# GX200 - EV200 COMPARISON

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| COMPARISON: Tyco/Kilovac EV200 vs GIGAVAC GX200 | | |
|---|---|---|
| | **Tyco/Kilovac EV200** | **GIGAVAC GX200** |
| **Contact Arrangement, Main** | SPST - NO | Same |
| **Contact Form, Main** | X | Same |
| **Contact Arrangement, Aux** | A | A |
| **Contact Form, Aux** | SPST - NO | SPST - NO |
| **Continuous Carry, Aux** | See Charts | Same + more, See Charts |
| **Continuous Carry, Aux, Max** | 2A @30Vdc<br>3A @125Vac | 2A @24Vdc, 100,000 cycles |
| **Continuous Carry, Aux, Min** | 100 mA, 8V | Same |
| **Make & Break Various Voltages** | See Charts | Same + more, See Charts |
| **Break Current @320Vdc, does not meet Dielectric or IR after test** | 2,000 A, 1 cycle | 1,980 A, 2 cycles |
| **Load Life** | See Charts | Same + More, See Charts |
| **Mechanical Life** | 1 million | Same |
| **Contact Resistance max** | 0.4 milliohms | Same |
| **Contact Resistance, Typical** | 0.1 to 0.3 milliohms | 0.15 to 0.3 milliohms |
| **Operate Time, 25 Deg C** | | |
| Close (includes bounce) Max | Not Specified | 20 ms |
| Close (includes bounce) Typical | 15 ms | 13 ms |
| Bounce, Max (after close) | 7 ms | Same |
| **Release Time (includes arcing), Max @ 2000A** | 12 ms | Same |

| | | |
|---|---|---|
| **Dielectric Withstanding Voltage (leakage <1mA), at sea level** | 2200 Vrms | 2500 Vrms |
| **Insulation Resistance @500Vdc** | 100 megohms – 50 at end of life | Same |
| **Shock, 11ms ½ sign, peak operating** | 20G | Same |
| **Vibration, sine, 80-2000HZ, peak** | 20G, 80-2000HZ, peak | 15G, 500-2000HZ, peak |
| **Operating Temperature, C** | -40 to +85 | -55 to +85 |
| **Storage Temperature, C** | Not Specified | -70 to +175 |
| **Weight, Nominal kg (lb)** | 0.43 (0.95) | 0.44/(0.98) |
| **Sealed in Coil Electronics** | No – Exposed to external elements | Yes |
| **Power Terminal Safety Cover** | No | Yes |
| **Stainless Steel mounting inserts** | No – Copper that can corrode | Yes |
| **Both AC & DC Load Switching Capabilities** | No, Only DC | Yes |
| **Meets UL 508 Terminal temp rise so standard temp. rated insulated cables can be use** | Unknown | Yes |

| 12Vdc & 24Vdc COIL COMPARISONS | | | | |
|---|---|---|---|---|
| | **GX200** | | **EV200** | |
| **Coil Voltage (Nominal)** | **12** | **24** | **12** | **24** |
| **Coil Voltage (Max)** | 15 | 30 | 36 | 36 |
| **In-Rush Current Max (75 ms) – Amps** | 4.0 | 1.7 | 3.8 | 3.8 |
| **Hold Current after in-rush (Avg.) - Amps** | 0.30 | 0.12 | 0.13 | 0.07 |
| **Hold Power after in-rush (Avg.) – Watts** | 3.6 | 3.0 | 1.6 | 1.7 |
| **Pick-up, Volts, Max** | 7.5 | 15.0 | 9.0 | 9.0 |

| | | | | |
|---|---|---|---|---|
| **Hold, Volts, Min** | 5.0 | 10.0 | 7.5 | 7.5 |
| **Drop-Out, Volts, Min** | 1.0 | 2.0 | 6.0 | 6.0 |
| **Coil Back EMF (volts)** | 45 | 45 | 0 | 0 |

## Understanding Contactor Contact Ratings

**There are two elements in establishing contact ratings for a contactor.**

**1 - Contact Carry Current Ratings –** This rating is simply a matter of heat. The contactor contact carry current rating is based on four parameters: 1) the ambient temperature, 2) the heat generated because of the contact resistance, 3) the internal resistance of the contactor current carrying mechanisms, and 4) the size of the cables connected to the terminals. Although conservative for some applications, GIGAVAC has specified UL compliant ratings using the UL standard of 75° C as the ambient temperature, 400 KCmil wire size to carry the rated current, as specified by UL, and a maximum terminal temperature rise of 50°C (125°C max). The terminal temperature rise (or maximum temperature) is specified by UL to make sure the terminal temperature does not exceed accepted wire size carry current ratings and not to exceed the insulation temperature rating of commonly used wire.

As indicated in the GX200 UL Compliant DC & AC Rating tables, the GX200 is conservatively rated to carry 350A using these standards. Also, as indicated, if the ambient temperature is reduced to 50°C, the GX200 will carry 400A and still not exceed the UL temperature rise or 125°C maximum terminal temperature requirement. If larger wire is used, removing more heat from the terminals, or if the ambient temperature is reduced further, the GX200 will carry even more current. It is simply a matter of heat. If you have questions, please **contact GIGAVAC**.

The Tyco EV200 has been promoted as “able to carry 500+ amps” and our GX200 can do the same or better under identical conditions (See “EV200 Equivalent DC Ratings”). However, these ratings do not comply with UL or any other internationally recognized standards. The Tyco EV200 specs assume an ambient temp of 85°C (10°C higher than allowed by UL) and 400 KCmil power cables (the same as UL), but the EV200 does not specify a maximum terminal temperature or a maximum terminal temperature rise, which is critical! The maximum terminal temperature is important for the user to know, otherwise the user has no knowledge of how hot the terminals and connecting wire may get. This is needed to select compatible wire insulation, and to determine how much heat the contactor may dissipate in a sealed enclosure. Worst case, this could result in a user applying a current that will exceed the contactor terminal rating and could cause a melt down of the contactor creating an electrical short or possible fire. For GIGAVAC’s ratings, we have assumed a temperature rise of 65°C that results in a maximum terminal temperature of 150°C (85° + 65°c). This is higher then the 125°C allowed by UL but is tolerated by the GX200 because of its EPIC® ceramic-to-metal seal, as long as the user selects a wire that is capable of handling the heat.

However, at an ambient temperature of 85°C and currents above about 400A continuous, the terminal temperature will reach 150°C. This means to achieve the 500+ Amps specified on the GX200 data sheet, the user must provide cables or bus bars that will actually pull heat from the terminals, reduce the ambient temperature, or both so that the maximum terminal temperature will not be exceeded.

**2- Power Switching Rating –** This rating is determined by the contact wear and the resulting loss of dielectric withstanding voltage or insulation resistance, caused by the depositing of vaporized contact material near the contacts. Unlike traditional contactors that are rated for just one or two voltages, the GX200 can switch multiple voltages, each that have a different affect on contact life.

We have provided both the Tyco EV200 Equivalent DC life ratings as well as Gigavac’s DC and AC life ratings using the UL 75°C ambient and 50°C maximum terminal temperature rise specification. The GX200 will perform as well or better than the Tyco EV200. Its important however to realize that when reviewing the Tyco EV200 life ratings, above about 400A at 85°C ambient, the user must address the terminal temperature rise issue, mentioned above, for carry current. It’s also important to review the dielectric stand off voltage of each contactor to make sure it meets your system requirements. Normally, the dielectric voltage is required to be two times the source voltage, plus 1,000 volts. This is why the GIGAVAC GX200 has a rating of 2,500 Vrms, e.g. 2 times 750V + 1,000V = 2,500Vrms. For 900V, the dielectric would have to be 2,800Vrms that is higher than the 2,500Vrms for GIGAVAC’s GX200, and much higher than the 2,200 Vrms dielectric rating of the Tyco EV200. If you need assistance or do not see the life or current rating you need, **contact GIGAVAC**. We also have special contactors in the same package with higher dielectric and higher life ratings.

**Motor controller or inverter applications with large capacitors –** Many DC applications involve controllers or inverters that have large capacitors. Unless these capacitors are pre-charged, the contactor sees essentially infinite current when

the contacts first close, limited only by the internal resistance of the system. If there is no pre-charge of the capacitor, the contacts can weld on the first or second cycle. The charts provided show the expected life with a pre-charge of 90% and 80%. The difference in life rating between the two is a factor of 100.

* Kilovac is a registered Trade Mark of Tyco International. GIGAVAC does not sell the Kilovac branded EV200 contactor, but offers the GIGAVAC GX200 as a direct alternative that we feel is better because of the EPIC® seal and other design enhancements.

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01/11/11