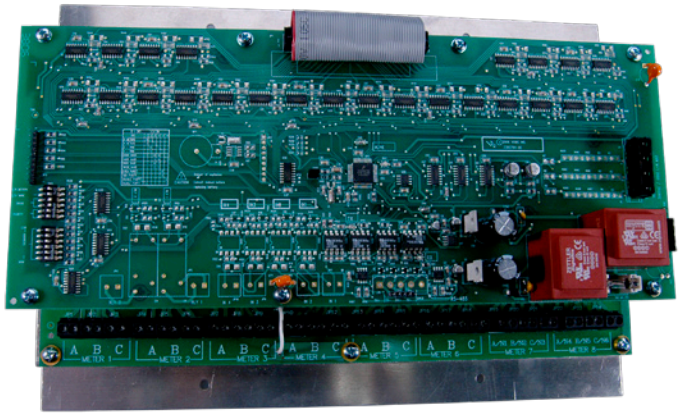
H8238

Multi-Circuit Meter



⚠ 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.

PRODUCT IDENTIFICATION

MODEL	DESCRIPTION
H8238	Multi-Circuit Monitor

*For 240VAC supply voltage version, order H8238E

Installer's Specifications

Electrical services	Eight 3Ø circuits. All circuits share a common line voltage source
Sample rate	1280Hz
Operating Temperature Range	0° to 60°C (32° to 140°F) (<95%RH, non-condensing)
Storage Temperature Range	-40°C to 70°C
Systems accuracy	+/- 1% (target, exclusive of user-supplied CTs)*
Variable update rate	200 msec for voltages, 1.6 sec for all other
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	480VAC + 10% = 528VAC
Frequency	50/60 Hz
Terminal block	4-position Euro style pluggable connector (max wire size 12 gauge)
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 pluggable connector (max. wire size 12 gauge)
Operating Power Inputs:	
Power source	Dedicated 120 or 240VAC, L-N; fused 40 mA (240VAC for H8238E)
Power voltage tolerance	+10/-25% (90-132VAC for H8238E)
Frequency	50/60Hz
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

** Accuracy specification valid only when amperages are greater than 10% of maximum CT range.*
*** Baud rate for L version is 1200, 2400, 4800, 9600.*

ATTENTION

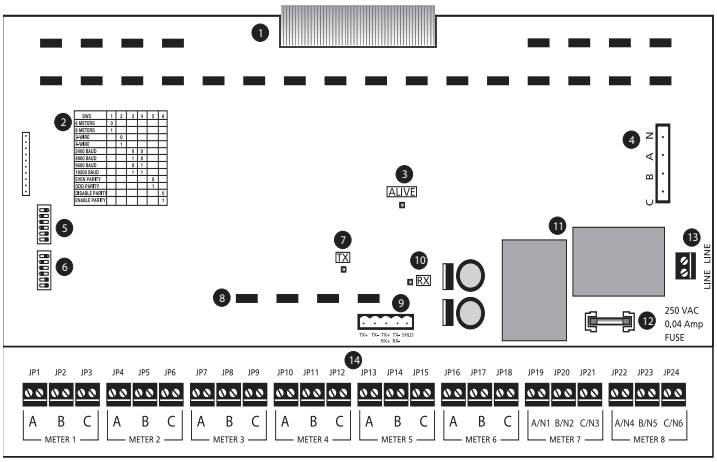
H8238 Series transducers are sold as open devices. Observe handling precautions for static sensitive devices to avoid damage to the circuitry which would not be covered under the factory warranty.

QUICK INSTALL

1. Connect the current inputs.
2. Connect 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 503.598.4564 / support@veris.com

PRODUCT DIAGRAM



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

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

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

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 2/4 wire communications parameters.

6. ***Modbus Address DIP Switches:*** Each Modbus device must have a unique address. These switches must be set to assign an individual address before the device is connected. (See page 7)

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

8. ***Optical Isolation:*** An optical isolation barrier is used to separate high voltage and 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.

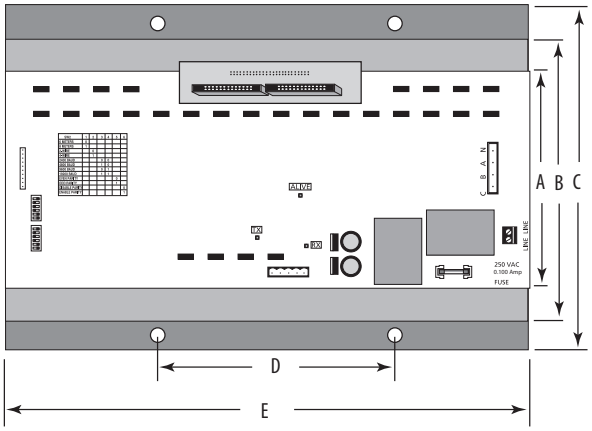
13. ***120 or 240 VAC Power Connection*:*** Easy 2-wire 120 or 240 VAC line to neutral 50/60Hz.

14. ***5A CT Input Terminals:*** CT terminals accept any 5A CT signal. Two wire, polarity insensitive.

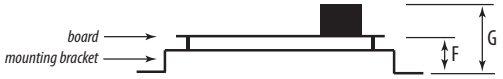
** For 240VAC power connection version, order catalog number H8238E.*

DIMENSIONS

Top View



Side View



WIDTH:
- A 5.3″/135mm (board)
- B 7.1″/181mm (mounting bracket)
- C 8.9″/226mm (mounting bracket base)

LENGTH:
- D 6.0″/153mm
- E 12.9″/327mm

HEIGHT:
- F 1.0″/26mm
- G 2.2″/55mm

INSTALLATION

Current Configuration

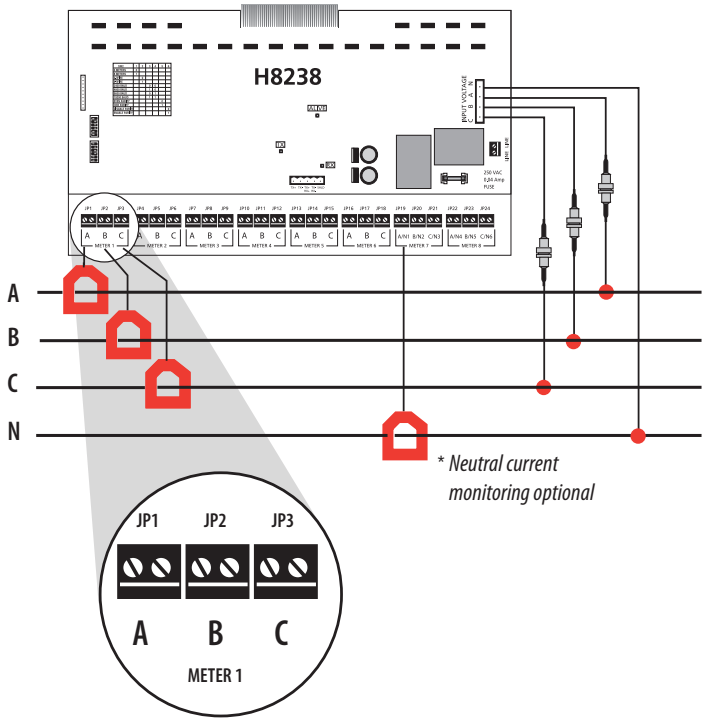
1. Connect the current inputs. The multi-circuit meter is capable of monitoring up to eight 3Ø 3-wire circuits or six 3Ø circuits plus neutral current. Choose either 8 or 6 meter configuration and proceed with the appropriate step 2.

2. Eight 3Ø 3-Wire Circuit Monitoring Mode: Connect 5 Amp current transformers to terminal blocks labeled JP1 through JP24. The JP terminal blocks are two position and polarity insensitive. They are compatible with standard 2-wire 5A CT outputs. Each monitored service should be connected to the JP terminals within a meter set. For example Meter #1 CT inputs are labeled JP1 (PhA), JP2(PhB), & JP3(PhC). The CT monitoring phase A for metered service should be connected to the first JP in its set.

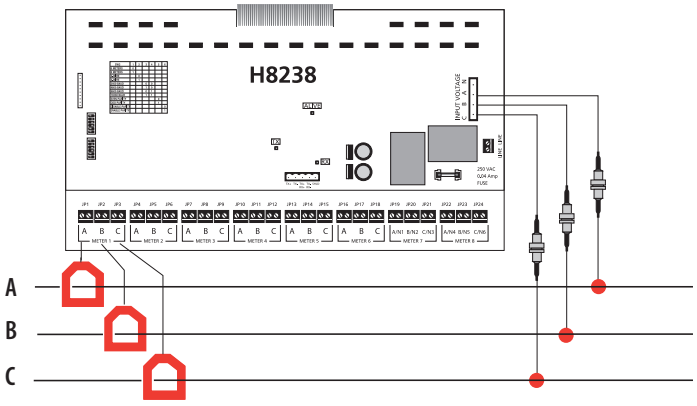
3. Six 3Ø 4-Wire Circuit Monitoring Mode: Connect 5 Amp current transformers to terminal blocks labeled JP1 through JP24. The JP terminal blocks are two position and polarity insensitive. They are compatible with standard two wire 5A CT outputs. Each monitored service should be connected to the JP terminals within a meter set. For example Meter #1 CT inputs are labeled JP1 (PhA), JP2 (PhB), & JP3 (PhC). The CT monitoring phase A for metered service should be connected 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 voltage leads to phase conductors as shown by the wiring examples on this page. The monitored voltage must be common to all services monitored by CTs installed at the previous step.

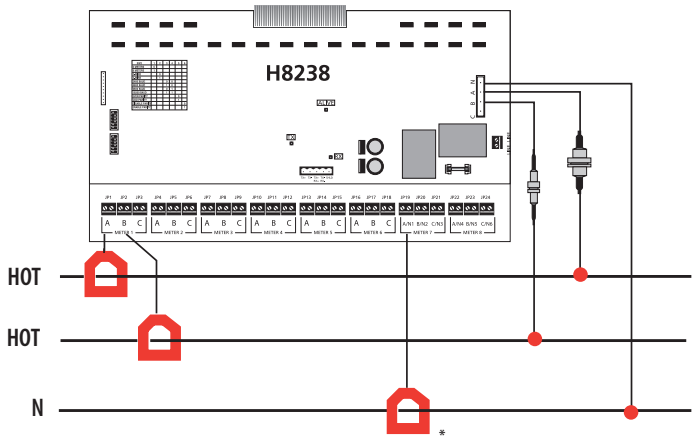
3-Phase 4-Wire Installation



3-Phase 3-Wire Installation

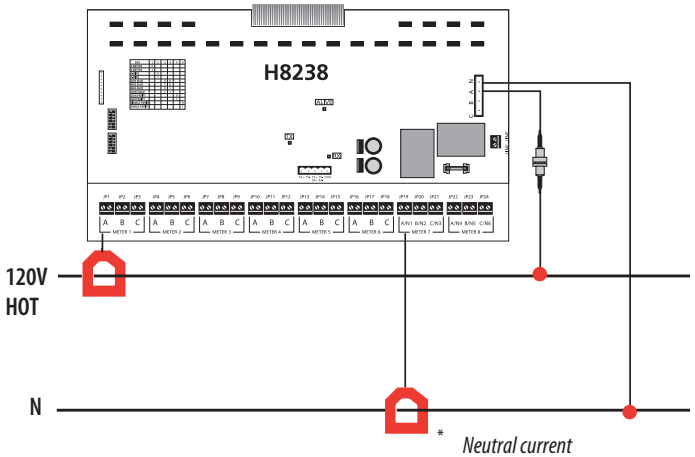


1-Phase 3-Wire Installation†



Neutral current monitoring optional

1-Phase 2-Wire Installation†



Neutral current monitoring optional

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

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Communications Configuration

5. Before wiring the multi-circuit meter a series of DIP switch configurations must be made:

   6/8 METERS

   The H8238 can be configured to monitor either 6 services and their neutral curents or 8 services without monitoring neutral currents.

   2/4 WIRE

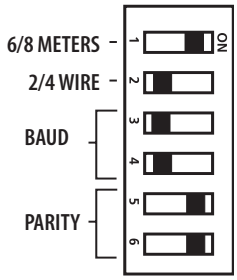
   The H8238 can be configured to supply a 4-wire RS-485 or a 2-wire RS-485 Modbus output.

   BAUD*

   The Modbus output of the H8238 is configurable to communicate at four different baud rates: 2400, 4800, 9600, and 19200.

   PARITY

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

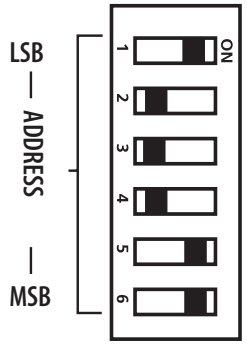


SW2	1	2	3	4	5	6
6 METERS	OFF					
8 METERS	ON					
2-WIRE		OFF				
4-WIRE		ON				
2400 BAUD			OFF	OFF		
4800 BAUD			ON	OFF		
9600 BAUD			OFF	ON		
19200 BAUD			ON	ON		
EVEN PARITY					OFF	
ODD PARITY					ON	
DISABLE PARITY						OFF
ENABLE PARITY						ON

***Baud Rate For L Version**

The Modbus output of the H8238EL is configurable to communicate at four different baud rates: 1200, 2400, 4800, and 9600.

6. Set the Network address of the device. An H8238 can be addressed in increments of 8 starting with the base address of 1. Note that 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) 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

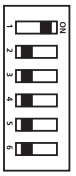
Switch number 2 has an ON value of 2 and switch number 3 has an ON value of 4. The total switch value is 6 (2+4=6). The base address for a switch address of 6 is 49.

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	†

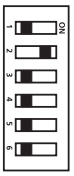
Switch Value = 1



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

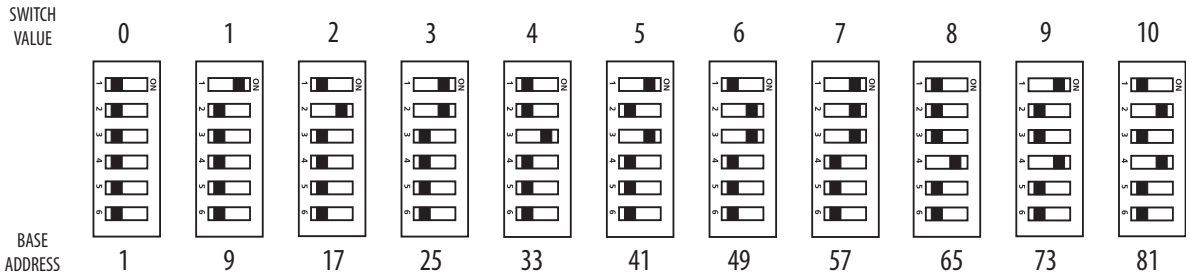


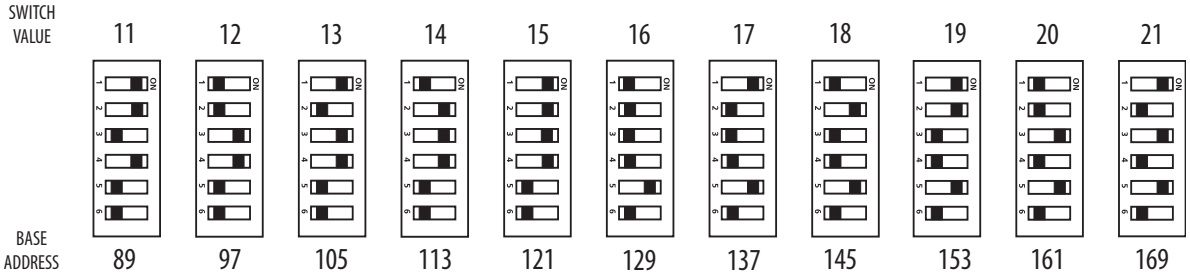
BASE 17

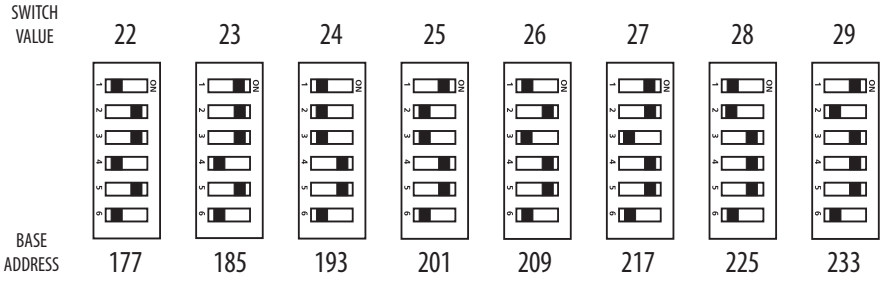
Base Address	8 METER	MODBUS ADDRESS	6 METER	MODBUS ADDRESS
17	Meter #1	17	Meter #1	17
	Meter #2	18	Meter #2	18
	Meter #3	19	Meter #3	19
	Meter #4	20	Meter #4	20
	Meter #5	21	Meter #5	21
	Meter #6	22	Meter #6	22
	Meter #7	23	Meter #7	†
	Meter #8	24	Meter #8	†

Address Selection

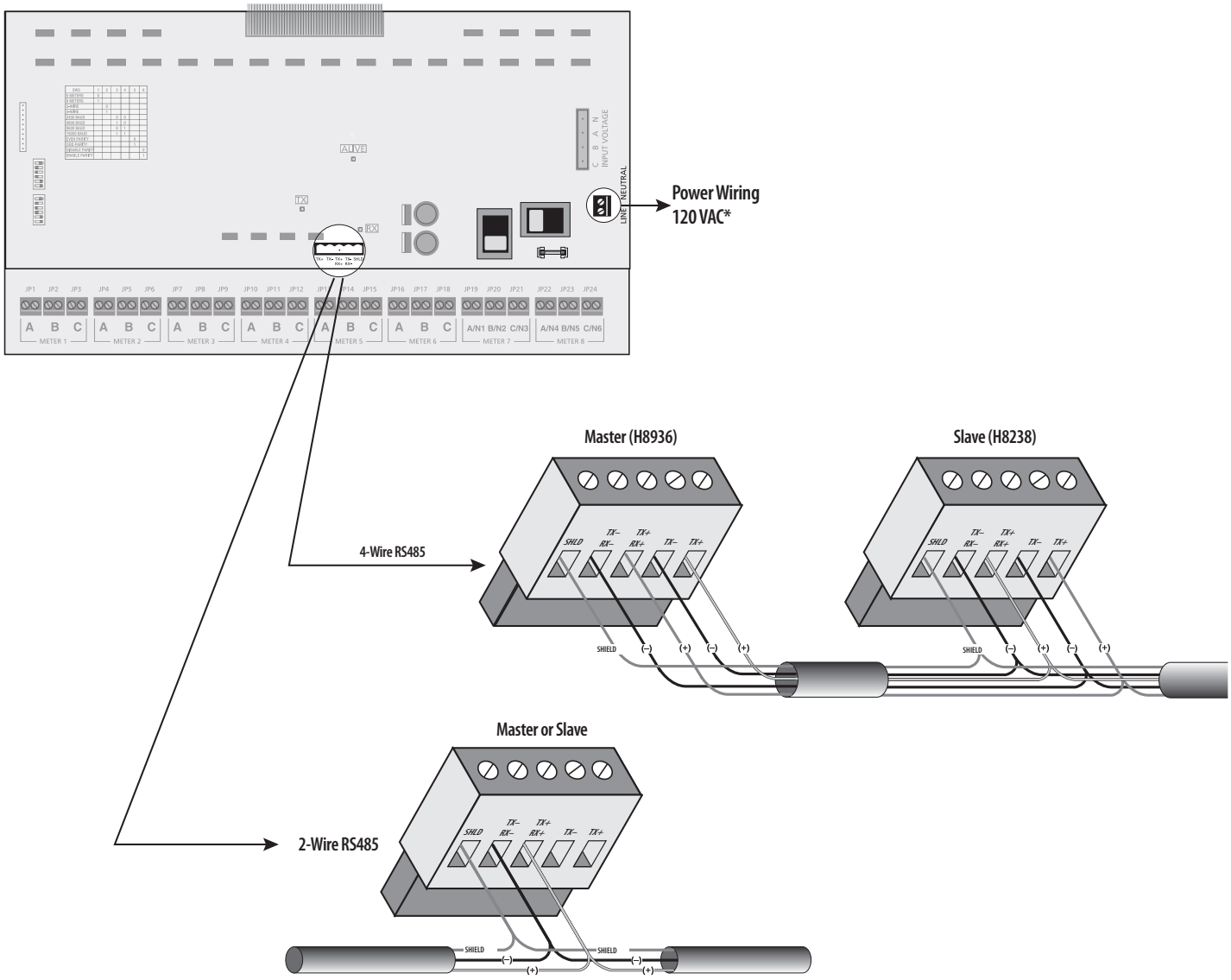
Each Modbus device must have a unique address. The switch block must be set to assign a unique address before the device is connected to the Modbus RS-485 line. If an address is selected which conflicts with another device, both devices will be unable to communicate. Below are all possible switch values at the top of the switches as shown.







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



**For 240VAC power connection version, order catalog number H8238E*

CONFIGURING CT VALUES AND SETTING ALARM THRESHOLDS

CT Values and Alarm Thresholds are configured with the software configuration utility or by writing to Modbus protocol registers.

Changing the CT Scale Register #30 (default = 100A)

Before operation the H8238 must be configured to the size of CTs monitoring the service. Range is 1-5999 Amps. A setting of 2500 indicates 2500:5A CTs are used.

Over Voltage Alarm Threshold Register #31

(default = 65535)
An over voltage alarm occurs if the average L-L voltage is greater than this threshold at any time. Range 0-65535*.

Under Voltage Alarm Threshold Register #32

(default = 0)
An under voltage alarm occurs if the average L-L voltage is less than this threshold for at least 1- seconds. Range 0-65535*.

Over Current Alarm Threshold Register #33

(default = 65535)
An over current alarm occurs if any phase current is greater than this threshold at any time. Range 0-65535*.

Under Current Alarm Threshold Register #34

(default = 0)
An under current alarm occurs if any phase current is less than this threshold at any time. Range 0-65535*.

Over kVA Alarm Threshold Register #35

(default = 65535)
An over kVA alarm occurs if the total apparent power is greater than this threshold at any time. Range 0-65535*.

Under kVA Alarm Threshold Register #36

(default = 65535)
An under KVA alarm occurs if the total apparent power is less than this threshold at any time. Range 0-65535*.

Meter Alarm Status Register #37 (Latching)

This register holds in memory any alarm that has occurred in the H704-42. Conditions which caused an alarm and then returned to normal states will be 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

Phase Loss Threshold Register #38 (default 65535)

Sets the maximum to deviation of any phase voltage compared the average L-N voltage. Range 0-100%. Default=65535 (disabled)

Meter Alarm Status Register #49 (Non Latching)

This register holds the instantaneous state of the meter alarms. Alarms in this register represent present conditions only.

Modbus Function Codes Supported

3, read holding registers
6, preset single register
17, report slave I.D.

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

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

2350 is the value to write to #31

