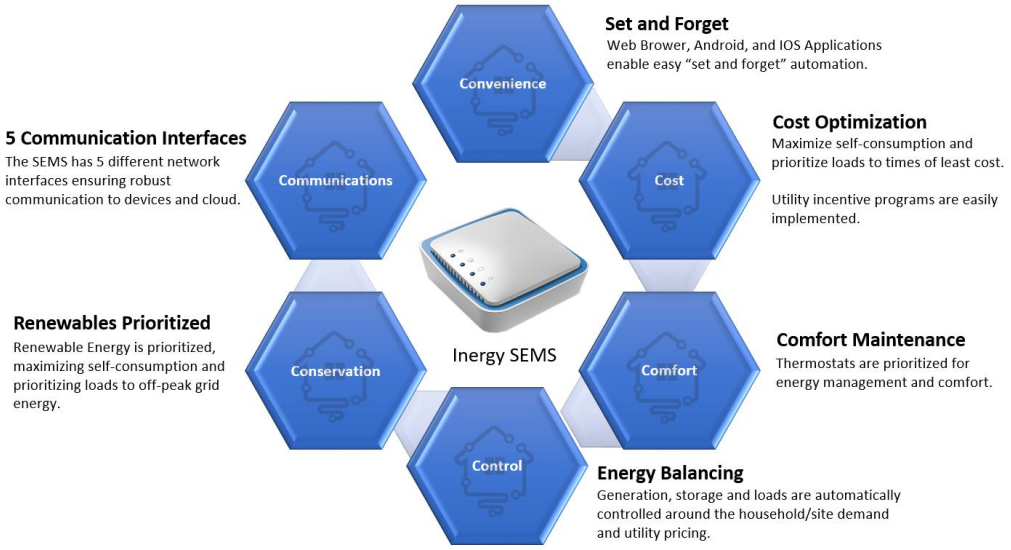
Smart Energy Management System
The Energy Conductor
SEMS – Technical Information

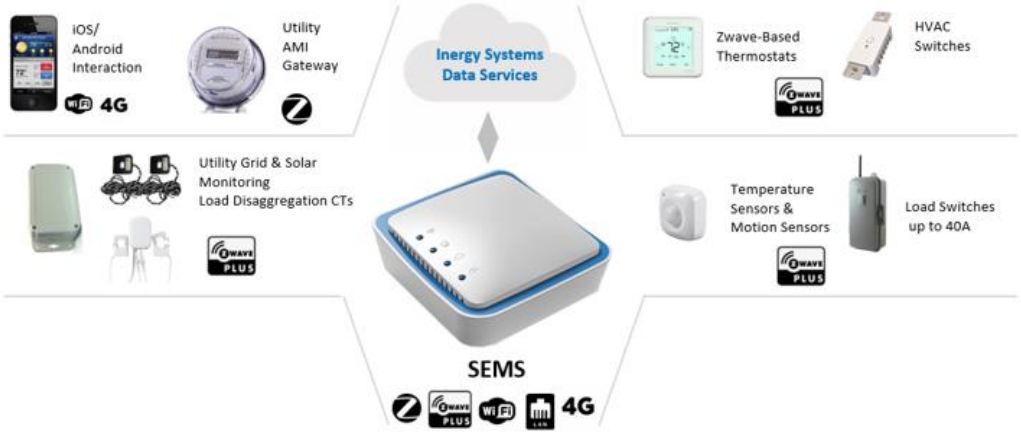
Introduction



The Inergy Systems Smart Energy Management System (SEMS) is a building automation system that focuses on energy management and control primarily of the HVACs. The SEMS connects to energy monitoring and control devices using Z-Wave, a low-power, secure, high-reliability mesh networking technology. Additionally, the SEMS can connect to utility meters that utilize Zigbee Smart Energy technology simplifying installation. Real-time control is used to synchronize device operation so that energy is used steadily and at times when electricity costs are low and renewable energy generation is high.

Commercial and Industrial Applications

- Office Demand Response
- Demand Charge Management
- Building HVAC Management
- Occupancy Based Efficiency



Specification

Dimensions:	5” x 4.5” x 1.25”
Weight:	5 oz.
Classification:	Tabletop
Environment:	Indoor Operational Only, 0-70°C
Power Supply:	<u>Included Class II Power Supply</u> Model: CUI SWI15-5-N-P5 Input Voltage: 90-260 VAC Input Current: 0.5A Max Input Frequency: 47 – 63 Hz. Integrated NEMA-1 Plug
Ports:	DC Input: 5.5MM DC Barrel, 5VDC +/- 10%, 2A Maximum Wired Ethernet: RJ-45 10 Mbps Ethernet Standard USB-A: Not used during normal operation. Micro-USB: Not used during normal operation. SMA: RF Connector LTE antenna RP-SMA: RF Connector Z-Wave antenna

Important Safety Information (RF Exposure)

This equipment contains multiple radio transmitters and receivers. When it is on, it receives and transmits RF energy automatically. This equipment complies with FCC radiation and exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum of 20cm between the radiators (equipment and antennas) and your body.

FCC Statements

SEMS Model: IH40, FCC ID: 2A93L-SEMS
Contains ICs: ZGM130S & RTL8188FTV (FG6188EUFX-05)
Contains FCC IDs: XFFZ357PA20 & N7NHL7648

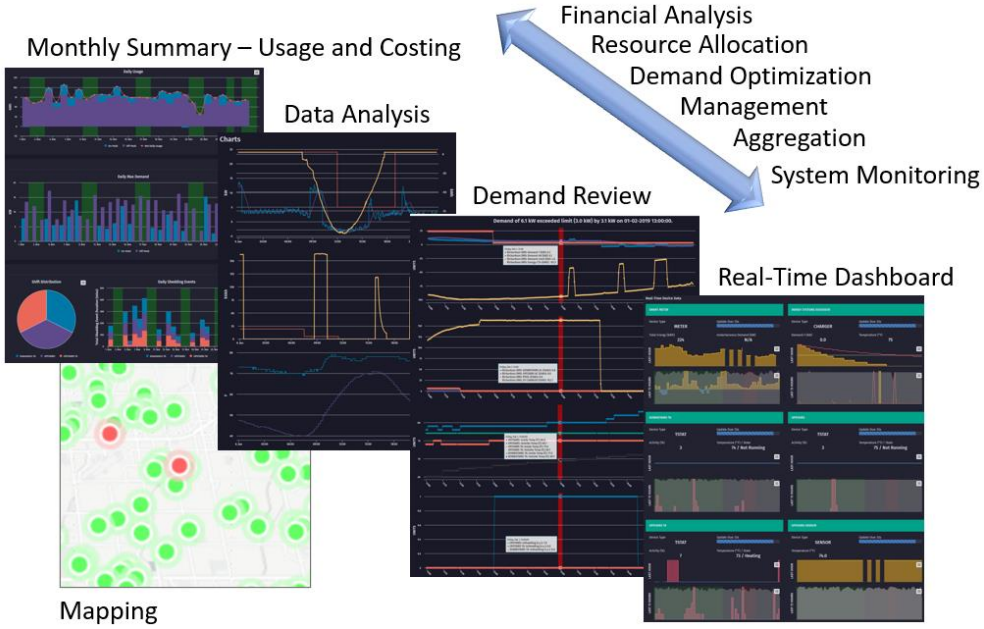
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Inergy Connect Portal



Watts-On Meter – if Utility Meter Zigbee not available

Manufacturer: Elkor Technologies Inc.
Model: WattsOn-Mark II: Precision Energy Meter

INPUTS			
Power Supply:	12-30 VDC or 24VAC, < 2VA		
Supported Wiring Types:	Up to 347/600V Delta, Wye Single-phase installations up to 347V RMS Split-phase (two phase) installations		
Frequency:	40-70 Hz nominal (30-300 Hz max)		
Voltage:	20Vac - 347Vac L-N (600Vac L-L) (450Vac L-N, 780V L-L absolute max)		
Current:	*-5A model*	*-mA model*	*-mV model*
Input Rating:	5A nominal via 5A output CTs (10A max)	200mA via mA CTs (ie: Elkor "Safe" mA output CTs)	333mV output CTs (400mV max)
Input Impedance:	0.05Ω max	1.5Ω typ	800kΩ min, 1.2MΩ typ
Wire Size:	Voltage: AWG 30-12, (AWG 16-22 recommended) Current: AWG 24-12, (AWG 12-16 recommended for 5A CTs)		
Overload:	20% continuous (voltage & current) maintaining full accuracy. 100% momentary current overload		

ACCURACY		
Standards:	Supports EN 50470-1, EN 50470-3, IEC 62053-21, IEC 62053-22, and IEC 62053-23 standards. ANSI C12.20 Class 0.2 Accuracy Certified by 3rd Party NRTL	
Current (A):	0.05% typ	0.1% max
Voltage L-N (V):	0.1% typ	0.2% max
Voltage L-L (V):	0.2% typ	0.3% max
Power (W, VA, VAR):	0.1% typ	0.2% max
Energy (Wh, VARh, VAh):	0.1% typ	0.2% max
Power Factor:	0.2% max	
Frequency:	0.01% max	
Input Bandwith:	2 kHz (33rd Harmonic @ 60Hz, 40th Harmonic @ 50Hz)	
Data Update Frequency:	10Hz (every 100ms) for W, VA, VAR 2 Hz (every 500ms) for all others	

Honeywell

T6 Pro Z-Wave
Programmable Thermostat

*TH6320ZW2003 depicted. Other models may vary.
Actual size 4.09" x 4.09" x 1.06"*

Specifications

Model Nr.: TH6320ZW2003

Model Name: T6 Pro Z-Wave Thermostat

Model Description: Programmable Z-Wave thermostat with touchscreen

Stages:
Up to 3 Heat / 2 Cool Heat Pump
Up to 2 Heat / 2 Cool Conventional

Power requirements:
Battery power: AA alkaline battery 3pcs.
C-wire input: 18-30VAC; 50Hz-60Hz

Electrical Ratings:

Terminal	Voltage (50/60Hz)	Running Current
W Heating	18-30 Vac	0.02-1.0 A
(Powerpile)	750 mV DC	100 mA DC
W2 (Aux) Heating	18-30 Vac	0.02-1.0 A
E Emergency Heat	18-30 Vac	0.02-0.5 A
Y Compressor Stage 1	18-30 Vac	0.02-1.0 A
Y2 Compressor Stage 2	18-30 Vac	0.02-1.0 A
G Fan	18-30 Vac	0.02-0.5 A
O/B Changeover	18-30 Vac	0.02-0.5 A
L/A Input	18-30 Vac	0.02-0.5 A

Dimension: 4.09" x 4.09" x 1.06"

Display size: 6.55 sq. in.

Temperature ranges:
Adjustable Heat Temperature Range Setting:
40-90 °F (4.5-32.0 °C)
Adjustable Cool Temperature Range Setting:
50-99 °F (10.0-37.0 °C)

Operating ambient temperature range:
37-102°F (2.78-38.89 °C)

Temperature Sensor Accuracy:
± 1.5 °F at 70 °F (0.85 °C at 21.0 °C)

Physical Dimensions in inches (mm) (H x W x D):
T6 PRO Z-Wave Thermostat (TH6320ZW2003):
4-5/64 x 4-5/64 x 1-1/16 (104 x 104 x 27)
UWP Mounting System (included):
2-9/32 x 2-13/64 x 2-43/64 (58 x 56 x 10)
Standard Installation Adapter (included):
3-29/32 x 3-57/64 x 21/32 (99 x 99 x 17)
Decorative Cover Plate – Small (included):
4-49/64 x 4-49/64 x 11/32 (121 x 121 x 9)
Decorative Cover Plate – Large (THP2400A1068):
6-7/64 x 6-7/64 x 9/32 (155 x 155 x 7)

Z-Wave Radio:
Frequency (USA and Canada): 908.42 MHz
Certified: Z-Wave Plus
Generic Device Type: Thermostat
Node type (C-wire): Always On Slave (AOS)
Node type (Battery): Listening Sleeping Slave (LSS)
Z-Wave Chipset: ZM5202AU

Supported Z-Wave Command Classes:
Z-Wave Plus Info V2
Supervision V1
Transport Service V2
Association V2
Version V2
Association Group Information V2
Basic V1
Battery V1
Clock V1
Configuration V4
Device Reset Local V1
Manufacturer Specific V2
Sensor Multilevel V5
Notification V3
Powerlevel V1
Security 2 V1
Thermostat Fan Mode V3
Thermostat Fan State V1
Thermostat Mode V3
Thermostat Operating State V1
Thermostat Setpoint V2

NOTES:
Thermostat Mode V3:
- Some of the reported modes are manufacturer specific if not covered by the Z-Wave command class.

Basic V1 (basic set command implementation):
- Value 0x00 Device goes to Energy saving setting (AWAY mode)
- Values 0x01-0x63 and 0xFF Device goes to Comfort setting (HOME mode)

Notification V3:
- Notification V3 is enabled by default (Power management alarm handling). Notification Type: Power Management (0x08). Notification Events: AC mains disconnected (0x02), AC mains re-connected (0x03).

Security:
- All supported Z-Wave Command classes are supported securely (S2 unauthenticated), except Transport Service V2, Security 2 V1 and Z-Wave Plus Info V2

GE Z-Wave Direct-Wire Indoor/Outdoor Smart Switch

Specifications

Power: 120-277 VAC, 60Hz, Single Phase

Signal (Frequency): 908.4/916 MHz

Contact Ratings:120-277 VAC, 40A Resistive Single Phase 120-277 VAC, 20A Ballast load (Inductive) Single Phase 125 VAC, 15A Tungsten 250 VAC, 5A Tungsten 1HP@120VAC, 2HP @ 240 VAC

Range: Up to 150 feet line of sight between the wireless controller and the closest Z-Wave receiver module

Operating Temperature: -22 to 104° F (-30 to 40° C)

For indoor, or outdoor use in dry, damp or wet locations

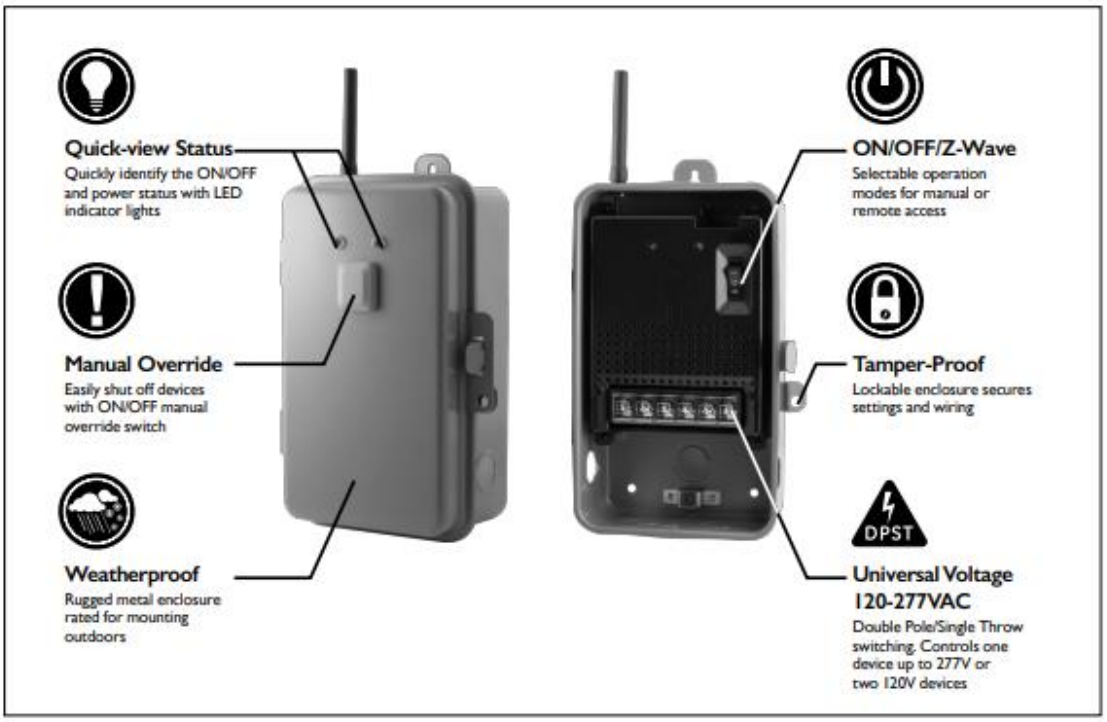
Design Features

- Turn the connected device On/Off manually via Z-Wave remote control
- Remotely monitor with any mobile device*
- Can be Included in multiple Groups and Scenes
- External mounted antenna
- Push-button Override switch on exteror door
- Dual exterior mounted LEDs - Red indicates power status, Green LED indicates Z-Wave status
- Can be Included in multiple Groups and Scenes
- Multi Voltage power supply supporting 120VAC or 277VAC up to 40Amps, up to 11,000W
- Screw Terminal installation; 120v-277VAC. Requires wiring connections for Line (Hot), Load, Neutral, and Ground. Configurations allow for single 120VAC, dual 120VAC, or single 277VAC
- OTA Updateable, utilizes the Z-Wave Firmware Update Meta Data command class for standardized firmware updates Over the Air
- Supports S2 Security and Smartstart
- Supports Advanced Configuration; Product state after power recovery; Energy reporting mode; Enery reporting frequency; Alternate exclusion button press process
- Can be used indoor for heavy-duty appliances and outdoor for pool pump, spa heaters, lighting, etc.
- Grey, lockable metal case, with exterior weather resistant On/Off switch. UL Rated for dry, damp or wet locations
- Z-Wave Plus Certified
- NEMA 3R enclosure

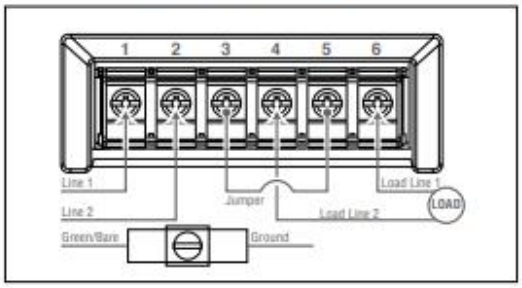
Z-Wave Plus Features

- Works with Z-Wave Classic and Z-Wave Plus Products
- 50% more wireless range
- 250% faster processor
- 400% more memory
- 50% more energy efficient
- Supports wireless upgrades to future-proof your home

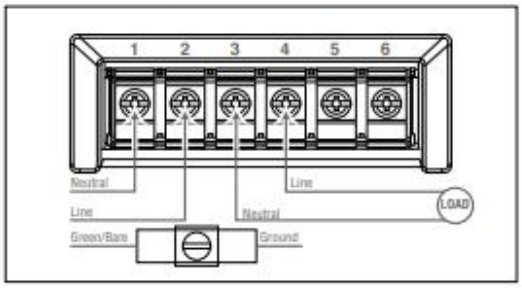
* Requires Z-Wave hub or controller, functions may vary depending on brand.



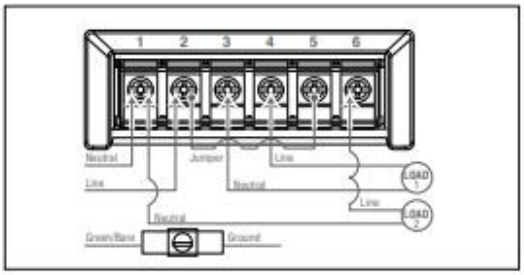
240VAC - Single Load Energy Monitored



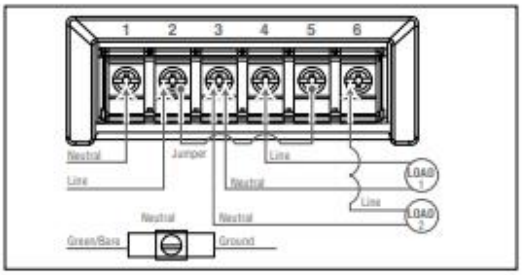
120VAC - Single Load Energy Monitored



120VAC - Dual Load (Load 1 Monitored)



120VAC - Dual Load (Total of Both Loads Monitored)



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