

# Hybrid

## Seiko's mecha-tronic marvel is launched at last

James Gurney

The Spring Drive watch has finally arrived, in tangible and marketable form, a mere 28 years since conception. It is everything Seiko set out to achieve: a perpetual mechanical watch, hybridised with an electronic regulatory system for maximal accuracy. However, beyond its glide-motion hands, nothing gives away the truly revolutionary technology lying within. *QP* explores the subtleties of a most understated horological watershed.

The two variants in Seiko's new Spring Drive range. (Left) Centre-seconds version of Seiko's Spring Drive watch, with bracelet and power reserve indicator at 4 o'clock (Right) Small-seconds version of the Spring Drive watch, with power reserve at 7 o'clock and leather strap - the "more classical embodiment of Spring Drive."



Three centre-seconds model variants, all driven by calibre 5R65 (€3,400).



Three small-seconds model variants, all driven by calibre 5R64 (€3,300).



A rather humble-looking calibre 5R65 - the result of 28 years' development, 230 patent applications and 600 prototypes.



The unique aesthetic aspect of the Spring Drive watch is the continuous sweep of the seconds hand, rather than tick of quartz or mechanical watch hands.



Announced by Seiko as 'The Quiet Revolution', the Spring Drive has been a long time coming. Since the project was quietly commenced in 1977, the underlying technology has changed out of recognition, with serious answers to the technical challenges only emerging in the mid to late nineties. Since then, development of the project has gathered pace to the extent that some 600 prototypes were produced in the last eight years of the project.

One of the early prototypes was then shown at the Basel fair as a work in progress. After several years of updates, the Spring Drive was finally unveiled in production form at Basel this year, to a certain level of razzmatazz (at least by Seiko standards). However, the light thrown on the Spring Drive seemed curiously muted. While the Spring Drive is of no great commercial significance in itself - particularly when compared to products such as the Sportura - the watch is certainly important, as many of the journalists gathered there realised. Even those writers that barely deign to lower their eyes from Patek Philippe were heard to talk about the concept in approving terms.

### Fruition

What was being understood was that the Spring Drive does the hitherto impossible trick of making a quartz-regulated watch both desirable and intriguing - even to the most pure-minded horologist. By reducing the electronic component of the watch to the absolute minimum, Seiko came up with a watch that is essentially hand-made and mechanical in the same way as a more conventional watch is; even to the point that there are only five watchmakers at Seiko capable of assembling the movement.

Even better, the Spring Drive's 28-year development has come to fruition at a time when traditional watchmaking skills are ever more frequently being hybridised with futuristic technology. August names such as Audemars Piguet, Jaeger-LeCoultre and Breguet are all introducing new materials and techniques into their watches and using design to communicate this to what they hope is a new audience. TAG Heuer's V4 concept watch was perhaps the most extreme example of this tendency, being, if you like, a watch for the CeBIT generation.

Given Seiko's legendary smartness, you might almost imagine the Spring Drive was held back for just this moment in time.

However, there is one detail that belies this - the apparent loss of confidence when it came to design. The bold prototypes have given way to a form that, while completely correct and perfectly nice, somehow fails to capture the spirit of the project. Seiko's press release was titled 'The Quiet Revolution' - a title that, for once, was only too true. After all, this is an exceptional watch that is aimed at a small market. Compared to the overtly technical feel of recent TAG Heuers and the Jaeger-LeCoultre Compressor series, the Spring Drive is ultra-conservative. Perhaps the strangest thing here is that, while most companies like to stress Formula 1 links of any sort in relation to their watches, Seiko remains happily understated about its 'Team Partnership' with BAR Honda.

### Heart of the matter

This, however, is one watch for which design really does take a back-seat to the internals. The Spring Drive is essentially conventional right up to the point on the gear train where you would find the escapement. As you would expect, a rotor stores power in a normal spring barrel, though there are two enhancements here: a new alloy for the main spring ('Spron 510') and the enticingly titled 'Magic Lever'. The latter transmits energy directly from the rotor shaft to the mainspring in a 30% more efficient manner than traditional winding systems, simply by doing away with an intermediary transmission wheel. It is unlikely to be this simple however, but Seiko are reluctant to reveal much more.

The heart of the movement is the new 'Tri-synchro Regulator'; a device that does essentially what it says on the tin. It replaces the traditional mechanical escapement, co-ordinating three types of

energy - mechanical, electrical and electromagnetic. Power is taken from the gear train and converted into a current that runs the quartz oscillator, as per systems such as Seiko's Kinetic movement.

The real revolution lies in what happens next though. Conventionally, the oscillations are divided down so that second or half-second impulses are sent to stepping motors from which the hands are driven. The Spring Drive however uses the oscillator signals to activate brakes that are fitted to the gear train. The advantage gained by this arrangement is that power runs through the gear train with greater smoothness and stability than other systems. Operating eight times per second, the effect of the brakes is almost invisible and gives the seconds hand a glide motion - "reflecting the true nature of time," as Seiko puts it.

### Question of desire

The simplicity of the arrangement gives the Spring Drive two important

By reducing the electronics of the watch to the absolute minimum, Seiko's watch is essentially mechanical, to the point that there are only five watchmakers capable of assembling the movement.

**28 years in the making**

**1977**

Idea conceived by engineer at Seiko's Suwa facility

**1982**

First working prototype and first patent filed. Problem with power generation.

**1982-1997**

First phase of R&D. Development of a new regulating system. Power generation problem solved.

**1998**

Debut of Spring Drive prototype at Basel.

**1999-2004**

Second phase of R&D.

**2000**

Hand-wound Spring Drive released.

**April 2005**

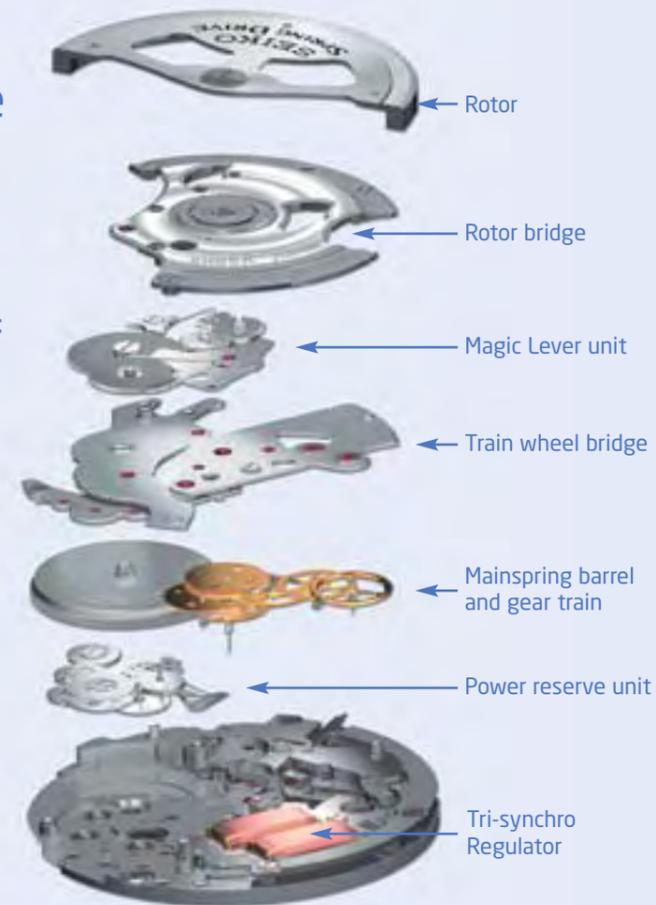
Final automatic Spring Drive watches presented at Basel.

**September 2005**

Spring Drive to be launched to the public at the Seiko Center in Paris



Pictured: Prototype Spring Drive calibres from 1999 (top) and 2001 (bottom).



Exploded diagram of the Spring Drive 'SR65' calibre. 276 components comprise this centre-seconds calibre. The small-seconds SR64 calibre contains 280 parts.

advantages: economy and stability. Without the jarring shocks that are part and parcel of traditional escapements, the Spring Drive can operate at a faster rate using less power - 25 nano-watts for the oscillator and brake units according to Seiko, meaning the watch should last much better than purely mechanical equivalents. This really is an exceptionally clever piece of technology.

Regardless of the practical benefits of the system, which include accuracy on a par with, or better than most quartz movements, the idea will only be of value if the technology can be made to appeal on the basis of less rational grounds. Is the invention intriguing enough to make it desirable in itself? Can the technology be expressed in design effectively enough to kindle that desire? I think the answer to both questions is yes, but the Spring Drive as released does not really set the world on fire in terms of looks, which is a pity. ○