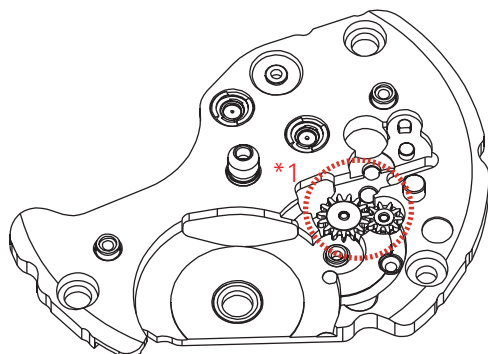
22 BARREL AND TRAIN WHEEL BRIDGE WITH HOLE JEWEL FRAME

Lubricating: Types of oil

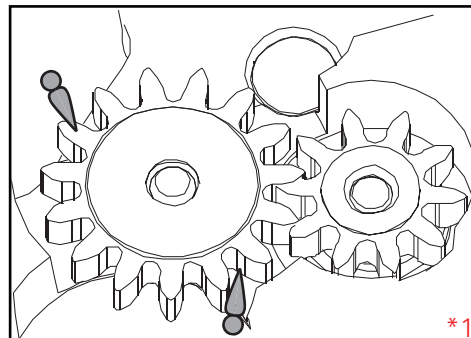
● AO-3 (Moebius A)

● SEIKO Watch Oil S-6

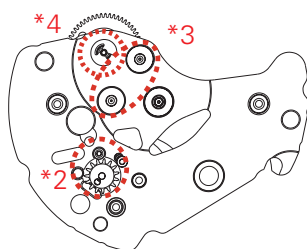
□ SEIKO Watch Oil S-4



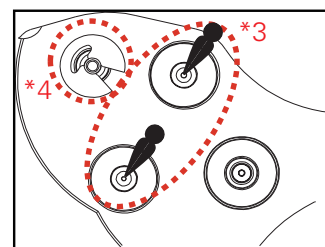
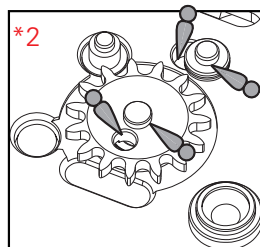
Enlarged view



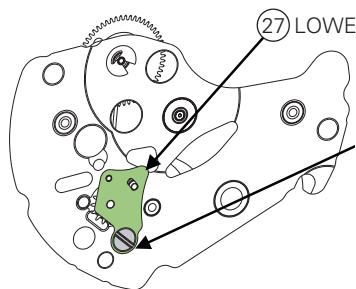
Back side



Enlarged view



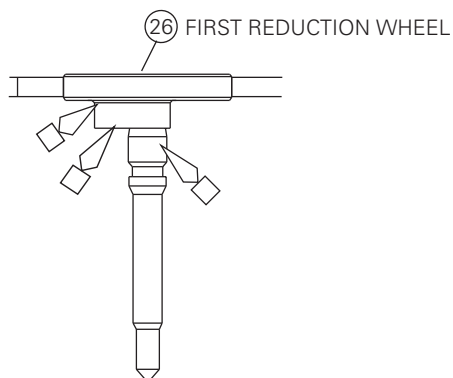
*2 After lubricating, set lower plate for barrel and train wheel bridge & screw.



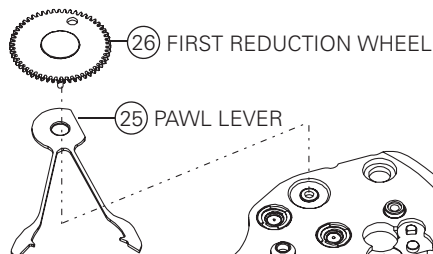
(27) LOWER PLATE FOR BARREL AND TRAIN WHEEL BRIDGE

(28) LOWER PLATE FOR BARREL AND TRAIN WHEEL BRIDGE SCREW

*4 After lubricating, set First reduction wheel & Pawl lever & Reduction wheel holder.



(26) FIRST REDUCTION WHEEL

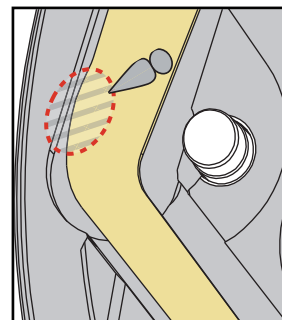
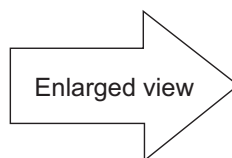
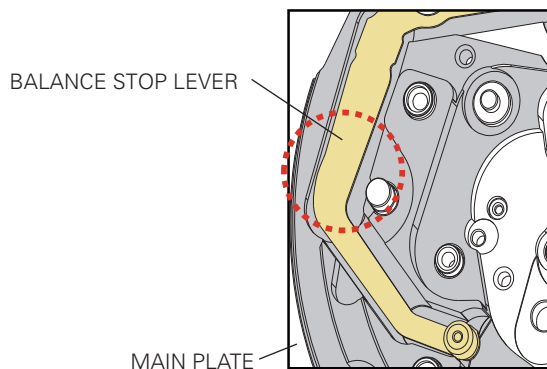


(25) PAWL LEVER



(24) REDUCTION WHEEL HOLDER

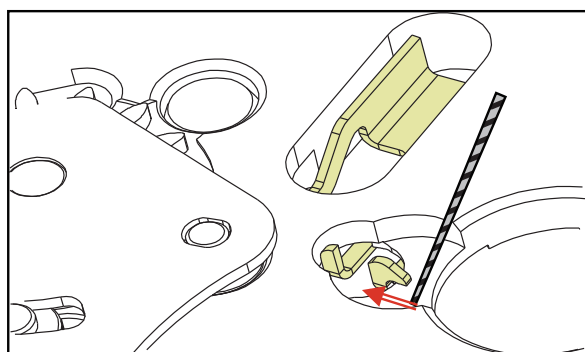
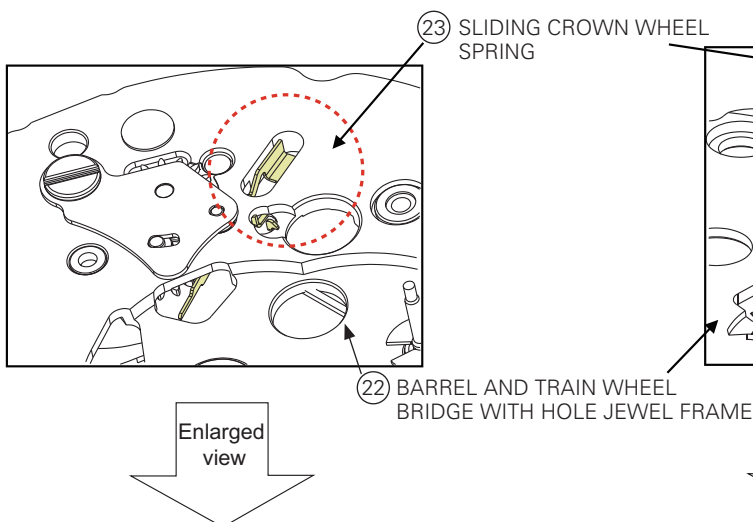
● Balance stop lever



Contact part of main plate and balance stop lever

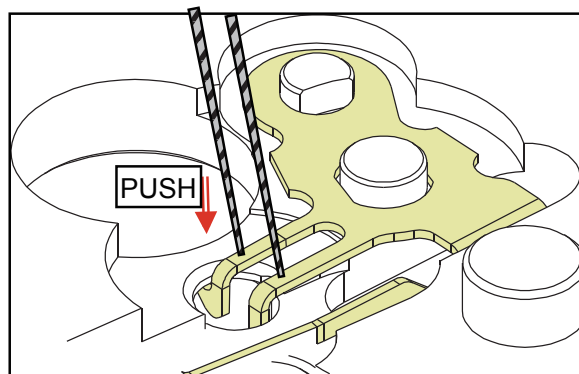
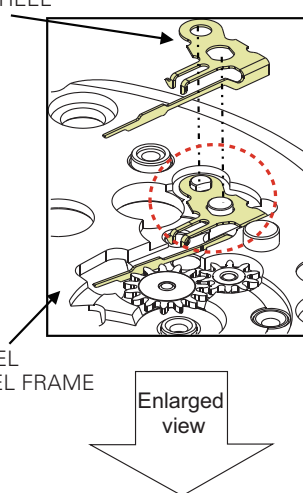
● Sliding crown wheel spring

• Disassembling



Remove the hook of the SLIDING CROWN WHEEL SPRING from BARREL AND TRAIN WHEEL BRIDGE WITH HOLE JEWEL FRAME.

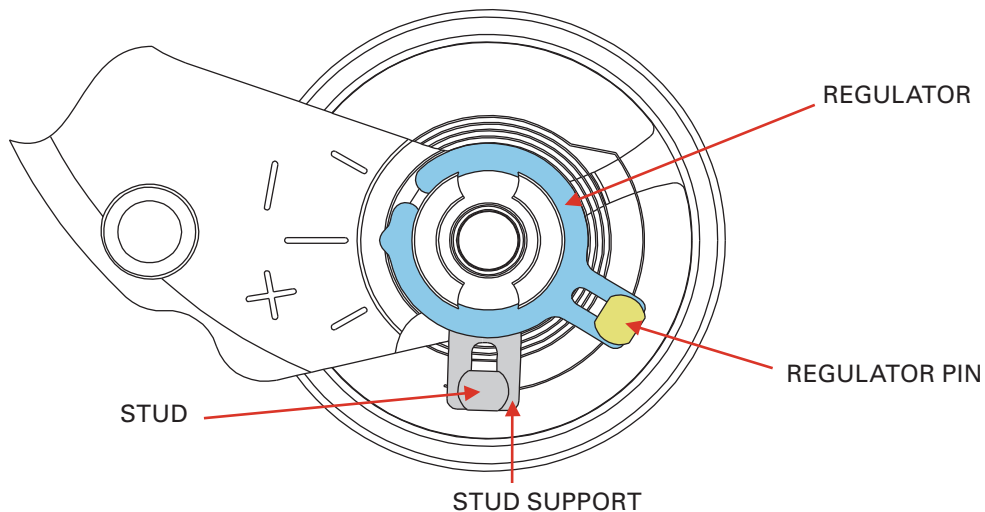
• Reassembling



The hook of SLIDING CROWN WHEEL SPRING is hang up a BARREL AND TRAIN WHEEL BRIDGE WITH HOLE JEWEL FRAME.

REGULATION

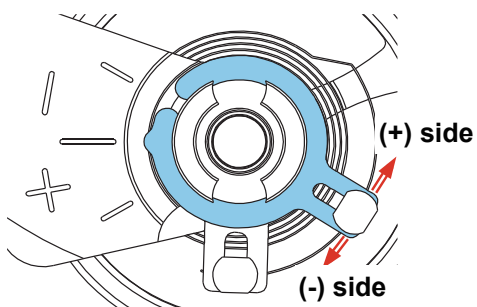
● Names of the parts for regulation and their functions



Note:

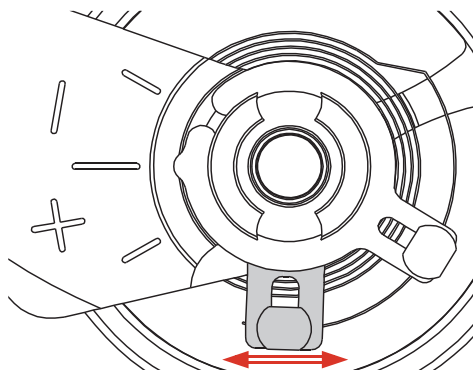
• Regulator

Regulation of the accuracy rate(+) or (-) by adjusting the operative length of the balance-spring



• Stud support

Correction of the beat error by positioning the roller jewel correctly

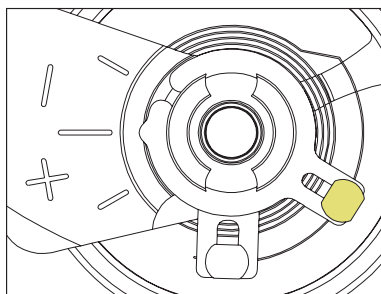


• Stud (glued at the balance-spring)

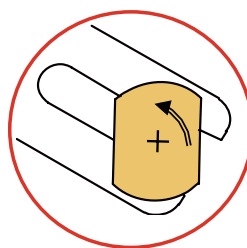
Alignment of the balance-spring to the center of the regulator pin's slit

• Regulator pin

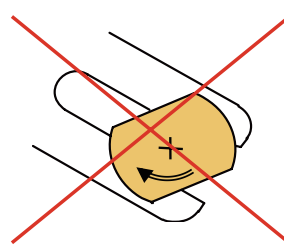
Adjustment of the play of the balance-spring embraced in its slit



Counterclockwise rotation



No clockwise rotation



● How to regulate the isochronism fault by adjusting the position of the balance-spring

This caliber has the Etachron system for fine regulation of the isochronism fault.

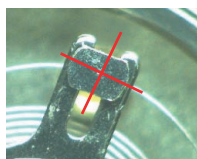
When an amplitude of the balance becomes weak, the watch shows time loss, in general.

By making a clearance of the balance-spring smaller, the decline curve of the instantaneous rate gets shallower.

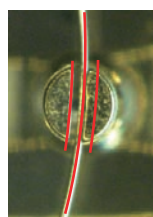
- 1) Make sure that the REGULATOR PIN is aligned in a vertical position to the REGULATOR and the balance-spring passes parallel through the slot of the REGULATOR PIN before fine-tuning the STUD and the REGULATOR PIN.

REGULATOR PIN

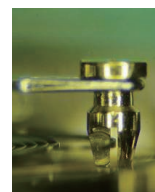
top side view



back side view



angled view



- 2) Rotate the STUD in order to align the position of the balance-spring passes through the center of the slot of the REGULATOR PIN.

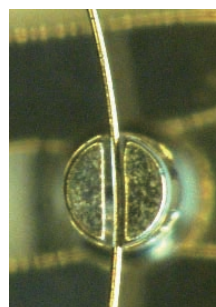
STUD

top side view



REGULATOR PIN

back side view

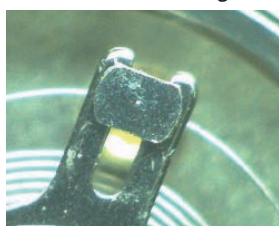


- 3) Rotate the REGULATOR PIN counterclockwise in order to fine-tune the clearance of the balance-spring passing through the slot of it.

REGULATOR PIN

top side view

Before rotating

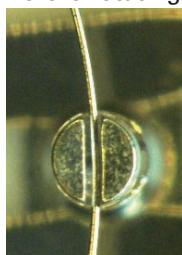


After rotating



back side view

Before rotating



After rotating

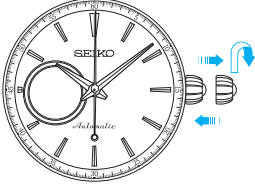
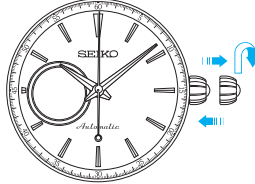
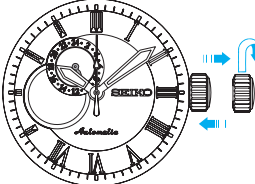
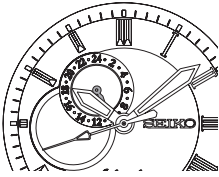
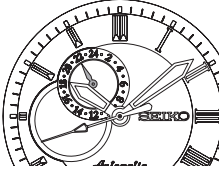


(Maximum clearance)

(Minimum clearance)

REMARKS ON INSPECTION AND MEASUREMENT

● Function check

Operation	Function	Check point
 <p>Pull out the crown to the first click when the second hand is at the 12 o'clock position. (The second hand stops on the spot.)</p>	Setting mechanism-switching the function of the time setting	Make sure that it has a click at each position and the stem is not pulled off.
 <p>Pull out the crown to the first click when the second hand is at the 12 o'clock position. (The second hand stops on the spot.)</p>  <p>Turn the crown to set the hour and minute hands to the correct time.</p> <p>Push the crown back in to the normal position in accordance with a time signal.</p>	Setting mechanism-hour and minute hands setting	Make sure that the hour and minute hands move smoothly (without touching each other or touching the surface of the dial or inside of the glass).
	Hands installation (4R39 only) 24-hour hand moves correspondingly with the hour hand.	
	 <p>10:08</p>  <p>22:08</p>	When setting the time, make sure that the 24-hour hand is correctly set.

● Water resistance test

Check the water resistance according to the designated specification of the watch.

Marking on the case back	Test method	Applied pressure
WATER RESISTANT (WATER RESIST)	Air leak test	3 BAR
WATER RESIST 5BAR	<div>Water pressure test</div> <div>↓</div> <div>Condensation test</div>	5 BAR
WATER RESIST 10BAR		10 BAR
WATER RESIST 15BAR		15 BAR
WATER RESIST 20BAR		20 BAR
SCUBA DIVER'S (AIR DIVER'S) 150 m	Condensation test	18.75 BAR = 150 (m) times 0.125
SCUBA DIVER'S (AIR DIVER'S) 200 m	↓	25 BAR = 200 (m) times 0.125
He-GAS DIVER'S 300 m	Water pressure test	37.5 BAR = 300 (m) times 0.125
He-GAS DIVER'S 600 m	↓	75 BAR = 600 (m) times 0.125
He-GAS DIVER'S 1000 m	Condensation test	125 BAR = 1000 (m) times 0.125

● Accuracy test

Measure the rate in three different positions within 30 minutes after the watch is fully wound up (wait approximately for 5 minutes after winding up in order to get a stable oscillation of the balance) and make sure the value shows within the range in the table below.

Measure the rate in dial-up position after 24 hours from fully wound up (T24) and check the rate difference with the rate in dial-up position when it is fully wound up (T0). Make sure that the value of T24-T0 shows within the range of the isochronism in the table below.

Standard rate for measurement	Mainspring wind up status	Fully wind up (T0)			After 24 hours from fully wind up (T24)
	Testing positions	Dial upwards: T0 (CH)	6 o'clock at the top	9 o'clock at the top	Dial upwards: T24 (CH)
	Measurement (daily rate in seconds:s/d)	±20 s/d	±30 s/d	±30 s/d	(Isochronism fault: T24-T0) ±30 s/d

ACCURACY OF MECHANICAL WATCHES

- ❖ The accuracy of mechanical watches is indicated by the daily rates of one week or so.
- ❖ The accuracy of mechanical watches may not fall within the specified range of time accuracy because of loss/gain changes due to the conditions of use, such as the length of time during which the watch is worn on the wrist, arm movement, whether the mainspring is wound up fully or not, etc.
- ❖ The key components in mechanical watches are made of metals which expand or contract depending on temperatures due to metal properties. This exerts an effect on the accuracy of the watches. Mechanical watches tend to lose time at high temperatures while they tend to gain time at low temperatures.
- ❖ In order to improve accuracy, it is important to regularly supply energy to the balance that controls the speed of the gears. The driving force of the mainspring that powers mechanical watches varies between when it is fully wound and immediately before it is unwound. As the mainspring unwinds, the force weakens.
- ❖ Relatively steady accuracy can be obtained by wearing the watch on the wrist frequently for the self-winding type and winding up the mainspring fully everyday at a fixed time to move it regularly for the wind-up mechanical type.
- ❖ When affected by external strong magnetism, a mechanical watch may loss/gain time temporarily. The parts of the watch may become magnetized depending on the extent of the effect. In such a case, consult the retailer from whom the watch was purchased since the watch requires repair, including demagnetizing.

● Duration time test

Check the Power reserve of the watch after the mainspring is fully wound up and leave it on natural condition with the dial-up position. Make sure that the watch runs **approximately 41 hours** until it stops.