e527 Datasheet

Overview

Like the larger e528, the compact, low profile e527 thermostat takes advantage of component end-of-life to redesign hardware and produce a more efficient, lower cost device. With onboard radio and RS485 connection and an added CDS light sensor, the e527 maintains its position as an integral part of the INNCOM Integrated Room Automation System (IRAS) and a property's Energy Management System (EMS).

Features

In an EMS, the e527 controls room heating and cooling using occupancy data collected from motion detectors and door switches and can be networked to the property's central management system. As an IRAS device, the e527 can communicate with devices within a room and function as a room gateway device towards the mesh network.

Figure 1 E527

- British gang mounting (American gang mounting with optional frame)
- Accurate temperature measurement +/- 1 degree F
- External temperature sensor support
- Motion sensor for occupancy detection
- RF transceiver (onboard 802.15.4, 2.4GHz radio) for wireless guestroom and backhaul network communications
- RS485 for wired backhaul network communications
- Photo sensor for light level detection

Installation Requirements

The e527 must be located on a partitioning interior wall, approximately 5' (1.5 m) above the floor, in a site of average temperature. It is important to ensure that the thermostat is located away from direct sunlight or radiant heat, air discharge grilles, stairwells, outside doors, steam or water pipes, warm air stacks, unheated/uncooled areas, or sources of electrical interference. The unit should not be placed on an outside wall or behind a door.

The e527 is designed to be mounted on a standard British-style single-gang electrical box. For use with an American box, the e527 can be installed in an optional frame by means of two screws. Screws for attaching the optional frame and mounting the e527 are included. The device is shipped with a clear clamshell dust cover.
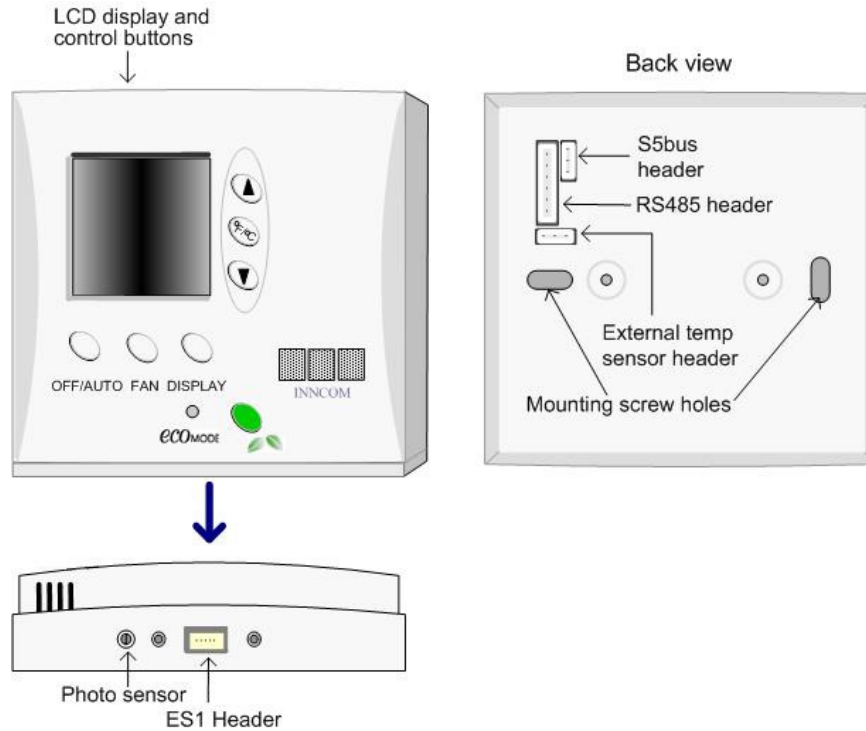
Headers

Figure 2 E527 Front/Back and External Headers

H1	ICP microprocessor programming
H2	Humidity sensor
H3	System interconnect
H4	PIR sensor
H5	ES1
H6	RS485 network header (see pinout below)
H7	System 5 header (see pinout below)
H8	System interconnect
H9	External temperature control sensor (see pinout below)

H6 Pinout

Pin	Function	Comment		
1	Common	GND		
2	12VDC	**Min**	**Nom**	**Max**
		10V	12V	14V
3	S5bus	Communication bus		
4	Dry Input	Input		
5	RS485B	RS485 Twisted Pair		
6	RS485A	RS485 Twisted Pair		

H7 Pinout

Pin	Function	Comment		
1	Common	GND		
2	12VDC	**Min** 10V	**Nom** 12V	**Max** 14V
3	S5bus	Communication bus		

H9 Pinout

Pin	Function	Comment
1	Common	GND
2	Common	GND
3	External temp sensor	

Motion Detection

The optional motion detector available on the e527 works in conjunction with the electronic door lock to determine room occupancy. If the door lock reports that the door has opened and closed and no motion is detected in the room for a set number of minutes, the e527 engages energy conservation setbacks. When motion is detected, the e527 returns to its occupied state. Also, the e527 reports occupancy changes to the central server.
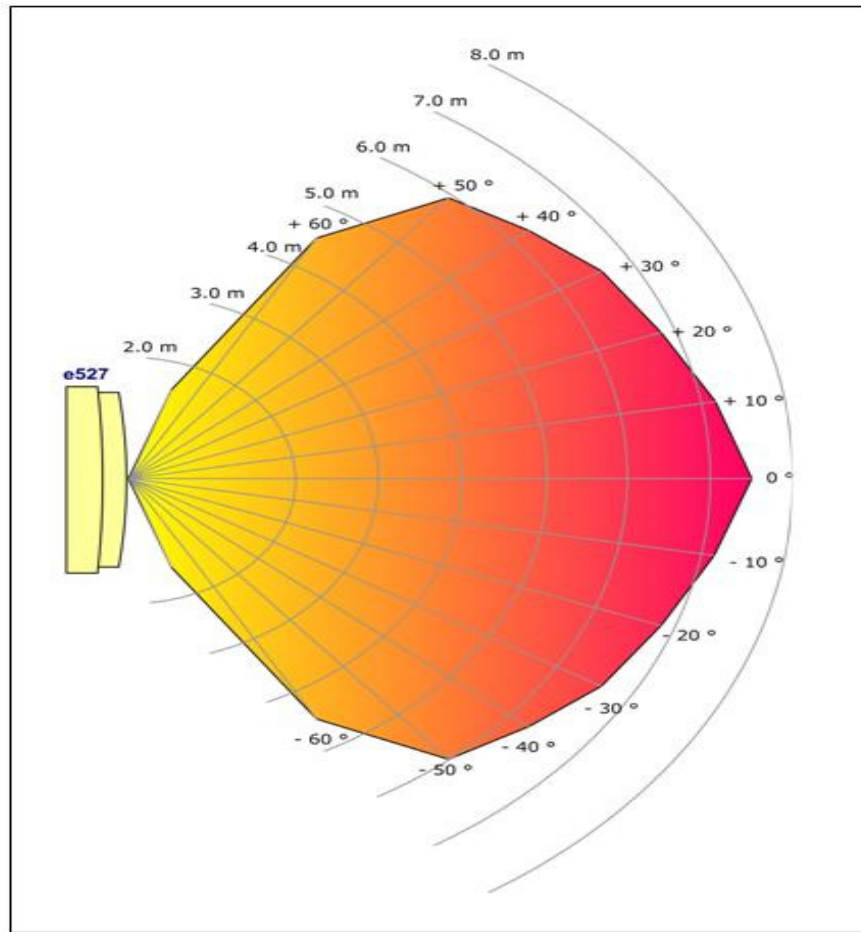

Figure 3 Motion Sensor Sensitivity

Network Communication

INNCOM employs a Deep Mesh system to connect guestroom IRAS components to management and monitoring servers. Because networking infrastructure is embedded in the IRAS devices, command and reporting information packets can follow multiple network pathways, increasing communication efficiency and reliability at lower cost. Typically, a Deep Mesh network integrates 50–200 rooms per network segment[*]. INNCOM generally uses a wireless radio network, but a Deep Mesh system may be constructed using RS485 networks (topologies that merge RF and RS485 networks are also possible).

2.4GHz Wireless RF

In a typical RF Deep Mesh network, an 802.15.4-based 2.4GHz radio-equipped IRAS device (most often a thermostat, such as the e527) acts as a room gateway for communication with the network. Data are propagated among the network nodes until terminated at edge routers that bridge traffic onto IP (Ethernet) networks towards the servers. The radio specifications are given in the table below:

Performance	0dB
RF Data Rate	250kbps
Antenna Type	SMT
Indoor Range	70ft
Outdoor/ RF line-of-sight range	540ft
Transmit Power	1mW
Receive Sensitivity	-94.6dBm
Frequency Band	2.4GHz
Encryption	AES-128
Protocol	802.15.4
Frequency Channels	11–26

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 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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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[*] The network segment size depends on the facility's layout, expected network traffic, and other environmental considerations.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RS485

A Deep Mesh RS485 (DM485) network typically uses a CAT5-type wiring wired as a home-run or daisy-chain. The DM485 network is routed to a dedicated device in each guestroom. This device becomes the room gateway, which transfers information packets between the DM485 backbone and the in-room network. The in-room network can be either S5Bus or a local mesh formed with RF. Each DM485 network is operated by a B575 hardware running DM485 software. Refer to the H6 pinout table above for wiring instructions.

Technical Specifications

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Power Requirements	12VDC, 50mA
Thermostat Measurement Range	33 to 99 degrees F (1 to 37 degrees C)
Outdoor Air Temperature Display	0 to 99 degrees F (-18 to 37 degrees C)
Display Resolution	Whole degree F, 0.5 degree C (0.1 degree F in test mode)
Standard Deadband	2 degrees F (1 degree C) between heating and cooling
Degrees C/Degrees F Display	Toggle Button located on front display
Ambient Operating	41 to 149 degrees F (5 to 65 degrees C), 0-95% RH noncondensing
Ambient Storage	33 to 149 degrees F (1 to 65 degrees C)
Dimensions	3.5" W x 3.5" H x 0.9" D (89 mm x 89 mm x 23 mm)
Approvals	FCC, CE Mark
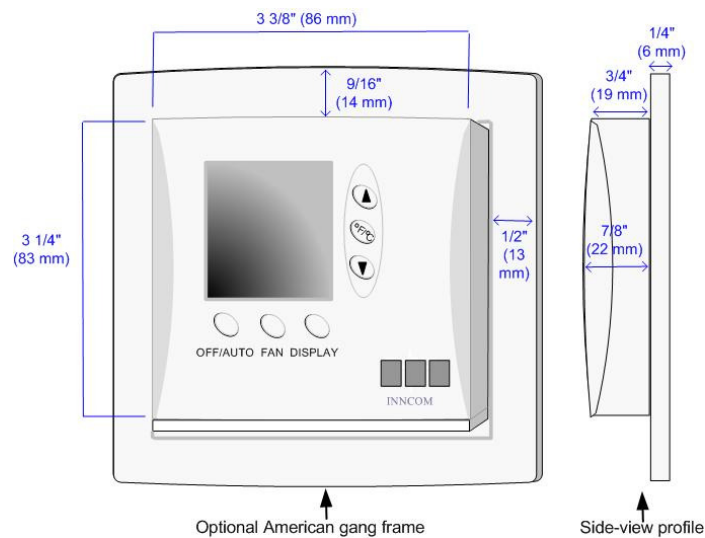
Figure 4 E527 Dimensions

Ordering Information

The e527 is available in several operating configurations, all based on the same fundamental hardware platform. The ordering part numbers (OPN) are formed by a combination of the elements, as shown below.
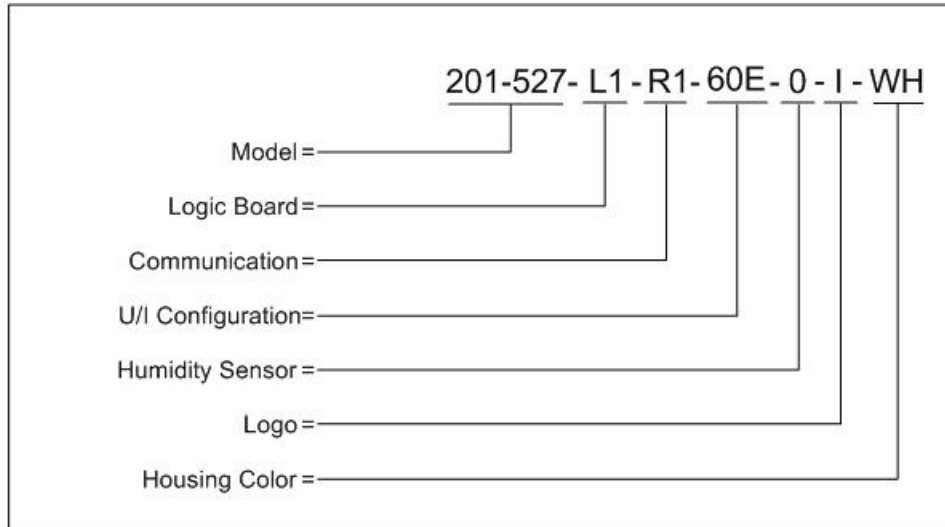
Assembly	Description	Part Number
e527	Final Assembly	201-527

Logic	Description	Part Number
L0	No Radio Logic Board	202-151.L0
L1	Radio Logic Board	202-151.L1

Communications	Description	Part Number
R0	No RS485	203-203.R0
R1	RS485	203-203.R1

User Interface	Description	Part Number
6PE	6 button with PIR and EcoMode	02-9972
6P0	6 button with PIR, without EcoMode	02-9972
60E	6 button EcoMode only	
600	6 button no PIR, no EcoMode	
5PE	5 button with PIR and EcoMode	02-9972
5P0	5 button with PIR, without EcoMode	02-9972
50E	5 button EcoMode only	
500	5 button no PIR, no EcoMode	

Humidity Sensor	Description	Part Number
0	No Humidity Sensor	
1	Humidity Sensor	02-9463

Logo OPN	Description
0	No Logo

Logo OPN	Description
I	INNCOM Logo
J	Johnson Controls Logo

Housing Color OPN	Description
WH	White
BK	Black
LA	Light Almond
EA	Eagle Almond

For American gang installation, add mounting plate 53-6092. Use wiring harness 62-1462 for the RS485 connection and 62-1465 for S5 and external temperature sensor.

Document Revision History

Revision	Date Issued	Reason
0.1	01-Jun-2012	First Draft
0.2	05-Jun-2012	Incorporated comments from AE review
0.3	20-Jun-2012	Incorporated R&D review comments
0.4	09-Jul-2012	Incorporated RS485 Deep Mesh information
1.0	09-Jul-2012	Finalized for release
1.1	07-Sep-2012	Added FCC language change