

Installation guidelines for users of Outdoor Magnum DS Low-Voltage Switchgear Assemblies for seismic applications

A representative Type Magnum DS® Outdoor Low-Voltage Switchgear Assembly was attached to a seismic table and shaken to simulate the effects of an earthquake. The test exceeded the requirements of the 2012 International Building Code (IBC), the 2013 California Building Code (CBC) and OSHPD Seismic Pre-certification (OSP). The following guidelines were developed as a result of that test program, and they apply to standard switchgear.

1. When Magnum DS Outdoor Switchgear is subjected to an earthquake, it pulls on the foundation. The importance of an adequate foundation cannot be over emphasized; in fact, proper mounting is the single most important factor in withstanding a seismic event. The foundation must be level and continuous under the entire switchgear assembly and designed to withstand the reaction loads imposed on it by the equipment. The foundation must be designed to hold a quantity of four ¾-11 SAE Grade 5 bolts per shipping section, one at each of the four corners, plus three additional bolts on the side of each end (*for walk-in enclosure, see drawing 9255C35 Section C-C; for non walk-in enclosure, see drawing 9259C06 Section C-C*). The anchoring system must be strong enough to prevent pull-out of the bolts. Welding to embedded steel members is acceptable, provided the weld strength is equivalent to that of the four SAE Grade 5 bolts specified. For nuclear installations, weld per AWS D1.1, alternatively, welding procedures and personnel qualifications may be performed IAW ASME BPVC Section IX and the inspections be performed IAW AWS D1.1, and/or D1.3 and/or D9.1. See foundation drawings provided for the specific project to identify anchoring locations.
2. When Magnum DS Outdoor Switchgear is subjected to an earthquake, it moves. The amount of motion depends on the magnitude of the earthquake. Eaton Pow-R-Way® and non-segregated phase bus ducts, and their associated switchgear flanges have been seismically qualified as a system. If other types of top entry, i.e., conduits, are necessary, attachments must be capable of accommodating 3-inch front-to-back and side-to-side (6 inches peak-to-peak) cabinet motion.
3. **Center of gravity**
For seismic calculations, the following dimensions should be used to locate the approximate center of gravity for Magnum DS outdoor switchgear. They are applicable to all types of line-ups:

Vertical	66 inches from the base of the switchgear
Left-to-right	Center of line-up
From front	One-half the depth of the switchgear

Enclosure weights are found on the equipment drawings provided for the specific project. Add breaker weights to enclosure weight.
4. When the outdoor switchgear is separated into groups of vertical sections for shipment, the user must be sure to install all of the inter-unit tie bolts. Failure to join the shipping groups together properly could result in damage to the equipment during an earthquake.
5. It is recommended that incoming power cable be lashed together at least every 4 feet within the outdoor switchgear.
6. Type Magnum DS circuit breakers are to remain in the connected position, or they are to be removed and secured in a remote location.
7. The top-of-gear traveling circuit breaker lifter is to be secured in place with the hardware provided, when not in use.



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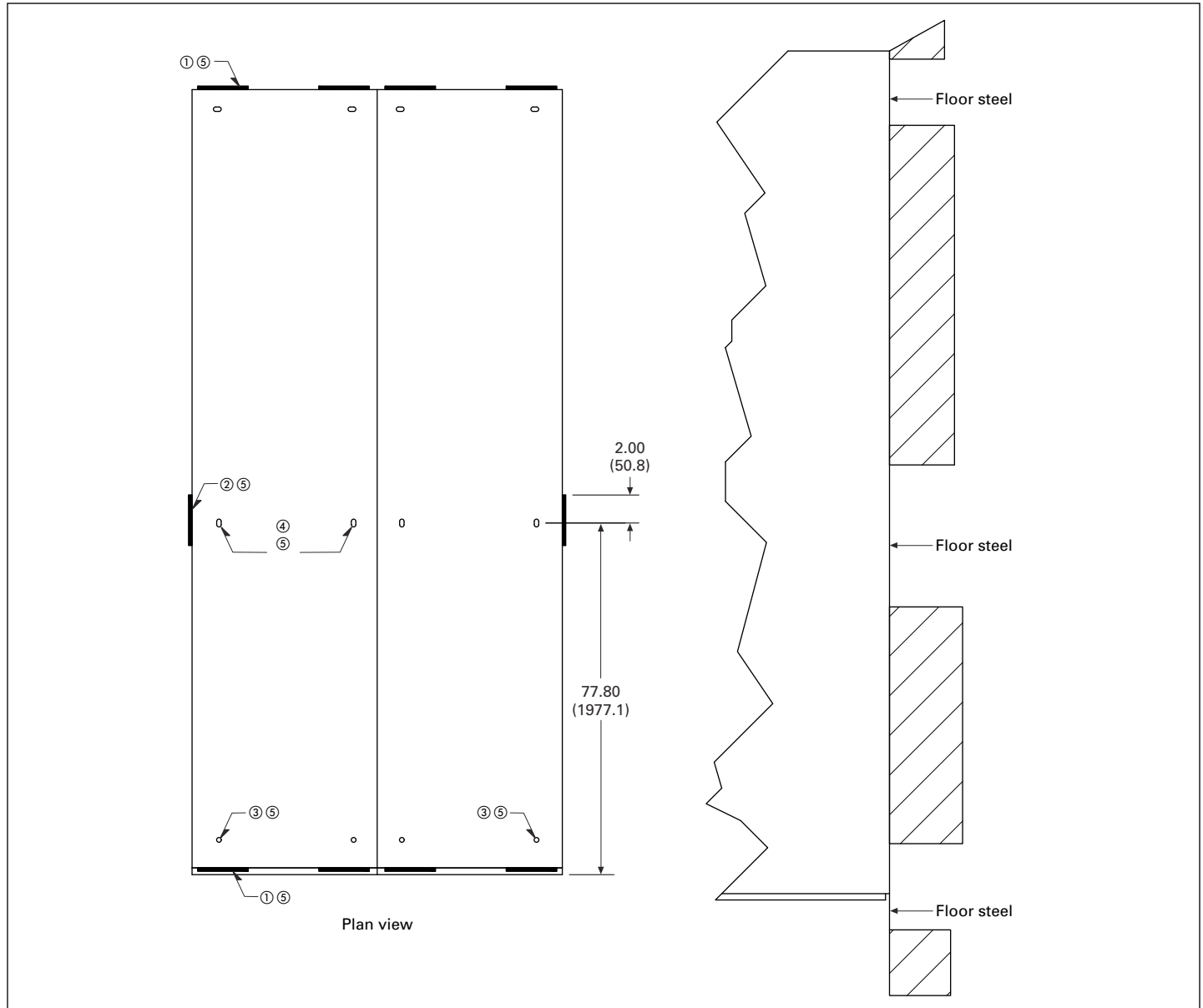


Figure 1. Welding of outdoor structures to imbedded floor steel

- ① 0.19 inches (4.8 mm) weld, 4.00 inches (101.6 mm) long at two places on front and rear of each section starting 0.50 inches (12.7 mm) from each edge of structure.
- ② 0.19 inches (4.8 mm) weld, 4.00 inches (101.6 mm) long on each end of line-up in area of bus compartment.
- ③ Internal bracket on each end of line-up to be plug welded to steel outdoor base.
- ④ Floor mounting holes, in bus compartment, to be plug welded to steel outdoor base.
- ⑤ For nuclear installations, weld per AWS D1.1, alternatively, welding procedures and personnel qualifications may be performed IAW ASME BPVC Section IX and the inspections be performed IAW AWS D1.1, and/or D1.3 and/or D9.1.

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