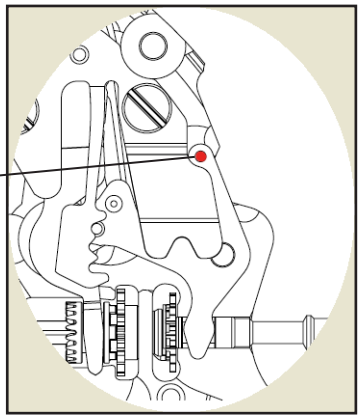
REMARKS ON DISASSEMBLING AND REASSEMBLING THE MOVEMENT

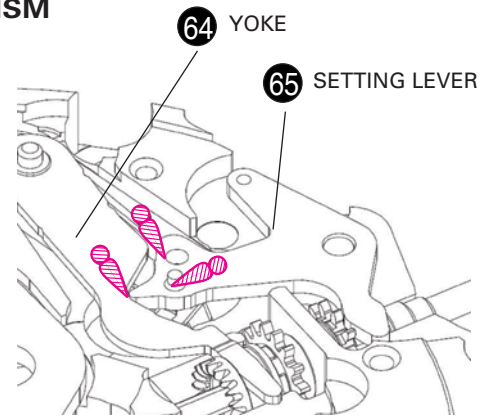
● HOW TO REMOVE THE SETTING STEM BEFORE DISMANTLING THE MOVEMENT

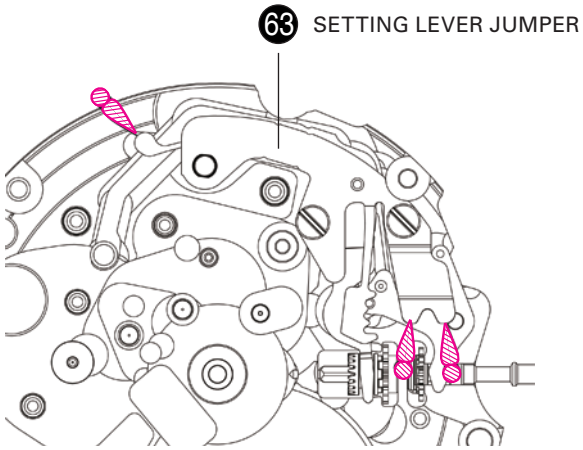
Crown position: 0 position

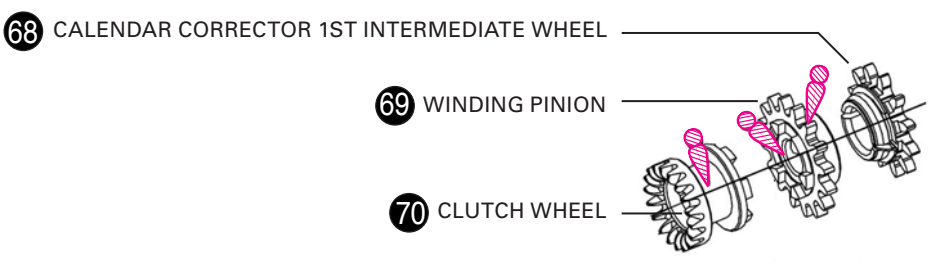
Push the SETTING LEVER gently (refer to the picture on the right) in order to disengage it from the SETTING STEM. Then pull out the crown with stem completely.



● SETTING MECHANISM





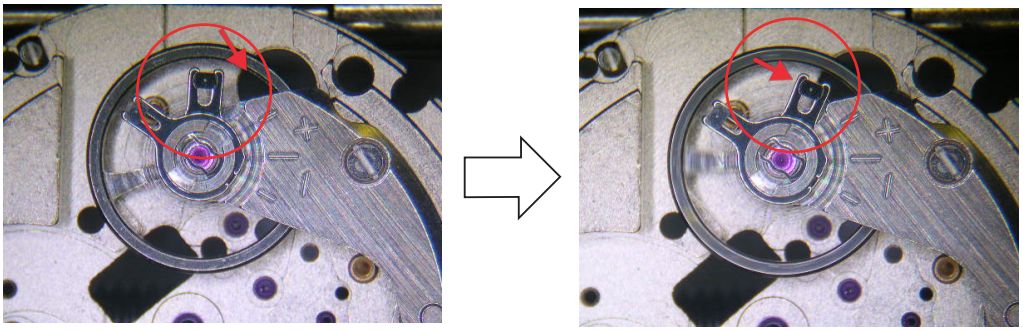


● BALANCE AND ESCAPEMENT

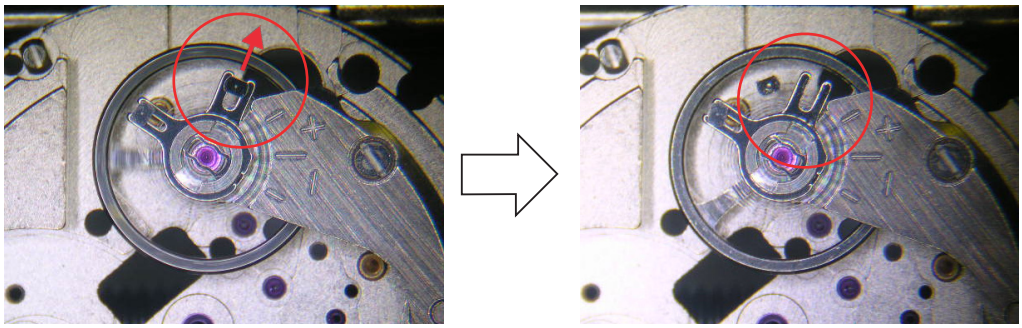
How to disassemble/reassemble the BALANCE and BALANCE COCK

- **Disassembling**

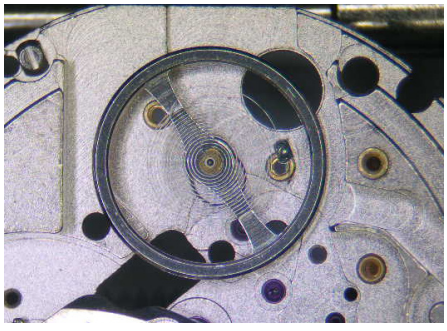
1) Rotate the STUD SUPPORT until it touches to the BALANCE COCK.
When doing so, make sure that the second bend of the balance-spring does not touch the REGULATOR PIN.



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.



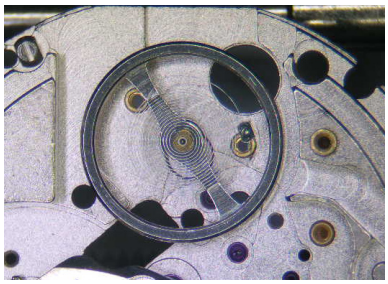
3) Unscrew the BALANCE COCK SCREW and remove the BALANCE COCK WITH REGULATOR.



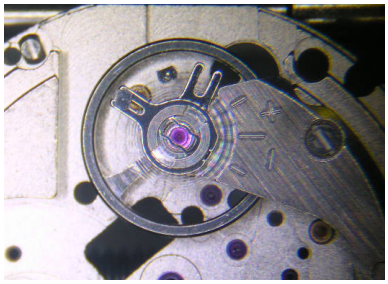
4) Remove the BALANCE COMPLETE WITH STUD.

• **Reassembling**

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

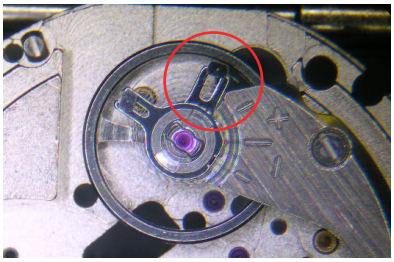


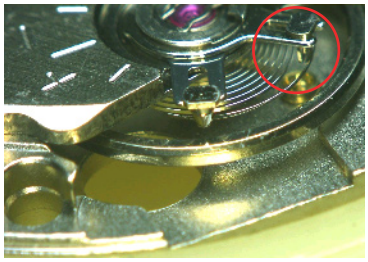
2) Set the BALANCE COCK WITH REGURATOR and tighten the BALANCE COCK SCREW.



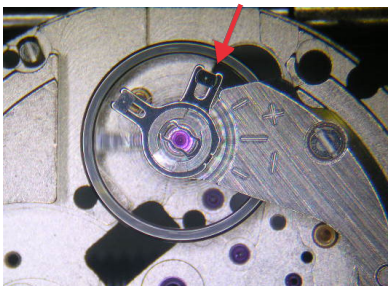
3) Temporarily set the stud to the STUD SUPPORT.

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





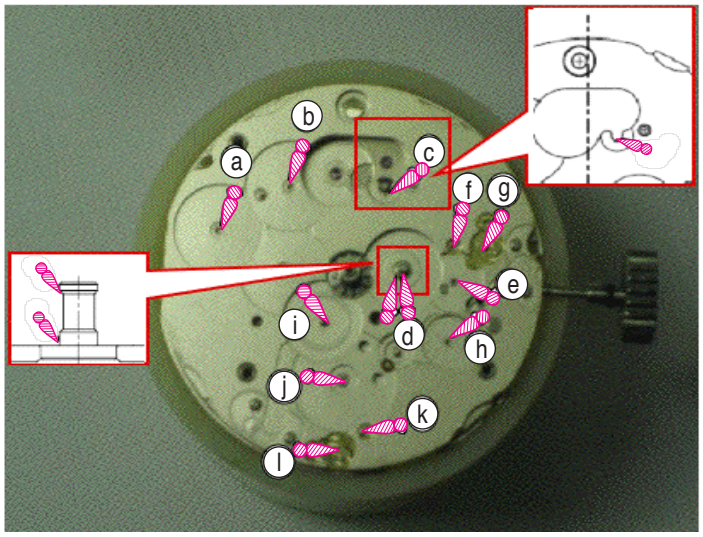
4) Push back the stud parallel to the slit of the STUD SUPPORT.



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.

HOW TO REASSEMBLE THE CALENDAR AND POWER RESERVE INDICATOR UNIT



Lubricate the below points on the CALENDAR TRAIN PLATE (a-k)

a) Lower pivot hole of the POWER RESERVE INDICATOR WHEEL. Type of oil: S-6

b) Lower pivot hole of the INTERMEDIATE POWER RESERVE INDICATOR WHEEL. Type of oil: S-6

c) Connecting part with the BARREL PINION. Type of oil: S-6

d) Lower shaft of the DAY DRIVING WHEEL (2 points.) Type of oil: S-6

e) Lower pivot hole of the INTERMEDIATE DAY DRIVING WHEEL. Type of oil: S-6

f) Lower pivot hole of the DAY RESET LEVER. Type of oil: S-6

g) Lower pivot hole of the DAY INDICATOR WHEEL. Type of oil: S-6

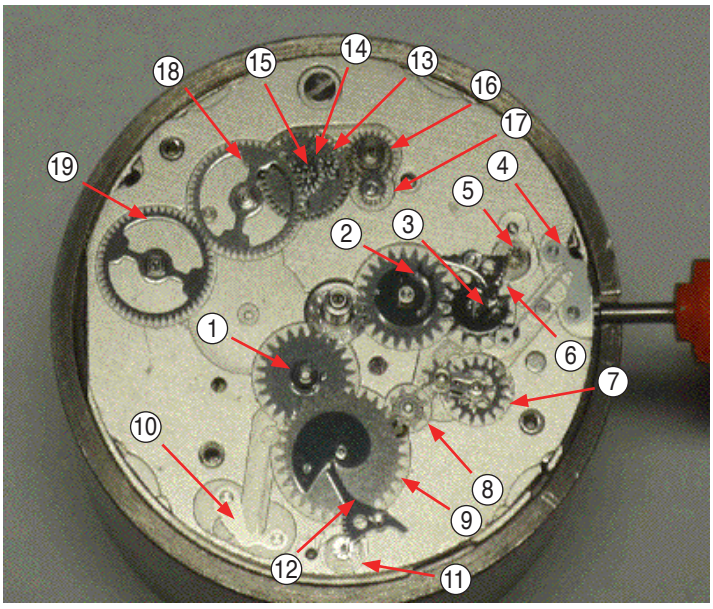
h) Lower pivot hole of the CALENDAR SETTING WHEEL UNIT. Type of oil: S-6

i) Shaft of the DATE DRIVING WHEEL. Type of oil: S-6

j) Lower pivot hole of the INTERMEDIATE DATE DRIVING WHEEL. Type of oil: S-6

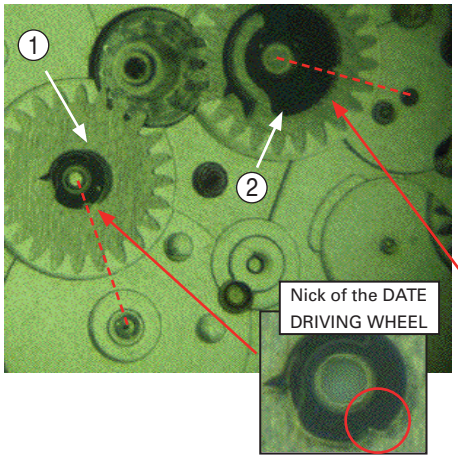
k) Lower pivot hole of the DATE RESET LEVER. Type of oil: S-6

l) Lower pivot hole of the DATE INDICATOR WHEEL. Type of oil: S-6



Reassembling order of the 19 parts for the Calendar and Power Reserve Indicator mechanism

1. DATE DRIVING WHEEL
2. DAY DRIVING WHEEL
3. INTERMEDIATE DAY DRIVING WHEEL
4. DAY JUMPER
5. DAY INDICATOR WHEEL
6. DAY RESET LEVER
7. CALENDAR SETTING WHEEL UNIT
8. DATE SETTING WHEEL
9. INTERMEDIATE DATE DRIVING WHEEL
10. DATE JUMPER
11. DATE INDICATOR WHEEL
12 DATE RESET LEVER
13. LOWER WHEEL FOR SUN AND PLANETARY WHEEL
14. SUN AND PLANETARY WHEEL UNIT
15. UPPER WHEEL FOR SUN AND PLANETARY WHEEL
16. INTERMEDIATE WHEEL FOR SUN AND PLANETARY WHEEL
17. BARREL PINION
18. INTERMEDIATE POWER RESERVE INDICATOR WHEEL
19. POWER RESERVE INDICATOR WHEEL

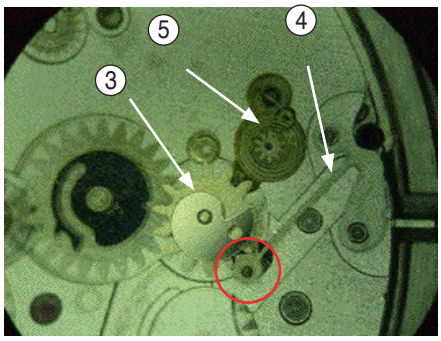


Reassemble the Day indicator train wheels.

1. Reassemble the DATE DRIVING WHEEL.

2. Reassemble the DAY DRIVING WHEEL.

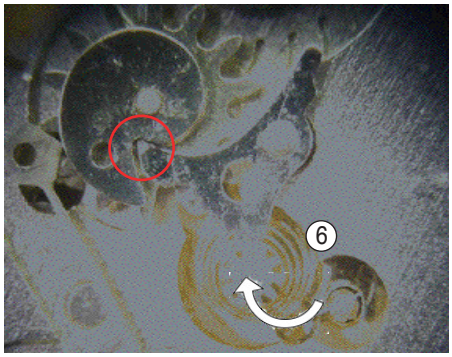
* Make sure that the nick of the DAY DRIVING WHEEL and lower pivot hole for the INTERMEDIATE DAY DRIVING WHEEL, and the DATE DRIVING WHEEL and the lower pivot hole for the INTERMEDIATE DATE DRIVING WHEEL on the CALENDAR TRAIN PLATE are aligned at same time as per the left image.



3. Reassemble the INTERMEDIATE DAY DRIVING WHEEL and mesh it to the DAY DRIVING WHEEL.
4. Reassemble the DAY JUMPER.

* Make sure that the DAY JUMPER is correctly engaged with the INTERMEDIATE DAY DRIVING WHEEL as per the left image.

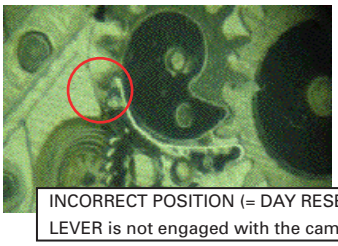
5. Reassemble the DAY INDICATOR WHEEL.



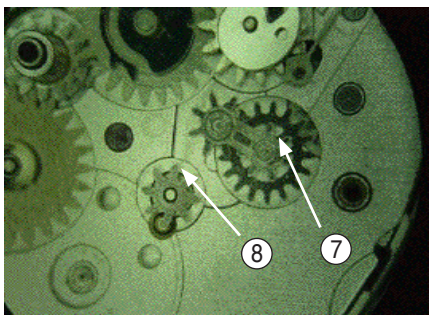
6. Reassemble the DAY RESET LEVER.

* Make sure that the DAY RESET LEVER is correctly engaged with the cam of the INTERMEDIATE DAY DRIVING WHEEL as per the left image.

Turn the DAY INDICATOR WHEEL 3 teeth clockwise, and wind its hair spring to press the DAY RESET LEVER and the DAY INDICATOR WHEEL in the correct position.



INCORRECT POSITION (= DAY RESET LEVER is not engaged with the cam).

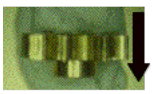


Reassemble the Date indicator train wheels.

7. Reassemble the CALENDAR SETTING WHEEL UNIT.

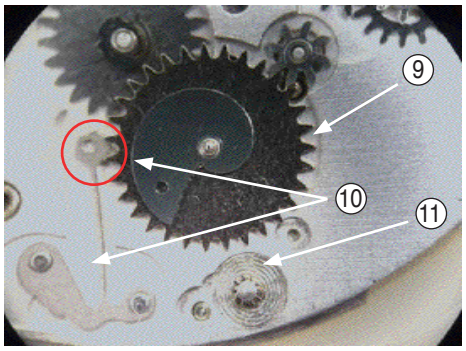
8. Reassemble the DATE SETTING WHEEL.

Setting position



UP

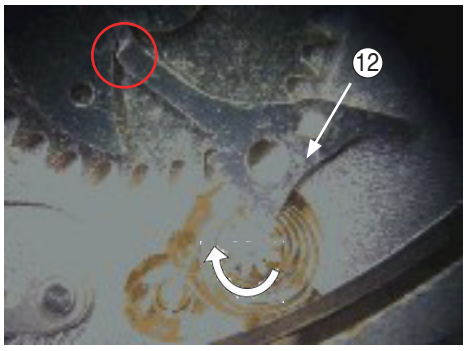
DOWN



9. Reassemble the INTERMEDIATE DATE DRIVING WHEEL and mesh it with the DATE SETTING WHEEL.

10. Reassemble the DATE JUMPER.
* Make sure that the DATE JUMPER is correctly engaged with the INTERMEDIATE DATE DRIVING WHEEL as per the left image.

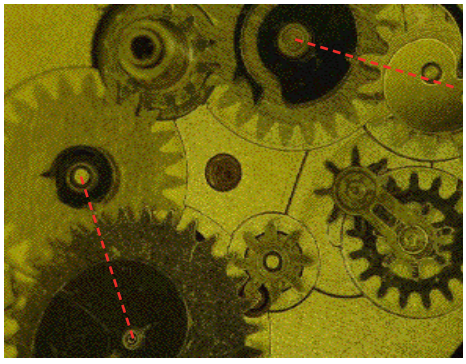
11. Reassemble the DATE WHEEL.



12. Reassemble the DATE RESET LEVER.
* Make sure that the DATE RESET LEVER is correctly engaged with the cam of the INTERMEDIATE DATE DRIVING WHEEL as per the left image.

Turn the DATE INDICATOR WHEEL 3 teeth clockwise and wind its hair spring to press the DATE RESET LEVER and the DATE INDICATOR WHEEL in the correct position.

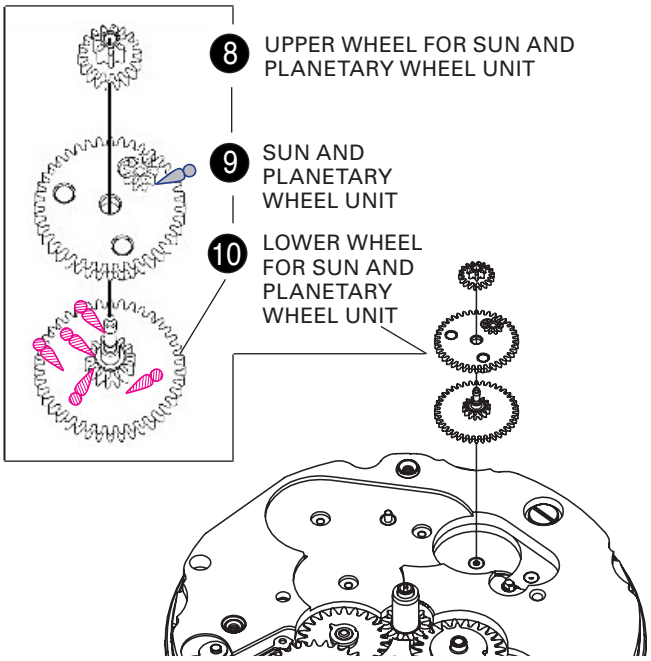
INCORRECT POSITION (= DAY RESET LEVER is not engaged with the cam).



* Recheck that the DAY DRIVING WHEEL and the INTERMEDIATE DAY DRIVING WHEEL, and the DATE DRIVING WHEEL and the INTEMEDIATE DATE DRIVING WHEEL are correctly aligned with the nick of the DAY DRIVING WHEEL and DATE DRIVING WHEEL.as per the left image, after securing both DAY and DATE JUMPERs.

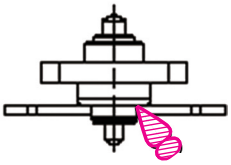
If it is not correct, please disassemble the parts of the calendar train wheels and reassemble them correctly.

HOW TO REASSEMBLE THE CALENDAR AND POWER RESERVE INDICATOR UNIT



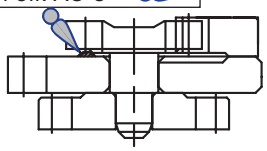
1. Reassemble the LOWER WHEEL FOR SUN AND PLANETARY WHEEL UNIT.
2. Lubricate the LOWER WHEEL FOR SUN AND PLANETARY WHEEL UNIT as per illustrated.

Type of oil: S-6

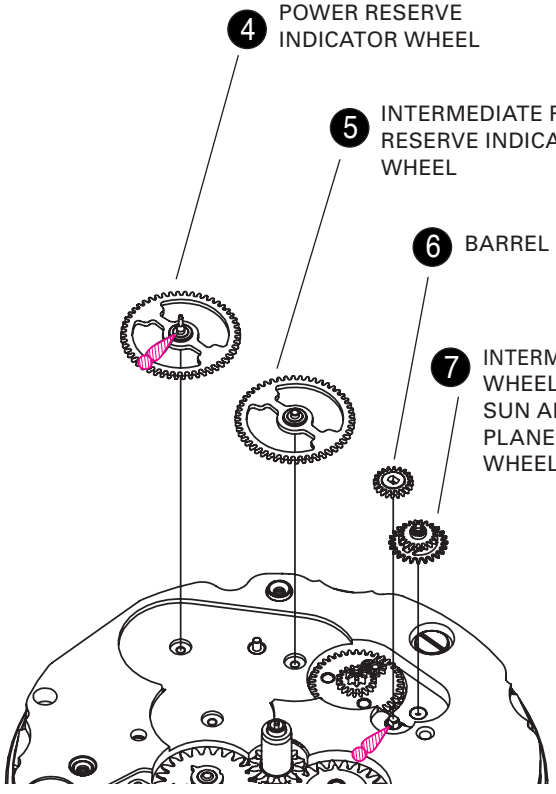


3. Mount the SUN AND PLANETARY WHEEL UNIT.
4. Lubricate the SUN AND PLANETARY WHEEL UNIT as illustrated.

Type of oil: AO-3

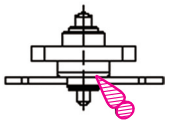


5. Mount the UPPER WHEEL FOR SUN AND PLANETARY WHEEL UNIT.



1. Reassemble and lubricate the INTERMEDIATE WHEEL FOR SUN AND PLANETARY WHEEL as illustrated.

Type of oil: S-6

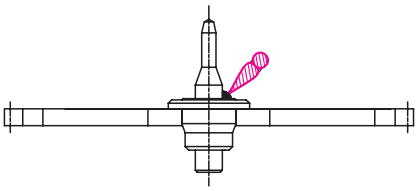


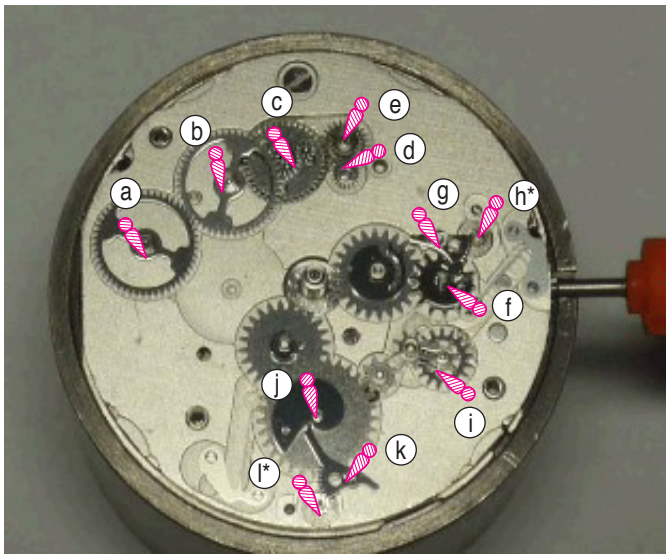
2. Reassemble the BARREL PINION.
3. Lubricate the pinion of the BARREL PINION.

Type of oil: S-6

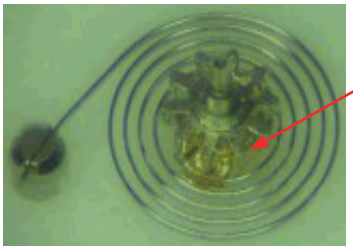
4. Reassemble the INTERMEDIATE POWER RESERVE INDICATOR WHEEL.
5. Reassemble the POWER RESERVE INDICATOR WHEEL.
6. Lubricate the shaft of the POWER RESERVE INDICATOR WHEEL as illustrated.

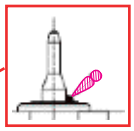
Type of oil: S-6

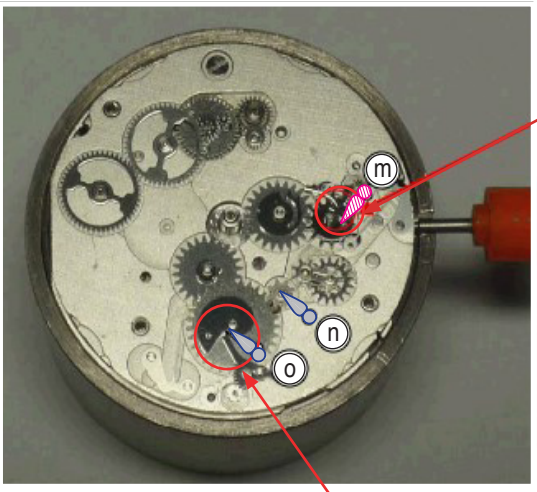


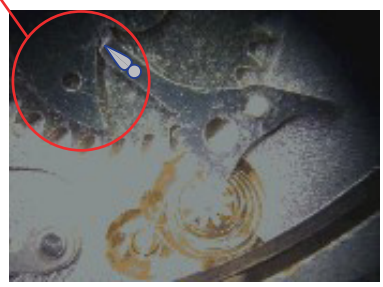


* Lubricate part for h) and l).









Lubricate the Calendar and Power Reserve Indicator function parts. (a-o)

* For a), b), c), e), f), g), h), i), j), k), l), please lublicate the contact point between the CALENDAR TRAIN BRIDGE and each train wheel.

a) Upper pivot of the POWER RESERVE INDICATOR WHEEL.
Type of oil: S-6

b) Upper pivot of the INTERMEDIATE POWER RESERVE INDICATOR WHEEL.
Type of oil: S-6

c) Upper pivot of the LOWER WHEEL FOR SUN AND PLANETARY WHEEL.
Type of oil: S-6

d) Upper pivot of the BARREL PINION.
Type of oil: S-6

e) Upper pivot of the INTERMEDIATE WHEEL FOR SUN AND PLANETARY WHEEL.
Type of oil: S-6

f) Upper pivot of the INTERMEDIATE DAY DRIVING WHEEL.
Type of oil: S-6

g) Upper pivot of the DAY RESET LEVER.
Type of oil: S-6

h) Upper pivot of the DAY INDICATOR WHEEL (refer to the left * image for detailed lubricate part).
Type of oil: S-6

i) Upper pivot of the CALENDAR SETTING WHEEL.
Type of oil: S-6

j) Upper pivot of the INTERMEDIATE DATE DRIVING WHEEL.
Type of oil: S-6

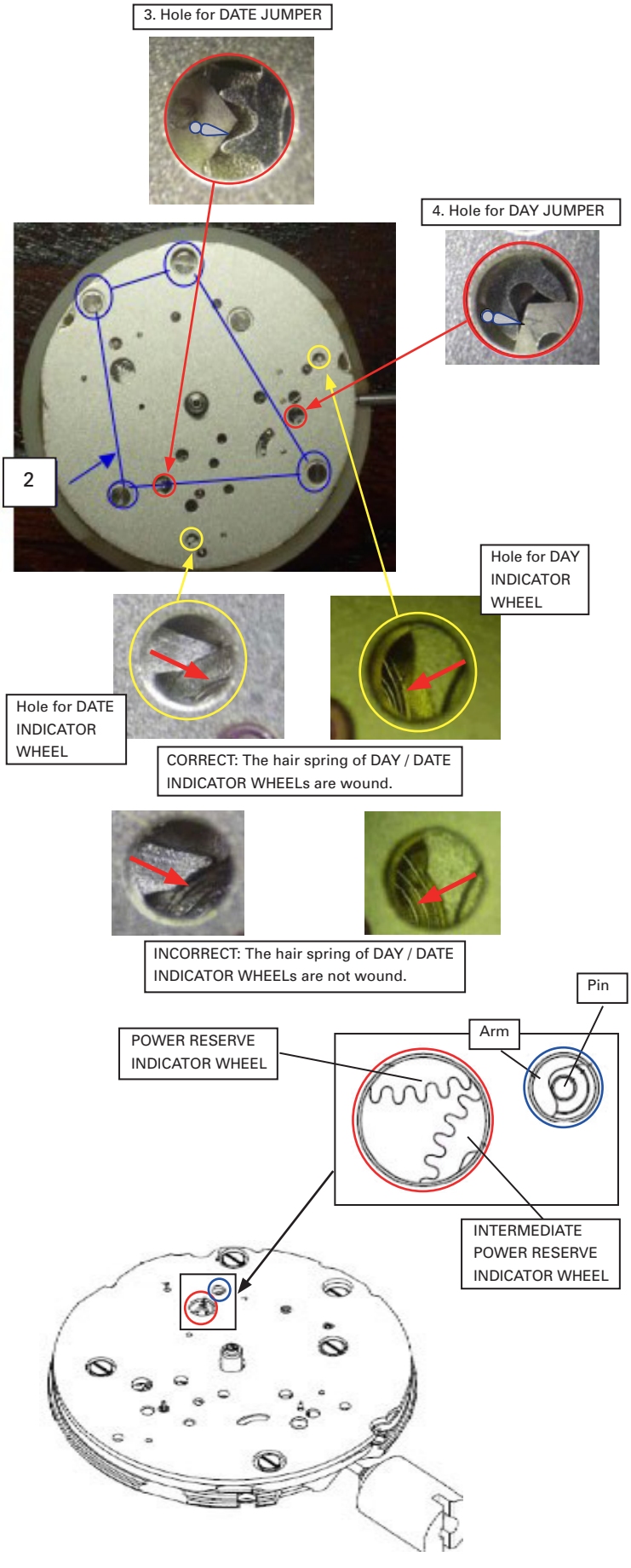
k) Upper pivot of the DATE RESET LEVER.
Type of oil: S-6

l) Upper pivot of the DATE INDICATOR WHEEL. (refer to the left * image for detailed lubricate part).
Type of oil: S-6

m) Contact point between cam of the INTERMEDIATE DAY DRIVING WHEEL and DAY RESET LEVER.
Type of oil: S-6

n) Shaft of the DATE SETTING WHEEL.
Type of oil: AO-3

o) Contact point between cam of the INTERMEDIATE DATE DRIVING WHEEL and DATE RESET LEVER.
Type of oil: AO-3



Reassembling of the CALENDAR TRAIN BRIDGE

1. Reassemble the CALENDAR TRAIN PLATE.

* Recheck if the DAY / DATE JUMPERs are correctly engaged with the INTERMEDIATE DAY / DATE DRIVING WHEELs before reassembling the plate.

2. Tighten the CALENDAR TRAIN BRIDGE SCREWs (4 pcs.)

3. Lubricate the contact point between DAY JUMPER and INTERMEDIATE DAY DRIVING WHEEL through the hole on the CALENDAR TRAIN BRIDGE.

Type of oil: AO-3

4. Lubricate the connecting part between DATE JUMPER and INTERMEDIATE DATE DRIVING WHEEL through the hole on the CALENDAR TRAIN BRIDGE.

Type of oil: AO-3

Function checking for the CALENDAR and POWER RESERVE INDICATOR mechanism

1. Check the day/date setting function.

a) Pull out the crown to the 1st click.

b) Turn the crown clockwise and check through a hole on the CALENDAR TRAIN BRIDGE if the DAY JUMPER moves.

c) Check if the hair spring of DAY INDICATOR WHEEL has been wound, in order to check the setting position of the DAY RESET LEVER (refer to the left image) .

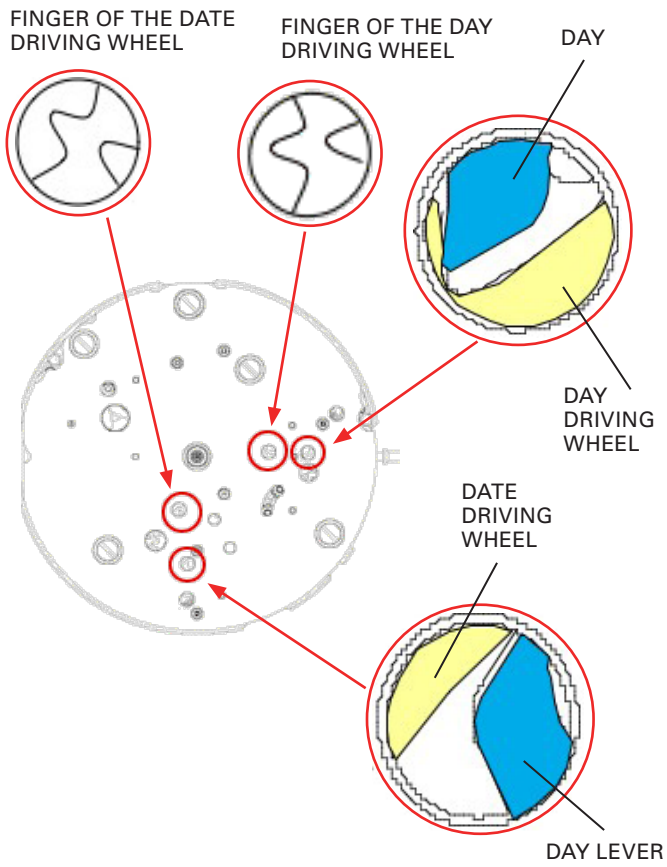
d) Turn the crown counter-clockwise and check through a hole on the CALENDAR TRAIN BRIDGE if the DATE JUMPER moves.

e) Check if the hair spring of DATE INDICATOR WHEEL has been wound, in order to check the setting position of the DAY RESET LEVER (refer to the left image).

f) Check if the hair spring of DATE INDICATOR WHEEL has been wound, in order to check the setting position of the DAY RESET LEVER (refer to the left image).

g) Wind the crown clockwise until the arm of INTERMEDIATE POWER RESERVE INDICATOR WHEEL contacts the pin on the CALENDAR TRAIN PLATE as per the illustration.

HOW TO REASSEMBLE THE HANDS AND DIALS

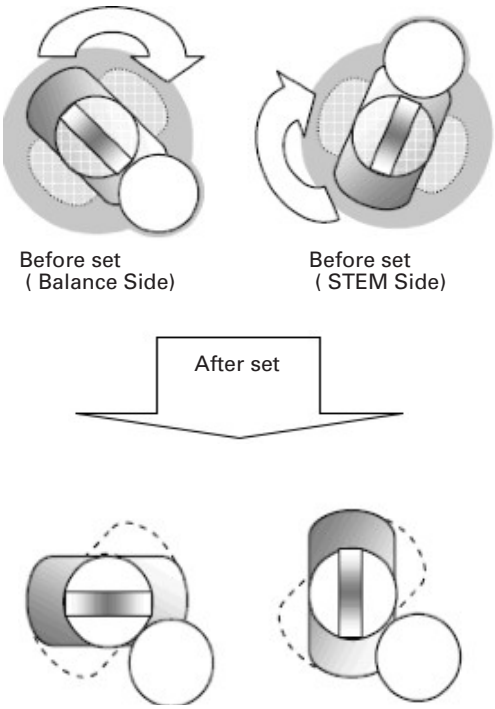


PREPARATION FOR DAY AND DATE INDICATOR HANDS REASSEMBLING

1. Pull out the crown to the 2nd click.
2. Turn the crown clockwise, and check if the DAY /DATE LEVERs and the finger of the DAY /DATE DRIVING WHEELs are aligned as the illustration at the same time, through the holes of the CALENDAR TRAIN BRIDGE.

* If the DAY / DATE DRIVING WHEELs are not correctly aligned, the movement should be disassembled and should be reassembled properly (refet to page 4).

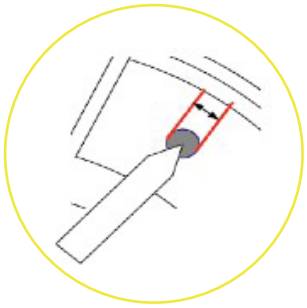
DIAL LOCKING PIN



ASSEMBLING OF THE DIAL

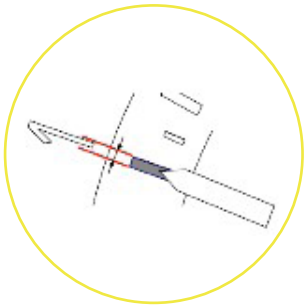
1. Set the dial to the movement and turn the movement over.
2. Turn the dial locking pin to hold the dial feet(at two points).

HOW TO REASSEMBLE THE HANDS AND DIALS



POWER RESERVE INDICATOR HAND

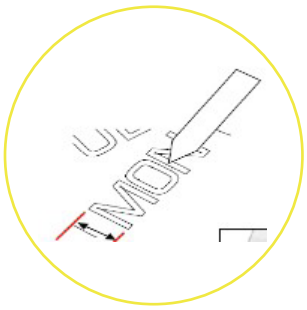
1. Fully wind the mainspring .
2. Install thePOWER RESERVE INDICATOR HAND with ponting its tip to the full position of the power reserve indication on the dial as per the left image.



DATE INDICATOR HAND

1. Install DATE INDICATOR HAND with ponting its tip to the "1st" of the date indication on the dial as per the left image.

* Please replace the hand with new one, as its hole becomes loosened once it is disassembled.



DAY INDICATOR HAND

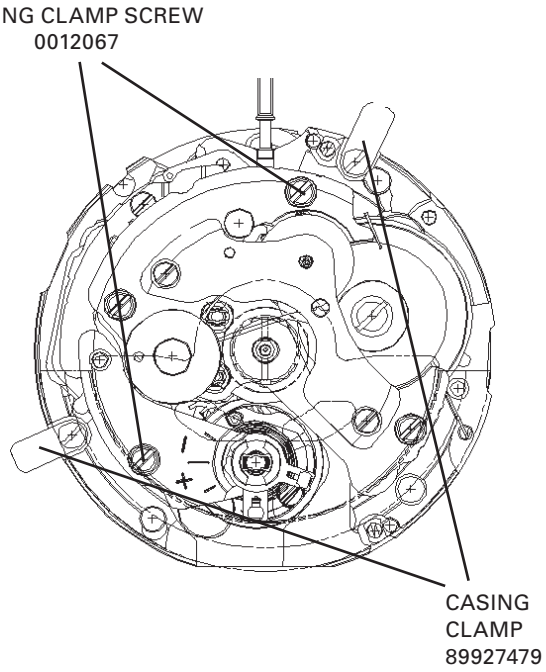
1. Install the DAY INDICATOR HAND with pointing its tip to the "MON" of the day indication on the dial as per the left image.

* Please replace the hand with new one, as its hole becomes loosened once it is disassembled.

HOUR/MINUTE/SECOND HANDS

1. Install the hour / minute / second hands.

HOW TO REASSEMBLE THE MOVEMENT INTO THE CASE



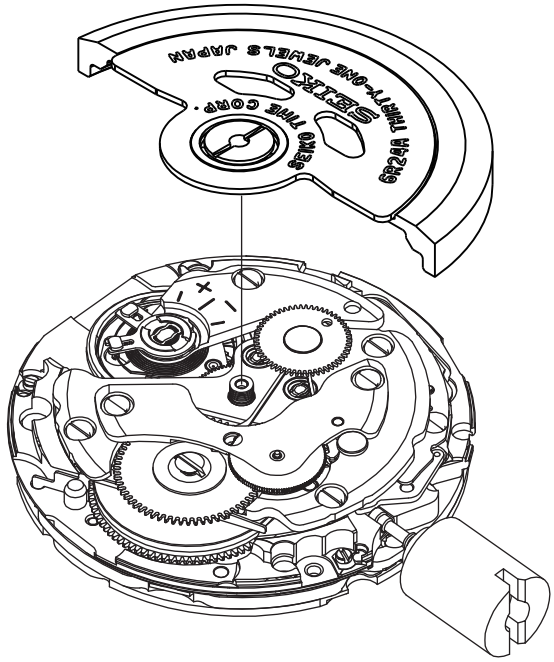
1. Take off the WINDING STEM (refer to Page 13/28.
2. Set the movement with dial to the case.
3. Set the case ring.
4. Set the WINDING STEM to the crown.
5. Set the CASING CLAMP and screw it with the CASING. CLAMP SCREWs (2 pcs.) as the right illustration.

* Do not assemble up side down as it has the top side and back side.

Top side has cutting around the screw hole

Backside has no cutting

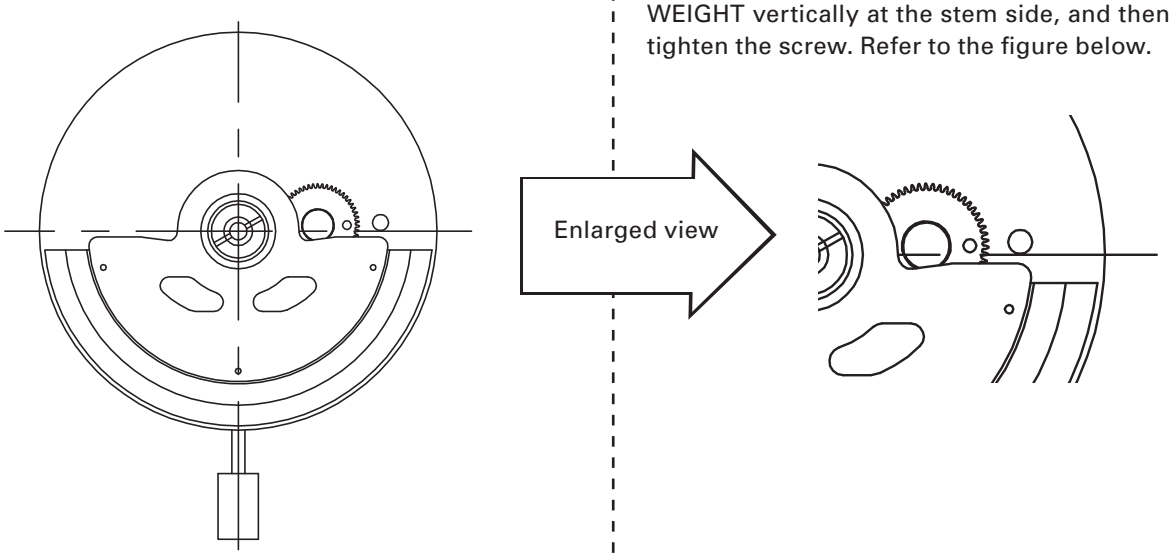
HOW TO REASSEMBLE OSCILLATING WEIGHT



❶ OSCILLATING WEIGHT

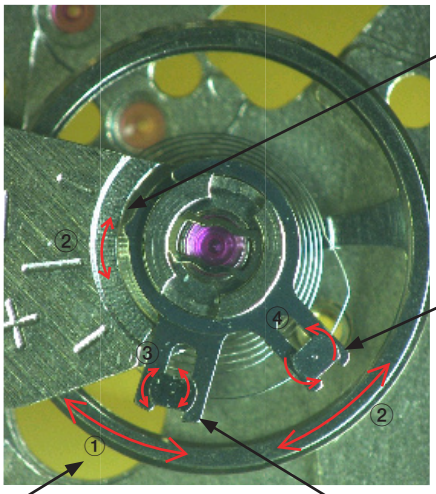
When fixing the OSCILLATING WEIGHT, an alignment with the FIRST REDUCTION WHEEL is necessary in order to wind the MAINSPRING most efficiently.

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.



REGULATION

● Names of the parts for regulation and their functions



② [REGULATOR]
Regulation of the accuracy rate (+) or (-) by adjusting the operative length of the balance-spring

④ [REGULATOR PIN]
Adjustment of the play of the balance-spring embraced in its slit

③ [STUD (glued at the balance-spring)]
Alignment of the balance-spring to the center of the regulator pin's slit

① [STUD SUPPORT]
Correction of the beat error by positioning the roller jewel correctly

● 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, which is the same design used for both Cal. 7S-B series.

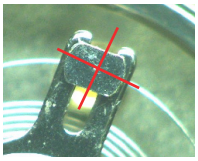
When an amplitude of the balance becomes weak, the watch shows time loss, in general.

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

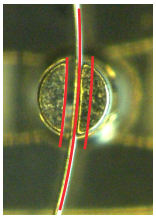
1) Make sure that the REGURATOR PIN is aligned in a vertical position to the REGURATOR and the balance-spring passes parallel through the slot of the REGULATOR PIN before fine-tuning the STUD and the REGULATOR PIN.

REGULATOR PIN

top side view



back side view



angled view

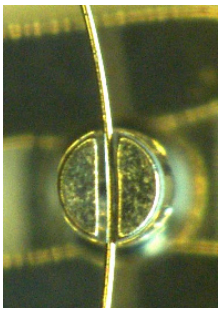
2) Rotate the STUD in order to align the position of the balance-spring passes through the center of the slot of the REGULATOR PIN.

STUD

top side view

REGULATOR PIN

back side view

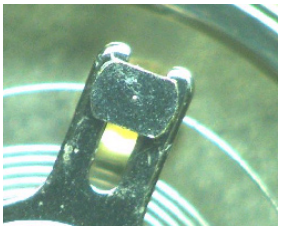


3) Rotate the REGULATOR PIN counterclockwise in order to fine-tune the clearance of the balance-spring passing through the slot of it.

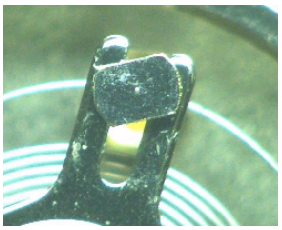
REGULATOR PIN

top side view

Before rotating

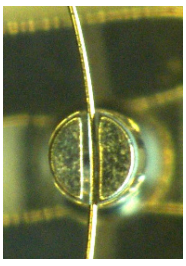


After rotating



back side view

Before rotating

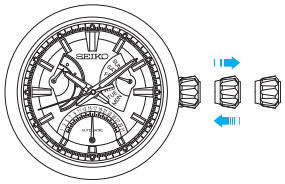
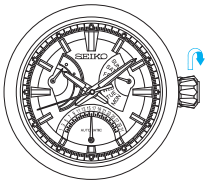
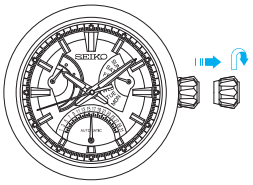
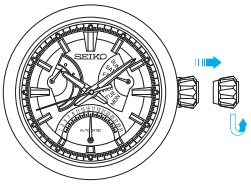
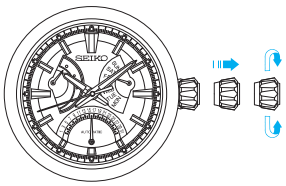


(Maximum clearance)

After rotating

(Minimum clearance)

● Function check

Operation	Function	Checkpoint
 Pull out the crown to the 2nd click and push it back in to the normal position. Repeat the same several times.	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.
 Turn the crown clockwise at the 0 click.	Hand winding function.	Make sure that the mainspring can be wound by turning the crown clock wise, and power reserve indicator shows properly.
	Power reserve indicator function.	
 Pull out the crown to the 1st click, then turn it clockwise.	Calendar mechanism - correcting the day.	Make sure that the day changes smoothly.
 Pull out the crown to the 1st click, then turn it counterclockwise.	Calendar mechanism - correcting the date.	Make sure that the date changes smoothly.
 Pull out the crown to the 2nd click, then turn it.	Second hand stop function.	Make sure that the second hand stops when the crown is pulled out to the 2nd click.
	Setting mechanism - hour and minute hand 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.	
	calendar mechanism - date change.	Make sure that the date changes when the hour and minute hands pass around midnight.

● 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	Water pressure test → Condensation test	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 → Water pressure test → 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		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		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)	±10 s/d	±15 s/d	±15 s/d	(Isochronism fault: T24-T0) ±10 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 oon natural condition with the dial-up position. Make sure that the watch runs **more than 45 hours** until it stops.