Quick Instructions for Installing

MICRO CONTROL SYSTEMS sells the MCS-POWERMETER as shown below:

- **MCS-POWERMETER** - programmed with (3) MCS-ROCOILS Current Transformers

  The unit is shipped programmed for 60Hz, using the MCS-ROCOILS Current Transformers.

- **MCS-POWERMETER-KIT** - programmed with (3) MCS-ROCOILS Current Transformers, (1) MCS-Modbus-IO Board.

  The unit is shipped programmed for operation with the MCS-Modbus-IO board and the (3) MCS-ROCOILS Current Transformers operating at 60Hz.

Follow these quick instructions on how to install the power meter. For more detailed instructions, download or read the MCS-POWERMETER manual located on our website: https://mcscontrols.com/manuals.html

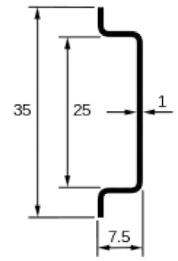
1.1. Field Installation

MCS-POWERMETER must be installed in an approved electrical panel or enclosure using proper installation practices, according to the local electrical codes.

WARNING! Remove the meter from all sources of voltage before mounting.

1. **Mount the MCS-POWERMETER** - use the two tabs provided at both ends of the case. Securely mount the MCS-POWERMETER near a dedicated circuit disconnect breaker.

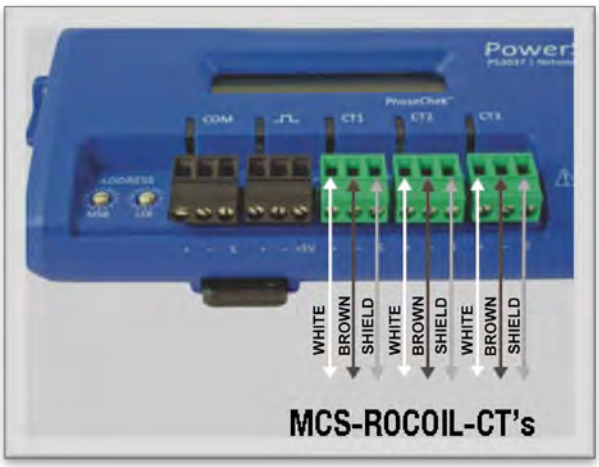
   The MCS-POWERMETER can also be mounted on a 35 mm width DIN rail.

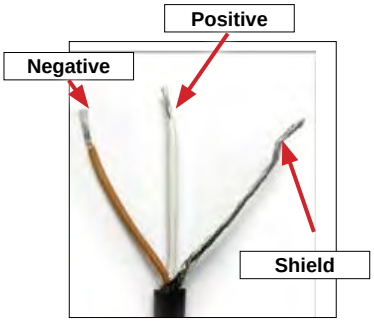


Top hat rail EN 50022

2. **Wiring MCS-ROCOILS-CT's** - Attach the CTs onto the MCS-POWERMETER connections labeled CT 1, CT 2 and CT 3.

   Place the CTs on the phase wires of the load to be monitored and corresponding to the phase of the voltage leads. The CT labeled CT 1 must be placed on L1 phase voltage wire, CT 2 must be on the L2 voltage and CT 3 on the L3 voltage. Refer to PhaseChek™ in MCS-POWERMETER manual for information about the CT LEDs and verifying the CT installation.





a. Connect the **CTs brown wire to the negative terminal on the connector. See photo.**

b. Connect the **CTs white wire to the positive terminal on the connector.**

c. Connect the **bare shield wire from the MCS-ROCOIL-CT's to the "S" shield terminal that is part of the connector. This reduces interference and improves accuracy of the CT.**

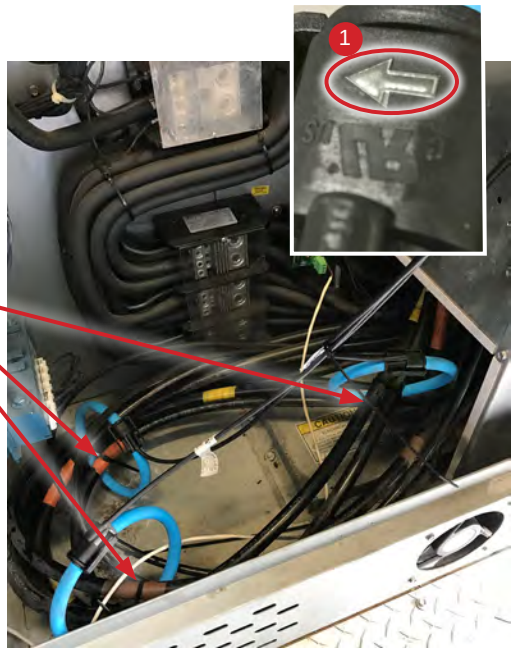
1.1.1 Installing MCS-RoCoil's in Chiller room.

NOTE: MCS-RoCoil's should be installed on in-coming power from the power source:

1. 'ARROW ON THE MCS-RoCoil's SHOULD POINT toward the Load'.

2. SPACING BETWEEN MCS-RoCoil's SHOULD BE A MINIMUM OF ONE INCH APART.

   Photo: shows MCS-RoCoil's more than one inch apart.



The MCS-RoCoil's in the photo are wire tied to the power cable so the position of the MCS-RoCoil is at the optimal reading position for the least amount of error.

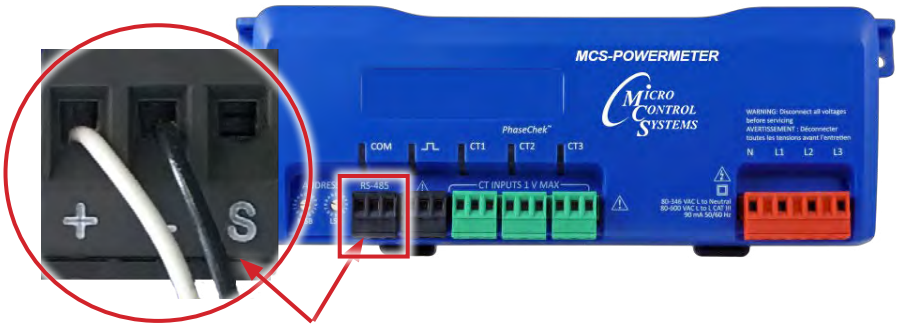
Additional information on placement of the MCS-RoCoil's can be found in our manual located on our website.

https://mcscontrols.com/manuals.html

1.1.2 RS-485 Communication

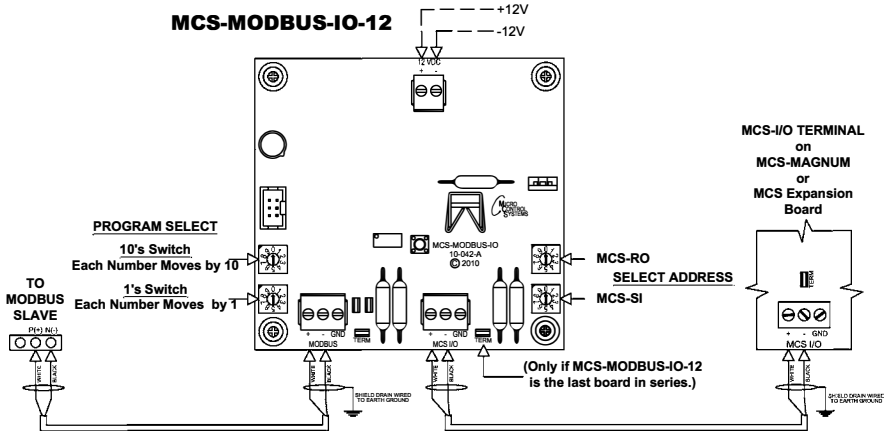
A two wire plus shielded cable is connected between the MCS-MODBUS and the MCS-POWERMETER.

Requires Modbus firmware 2.02I or better.



RS-485 Connection from MCS-MODBUS

MCS-MODBUS-IO-12
To MCS-MAGNUM or MCS Expansion Board — Wiring Diagram



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MCS-MODBUS-IO-12 Wiring Diagram (2021-02-17).dwg

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1.1.3 Connecting Voltage

1. Connect the voltage leads (L1, L2, L3, and N, as necessary) to the meter. A voltage lead of 14 AWG THHN Minimum 600VAC rating (or equivalent in order to maintain 600VAC safety rating of the device) is required.

2. Connect the leads to the POWER SOURCE TRANSFORMER.

a. Refer to the wiring diagrams for wiring connection specifics. Follow local electrical codes during this installation.

b. **IMPORTANT:** VERIFY THAT THE METHOD OF POWER DISCONNECT IS SPECIFIED AT THE MCS-POWERMETER.

c. NOTE: Refer to the Safety Summary in the manual, for information on DC voltage connections.

1.2. Powering the Meter

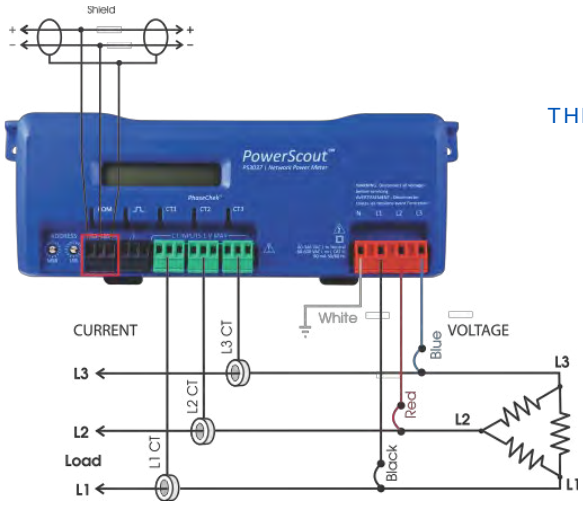
Connect the MCS-POWERMETER 14 AWG THHN Minimum 600VAC rating (or equivalent in order to maintain 600VAC safety rating of the device) voltage leads as close as possible to a building-installed, dedicated circuit disconnect breaker. Mark the breaker as the “disconnect” for the MCS-POWERMETER. Refer to the wiring diagrams for specifics of the wiring connections.

Follow local electrical codes during this installation. MCS-POWERMETER are self-powered from the L1 and L2 lines. When 80–600VAC or DC is placed across the L1 and L2 wires, the three phasing LEDs begin to flash in sequence.

1.2.1 Mcs-Powermeter Single-Phase Connections

The MCS-POWERMETER can be used to monitor single-phase loads. There are several guidelines to keep in mind about this type of connection:

1. The MCS-POWERMETER is powered from a potential between L1 and L2. This can be phase-to-phase (230V) or phase-to-neutral (115V).
2. With a single-phase 230V panel, the L1 and L2 voltage leads are connected between the L1 and L2 voltage sources. With a 115V circuit, the L1 voltage lead is connected to the L1 “hot lead,” and the L2 voltage lead is connected to neutral.
3. Each CT must be paired with the correct voltage source. The current and voltage need to be in- phase for accurate measurements. For instance, CT 1 would monitor branch circuit supplied by voltage source L1, and so on.
4. The neutral must be connected because the MCS-POWERMETER uses line-to-neutral measurements for all calculations.



THREE-WIRE DELTA

1.2.2 A Typical 230V Single-Phase Panel

Setup (US Wire Colors)

Connect the Black L1 voltage lead to Voltage L1, Red L2 voltage lead to L2 voltage, White Neutral voltage lead to neutral. CT1 would monitor L1 loads and CT2 would monitor L2 loads. Based on the above guidelines, CT3 can be used if the Blue L3 voltage lead is connected to either L1 or L2. As long as voltage lead L3 and CT3 are in-phase, the MCS-POWERMETER will provide correct kW readings. If the Blue L3 voltage lead was connected to L2 voltage source, then CT3 could monitor any L2 branch circuit. Or, if the Blue L3 voltage lead was connected to L1 voltage source, then CT3 could monitor any L1 branch circuit.

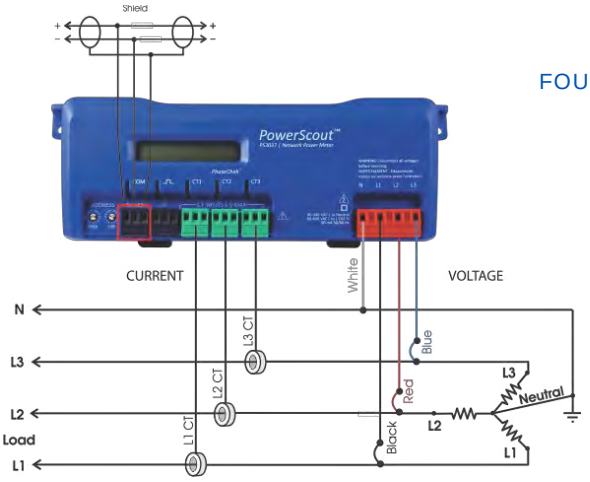
1.2.3 A Typical 115V Single-Phase Panel Setup

Connect the Black L1 voltage lead to Voltage L1 (hot), Red L2 voltage lead to Neutral, and White N voltage lead to neutral. CT1 would monitor the L1 load. CT3 can be used if the Blue L3 voltage lead is connected to L1. CT3 could then monitor any L1 branch circuit.

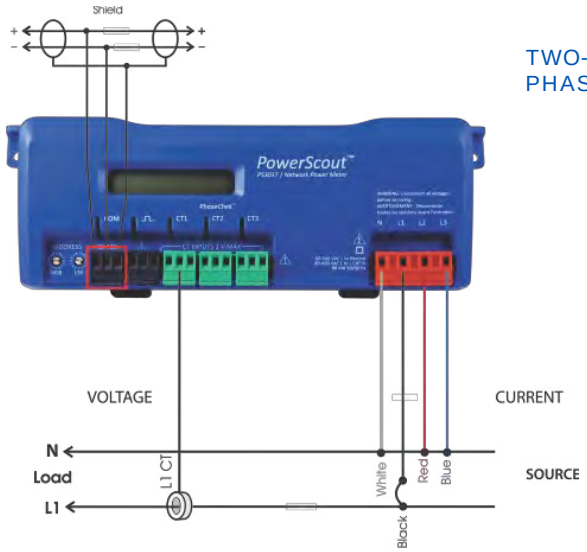
1.2.4 System Values

System values are the sum of L1 + L2 + L3 measurements. System values may not be meaningful since two different devices or loads can be monitored by a single MCS-POWERMETER element.

When paired with the right voltage phase, each CT provides individual kW/kWh readings for that CT channel.



FOUR-WIRE WYE



TWO-WIRE SINGLE PHASE

Additional information can be found in our manual located on our website.

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