

Installation Instructions

H663 Series

Split-Core Branch
Current Monitor



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Easy Installation

- First split-core solution for branch current monitoring in the industry!
- Monitor up to 42 (breakers) poles with one product
- Split-core CT's provide quick and easy installation...ideal for retrofit
- Simple two wire 120 VAC power connection*

Network Ready RS485 Output

- Retrieve amperage information from up to 42 circuits with one RS485 drop... easy wiring
- Global alarm register for instant alarm and warning notification
- Integrates to available network display for local indication
- Easy to use configuration software simplifies setup and provides flexibility to customize the configuration to meet the application

WARNINGS



DANGER OF ELECTROCUTION: BE CERTAIN THAT EVERY CT IS CONNECTED TO A LOAD AT ALL TIMES WHEN CLAMPED TO AN ENERGIZED CONDUCTOR. Current mode Current Transformers (CTs) such as those used in this product can be damaged, or generate lethal voltages, if clamped around current carrying conductors while the output leads are not properly terminated to a shorting device, or loaded, as by the H663SM main board. Install wiring connectors in accordance with manufacturer's specifications and instructions.

- Potential electrocution hazard exists. Installing sensors in an energized electrical panel, or on any energized conductor can be hazardous. CT outputs should not be connected to Operator Accessible circuits.
- Read instructions thoroughly prior to install
- This product is not intended for life or safety applications.
- This product is not intended for installation in hazardous or classified locations and must be installed in an electrical and fire enclosure in accordance with EN 61010-1.

Severe injury or death can result from electrical shock during contact with high voltage conductors or related equipment. Disconnect and lock-out all power sources during installation and service. Applications shown are suggested means of installing sensors, but it is the responsibility of the installer to ensure that the installation is safe and in compliance with all national and local codes. Installation should be attempted only by individuals familiar with codes, standards, and proper safety procedures for high-voltage installations.

OPERATION

Designed for the critical load monitoring such as Co-location Data Centers and lighting panels, the H663 series monitors current on up to 42 branch circuits in a 120/208/240 VAC electrical panel. By individually reporting current draw and initiating capacity warnings and alarms, the H663 series allows the user to manage loading and eliminate power disturbances caused by overloaded breakers.

The H663 series consists of a data acquisition system board and up to 42 individual split-core current transformers (CTs). The acquisition board should be mounted inside the electrical panel, or in an enclosure mounted near enough for the CT output leads to reach the acquisition board connectors. The CTs are clipped onto each of the branch circuit conductors. These CTs transmit amperage data from each monitored circuit to the acquisition system for processing.

Current and alarm information is transmitted to the user's Control Data Acquisition system over an RS485 drop using the Modbus protocol.

Set-up is made easy with a PC based configuration tool which allows for global or individual selection of breaker size, warning levels, and alarm levels.

The H663 Series is a UL508 Listed open device without enclosure.

*For 240VAC Power connection versions, order catalog number H663SM-xxE

INSTALLATION

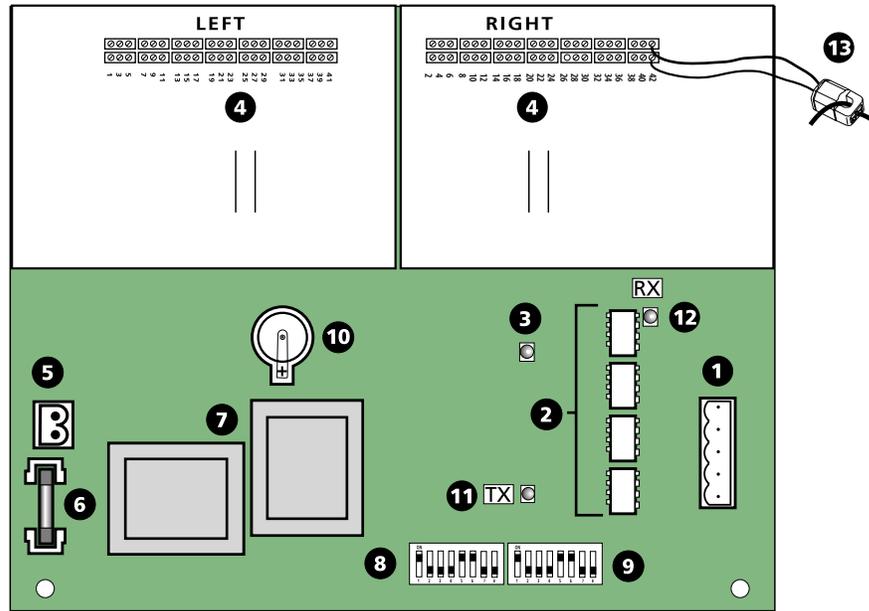


Figure 1

- 1** RS 485 2 or 4-Wire Connection
Daisy chain multiple H663's using a 2-wire or 4-wire modbus network. Refer to Figure 4 on page 7.
- 2** Optical Communications Isolation
Optical isolators are used to separate 120 VAC portions of the circuit from the RS485 network.
- 3** Alive LED
Flashes once per second to indicate correct operation. If steadily lit or out, indicates internal failure.
- 4** Current Transformer (CT) Connectors (Interconnection Boards)
Numbered terminals correspond to the input channels of the acquisition board. Fasten the current transformer connectors into the terminals as shown in figure 3 on page 3.
- 5** 120 VAC Power Connection*
Easy 2-wire 120 VAC line to neutral 50/60 Hz.
- 6** 250 VAC 100mA Fuse
Fused power connection for circuit protection.
- 7** Power Transformer
Linear power supply for reliability and low noise
- 8** Baud Rate & Parity Selection Switches
Field selectable RS-485 serial interface control. (See Chart 1 on page 5)
- 9** 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 to the network. (See page 5)
- 10** Lithium Battery
CAUTION! DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
- 11** TX LED
Indicates transmission of information over the Modbus network.
- 12** RX LED
Indicates data received on the Modbus network
- 13** Current Sensors
Each current sensor is capable of monitoring conductors carrying up to a maximum of 50 amps.*

*The H663SM-42H is capable of monitoring conductors up to a maximum of 100 amps.

*For 240VAC Power Connection version, order catalog number H663SM-xxE.

INSTALLATION

Physical Installation

1. Snap split-core CT's on branch circuit wires. (CT's may need to be staggered).
2. Prepare 120VAC* 50/60Hz power leads and connect to line and neutral terminals of the acquisition board. Allow wiring length to fit when board is installed. **DO NOT CONNECT LINE VOLTAGE UNTIL LAST STEP!**
3. Connect current transformers to interconnection board terminals as shown in Figure 3.
4. Acquisition Board Installation (see Figure 2)
Find screw holes under panel board in side of chassis or panel. Attach Data Acquisition Board.

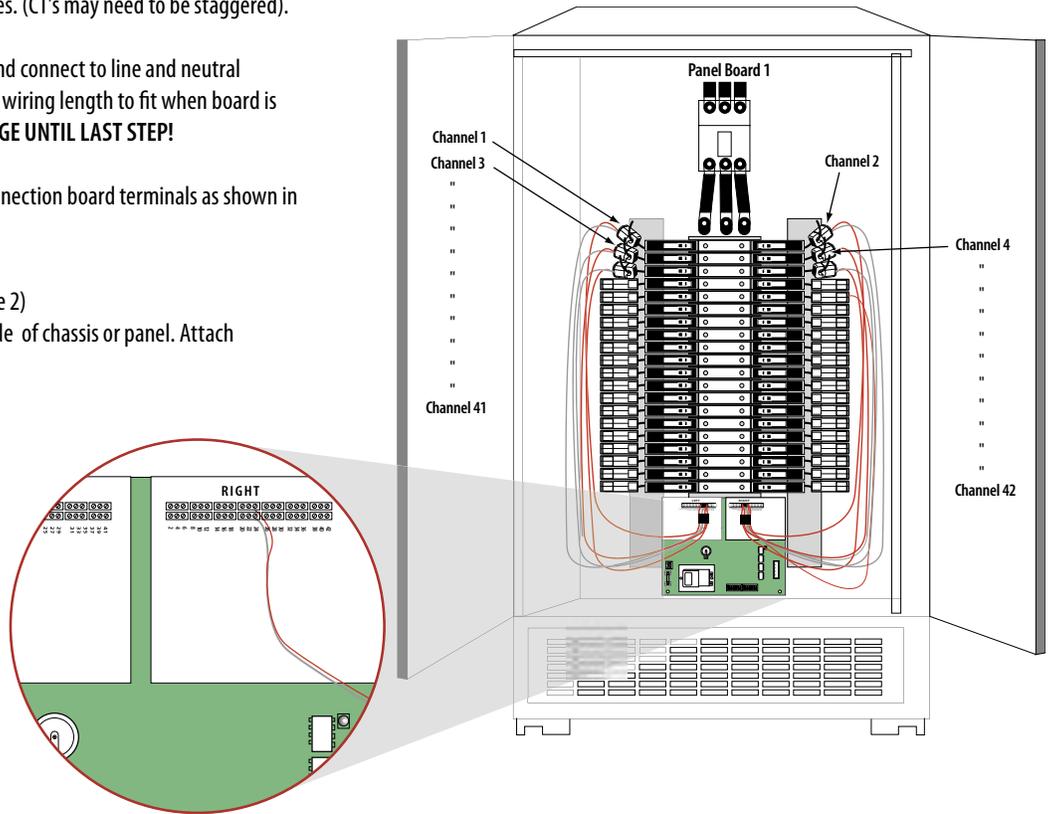


Figure 2



DANGER: Beware of exposed busbars on back of panelboard when installing circuit board assembly/mounting bracket. Assure adequate clearance between live parts and this product.

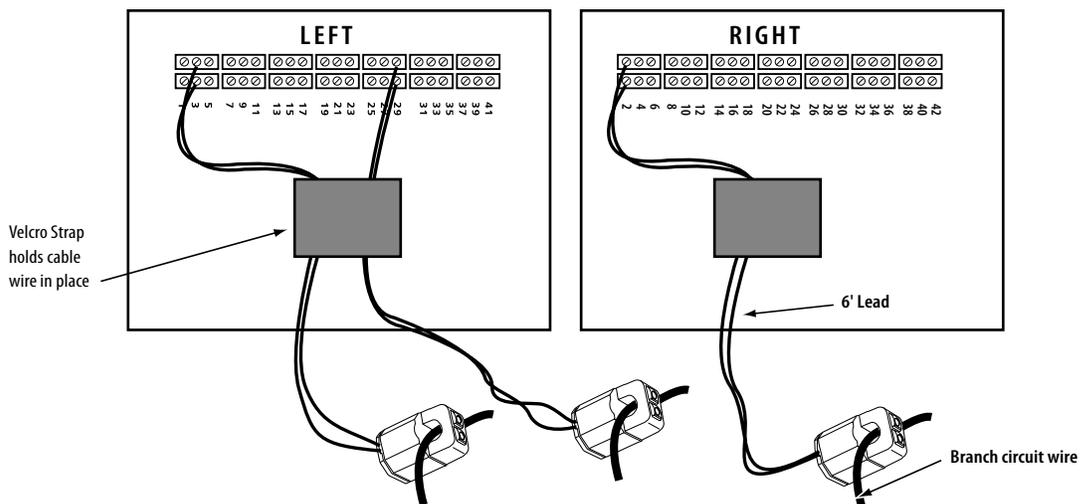
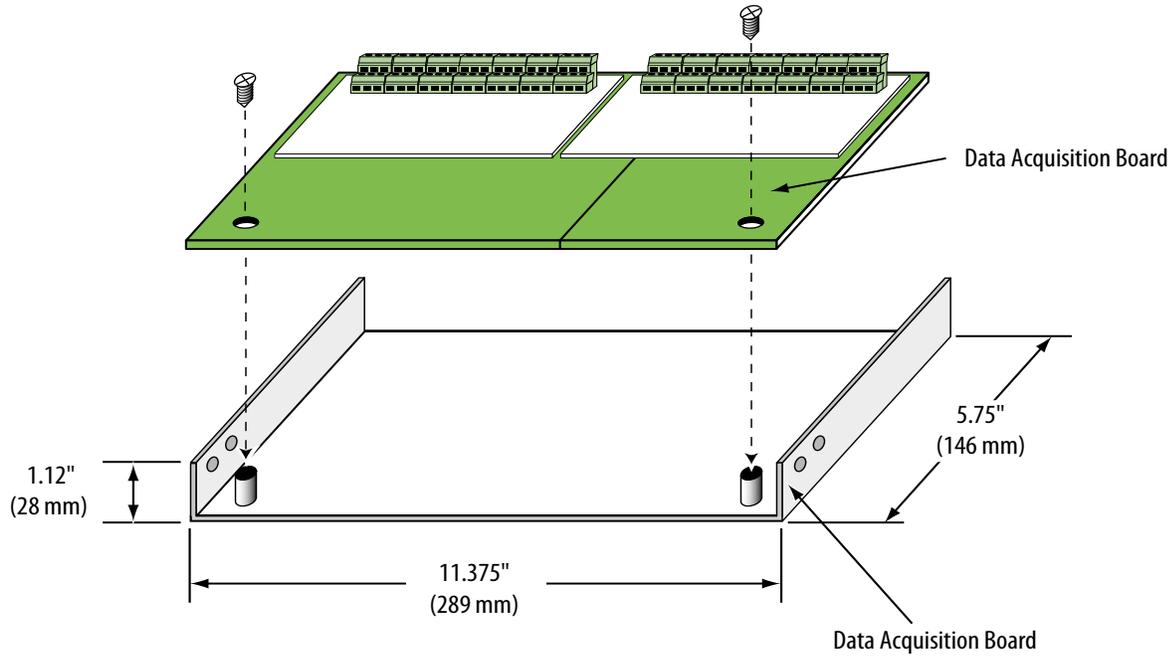


Figure 3

*240VAC for H663SM-xxE

Mounting Bracket Kit

Acquisition and interconnection boards are mounted to the bracket at the factory.



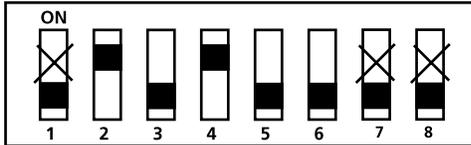
CONFIGURATION

Output Configuration

1. Communications Configuration

Communications parameters for the H663 series are field selectable for your convenience. Please see Figure 1 (page 2, #8) for selector location. The following parameters are configurable:

- Parity: Odd, even or none
- Wiring: Two or four
- Baud Rate: 2400, 4800, 9600 or 19200



Example: 2-wire 9600 Baud No Parity (Default Only)

2. Address Configuration

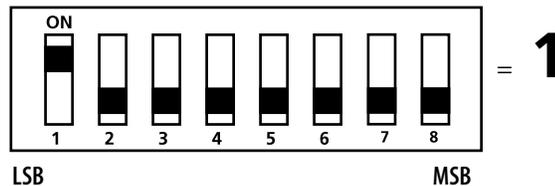
Each ModBus device on a single network must have a unique address. The switch block must be set to assign a unique address before the device is connected to the ModBus RS485 network. If an address is selected which conflicts with another device, neither device will be able to communicate.

H663 series can be addressed as any whole number between and including 1-247. Each unit is equipped with a set of 8 dip switches for addressing. See below.

Baud Rate and Parity Switch Settings

| Switch # | | | | | | | | Wiring, Baud Rate, Parity | | |
|----------|-----|-----|-----|-----|-----|---|---|---------------------------|-----------------------------|--------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Wiring | DESIRED RESULT Baud Rate | Parity |
| X | On | | | | | X | X | 2 wire | | |
| X | Off | | | | | X | X | 4 wire | | |
| X | | Off | Off | | | X | X | | 2400 Baud | |
| X | | On | Off | | | X | X | | 4800 Baud | |
| X | | Off | On | | | X | X | | 9600 Baud | |
| X | | On | On | | | X | X | | 19200 Baud | |
| | | | | Off | Off | | | | | None |
| | | | | On | Off | | | | | Even |
| | | | | Off | On | | | | | Odd |

Chart 1



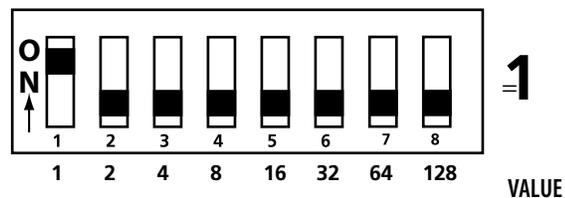
LSB

MSB

The values of each dip switch are as follows:

- 1=1
- 2=2
- 3=4
- 4=8
- 5=16
- 6=32
- 7=64
- 8=128

or



VALUE

To determine an address you simply add the values of any switch that is on.

For example:



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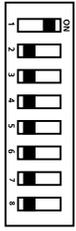
Switch number 4 has an ON Value of 8 and switch number 6 has an ON Value of 32. (8+32 = 40)

See Chart 2 on the following page for a pictorial listing of the first 63 switch positions.

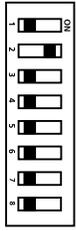
ADDRESS SELECTION EXAMPLES



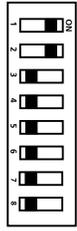
DO NOT
USE ZERO



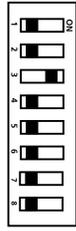
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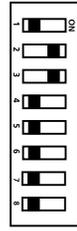
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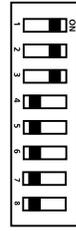
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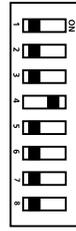
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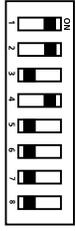
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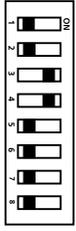
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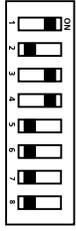
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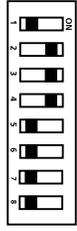
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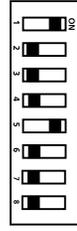
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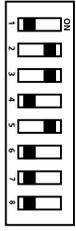
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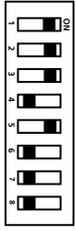
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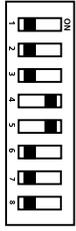
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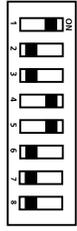
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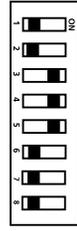
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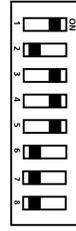
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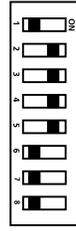
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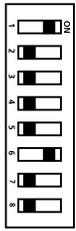
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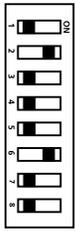
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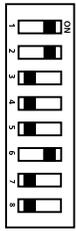
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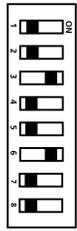
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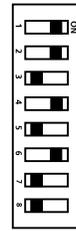
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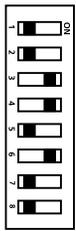
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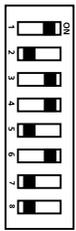
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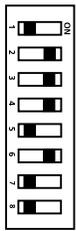
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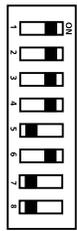
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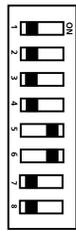
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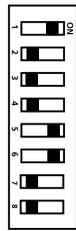
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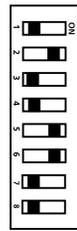
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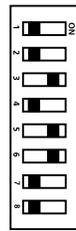
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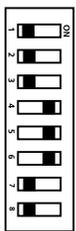
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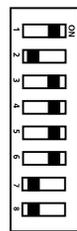
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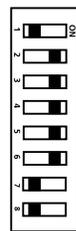
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INSTALLATION

1. Connect 2-wire or 4-wire Modbus RS485 network (see Figure 4).

NOTES

A. The Modbus cable should be mechanically secured where it enters the electrical panel.

B. All Modbus devices should be connected together in a daisy-chain fashion, and properly terminated.

C. The Modbus cable should be shielded twisted pair wire such as Belden 1120A. The cable must be voltage rated for the installation.



WARNING: After wiring the Modbus cable, remove all scraps of wire or foil shield from the electrical panel. This could be **DANGEROUS** if wire scraps come into contact with high voltage conductors!

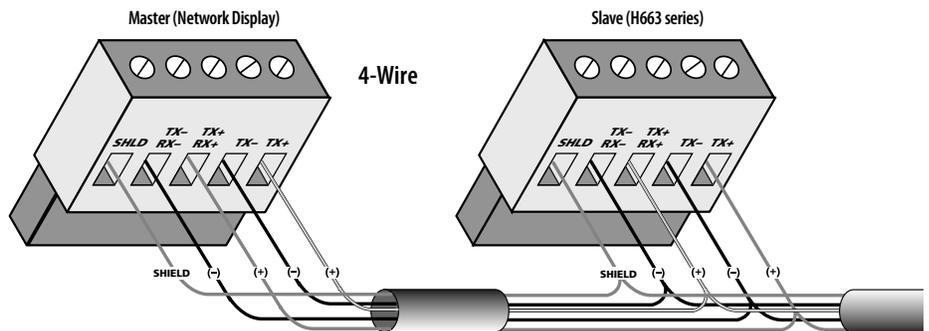
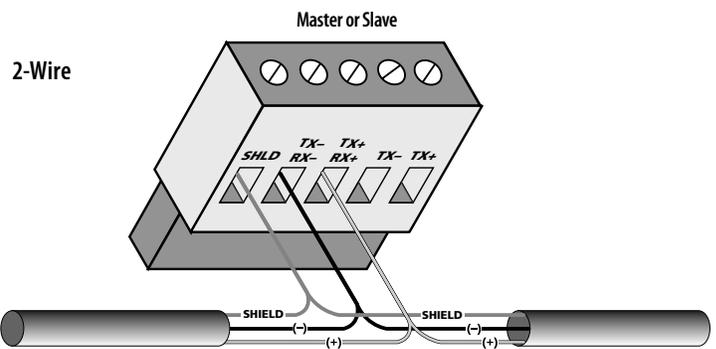


Figure 4

2. Use Software Configuration Tool to set up breaker size, warning levels, and alarm levels.

3. Power Connection



Disconnect and lock out power source before making any connections. Connect 2-wire 120 VAC power to power terminals. (see #5 on page 2 for location) Observe polarity.

SERVICE

Changing the Lithium Battery

1. Normal life expectancy is approximately 5 years.
2. Disconnect and lock out power to panel.
3. Disconnect and lock out 120 V* power source to Data Acquisition Board.
4. Remove old lithium battery. Take care not to short battery terminals.
5. Replace with new lithium battery. (See specifications for battery type)
6. Reconnect 120V* power source to Data Acquisition Board.
7. Reconnect power.

Note: Do not dispose of lithium battery in fire. Use local recycling facility to dispose of lithium batteries.

Changing the Fuse

1. Disconnect and lock out power.
2. Disconnect and lock out 120V* power source to Data Acquisition Board.
3. Remove old fuse.
4. Replace with new fuse (see specifications for fuse type).
5. Reconnect 120V* power source to Data Acquisition Board.
6. Reconnect power.
7. Check "Alive" LED for proper function (See Figure 1, #3 on page 2 for location).

*240VAC for H663SM-xxE

**If fuse blows repeatedly, check power source to ensure that it is a stable 120VAC source.

