



ARNOLD & SON

SINCE 1764

**Royal Collection – Constant Force Tourbillon
Pre-BASELWORLD 2015**

Arnold & Son pushes precision chronometry ever further with the Constant Force Tourbillon, featuring a patented constant force device with 60-second tourbillon and true beat seconds.

The symmetrical movement architecture of the Constant Force Tourbillon movement pays tribute to Arnold & Sons' historic marine chronometers. At the top, two visible mainspring barrels and the constant force device provide optimal power to the tourbillon at the bottom of the dial.



Constant Force Tourbillon

Exclusive Arnold & Son mechanical movement A&S5119, hand-wound, anthracite open dial, 18-carat red gold case, diameter 46 mm

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Arnold & Son SA, Switzerland, March 2015



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The Constant Force Tourbillon is part of the Royal Collection and, like every other model from Arnold & Son, features an in-house mechanical movement. John Arnold (1736-1793) was constantly searching for higher precision in his timepieces, as the more accurate the chronometer, the more precise the calculation of longitudinal (east/west) position at sea. Arnold and his son were the first to develop and produce technically superlative (but reasonably priced) marine chronometers in significant quantities.

Constant force is an essential element in the quest for higher precision because it is difficult regulating a consistent output, e.g. isochronal time when the power input from the mainspring is constantly changing. Imagine trying to drive a car at a consistent speed with an engine that continually varies its power output.



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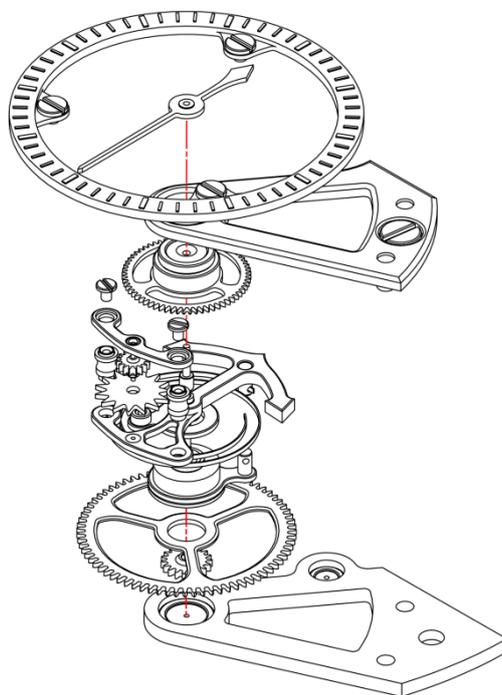
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To maximize power consistency in the Constant Force Tourbillon, Arnold & Son began at the beginning, i.e. the mainspring barrel, as this is the source of the movement's power. Instead of using just one mainspring barrel, which would produce significantly different amounts of torque between fully wound and nearly empty, the Constant Force Tourbillon has two symmetrical barrels in series, visible dial side at 10:30 and 1:30. The first mainspring barrel alone powers the gear train, while the second barrel tops up the first whenever its torque output drops below optimal. This ensures that the power to the regulator flows as constantly as possible.



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A&S5119

Exploded view of the patented constant force mechanism

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The Constant Force Tourbillon features a patented constant force mechanism. Instead of power from the mainspring feeding directly to the escapement/tourbillon, it charges a small hairspring which in turn releases a consistent amount of power to the escapement/tourbillon once each second. The device also drives the true-beat seconds hand (also known as jumping seconds or dead seconds), a highly cherished Arnold & Son complication. When the power from the mainspring drops below that required by the constant force mechanism, the movement stops rather than running at lower precision. The constant force device rotates once per minute in increments of one second, visually mirroring the rotation of the constantly rotating tourbillon cage. The bridges supporting the constant force regulator and tourbillon are also symmetrical, both horizontally with each other and vertically with the barrel bridges.

While the constant force mechanisms optimize precision with the movement in stable positions, the 60-second tourbillon averages out gravitational errors on the escapement by constantly rotating it through 360°. The difference between the rotating tourbillon and rotating constant force device is that the former turns continually while the latter steps in increments of one second.

The Constant Force Tourbillon is a limited edition of 28 timepieces, and is available in a 46 mm 18-carat red gold case with anti-reflective sapphire crystal and sapphire display back for viewing the superbly hand-finished movement.



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Main technical characteristics:

Calibre:	A&S5119
	Exclusive Arnold & Son mechanical movement, hand-wound, 39 jewels, diameter 36.8 mm, thickness 6 mm, power reserve 90 h, double barrel, 21,600 vibrations/h
Functions:	hours, minutes, true beat seconds, tourbillon, constant force
Movement decoration:	nickel-silver and steel movement, palladium treated bridges and NAC grey treated main plate with <i>Haute Horlogerie</i> finishing: hand-chamfered bridges with polished edges and brushed surfaces, screwed gold chatons, screws with bevelled and mirror-polished heads <u>Tourbillon cage:</u> mirror-polished with hand-chamfered polished edges and circular satin-finished surfaces
Dial:	anthracite open dial
Case:	18-carat red gold, diameter 46 mm, cambered sapphire with anti-reflective coating on both sides, see-through sapphire case back, water-resistant to 30 m
Strap:	hand-stitched brown <i>bottier</i> alligator leather with patina
Limited edition:	28 timepieces
Reference:	1FCAR.B01A.C112C

For **high resolution images** please find here the link:

<http://www.arnoldandson.com/home/news-events/press-corner.aspx>

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