Switchboard Meter Installation Instructions

The 9300 Series power meters are now available in the optional switchboard meter style, compatible with either the S1 (General Electric) or the FT21 (ABB) switchboard case. In this document, the 9300 Series switchboard meter will simply be referred to as “switchboard meter.”

The switchboard meter consists of the meter chassis (S1 or FT21 draw-out carriage with the meter base pre-mounted and pre-wired), the cover assembly (S1 or FT21 case cover with the display unit pre-mounted), and a ribbon cable to connect the display to the meter base. The S1 or FT21 cases (outer shells) are also available as separately ordered options.

This document contains instructions for installing and wiring a switchboard meter and must be used in conjunction with the Installation and Basic Setup Instructions manual supplied with the meter. Read the Installation & Basic Setup Instructions manual in its entirety. All notices and warnings contained in that document apply to the switchboard meter as well.

⚠️ CAUTION

For 120V, 110V, 69.3V or 63.5V transformer-coupled systems only
The switchboard meter is pre-wired for use in systems that use PTs with 120V, 110V, 69.3V or 63.5V secondaries. Using the switchboard meter in other applications or higher voltage systems may permanently damage the meter.
(This Caution does not apply to the P24 power supply option).

Installation and maintenance of the switchboard meter should only be performed by qualified and competent personnel who have appropriate training and experience with high voltage and current devices.

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Installation Overview

CAUTION

Installation and maintenance of the switchboard meter should only be performed by qualified personnel who have appropriate training and experience with high voltage and high current devices.

If the switchboard case is included with your meter, draw the meter chassis out of the case to facilitate its installation into the mounting hole. Installing and setting up the switchboard meter is summarized in the following steps.

1. Review the unit’s dimensions and prepare a mounting hole for the switchboard case. If you are retrofitting your switchboard meter into an existing case, you may have to drill or punch a 29mm (1.13") round hole in the back of the case to accommodate communications, I/O, and/or auxiliary power wiring.

   NOTE

   For retrofitting S1 style switchboard cases, a pre-drilled backplate is included. To use it, remove the backplate from the old switchboard case and replace it with the supplied backplate.

   Place the supplied 29mm (1.13") nylon bushing into the drilled hole if desired. Refer to “Unit Dimensions” on page 4.

2. Place the switchboard case into the prepared mounting hole. Attach the mounting screws.

3. Wire the phase voltages and currents to the terminal posts on the rear of the case; refer to “Power System Wiring Diagrams” on page 8. Connect the chassis ground to switchgear earth ground; refer to “Connecting the Unit’s Chassis Ground Connection” on page 7.

4. Read the warning label on the green captured-wire plug.

5. Connect any communications, I/O, and/or auxiliary power wiring to the meter.
   - For the P24 power supply option, ensure that the auxiliary power cable is powered off.
   - Pass all wiring through the switchboard case using the round hole in back.
   - Connect the communications and I/O wiring to the meter; for the P24 power supply option, also connect the auxiliary power cable to the meter’s power supply terminals.
   - Slide the meter chassis into position while feeding the excess wiring through the hole in the rear of the switchboard case, making sure none of the wires are pinched.
   - Secure the meter by locking the two chassis levers into position.
   - Wire any external communications and I/O; for the P24 power supply option, connect the other end of the auxiliary power cable to an external dedicated 20 to 60VDC source that is powered down.
6. Connect the ribbon cable to the back of the display on the case cover.

7. Energize the meter as follows:
   ♦ For the P24 power supply option, power up the auxiliary power (20 to 60VDC) source.
   ♦ For the standard option, the meter is powered up when the voltage inputs are applied in the next step.

8. Apply the current and voltage inputs:
   ♦ For S1 style switchboard meters, insert the connection plug into the slot at the bottom of the meter.
   ♦ For FT21 style switchboard meters, push the shorting switches up.

9. Place the case cover into position and tighten the thumbscrew(s).

10. Perform basic setup and verify the meter’s operation: refer to the meter’s Installation and Basic Setup Instructions manual for details.
Unit Dimensions

S1 Case

FT21 Case
Suggested Mounting Hole Dimensions

S1 Case Hole

FT21 Case Hole

156mm (6.14")
146mm (5.75")

149mm (5.87")
141mm (5.55")

111mm (4.37")
210mm (8.27")

230mm (9.06")
246mm (9.69")
Wiring the Switchboard Meter

⚠️ DANGER
During normal operation of this device, hazardous voltages and currents are present on the device and throughout the connected potential transformers (PTs), current transformers (CTs), control power and I/O circuits. Use authorized utility procedures to install and service metering equipment. Equipment damage, personal injury and death can result if circuit closing devices are not used, or if safety precautions are not followed.

Voltage and Current Terminals

⚠️ CAUTION
For 120V, 110V, 69.3V or 63.5V transformer-coupled systems only
The switchboard meter is pre-wired for use in systems that use PTs with 120V, 110V, 69.3V or 63.5V secondaries. Using the switchboard meter in other applications or in higher voltage systems may permanently damage the meter.

All voltage and current connections to the switchboard meter are made to terminals located on the rear of the unit. External 2A slow-blow fuses are recommended to be used between the meter’s V1, V2, V3 terminals and the PT secondaries. When the meter is removed from its draw-out case, the current inputs are automatically short-circuited — thus the use of external shorting blocks is not required. The phase voltage and current terminals are of a screw-in-type for which ring or spade terminals may be used to simplify connection. The locations of the voltage and current terminal posts are shown in the wiring diagrams starting on page 8. For further information and wire dimensions, refer to the meter’s Installation and Basic Setup Instructions manual.

Powering the Switchboard Meter

The standard switchboard meter is powered from the voltage sensing terminals V1 and V3 on the rear of the switchboard case (i.e. the switchboard meter’s power supply L/+ and N/- connectors are hard-wired to the V1 and V3 chassis terminals).

Optionally, the switchboard meter can be powered from a separate AC or DC voltage source — this requires modifications to be made to the internal wiring harness; contact Technical Services for more information.

The optional P24 power supply must be connected to an external dedicated 20 to 60VDC source.
Connecting the Unit’s Chassis Ground Connection

⚠️ CAUTION

The switchboard meter must be installed with an adequate chassis ground connection. Use authorized utility procedures to install the ground connection before wiring. Hazardous voltages are present on the device. Ground the device BEFORE power is applied. Failure to properly connect the chassis ground will void the unit’s warranty.

The ground terminal on the rear of the switchboard case provides the chassis ground connection. The chassis ground source must be installed before the switchboard meter can be installed — a good low impedance chassis ground connection is essential for the meter’s surge and transient protection circuitry to function effectively.

The ground should be wired to the earth ground using a dedicated AWG 14 (2.5mm²) or larger wire to a point where there will be no voltage error due to distribution voltage drops. Do not rely on metal door hinges as a ground path. Ensure that the ground terminal screw is tightened down securely onto the ground wire.

The arrows in the diagram below indicate where the grounding posts are located (on the back of the switchboard meter):
PTs with 120V, 110V, 69.3V or 63.5V secondaries must be used for 4-wire Wye systems. Both the PT primary and secondary circuits should be protected by breakers or fuses at their source. Wiring must be exactly as shown for correct operation.

VOLTS MODE should be set to 4W-WYE.
This 2½-element scheme requires only 2 PTs with 120V, 110V, 69.3V or 63.5V secondaries. In this configuration, the phase B voltage displayed by the meter is derived from the phase A and C voltages. If the voltages are unbalanced, the power readings may not meet the meter’s accuracy specifications.

VOLTS MODE should be set to 3W-WYE.
The switchboard meter requires PTs with 120V, 110V, 69.3V or 63.5V secondaries. In this configuration, the meter senses the line-to-line voltages between each of the phases. VOLTS MODE should be set to DELTA.
The switchboard meter requires PTs with 120V, 110V, 69.3V or 63.5V secondaries for ungrounded 3-wire systems. In this configuration, the meter senses the line-to-line voltages between each of the phases.

VOLTS MODE should be set to DELTA.

3-Wire Delta, 2-Element, 2 PT & 2 CT Connection Diagram

**FT21 Case**

**S1 Case**
Wiring for the P24 Power Supply Option

1. Connect the auxiliary power cable to the meter’s power supply terminals.
2. Connect the other end of the cable to an external dedicated 20 to 60VDC source that is powered down.

**Energizing the meter**

Energize the meter by powering up the dedicated 20 to 60VDC source.