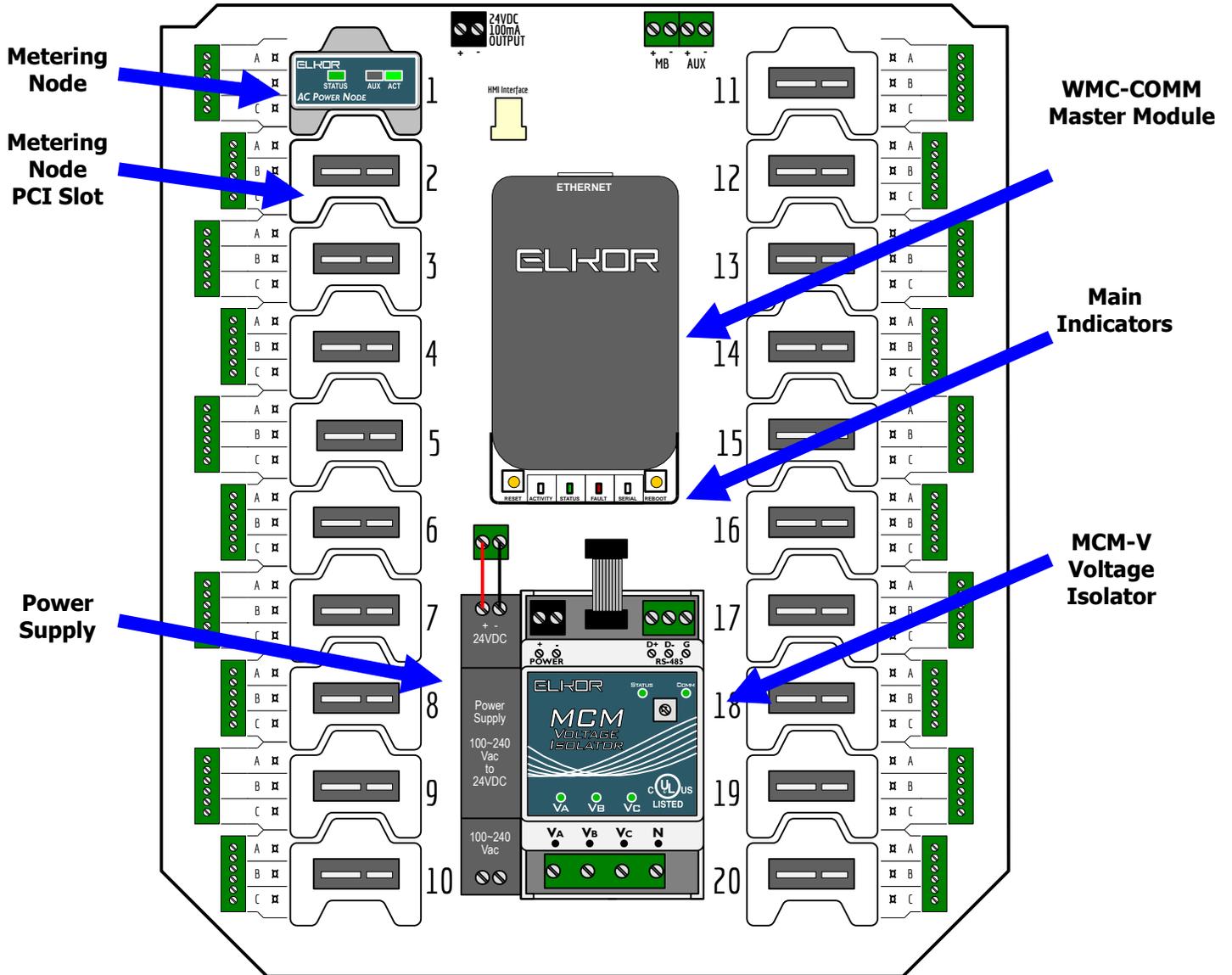




WattsOn-MCM Installation Brief

1.1. Visual Guide

The following image illustrates the different components and ports of the WattsOn-MCM, which are referred to in this section and throughout the document.



INSTALLATION SUMMARY

1.2. Overall Procedure

When working with the WattsOn-MCM device for the first time, especially if Wi-Fi is required, it is recommended to initially setup and verify communication between the WattsOn-MCM and a PC or mobile device at a convenient location, before live voltages and current transformers are connected in their intended, final location.

See the Visual Guide [section **1.1**] to locate and identify ports and components. The following steps outline the overall installation procedure. A section number following each step indicates where details can be found for each step.

1. Setup and test communication port(s) [see **1.3-1.4**]
 - Three options exist: Ethernet, Wi-Fi, or RS-485 serial.
 - Ethernet connections are simplest. Connect the WattsOn-MCM either to a LAN (switch/hub), or directly to a Windows PC. [see **1.3.2**]
 - Use Modbus Commander to find the IP address
2. Mount the enclosure in the intended location [see **1.5**]
3. Install metering nodes into PCI slots (if they were shipped or ordered separately) [see **1.6**]
 - Nodes can also be added later, even while the device is powered on.
4. Connect current transformers (CTs) to the terminal blocks corresponding to the installed nodes. [see **1.7**]
 - CT polarity is important for some node types.
 - The phase onto which the CT is installed should be noted (ideally labeled on the CT). This will be important when configuring the voltage-to-current mapping in the setup step.
5. Connect voltage inputs to the terminal blocks on the MCM-V module, observing relevant safety practices. [see **1.8**].
 - Voltage input wiring should be protected by an appropriately voltage rated fuse or breaker. The voltage inputs use very little current, so the SMALLEST practical fuse/breaker amperage may be used.
 - The fuse/breaker should also act as a disconnect means when service to the unit is required.
 - Voltage wiring depends on the number of phases to be measured.
 - i. Single phase [see **1.10**]
 - ii. Two / Split Phase [see **1.11**]
 - iii. Three Phase [see **1.12**]
6. Connect power to the power supply L & N terminals to a 100 to 240Vac circuit, observing relevant safety procedures. [see **1.9**]
 - The power supply is rated at 10W, therefore the smallest practical fuse/breaker should be used. The power supply input may be shared with the voltage inputs to the MCM-V module, provided that the line voltage does not exceed 240Vac.

For split and three-phase systems, it is recommended to connect the power supply to the hot and neutral (120Vac) connection points (as opposed to 208Vac or 240Vac connection between phases). In multi-phase systems, it is not critical which phase is used to power the device (ie: A, B or C).

If voltages below 240Vac are not available, contact Elkor for installation options.

7. Setup Nodes using the Web Interface
 - Use the Web Interface by navigating to the IP address of the WattsOn-MCM
 - [see **Installation & User Guide, p. 15**]
8. Change the default username / password (**admin / admin**) to prevent unauthorized access:
 - "System" Menu on the web user interface.
 - [see Installation & User Guide, p. 19]

1.3. Communication Setup

There are three options for communicating with the WattsOn-MCM: using the RS-485 serial port (with the Modbus RTU protocol), using the Ethernet port (with either the web interface, or the Modbus/TCP protocol), or using Wi-Fi (with the same options as with the Ethernet port). If desired, the RS-485 serial port can be used simultaneously with either Ethernet or Wi-Fi; however, Ethernet and Wi-Fi cannot be used at the same time.

Note that Wi-Fi mode will not activate if an Ethernet cable is connected to the device.

1.3.1. RS-485 Port

Connect RS-485 wires to the D+ / D- terminal on the top-right RS-485 port, labelled "MB", of the WattsOn-MCM. Connect the other end to a Modbus master device (with D+ to D+, D- to D-), or to a PC via a USB-to-RS485 converter cable.

The RS-485 port comes factory-programmed with the indicated settings below. The baud rate, parity, and stop bit settings can be changed via the Web Interface.

Parameter	Default Value
Device Address	Modbus Address 1
Baud rate	115200 bps
Parity	None
Data bits	8
Stop bits	1

1.3.2. Ethernet Port

Connect an Ethernet cable to the top RJ-45 (8P8C) jack. Connect the other end to your router, switch, hub, or directly to a PC.

If connected directly, the PC and the WattsOn-MCM should both generate their own unique IP addresses using AutoIP. The PC and WattsOn-MCM will both have addresses in the 169.254.xxx.xxx range.

See section "Network Discovery" [1.4], for details on finding the device IP address and viewing the Web Interface.

1.3.3. Wi-Fi

Note that Wi-Fi is **only available when the Ethernet port is disconnected**. To program the device with the settings for your wireless network, there are two options:

- (a) connecting to the WattsOn-MCM with an Ethernet port first, or
- (b) connecting to the WattsOn-MCM over Wi-Fi via a mobile phone or PC with Wi-Fi support.

The first method is considerably simpler, and the recommended configuration method, if possible at your location.

For method (a), connect an Ethernet cable [as per **1.3.2**], and follow the directions to discover the device. WiFi network and credentials may be configured using the Network Discovery tool within the free Modbus Commander software, or via the Network page

For method (b), perform the following steps.

1. Connect a Wi-Fi enabled device, such as a mobile phone or a PC, to the wireless network created by the WattsOn-MCM. This network will have a name, or SSID, beginning with "MCM-" followed by the final four characters in its MAC address.
 - The mobile device or PC may issue a warning that the internet is not available on this network; this is normal.
2. Once connected, open a browser and direct it to the address <http://192.168.1.1>, which will load the device's Web Interface.
 - If you have already installed one or more metering new nodes, it may prompt you to configure the cards, which can safely be skipped temporarily by clicking "Finish Later."
 - For details about the device's Web Interface, see section 3 in the Installation and User Guide.
3. Click on the "Network" menu item under the Gateway heading to open up the network settings.
 - On a small screen device, you may need to open the menu by first clicking on the menu button, , in the top right.
4. Fill in the boxes labelled "Wifi SSID" and "Wifi Password" with the settings for your wireless network, and click "Submit". The device will reboot, and will attempt to connect with the given settings.
5. If the settings are incorrect, or the procedure cannot be performed with the available devices, try method (a), or clear the above settings and try again with this method by performing a Factory Reset (see **Installation & User Guide, p. 30**).

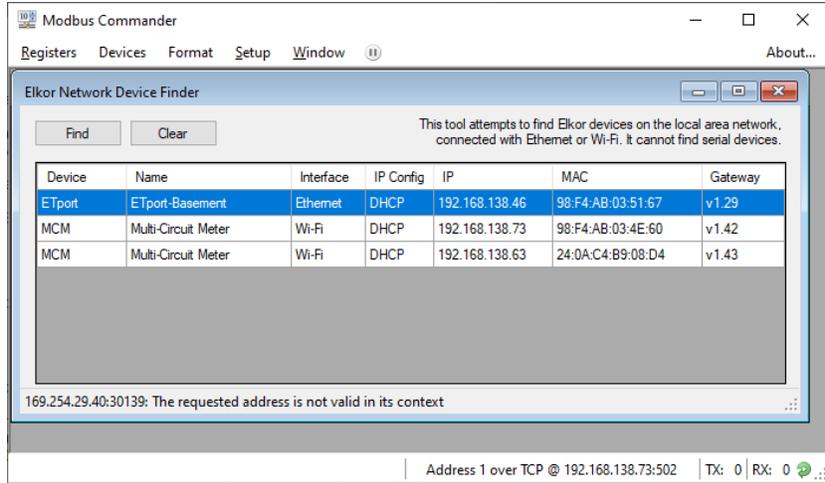
1.4. Network Discovery and Network Settings

By default, the WattsOn-MCM is configured to automatically obtain its IP address via DHCP if available, and with AutoIP otherwise. If you are the network administrator, you may be able to determine the device's IP address by consulting your router's user interface. Alternatively, see **1.4.1** to find the WattsOn-MCM on the network using Modbus Commander.

1.4.1. Network Discovery with Modbus Commander

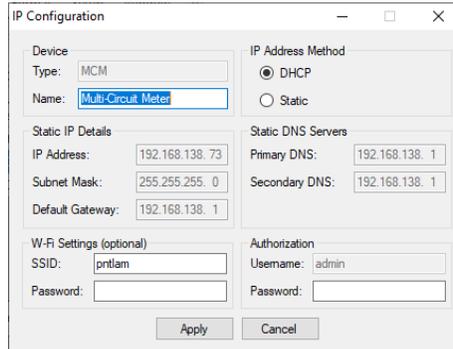
Modbus Commander (http://www.elkor.net/bin/mbcmdr_lite.zip) is a free PC / Windows application which may be used to communicate with various Elkor devices using either serial (RS-485) or network (Ethernet/WiFi) connections. The software can also assist in discovering any WattsOn-MCM devices on the local area network when their IP addresses are not known.

After installation, start the software. Navigate to *Devices > Elkor Network Device Finder*



1.4.2. IP Configuration

Once the WattsOn-MCM is found [see 1.4.1], double-clicking on the device brings up a configuration dialog box.



IP address, configuration method and WiFi SSID/credentials may be entered in this dialog. Either static IP (i.e. one that is set manually), or the Dynamic Host Configuration Protocol (DHCP, a router or other device on the network automatically assigns the device an IP configuration) may be selected. By default, the WattsOn-MCM uses DHCP.

To enter a static IP configuration, click the **Static** radio button, to enable the other fields. IP address, subnet mask, default gateway, primary and secondary DNS servers may be entered. If a static IP address is chosen, the network administrator must ensure that no other devices on the network are using this IP address, and that the router or DHCP server does not include this IP address in its DHCP address pool. The secondary DNS server is optional, and may be left blank.

To configure Wi-Fi mode, enter an SSID and Password in the WiFi Settings (optional) area.

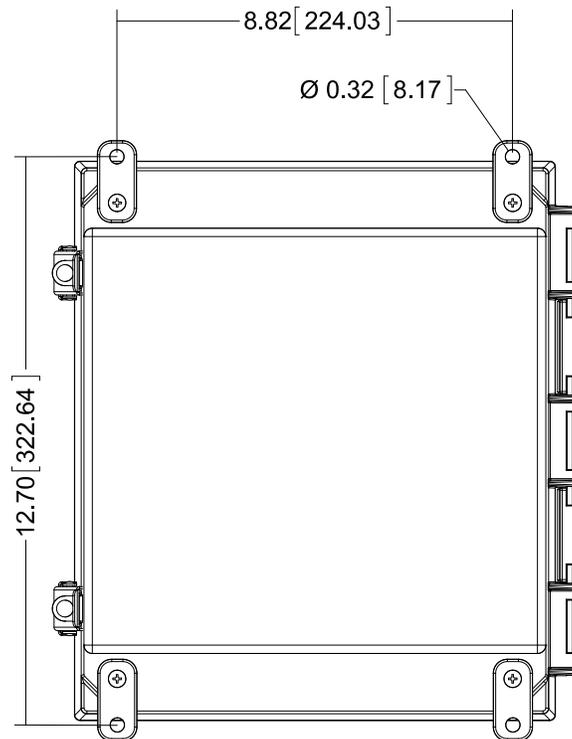
Note that Wi-Fi mode will not activate if an Ethernet cable is connected to the device.

A valid username / password (default **admin / admin**) are required to apply the changes.

1.5. Enclosure Mounting

The WattsOn-MCM is intended to be installed indoors. While the enclosure is rated at NEMA4X, if equipped with the front panel HMI display, the enclosure is de-rated to NEMA1. Additionally, the enclosure openings must be properly sealed with rated grommets, glands or covers (not included).

The enclosure is designed for wall mounting using the attached feet. The below diagram shows the dimensions for the panel mounting feet.



1.6. Node Installation

Each node can meter up to three independent circuits, and up to 20 can be installed in a single WattsOn-MCM, giving a total of 60 independent circuits. Each node plugs in to one of the 20 PCI slots on the WattsOn-MCM, numbered 1 through 10 on the left side, and 11 through 20 on the right side. The nodes do not need to be installed in any particular order – any node can be installed into any slot, left or right, according to convenience.

Nodes are "hot-pluggable," meaning that they can be installed or removed even while the device is powered, allowing for metering to continue un-interrupted even when the configuration is changed.

Each node corresponds to three current inputs. Each current input must be paired with a voltage input during setup. Any current channel on any node can be paired with any voltage channel.

1.7. Current Inputs

Standard wiring principles for electricity meters apply to the WattsOn-MCM, as for any other electricity meter. The polarity of interfacing transformers must be observed. The left terminal of each current input connector is always associated with the 'X1' wire of the responding CT. Please refer to Appendix A for details on CT wiring.

All mV and mA CTs must be wired independently to the corresponding current inputs (two wires from each CT without shunts or jumpers). **mA and mV CTs must NOT be grounded, or interconnected with each other (or any other components) in any way.**

A CT shorting mechanism is not required for mV and Elkor mA style CTs, since these are voltage clamped, however appropriate protection (fuse or breaker) for input line voltages is required.

1.8. Voltage Inputs

The four input terminals on the bottom of the WattsOn-MCM-V, on the bottom-right of the WattsOn-MCM, are voltage inputs, with the rightmost terminal being the neutral line. Line-to-line voltages of up to 600V may be present on these lines, so proper electrical safety procedures should be followed during installation and maintenance according to local codes.

Line voltages of up to 600V line-to-line on the WattsOn-MCM-V terminals are isolated from the rest of the WattsOn-MCM's components, and from the output ports.

1.8.1. Fusing of Voltage Sensing Inputs

The input voltage lines should be protected as per electrical code requirements. This is also good practice to facilitate an easy disconnect means for servicing the meter. In some cases, the voltage may be tapped off of existing fuses or breakers. If this is not possible, Elkor recommends a 1A or lower fuse (fast acting) for protection of the installation wiring. The WattsOn-MCM voltage inputs are high impedance ($> 1.5M\Omega$) and draw negligible current (less than 0.3mA max).

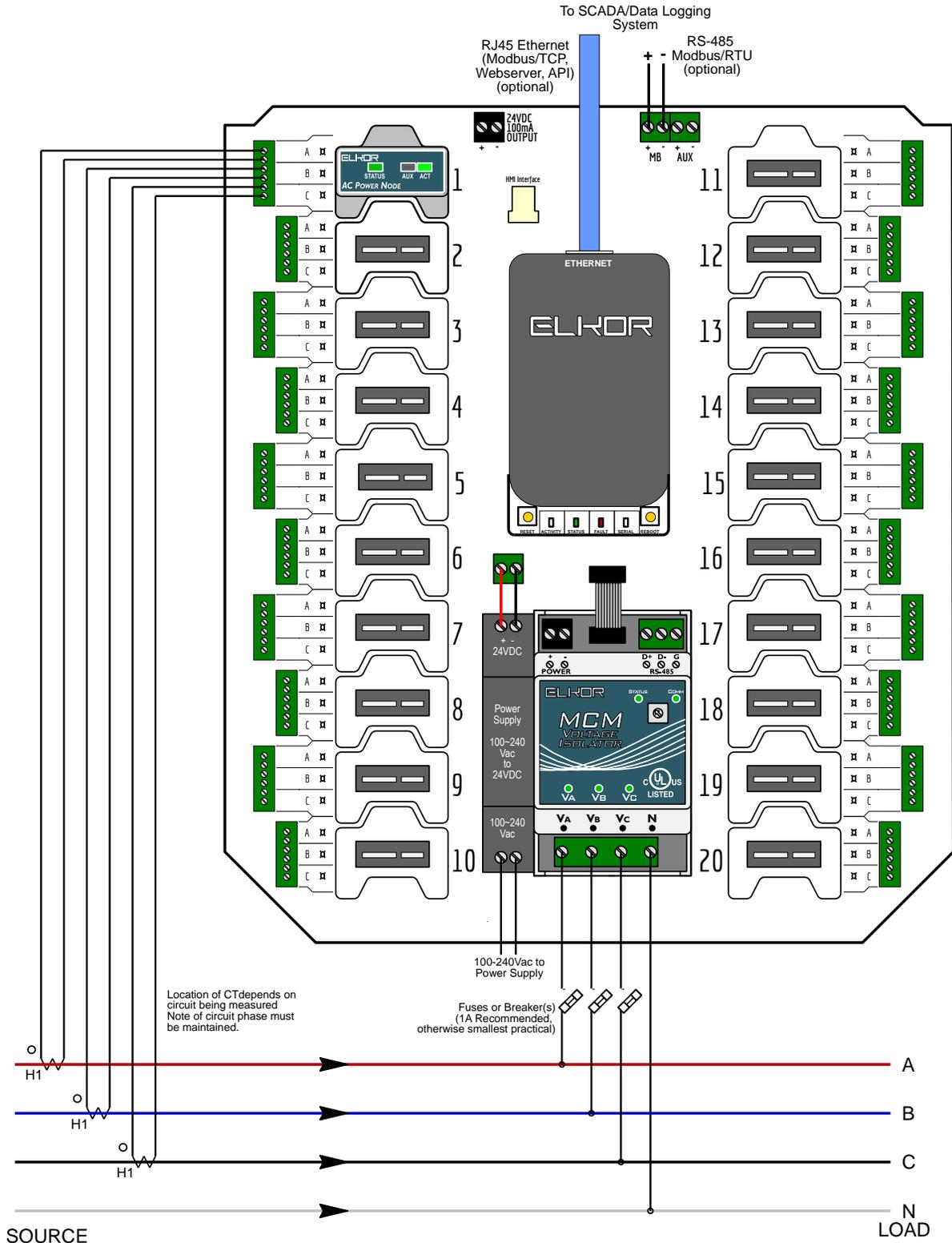
1.9. Power Supply

The WattsOn-MCM is powered by a 10W, 100-240VAC (input) power supply which is DIN rail mounted next to the isolator. This power supply outputs 24VDC to the motherboard, from which each component is powered. The power supply also provides 4kVAC isolation between the input (100-240VAC) and the output (24VDC). While this DIN rail power supply may be replaced with an external 24VDC source, considerations for grounding and power requirements should be observed.

The power supply inputs may be shared with the metering lines provided that the measurement voltage is within the 100-240VAC specification. If there is no voltage within the 100-240VAC range available at the installation location, contact Elkor Technologies Inc. for options.

1.12. Three Phase Installation

1.13.



1.14.

1.16. Circuit Map

CH		Description	Volt Phase	CT Model	CH		Description	Volt Phase	CT Model
1	A				11	A			
	B					B			
	C					C			
2	A				12	A			
	B					B			
	C					C			
3	A				13	A			
	B					B			
	C					C			
4	A				14	A			
	B					B			
	C					C			
5	A				15	A			
	B					B			
	C					C			
6	A				16	A			
	B					B			
	C					C			
7	A				17	A			
	B					B			
	C					C			
8	A				18	A			
	B					B			
	C					C			
9	A				19	A			
	B					B			
	C					C			
10	A				20	A			
	B					B			
	C					C			