

## Cyberhawk-200M Installation Bulletin

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### Safety Notice

A potential **Shock and Injury Hazard** exists when working on electrical systems which could lead to serious injury or even death if safety precautions are not observed. Only qualified competent personnel who have been trained in and are familiar with the **Risk of Electric Shock** and burns from **Plasma Arcs** should perform installation and maintenance on electrical systems. It is the sole **responsibility of the personnel** doing the work to be fully cognizant of all necessary safety regulations and procedures and **be familiar with the installation instructions detailed in this manual**.

**FOR YOUR SAFETY, IT IS IMPERATIVE THAT THE POWER BE PROVEN DISCONNECTED BEFORE ANY WORK ON OR PHYSICAL CONTACT TO ELECTRICAL CIRCUITS IS ATTEMPTED: DO NOT ASSUME BUT CHECK ACROSS THE LINES AND TO GROUND WITH AN APPROVED VOLTAGE INDICATING DEVICE AND ENSURE THAT THE POWER SOURCE(S) DISCONNECTION DEVICES ARE LOCKED OUT.**

**WHEN WORKING IN CLOSE PROXIMITY TO LIVE INSTALLATIONS FOLLOW ALL SAFETY REQUIREMENTS DEFINED IN NFPA 70E OR CSA Z462 WHICH WILL INCLUDE, BUT NOT LIMITED TO, THE USE OF PROTECTIVE EQUIPMENT (PPE) (CLOTHING, INSULATED GLOVES, SAFETY GOGGLES, ETC.). IT FURTHER RECOMMENDED THAT ALL METALLIC OBJECTS (SUCH AS JEWELRY, WATCHES, CHAINS ETC.) BE REMOVED FROM THEIR PERSON.**

### Symbols Used in this Manual



Risk of Electric Shock and/or ARC Flash Hazard: Life threatening voltages may be present with the risk of ARC Flash in the event of an inadvertent short circuit.



Cautionary Safety Alert: Draws attention to particular cautionary notes which, though not life threatening, could result in injury or equipment damage if attention is not paid to the described precaution.

### Limits to use of this equipment



This equipment is designed for permanent installation to monitor electrical circuits to 250VAC or 600VAC, model specific. Refer to the specific model as defined in the specifications for the model specific voltage limits and for the installation and environmental category.



The devices defined herein are intended to be used with defined current sensors; refer to the specific sections of the manual for the approved accessories. Use of other unapproved current sensors may compromise the safe operation of this instrument.



Devices and connections to the ancillary inputs and outputs (other than to external power) are required to be insulated and isolated from mains voltages and must not exceed 32VAC (60VDC); refer to relevant sections of this manual for additional notes and limits.



Protection is effected by double/reinforced insulation between the power and control/user circuits to 600V CATIII (UL61010-1) and by integral fusing for internal faults. Application of this equipment in a manner not specified in this manual may compromise its inherent protection.



The equipment is insulated by double/reinforced insulation up to 600VAC CAT III (UL61010-1) between the power inputs (L1, L2, L3, N) and the control and user circuits. The power input circuits may be field 'High Potential' tested up to 2.5kVAC without damage.

## RECEIVING

The **Cyberhawk-200M-xP** Multi Power Meter is packaged for shipping in a reinforced cardboard box together with mounting hardware and manuals. CTs and Interface terminals may also be included in the shipment packaged in separate boxes. Unpack and inspect equipment for damage that might have occurred during shipment. Also check the packing list to ensure all the equipment is accounted for (note accessories may be shipped in separate packages).

Claims for damages should be made to the carrier immediately and also notify Powersmiths International of the details. Claims for shortages should be made to Powersmiths International at the earliest opportunity.

## HANDLING

The units may weigh up to 50 lbs (~ 22kg) which may require two persons to handle it comfortably. Handle the unit in such a way to protect the Displays and avoid rough surfaces that may mar or scratch the surface of the case.

## STORAGE

No special precautions need be taken in storing this device other that it should be protected from moisture or excessive humidity. Storage temperatures should not exceed the limits of  $-25\text{ }^{\circ}\text{C}$  to  $+60\text{ }^{\circ}\text{C}$

## INSTALLATION GUIDELINES

***This equipment is to be installed in accordance with the prevailing local and National Electric Codes such as National Electric Code (NEC) in the USA or Canadian Electric Code in Canada, which governs the requirements for electrical wiring and protection. These requirements will include, but not limited to:***

*Note: This device is not intended as a utility meter or for use ahead of branch-circuit protection*

- Branch circuit protection devices for connection to the voltage bus(es) (not supplied)
- Use of an appropriate and approved Current Transformers (CTs) for installation on the current carrying buses (available from Powersmiths on separate order only)
- Separation of Primary (Voltage Input) and Secondary wiring (CT and Digital Inputs, Communication)

The following points should be considered in choosing a location:

- Environmental rating (Type 1 is for dry protected environments)
- Accessibility including clearance for the door swing
- Location relative to associated Disconnects and CTs
- Viewing height for displays

## NOTICE



## SAFETY INSTRUCTIONS

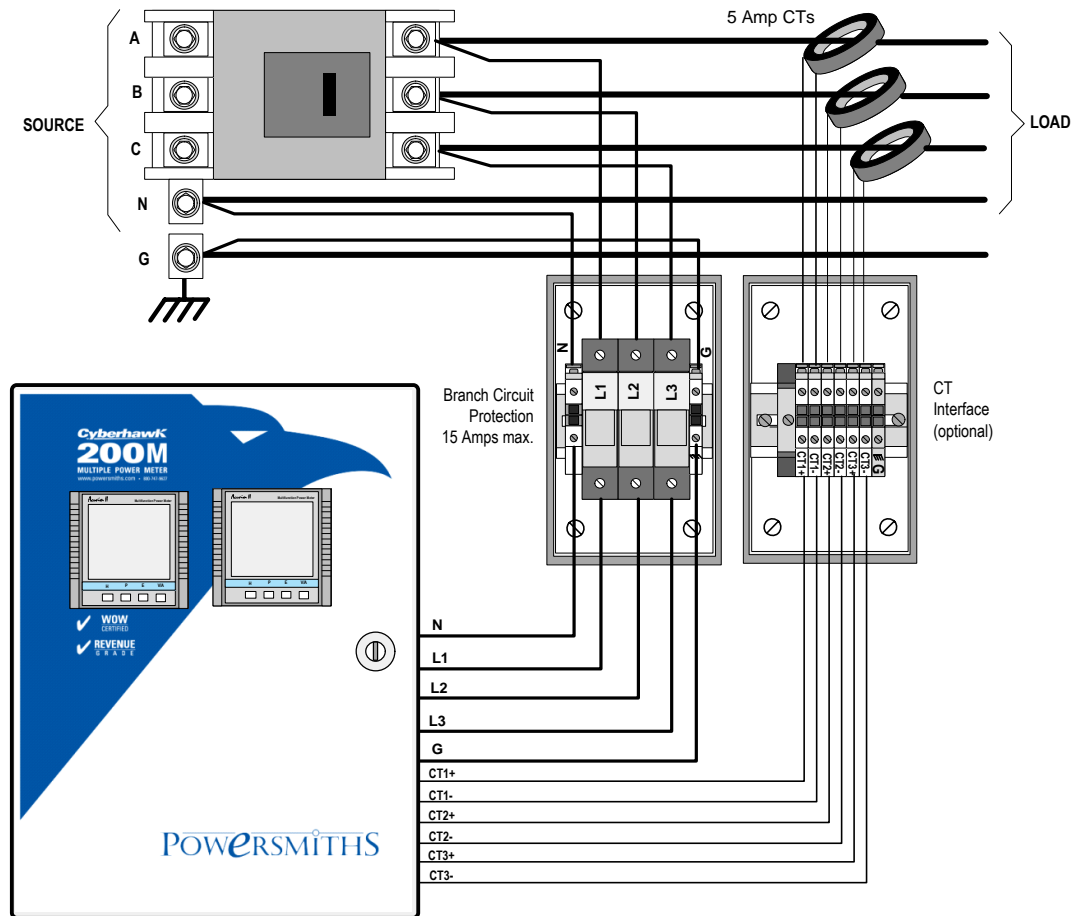
- Read and follow these instructions
- Use appropriate personal protective equipment and follow safe electrical work practices (eg. NPA 70E)
- This equipment to be installed and serviced only by qualified competent electrical personnel that have appropriate training on Electrical Systems
- This device is to be installed in accordance with the prevailing local and National Electric Codes

**Failure to observe and follow these installation instructions and procedures could result in serious injury or even death**

## OVERVIEW

The **Cyberhawk-200M-xP** is available with 1 to 6 meter ports ('x' in XP representing the number of ports) in two physical sizes. It measures independently per meter port Voltages, Currents, Powers, Energies and Distortions on electrical networks and logs user selected parameters. The unit is supplied in two voltage ranges and with independent user configurable 3-phase measurement Ports for single or three phase applications. It also includes six (6) (1P model) or 12 Digital Inputs (2P models and higher) for remote contact status, demand synchronization or measurement of pulses from typically Gas, Water or Utility meters.

A line diagram illustrating a basic system hookup per meter port is illustrated below.



It is user programmed for operational characteristics such as Bus Configuration and Voltages, Interfaces (PTs and CTs) and Data Logging described in the operational manual.

A standard RS485 connection is provided to support remote communication or it may also incorporate a Powersmiths COMSERVER (optional Ethernet Port with a built in WEB server) that provides for remote user access to all system data and data logs using only a Java enabled Browser. Setup can also be facilitated using one of Powersmiths' propriety setup software tools available from [www.powersmiths.com](http://www.powersmiths.com) under the Cyberhawk-200M selection.

*Note: The installation manual is necessarily short and intended to specifically address primarily the installation of the unit; please refer to the Cyberhawk-200M User's Manual for full details.*

## USER SUPPLIED HARDWARE

In addition to the **Cyberhawk-200M-xP**, the following user supplied hardware will be required to complete installation:

- Branch circuit protection must be provided for buses (voltage feed) connections, either Fused Disconnects or Breakers, rated 15 Amps or less with an interrupt capacity rating to match bus short circuit rating. Breaker or fuse disconnect must be 3-pole handle tied for 3-phase, 2-pole handle tied for split-phase or 1-pole for single-phase applications.
- Primary Circuit Wires - UL Listed 600V min. with 75°C minimum temperature Copper conductors 14 – 10 gauge
- CT Secondary Circuit or Secondary Circuit - UL Listed 600V min. with 75°C minimum temperature Copper conductors 16 – 10 gauge.
- Ethernet cabling must meet the following requirements: 150 Volts minimum, 75°C minimum temperature rating, Cat 3 minimum, RJ45 Plug
- CTs for sensing bus currents that have been evaluated for use with this instrument:
  - INSTRUMENT TRANSFORMERS INC, DIV OF GE MULTILIN. Models 2DARL Series, 5DARL Series, 6ARL Series, 7ARL Series, 8RL Series, 19RL Series, 550L Series, 500L Series, 600L Series, 601L Series, rated min. 600 V. Provided with min. 24 in. leads with min. 1/32 in. insulation, rated minimum 600V, and minimum of 105°C.

*Note: CT sizing is based on Bus current and the physical dimensions of the bus; refer to table following:*

- CT Interface Terminal Blocks (Optional)

*Note: Not required but facilitates CT termination and service. It consists of a set of terminals mounted in an electrical box that provides a convenient termination point for the CT secondary leads close to the CT location and also a means of conveniently shunting (shorting) the CT outputs to facilitate equipment service.*

**CT Selection Table**

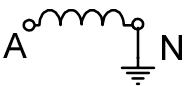
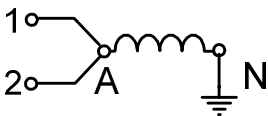
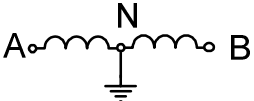
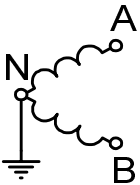
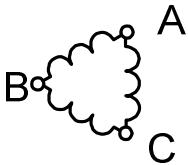
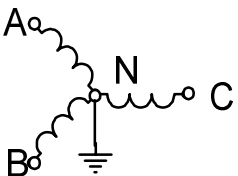
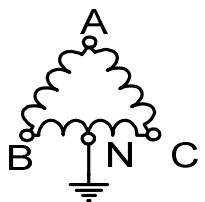
Parameter	Requirement
<b>Primary CT Rating (current)</b>	Equal to current rating of bus or Bus Power Protection Device
<b>Primary Voltage Rating</b>	600V min.
<b>Secondary Current</b>	5 Amps at nominal current rating
<b>Burden</b>	3 VA minimum
<b>Ratio</b>	Nominal Primary Current: 5 (eg: 1000:5)
<b>Window</b>	Sized for Bus dimensions
<b>UL Listed</b>	ANSI/IEEE C57.13
<b>UL746 Compliance</b>	UL746C: Standard for Polymeric Materials
<b>Secondary Terminations</b>	Wire Leads with minimum specifications as follows: Voltage: 600V minimum Temperature: 105 °C Insulation: 1/32 inch Wire Lead Length: 24" minimum
<b>CTs* investigated for direct use in an electrical system</b>	Manufacturer: (GE) Instrument Transformers Donut Models: 2DARL-xxx; 5DARL-xxx; 6ARL-xxx; 7ARL-xxx; 8RL-xxx; 19RL-xxx; Rectangular Models: 550-L-yyy x zzz-xxx Split-core Models: 500-L-xxx; 600-L-xxx; 601-L-xxx Note: xxx denotes ratio (e.g. - 501 is 500:5) yyy and zzz denotes window dimensions

\*Note: These CTs are listed to UL ANSI/IEEE C57.13 and additionally comply with the requirements of UL916 with regard UL746 for polymeric material requirements and secondary lead termination as specified above.

## SYSTEM INSTALLATION CONFIGURATIONS

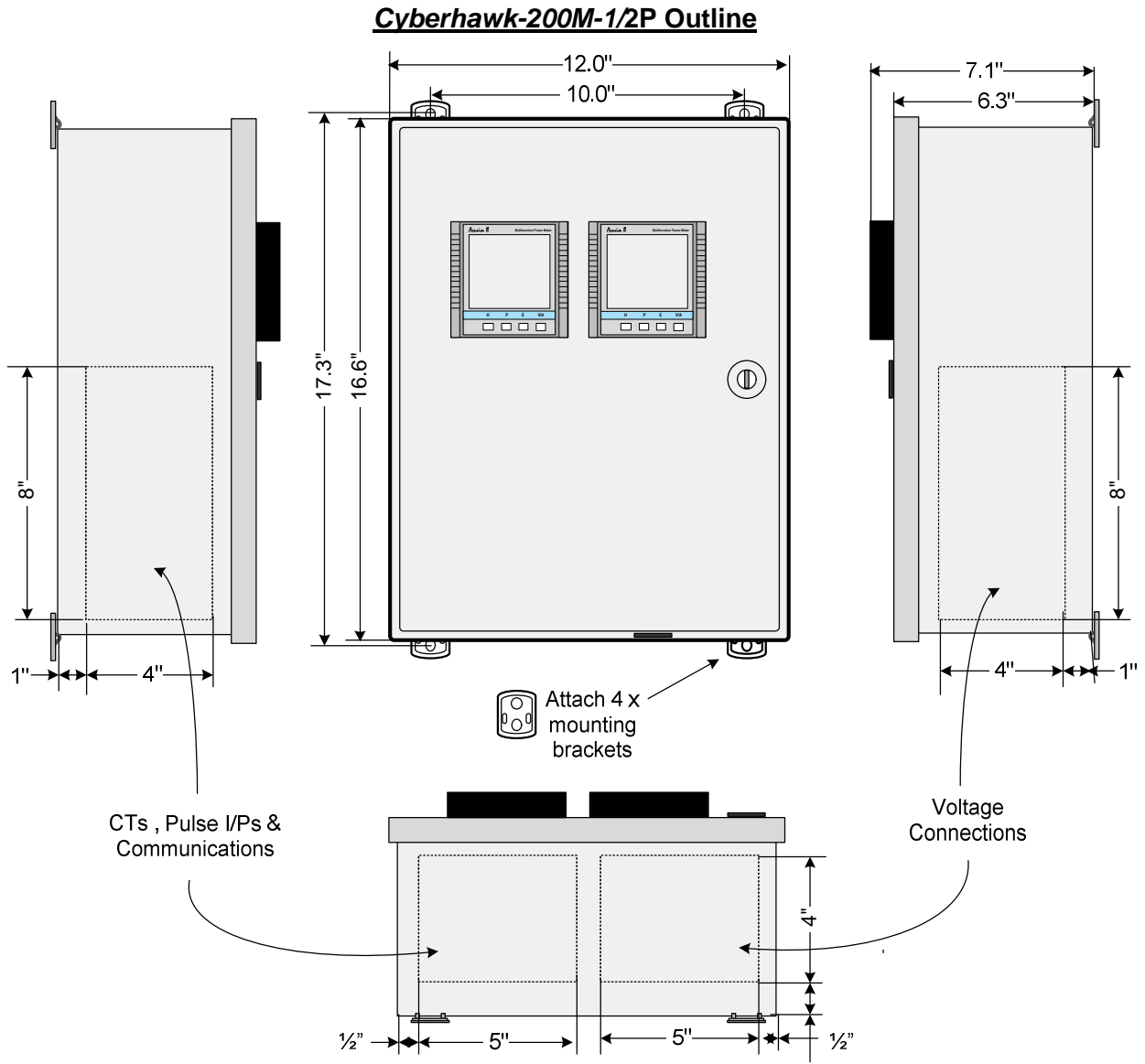
Prior to installation make a wiring diagram of the desired connections with reference to the appropriate system configuration to be connected for each meter port. Note that wiring for the different system configurations are illustrated in this bulletin. This will define the system voltage connections and the number of CTs required.

The following system configurations are supported:

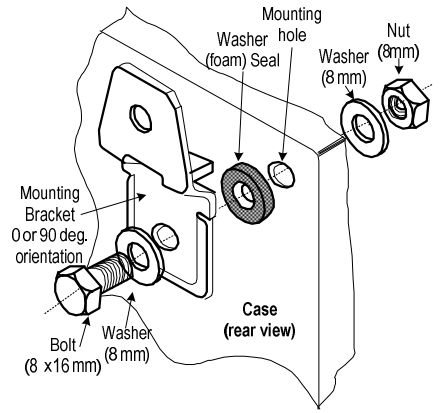
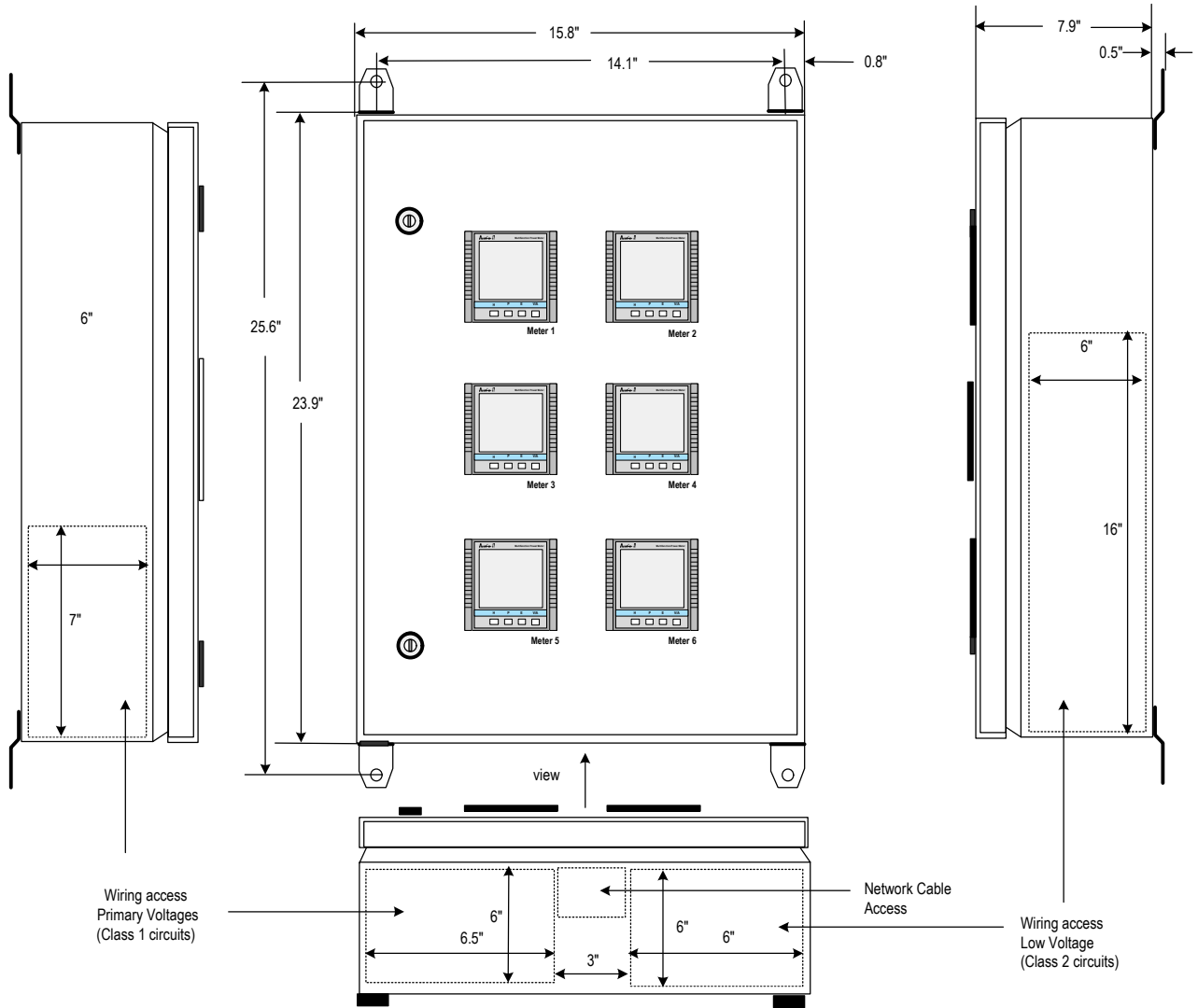
Table of System Configurations		
System Type	Diagram	Reference Diagrams
Single Phase (2-wire + GND)		Single Phase 2-Wire; 1-CT
2 x Single Phase from single source (2 x 2-wire + GND)		Split Phase 3-Wire; 2-CT
Split Phase (3-Wire + GND)		
Three Phase Open-Delta (3-wire + GND)		Three Phase 3-Wire; 2-CT  Three Phase 3-Wire; 3-CT
Three Phase Delta (3-wire + GND)		
Three Phase Wye (4-wire + GND)		Three Phase 4-Wire; 3-CT
Three Phase High Leg Delta (4-wire + GND)		

**UNIT DIMENSIONS**


Unit dimensions and mounting details are illustrated following outline diagram.



**Cyberhawk-200M-3/6P Outline**



## INSTALLATION

WARNING	HAZARD OF ELECTRIC SHOCK OR ARC FLASH
 <p><b>Risk of Electric Shock</b></p>	<ul style="list-style-type: none"> <li>▪ Open or disconnect all power sources and “Lock out” prior to any work being done on the electrical system</li> <li>▪ More than one disconnect may be required to de-energize the equipment before servicing</li> <li>▪ Open or disconnect circuit from power-distribution system (or service) of building before installing or servicing current-sensing transformers (CTs)</li> <li>▪ Never leave CTs in powered circuit open circuited</li> </ul>



**Caution:** *Do not assume but check that all power sources at the system connection points are off using a properly rated voltage indicating device (Multi-meter, etc) and “Locked out”*

## MOUNTING

### Prior to Installation:

Prior to installation check the internal condition of the equipment as follows:

- Equipment Voltage rating for the application (e.g. 600/480V, 208/120V)
- Damaged or dislodged or loose components
- Loose connectors or connections
- Broken wires

### Mounting the *Cyberhawk-200M-xP*

- Attach the mounting brackets to the *Cyberhawk-200M-xP* with supplied mounting bracket hardware. One of two types may be supplied as illustrated.
- Mount the unit to the wall in the required location with ¼” hardware appropriate for the mounting surface material (Note: mounting hole is 5/16”).

### Mounting the CT Interface Box (if supplied)

- Attach the wall mounting brackets to the *CT Interface Box* with supplied mounting bracket hardware as illustrated above
- Locate and mount the unit to a wall in the required location with ¼” hardware appropriate for the mounting surface material (Note: mounting hole is 5/16”)

*Note locate the CT Interface Box (if supplied) to allow for direct wire connections (without splices) from the CTs to the terminals in the box.*


### Installation of Branch Circuit Protection Devices

- Install a Branch Circuit Protection Device (Fused Disconnect or Breaker) for each Bus to be monitored following the specific manufacturer’s instruction and in compliance with the relevant local and national electric codes\*.

*\*Reference: NEC 2005 Article 408 Para: 408.52*



**Current Transformers Installation**

<p><b>WARNING</b></p>  <p><b>Risk of Electric Shock</b></p>	<p><b>HAZARD OF ELECTRIC SHOCK OR ARC FLASH</b></p> <p>To reduce risk of electric shock, always open or disconnect circuit from power-distribution system (or service) of building before installing or servicing current-sensing transformers</p>
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**Considerations:**

CTs may be installed in Electrical Enclosures, Switchgear, Switchboards, Panel-boards or in auxiliary gutters on the current carrying bus wires under the following code requirements\*\* and considerations:

- Installation of the CTs within Switchgear, Panel-boards or Gutters shall not reduce the available space to more than 75% of its available volume\*
  - \*See *NEC 2005 Article 312 Para: 312.8 and Article 366*
- CTs and the secondary wires are to be arranged away from live terminals and the CTs secured to the bus wires using a minimum of three cable ties to prevent movement
- CT secondary wires to be secured in their desired position away from the live bus
- CT Secondary wires are to be feed in a dedicated conduit installed for the purpose (not common with live bus voltage wires) to the meter or CT Interface Box (if fitted).

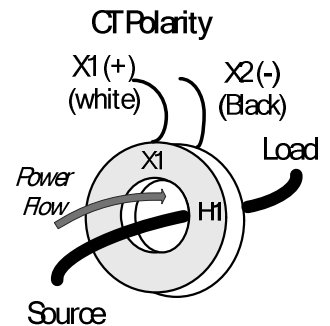
Note: No splices on the CT secondary wires are permitted within the enclosure where installed or in the conduit through which the secondary wires are run. Splices are only permitted as follows:

- Within the CT Interface Box or the *Cyberhawk-300/MPC*
- In a dedicated Auxiliary Gutter or Terminal box

Note: Splices must comply with the requirements of the relevant local and national electric codes See *NEC 2005 Article 110 Para: 110.14 (B)*

**Installation:**

- Install each CT on the required phases of current carrying bus wires with regard to phase and polarity (see diagram opposite)
  - Note that errors in CT phasing may be corrected later by software correction in the meter*
- Secure CT secondary wires in their desired position away from the current carrying bus using cable ties
- Feed the CT Secondary wires through the dedicated conduit installed for the purpose (not common with live bus voltage wires) to the meter or CT Interface Box (if fitted)



*Note: All CTs are internally grounded at CT negative (-) terminals in the meter*

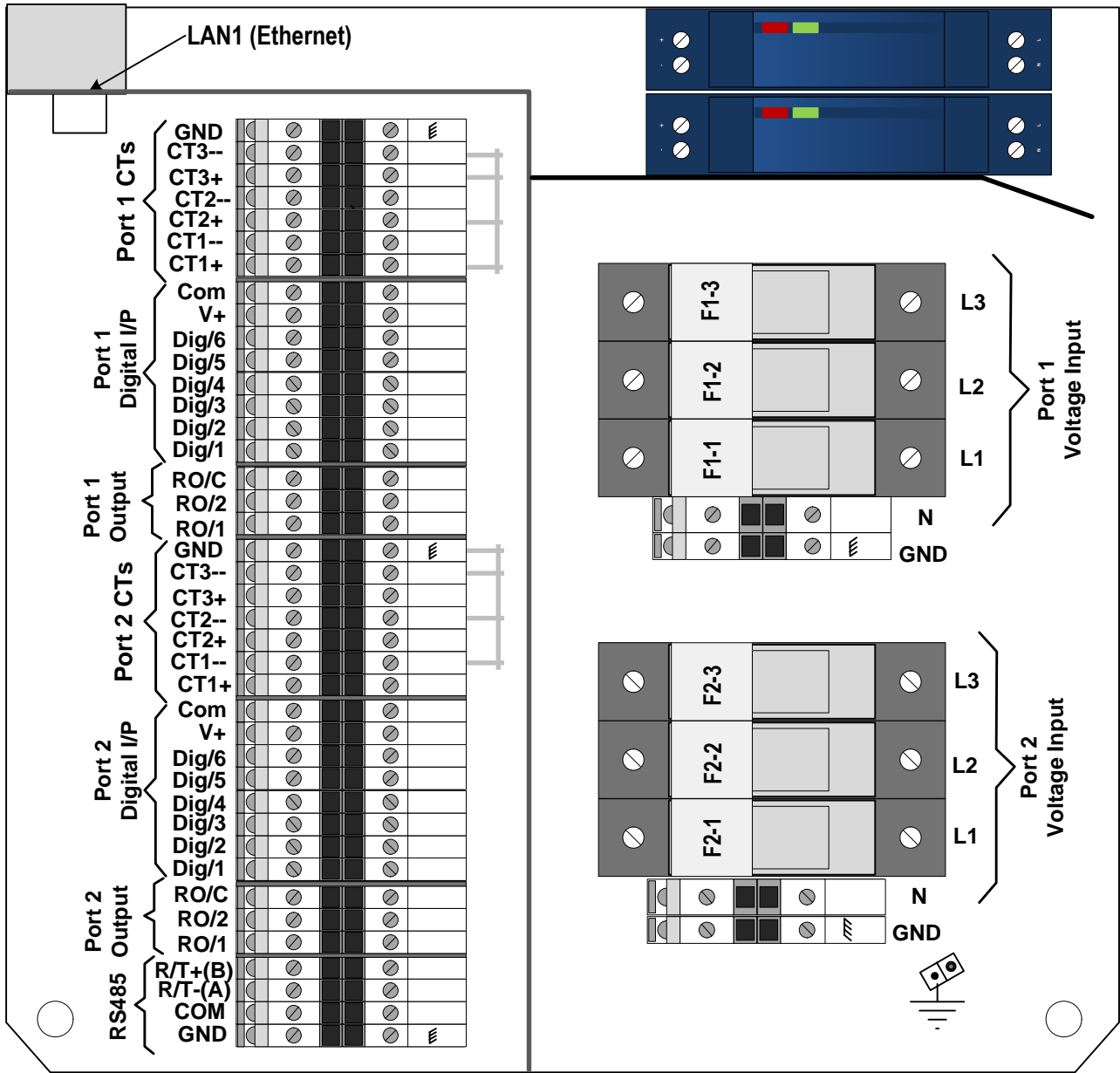
**Cyberhawk-200M-xP Terminal Identification**

The internal terminals are identified below and are segregated into Class 1 and Class 2 partitions as follows:

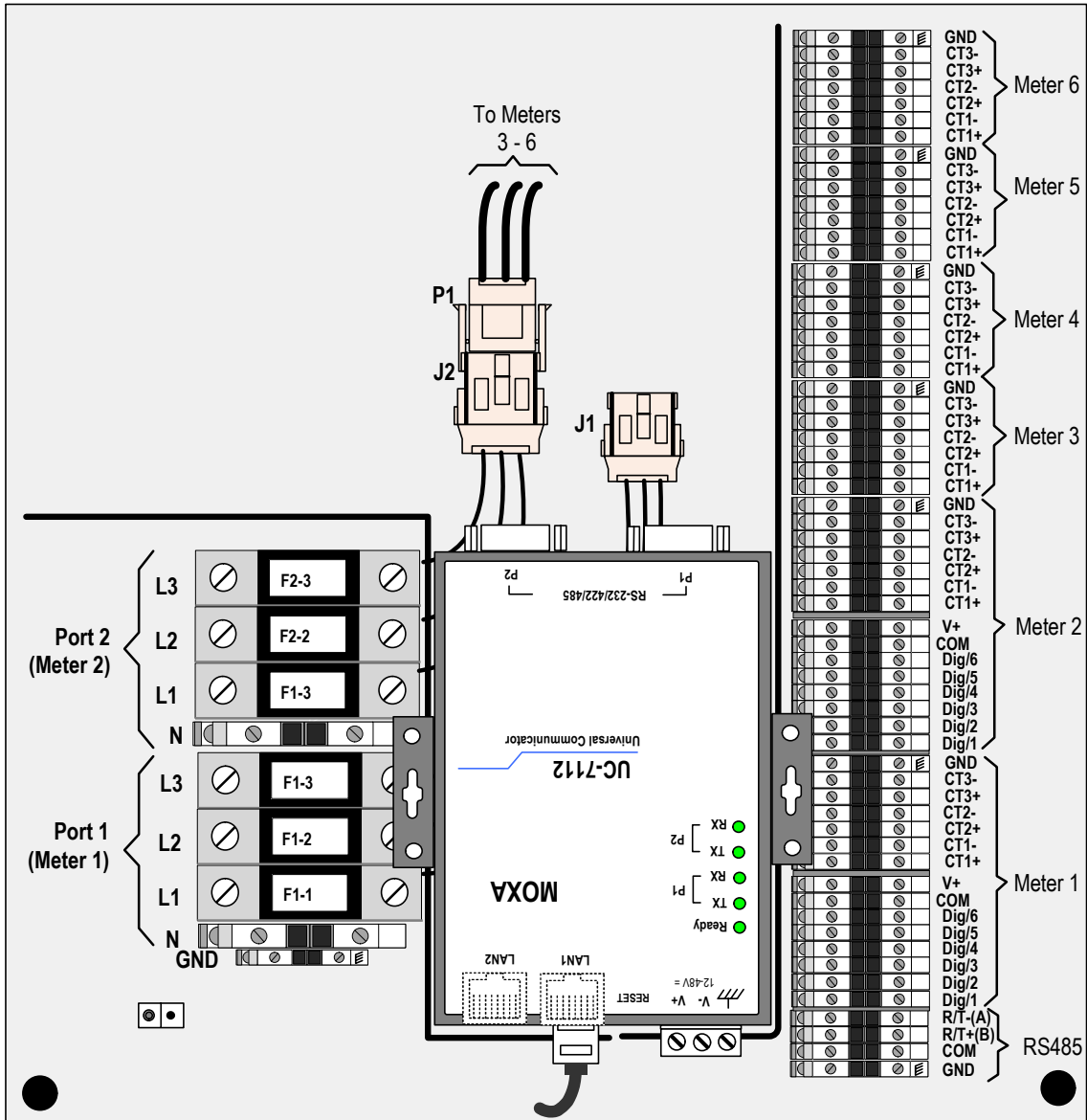
- Class 1 Circuits: Voltage Sensing Inputs
- Class 2 Circuits: Current Transformer Inputs, Digital Inputs (or Outputs if fitted)

*Note that this segregation of wiring must be adhered to during installation*

**1/2P Terminal Identification and Layout**



**3/6P Terminal Identification and Layout**



*Note: CTs are internally grounded at all CT negative (-) terminals*

## SYSTEM WIRING

The **Cyberhawk-200M-xP** is supplied with 4-Wire measurement inputs for each meter port (in one of two voltage ranges; 600/480 or 208/120). Each input may be independently configured and setup to operate on any of the listed configurations. Note that internal operating power is derived from the measurement inputs at Meter Port 1 with provision to changing this to Meter Port 2.

Wire the unit for each meter port per the relevant local and national electric codes\* and the following instructions and with reference to the specific system diagram for the application configuration.

\* See *NEC 2005 Section 200 (Wiring and Protection)*

### Voltage Hookups:

Wire each of the two Meter Port Voltage Inputs through Branch Circuit Protection Devices\* (Breaker or Fused Disconnect) rated 15 Amp or less (2 amp minimum) with an interrupt capacity rating to match the bus short circuit rating. This protection device, Breaker or Fuse disconnect, must be 3-pole handle ties for 3-phase or 1-pole for single phase applications.

\*Reference: *NEC 2005 Article 408 Para: 408.52 and see notes below:*

- *Wires to be copper conductors 14 – 10 gauge rated 600 Volt minimum with 75 °C minimum temperature rating*
- *Unit must have a grounded conductor wired to the ground terminal*
- *Each ungrounded connector must be "fused" including the Neutral if it is not grounded*
- *This wiring must be segregated in the Class 1 wiring compartment separate from the Class 2 circuits*
- *Actual unit load is less than 100mA per phase current*
- *Actual phase rotation is not critical but CTs and the voltage connection must match e.g. CT1 on L1 etc.*

*Note: For measurement of multiple circuits on a common Bus, it is acceptable to wire all the voltage inputs to one disconnect device for voltage sensing to save on installation costs.*

### CT Hookup (Direct):

Wire the CT secondaries for each Meter Port through a dedicated conduit (separate from voltage wires) to the **Cyberhawk-200M-xP** observing polarity and ensuring correlation between Voltage and Current inputs.

*Note: For guidance in wiring CTs some distance from the Meter, please refer to the Powersmiths White paper on the subject.*

### CT Hookup (through optional CT Interface):

Wire the CT secondaries through a dedicated conduit (as previously described) to the CT Interface box and terminate at the appropriate terminal observing polarity:

- *Wire the CT secondaries from the other side of the CT Interface terminals to the Cyberhawk-200M-XP through a dedicated conduit observing polarity*

*Note: Wires to be copper conductors 16 – 10 gauge rated 600 Volt minimum with 75 °C minimum temperature rating*

### Ethernet Cabling:

Cabling to this Port must meet the following requirements:

- *Ethernet Cabling to be rated 150 Volt minimum with 75 °C minimum temperature rating with a RJ45 termination plug*

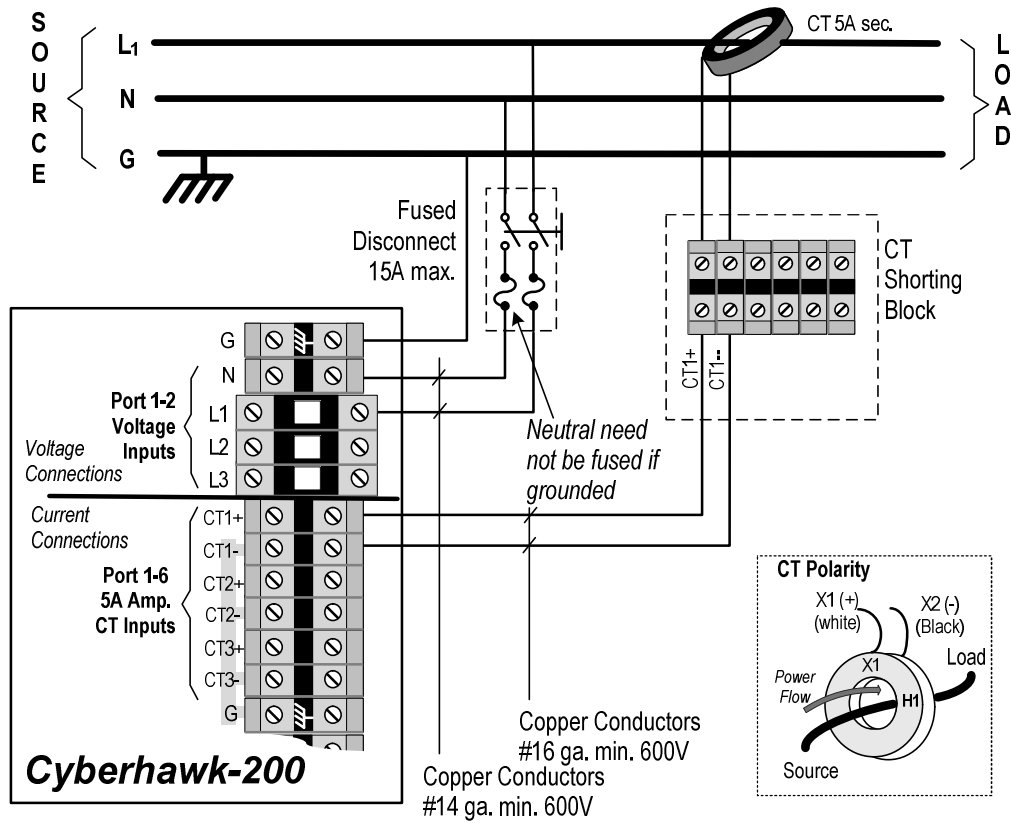
### System Wiring Diagrams:

The following system wiring diagrams detail the wiring for each Port configuration for direct connection to the system. Nominal system voltages referenced to the two models are as follows:

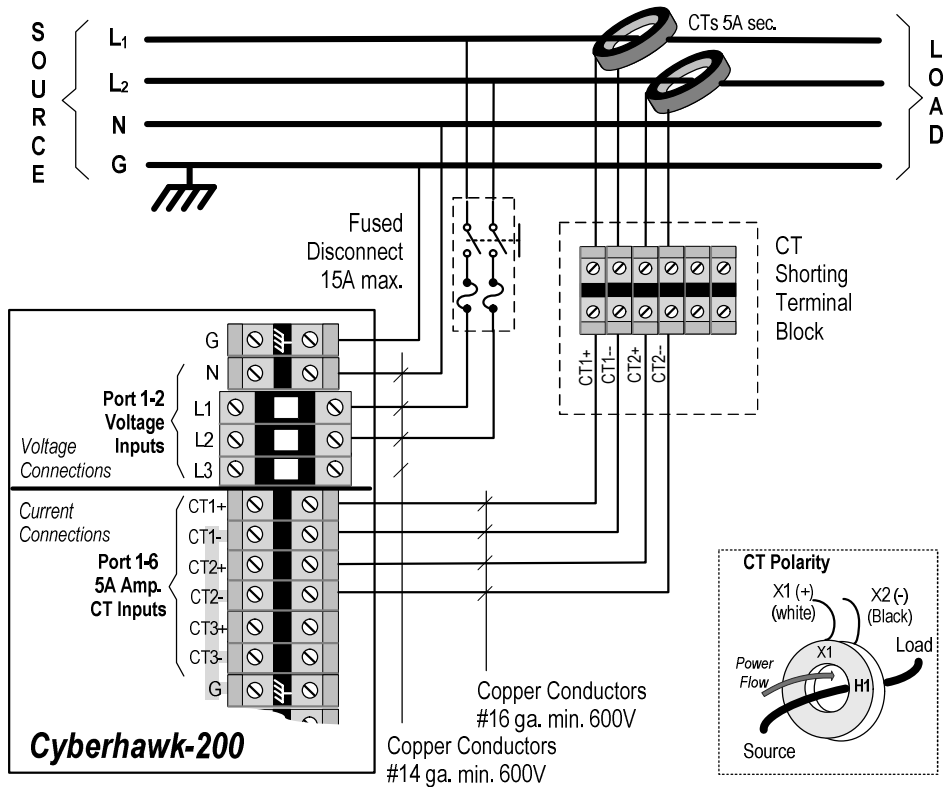
- *Cyberhawk-200M-xP-208/120: 240 Volts Line to Line, single or three phase*
- *Cyberhawk-200M-xP-600/480: 600 Volts Line to Line, single or three phase*

*Note that connection to Electrical Systems with voltages greater that listed will require the use of Potential Transformers (PT) in the voltage connection (L1, L2, L3 and N) and additionally insulated CTs. Refer to the Operating Manual for more details.*

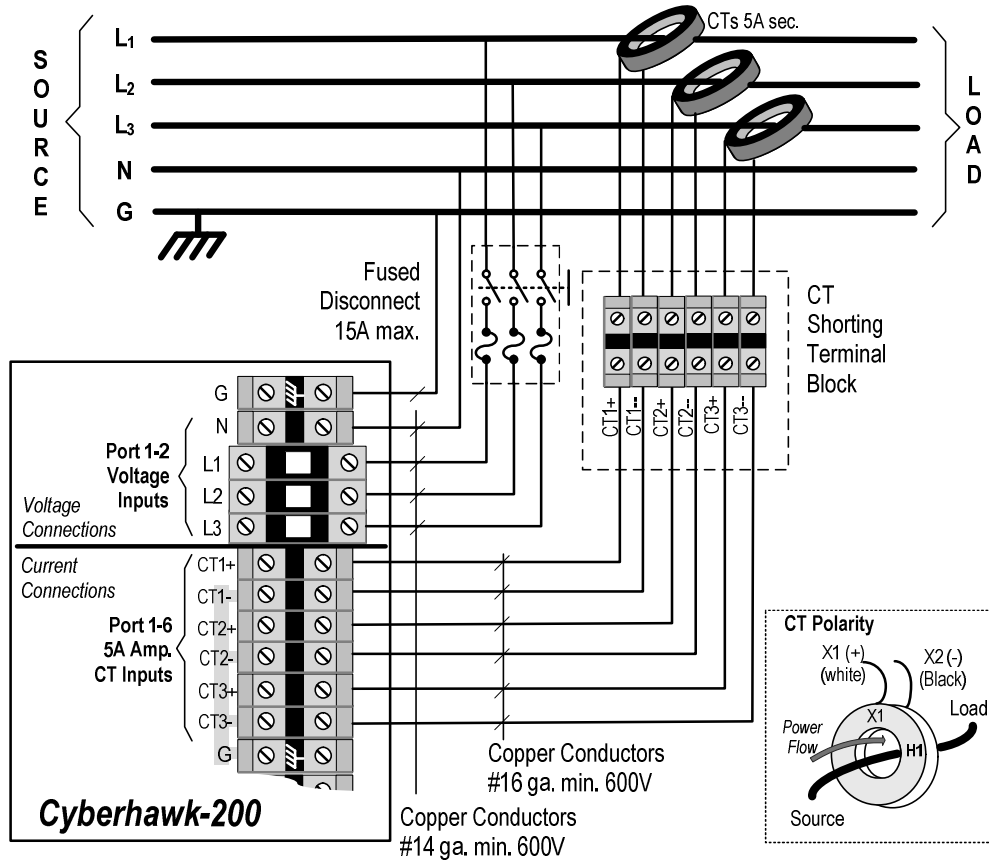
**Wiring Diagram for Single Phase 2-wire systems**



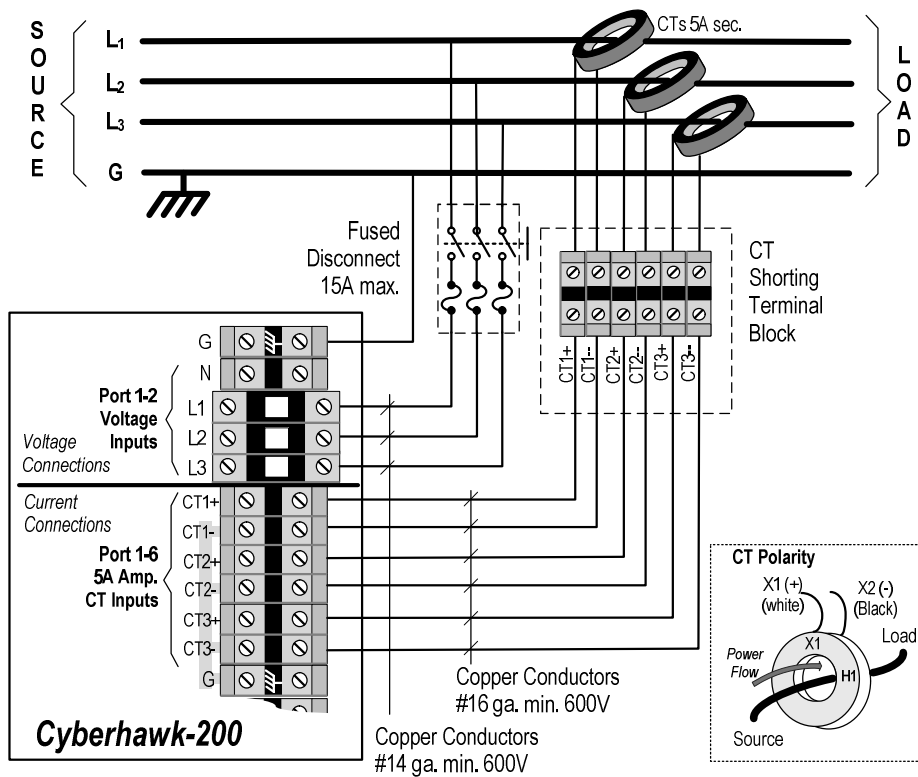
**Wiring Diagram for Split Phase 3-wire systems**



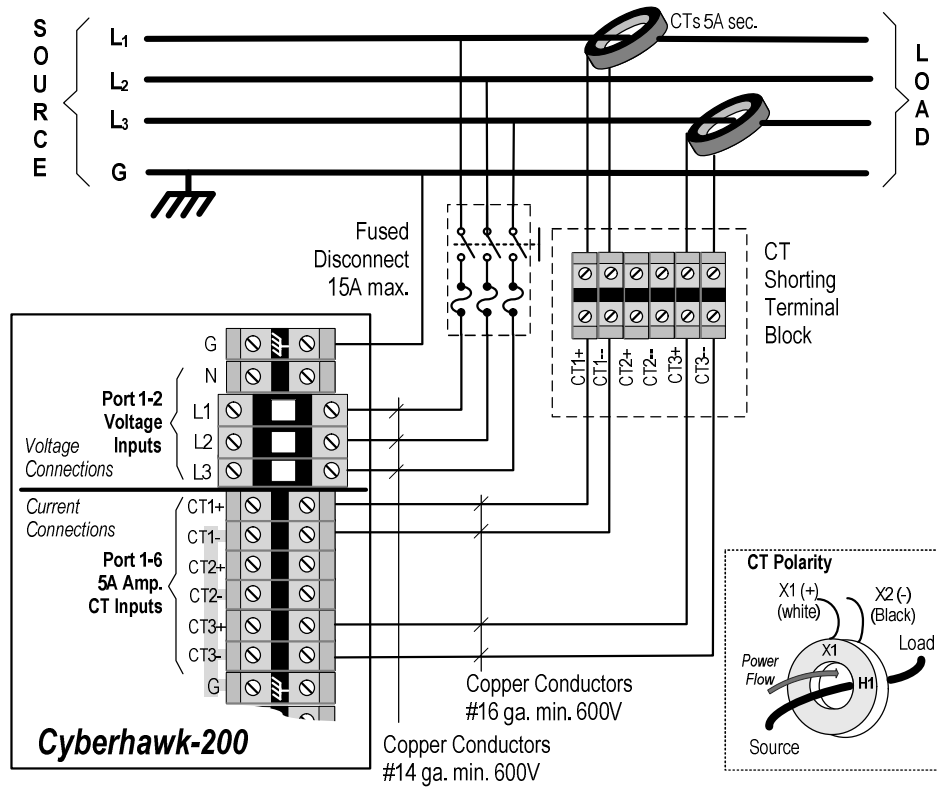
**Wiring Diagram for three phase 4-wire systems**



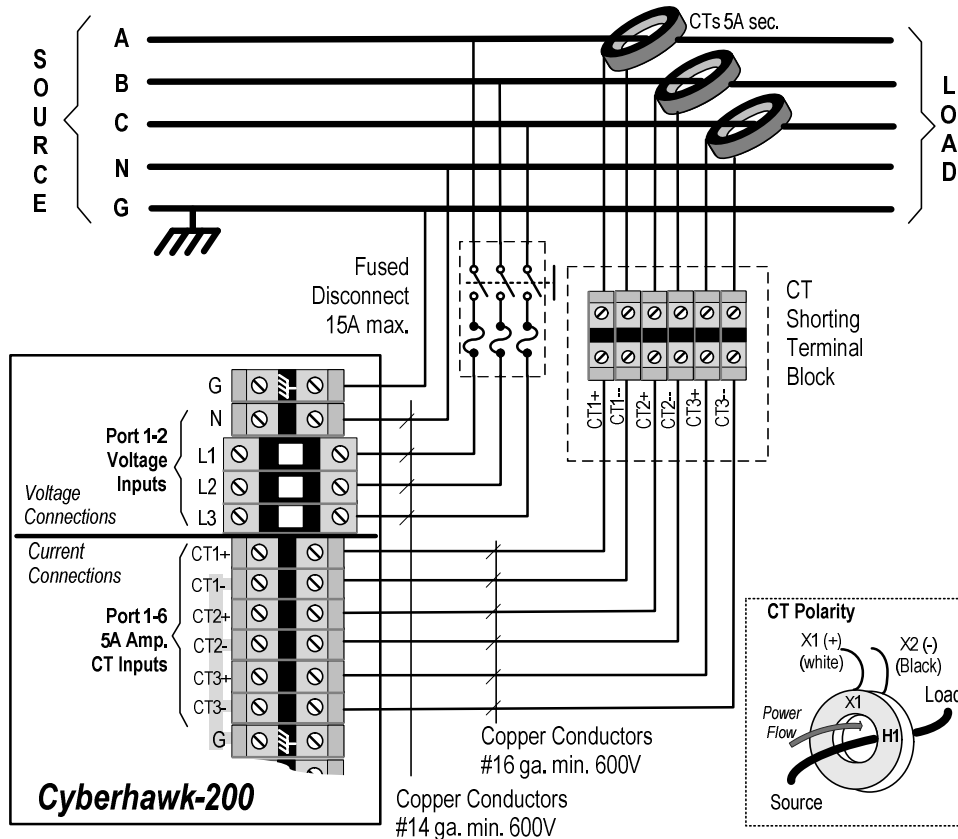
**Wiring Diagram for three phase 3-wire systems (3-CT connection)**



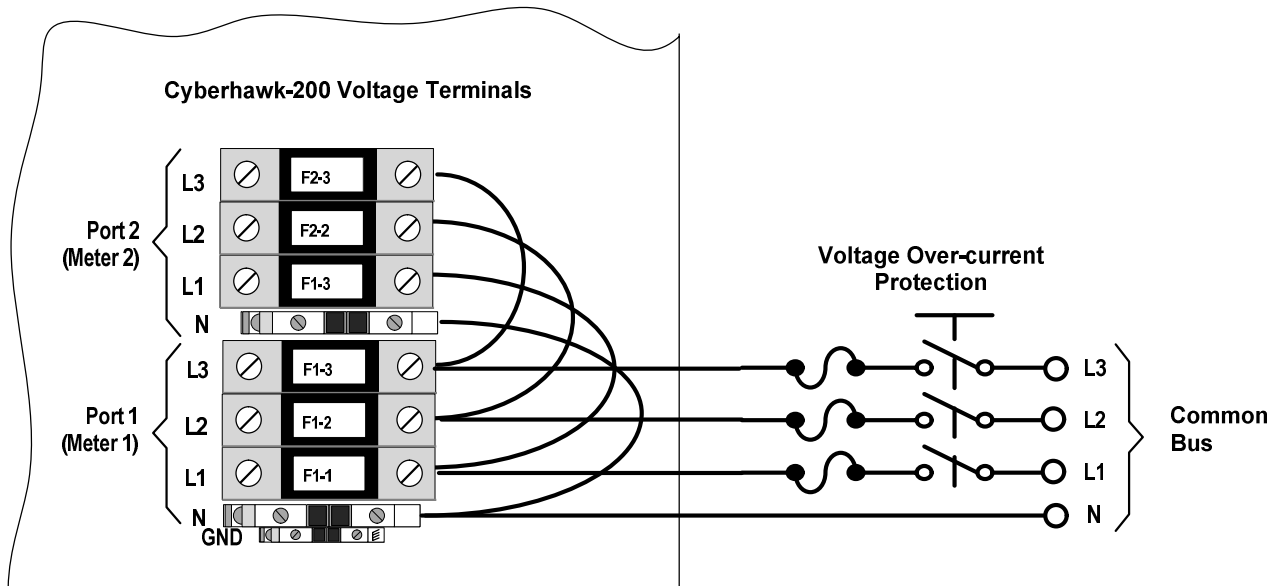
**Wiring Diagram for three phase 3-wire systems (2-CT connection)**



**Wiring Diagram for three phase 4-wire High Leg systems**



**Common Bus with Paralleled Input Port Connection**



*Note: Paralleling the Voltage Inputs to facilitate a single connection to the common Voltage Bus simplifies hookup by requiring only one Disconnect, however all meters will display the same Bus voltage even when its input Breaker is open but the current, power and energy readings will be correct.*



## Digital Input Hookups:

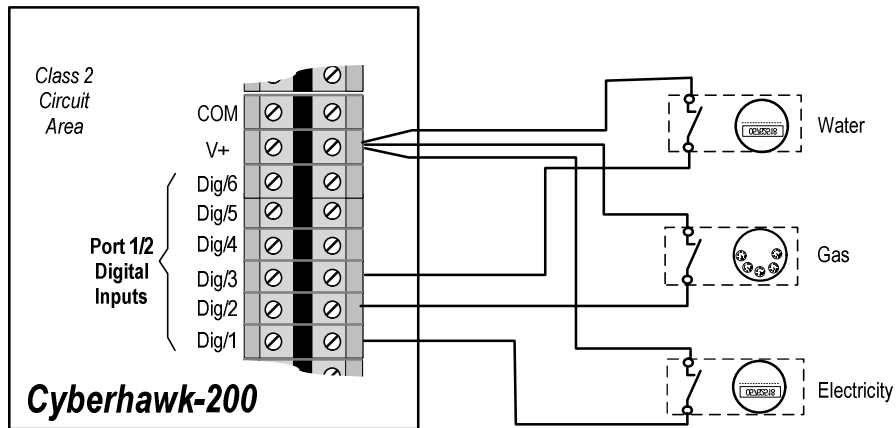
The unit is equipped with a set of 6 Digital Inputs for Port 1 meter and 6 Digital Inputs for Port 2 meter (if so equipped) to a maximum of 12 inputs. The primary functions provided by the digital inputs are as follows:

- Remote reading of the status of the digital inputs (ON/OFF)
- Pulse counting of Gas (volume), Water (volume) and Energy (kWh) from other meter with user settable weighing and scaling factors in the selected units.

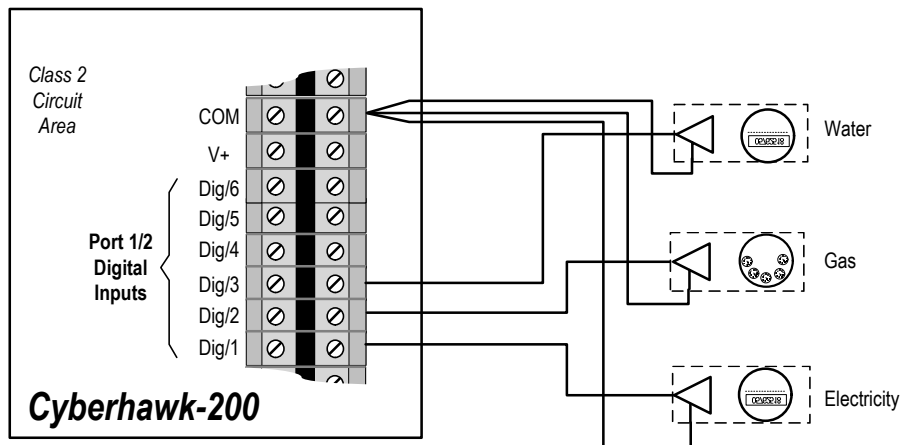
**Table of Digital Input Characteristics**

Parameter	Description
Inputs	Port 1: Dig/1-6; Port 2: Dig/1-6
Voltage Range	20-160VDC/AC; Start: 15V; Stop: 5V
Bias Current	2 mA
Internal Bias	24VDC
Connector	Screw Clamp; #12 to 18 ga. Wire
Location	Class 2 segregated compartment
Naming/Units	User Selected*: Energy (kWh), Gas and Water (Volume)
Weighing/Scaling	1-9999/1.999-9999.0
Response Time	5ms (max. @ 50% duty cycle)

### Digital Input Wiring for Pulse Counting with Dry Contacts (one group shown)



### Digital Input Wiring for Pulse Counting with Wet Contacts (one group shown)



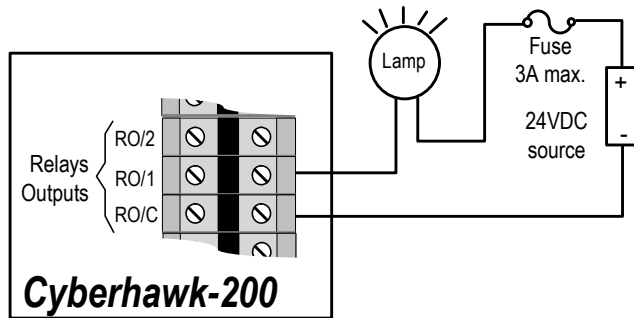
## Relay Output Hookups:

The Cyberhawk-200M is equipped with a set of 2 NO Relay Outputs each for Port 1 and Port 2 Meters (if so equipped). The primary functions provided by the Relay Outputs

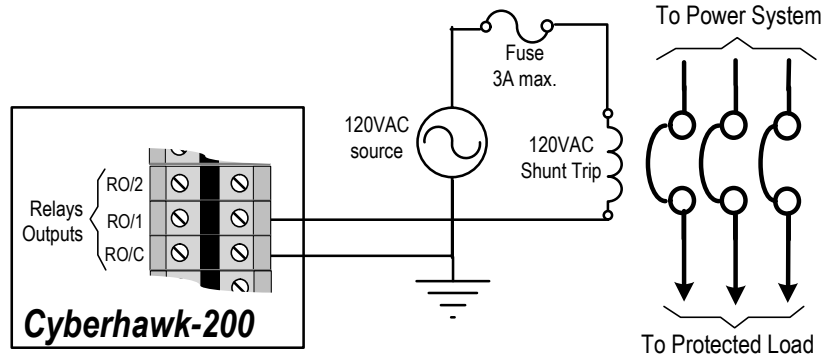
- Signaling for set alarm conditions
- On/Off control under Modbus or Manual control

Table of Relay Output Electrical Characteristics (-1P and -2P Models only)	
Parameter	Description
Relay Connections	Port 1: RO/1, RO/2, RO/C; Port 2: RO/1, RO/2, RO/C
Voltage Rating	250VAC/30VDC
Current Rating	3A Resistive; 2A Inductive
Connector	Screw Clamp; #12 to 18 ga. Wire
Location	Class 2 segregated compartment

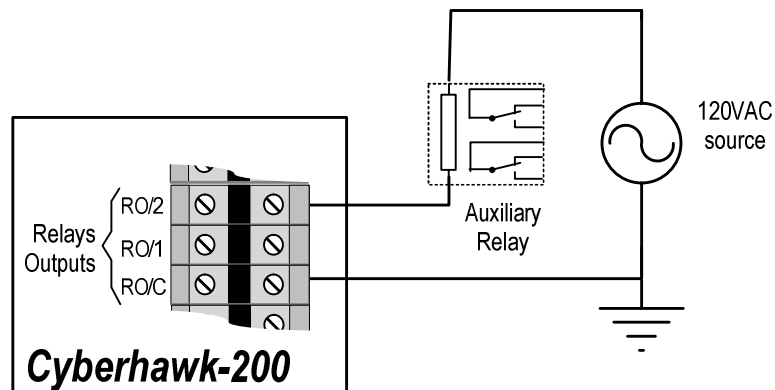
### Application of Alarm Relay for driving external visual indicator



### Application of Alarm Relay for Shunt Trip of Breaker



### Boosting the current capability of the Alarm Relays with an External Auxiliary Relay



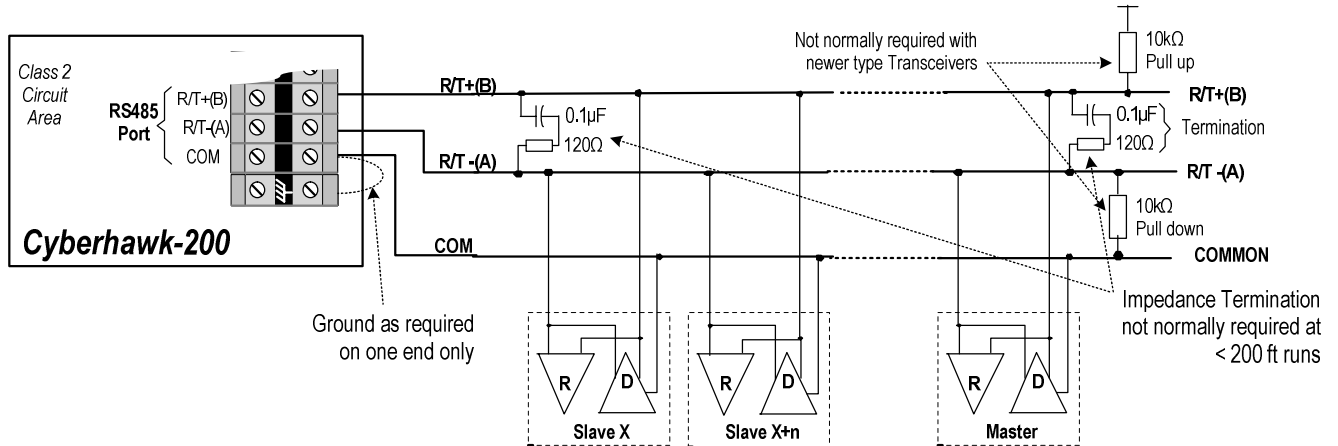
## COMMUNICATION:

The *Cyberhawk-200M-xP* is equipped with a RS485 Port and optionally with a Powersmiths COMSERVER providing an Ethernet connection with RS485 Port.

### RS485 Port

Wire and connect the external RS485 network to the R/T+ (B), R/T-(A) and COM (common) terminals observing polarity as illustrated in the figure below. Terminate and ground as required per the Network configuration using the diagram provided as a guide. Refer to the table following for RS485 characteristics.

### Typical RS485 Network Connection



#### Notes:

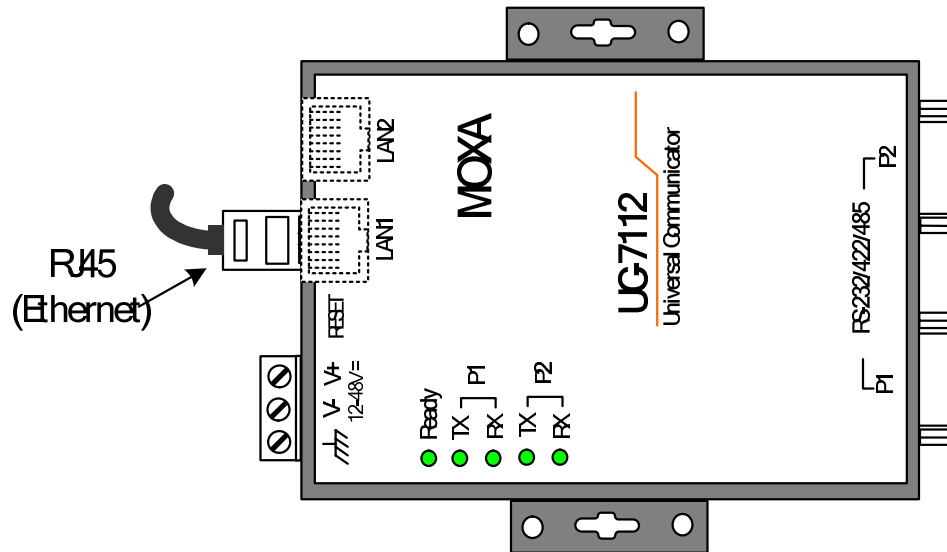
- The standard RS485 Port is directly supported by the Meters which will each have unique Modbus addresses (1 – 247) plus additional set parameters (Baud rate, Parity, Stop bits etc.).
- A 100 ohm `soft` ground is included in the Cyberhawk-200M.

Table of Standard RS485 Characteristics	
Parameter	Description
Connections	Com (Shield), R/T – (A), R/ T + (B)
Connector	Screw Clamp; 12 to 24 ga. wire
Baud Rates	1.2k, 2.4k, 4.8k, 9.6k, 19.2k, 38.4k
Data Format	1 Start, 8 Bit,, no/even/odd parity, 1 Stop Bit
Max. Range	1,200 m
Max. Load	1/5, (160 max. transceivers on same bus)
Isolation	> 1.5kV (1 min)
Wiring (typical)	300V, 75°C, #18 – 24 ga.
Termination (external)	120 ohms
Protocol	Modbus RTU

**Ethernet Port**

The Port is located on the COMSERVER (Hardware MOXA UC-7112 with Powersmiths proprietary firmware), located as shown in the layout diagrams. Port LAN1 and is connected using a standard Ethernet patch cable fitted with a RJ45 plug. Connection can be to a network or directly to a PC (older PCs may need a cross over patch cable); refer to the Powersmiths COMSERVER User Manual for setup instructions downloadable from [www.powersmiths.com](http://www.powersmiths.com) under the Cyberhawk-200M selection.

**Illustration of Ethernet Module**



**Table of Ethernet Port Characteristics**

Parameter	Description
Bit rate	10/100 BaseT
Connection	RJ45
Isolation	1,500V
Protocols	TCP/IP, HTTP, Modbus TCP
IP Addressing	DHCP Client (dynamic and static)
<i>Note: Unit shipped with dynamic addressing enabled which may be changed to static at setup.</i>	

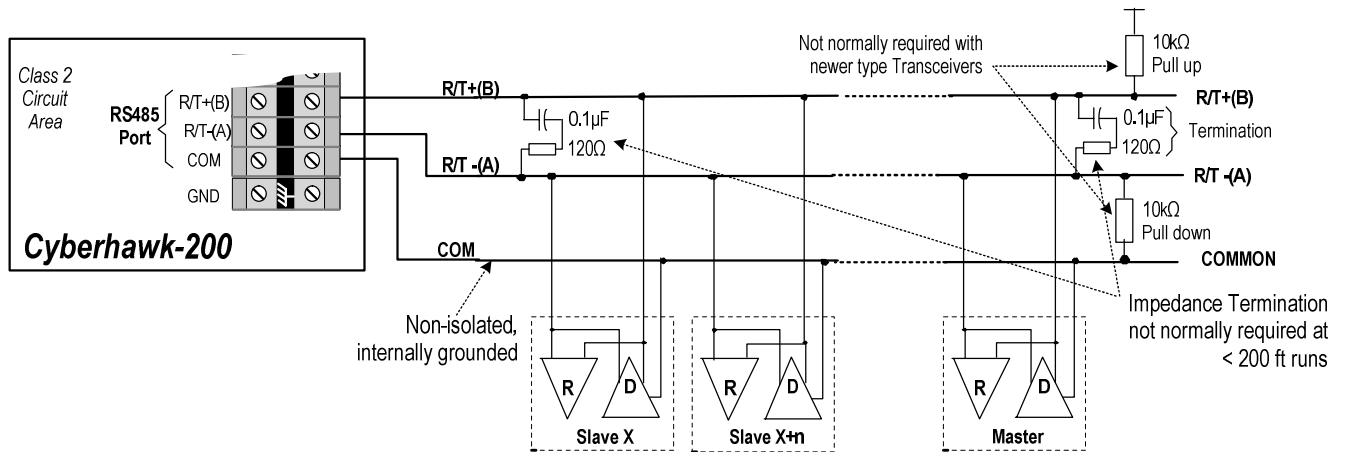
*Note: It may be advisable to check with the local IT administrator prior to actually connecting the unit to the network for pre-assignment of Network IP addresses; to this end a crossover cable may be used with a local PC for local setup and is covered in the Manual in the section on communication setup.*

**Ethernet Module supported RS485**

When equipped with a COMSERVER, the RS485 function is provided via its pass through function. In this case, the internal meter(s) RS485 is not directly accessible by the user but externally supported by the COMSERVER where communication setup is done. Refer to the RS485 network diagram above for connection details and to the table below for COMSERVER supported RS485 characteristics.

Table of Ethernet Module supported RS485 Port	
Parameter	Description
Connections	Com (Shield), R/T – (A), R/ T + (B)
Connector	Screw Clamp; 12 to 24 ga. wire
Baud Rates	9.6k, 19.2k, 38.4k, 115.2k
Data Format	1 Start, 8 Bit,, no/even/odd parity, 1 Stop Bit
Max. Range	1,200 m
Max. Load	Standard, (32 max. transceivers on same bus)
Isolation	None, connect only to isolated transceiver
Wiring (typical)	300V, 75°C, #18 – 24 ga.
Termination (external)	120 ohms
Protocol	Modbus RTU

**Ethernet Module Supported RS485**



## OPERATIONAL CHECKS

### CAUTION

### RISK OF ELECTRIC SHOCK or ARC FLASH HAZARD



- Replace all equipment covers (or doors) prior to powering on
- Do not attempt any internal service of the power meter
- Do not touch any electrical terminals; CT inputs may generate dangerous voltages if not properly terminated
- Refer all servicing only to by qualified competent electrical personnel that have appropriate training in electrical systems
- Open or disconnect circuit from power-distribution system (or service) of building before any service (e.g. wiring corrections) is attempted

Please refer to the manual for full setup and operating instructions:

- Open CT Shorting Links (if any were installed)
- Close all equipment covers
- Power on system Bus
- Observe normal Power On (Screens on)
- Setup the *Cyberhawk-200M-xP* for each meter following instructions given in the Operational Manual. Setup may be done locally at the screen or by PC using the propriety setup software.

*Note: It is generally the contractor's responsibility to setup the meter with at least the system parameters (eg. Configuration (Phases, 3/4-wire, CT ratio, etc)*

- Observe that the individual meter screens on the *Cyberhawk-200M-xP* display meaningful data:
  - Voltages
  - Currents
  - Powers (positive not negative)

*Note: It is important that the Powers be checked per phase to ensure that the CTs have been installed with the correct polarity and with respect to the correct phase. The individual phase powers should be positive and the PF within reasonable range (typ. 0.75 to 0.99)*

- Check network operation if connected to Ethernet

*Refer connection and test to the competent network administrator prior to connecting with reference to the Comserver manual for the setup of required WEB services (eg. Powersmiths WOW etc).*