

H81xx



AH06 (optional mounting bracket)



H81xx Energy Meter

Installer's Specifications

Insulation Class	600VAC *
Sample Rate	1280 Hz
Internal Isolation	2500VAC
Operating Temp. Range	0° to 50°C (32° to 122°F) (<95%RH, non-condensing)
Storage Temp. Range	-40°C to 70°C (-40° to 158°F)
Accuracy	±1% of reading from 2% to 100% of the CT current rating **
Power Consumption	50 VA
Voltage Tolerance:	
H8150 Control Power	90 to 132VAC line-to-neutral
H8163 Control Power	90 to 300VAC line-to-neutral
Electrical Services:	
H8150	120/240 VAC with neutral, 208Y/120 VAC line-to-neutral
H8163	Any service in which the phase A-N voltage is ≤300VAC and the phase-to-phase voltage is ≤480 VAC nom. with neutral
Frequency	50/60 Hz
Pulse Output (H8163 only)	N.O., Opto-Fet, 100mA@240VAC/DC
Pulse Rate (H8163 only)	0.10, 0.25, 0.50, 1.00 kWh per pulse (jumper selectable)
Pulse Width (H8163 only)	200msec closed
Phase Loss Alarm Output (H8163 only)	N.O. (opens on alarm), Opto-Fet, 100mA@24VAC/DC; Fixed threshold 25% below any other phase; remains open while alarm persists
Safety	UL 3111-1 Cat. III pollution degree 2, alt. 0-2000 meters
Protection Class	NEMA 1

* Do not apply 600V class current transformers to circuits having a phase-to-phase voltage greater than 600V without adequate additional insulation between primary conductor and current transformers.

** Meters and current transformers are calibrated as a set. To achieve this accuracy, match the serial numbers on the transformers and the meter at the time of installation.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Follow safe electrical work practices. See NFPA 70E in the USA, or applicable local codes.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Read, understand and follow the instructions before installing this product.
- Turn off all power supplying equipment before working on or inside the equipment.
- Use a properly rated voltage sensing device to confirm power is off.
DO NOT DEPEND ON THIS PRODUCT FOR VOLTAGE INDICATION
- Only install this product on insulated conductors.

Failure to follow these instructions will result in death or serious injury.

NOTICE

- This product is not intended for life or safety applications.
- Do not install this product in hazardous or classified locations.
- The installer is responsible for conformance to all applicable codes.
- Mount this product inside a suitable fire and electrical enclosure.

FCC PART 15 INFORMATION

NOTE: This equipment has been tested by the manufacturer and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Modifications to this product without the express authorization of Veris Industries nullify this statement.

QUICK INSTALL

1. Verify that serial numbers on meter and current transformers match.
2. Mount the meter housing.
3. Attach current transformer(s) to the conductor.
4. Connect voltage leads.
5. Use color coding to connect current transformer leads to the input terminals and voltage leads to phase conductors (e.g. red to red).
6. Connect the Pulse and Phase Loss output terminals to the controller (H8163 only).
7. Set the backlight and display data jumpers as desired.
8. Set the Pulse Rate selection switch as desired (H8163 only).
9. Secure the cover.
10. Apply power to the meter.

PRODUCT IDENTIFICATION

120VAC-240VAC (nom.)

Amps	One CT	Two CTs	Three CTs	Voltage	Output
100 Micro	H8150-0100-0-1	H8150-0100-0-2	H8150-0100-0-3	90-132VAC L-N	Display Only
200 Mini	H8150-0200-1-1	H8150-0200-1-2	H8150-0200-1-3		
300 Small	H8150-0300-2-1	H8150-0300-2-2	H8150-0300-2-3		
400 Med		H8150-0400-3-2	H8150-0400-3-3		
800 Med		H8150-0800-3-2	H8150-0800-3-3		
800 Lg			H8150-0800-4-3		
1600 Lg			H8150-01600-4-3		
2400 Lg			H8150-2400-4-3		

Optional Accessory

Model	Description
AH06	Mounting Bracket Kit (fits the Small, Medium, and Large CTs only)

120VAC-480VAC (nom.)

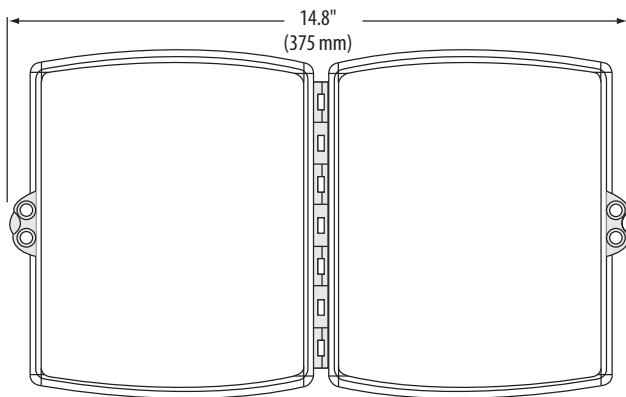
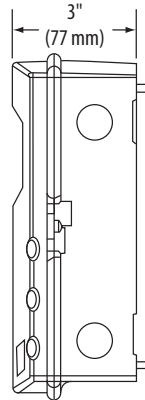
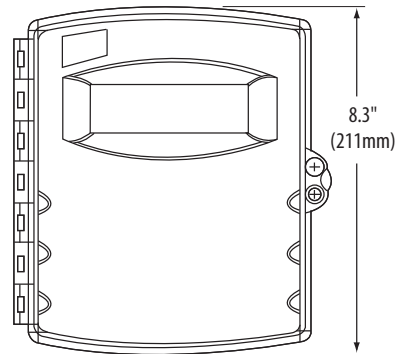
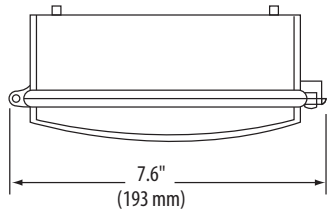
Amps	One CT	Two CTs	Three CTs	Voltage	Output
100 Micro	H8163-0100-0-1	H8163-0100-0-2	H8163-0100-0-3	90-300VAC L-N	Pulse, Phase Loss, and Display
200 Mini	H8163-0200-1-1	H8163-0200-1-2	H8163-0200-1-3		
300 Small	H8163-0300-2-1	H8163-0300-2-2	H8163-0300-2-3		
400 Med		H8163-0400-3-2	H8163-0400-3-3		
800 Med		H8163-0800-3-2	H8163-0800-3-3		
800 Lg			H8163-0800-4-3		
1600 Lg			H8163-01600-4-3		
2400 Lg			H8163-2400-4-3		

Optional Comm Board

Model	Description
H8163-CB	Modbus® Communications Board for H8100 Series
H8186-CB	BACnet® Communications Board for H8100 Series
H8126-CB	Metasys® N2 Communications Board for H8100 Series (consult factory if ordering this item)

DIMENSIONS

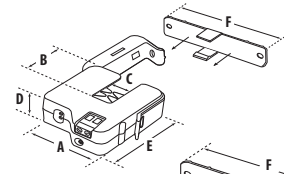
Meter



CT

**MICRO
100 Amp**

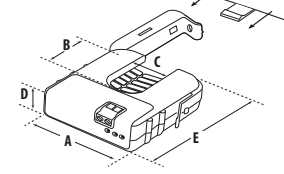
- A = 2.2" (55 mm)
- B = 1.3" (33 mm)
- C = 0.5" (13 mm)
- D = 0.9" (24 mm)
- E = 2.3" (60 mm)
- F = 3.5" (90 mm)



MICRO

**MINI
200 Amp**

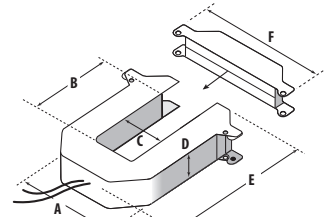
- A = 2.6" (66 mm)
- B = 1.1" (28 mm)
- C = 0.8" (19 mm)
- D = 1" (27 mm)
- E = 2.9" (74 mm)
- F = 3.5" (90 mm)



MINI

**SMALL
300 Amp**

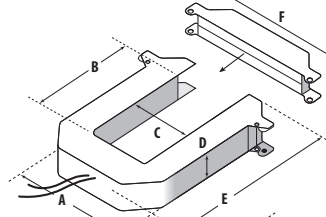
- A = 3.8" (95 mm)
- B = 1.5" (38 mm)
- C = 1.3" (32 mm)
- D = 1.1" (29 mm)
- E = 4.2" (107 mm)
- F = 4.8" (121 mm)



SMALL

**MEDIUM
400/800 Amp**

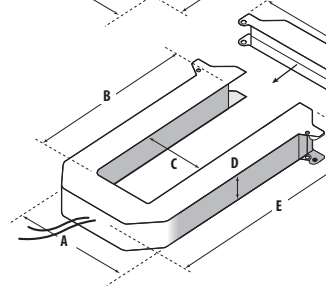
- A = 4.9" (124 mm)
- B = 2.9" (73 mm)
- C = 2.5" (62 mm)
- D = 1.1" (29 mm)
- E = 5.6" (141 mm)
- F = 5.9" (150 mm)



MEDIUM

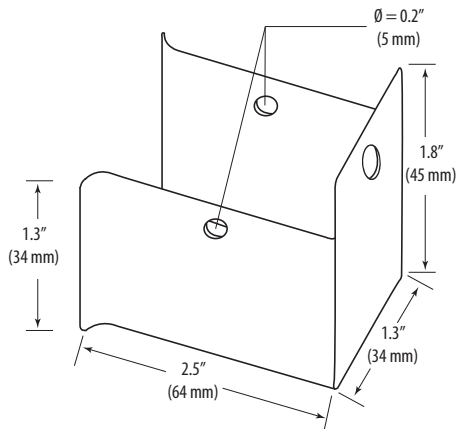
**LARGE
800/1600/2400 Amp**

- A = 4.9" (124 mm)
- B = 5.5" (140 mm)
- C = 2.5" (62 mm)
- D = 1.1" (29 mm)
- E = 8.1" (207 mm)
- F = 5.9" (150 mm)



LARGE

AH06 Bracket Dimensions (optional accessory)





This symbol indicates an electrical shock hazard exists.



Documentation must be consulted where this symbol is used on the product.

SAFETY

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Only qualified electrical workers should install this equipment. Such work should be performed only after reading this entire set of instructions.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.
- Turn off all power supplying the power meter and the equipment in which it is installed before working on it.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. In the USA, see NFPA 70E.
- Qualified persons performing diagnostics or troubleshooting that require electrical conductors to be energized must comply with NFPA 70 E - Standard for Electrical Safety Requirements for Employee Workplaces and OSHA Standards - 29 CFR Part 1910 Subpart S - Electrical.
- Before closing all covers and doors, carefully inspect the work area for tools and objects that may have been left inside the equipment.
- Use caution while removing or installing panels so that they do not extend into the energized bus; avoid handling the panels, which could cause personal injury.
- NEVER bypass external fusing.
- NEVER short the secondary of a potential transformer.
- Before performing Dielectric (Hi-Pot) or Megger testing on any equipment in which the power meter is installed, disconnect all input and output wires to the power meter. High voltage testing may damage electronic components contained in the power meter.
- The power meter should be installed in a suitable electrical and fire enclosure.

Failure to follow these instructions may result in death or serious injury.

Always observe all National and Local Codes during installation of this product.

Provide a disconnect device to disconnect the H81xx from the supply source. Place this device in close proximity to the equipment and within easy reach of the operator, and mark it as the disconnecting device. The disconnecting device shall meet the relevant requirements of IEC 60947-1 and IEC 60947-3 and be suitable for the application. In the US and Canada, disconnecting fuse holders can be used.

Provide overcurrent protection devices for supply conductors. Install per national or local regulations.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the device may be impaired.

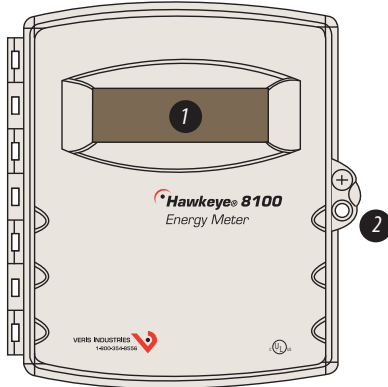
OPERATION

The H81xx Series energy meter combines industrial-grade split-core current transformers and precision microprocessor-based metering electronics. It can detect phase reversal, which eliminates load orientation concerns. The meter and current transformers are calibrated as a set, so the installer must match their serial numbers at the time of installation. The H8150 provides a control power voltage range of 90-132 VAC. The H8163 provides an extended input control power voltage range (90-300 VAC).

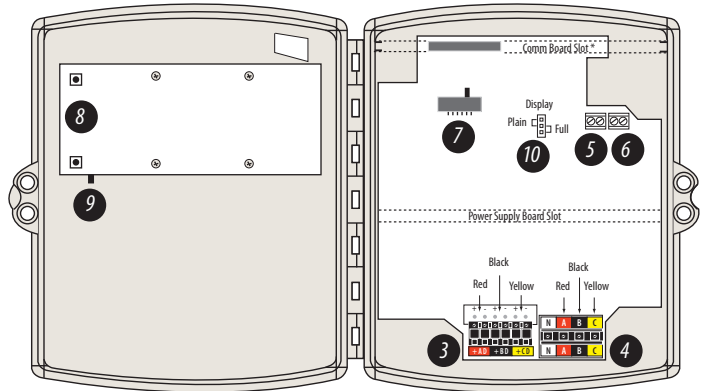
The H8163 model also has a pulse output compatible with building control systems, a phase loss output to protect equipment, and a slot to install a Modbus, BACnet, or Metasys communication board (sold separately). When equipped with this board and connected to a data acquisition system, the H8163 can report energy and power diagnostic variables, including kWh, kW, PF, kVAR, Volts, and Amps.

PRODUCT DIAGRAM

H81xx Series Cover



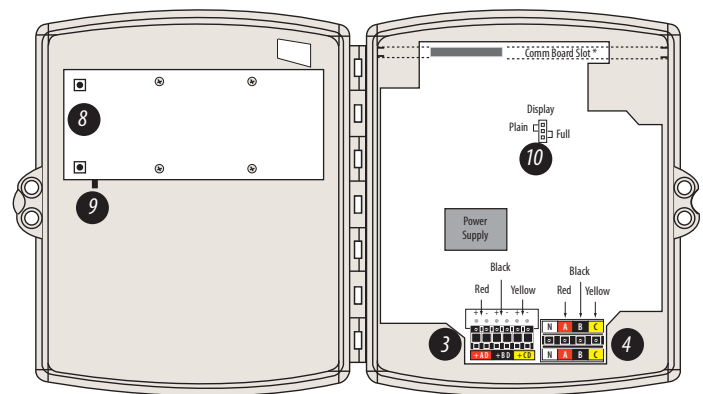
H8163 Inside and Board Layout



* Comm board is optional and sold as a separate product.

1. **Display.** Large digit backlit LCD for data and diagnostics.
2. **Security hasp.**
3. **Current transformer input terminals.** These ensure that voltage lead and current transformer are properly matched (e.g. red to red).
4. **Voltage input terminals.** These ensure that voltage lead and current transformer are properly matched (e.g. red to red).
5. **Pulse output terminals.** These provide easy integration to existing control/data acquisition systems. (H8163 only)
6. **Phase loss output alarm.** Alarm trips to protect equipment if phase voltage drops 25%. (H8163 only)
7. **Pulse rate selection switch.** Set the pulse output at 0.1, 0.25, 0.50, or 1 pulse/kWh to match resolution requirements. (H8163 only)
8. **kWh reset.** To reset the kWh counter, push both buttons at the same time and hold for 10 seconds. To reset kW max, push both buttons and hold for 5 seconds.
9. **Backlight enabling jumper.** Remove this jumper to disable lighting.
10. **Plain/full display data jumper.** 20 or 90 second display cycle (see page 5 for details).

H8150 Inside and Board Layout



* Comm board is optional and sold as a separate product.

Connect white wire to (-).

Connect red/black/yellow wire to (+).

INSTALLATION



Disconnect and lock out all power sources during installation and configuration.

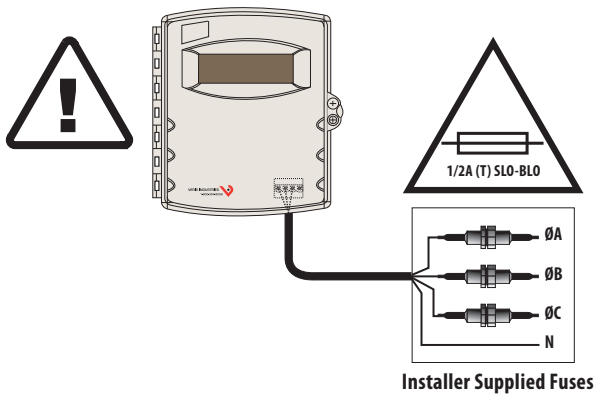


If making connections to the meter through more than one metallic conduit, use a bonding plate (Veris part number AH11 or equivalent) to prevent electric shock.

1. Verify that the serial number on the meter matches the serial numbers on the current transformers. These are calibrated as a set, and mixing transformers with non-matching meters may damage the device when power is applied. The meter's serial number is printed on the label affixed to the inside of the front cover, and the current transformer serial number is on the transformer label.
2. Mount the meter.
3. Attach current transformers to conductors. Local code requirements may require a mounting bracket. For maximum accuracy, run the conductor through the center of the current transformer window.
4. *Optional step, per NEC and local regulations:* Attach external fuses (not included with the H81xx devices; installer must provide). Verify that fuse rating is adequate for the applied voltage, with a current rating of 1/2 Amp (T) SLO-BLO. Select fuses with a fault current rating that matches the power source rating.



Serial numbers are printed on labels on the inside of the meter cover and on the side of the current transformer. Only connect transformers and meters with matching serial numbers.

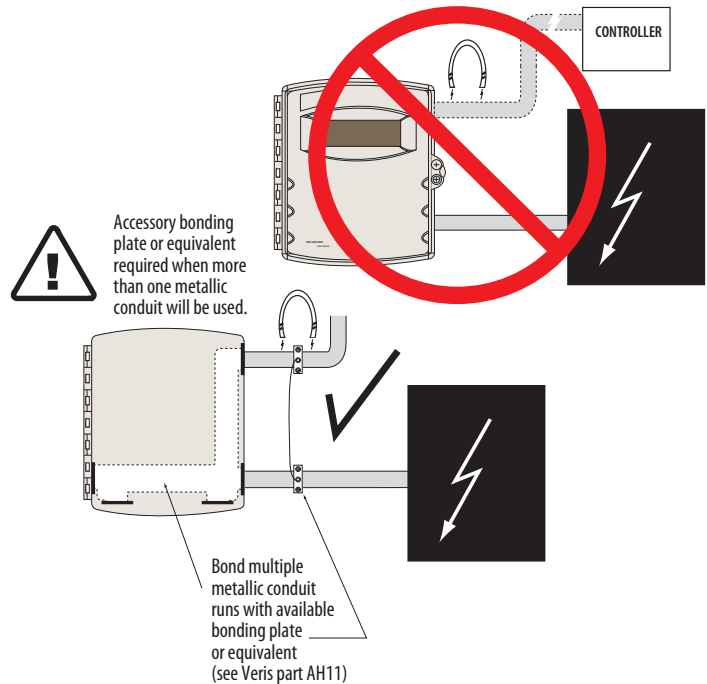


Installer Supplied Fuses

Use fuses compatible with this meter:

Single phase	Veris AH02
Two phase	Veris AH03
Three phase	Veris AH04

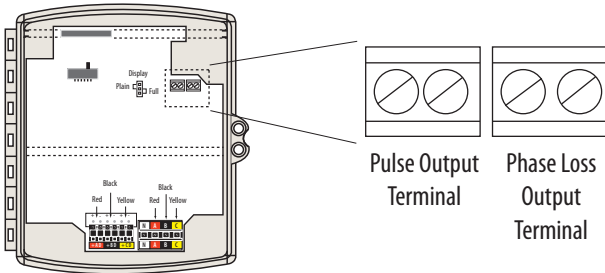
Shock Hazard!



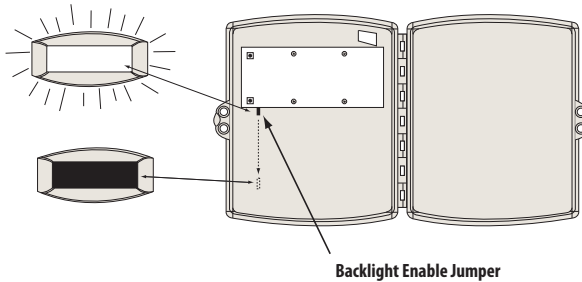
Accessory bonding plate or equivalent required when more than one metallic conduit will be used.

Bond multiple metallic conduit runs with available bonding plate or equivalent (see Veris part AH11)

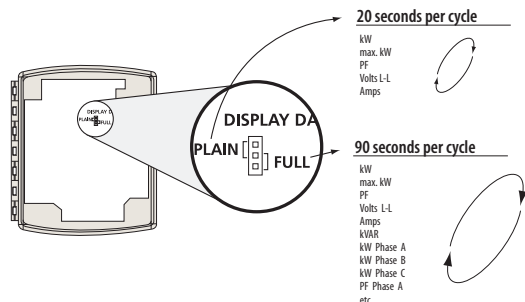
- Use color coding to attach current transformer leads to the input terminals (e.g. red lead to red terminal). Polarity is indicated in the wiring diagrams, but the meter is polarity insensitive. See Wiring section.
- Use color coding to connect voltage leads to phase conductors (e.g. red transformer lead to red terminal). The meter is powered from the monitored source, so connect the voltage leads to a circuit that is normally left on. See Wiring section.
- H8163 only:* Connect the output terminals to the control/data acquisition system. The Pulse Output is normally open, and the Phase Loss Output is normally open. Both are rated for 24VAC/VDC@100mA maximum. Ensure that the installation method and insulation ratings conform to local and national electrical codes.



- Set the backlight enabling jumper as desired. Remove the jumper to disable the backlight.



- Set the Display Data jumper for either Plain or Full settings. Plain mode cycles the display through five data elements (kW, max. kW since last reset, average PF, line-to-line voltage, and amps) for four seconds each. Full mode cycles through all of the data available in the meter. See the Information Reporting section for more details.

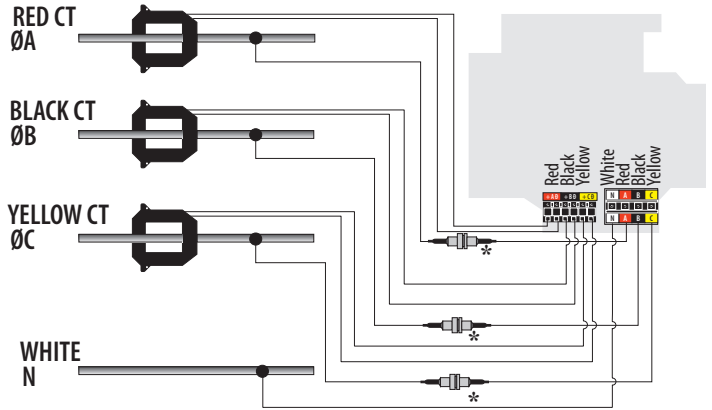


WIRING

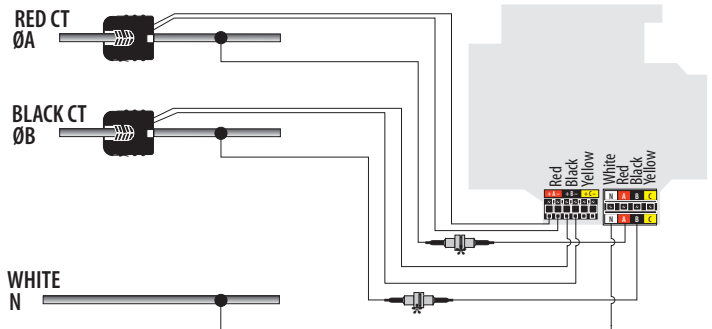
Connect white wire to (-).

Connect red/black/yellow wire to (+).

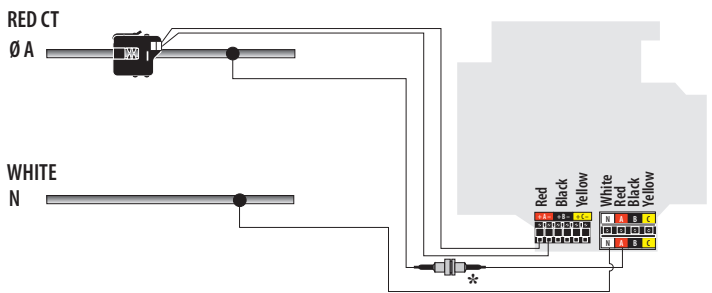
*Typical 208/480VAC**, 4-Wire, 3Ø Installation*



Typical 240/120 VAC, 3-Wire, 1Ø Installation



Typical 120 VAC, 2-Wire, 1Ø Installation

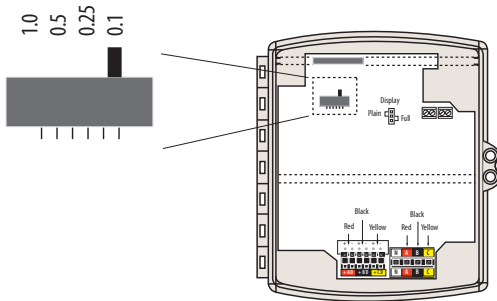


* External fuse provided by installer (optional, per NEC and local regulations).

** 480VAC applies to the H8163 only.

For 1600A or larger models in contact with a power conductor for use over the full ambient temperature load range, use 90°C wire insulation or derate the accuracy appropriately.

10. *H8163 only*: Set the Pulse Rate selection switch to the desired output rate (kWh per pulse). Note that 0.1 is not valid for 1600A systems, and 0.1 and 0.25 are not valid for 2400A systems.



11. Secure the meter cover shut using a padlock, wire tie, or other locking device.

12. Apply power to the meter.

13. Check the display. At initial power-up, the meter checks each phase, and, if the phasing is correct, an OKAY message will appear. If the phasing is incorrect, an error message will indicate which color leads are not connected properly. Disconnect power before reconnecting leads.

14. Check power reading. Expected power is estimated as follows:

$$kW = \text{Volts(L-L)} * \text{Amps} * 1.732 * \text{PF} / 1000$$

$$kW = \text{horsepower} * 0.746$$

15. To reset the kWh accumulator to zero, press and hold the two pushbuttons on the inside of the meter cover for 10 seconds.

16. To reset the kW max. register, press and hold the two pushbuttons on the inside of the meter cover for 5 seconds.

ALARMS

The following messages remain on the lower display for the duration of an alarm condition:

Message	Explanation
Phase loss	The voltage on one phase is less than 75% of the voltage on any other phase. The displayed message will indicate the problem phase.
Amps Over	The measured current is greater than 110% of the transformer range. The display message will indicate the problem phase.
Volts Over	Volts A-C, B-C, or A-C is greater than 660VAC. [†] The displayed message will indicate the problem phase.

[†] The H8163 devices are rated to 300VAC L-N, and the H8150 devices are rated to 132VAC L-N. Operation above these levels will damage the device.

INFORMATION REPORTING

All monitored data is listed below.

- kW
- Max. kW
- PF
- Volts
- Amps
- kVAR
- kW, phase A *
- kW, phase B *
- kW, phase C **
- PF, phase A *
- PF, phase B *
- PF, phase C **
- Volts, A-B **
- Volts, B-C **
- Volts, A-C **
- Volts, A-N *
- Volts, B-N *
- Volts, C-N **
- Amps, A *
- Amps, B *
- Amps, C **

The H81xx continually reports kWh or MWh, depending on the total accumulated energy. A secondary display cycles through other parameters. The meter has two modes of display operation, depending on the setting of the Display Data jumper (J8) on the main circuit board. In Full Display mode, the meter cycles through all parameters. In Plain Display mode, the meter cycles through only the first five parameters as listed above.

Every 10th rotation of parameters, the meter displays another set of data elements:

- Pulse Rate ***
- Address ****
- Baud Rate *****
- Parity ****
- 2/4 Wire *****

* For meters with 2 or 3 current transformers.
 ** For meters with 3 current transformers.
 *** H8163 only.
 **** H8163, only if a comm board is installed.

TROUBLESHOOTING

Problem	Solution
No display	<ul style="list-style-type: none"> · Replace external fuses. · Verify that display cable has not been disconnected during installation. · Verify voltage leads are properly connected.
Reported power too low	<ul style="list-style-type: none"> · Verify current transformers and terminals are color-matched. · Check for phase loss. · Check external fuses.
Reported power inaccurate	Verify meter and current transformers have matching serial numbers.
Accuracy not as specified	<ul style="list-style-type: none"> · Verify current transformers and terminals are color-matched. · Verify that no stray conductive materials (wire clippings, etc.) have shorted between the terminals.
No Pulse output (H8163 only)	<ul style="list-style-type: none"> · Verify power is supplied in the range of 5-24VAC/DC, with a max. load of 100mA. · The pulse output interval is 200msec; verify the controller will accept this signal as input.
Pulse output wrong, display OK (H8163 only)	Set the pulse rate switch and the controller to match kWh/pulse.
No Phase Loss output (H8163 only)	Verify power is supplied in the range of 5-24VAC/DC, with a max. load of 100mA.
"bAd" appears in the display (H8163 only)	Verify that the Pulse Rate slide switch is set to a valid value. 0.1 is not valid for 1600A systems; 0.1 and 0.25 are not valid for 2400A systems.
Accuracy not as specified	Verify current transformers and terminals are color-matched.