

Seiko Crystal Chronometer QC-951

September 1963



Average daily rate: ± 0.2 seconds
 Second adjustment: Adjustable in 0.2-second units
 Power consumption: 0.003 W
 Operational temperature range: -10 to 50°C
 Outside dimension: (W)160 x (D)200 x (H)70
 (H at lowest point = 40) mm
 Weight: 3.0 kg

Product Features

Developed as a timer for sports games, the Seiko Crystal Chronometer QC-951 was a small, desktop quartz timer. With its unprecedented low-power consumption — the QC-951 was capable of operating for one year on two size-D batteries — this high-precision quartz watch played an important role at sporting events such as the Tokyo Olympic Games as an official timing device. Models subsequently commercialized in this series were also employed as clocks for sport and in public transport.

When a voltage is applied to a crystal, the crystal will "count" out an exact rhythm. A quartz timepiece utilizes this property of crystal to keep time. However, crystal resonators are sensitive to changes in temperature (a temperature change of 20°C results in a two-second variation in quartz oscillation per day). To eliminate the effects of temperature changes on accuracy, crystal resonators used to be kept in thermostatic chambers. However, thermostatic chambers consume large amounts of energy and pose a serious problem in downsizing.

Epson* thus set out to use its precision processing technology to develop a temperature correction device (thermo-variable condenser) to solve these problems. A small, extremely low-power synchronous motor was also employed, realizing a drastic reduction in power consumption from the conventional 100 - 150 W to only 0.003 W.

The QC-951 was used as a main timing device, especially in long-distance races and in sports played over fixed time periods. With the built-in timing contact, it was also used for driving start signal clocks, as a stopwatch remote control device, and so on.

Background

In May 1960, when Tokyo was chosen as the venue for the Olympic Games, the Seiko Group began preparing for its role as official timer by developing new timing devices. Committed to developing a more advanced timekeeping device, Seiko focused its energy on developing new products. Epson took charge of the development of a crystal chronometer, and orchestrated all its technologies to develop a small, low-power quartz watch that could be used in any environment. Three years later, in September 1963, the highly accurate Crystal Chronometer QC-951 timer was finally born, turning the conventional wisdom for quartz clocks on its head.

Impact

Starting with the Tokyo Olympic Games in October 1964, crystal chronometers were widely used as official timing devices at the Asian Games, the European track and field championships and at other athletic meetings throughout the world. Even under severe operating conditions, from the blazing heat of midsummer to below the freezing point in midwinter, this small, low-power, easily portable chronometer operated accurately, receiving high praise at each event. Subsequently commercialized models in this series were employed on bullet trains and on snow vehicles for Antarctic exploration. They were also used as clocks and timers on public transport. Moreover, this crystal chronometer had a big influence on the later development of the world's first quartz watch, the Seiko Quartz Astron 35SQ.

*Then known as Suwa Seikosha Co., Ltd.