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## 1.0 Introduction

The MS-GFCI accessory allows a GFCI (Ground Fault Circuit Interrupter) receptacle to be installed directly on a Magnum inverter. This accessory includes a duplex GFCI 20-amp rated outlet that can be easily wired and attached to the right side of the inverter. The GFCI outlet quickly stops the flow of electricity in the event a ground fault occurs on the device that is plugged into the inverter.

A GFCI receptacle does NOT protect against circuit overloads, short circuits, or shocks; therefore, the MS-GFCI accessory can only be safely installed on a Magnum inverter that includes output branch-rated circuit protection. This integral output circuit protection is only available on Magnum Energy's MS2000-20B or MS2012-20B inverter/charger models.

## 2.0 Installation

The following pertains to attaching the GFCI accessory to the MS2000-20B or MS2012-20B inverter/charger models.



**WARNING:** Installing the MS-GFCI accessory on an inverter without integral output circuit protection (i.e., not a -20B model) may cause the wires to overheat and cause a fire.



**WARNING:** Installations should be performed by personnel that understand basic wiring principles and techniques, can interpret wiring diagrams, have circuit wiring experience, and are prepared to take a few minutes to test their work to ensure the GFCI receptacle is wired correctly.



**WARNING:** Before proceeding — to prevent accidental shock — **do not** touch any parts inside the inverter until all sources of power to the inverter are de-energized (i.e., breakers open, fuses removed). This includes all DC power (i.e., batteries, solar, wind or hydro) and AC power (utility power or AC generator). Use a voltmeter to ensure all power has been removed.

## 2.1 Tools Required

To install the GFCI outlet panel you will need:

- Flat blade screwdriver
- AC voltmeter
- Phillips screwdriver
- Test lamp (rated at 120 VAC)

## 2.2 Attaching the GFCI to the Inverter

To wire the GFCI outlet to the inverter, follow these steps:

1. Remove the two Phillips screws (#8-32) that hold the existing AC access panel to the inverter (retain for attaching the GFCI outlet panel).
2. Connect the voltmeter between the AC HOT 1 OUT and the AC NEUT OUT terminals/wires. Ensure there is no voltage present on any terminals/wires.
3. Connect the GFCI outlet's 3 pre-stripped wires as follows (refer to Figure 1 for MS2012-20B models, or Figure 2 for MS2000-20B models):

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- **Blue** wire – connect to the inverter's AC HOT 1 OUT terminal/wire
  - **White w/black stripe** wire – connect to the inverter's AC NEUT OUT terminal/wire
  - **Green** wire – connect to the inverter's AC GROUND terminal/wire
4. Ensure each wire on the GFCI is appropriately connected to the correct terminal/wire on the inverter.
    - a) On MS2012-20B models, tighten each terminal to a maximum torque of 16 lbf-in (1.8N-m).
    - b) On MS2000-20B models, use an appropriate wire connector to attach the GFCI wires to the inverter wires.
  5. Attach the GFCI outlet panel to the inverter using the two Phillips screws you removed earlier. Make sure not to pinch the wires.

Once the GFCI is installed, it is highly recommended that you test the GFCI outlet before using it.

**Can the inverter also be wired to run AC loads directly from the inverter (i.e., hardwired) with the MS-GFCI accessory installed?** Yes, the inverter can also be hardwired to power loads directly from the inverter. However, because the GFCI receptacle looks for a balance of current flowing in a single hot conductor and a single neutral conductor, ensure all wiring is directly made from the inverter (either directly from the AC wiring terminal on MS2012-20B models, or from the pigtail wires on MS2000-20B models). There should not be any additional wiring made from the GFCI receptacle, this is to prevent nuisance GFCI tripping when a current imbalance occurs by sharing the neutral or hot wires on the GFCI. For information on hardwiring to the inverter, refer to your inverter's owner's manual.

### 3.0 Testing the GFCI Outlet



**WARNING:** A miswired GFCI may result in personal injury or death due to a ground fault (electrical shock).



**WARNING:** Exercise extreme caution when re-applying power to the inverter and during the entire GFCI testing process. A shock hazard may be present.

**IMPORTANT:** To properly test the GFCI's operation, the inverter must be providing ~120VAC to the GFCI outlet. If the inverter is "Searching", the Search mode feature must be turned off to allow the inverter to provide ~120VAC.

#### To test the GFCI outlet:

1. Apply DC power to the inverter, and then turn the inverter on.
2. Plug the test lamp in to the GFCI outlet and turn it on. If the lamp comes on – proceed to Step 3. If it does not:
  - a) Ensure the GFCI's **RESET** button (see Figure 3) is not "tripped" (the **RESET** button is tripped if the button is flush with the face of the **TEST** button). If fully pushing the **RESET** button does not cause it to light up, then the wire connections from the GFCI outlet to the inverter are not attached correctly, repeat Steps 3 and 4 of the installation; or,
  - b) Ensure the inverter is on and not in Search mode, or
  - c) Check the test lamp to ensure it is not faulty, or use a different test lamp.

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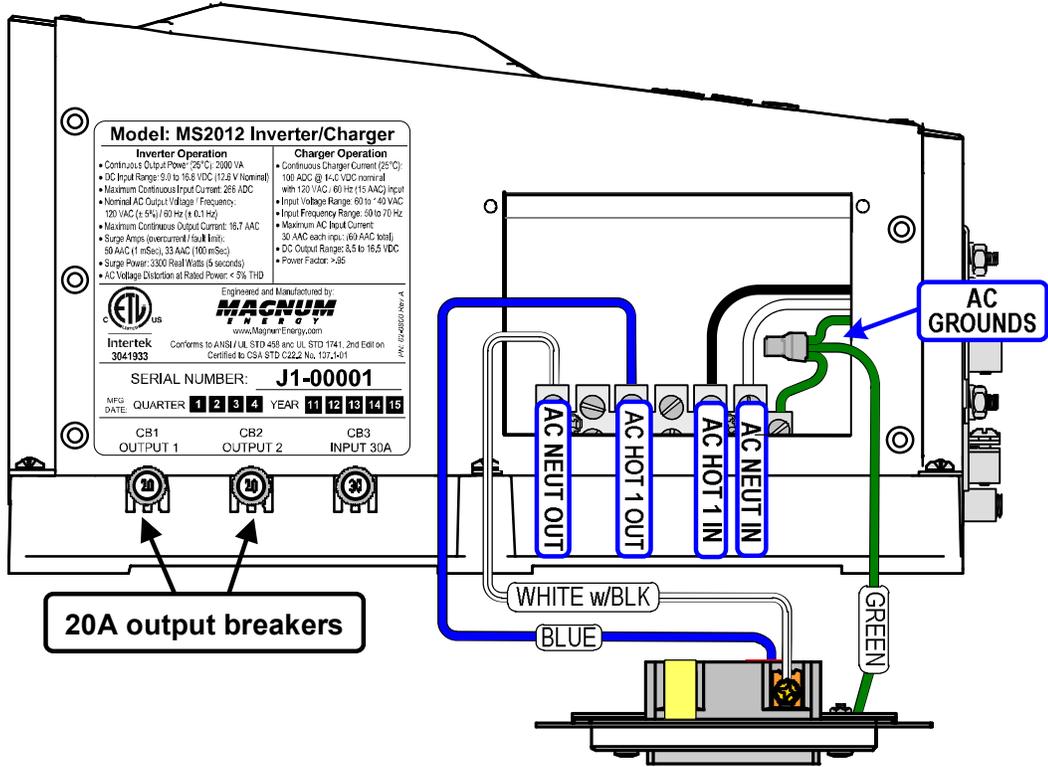


Figure 1, AC Output Wiring for MS2012-20B

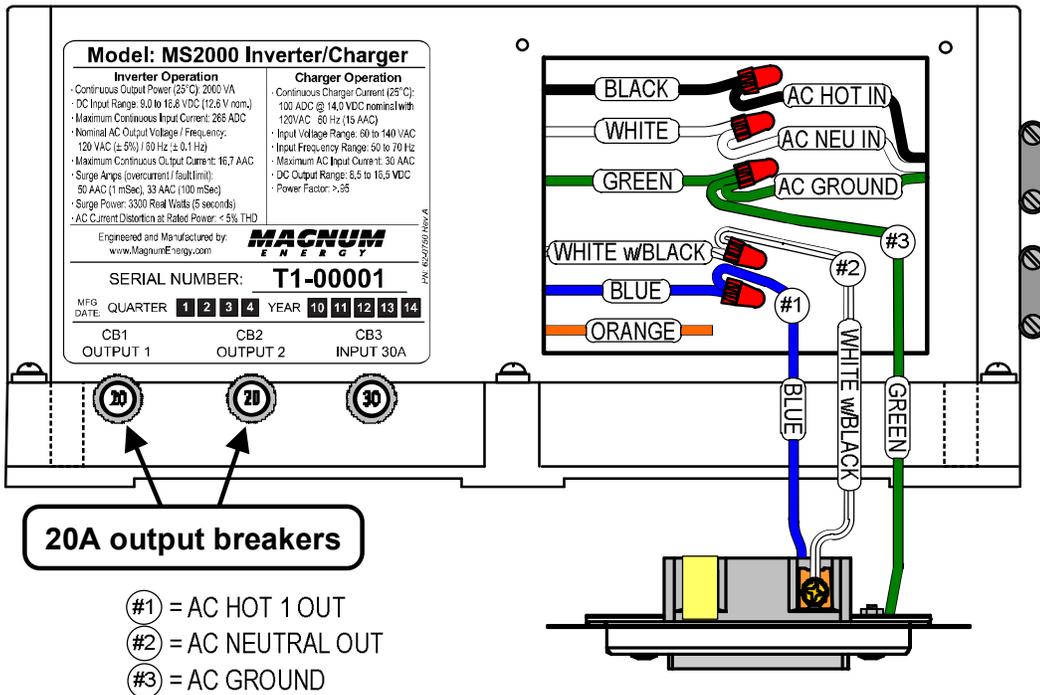
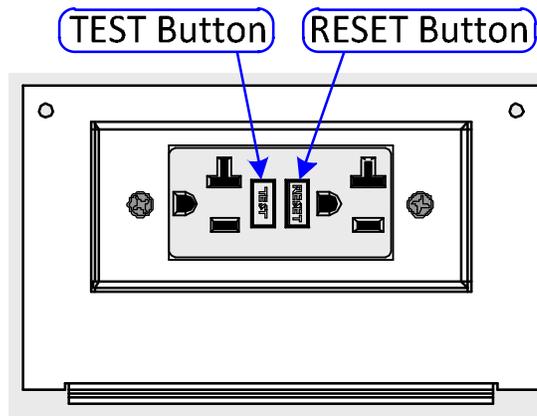


Figure 2, AC Output Wiring for MS2000-20B

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3. Press the **TEST** button on the GFCI outlet. The **RESET** button immediately pop outs and the test lamp turns off. If this occurs, the GFCI accessory has been properly installed and is operating correctly – proceed to Step 4. If the above does not occur:
  - a) The **RESET** button does not pop out when the **TEST** button is pressed. The GFCI outlet is not operating correctly, repeat Steps 3 and 4 of the installation.
  - b) The **RESET** button pops out, but the test lamp does not turn off. This indicates you need to either:
    - check the blue AC HOT OUT wire and the white w/stripe AC NEUT OUT wire to ensure they were not reversed during installation (repeat installation Steps 3 & 4), or
    - check the HOT IN and NEUT IN wires to ensure they are not reversed from the external AC power source
4. Apply an external AC power source (utility or generator) to the inverter's AC input and repeat Steps 2-3 above. This ensures the GFCI is operating correctly when powered from an external AC power source.

Once the GFCI passes all tests, the installation is complete.



**Figure 3, MS-GFCI Front View**

### 4.0 Operation

The GFCI outlets provide auxiliary power to 120V AC devices that require 20 amps or less. If you are using both GFCI outlets at once, the amperage cannot exceed a total of 20 amps for both devices combined. Use only a 3-prong grounded plug when using the GFCI outlets.

Because GFCI outlets can become damaged over time, they must be tested monthly to ensure they are providing protection.

#### To clear a tripped GFCI:

1. Some faults are self-clearing, try resetting the GFCI outlet by pressing the **RESET** button.
2. If the **RESET** button will not stay in, ensure the inverter is not in Search mode\*.
3. If the GFCI outlet continues to trip, the device is performing its intended protection function; which means that a hazardous condition could exist. A qualified electrician should be called to evaluate the circuit.

\* The **RESET** button will not reset if the inverter is "searching". Use a remote control to turn off the Search feature.