

Installation

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Introduction

Qualified Persons

WARNING

Only qualified persons who are knowledgeable in the installation, operation, and maintenance of overhead and underground electric distribution equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended **ONLY** for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

Read this Instruction Sheet

NOTICE

Thoroughly and carefully read this instruction sheet before installing or operating your GridMaster Microgrid Control System. Familiarize yourself with the Safety Information pages 4 through 5. The latest version of this publication is available online in PDF format at sandc.com/en/support/product-literature/.

Retain this Instruction Sheet

This instruction sheet is a permanent part of your GridMaster Microgrid Control System. Designate a location where you can easily retrieve and refer to this publication.

Proper Application

WARNING

A GridMaster controller is only intended for use in the GridMaster Microgrid Control System. Application information for the S&C Microgrid Control System is listed in Specification Bulletin 1025-31 and with the system diagram drawings provided by S&C Electric Company.

Operating Considerations

A GridMaster Microgrid Control System enables intelligent electronic devices to be incorporated into a microgrid. Each GridMaster controller operates as a member of a peer-to-peer network that ensures electrical demand is met while eliminating single points of failure. GridMaster controllers are used to monitor and switch new or existing renewable sources of energy such as wind and solar, critical and non-critical loads (prioritized load shedding), utility and non-utility sources of generation, and energy storage to allow for islanding of electrical loads. The GridMaster controller is also capable of recognizing when devices and equipment are unavailable and can compensate for such contingencies.

The GridMaster controller operates in tandem with the controls of its associated intelligent electronic device (IED). It does not directly provide switching capabilities but does interface with the IED controls to do so. It is powered through a connection with the IED and may be supplied with an optional backup battery system. For more information on the operation of the GridMaster controller, see S&C Instruction Sheet 1025-530, “S&C GridMaster® Microgrid Control System: *Operation*.”

Special Warranty Provisions

The standard warranty contained in the seller's standard conditions of sale, as set forth in Price Sheet 150, applies to GridMaster Microgrid Control System, except that the first paragraph of said warranty is replaced by the following:

(1) **General:** The seller warrants to the immediate purchaser or end user for a period of 10 years from the date of shipment that the equipment delivered will be of the kind and quality specified in the contract description and will be free of defects of workmanship and material. Should any failure to conform to this warranty appear under proper and normal use within 10 years after the date of shipment, the seller agrees, upon prompt notification thereof and confirmation that the equipment has been stored, installed, operated, inspected, and maintained in accordance with recommendations of the seller and standard industry practice, to correct the non-conformity either by repairing any damaged or defective parts of the equipment or (at the seller's option) by shipment of necessary replacement parts. The seller's warranty does not apply to any equipment that has been disassembled, repaired, or altered by anyone other than the seller. This limited warranty is granted only to the immediate purchaser or, if the equipment is purchased by a third party for installation in third-party equipment, the end user of the equipment. The seller's duty to perform under any warranty may be delayed, at the seller's sole option, until the seller has been paid in full for all goods purchased by the immediate purchaser. No such delay shall extend the warranty period.

Replacement parts provided by the seller or repairs performed by the seller under the warranty for the original equipment will be covered by the above special warranty provision for its duration. Replacement parts purchased separately will be covered by the above special warranty provision.

Warranty Qualifications

Warranty of a GridMaster Microgrid Control System is contingent upon the installation, configuration, and use of the control and software in accordance with S&C's applicable instruction sheets. This warranty does not apply to major components not manufactured by S&C, such as batteries, communication devices, and the IED associated with the controller. However, S&C will assign to the immediate purchaser or end user all manufacturers' warranties that apply to such major components.

Safety Information

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to your S&C GridMaster Microgrid Control System. Familiarize yourself with these messages and the importance of these signal words:

DANGER

“DANGER” identifies the most serious and immediate hazards that will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.

WARNING

“WARNING” identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.

CAUTION

“CAUTION” identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.

NOTICE

“NOTICE” identifies important procedures or requirements that can result in product or property damage if instructions are not followed.

Following Safety Instructions

If you do not understand any portion of this instruction sheet and need assistance, contact your nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C’s website sandc.com, or call the S&C Global Support and Monitoring Center at 1-888-456-1100.

NOTICE

Read this instruction sheet thoroughly and carefully before installing your GridMaster Microgrid Control System.



Replacement Instructions and Labels

If additional copies of this instruction sheet are needed, contact your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd. The latest version is available online in PDF format at sandc.com/en/Support/Product-Literature/.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

⚠ DANGER



The S&C GridMaster Microgrid Control System may be installed in equipment that operates at high voltage. Failure to observe the precautions below will result in serious personal injury or death.

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. QUALIFIED PERSONS. Access to the GridMaster Microgrid Control System must be restricted only to qualified persons. See the "Qualified Persons" section on page 2. 2. SAFETY PROCEDURES. Always follow safe operating procedures and rules. 3. PERSONAL PROTECTIVE EQUIPMENT. Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing, in accordance with safe operating procedures and rules. | <ol style="list-style-type: none"> 4. SAFETY LABELS. Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels and tags. Remove tags ONLY if instructed to do so. 5. ENERGIZED COMPONENTS. Always consider all parts live until de-energized, tested, and grounded. 6. MAINTAINING PROPER CLEARANCE. Always maintain proper clearance from energized components. |
|---|---|

Shipping and Handling

Inspection

Examine the shipment for external evidence of damage as soon after receipt as possible, preferably before removal from the carrier's conveyance. Check the bill of lading to make sure the listed shipping skids, crates, and containers are present. If there is visible loss or damage:

1. Notify the delivering carrier immediately.
2. Ask for a carrier inspection.
3. Note the condition of shipment on all copies of the delivery receipt.
4. File a claim with the carrier.

If concealed damage is discovered:

1. Notify the delivering carrier within 15 days of receipt of shipment.
2. Ask for a carrier inspection.
3. File a claim with the carrier.

Also, notify S&C Electric Company in all instances of loss or damage.

Packing

A complete GridMaster Microgrid Control System consists of the following components:

- The GridMaster controller
- This instruction manual

Before Starting

Familiarize yourself with the parts of the GridMaster controller. See Figure 1.

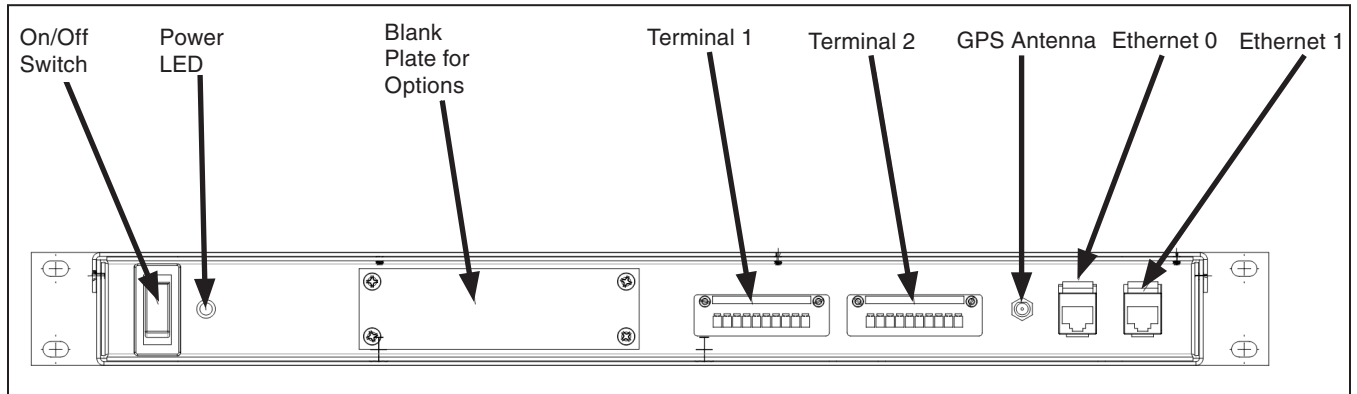


Figure 1. GridMaster controller: rear view.

Installation

Installing the Rack-Mounted GridMaster Controller

Rack-mounted GridMaster controllers can be installed in a standard 1U slot in a 19-inch (483-mm) equipment rack.

To install the GridMaster controller into an equipment rack:

- STEP 1.** Use best practices for installing rack equipment by installing the heaviest equipment on the bottom of the rack. On taller racks, this prevents the equipment rack from becoming top heavy. The GridMaster controller is lightweight at only 8 lbs (3.6 kg) and can be installed toward the top of the rack.
- STEP 2.** Slide the microgrid controller into a 1U slot and use the appropriately sized mounting screws (10-32, 12-24, and M6 screws are most common) to install the GridMaster controller to the rack. See Figure 2. For installation in a rack without threaded holes, cage nuts and screws are recommended. Tighten the screws.

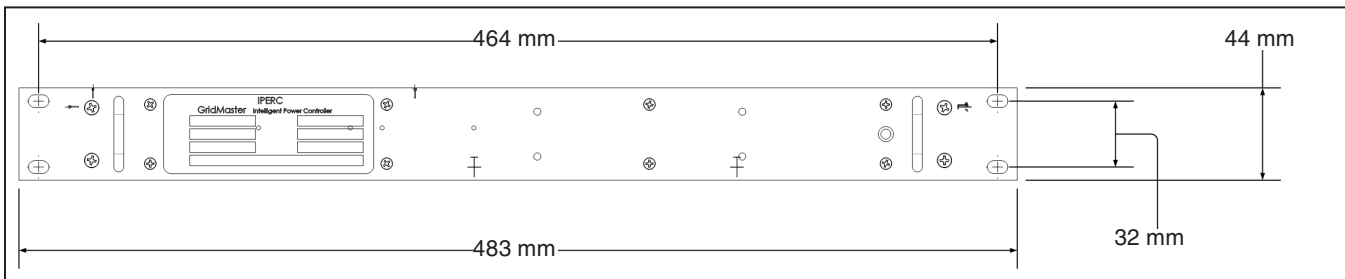


Figure 2. Rack dimensions and mounting hole centers.

Making the Control Power, Data, and GPS Connections

A GridMaster controller comes standard with connections for power, two Ethernet ports, a coaxial port for connecting a GPS antenna, and two screw terminal connectors. See Figure 1 on page 7. Make the control power, data, and GPS connections by completing the following steps:

- STEP 1.** If present, connect a GPS antenna to the female coaxial connector on the controller.
- STEP 2.** Connect a solid-copper Ethernet cable to the Ethernet 0 port on the controller. The other end of the cable may be connected to either a radio, a network switch, or directly to the local-area network on which the GridMaster Microgrid Control System will be interconnected.
- STEP 3.** The GridMaster controller can accept 24 Vdc control power. Connect the two 12–30 AWG wires from the control power source to the GridMaster controller to the first two (left-hand facing) screw terminals of Terminal 1.
- STEP 4.** S&C recommends the control power source be supported by an uninterruptable power supply that can power the controller for at least one hour after control power is lost.
- STEP 5.** If the associated IED communicates via Ethernet, connect a solid-copper Ethernet cable to the Ethernet 1 port. Connect the other end to the IED according to the IED manufacturer's instructions.
- STEP 6.** A three-port RS-485 screw terminal comes standard with the controller. To connect to a RS-485 connector module, connect three 12–30 AWG wires to the screw terminal and tighten the screws until they bottom out. Do not leave the wires unsecured. The maximum recommended length of wire is 1,000 meters (3,281 feet). There is no required order for use of the screw terminals. When using stranded wire, S&C recommends coating the stranded ends with tin-solder before insertion into the screw terminals. The pinout is shown in the “Module Pinouts” section on page 11.

Note: The RS-485 connection can communicate at speeds up to 115200 baud and can be used to acquire data from any compatible IED, including those that use the Modbus protocol. Third party converters are available to convert from RS-485 to RS-232 or RS-422. The port is configured as Data Terminal Equipment (DTE). Both the send and receive registers of the port have a 16-byte FIFO and 16C550-compatible UARTs. Individual modem handshake control signals are supported.

Option Plate

A number of options, including digital Input/Output connectors, CAN ports, and analog Input/Output ports, can be custom-engineered and installed in place of the options plate depending on the application. Wiring information on the options will be provided as a part of the system diagram supplied with the GridMaster Microgrid Control System.

Final Setup and Checkout

Before switching on and configuring the GridMaster controller according to the instructions in S&C Instruction Sheet 1025-530, check the following:

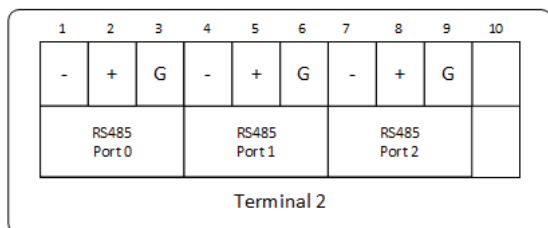
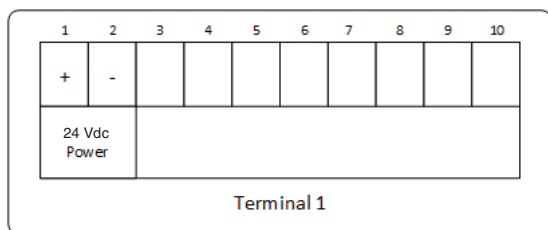
- STEP 1.** Make sure the GridMaster controller is securely installed in the rack. Check all fasteners for tightness.
- STEP 2.** Make sure all cable connections and wiring connections to the GridMaster controller are secure.
- STEP 3.** Turn on control power to the GridMaster controller by toggling the ON switch on the back of the control to the **On** position. The power indicator will illuminate.
- STEP 4.** Test the connection by opening a browser window and connecting to the network to which the controller is connected. Connect to the controller by entering in the address and log-in credentials securely supplied to you by S&C Electric Company. Detailed log-in and password maintenance information can be found in S&C Instruction Sheet 1025-530.

General Specifications

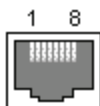
Control Voltage	24 Vdc
Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Operating Humidity	95% non-condensing humidity
Altitude	3000 meters (9843 feet)

Module Pinouts

Terminal 1 and Terminal 2



Ethernet



Pin	Function
1	Data (TX +)
2	Data (TX -)
3	Data (RX +)
4	Ground (-)
5	Ground (-)
6	Data (RX -)
7	Power (+)
8	Power (+)