

CHRONOMÈTRE OPTIMUM

Masterpiece of the collection Souveraine, the Chronomètre Optimum joins the iconic timepieces of Haute Horology



Combining a rich knowledge of the history of time with modern technologies and the example set by the great masters, the Chronomètre Optimum most certainly joins the great iconic timepieces of F.P.Journe Haute Horology, in an ongoing quest for precision, innovation and excellence. The Chronomètre Optimum symbolises the very essence of precision for a wristwatch endorsing the accomplishment of F.P.Journe chronometric research.

- The double barrel with its two springs ensures the stability of the driving force of this emblematic movement made of 18ct rose Gold, a specificity of the brand.
- The constant-force remontoire (patent EP1528443.A1) balances the driving force applied to the escapement to make it constant. By adding an extra gear representing an independent system wound in short spurts by the mainspring, the escapement ensures the balance's isochronism. This remontoire, made of titanium for the first time, maintains its balance in different positions, for greater efficiency.
- The EBHP High-Performance Bi-axial Escapement has also been patented (patent EP11405210.3). This two-wheel direct impulse escapement functions without oil and is the only direct impulse escapement to start up on its own. But not only does it function without lubricant, it also has far greater output than the majority of escapements: 50 hours without loss of amplitude. *Many dual-wheel escapements have been created in the past, the most efficient being the "natural" escapement invented by A-L. Breguet (†1823).*
- The balance with a spiral with Phillips curve guarantees better equilibrium.
- A natural dead beat second on the back of the movement's bridge.

The aesthetics of the hour, minute and small second displays and of the 70-hour power reserve are in perfect harmony with the visible wheel of the constant-force remontoir on the face of the dial. The back of the 18ct rose Gold movement reveals, through the sapphire back, a surprising natural dead beat second defined by a seconds circle screwed onto the movement's bridges.

The Chronomètre Optimum comes with a 40 or 42 mm Platinum or 18ct red Gold case, with a white Gold or red Gold dial, on a leather strap, Platinum or 18ct red Gold bracelet.

EBHP - F.P.Journe High-Performance Bi-Axial Escapement

I designed the Chronomètre Optimum in 2001. It was the first time that I integrated the dead beat second into my constant-force remontoire. This dead beat second can clearly be seen and is natural due to being linked to the one-second remontoire. In this watch the constant-force remontoire is visible while the second hand on the main dial ticks away at a speed of 3 hertz, i.e. 6 times per second (frequency of the escapement).

This watch, in 2004, inspired the Tourbillon Souverain with Dead Beat Second. As I was working on the Octa collection and the various models of these automatic watches at the same time, I was unable to put the Chronomètre Optimum into production. Then other models such as the Sonnerie Souveraine, the Centigraphe and the Répétition Souveraine took up all my time.

The basic premise was to make a watch with less internal friction, a constant force on the escapement to ensure isochronism and an escapement without lubrication to ensure stability.

- 1) Friction: to reduce friction the two barrels in parallel eliminate the lateral pressure to which the great wheel is subjected and exert a more stable force on the wheel train.

Isochronism: the balance's oscillation rate must always stay the same. Unfortunately the spiral is always imperfect, making it impossible to achieve this when amplitudes change due to the energy of the spring weakening. The constant-force remontoire (patent EP 1 528 443 A1) achieves constant amplitude for the first 45 hours of power reserve.

- 2) The escapement (EP11405210.3) patented under the name of EBHP is a direct impulse escapement, which means that the escapement wheels supply impulse directly to the axis of the balance. In the 18th century there were several direct impulse escapements: the spring detent or pivoted detent escapement, the Robin escapement, Breguet's natural escapement, etc. All these escapements work without oil but are not suitable for wristwatches.

Modern escapements are assumed to be self-starting and to have the stabilising features required to deal with arm movement. For this reason the EBHP has an original geometry enabling automatic starting and a configuration of ruby pallets blocking the escapement wheels at a specific angle, similar to the Swiss anchor escapement, enabling "recoil". This isolates the blocking anchor from the balance in order to stabilise it during movement on the wrist.

My watchmaking philosophy is to make watches that will still work in 200 years. Those made 200 years ago are still in working order today if they have been maintained regularly. It is for this reason that I only use solid materials that have proven their worth rather than modern materials that will probably be unable to be repaired in a few decades.

Variations in some of the watches from the Souveraine collection:

- The Chronomètre à Résonance achieves a constant rate when exposed to movement on the wrist. This watch is very accurate because its rate is not affected when the watch is worn.
- The Tourbillon Souverain: the classic tourbillon is not generally a very good watch, but combined with a constant force remontoire, its stability is guaranteed.
- The Chronomètre Souverain: has the same accuracy as the Chronomètre à Résonance but does not cancel out the effects of being worn.

François-Paul Journe

CHRONOMÈTRE OPTIMUM _ Technical Specifications

Movement

Calibre 1510
Manuel winding / 27 turns of crown
18K rose Gold

Dimensions of the Movement

Overall diameter: 34.40 mm
Casing-up diameter: 33.60 mm
Overall height: 5.80 mm
Height of winding stem: 3.75 mm
Diameter of stem thread: S1.20 mm

Balance

Chronometric balance with inertia weight
Hair spring with Phillips curve
Mobile stud holder
Free sprung
Pinned GE stud
Frequency: 21,600v/h (3Hz)
Inertia: 10.10 mg x cm²
Angle of lift : 58°
Amplitude : 0h dial up : > 260°
24h dial up : > 260°

Main characteristics

1 second remontoire at 11h, very light in Titanium and balanced
Natural dead beat second on the back of the movement
High performance Bi-axial escapement with arbor and wheels in Titanium, functioning without oil, (inspired by that of A.L.Breguet created in the XVIII Century)
2 mainspring barrels in parallel
2 position crown
Time adjustment in position 2

Indications

Off centre hours and minutes
Small second at 9h00
Power reserve at 6h00
Large dead beat second on the back

Power reserve

70 hours

Finishes

Circular graining on baseplate
Geneva waves on bridges
Polished screw heads with chamfered slots
Pegs with polished rounded ends

Case

Platinum or 18K red Gold
Diameter : 40 or 42 mm
Total height : 10.10 mm
Dial : Gold and Silver guilloché clous de Paris

Number of parts

Movement without dial : 240
Cased up with strap : 264
Jewels 44