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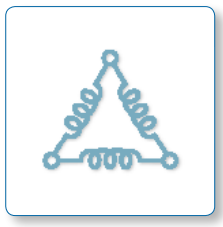
Unparalleled Protection

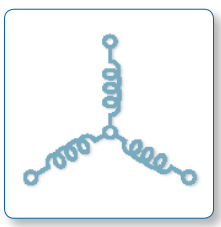
STRIKE TECHNOLOGIES

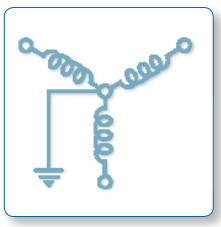
ZORC® TRANSIENT SURGE SUPPRESSOR

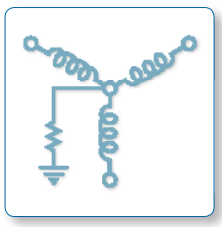
FREQUENTLY ASKED QUESTIONS

Q&A









May, 2021

ZORC® - FREQUENTLY ASKED QUESTIONS

Q1. What is the primary use of the ZORC product?

A. The ZORC is a unique, high frequency transient over voltage surge suppressor for the protection of motors, transformers and generators from steep wave-front, short rise-time, high magnitude, spikes, surges, other transient voltages and circuit switching.

Q2. Does ZORC protect against lightning strikes?

A. No. ZORC is not designed to protect against direct lightning strikes and it is strongly advised that additional lightning protection be employed in high lightning incidence areas.

Q3. How is ZORC selected for a particular application?

A. The ZORC should be selected to match the system voltage (VL-L) in which it will be installed. Furthermore, consideration should be given to whether the ZORC will be installed in a switchgear panel or close the equipment that it will ultimately protect.

Q4. What maintenance checks need to be performed on the ZORC?

A. The ZORC is maintenance-free requiring only periodic cleaning of bushings in contaminated areas.
Periodic visual inspection on the installed ZORC unit should include checks for:

- Dirty, broken or chipped bushings.
- Tracking on the porcelain bushings.
- Physical damage to the casing.
- Earth/grounding cable and terminal cable. The casing earth and terminal cable should not be corroded.
- Excessive bulging of the metal container. (Needs to be removed from service immediately)
- Oil leaks, especially as a result of hair-line cracks on the bushing. (Needs to be removed from service immediately

Q5. How often should a ZORC be checked or tested when in service?

A. Electrical testing may be done once per annum with visual inspections every second month.

Q6. What electrical tests are typically performed on the ZORC?

A. Each ZORC unit is routine tested after the manufacturing process. The tests are typically AC and DC over-potential tests performed in a controlled testing environment and according to certain testing specifications. Furthermore, basic resistance and capacitance testing is done prior to being dispatched.

Q7. Can the ZORC be mounted inverted (up-side down)?

A. ZORC units may be installed in any orientation (including up-side down).
However, consideration needs to be given to any force that may be applied to the porcelain bushing as a result of the mass of the connecting cable. Cable mass needs to be supported to minimize any moment of force on the bushing.

Q8. Why are there signs of bulging on the ZORC metal container?

A. It is normal, during production, that a certain amount of swelling will occur as a result of the heating process required and the packing of internal components.
Excessive swelling would indicate an internal issue as a result of heat build-up. In this case the manufactures should be consulted.

Q9. What is the maximum continuous operating voltage that the ZORC may be exposed to?

A. The ZORC is capable of operating with a Line to Neutral voltage (L-N) equivalent to the full Line to Line voltage of the system in which the ZORC is installed.

Q10. What is the difference between the panel mount and machine mount ZORC units?

A. The ZORC designed for installation in switchgear panels, that will be close to the source of the switching transient, has a significant wave sloping characteristic that mostly minimizes the effect of the transient at the machine end. However, the machine mount ZORC completely eliminates the effect of the transient at the machine end.
Note that panel mount units are only available up to and including 13.8 kV rated ZORCs.

Q11. Which application is best, machine mount or panel mount?

A. Machine mount (as mentioned above) is considered to be the best application for ZORC.

Q12. What is the maximum distance from the machine or switchgear (supply cable length) that a ZORC may be mounted?

A. It is recommended that the ZORC be mounted no further than 20 m (supply cable length) from the machine or switchgear.

Q13. What is the maximum length of the cable that connects the ZORC to the machine terminals or switchgear bus bar?

A. The cable connecting the ZORC to the machine or switchgear bus bar should not be more than 5 m. However, 3 m is strongly recommended.

Q14. Does harmonic activity have an effect on ZORC?

A. Harmonics will generate heat within the sealed ZORC container and this in turn will potentially damage and degrade the capacitor elements, therefore decreasing the life expectancy of the ZORC unit. Excessive harmonic levels could also result in immediate permanent damage to the ZORC or result in catastrophic failure.
Total harmonic voltage distortion TH(V)D of 8% or above should be considered dangerous to the ZORC unit.

Q15. Is there a specification for the tightening of the bushing terminal nuts?

A. The bushing nuts should be tightened to 20 Nm or less.

Q16. What size cable should be used to connect a ZORC to the machine or switchgear bus bar or terminal?

A. A minimum cable size of 2.5 mm^2 should be used for ZORCs rated from 3.3 kV to 13.8 kV. For voltages types from 15 kV to 22 kV a cable size of 4 mm^2 is recommended and for 25 kV to 40 kV a cable size of 6 mm^2 to 10 mm^2 will suffice.

Q17. Should additional insulation be applied to the bushing terminals of the ZORC?

A. It is strongly recommended that additional insulation be applied to the bushing terminals of the ZORC. This could be in the form of standard taping or the use of 'bird cage' type insulator caps.

Q18. What size earth / grounding cable should be used with the ZORC?

A. The earth cable should not be less than 16 mm^2 to 25 mm^2. Braided copper is preferred although other types may be used. Using a smaller cable size could result in local damage and possible failure of the ZORC when the discharge goes to ground via the mounting bracket

Q19. Where should the earth / grounding cable of the ZORC be terminated or connected to?

A. It is imperative that the earth / grounding cable from the ZORC be connected to the machine earth that it is protecting or switchgear panel earth in accordance with local regulations.

Q20. What is the life expectancy of the ZORC?

A. Under normal operating conditions the ZORC has an expected lifespan of approximately 20 years.

Q21. Is flexible terminal cable supplied with the ZORC unit?

A. Flexible terminal cable is only supplied for the 3.3 kV and 6.6 kV Compact ZORCs.

Q22. Does the ZORC have an internal discharge resistor?

A. The ZORC is not equipped with an internal discharge resistor and caution should be exercised when removing the unit m service. Proper safety discharge procedures should be followed before handling the ZORC unit.

Q23. Why is a standard 0.2 µF capacitor per phase used in most ZORC units?

A. The value of Capacitive Elements is optimized to minimise the heat dissipation and stressing of the resistive elements under normal mains frequency conditions while still performing its function as a "frequency dependent switch" and as a "wave sloping capacitor" under high frequency transient conditions.

Q24. What is the knee-point voltage of the MOVs within the ZORC (what voltage does it active at)?

A. Under high magnitude steep wave-front conditions, the ZnO arrestors 'trigger' between 1 and 2 pu, where 1 pu = $\sqrt{2} \div (\sqrt{3} \times V_{L-L})$.

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STRIKE TECHNOLOGIES

www.i-gard.com

www.strike.co.za

Phone: 905-673-1553
Toll Free: 1-888-737-4787

Fax: 905-673-8472
support@i-gard.com