

**URWERK**

## URWERK - The UR-202 Turbine Automatic

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### Twin Turbines

The UR-202 is the world's first watch with the winding rate regulated by fluid dynamics. As long ago as the 18th century, clockmakers were using air friction to regulate the speed of chiming clocks, and their techniques evolved to become the preferred method of regulating the rate of chimes on minuterepeaters.

With the UR-202, URWERK have taken the traditional idea of using air friction and refined it to control the rate of automatic winding. The traditional rotating vanes of the past have been replaced by cutting-edge miniature twin turbines - miniature air compressors - which can be seen spinning on the back of the watch.

The UR-202's twin turbines are coupled with the winding rotor. According to the position of the selector lever, the turbines act as shock absorbers. In normal activity they cushion sharp movements of the rotor. This reduces wear and increases the lifespan of the movement. While the selector position is continuously variable, the three principal positions are: normal activity, where the turbines spin freely; vigorous activity, where the air pressure generated by the turbines reduces the winding rate by approximately 35%; and extreme activity, where the turbines and rotor are fully blocked.

The turbine system is totally self-contained within the waterproof case. The air flows from under the turbines and is channeled up past them under a sapphire plate and down through holes leading to a tiny air chamber.

The turbines are controlled by a 3-position selector switch. This functions by adjusting the level of air compression the turbines generate by selectively regulating the amount of air flowing from inside the case. The spinning turbines force air through holes into a tiny air chamber. The selector switch controls the amount of air escaping from the turbines. By restricting the airflow, it increases the air pressure and slows down the turbines and the winding rotor.

### Revolving Satellite Complication

The UR-202 also features URWERK's patented Revolving Satellite Complication with telescopic minutes hands. The Revolving Satellite Complication displays time using telescopic minutes hands operating through the middle of three orbiting and revolving hours satellites.

The telescopic minutes hands precisely adjust their length to follow the three sectors marking the minutes: 0-14, 15-44, 45-60. Extended, they enable the UR-202 to display the time across a large, easy-to-read dial. Retracted, they allow for a very wearable and comfortably sized case. The patented carousel is the critical component of the revolving satellite complication. It is responsible for not only the rotation of the hours satellites but also the integral telescopic minutes hands. This rotating central hub is an extremely complex part to manufacture due to the extreme precision and tight tolerances necessary. Many of the carousel's intricacies have to be machined and finished to tolerances of 1/1000mm. High precision 'transporters' are used to control the variable length of the minutes hands. One end of each transporter follows a cam plotting the path of the minute indication, while the other controls the precise length of the minutes hand.

### The transporters

The transporters - one for each minutes hand - allow the telescoping hands to adjust their length as they follow the vectors of the minutes scale. One end of the transporter follows a cam simulating the path of the three vectors, while the other controls the length of the minutes hand.

The cam's shape was designed by plotting 380 points of reference to ensure the minutes hands extend and retract to the precise length. The transporter measures 0.895mm (thickness) and the lubricating surface treatment is 0.005mm, thus making the total thickness of the transporter 0.900mm. The inside dimension of the carousels where the transporters work is 0.905mm, giving a clearance of just 0.005mm.

### The telescopic minutes hands

The minutes are shown over three straight-line segments: each 15-minute side has a length of 8.3mm while the central 30-minute segment is 16.6mm. When they are not passing across the minutes, the hands retract to their minimum length of 1.8mm.

## TECHNICAL SPECIFICATIONS

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Model: URWERK UR-202

Case: available in white gold, red gold, black PE-CVD platinum and AlTiN

Movement: calibre UR 7.02; automatic winding with world's first twin turbine regulation

Functions: patented revolving satellite complication with integral telescopic minutes hands; moon phase indicator; day/night indicator.

Dimensions: 45.6mm x 43.5mm x 15mm; micro-sandblasted; satin finish; back in titanium.

Dial: ARCAP P40. Carousel mirror polished by diamond cutter. SuperLumiNova treatment on hours and minutes markers.

Indications: Dial featuring: hours and minutes; moon-phase indication; day/ night indicator.