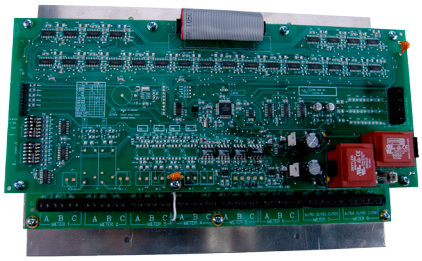
H8238

Multi-Circuit Meter



CE c UL us LISTED

⚠ ⚠ 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
- SECONDARY LEADS/TERMINALS OF CURRENT OUTPUT (e.g. 5A) CTs MUST BE SHORTED, OR CONNECTED TO THE BURDEN AT ALL TIMES.
- Only install this product on insulated conductors.

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

A qualified person is one who has skills and knowledge related to the construction and operation of this electrical equipment and the installation, and has received safety training to recognize and avoid the hazards involved. NEC2009 Article 100

No responsibility is assumed by Veris Industries for any consequences arising out of the use of this material.

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.

PRODUCT IDENTIFICATION

MODEL	DESCRIPTION
H8238	Multi-Circuit Monitor, 90-130 VAC supply voltage
H8238E	Multi-Circuit Monitor, 240 VAC supply voltage
H8238EL	Multi-Circuit Monitor, 240 VAC supply voltage, low baud rate version

SPECIFICATIONS

Electrical Services	Eight 3Ø circuits sharing a common line voltage source
Sample Rate	1280 Hz
Operating Temperature Range	0° to 60°C (32° to 140°F) (<95% RH, non-condensing)
Storage Temperature Range	-40°C to 70°C (-40° to 158°F)
Altitude of Operation	3 km
Systems Accuracy	+/- 1% (target, exclusive of user-supplied CTs)*
Variable Update Rate	200 msec for voltages, 1.6 sec for all others
Measured Voltage Inputs:	
Number of Channels	Three (phase A, B, C, plus neutral). Average of phases used for L-N values if no neutral present
Maximum Voltage	277VAC L-N +10%; 480VAC L-L +10%
Frequency	50/60 Hz
Terminal Block	4-position Euro style pluggable connector (max. wire size 12 gauge); torque 5.7 in•b (0.64 N•m)
Measured Current Inputs:	
Number of Channels	24 (8 meters x 3 phases/meter)
CT Input Type	5 Amp (customer-supplied)
CT Range	Each of 8 meters independently adjustable from 1A:5A to 9999A:5A
Terminal Block	6-position Euro style cage clamp connector (max. wire size 14 gauge); torque 4.4 in•lb (0.50 N•m)
Operating Power Inputs:	
Power Source	Dedicated 120VAC L-N (H8238) or 240VAC L-N (H8238E); fused 40 mA
Power Voltage Tolerance	+10/-25%
Frequency	50/60 Hz
Terminal Block	2-position Euro style pluggable connector (max. wire size 12 gauge)
Network Connections:	
Type	Modbus RTU
Connection	DIP switch-selectable 2-wire or 4-wire
Address	DIP switch-selectable base address (1 to 233 in steps of 8)
Baud Rate	DIP switch-selectable 2400, 4800, 9600, 19200**
Parity	DIP switch-selectable NONE, ODD, EVEN
Communication Format	8-data-bits, 1-start-bit, 1-stop-bit
Terminal Block	5-position Euro style pluggable connector (max. wire size 12 gauge); nominal torque 4.0 in•lb (0.45 N•m); maximum torque 5.0 in•lb (0.56 N•m)
Installation Category	Cat III, pollution degree 2

** Accuracy specification valid only when amperages are greater than 10% of maximum CT range.*
*** Baud rates for H8238EL are 1200, 2400, 4800, and 9600.*

QUICK INSTALL

Observe precautions for handling static sensitive devices to avoid damage to the circuitry that is not covered under the factory warranty.

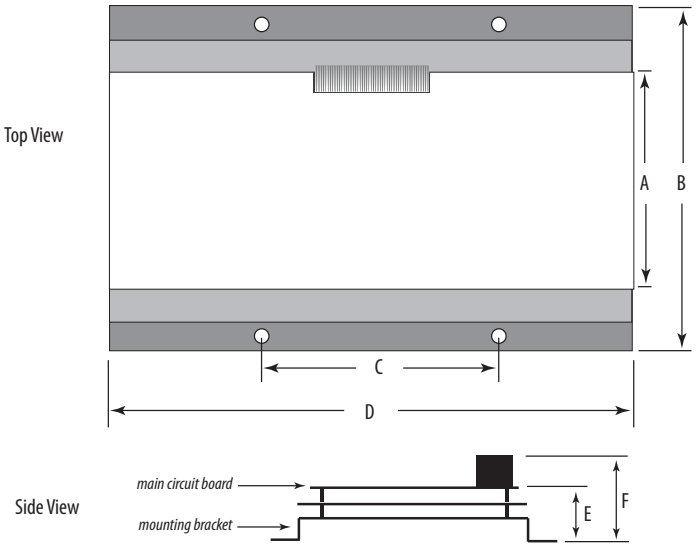
1. Connect the current inputs.
2. Connect the voltage leads.
3. Configure the communication switches.
4. Select a network address.
5. Connect the RS-485 connection to the communications wiring.
6. Connect the circuit power.

  USA 800.354.8556 or +1.503.598.4564 / support@veris.com

PRODUCT OVERVIEW

The H8238 multi-circuit meter provides a means of monitoring multiple loads originating from the same electrical service. The multi-circuit meter can monitor up to eight 3-phase, 3-wire loads or six 3-phase, 4-wire loads with neutral current monitoring. With one RS-485 connection, the H8238 provides a Modbus RTU communications output and 72 alarms for situations such as over/under voltage, over/under current, and phase loss. Up to 30 devices can be addressed on the same Modbus network.

DIMENSIONS

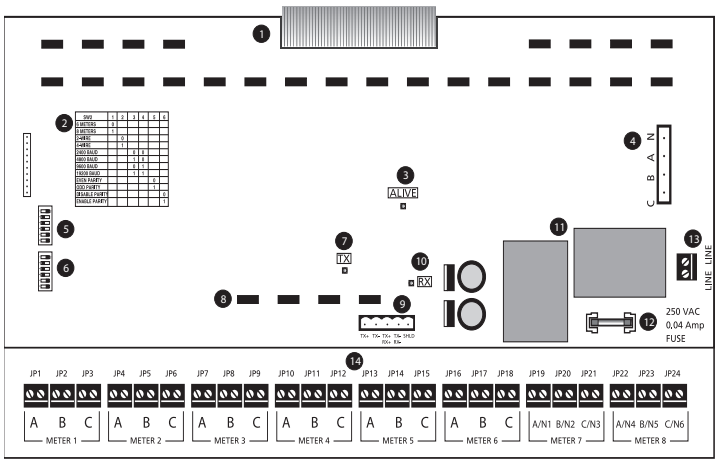


WIDTH:
A 5.3″/135mm (board)
B 8.9″/226mm (mounting bracket base)

LENGTH:
C 6.0″/153mm
D 12.8″/325mm

HEIGHT:
E 2.9″/74mm
F 4.0″/101mm

PRODUCT DIAGRAM



1. ***Board Connection Ribbon Cable:*** Connects the transducer and CT circuit boards.

2. ***Configuration Table:*** Easy reference communications configuration chart, silk-screened on the circuit board.

3. ***ALIVE LED:*** Flashes once per second to indicate correct operation. If steadily lit, indicates internal communications diagnostic event.

4. ***Sensed Voltage Connection:*** Sensed line voltage, common for all meter channels. 0-480 VAC.

5. ***Baud Rate & Parity Selection Switches:*** Field selectable parity, baud rate, and 2 or 4 wire communications parameters.

6. ***Modbus Address DIP Switches:*** Set these switches must be set to assign an individual Modbus address before connecting the device (see page 7) .

7. ***TX LED:*** Indicates successful transmission of information over the Modbus network.

8. ***Optical Isolation:*** An optical isolation barrier separates high voltage from the communications network.

9. ***RS-485 2 or 4-wire Connection:*** Daisy chain multiple H8238s using a 2 or 4-wire Modbus network.

10. ***RX LED:*** Indicates successful reception of information over the Modbus network.

11. ***Power Transformers:*** Linear power supply for reliability and low noise.

12. ***250 VAC 40mA Slow Blow Fuse:*** Fused power connection for circuit protection.

13. ***120 or 240 VAC Power Connection*:*** Easy 2-wire 120 or 240 VAC line to neutral 50/60 Hz.

14. ***5A CT Input Terminals:*** Current Transformer (CT) terminals accept any 5 A CT signal. Two wire, not polarity sensitive.

** For 240 VAC power connection version, use the H8238E or H8238EL.*

DANGER: 5A CTs can present hazardous voltages.
Install CTs in accordance with manufacturer's instructions.
Terminate the CT secondary before applying current.

INSTALLATION

Disconnect and lock out power to the device.

Current Configuration

DANGER: 5A CTs can present hazardous voltages. Install CTs in accordance with manufacturer's instructions. Terminate the CT secondary before applying current.

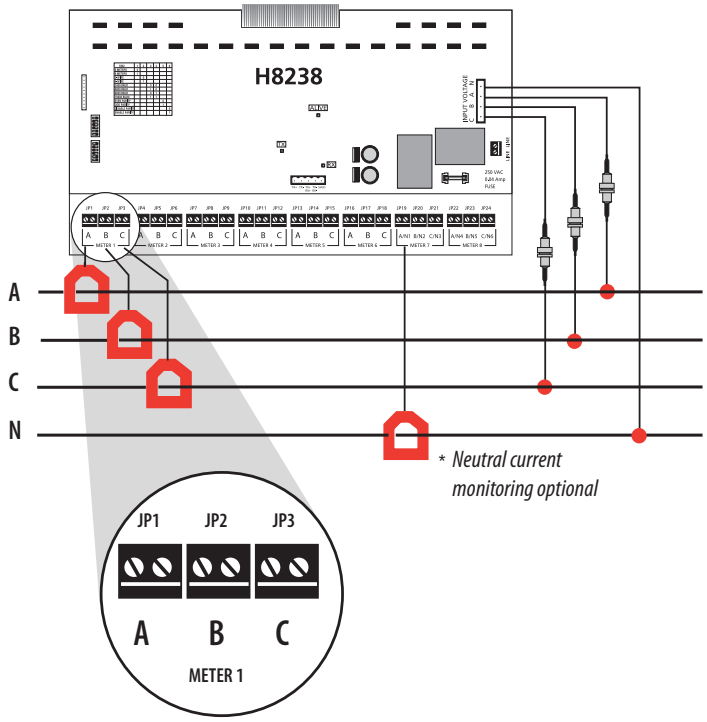
1. Connect the current inputs. The multi-circuit meter is capable of monitoring up to eight 3Ø 3-wire circuits or six 3Ø circuits plus neutral current. Choose either 8 or 6 meter configuration and proceed to either step 2 or 3, as appropriate.

2. Eight 3Ø 3-Wire Circuit Monitoring Mode: Connect 5 Amp CTs to terminal blocks JP1 through JP24. The JP terminal blocks are two position, not polarity sensitive, and compatible with standard 2-wire 5 Amp CT outputs. Connect each monitored service to the JP terminals within a meter set. For example meter #1 CT inputs are labeled JP1 (PhA), JP2(PhB), & JP3(PhC). Connect the CT monitoring phase A for metered service to the first JP in its set.

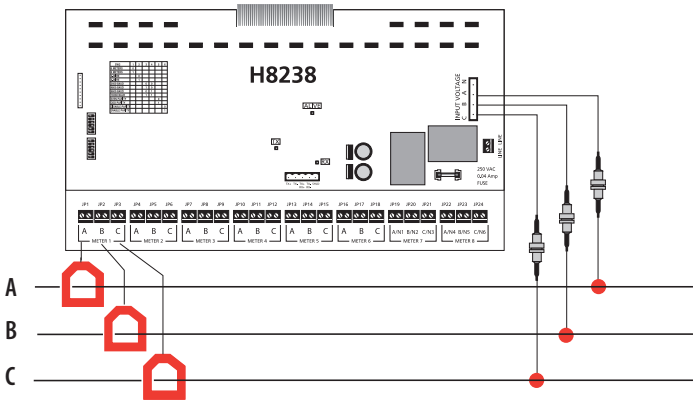
3. Six 3Ø 4-Wire Circuit Monitoring Mode: Connect 5 Amp CTs to terminal blocks JP1 through JP24. The JP terminal blocks are two position, not polarity sensitive, and compatible with standard 2-wire 5 Amp CT outputs. Connect each monitored service to the JP terminals within a meter set. For example meter #1 CT inputs are labeled JP1 (PhA), JP2 (PhB), & JP3 (PhC). Connect the CT monitoring phase A for metered service to the first JP in its set. The terminal blocks referenced by meter 7 and meter 8 are used to monitor neutral currents. Wire the CT monitoring neutral current for the service monitored by METER 1 to JP19. Wire the CT monitoring neutral current for the service monitored by METER 2 to JP20. Wire the CT monitoring neutral current for the service monitored by METER 3 to JP21 and so on through JP24.

4. Connect the voltage leads to the phase conductors as shown in the wiring examples on this page. The monitored voltage must be common to all services monitored by the CTs installed previously.

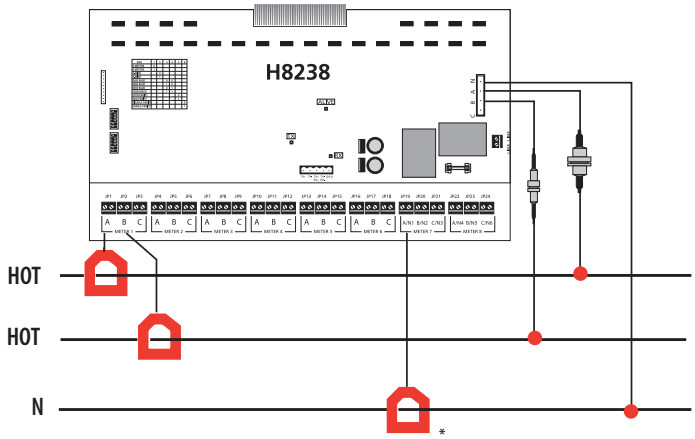
3-Phase 4-Wire Installation



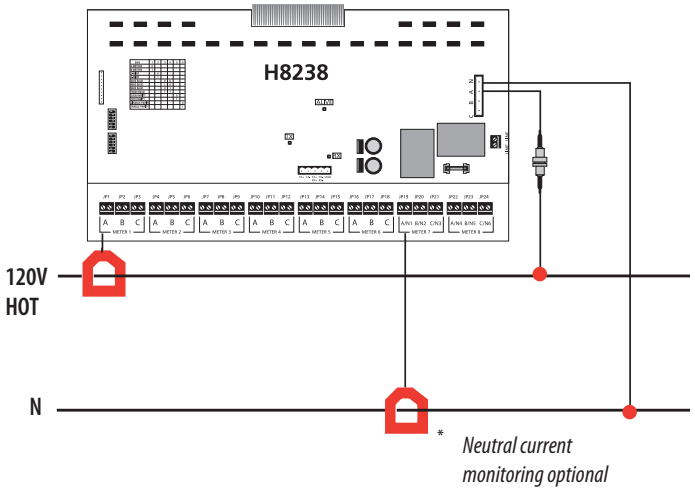
3-Phase 3-Wire Installation



1-Phase 3-Wire Installation†



1-Phase 2-Wire Installation†



† Phase loss, Under Current & Under Voltage alarms are active when monitoring single phase loads.

Communications Configuration

5. Before wiring the H8238, configure the DIP switches:

   6 or 8 Meters

   Configure the H8238 to monitor either 6 services and their neutral curents or 8 services without monitoring neutral currents.

   2 or 4 Wire

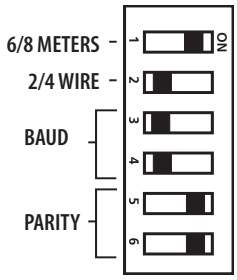
   Configure the H8238 to supply a 4-wire or a 2-wire RS-485 Modbus output.

   Baud Rate

   Configure the Modbus output of the H8238 to communicate at one of four different baud rates: 2400, 4800, 9600, or 19200 (for the H8238EL, possible baud rates are 1200, 2400, 4800, or 9600).

   Parity

   Configure the Modbus output of the H8238 to Even Parity, Odd Parity, or no Parity (Disable).



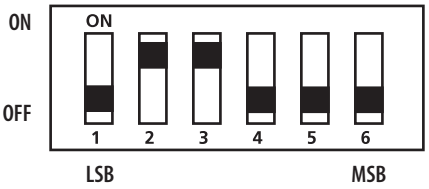
SW2	1	2	3	4	5	6
6 METERS	OFF					
8 METERS	ON					
2-WIRE		OFF				
4-WIRE		ON				
2400 BAUD			OFF	OFF		
4800 BAUD			ON	OFF		
9600 BAUD			OFF	ON		
19200 BAUD			ON	ON		
EVEN PARITY					OFF	
ODD PARITY					ON	
DISABLE PARITY						OFF
ENABLE PARITY						ON

6. Set the network address of the device in increments of 8 starting with the base address of 1. The switch value and the base address are not the same. If a switch value of zero is chosen (all switches in the off position), then the base address is 1. The 8 meters of that H8238 are automatically assigned addresses of 1 through 8 on the Modbus network. No other device on the network may occupy any of the addresses occupied by an H8238. See right for the first three possible switch values, base addresses, and meter addresses. See the Address Selection section of this guide for all possible switch values and base addresses.

The values of each DIP switch are as follows:

Switch Number	Switch Value
1	1
2	2
3	4
4	8
5	16
6	32

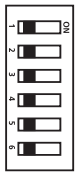
To determine an address, add the values of any address that is on.



= Switch Value of 6
Base Address of 49

Switch number 2 has an ON value of 2 and switch number 3 has an ON value of 4. The total switch value is 6 (2+4=6). The base address for a switch address of 6 is 49.

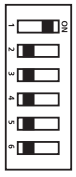
Switch Value = 0



BASE 1

Base Address	8 METER	MODBUS ADDRESS	6 METER	MODBUS ADDRESS
1	Meter #1	1	Meter #1	1
	Meter #2	2	Meter #2	2
	Meter #3	3	Meter #3	3
	Meter #4	4	Meter #4	4
	Meter #5	5	Meter #5	5
	Meter #6	6	Meter #6	6
	Meter #7	7	Meter #7	†
	Meter #8	8	Meter #8	†

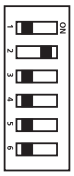
Switch Value = 1



BASE 9

Base Address	8 METER	MODBUS ADDRESS	6 METER	MODBUS ADDRESS
9	Meter #1	9	Meter #1	9
	Meter #2	10	Meter #2	10
	Meter #3	11	Meter #3	11
	Meter #4	12	Meter #4	12
	Meter #5	13	Meter #5	13
	Meter #6	14	Meter #6	14
	Meter #7	15	Meter #7	†
	Meter #8	16	Meter #8	†

Switch Value = 2



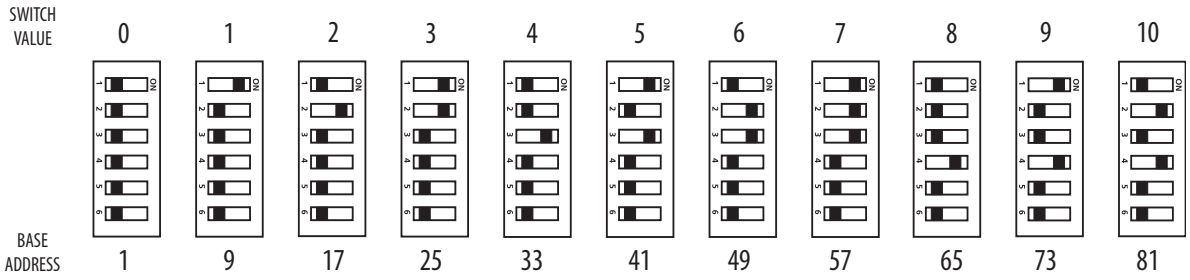
BASE 17

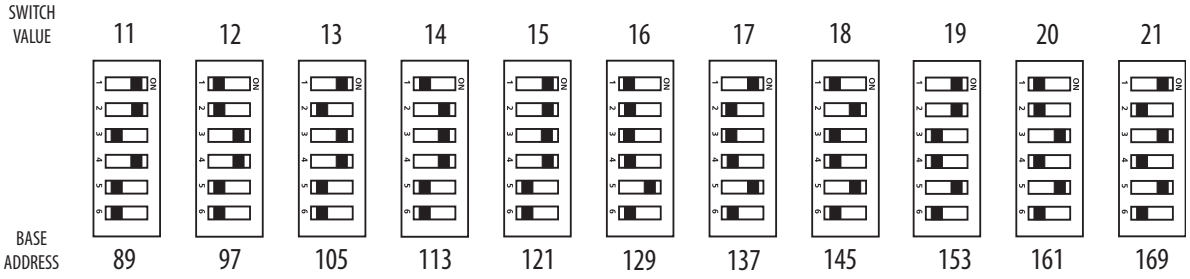
Base Address	8 METER	MODBUS ADDRESS	6 METER	MODBUS ADDRESS
17	Meter #1	17	Meter #1	17
	Meter #2	18	Meter #2	18
	Meter #3	19	Meter #3	19
	Meter #4	20	Meter #4	20
	Meter #5	21	Meter #5	21
	Meter #6	22	Meter #6	22
	Meter #7	23	Meter #7	†
	Meter #8	24	Meter #8	†

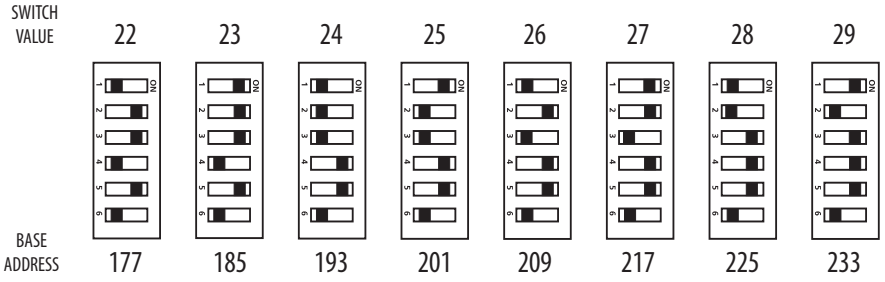
† Reserved for use when 8 meters are connected. Connection of 8 meters is only possible when neutral current monitoring is not required.

Address Selection

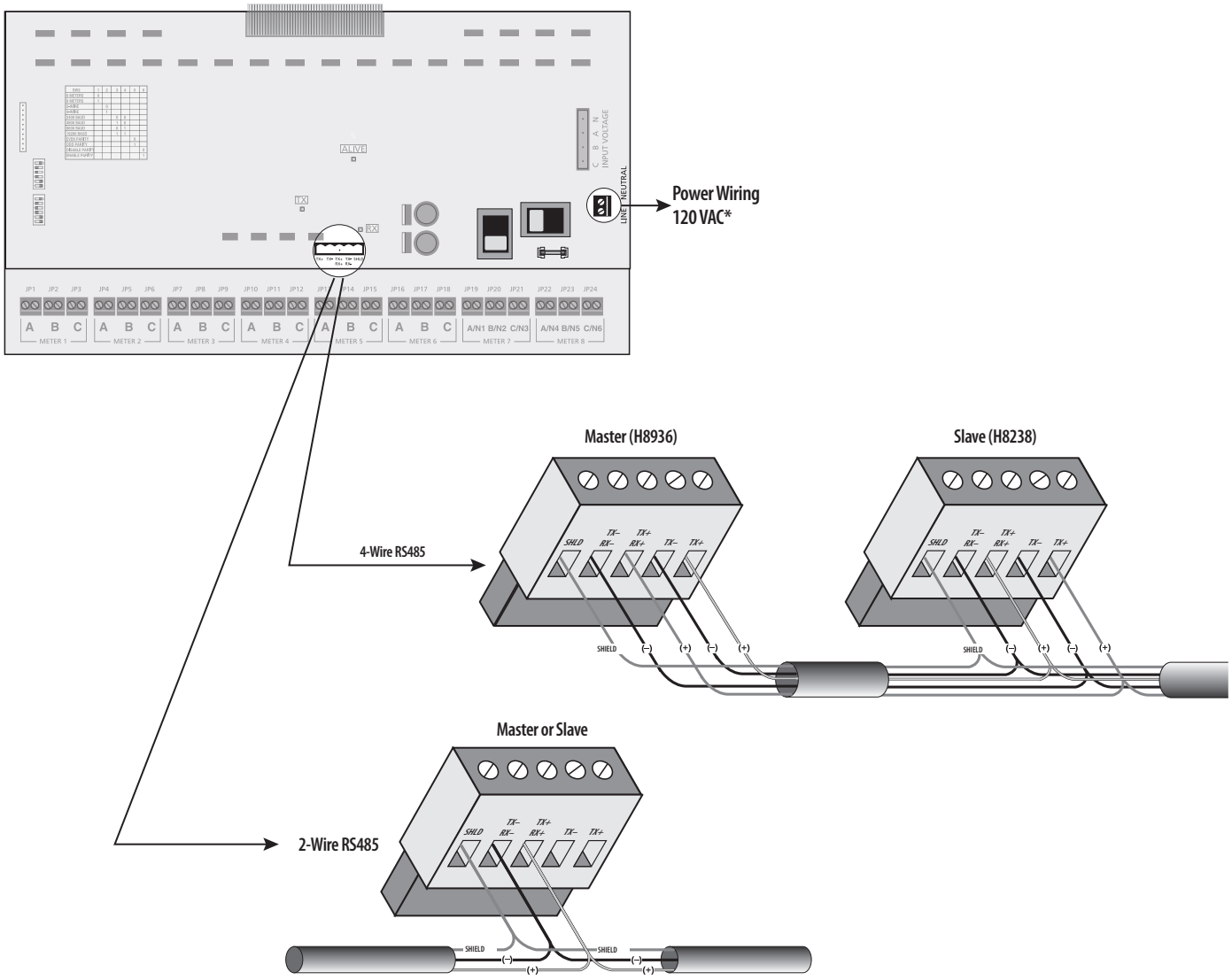
Assign a unique Modbus address to each device. Set the switch block to assign a unique address before the connecting the device to the Modbus RS-485 line. If two devices are assigned the same address, then neither device will be able to communicate. Below are all possible switch values.







7. Connect communications wiring. Follow diagrams below. Wire the RS-485 connection consistent with the 2/4 wire configurations made in step 4.

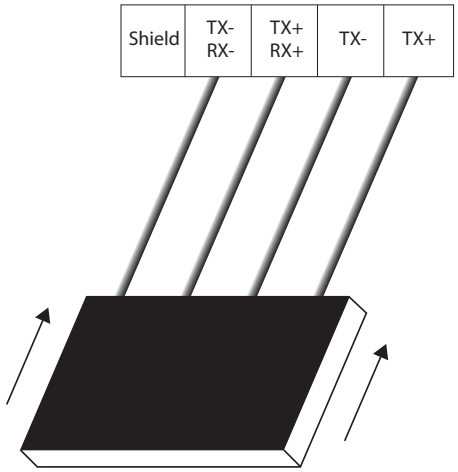


For 240VAC power connection version, order catalog number H8238E

TERMINATING THE H8238

If the H8238 is the last device on the network, terminate it to ensure reliable communications.

1. Insert the wires of the daisy chain and the wires of the terminator into the holes of the RS-485 communications connector.
2. Using a small flat blade screwdriver, tighten the connector's screws. Torque the connector screws 4 lbs-in. (0.45 N-m).
3. Reinstall the connector back into the signal acquisition board.
4. Secure the communications cable in the enclosure.



CONFIGURING CT VALUES AND SETTING ALARM THRESHOLDS

Configure CT values and alarm thresholds with the software configuration utility or by writing to Modbus protocol registers.

Parameter	Description	Register Number	Range	Default Value
CT Scale	configure the H8238 to the size of the CTs monitoring the service.	30	1-5999 A	100 A
Over Voltage Alarm Threshold	occurs if the average L-L voltage is greater than this threshold at any time	31	0-65535 V*	65535 V
Under Voltage Alarm Threshold	occurs if the average L-L voltage is less than this threshold for at least 1- seconds	32	0-65535 V*	0 V
Over Current Alarm Threshold Register	occurs if any phase current is greater than this threshold at any time	33	0-65535 A*	65535 A
Under Current Alarm Threshold	occurs if any phase current is less than this threshold at any time	34	0-65535 A*	0 A
Over kVA Alarm Threshold Register	occurs if the total apparent power is greater than this threshold at any time	35	0-65535 kVA*	65535 kVA
Under kVA Alarm Threshold	occurs if the total apparent power is less than this threshold at any time	36	0-65535 kVA*	65535 kVA
Meter Alarm Status Register	This register holds in memory any alarm that has occurred in the meter. Conditions that caused an alarm and then returned to normal states are visible in this register. To clear the latching alarms, write a 0 to the desired bit. Bit 0 – Over Current Bit 1 – Under Current Bit 2 – Over kVA Bit 3 – Under kVA Bit 4 – Over Voltage Bit 5 – Under Voltage Bit 6 – Phase Loss A Bit 7 – Phase Loss B Bit 8 – Phase Loss C	37	n/a	
Phase Loss Threshold	Sets the maximum to deviation of any phase voltage compared the average L-N voltage	38	0-100%	65535 (disabled)
Meter Alarm Status	This register holds the instantaneous state of the meter alarms. Alarms in this register represent present conditions only.	49	n/a	Non Latching

Modbus Function Codes Supported

3, read holding registers

6, preset single register

17, report slave ID

** Correct conversion to engineering units requires use of integer multiplier. For example: To set over-voltage threshold (#31) to 235 V:*

$$\frac{235V}{0.1} = 2350$$

2350 is the value to write to #31

