

GT 3.0 DC/AC wiring/disconnect box and NEC 690

Application Note
GT 3.0 976-0085-01-01
Rev A

Introduction

The GT 3.0 and the included wiring box (pn 100-0243-01-01) provide an easily accessible terminal block for PV/utility inputs, an integrated Ground-Fault Protection (GFP) circuit and a DC/AC disconnect that allows the installation of the GT 3.0 to be simple, code compliant and reduces equipment and installation costs.

Applicable NEC Code

The U.S. National Electrical Code (NEC) requires residential rooftop photovoltaic installations to include a Photovoltaic GFP device to protect the system should a short occur between a DC common (negative) and building structure (or other conductive devices) [NEC 2002, Article 690.5].

The NEC also requires each piece of equipment in the PV system to have switches (or breakers) to disconnect it from all sources of power. [NEC 2002, Article 690.15]. The disconnecting means shall consist of a manually operable switch, be operable without exposing the operator to contact with live parts, and be readily accessible. The rating of the switch should not be less than the load to be carried by the inverter, the *open* or *closed* position of the switch should be verifiable and should be permanently marked to identify it as a photovoltaic system disconnect. [NEC 2002, Article 690.17]

Does the GT 3.0 DC disconnect meet the NEC requirement?

Xantrex's GT 3.0 inverter includes an integrated GFP circuit that interrupts the fault current and displays a red LED (Ground Fault) on the front of the inverter. The included high voltage wiring/disconnect box is designed to accept the output of multiple high voltage PV source circuits and the utility connection along with providing NEC required AC and DC equipment disconnects.

Although the GT 3.0 is shipped as a complete system it is essentially two separable products; a 3 kW PV inverter and a wiring/disconnect box. The manual disconnect switch in the wiring box allows easy access and a quick one-turn disconnect for both AC and DC inputs. It has been designed to be physically mated to the electronics section of the GT 3.0 at the factory, but remains in place as a non-serviceable item in the event that the inverter electronics section is ever required to be removed. When used with the GT 3.0, the DC/AC disconnect switch is 600V AC and DC rated and also is identified on the outside with a silkscreen illustration clearly showing the open and closed switch positions. The DC/AC wiring/disconnect box is a NEMA 3R enclosure to allow outdoor installation and is clearly marked as a PV system disconnect. This lockable switch undoubtedly meets the intention of the NEC section 690 requirements as a PVGFP and as a means of disconnect.

AC disconnect

In some jurisdictions, where the local utility requires the AC disconnect be capable of being locked in the open position by its service personnel, this disconnect switch can also serve as a lockable and visible break isolating device.

Conclusion

Because all the inverter disconnects are included and code compliant, the increased costs associated with third party listed enclosures, large-frame high voltage switch disconnects and externally installed ground fault protection devices are not needed. The Xantrex GT 3.0 integrated design dramatically decreases the total balance of system equipment and installation costs and provides an aesthetically pleasing and code compliant grid-tie inverter installation.

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Technical Note: *GT3.0 DC/AC Disconnect and NEC 690* © October 2004 Xantrex International

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Part number: 976-0085-01-01 Rev 1

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