

*The Sphérotourbillon has an inclined tourbillon, calendar and second time zone.*



*Jaeger-LeCoultre's new  
Duomètre Sphérotourbillon  
has two independent  
barrels for greater  
precision.*

BY NORMA BUCHANAN

# TWIN

# POWERS

# A

t this year's Salon International de la Haute Horlogerie, in January in Geneva, Jaeger-LeCoultre is unveiling a new, double-axis tourbillon watch called the Duomètre à Sphérotourbillon. JLC's headline introduction for the year, the watch is as much showpiece as timepiece. JLC executives say the Sphérotourbillon stands as a symbol of what JLC, with its giant, super-multi-tasking factory in Le Sentier in Switzerland's Vallée de Joux, can do. The watch's 460-component movement, Caliber 382, designed and made in-house, incorporates myriad technical innovations and unusual features.

First among them is its so-called Duomètre system of delivering power to the watch using two independent barrels. One powers the tourbillon and the other the time indications and calendar. Providing separate energy sources ensures that the power required to move the hands does not sap the steady supply of energy needed to keep the balance running precisely. The Sphérotourbillon is the latest in a series of watches that make use of the





*Jaeger-LeCoultre's huge factory  
in Le Sentier*

Duomètre system. Both barrels are wound via the crown. Turning it in one direction winds the barrel driving the time indications and turning it in the other direction the barrel for the escapement. The dial has a power-reserve indicator for each barrel.

One of the watch's major points of distinction is its stop-seconds flyback function, the first ever in a tourbillon watch. This function, operated by means of a pusher at 2 o'clock, enables the wearer to synchronize the watch with an external time signal, such as the radio signal from an atomic clock. That way, the watch wearer can benefit fully from the movement's impressive precision, JLC says. Other tourbillon watches have had stop-seconds

functions, enabling the wearer to stop the seconds hand at zero in order to synchronize it. But none has ever had a seconds hand that can be brought back to zero and restarted instantly so that synchronization can be quick and precise.

The stop-seconds function has another notable feature. On a standard stop-seconds, or hacking, watch, the balance stops when the stop-seconds function is activated. This causes a loss in precision, JLC says, because when the balance starts oscillating again it needs time to recover from having been at a dead stop. But with the Sphérotourbillon, thanks to the Duomètre system, the balance keeps oscillating and the tourbillon turning when the seconds hand is stopped.

Another unusual feature of the watch is its two-axis tourbillon, a concept JLC first used in 2004 in its Gyrotourbillon 1. The tourbillon revolves around both its own axis and around a second axis inclined at a 20-degree angle. The point of this arrangement is to prevent the tourbillon from ever resting in a horizontal position, even when the watch itself is lying flat. This is desirable because a tourbillon has no effect on precision when it is in a horizontal plane. Originally intended for use in pocket-watches, the tourbillon was designed to correct for timing errors in the vertical position only. Because the balance of the Sphérotourbillon is always inclined, it loses no more than eight or 10 degrees of amplitude when the watch moves from one position to another. A standard balance often loses 20 degrees or more moving from the horizontal to the vertical position.

The tourbillon is made even more precise by the speediness of its rotations, says JLC. The carriage revolves around its first axis every 30 seconds (most tourbillons revolve once per



## SPECS

### JAEGER-LECOULTRE DUOMÈTRE À SPHÉROTOURBILLON

**Manufacturer:** Jaeger-LeCoultre, Rue de la  
Golisse 8, CH-1347 Le Sentier, Switzerland

**Reference number:** 605 25 20

**Functions:** Hours, minutes, stop-seconds;  
return-to-zero function operated via  
push-piece at 2 o'clock; second time  
zone; pointer-type date moves forward or  
backward along with local-time hour  
hand; one power-reserve display for each  
of the two barrels

**Movement:** Manufacture Caliber 382;  
double-axis tourbillon with second axis  
inclined at 20°; rotation speeds for two  
axes once per 30 seconds and once per  
15 seconds, respectively; titanium tourbil-  
lon carriage with 11.5-mm diameter; con-  
structed according to Duomètre concept,  
with two independent barrels and trains,  
one powering the time indications and  
the other the tourbillon; cylindrical bal-  
ance spring with two terminal curves;  
14k-gold balance with 14k-gold inertia  
blocks, inertia = 12.5mg·cm<sup>2</sup>, 21,600 vph;  
manually wound by turning crown in one  
direction for one barrel and the other for  
the second barrel; 50-hour power reserve;  
460 components; 55 jewels; nickel silver  
bridges and mainplate; diameter =  
33.70 mm; height = 10.45 mm

**Case:** Rose gold; nonreflective sapphire  
crystal and caseback; diameter = 42 mm;  
height = 14.1 mm, including crystals;  
water-resistant to 50 meters; polished  
and satin finishes

**Strap and clasp:** Hand-sewn crocodile  
with 18k-gold pin buckle

**Variations:** Platinum case, limited edition  
of 75 pieces (220,000 euros, U.S. prices  
not yet determined)

**Price:** 200,000 euros (U.S. price not yet  
determined)



*The double-axis  
tourbillon is in-  
clined at a 20-  
degree angle.*

minute) and around its second, inclined axis every 15 seconds. Faster rotations mean greater precision, the company says.

The tourbillon carriage is made of titanium to keep its weight down to just 0.518 grams. It consists of only two sections, which means fewer screws and pillars are needed than on a traditional tourbillon and the weight is therefore minimized.

The watch's balance spring is also unorthodox; it is coiled in a cylinder like the balance springs used in marine chronometers of yore. The main advantage of this shape is that it allows for terminal curves at both ends of the spring — not, as on a flat balance spring, at just one end. This means that the spring will beat concentrically in all positions and hence keep better time. The watch has a second time zone, in 24-hour format (the word *fuseau* on the dial means “time zone”), and a calendar. Moving the hour hand forward or backward automatically changes the date. The calendar display is what JLC calls a “jumping date”: when the date pointer moves forward to the first of the month, it advances in a long leap to traverse the gap between the “31” and the “1” on the date ring.



## Jaeger-LeCoultre Duomètre à Sphérotourbillon



The Duomètre à Chronographe contains Caliber 380.

The Duomètre system, combined with the fast-rotating, double-axis tourbillon and cylindrical balance spring, makes for an unusually precise rate, JLC says. The watch will be off by one second per day or less. This is slightly less precise than the Gyrotourbillon 1, which loses or gains no more than 0.5 seconds per day (the difference is due to the smaller size of the Sphérotourbillon mechanism). It is nonetheless considerably more precise than a similarly well-made single-axis tourbillon, which gains or loses as much as three seconds per day, JLC says.

As notable as the watch itself is the fact that nearly all of it, from case to balance to tourbillon carriage, was made in-house. For nearly a decade, JLC has been developing and enhancing its complications-making ability. Design occurs in one dedicated department using 3D CAD CAM systems. All the components for the escapement are made on the premises except for the wire used for the balance spring, which, like most of JLC's balance springs, is produced by JLC's sister company in the Richemont Group, A. Lange & Söhne. Once the wire is delivered, coiled in

a cylinder, JLC's own technician takes over, cutting the spring and shaping its terminal curves. (Making the curves alone requires two hours and assembling the escapement takes an entire day.) The movement and watch itself are assembled in a special complications department employing 34 watchmakers. A single watchmaker is in charge of the entire assembly and also servicing the watch after it is sold.

Jaeger-LeCoultre's Sphérotourbillon is the fourth and latest member of its "Duomètre" series. All have in common a single feature, the source of the "Duo" in the watches' name: two independent barrels that power different functions in the watch and thereby prevent the energy requirements of one function from impairing the watch's timekeeping precision.

The company nicknamed the concept "Dual-Wing," the two "wings," or sides, being the two sections of the movement containing the two going trains, one for each barrel.

The series began in 2007 with the launch of the Duomètre à Chronographe, containing Caliber 380. In that watch, one barrel and going train power the elapsed seconds, minutes, hours, and *foudroyante* display, at 6 o'clock, which shows 1/6-second increments, corresponding to the balance's frequency of 21,600 vph. The other barrel and going train drive the regular time indications. Unlike other chronographs, this one has no coupling clutch because each of the two functions, chronograph and regular time, has its own power source. The chronograph and regular time both have power reserves of 50 hours, indicated by two displays on the dial. This structure prevents the chronograph from affecting the precision of the regular-time indications. In the Duomètre à Chronographe, the precision of the timekeeping function is the same whether the chronograph function is switched on or off.

The chronograph indicators are on the right side of the dial and the regular-time displays on the left. To prevent confusion, the hands on each are color-coded: blue for the chronograph indicators and golden or rhodium-plated, depending on the particular model, for the regular time.

In 2009, JLC launched its second watch using the Duomètre concept, a grande sonnerie containing Caliber 182. Here, one barrel was used to power the chiming mechanism, which rang with the same tones as the famous Westminster, or Big Ben, chimes in London. The other barrel powered all the other indications, i.e., the time displays and the indicators for a perpetual

The Hybris Mechanica  
à Grande Sonnerie



calendar. The watch was called the Hybris Mechanica à Grande Sonnerie, and sold as one in a set of three high-complication watches.

The next year came Duomètre number three, the Duomètre à Quantième Lunaire, containing Caliber 381. In this watch, one barrel is responsible for powering the escapement only. The other drives both the time and calendar indications, including the moon-phase indicator. Like the Chronographe, the Quantième Lunaire has a 1/6-second *foudroyante* display. The *foudroyante* mechanism gets its power from the same barrel as the other indicators. The watch has a stop-seconds, or hacking, feature, which stops both the regular seconds hand and the *foudroyante* hand so that the watch can be synchronized with a time signal. While the seconds are stopped, the escapement continues oscillating. This prevents any loss in precision that would occur if the balance had to restart from a resting position.

The Duomètre à Sphérotourbillon resembles the Quantième Lunaire in the division of labor assigned to its two barrels: one powers the escapement and the other the time indications. And, like the Quantième Lunaire, it has a stop-seconds function (albeit with the additional bonus of a flyback feature).

There are more Duomètre models being developed, says Stéphane Belmont, the company's international marketing director. One will come out next year and another in 2014. Stay tuned. ○



The Duomètre à  
Quantième Lunaire  
and its movement,  
Caliber 381



MORE DUOMÈTRE  
MODELS WILL  
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# GETTING INTRICATE



*Jaeger-LeCoultre's series of fantastically complicated watches is meant to send a simple message, says CEO Jérôme Lambert.*

When Jérôme Lambert looks back on his first decade at the helm of Jaeger-LeCoultre, one achievement stands out among all others. It's the string of highly complicated watches that started eight years ago and has now led to the diabolically complex Duomètre à Sphérotourbillon, the company's star introduction for this year.

When Lambert became CEO, in April of 2002, the company was known almost entirely for its Reverso watch, whose most obvious technical innovation was its case, not its movement. This was despite the fact that JLC had been making its own movements since the mechanical-watch revival began more than a decade earlier — JLC was a manufacture before being one was fashionable — and was a supplier to many other prestigious brands.

"Somehow we were not putting that expertise on stage," Lambert says. "We had this fantastic mastery, but no product [we had] really embodied that level of expertise."

His solution was to introduce a series of extremely complicated watches, a new one every year, that would knock the socks off any watch lover who saw them.

The series began in 2004 with a fireworks display: the Gyrotourbillon 1, a double-axis, inclined tourbillon with perpetual calendar, equation of time and eight-day power reserve. It was priced at \$275,000. Another showstopper, unveiled in 2006, was the Reverso Grande Complication à Triptyque, a three-faced watch with tourbillon, perpetual calendar, astronomical chart, equation of time, and much else (\$375,000 at the time). There have been others, among them the Reverso Gyrotourbillon 2 and the three Duomètre models launched between 2007 and 2010. The latest high complication is the Duomètre à Sphérotourbillon, which is being unveiled at SIHH in Geneva this January (see preceding story).

All these watches are made in JLC's 25,000-square-meter factory in Le Sentier, an amalgam of buildings dating back to

the mid-19th century, where the company makes everything from cases to nearly invisible movement parts (the tiniest component made there is the 0.6-mm guard pin for Caliber 101, the smallest mechanical movement in the world) to tourbillon cages. It is this know-how and versatility to which Lambert wants to draw attention with his show-off series of complications.

About 1,200 people work in the factory (to give you an idea of its relative size, the whole Vallée de Joux has just 6,000 inhabitants), making not just high complications, of course, but all the models in JLC's watch families: the Reverso, Master and Duomètre. JLC makes 60 different calibers. It manufactures some of its own cases and some dials and hands. It even employs its own enamellers and gem-setters.

JLC makes escapements for more than 60 percent of its watches, Lambert says. (The company does not divulge how many watches it makes a year, other than to say it is about as many as Patek Philippe. Sources put that company's production at about 45,000 watches per year.) It was Günter Blümlein, former chairman of JLC, who, before he died in 2001, decided to make JLC, which already made parts of some its escapements, a start-to-finish escapement manufacturer. "Mastering that has been a tremen-

dous additional challenge of the past 10 years,” Lambert says. The problem is that we don’t have just three escapements. We have more than 40 different ones. And you have to do each one from scratch, meaning the spiral is different, the balance wheel is different, the réglage is different. Every one is like a new movement.” In the next five to 10 years, JLC will be making the escapements for 80 percent of its watches. The company also makes escapements for some other brands under the Richemont Group umbrella.

It was Richemont’s purchase of JLC that has made possible much of the brand’s recent progress, Lambert says. Richemont bought the company, along with IWC Schaffhausen and A. Lange & Söhne, all part of the Mannesmann-owned Les Manufactures Horlogères, in 2000. (The astronomical price, 3.08 billion Swiss francs, about \$1.7 billion at the time, was due mostly to JLC’s movement-making capability.) The acquisition brought what Lambert calls “oxygen” to the brand, enabling it to expand its manufacturing capabilities and fulfill its high-horology potential. JLC was able to add a

new wing to its factory, a project undertaken in the economically catastrophic year of 2008 and finished in 2009. Throughout the recession, the company has invested huge amounts in research and development: the equivalent of 30 or 40 percent of what it has spent on media and marketing. (The company does not release information about those expenses.) “Jaeger-LeCoultre has registered more than 80 patents in the past 10 years,” Lambert says.

Also thanks to the Richemont acquisition, JLC was able to grow internationally, buying back its distribution in markets including Hong Kong (now its largest market), Japan, Singapore and Italy, and setting up its own subsidiaries. (There already was a U.S. subsidiary at the time of the takeover. This country now ranks somewhere between five and 10 among the brand’s top markets, Lambert says. He declines to be more specific.) The company’s rapid growth in China, which began in 2002, is due to support from Richemont, Lambert says.

And the company has benefited from Richemont’s logistical support. Without

“WE HAD THIS FANTASTIC MASTERY, BUT NO PRODUCT WE HAD REALLY EMBODIED THAT LEVEL OF EXPERTISE.”

it, JLC executives would have had a far harder time focusing on watchmaking. “On Monday, you have to be a lawyer, on Tuesday, a tax advisor, and maybe on Wednesday you can concentrate on your job,” he says. The company has been able to call on Richemont’s retailing expertise for the expansion of its string of boutiques, of which there are now 45. “Retailing Jaeger-LeCoultre is probably 10 times easier [under Richemont] because retailing has been part of the group’s activities for [so long],” Lambert says.

Although some people think that being taken over by a big conglomerate weakens a brand’s identity, the opposite has been true for JLC, he says. “Jaeger-LeCoultre has never been as much Jaeger-LeCoultre as it is today, being part of the group.” ○



*The Reverso Gyrotourbillon 2*

*The Gyrotourbillon 1*



*The Reverso Grande  
Complication à Triptyque*