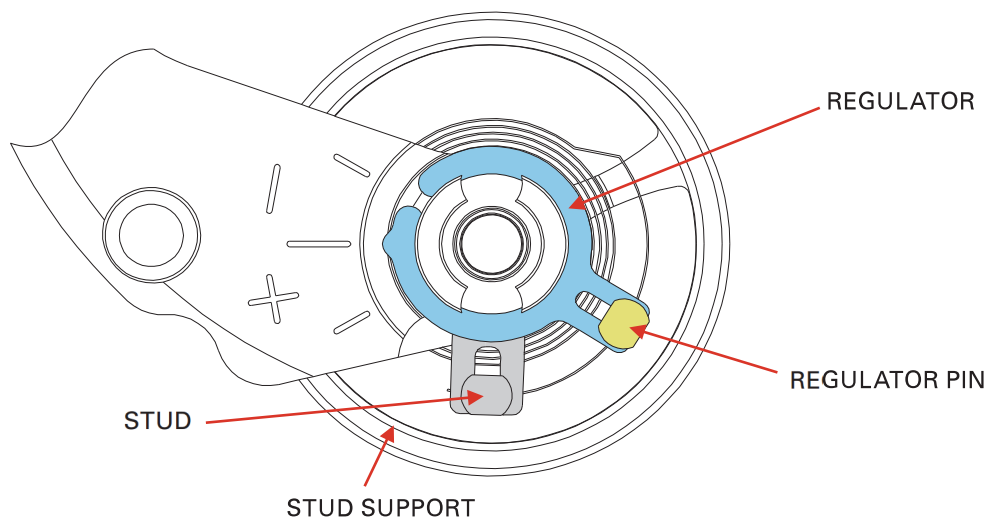


REGULATION

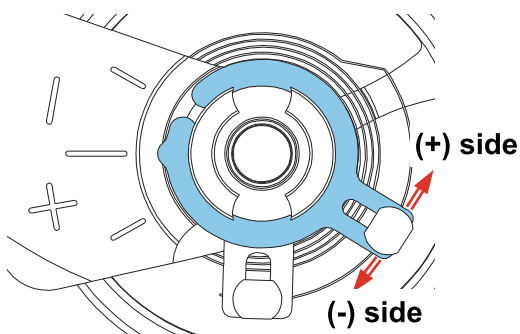
● Names of the parts for regulation and their functions



Note:

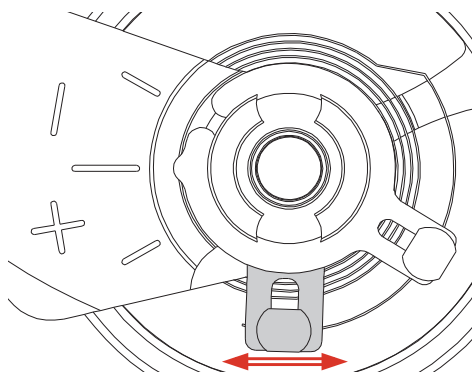
• Regulator

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

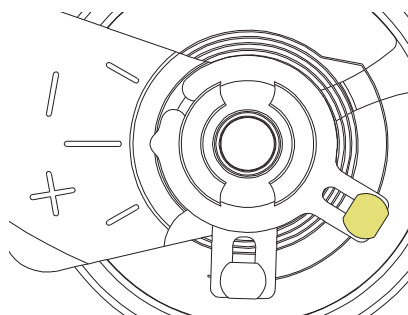


• Stud (glued at the balance-spring)

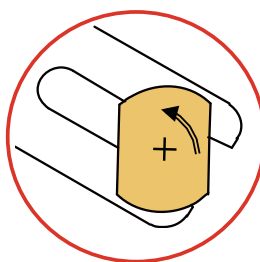
Alignment of the balance-spring to the center of the regulator pin's slit

• Regulator pin

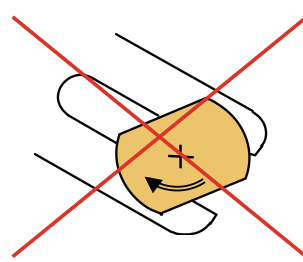
Adjustment of the play of the balance-spring embraced in its slit



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.

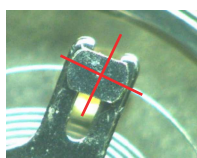
When an amplitude of the balance becomes weak, the watch shows time loss, in general.

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

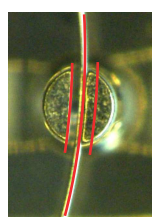
- 1) Make sure that the REGULATOR PIN is aligned in a vertical position to the REGULATOR and the balance-spring passes parallel through the slot of the REGULATOR PIN before fine-tuning the STUD and the REGULATOR PIN.

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.

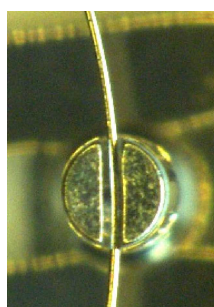
STUD

top side view



REGULATOR PIN

back side view

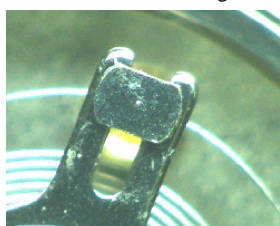


- 3) Rotate the REGULATOR PIN counterclockwise in order to fine-tune the clearance of the balance-spring passing through the slot of it.

REGULATOR PIN

top side view

Before rotating

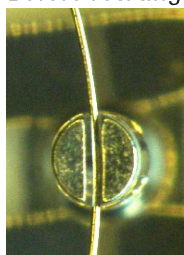


After rotating

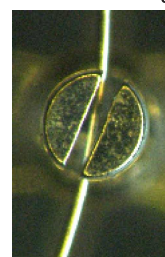


back side view

Before rotating



After rotating

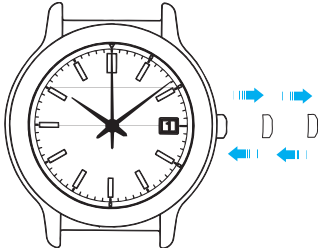
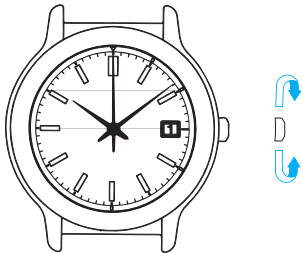
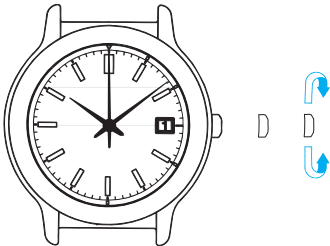


(Maximum clearance)

(Minimum clearance)

REMARKS ON INSPECTION AND MEASUREMENT

● Function check

Operation	Function	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.
 Pull out the crown to the 1st click, then turn it.	Calendar mechanism - correcting the date (and day), if available	Make sure that the date (and day) changes smoothly.
 Pull out the crown to the 2nd click, then turn it.	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		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)	±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.