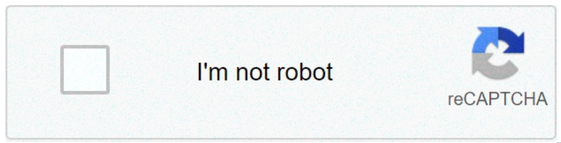

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What is citizen eco drive movement

Citizen watch movements | Mechanical | Quartz | Ecodrive Solar watch movements | Choose from popular calibers B023, C300, E013, E031, E812, E111, H500, 2500, 5510, BP10. Many Citizen movements are interchangeable with Miyota movements. To replace a Citizen movement, change the 2nd digit in the Citizen movement number to find the Miyota replacement. 0 = L 2=N 4=R 6=T 8=W 1 = M 3=P 5=S 7=V 9=Y Example: Citizen 3510 = Miyota 3S10 Page 2 Citizen watch movements | Mechanical | Quartz | Ecodrive Solar watch movements | Choose from popular calibers B023, C300, E013, E031, E812, E111, H500, 2500, 5510, BP10. Many Citizen movements are interchangeable with Miyota movements. To replace a Citizen movement, change the 2nd digit in the Citizen movement number to find the Miyota replacement. 0 = L 2=N 4=R 6=T 8=W 1 = M 3=P 5=S 7=V 9=Y Example: Citizen 3510 = Miyota 3S10 The Citizen Watch Company is perhaps a very well known manufacturer. Especially for well built, reliable, and reasonably priced watches. But lesser known is their illustrious history, interesting firsts, and engineering prowess. Here are 5 facts about the Citizen Watch Company which you may not know. The photograph on the left was taken in April 2018, when Citizen opened its doors for the first time in 100 years to journalists. The picture shows the group, dressed up in protective clothing as we entered the low dust environment of the manufacture. We were among the first to visit, and from our week with them in Japan, we make this list for you. 1. Citizen was founded in 1918, which makes it 100 years old. OK, this may not be that much of a news to most regular readers. We have talked about the 100th Anniversary celebratory products, like the F990 100th Anniversary Satellite Wave. And the Citizen Caliber 0100 which was announced in Baselworld 2018 as the most accurate stand alone quartz watch (+/- 1s a year). The Baselworld showing was a prototype pocket watch in a sapphire glass case and not a commercial release. But we were given to understand that this new watch will be presented as a special watch, to be commercially available for 2019. The first Citizen made for Emperor Taishō circa 1924. The name “Citizen” was originally given by the Mayor of Tokyo Shinpei Goto, who was a friend of the founder Kamekichi Yamazaki. Goto used the name Citizen circa 1920 to signify the dream of high quality watches that every citizen can afford. Interestingly and perhaps ironically, the then Emperor of Japan, Taishō was probably the first to own a Citizen watch. The watch is shown in the photograph above, which was taken during a visit to the Citizen Museum in April, 2018. A brief history of the company is found on the excellent Vintage Citizen Blog. And in the corporate video below: 2. They make everything in-house. Citizen is one of the most vertically integrated manufactures in the world. They make all the components in-house in Japan. Contrary to what some may be led to believe, all movements (including movements sold to third party labelled Miyota) are manufactured in Japan, and they do not have any manufacturing facility outside the home country. All components are manufactured within the company, from integrated circuits, to electronic chips, to mechanical components. The only exception is the movements used in some Campagnola watches are made by La Joux Perret, a company which Citizen owns, and which manufactures out of Switzerland. Citizen makes the cases, the dial, the hands, the movement, all totally within their premises. They even make the machines which make the parts. We visited the factory in Iida, but they have manufacturing facilities in the town of Miyota, which churns out the millions of movements used by third parties all over the world. 3. Their automated assembly line was the Swiss Industry killer in the late 1970s. One of their automated manufacturing lines which began life in the late 1970s to mass produce quartz movements is still in use today. However, it is updated, and the capacity upgraded. This line in the Iida Factory is currently capable of making one complete quartz movement every second. Quick math will show that’s 30 million a year, if operated continuously all year. And we understand they have at least 10 of these lines. The manufacturing line known in Citizen as the AT-3 line, is almost totally automated, and only requires human intervention to setup and to fix problems if and when it arises. Rapid manufacturing machine to produce motor coil. The motor coil is exclusive for Citizen brand. 24 automatic machines in line. The wire is 21.5μm and rolls up in 21 seconds. Similar rapid manufacturing lines exist for low end mechanical movements, albeit operating at a lower production rate. And moving up the scale of movement complexity, Citizen also have production lines with human assisted assembly, like many Swiss manufactures. Manual assembly for more complicated and/or higher end movements. 4. High end Citizen watches are hand assembled by Meisters and Super Meisters Although they have the super mass production manufacturing line, the high end Citizens, including quartz models like the Citizen Chronomaster we waxed lyrical about, are hand assembled by a single watchmaker, which Citizen call Meisters and Super Meisters. To qualify as a Super Meister, the watchmaker must have at least 30 years of experience in the Citizen manufacture. Most start out in the Citizen Watch School and progress from Specialists to Meisters before they become Super Meisters. The Meister and Super Meisters work on all the high end watches and are responsible for hand assembly, finishing and regulation of all the Citizen high end watches. 5. They are super focused on light power, ultra thin, and ultra accuracy. Light power In 1976, Citizen released the Crystron Solar Cell, the World’s first light-powered analogue quartz watch. Source: Eight single-crystal solar cells arranged on the dial to charge a secondary battery made the Crystron Solar Cell and the first every light-powered analogue quartz watch. This technology is still in production, albeit updated to the latest specifications in their highly popular Eco-Drive watches. Ultra Thin Citizen also focuses on ultra thin watches. In 1962, their Diamond Flake was the thinnest men’s watch with center seconds in the market. The movement is just 2.75mm thick and when cased, several models were available between 4 to 5 mm. This thinness was achieved by the use of a unique gear train structure different from the standard center second gear train. Some versions used as many as 31 stones to increase gear train efficiency. In 1978, they made the thinnest quartz watch, with the movement measuring only 1.00 mm. The Citizen developed the integrated circuit and the crystal oscillator in-house also had an accuracy is ±10 seconds per month. The oscillator is a thin tuning-fork crystal oscillator vacuum-enclosed in glass. The Eco Drive One. These dual goals were combined in the Eco-Drive One in 2016, shown above. The watch has a movement just 1.00 mm thick, comprising of 85 components. The case was only 2.98mm. Eco Drive watches are now the cornerstone of the Citizen strategy, as much as their pursuit of ultra accuracy. Ultra Accurate High precision and accuracy was also priority. In 1975, the Crystron Mega was announced with an annual accuracy of +/- 3 seconds. This was continually improved by Citizen, pushing the envelope to +/-10 seconds a year. This is is a current standard high precision watches, with offerings from from Seiko. Current Citizen high precision watches provide an even higher accuracy of +/- 5 seconds a year. A precision matched by the Longines VHP. The Citizen Cryston Mega. However, Citizen set the record anew in 2018, when they showed a prototype Caliber 0100 in a sapphire glass cased pocket watch which is rated to an unprecedented accuracy of +/- 1 second a year. The Citizen 0100, an ultraprecise light-powered movement accurate to ± 1 second per year. And the combination of ultra accuracy and light power is found coupled in some of the watches in the Citizen catalog. One example is the use of GPS and Satellite Wave technologies running on the light powered Eco-Drive. One such watch which is a result is the Citizen Satellite Wave GPS Super Titanium F990 which we reviewed here. The Citizen Satellite Wave GPS Super Titanium combines light powered technology with ultra accuracy via the use of the GPS atomic clocks. Concluding thoughts We leave you with this rather cute video, made by Citizen to demonstrate their philosophy of continuous improvement. Model range of watches by Citizen This article is about watches. For "eco-driving", see Fuel economy-maximizing behaviors. Citizen Promaster Eco-Drive AP0440-14F Diver's 200 m manufactured in 2000. The 7878 caliber Eco-Drive movement used in this watch can run for up to 180 days on its secondary power cell. Four solar cell segments are just visible under the dial. Citizen Attesa Eco-Drive ATV53-3023 analog-digital chronograph with 4 area Radio Controlled reception (North America, Europe, China, Japan). Manufactured in 2010. Citizen Eco-Drive METAL AW1365-19P featuring a light-absorbing "solar ring" instead of solar cell panels, allowing opaque metal dials to be used.[1] Example of the invisible solar cells thanks to VITRO technology, using the CB0021-06E radio-controlled watch model (from 2011 to 2018). Eco-Drive is a model range of watches manufactured and marketed worldwide by Citizen Watch Co., Ltd., powered primarily by light. As of 2007, the company estimated the drive system had eliminated the disposal of ten million batteries in North America.[2] Citizen introduced the Eco-Drive line to Asia, Latin America, and Europe in 1995 and to the United States in April, 1996.[3] The Eco-Drive concept introduced several technical refinements over previous solar powered watches, including light-capturing cells that could be made virtually invisible behind the dial instead of highly conspicuous, enhancing the appearance of the watch. History Eco-Drive concept The technical platform that made the Eco-Drive concept possible was the Eco-Drive caliber 7878 movement. This movement was the first light-powered movement where the solar cells could be mounted under the dial. Previous light powered watches from Citizen and other manufacturers had the solar cell(s) mounted directly on the dial. This innovation was enabled by marked improvements in thin film amorphous silicon solar cells, which, by the early 1990s had become significantly more efficient. By locating a sufficiently translucent dial material over the now more efficient solar cells, enough light could pass through the dial face to power the movement. Though the Eco-Drive caliber 7878 movement solar cells remained slightly visible through the dial, the physical styling of the light-powered watch was no longer constrained by visible solar cells. To store electrical energy the first Eco-Drive movements employed titanium lithium-ion rechargeable or secondary batteries. This battery type became available in the early 1990s, enabling an Eco-Drive 7878 movement to run 180 days on secondary power before requiring recharging via light exposure – a marked improvement in energy storage over previous light-powered watches. The movement also featured an "insufficient recharging" indicator. The accuracy of the quartz movement was stated as within ± 20 seconds per month at a normal temperature range of 5 to 40 °C (41 to 104 °F).[4] Commercial history In addition to the first three Eco-Drive models introduced in 1995, Citizen marketed numerous other Eco-Drive models during the 1990s, including the 6.05 mm (0.238 in) thick Eco-Drive Slim of 1996.[5] Where the first models offered hours, minutes, seconds and date features, ultimately the movements evolved to include a broad range of design features, including complex analog and digital-analog movements and the horological complications of chronographs, flyback chronographs and dive watches. In the early 2000s, while wristwatch sales declined with the advent of cell phones and their timekeeping capability, demand for Citizen watches in North America remained robust. Eco-Drive models were well received, generating a third of Citizen's North American revenues by 2000. In 2002 the VITRO technology (Eco-Drive VITRO) came on the market, where the solar cells were no longer even slightly visible under the dial. During the mid-2000s, wristwatch sales improved for Citizen thanks to further development of the Eco-Drive line and integration of radio-controlled timing with the 2002 Eco-Drive line.[3] Later specialized tool watch designs were introduced like the Promaster Eco-Drive Professional Diver 1000M Titanium BN7020-09E in 2017. This is a very large watch, the titanium watch case has a diameter of 52.2 mm and thickness of 22 mm and features a helium release valve, designed for mixed gas saturation diving at great depths.[6][7][8] Eco-Drive Concept Models Since 2009, Citizen has developed Eco-Drive Concept Models as technology demonstration and marketing tools. These Eco-Drive Concept Models are generally shown at exhibitions and produced in limited editions.[9][10][11] The Concept Model 2011 was the Eco-Drive SATELLITE WAVE that has a movement that can receive time synchronization signals from GPS satellites. This makes radio-controlled timing possible in remote areas that are not serviced by land based radio time signal stations.[12] In 2012 Citizen announced the Eco-Drive RING Concept Model. This watch features a ring-shaped solar cell surrounding the watch case sidewall.[13][14] In 2018 Citizen announced it developed the Caliber 0100 Eco-Drive prototype autonomous high-accuracy quartz watch movement which is claimed to be accurate to ± 1 second per year.[15] Key elements to obtain the high claimed accuracy are applying a for a watch unusual shaped (AT-cut) quartz crystal operated at 223 or 8388608 Hz frequency, thermal compensation and hand selecting pre-aged crystals.[16] Besides that AT-cut variations allow for greater temperature tolerances, specifically in the range of −40 to 125 °C (−40 to 257 °F), they exhibit reduced deviations caused by gravitational orientation changes. As a result, errors caused by spatial orientation and positioning become less of a concern.[17] The Caliber 0100 movement in 2018 was not available for sale to the public, the technology inside the movement will be introduced in future models.[18] In March 2019 three limited edition wrist watch models with the Caliber 0100 movement were announced to become available for sale with deliveries expected around the 2019 fall.[19] Recent history According to Citizen, by 2011 80% of their wristwatches featured Eco-Drive, and the company saw Eco-Drive type watches as the focus of new generations of watches.[20] In 2012 Citizen offered over 320 Eco-Drive watch models in various types, styles and price ranges.[21] Eco-Drive technology Light as power source Most Eco-Drive type watches are equipped with a special titanium lithium ion secondary battery charged by an amorphous silicon photocell located behind the dial.[22] Light passes through the crystal and dial before reaching the photocell.[23] Depending on the electronic movement, a fully charged secondary power cell could run with no further charging from 30 days to 3,175 days (8.7 years), though most Eco-Drive men's watch models offer a six-month power reserve.[24] If kept from light for an extended period, some Eco-Drive movement models can hibernate, where the hands of the watch stop and the internal quartz movement continues to track the correct time. When subsequently exposed to sufficient light, the hands move automatically (without human intervention) to the proper positions and resume regular timekeeping.[22] Temperature difference as power source Citizen Eco-Drive Thermo watches were introduced in 1999 and use the temperature difference between the wearer's arm and the surrounding environment as a power source. The rare Eco-Drive Thermo watches use the Seebeck effect to generate thermo electricity that powers the electronic movement and charges the secondary power cell. In the sun or in the tropics the ambient temperature can come close to or exceed the temperature of the wearer's wrist causing the watch to stop generating thermo electricity. In case no power is generated, an Eco-Drive Thermo movement will save power by moving the second hand in ten second increments until the production of thermo electricity is resumed.[25] Citizen has stopped making Eco-Drive Thermo watches. Hybrid Eco-Drive movements Citizen also built an automatic quartz powered watch, the Citizen Promaster Eco-Duo Drive (released in December 1998).[26] Novel to this watch was the use of both mechanical power as well as a solar cell to power the electronic movement and charge the secondary power cell. This model was an attempt to enter higher-priced markets (at a cost of around $1,000 USD). The Eco-Duo Drive technology failed to attract consumer interest and Citizen has since stopped making use of the unique movement. Solar cell and secondary battery life expectancy According to Citizen, experimental data showed the solar cell and secondary battery will last for more than 10 years.[27] According to Citizen Europe, laboratory tests showed that after 20 years the secondary battery retains a power storage capacity of 80% of its initial capacity.[28] Newer Citizen claims state the rechargeable/secondary batteries will last up to 40 years and that it is highly unusual for these batteries to fail.[29] These rechargeable/secondary batteries last significantly longer than a typical quartz-watch battery, but when stored, attention must be given to keep the rechargeable/secondary batteries in Eco-Drive watches sufficiently energized to ensure a long-lasting correctly functioning movement. Maintenance For water resistant and diving Eco-Drive watches Citizen recommends a watch gasket exchange every 2 or 3 years to preserve their water resistance because watch gaskets, which form a watertight seal, degrade as they age. Further, Citizen recommends maintenance for Eco-Drive watch movements in regular intervals in order to extend the life of the watch movement, since the gears used in running watch movements are subject to slow wear.[27] Citizen states that when their lubricants for Long-Lasting Precision Equipment are used in watches, timepiece movements remain smooth for a long time as the oil does not harden even after 20 years.[30] Gallery Citizen Eco-Drive Marinaut Titan GN 4W S. Citizen Promaster Eco-Drive BN0000-04H Diver's 300 m Citizen Promaster Eco-Drive BJ8050-08E Diver's 300 m Citizen Eco-Drive Titanium Sapphire Citizen Eco-Drive JY8034-58E Navihawk A-T analog-digital chronograph See also Watch Solar powered watch References ^ "Eco-Drive METAL Watches". 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