
Temporary Grounding Cables and Ground and Test Devices

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There are two questions that are commonly asked about PowlVac® Manual Ground and Test (G&T) devices. The first is “can commercially available grounding studs that are commonly used in switchgear be added”? The second is “why are the cables provided on the standard device are so large”?

The answer to the first question is definitely yes, but there is a definite drawback that must be considered.

Powell G&T devices for use in PowlVac® Metal-Clad switchgear are designed and tested to IEEE C37.20.6. The ratings specified for G&Ts are taken from the ratings specified in the Standard for Metal-Clad (MC) Switchgear, IEEE C37.20.2. The ground bus must be able to withstand the peak current and carry the rated short circuit current for a period of two seconds. Accordingly, the cables and ground connection system of a G&T must carry the same currents for the same duration. The ground connection system consists of the G&T conductors that connect with the drawout compartment stationary ground bus. This connection between the G&T and the compartment ground bus is sometimes referred to as a “ground shoe”.

Standard PowlVac® G&Ts are supplied with 777 MCM cables. These cables successfully carried 50kA (130kA peak) for two seconds, as required by the design standards. Smaller cables were also tested and did not meet the performance requirements. That is why the cables are so large. It is also worth noting that two-hole compression lugs on each end of the cable were required to withstand the extreme electromagnetic forces that are present during a fault condition. Flexible cables are not available on PowlVac® manual G&Ts rated 63kA. Rigid conductors (i.e. bus bars) are required to withstand the electromechanical forces at that rating.

The standard for grounding cables and clamps, ASTM F855, Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment, contains a much different rating structure. ASTM F855 – 2015 has two rating tables. Table 1 provides the required cable sizes that are based on cable melting temperatures for symmetrical currents having durations of 15 and 30 cycles. Grade 5, which is the largest single ground cable, is rated for 43kA symmetrical for 15 cycles and 30kA for 30 cycles. The stated Withstand Ratings are the highest currents and durations the cable and ground connections must withstand without damage to meet the requirements of the standard.

Back to the first question. “Can you provide grounding studs on the PowlVac® Manual G&T”? The answer is yes, if the rating of the G&T device is reduced to reflect the ratings of the selected grounding clamps and cables.

That may present another question. Is it safe to do so?

NFPA 70E, Standard for Electrical Safety in the Workplace, states in part *“Temporary protective grounding equipment shall be capable of conducting the maximum fault current that could flow at the point of grounding for the time necessary to clear the fault.”* IEEE C37.20.6 addresses the use of grounding cables on G&Ts by stating in part “When grounding clamps are used to make connections to the G&T device terminals and/or the G&T device grounding system, the short-time and momentary ratings of the G&T device are reduced. Generally, the short-time and momentary ratings are reduced to the equivalent ratings of the grounding clamps and/or the associated cables. These capabilities are usually much lower than for the switchgear itself.”

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IEEE C37.20.6 also states “For G&T devices intended for use with grounding cables and/or grounding clamps, it is recommended that the warning label in Figure 1 be provided on the device.”

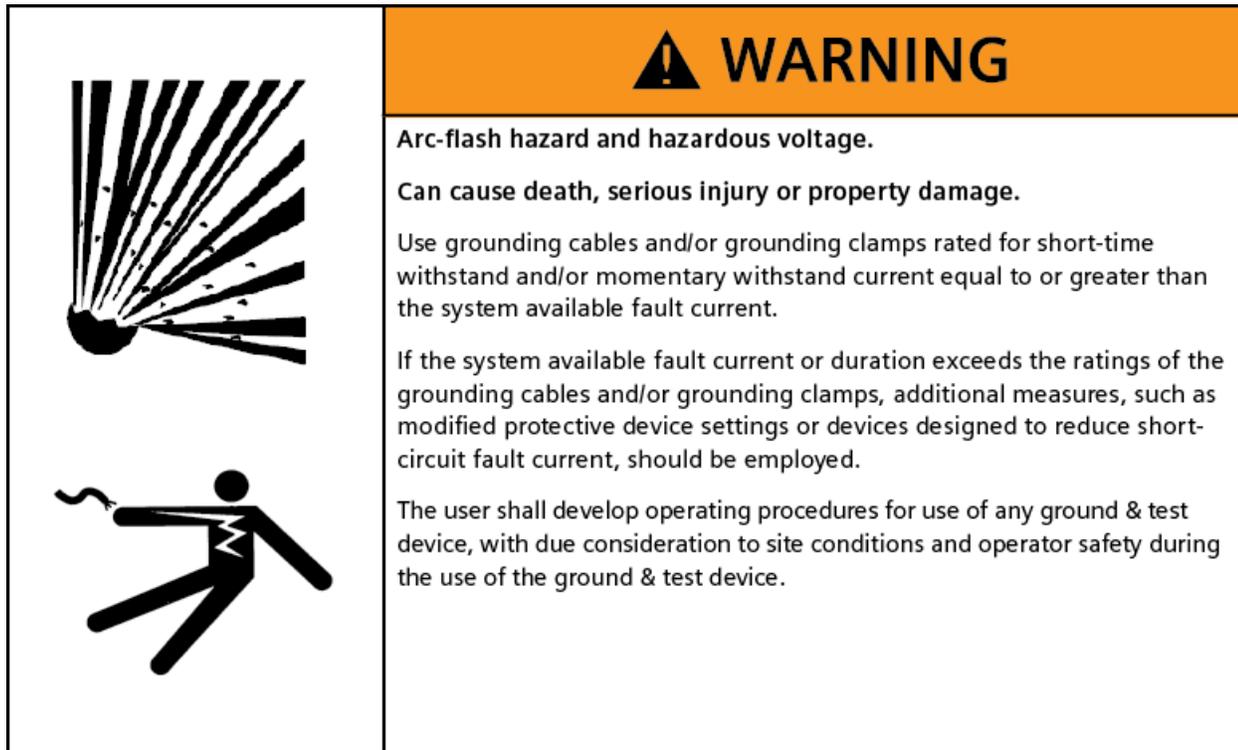


Figure 1 —Warning label for G&T devices intended for use with grounding cables and/or grounding clamps

To answer the last question, the answer is “maybe”. If the precautions stated in the warning are followed, the answer is “yes”. If the precautions are not followed and either the available fault current exceeds the ratings of the cables and/or clamps or the protective device settings are higher than the ratings, the answer is “no”. It is the responsibility of the user to ensure the application of the grounding cables and clamps is satisfactory and to be willing to accept a G&T with lower ratings than that of the switchgear where it is intended to be used.

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