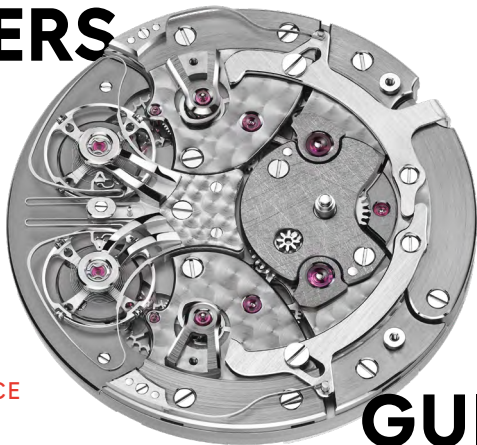


ARMIN STROM

SWISS WATCH MANUFACTURE

OWNERS



MIRRORED FORCE
RESONANCE
CALIBRE ARF21

GUIDE

RESONANCE

INSTRUCTIONS FOR USE

Resonance is a well-documented phenomenon in physics. Two oscillators in close proximity tend to influence each other and eventually synchronize. Back to the 17th century, Huygens was the first to observe the synchronization of pendulum clocks hanging from a common wood beam. Since then, the phenomenon has fascinated many watchmakers. But resonance has rarely been attempted, let alone mastered. Most research has generally focused on uniting two movements and adjusting the distance between their balance wheels. But with its Resonance concept, Armin Strom proposes one of the most spectacular and innovative applications of the resonance phenomenon in watchmaking. The radical innovation lies in its coupling mechanism. The twin balances are joined together by a steel coupling spring. The tiny vibrations in the spring cause them to resonate and synchronize. Oscillating at opposing rhythms, they mutually correct their rate differences to achieve enhanced marine chronometer precision and stability of rate!

Thank you for buying an Armin Strom watch. To guarantee perfect working of your watch for many years to come, please pay careful attention to the advice on use set out in these instruction.



Hours

Seconds

Seconds

Minutes

WINDING

Your manual mechanical watch must be wound regularly for it to work properly. To do so, turn the crown clockwise **in the normal crown position**.

When fully wound, the watch has a 48h power-reserve. The two barrels of the Mirrored Force Resonance model are fitted with a slip-spring, which is not locked when the movement is fully wound. Some thirty turns are needed to wind the watch fully. You may also check the state of winding by looking on the back of your watch at the two barrel springs compressed around their arbor once the movement has been fully wound.



SETTING THE TIME

Pull the crown out **one click**.

To ensure correct setting of the time, first rotate the minute hand 5 minutes ahead of the desired time, then go back (by rotating counterclockwise) to the desired time.



SETTING THE TIME

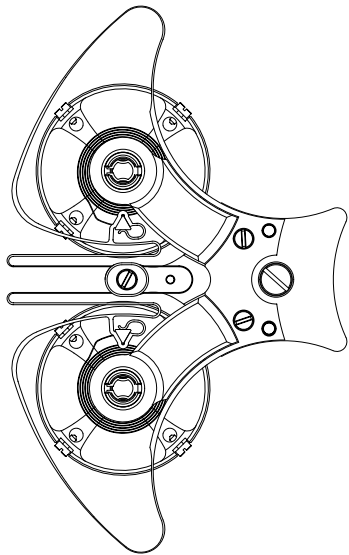
IMPORTANT: do not operate the crown or press a button underwater or when the watch is wet. Always push the crown back to the normal position once the settings have been made.



Rapid pressure on the pushpiece at two o'clock enables the seconds to be reinitialised and synchronized with a time signal. Do not press the pushpiece for too long. Avoid pressing repeatedly the pushpiece.



**SUSTAINING A
CONSISTENT
RESONANCE STATE:
A SOLUTION TO
THE 200-YEAR OLD
PROBLEM**



The twin balance wheels of the Armin Strom Mirrored Force Resonance oscillate in opposite direction. If you have not worn your watch for some time and restart it by manually winding it, the oscillators will synchronize in less than ten minutes. In case of a disturbance such as a shock, it takes only a few minutes for the two balances to find their resonant rhythm once again.

Resonance watches are so rare precisely because they are so extraordinarily difficult to design and produce, as they essentially require two watch movements to be combined into one unit that utilizes two independent mainsprings, gear trains, escapements, and balances. A resonance watch requires its two balance wheels find a concurrent rhythm so as to continuously regulate one another. The follow-on challenge is to consistently maintain oscillation-rate stability; in or-

der to enlist the resonance phenomenon to the cause of chronometric precision. This challenge has historically eluded even the greatest of watchmakers, as the fragility of the phenomenon makes it extraordinarily difficult to consistently maintain with resiliency to disruption; particularly in the context of a human wrist that is both continuously engaged in unpredictable motion and which often 'bumps into things'.

The pursuit of a consistent state of resonance is what ultimately led Claude Greisler to conclude that Abraham-Louis Breguet's approach, which achieves resonance via precise balance-wheel proximity, was of little actual utility in the context of his precision-oriented horological ambitions. Greisler's goal was to harness the resonance phenomenon in a wristwatch with sufficient consistency to enable his wristwatch to operate with marine-chronometer precision, despite the ever-changing positions of the human wrist. Marine Chronometer accuracy targets consistency as its sole goal; meaning that it must gain or lose precisely the same number of seconds every single day without variation. Contrast this with the variable plus/minus approach for a standard wristwatch and the difference becomes exceedingly clear. It would require two balance wheels to dynamically

regulate each other on a consistent basis in order for Greisler's ambition to be achieved. In the end, Greisler's solution would require a return to first principles and a deep exploration of the resonance theories of Christiaan Huygens (the father of mathematical physics and the inventor of the pendulum clock; who had died over 50 years before Breguet was even born). In keeping with his desire to restrict his solution to the same materials that his watchmaker-grandfather could have used, Greisler's developed his „Huygens Resonance Clutch Spring“ in steel. He spent three years perfecting its shape and characteristics: recalculating, optimizing, simulating, testing, retesting and achieving incremental improvements until the ‚Huygens Clutch Spring‘ had developed into its current form. This patented clutch spring design maintains an optimal a state of resonance by

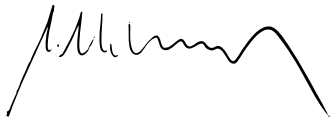
synchronizing two sets of oscillators (comprising twin balance wheels and balance springs) in what Huygens described as a state of 'odd sympathy' (oscillating in perfect consonance but in opposite directions, while synchronized in anti-phase).

WATER RESISTANCE

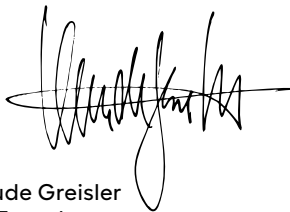
Your Armin Strom watch is water resistant to 50m. The water resistance of a watch can be compromised by external factors (such as shocks, perspiration, cosmetics or salt water) or by the natural aging process of the gaskets. That is why water resistance cannot be permanently guaranteed, and the gaskets must be periodically replaced. We recommend having a water-resistance check conducted every two years. Always make sure that the crown is pressed back in the normal position.

Dear Collector, You are the proud owner of an ARMIN STROM timepiece. Our sincere congratulations on your purchase!

We hope you derive great pleasure from your watch and thank you for your confidence in us.

A handwritten signature in black ink, appearing to read 'S. Michel', with a long horizontal stroke extending to the right.

Serge Michel
Founder

A complex handwritten signature in black ink, appearing to read 'Claude Greisler', with a large loop and a long horizontal stroke extending to the right.

Claude Greisler
Co-Founder

WARRANTY

Your Armin Strom watch is warranted against manufacturing defects for a period of five years from the original purchase date. Within the framework of this warranty, any servicing or repair work on your Armin Strom watch must be carried out by an authorized Armin Strom service center.

In order to benefit from your Armin Strom warranty, you will be required to present to Armin Strom or any Armin Strom authorized Retailer, your warranty Certificate duly completed, dated, stamped and signed by Armin Strom or an Armin Strom Authorized Retailer.

NOTE The international warranty does not in any way affect the consumers' rights legally recognized by the applicable national legislation.

The warranty does not cover:

- defects or damages after the warranty expires
- damages resulting from the misuse, negligence or accident
- defects or damages resulting from unauthorized modifications or repairs
- theft, loss, acts of God, accidents and natural disasters
- wear and tear from normal ageing and use of the watch
- damages resulting from the contact with water if water resistance tests have not been performed every two years and each time the case was opened, or, if your watch is not water resistant

MAINTENANCE AND CARE

Like any sophisticated instrument that can be subjected to a wide variety of stresses and strains, your Armin Strom requires proper care and regular maintenance. We generally recommend that a maintenance service should be carried out every 3 to 5 years. To ensure that the service is carried out professionally, take your watch to Armin Strom or an authorized Armin Strom retailer.

We recommend the following considerations, so that your watch is preserved as long as possible:

- keep your watch away from exposure to magnetic fields like electric devices, speakers or other electromagnetic appliances
- avoid wearing your watch during activities involving strong vibrations or impacts
- avoid exposing your watch to extreme climatic changes, in particular changes in temperature or humidity such as saunas
- take your watch off before you swim in seawater. Rinse your watch with fresh water after exposure to salt water
- Avoid contact with cosmetics or corrosive products as these may damage seals, straps or case
- to clean your watch, simply wipe it with a little soapy water and dry it with a soft cloth
- When not being worn, keep your watch in a cool dry place



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