



Installation Instructions

H662 Series

*Networked (N2BUS) Split-Core Branch
Current Monitor Compatible with Johnson Controls, Inc.,
Metasys & Companion Systems*

VERIS INDUSTRIES

PORTLAND, OREGON USA
(503) 598-4564 FAX (503) 598-4664
1-800-354-8556
<http://www.veris.com> email:sales@veris.com



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 N2 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



- *This product is not intended for life or safety applications.
This product is not intended for installation in hazardous or classified locations.*

- *Potential electrocution hazard exists. Installing sensors in an energized motor control center or on any energized conductor can be hazardous.*
- *Read instructions thoroughly prior to install*

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 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 H662 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 H662 series allows the user to manage loading and eliminate power disturbances caused by overloaded breakers.

The H662 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. The CTs are voltage output limited for safe installation while the circuit is under power.

Current and alarm information is transmitted to the user's Control Data Acquisition system over an RS485 drop using the N2 protocol.

An included PC-based software tool simplifies configuration of the H662 series. The software sets circuit breaker trip points, and warning and alarm levels globally for the entire panel, or circuit by circuit.

The H662 Series is a UL508 Listed open device without enclosure.

*For 240VAC Power connection versions, order catalog number H662SM-xxE.

INSTALLATION

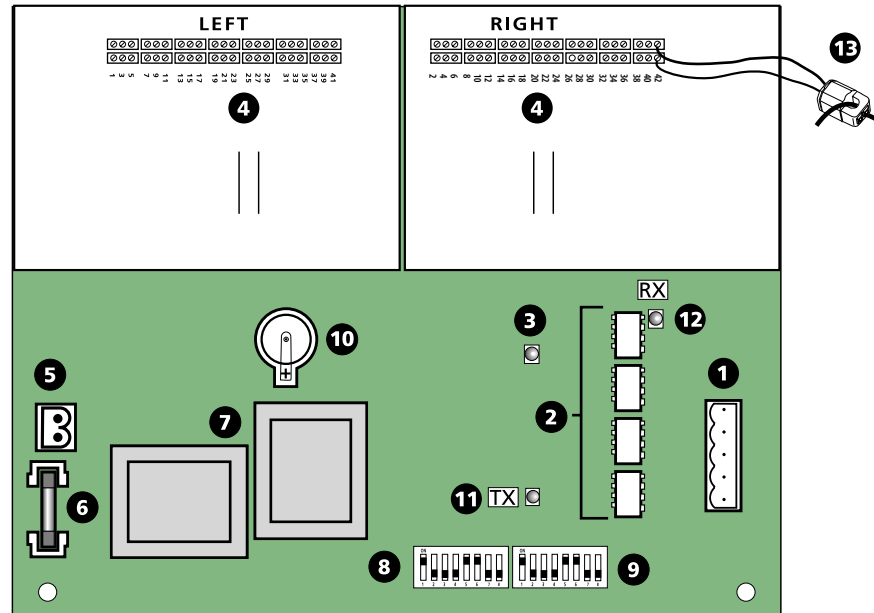


Figure 1

- 1** RS 485 2-Wire Connection
Daisy chain multiple H662's using a 2-wire N2 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** N2 Address Dip Switches
Each N2 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 N2 network.
- 12** RX LED
Indicates data received on the N2 network
- 13** Current Sensors
Each current sensor is capable of monitoring conductors carrying up to a maximum of 50 amps.

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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.

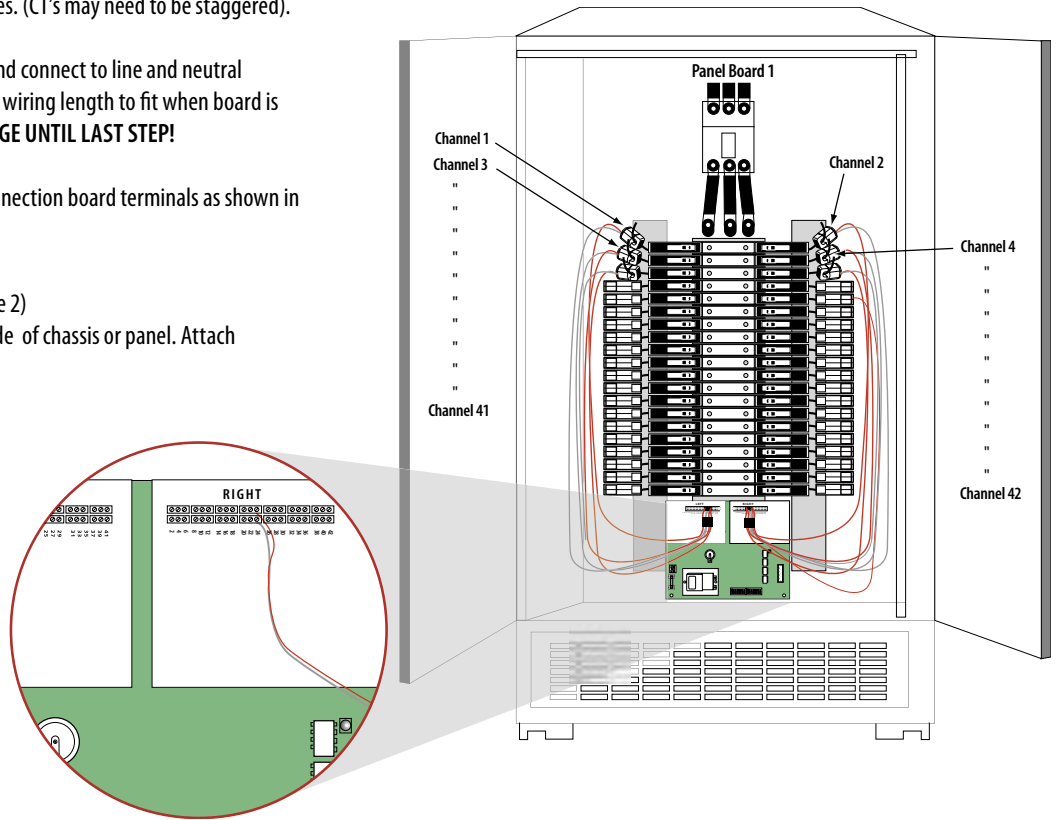


Figure 2



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.

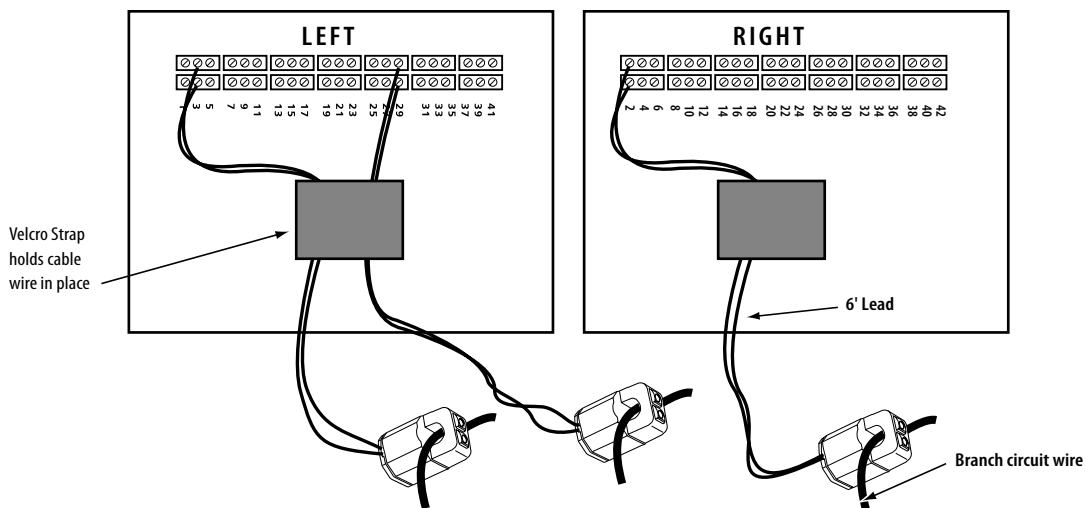
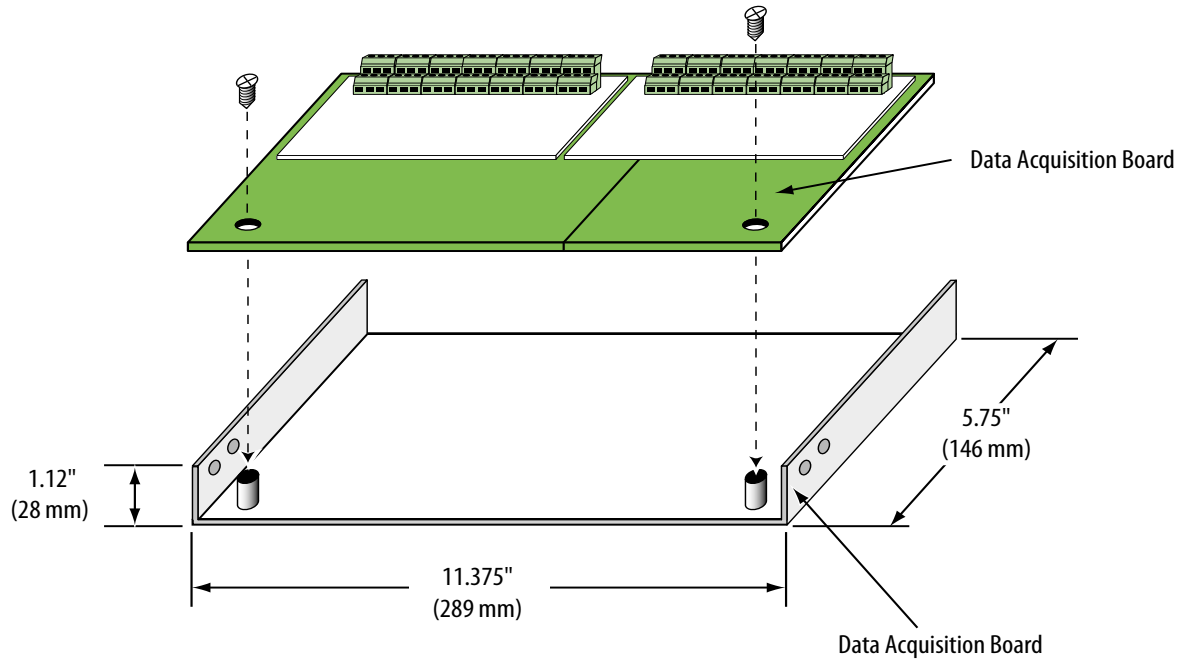


Figure 3

*For 240VAC Power connection versions, order catalog number H662SM-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 H662 series are field selectable for your convenience. Please see Figure 1 (page 2, #8) for selector location. The following parameters are configurable: Standard N2 configuration is underlined.

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



Standard N2 Configuration: X = unused. 2-wire 9600 Baud No Parity (Default Only)

2. Address Configuration

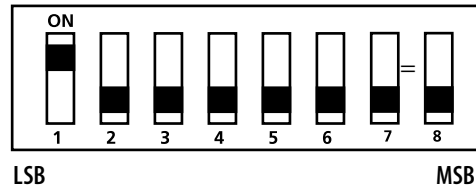
Each N2 device on a single network must have a unique address. The switch block must be set to assign a unique address before the device is connected to the N2 RS485 network. If an address is selected which conflicts with another device, neither device will be able to communicate.

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		<u>9600 Baud</u>	
X		On	On			X	X		19200 Baud	
				Off	Off					None
				On	Off					Even
				Off	On					Odd

Chart 1

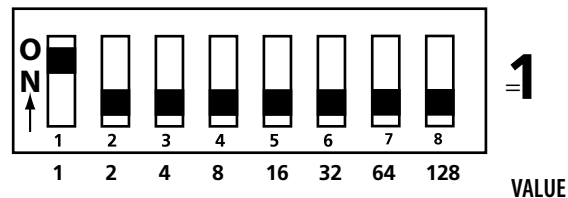
H662 series can be addressed as any whole number between and including 1-247. Each unit is equipped with a set of 8 dip switches for addressing. See below.



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



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

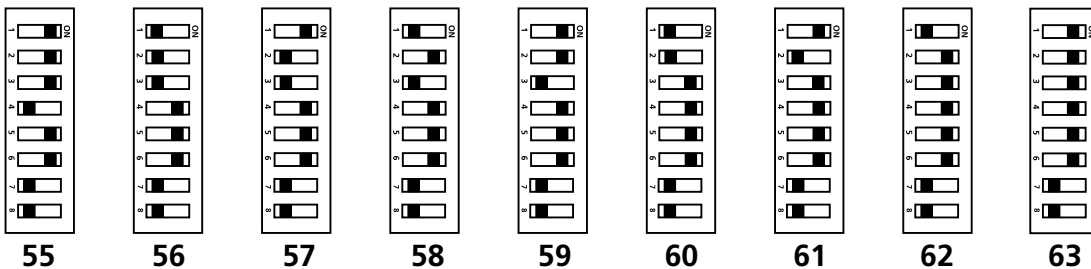
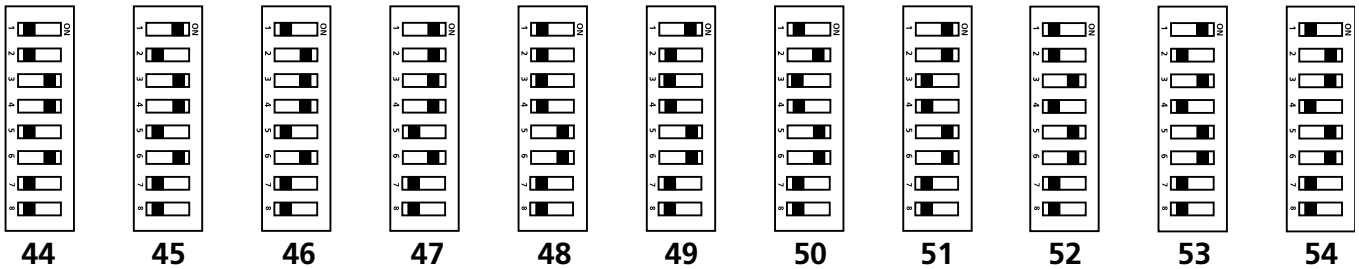
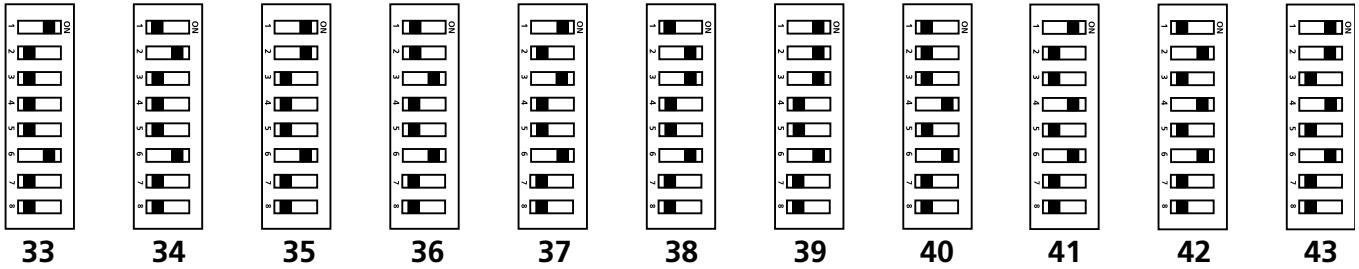
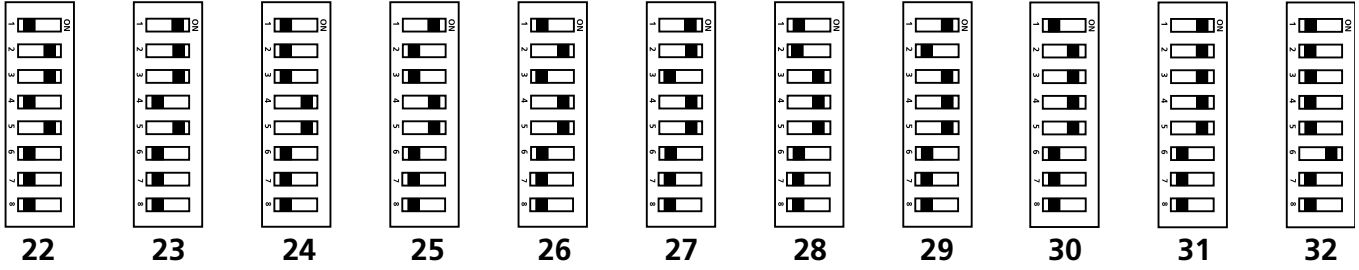
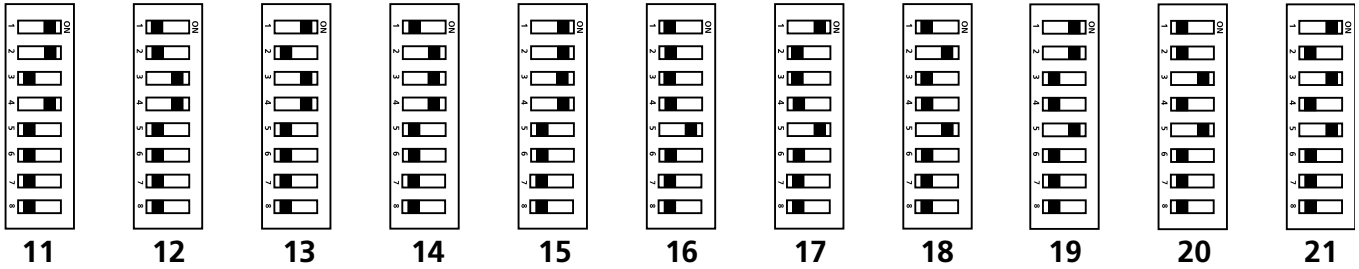
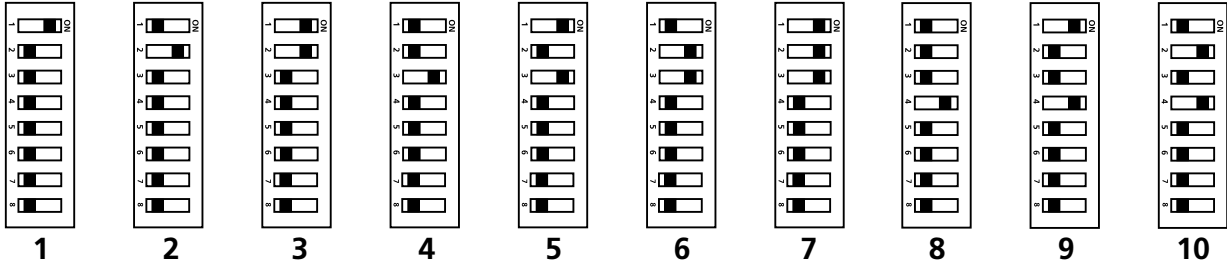
For example:



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



INSTALLATION

1. Connect 2-wire N2 RS485 network (see Figure 4).

NOTES

- A. The N2 cable should be mechanically secured where it enters the electrical panel.
- B. All N2 devices should be connected together in a daisy-chain fashion, and properly terminated.
- C. The N2 cable should be shielded twisted pair wire such as Belden 1120A. The cable must be voltage rated for the installation.



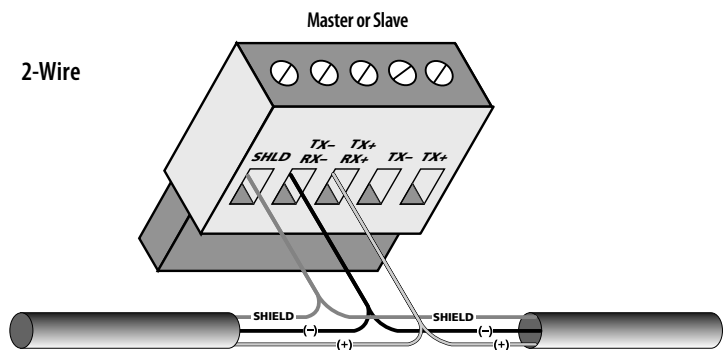
WARNING: After wiring the N2 cable, remove all scraps of wire or foil shield from the electrical panel. This could be **DANGEROUS** if wire scraps come into contact with high voltage conductors!

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).

*For 240VAC Power connection versions, order catalog number H662SM-xxE.

POINT MAP FOR

Johnson Controls N2 OPEN, "VND" TYPE

NPT	NPA	OR	WR	UNITS	RANGE/VALUES	POINT DESCRIPTION	NOTES
AI	1	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 1	
AI	2	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 2	
AI	3	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 3	
AI	4	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 4	
AI	5	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 5	
AI	6	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 6	
AI	7	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 7	
AI	8	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 8	
AI	9	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 9	
AI	10	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 10	
AI	11	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 11	
AI	12	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 12	
AI	13	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 13	
AI	14	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 14	
AI	15	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 15	
AI	16	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 16	
AI	17	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 17	
AI	18	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 18	
AI	19	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 19	
AI	20	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 20	
AI	21	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 21	
AI	22	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 22	
AI	23	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 23	
AI	24	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 24	
AI	25	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 25	
AI	26	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 26	
AI	27	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 27	
AI	28	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 28	
AI	29	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 29	
AI	30	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 30	
AI	31	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 31	
AI	32	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 32	
AI	33	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 33	
AI	34	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 34	
AI	35	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 35	
AI	36	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 36	
AI	37	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 37	
AI	38	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 38	
AI	39	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 39	
AI	40	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 40	
AI	41	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 41	
AI	42	Y	Y	AMPS	0-65.535	CURRENT, CHANNEL 42	

NPT	NPA	OR	WR	UNITS	RANGE/VALUES	POINT DESCRIPTION	NOTES
ADI	1	N	N	N/A	0-65535 bit 0: NV Ram error bits 1-15: Reserved	ERROR FLAGS	This object reports internal errors detected by the microcontroller. The ALIVE LED will be steadily lit if any errors are detected.
ADI	2	N	N	N/A	0-65535	FIRMWARE REVISION	
ADI	3	N	N	N/A	0-65535	FIRMWARE REVISION	
ADI	4	N	N	N/A	0-65535	SERIAL NUMBER MSW	most significant 16 bits
ADI	5	N	N	N/A	0-65535	SERIAL NUMBER LSW	least significant 16 bits
ADI	6	Y	N	Seconds	0-65535	High Alarm Delay	The following ADI Objects set the minimum time the measured current for a channel must remain in the alarm/warning window before the alarm/warning state is changed.
ADI	7	Y	N	Seconds	0-65535	High Warning Delay	
ADI	8	Y	N	Seconds	0-65535	Low Warning Delay	
ADI	9	Y	N	Seconds	0-65535	Low Alarm Delay	

LEGEND:

AI= Analog Input OR = Object can be overridden
 ADI=Analog Data Integer WR = Object can be written
 NPT=Network Point Type
 NPA=Network Point Address

Supported N2 Commands (Command/Subcommand):

0/0	-	Time Update message	7/2/01	-	Override AI command
0/4	-	Poll without acknowledge message	7/2/06	-	Override ADI command (ADI6-ADI9 only)
0/5	-	Poll with acknowledge message	7/3/01	-	Override Release request (AI points only)
1/1	-	Read AI command	F	-	Identify device type command
1/6	-	Read ADI command			
2/1	-	Write ADI command			

SPECIFICATIONS

General

Operating Temp. Range 0 to 60°C (<95%RH, non-condensing)
Storage Temp. Range -40°C to 70°C
Power Source 120 VAC (+10/-25%), line-to-neutral, 50/60 Hz. (240VAC for H662SM-xxE)

Measured Current Inputs

Number of Channels 42
Frequency 50/60 Hz.
Sample Frequency 1280 Hz.
Update Rate 1.2 sec
Accuracy ±5% from 5A to 50A
Connection to Conductor Inductive split-core CT

Network Communications

Type N2
Connection 2-wire plus SHIELD
Address DIP switch-selectable address 1 to 247
Baud Rate 9600
Parity NONE
Communication Format 8-data-bits, 1-start-bit, 1-stop-bit
Termination 5-position depluggable connector

Defaults

Warning Register 60% of current sensor max. (configurable)
Alarm Register 70% of current sensor max. (configurable)
Breaker Size Register 20A

Dimensions

Circuit Board (L x W) 19.5" x 1.0"
Mainboard (L x W) 7.25" x 5.75"
Brackets Only (Strips L x W) 20.31" x 0.75"
Sensor Spacing 0.75" on center
Lithium Battery Life 5 years (Replace with type CRF 1220 or equiv.)



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Measured Currents Current Range 0-50A*
Primary Fusing 250VAC/100mA, 5x20mm, (if equipped) Littlefuse 218 series or equivalent
*Maximum conductor size is AW6 THHN

Safety

UL Listed under standard 508 as an "open type device".
Critical components evaluated to UL 1950 as well

U.S. Patent Number 6,330,516