ECOsmart™
Intelligent Energy Management

SS6010 EcoInsight+

Installation, Operation & Maintenance Guide

Firmware Version 2.x

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EcoSmart Energy Management System

The EcoSmart Energy Management System is designed to reduce HVAC energy consumption without interfering with an occupant's comfort.

EcoSmart thermostats such as the SS6010 will automatically learn and adapt to the heating and cooling patterns of each room. For example, a room on the east side of a building will receive direct sunlight in the morning and will either need less HVAC heating or more HVAC cooling. However, as the day progresses, the room will need more HVAC heating or less HVAC cooling as it moves into the shade. An EcoSmart thermostat will continually monitor the room, learn its patterns, and adjust its heating and cooling profiles accordingly.

EcoSmart thermostats also learn and adapt to occupant schedules. When a room is unoccupied, an EcoSmart thermostat will enter an energy saving mode, allowing the room to drift away from the desired set point. During this drift period, the thermostat will operate the HVAC unit less often, reducing energy costs. When the room becomes occupied again, the EcoSmart Recovery Time™ technology built into each thermostat will return the room to the set point without the occupant noticing.

The SS6010 is available in several possible configurations, to address specific requirements of multiple applications including hotel, classroom, office, university dormitory, military residence hall, retail, public area, convention center, and a wide variety of commercial and industrial spaces.

The form factor of all non-networked models is identical, as are the form factors of the networked versions. Networking options may be added to the base units at any time via a simple retrofit module process.

Additional controls generally used during installation, maintenance, and troubleshooting are available in the on-screen Maintenance menu.

Regulatory Compliance & FCC Notice

Warning: Any changes or modifications made to this product not expressly authorized by the manufacturer could void the user's right to operate this device.

The device complies with part 15 of the FCC Rules as well as Industry Canada Rules and Regulations license-exempt RSS standard(s). 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.

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.

A separation distance of at least 20 centimeters should be maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

Afin de se conformer aux exigences d'exposition RF MIC / FCC / ISED, cet appareil doit être installé pour fournir au moins 20 cm de séparation du corps humain en tout temps.

FCC ID: XV6SS6010

About This Product

This product is intended for outlet box mounting.

This product utilizes relays as the load-controlling/switching elements.

This product does not include GCFI functionality (as commonly required for systems that control in-floor radiant electric heat).

This product has a "marked off" position but have the capacity to open only one pole of the load supply circuit. Accordingly, this product is limited to the control of loads having only one ungrounded supply pole (120 or 277 Vac circuits). In the off position the ungrounded pole is opened when the thermostat is placed in the off position.

This product is not suitable for safety or limiting applications.

This product is not suitable for plenum applications/installations.

ZigBee Wireless

Telkonet's suite of products—including the SS6010—relies on the ZigBee wireless communications protocol.

Zigbee devices are low powered and can communicate via radio frequency over long distances by transmitting data to intermediate devices to reach more distant ones. There is no main transmitter, but rather a series—or "mesh"—of transmitters. This is referred to as the ZigBee Mesh Network.

Functional Caveats

Telkonet ships equipment to customers pre-programmed based on a pre-deployment analysis and discussion with property management. Generally, command-level programming at the field level will not be needed.

When a command change is needed, Telkonet will provide a detailed synopsis of the proposed changes.

Arbitrarily changing command values without prior discussion with Telkonet Applications Engineering can result in suboptimal thermostat performance and a loss of energy savings. All of these can possibly impact the user interface. For this reason, such arbitrary changes do not represent a Recommended Best Practice, and any corrective actions taken by Telkonet (including consultation) are subject to Professional Services charges at prevailing rates.

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Electrical Ratings

The units are rated for applications where electrical connections at J3 will either be to: 1) a Class 2 circuit, or 2) a Non-Class 2 (i.e. electrical light and power circuits). Accordingly, separate schedules are applicable for each type of installation. The rating schedule for Non-Class 2 installations is located on page 13. The rating schedule for Class 2 installations is located on page 20.

High Voltage Installation Option (page7) • High Voltage is defined as 30 volts or greater. • There is only one installation option: JBOX with Vertical Mud Ring Mount: requires adapter plate as shown in Figure 3 on page 9.	**Low Voltage Installation Options (page 16)** There are 3 options; select based on code and desired look: 1) Drywall mount: no conduit required; no JBOX adapter plate required. 2) JBOX with Vertical Mud Ring Mount: requires adapter plate as shown in Figure 3 on page 9. 3) JBOX with Horizontal Mud Ring Mount:

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EcoInsight SS6010 Location Planning

EcoInsight+ Placement Guidelines

- Point toward main sleeping area if possible (max 12' from bed)…
- …otherwise, point to center of room
- Mount ON wall, not IN wall
- Vents in backplate require proper air flow
- Standard height=60" from finished floor; ADA=above 15" & below 48
- Mount on inside wall if possible

AVOID:

- Avoid spinning fan blades
- Avoid direct sunlight
- Avoid heat registers
- Avoid heat & cold sources in walls *

**outside-facing walls with poor insulation, walls with pipes circulating hot water, and walls near radiators.*

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EcoInsight SS6010 Location Planning

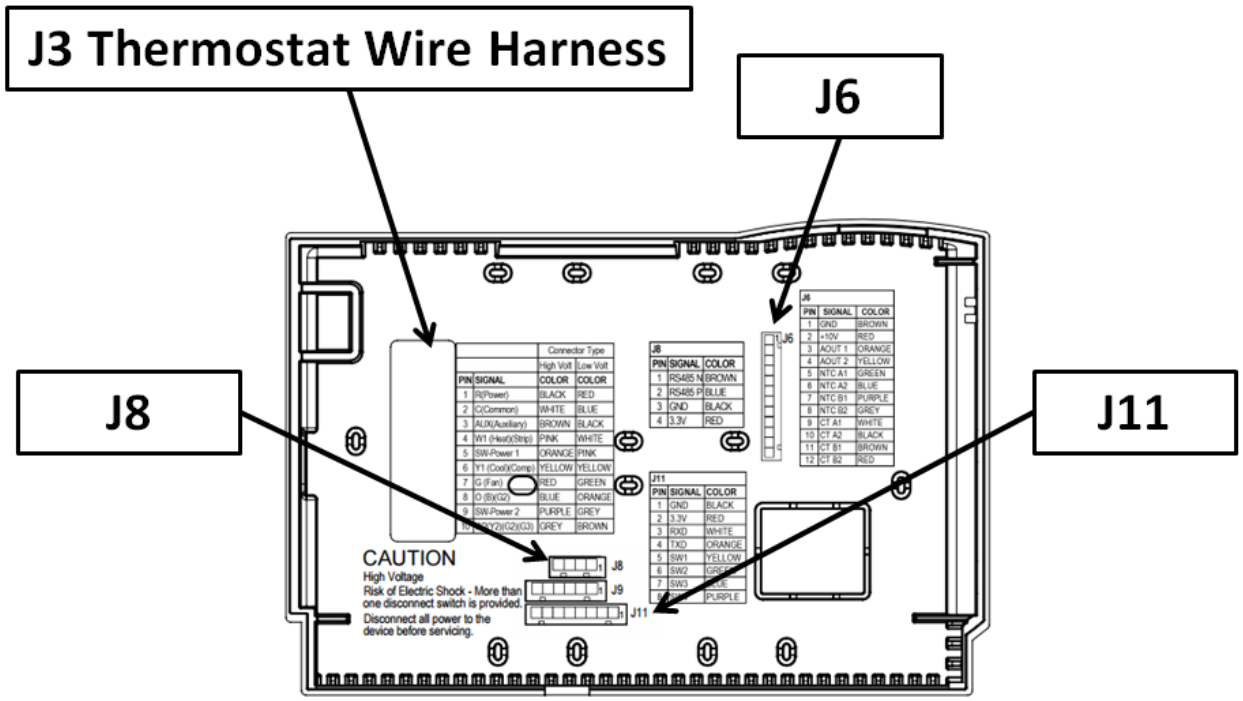

Figure 1: SS6010 Backplate

	Wire harness tables appear in the Pinout Tables section, beginning on Page 30.

High Voltage Installation (Non-Class 2)

(Note: for Low Voltage Installation instructions, see page 16.)

CAUTION!

- High voltage installation should only be performed by a qualified heating & air conditioning contractor or licensed electrician.
- Failure to understand and follow all instructions carefully before installing or operating this device could cause personal injury and/or property damage.
- All wiring must conform to local and national electrical ordinances and codes.
- Prevent electrical shock, personal injury, and equipment damage: prior to installation or service, disconnect system's electric power at main fuse or circuit breaker box.

Required Equipment

• SS6010 (included) • High Voltage Backplate (included) • Molex harnesses as applicable (included) • Telkonet High Voltage JBOX Adapter Plate (included) • JBOX	• Two #6-32 1" screws • Four #5 ½" coarse thread screws Voltmeter • Level • Phillips screwdriver • UL rated insulating tape • Wire stripper • Wire nuts

Installation

	For all high voltage installations a single gang mud ring must be mounted VERTICALLY on a JBOX. A Telkonet JBOX Adapter Plate is required for all JBOX installations.

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High Voltage Installation (Non-Class 2)

1. Ensure the JBOX has been installed with a vertical single gang mud ring. See **Figure 15: Vertical Single Gang Mud Ring** and **Figure 17-JBOX Vertical Mounting Single Gang Mud Ring**, both in Appendix B beginning on page 35.
2. Turn off power at SS6010 or mounting location using a disconnect switch or breaker lockout/tag out on appropriate breaker panel.
3. Test that power is off by using a voltmeter.
4. Strip the LINE wire back 0.25 inches.
5. Cap the LINE wire with a wire nut or electrical tape.
6. Cut the COMMON wire so the copper is flush with the insulation.
7. Strip all wires except for COMMON back 0.25 inches.
8. If using an adapter plate, determine which end of the adapter plate should be installed as the top, and which end should be installed as the bottom:

Figure 2-Adapter Plate

9. Level the high voltage Telkonet JBOX adapter plate and mount to the mud ring with two #6-32 1” screws. See Figure 3.

High Voltage Installation (Non-Class 2)

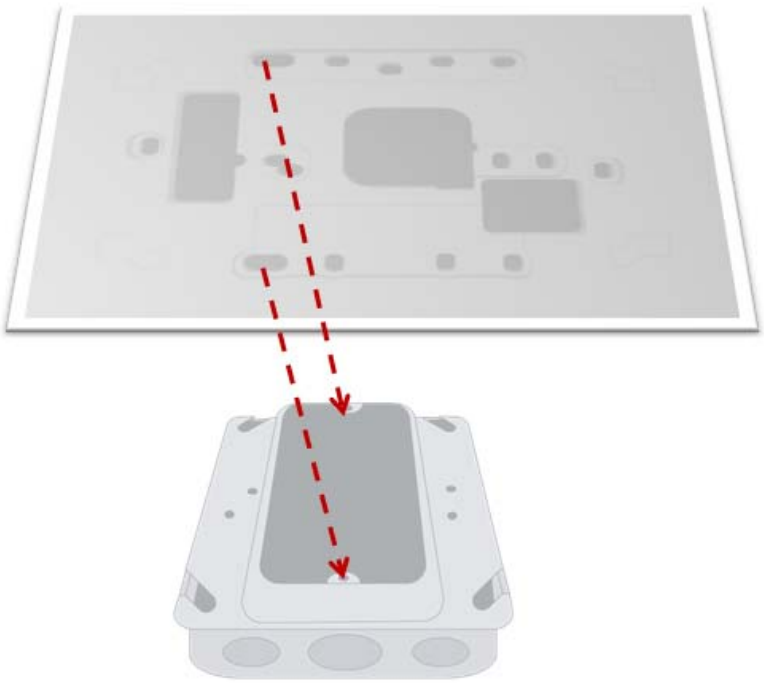

Figure 3: JBOX, Mud Ring, Adapter Plate

10. Remove the safety screw from the left side of the SS6010 using the hex wrench. See Figure 4.

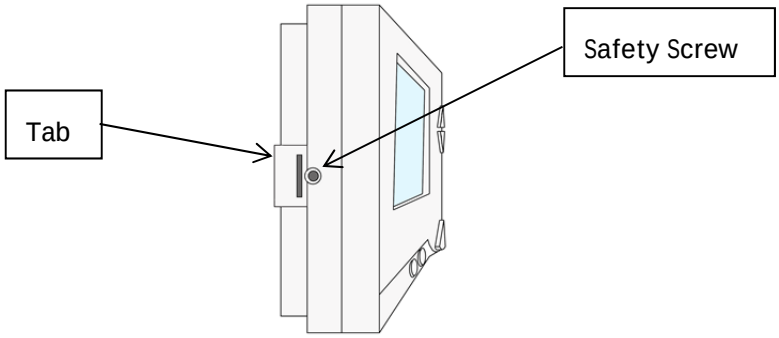

Figure 4: Thermostat Side View

11. Separate the high voltage back plate from the thermostat: use a flathead screwdriver to GENTLY press the tab next to the screw hole to allow the thermostat to pop open. *WARNING: Using too much force can break the tab.*

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High Voltage Installation (Non-Class 2)

12. Place thermostat backplate against the JBOX adapter plate. The adapter plate and backplate holes should align if both are correctly oriented. See Figure 5.
13. Connect wires and harnesses as per the pinout tables in the Tables section, which begins on page 30.
14. Mount SS6010 backplate on top of JBOX adapter plate, using four #5 ½" coarse thread screws (or other appropriate mounting screws).

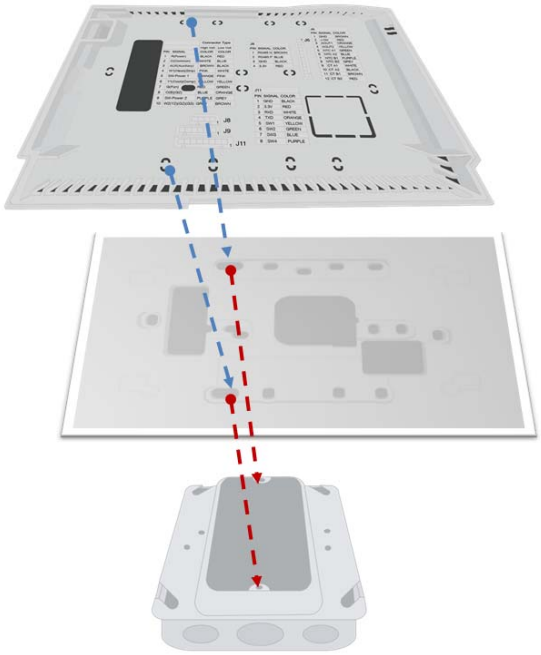

Figure 5: Back Plate on Adapter Plate

15. Feed wire harnesses through the applicable holes in the backplate.
16. Connect the harnesses to the SS6010.

⚠	REMINDER: Wiring to J3 must exit the enclosure at *Opening A* of the backplate as shown **in Figure 6** and **Figure 7** (page11). Wiring to all other connectors must exit the enclosure at *Opening B* of the backplate. Class 2 and Non-Class 2 wiring must not be mixed within a junction box or conduit run.

High Voltage Installation (Non-Class 2)

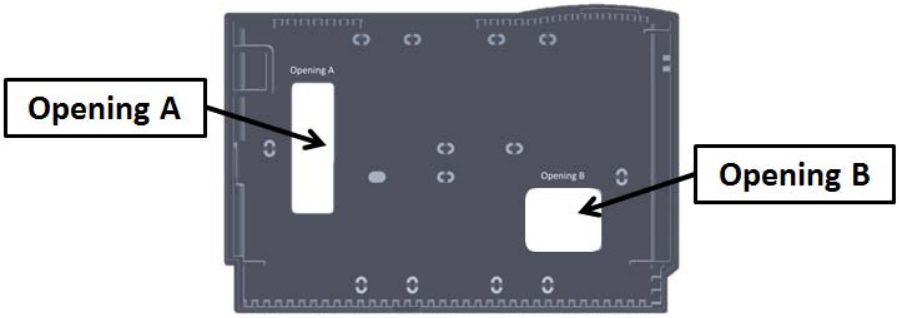

Figure 6-Separate High and Low Voltage Wires

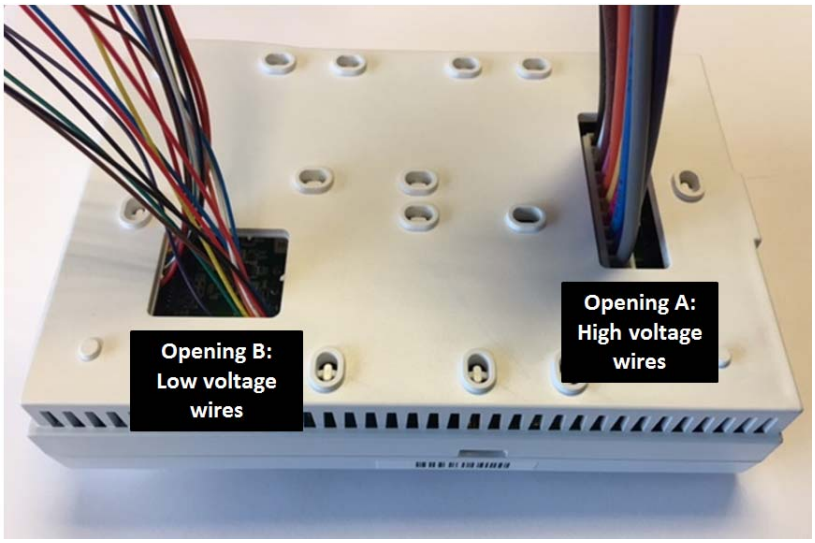

Figure 7-Another View: Separate High and Low Voltage Wires

	For variable output connections, see Appendix B, page 35.

1. Ensure no airflow from JBOX or wall cavity is able to seep into the thermostat through the wire harness. Telkonet recommends the use of UL caulk or UL rated insulating tape as shown in Figure 8 to avoid false temperature readings.

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High Voltage Installation (Non-Class 2)

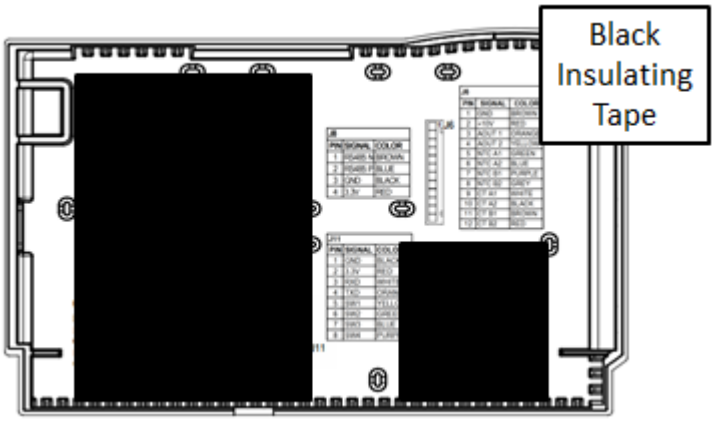

Figure 8: Backplate with UL-Rated Insulating Tape

2. Line up the hinges on the thermostat to the notches on the backplate. See Figure 9

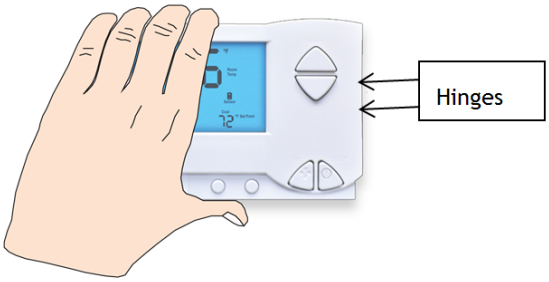

Figure 9: Line Up Hinges on Right

3. Press the right side of the thermostat tightly against the back plate.
4. Slowly bring the left side toward the wall. Use care not to force the faceplate closed. If you encounter resistance, check to make sure no wires are pinched between components.
5. Return the electrical circuit to operation. Remove all lockouts or tags from the circuit breaker and enable any disconnects.
6. Verify the SS6010 thermostat display is active.
7. Test all components to make sure that you can engage both the heat and cool, and all supported fan settings (high, low, etc.). Wiring is complete.
8. Once the thermostat has been snapped onto the back plate, use a hex wrench to insert the safety screw.

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High Voltage Installation (Non-Class 2)

Rating Schedule – Non-Class 2

INPUTS:

Input Type (i.e. Supply, Sensor, Communication)	Terminals	Input Rating
Communication	J8, J9, J10, J11	3.3 Vdc max. Class 2, SELV, Low Power (Less than 15 watts) See Note 4
Accessible communications: RS232	J12	5 Vdc max. Class 2, SELV, Low Power (Less than 15 watts)
Power Supply	J3-1 (R) and J3-2 (C)	30 – 277VAC See Note 4

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High Voltage Installation (Non-Class 2)

OUTPUTS (+):

Position Relay	Terminal	Ratings			
		Current / power	**Voltage**	**Load type**	**Action Type Design**
RLY1, RLY2, RLY3	RLY1:J3-1 (R) and J3-3 (AUX) RLY2:J3-5 (W1/Y1) and J3-4 (W1) RLY3:J3-5 (W1/Y1) and J3-6 (Y1) See note 1	5A	125/250/277 VAC	General use	**Operating 1.C**
RLY5, RYL7	RLY5: J3-9 (G/O/W2) and J3-7 (G) See Note 3 RLY7: J3-9 (G/O/W2) and J3-8 (O) See Note 3 See Note 1	10A	125 VAC	General use	**Operating 1.C**
		8A	277 VAC	General use	
		1/10HP	125 VAC	Motor	
		1/6HP	250 VAC & 277 VAC	Motor	
RLY8	J3-9 (G/O/W2) and J3-10 (W2) See Note 3 See Note 1	16A	277 VAC	Resistive (including Fixed Electric Space Heating) See Note 2	**Operating 1.A.Y See Note 2**
		1HP	250 VAC	Motor	
		1HP	277 VAC	Motor	
		½HP	125 VAC	Motor	

Note 1: J3-1 (R), J3-5 (W1/Y1), and J3-9 (G/O/W2) – must be connected to the same pole of the same supply circuit. Relay contacts must be connected in a same polarity fashion.

Note 2: Relay RLY8 is the only output device rated for the control of fixed electric space heating equipment. This relay will de-energize when the On/Off switch is adjusted to the "OFF" position. RLY8 only

High Voltage Installation (Non-Class 2)

interrupts one pole of the supply circuit. Accordingly, the thermostat/relay is restricted to controlling fixed electric space heating loads with a single ungrounded conductor – such as loads connected to a 120 or 277 Vac circuit.

Note 3: The total connected load of Relays 5, 7 and 8 should not exceed 16 Amps (through common terminal J3-9).

Note 4: Wiring to J3 must exit the enclosure at *Opening A* of the backplate as shown **in Figure 6** and **Figure 7** (page11). Wiring to all other connectors must exit the enclosure at *Opening B* of the backplate. Class 2 and Non-Class 2 wiring must not be mixed within a junction box or conduit run.

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Low Voltage Installation (Class 2)

⚠	Always ensure power has been turned off before starting installation.

Required Equipment

- SS6010 (included)
- Wire harnesses as applicable (included)
- Voltmeter
- Level
- Phillips Head Screwdriver
- Wire nuts
- Precision Screwdriver
- UL rated insulating tape
- Wire stripper
- Speed nut (if applicable)

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Low Voltage Installation (Class 2)

Additional Hardware:

Drywall Mount:	• 4 – 50 lb. EZ-Lock anchors and provided screws
VERTICAL JBOX Mount:	• Telkonet JBOX Adapter Plate • Two #6-32 1” screws • Four #5 ½” coarse thread screws
HORIZONTAL JBOX Mount:	• Two #6-32 1” screws

Installation

1. If applicable, determine the location in the room where the thermostat will be installed. (See SS6010 Location Planning section, page 5.)
2. Turn off power at SS6010 mounting location using a disconnect switch or breaker lockout/tag out on appropriate breaker panel.
3. Test that power is off by using a voltmeter.
4. Remove the safety screw from the left side of the thermostat using the hex wrench. See Figure 10.

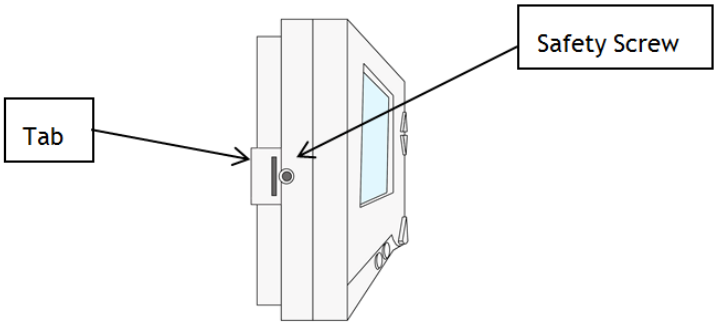

Figure 10: Thermostat Side View

5. Separate the back plate from the thermostat: Use a flathead screwdriver to GENTLY press the tab next to the screw hole to allow the thermostat to pop open. WARNING: Using too much force can break the tab.

- For drywall mounting instructions, see below.
- For JBOX vertical installation instructions, go to page 18
- For JBOX horizontal installation instructions, go to page

Drywall Mounting Instructions

- Requires four 50 lb. EZ-Lock anchors and provided screws

6. Strip the LINE wire back 0.25 inches.
7. Cap the LINE wire with a wire nut or electrical tape.
8. Cut the COMMON wire so the copper is flush with the insulation.
9. Strip all wires except for COMMON back 0.25 inches.
10. Verify the wiring now looks similar to Figure 11.

Figure 11: Drywall Mount Wiring

11. Ensure the wiring Molex has appropriate wires jumped between R, SW1 and SW2 (assuming they are controlling all fan and modes from the same voltage as powering the thermostat). If installing on a heat pump, ensure that Y1 and W1 are jumped together.
12. Connect wires and harnesses as per the tables in the Tables section, which begins on page 30.
13. Verify each wire is secure by gently tugging on it.
14. Hold backplate against wall at appropriate height. Using a pen, level-mark your 4 holes.
15. Use appropriate drill for anchor and insert anchors into holes.
16. Screw backplate to the wall and into the anchors. Re-check that it is still level.
17. Connect the harnesses to the SS6010.
18. Continue to Step 35 (on page 19).

JBOX Using Vertical Mud Ring Instructions

- Requires Telkonet JBOX Adapter Plate and two #6-32 1” screws

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Low Voltage Installation (Class 2)

19. Strip the LINE wire back 0.25 inches.
20. Cap the LINE wire with a wire nut or electrical tape.
21. Cut the COMMON wire so the copper is flush with the insulation.
22. Strip all wires except for COMMON back 0.25 inches.
23. Determine which end of the adapter should be situated on top, and which end should be situated on the bottom.
24. Mount the Telkonet JBOX adapter plate to the mud ring with two #6-32 1" screws.
25. Mount SS600 backplate on top of JBOX adapter plate, using four #5 ½" coarse thread screws.
26. Connect each Molex wire to the matching functional wire within the JBOX. Refer to
27. . (If controlling proportional valve or ECM fan, see Appendix B.) Any unused wires must be capped according to NEC standards.

	For variable output connections, see Appendix B on page 35.

28. Connect all other wires and harnesses as per the tables in the Tables section, which begins on page 30.
29. Mount SS6010 backplate on top of JBOX adapter plate, using four #5 ½" coarse thread screws
30. Feed wire harnesses through the applicable holes in the backplate. High and low voltage wires must be fed through separate holes as shown in Figure 7 (on page 11).
31. Connect the harnesses to the SS6010.
32. Ensure backplate has appropriate jumpers between R, SW1 and SW2. If installing on a head pump, ensure there is a jumper between Y1 and W1.
33. Ensure no airflow from the JBOX or wall cavity is able to seep into the thermostat through the wire harness. Telkonet recommends the use of approved UL caulk or UL rated insulating tape to avoid false temperature readings. Figure 8 (page 12) illustrates sections of insulating tape on the backplate, covering the wall opening.
34. Continue to Step 35 (on page 19).

Steps Common to all Installation Methods

35. Connect all Molex harnesses.
36. Hook the thermostat to the hinges on the right side of the backplate.
37. Line up the hinges on the thermostat to the notches on the backplate. Press the right side of the thermostat tightly against the back plate.

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Low Voltage Installation (Class 2)

38. Slowly bring the left side toward the wall as shown. Use care not to force the faceplate closed. If you encounter resistance, make sure no wires are pinched between components and that no pins are bent.
39. Once the thermostat has been snapped onto the back plate, use a hex wrench to insert the safety screw in the location shown in Figure 10: Thermostat Side View on page 17.
40. Remove all lockouts or tags from the circuit breaker.
41. Return the electrical circuit to operation.
42. Verify the SS6010 thermostat display is active.
43. Test all components to make sure that you can engage both the heat and air conditioning, and all supported fan settings (high, low, etc.). Wiring is complete.
44. Join, pair and bind. (See Device Association Guide for details.)

Rating Schedule– Class 2:

INPUTS:

Input Type (i.e. Supply, Sensor, Communication)	Terminals	Input Rating
Communication	J8, J9, J10, J11	3.3 Vdc max. Class 2, SELV, Low Power (Less than 15 watts)
Accessible communications: RS232	J12	5 Vdc max. Class 2, SELV, Low Power (Less than 15 watts)
Power Supply	J3-1 (R) and J3-2 (C)	24 Vac/Vdc (Nominal); 30 Vac/Vdc max. Class 2, SELV, Low Power (Less than 15 watts)

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Low Voltage Installation (Class 2)

OUTPUTS (+):

Position Relay	Terminal	Ratings per relay				
		Max. Voltage	Max. current, A	Max. power, VA	Load type	Action Type Design.
RLY1, RLY2, RLY3, RLY5, RYL7, RLY8	RLY1:J3-1 (R) and J3-3 (AUX) RLY2:J3-5 (W1/Y1) and J3-4 (W1) RY3:J3-5 (W1/Y1) and J3-6 (Y1) RLY5: J3-9 (G/O/W2) and J3-7 (G) RLY7: J3-9 (G/O/W2) and J3-8 (O) J3-9 (W2) and J3-10	30 Vac/ Vdc, Class 2, SELV	5	100	General use	**Operating 1.C**

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Add-Ons

About Wiring

The SS6010 interconnects with the existing HVAC system via standard wiring conventions, using 24-277VAC OR 24VDC voltage supplied by the HVAC system itself.

Note: The SS6010 does not allow three different power sources, as the SS6600 does. On the SS6010, all three poles must be connected to the same power source.

The SS6010 does not support wiring directly, as the SS6600 does. Instead, we provide bare leads. It is up to the installer to connect these leads using an appropriate method described herein. Wiring conventions follow industry standards; however, it is important to note that the relay configuration is dynamic and can be modified at the factory or in the field. It is important to always follow site-specific wire diagrams.

Relay Configuration

The thermostat comes with a default relay configuration, which sets the functions of each pin. This default can be changed to one of several alternate relay configurations, which are stored in the memory of the thermostat. To change your thermostat relay configuration, see **Maintenance Menu**

Table 6, specifically command #2.

Speed Configurations

The SS6010 will ship with a default speed configuration that matches the default relay configuration. The speed configuration controls the timing of shifts between both fan speeds and stages of HVAC for compressor based systems. The speed configuration will have a 3 minute safety delay between compressor cycles and upon power up. The SS6010 also has several alternative embedded speed configurations. See **Maintenance Menu**

Table 6: Maintenance Menu Functions, specifically command #3.

NTC Probe

Temp probes can be used for multiple purposes:

1. HVAC Discharge Air temp
2. HVAC Return Air temp
3. Supply Water Temp
4. AquaStat Mode (switches thermostat's Heat/Cool)

For temperature probe if not using Telkonet provided external temperature probe, a probe with a Beta R0 must match. Alternatively, a probe can be provided to Telkonet for lab calibration. Required specifications:

US Sensor model USP10972 or equivalent, per the following:

- Resistance at 25 degrees C = 10 000 ohms +/- 1%
- Resistance/Temperature curve = "J"

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- Beta (0 to 50 degrees C) = 3892 degrees K nominal

Other models may be compatible; provide model number and specifications.

Analog Outputs

See Appendix B

CT Inputs

All Models have 2 inputs. The CT inputs are commonly used for monitoring/alerting on fan motors, compressors or other equipment with excessive load or for determining a failure. The CT Inputs must be used with a compatible CT and sized appropriately for the load they will be connected to.

Current Transformer (CT) approved models from Sentran Corp.:
Rated loads are 100, 50, 30, 20 and 10 A respectively.

BCF-100A: 0.025A
LCF-50A: 0.025A
LCF-30A:0.025A
LCF-20A:0.025A
LCF-10A: 0.01A

Preferred operating range is between 10 and 80% of rated load.
Other models may be compatible: provide model number and specifications

⚠	If not sized correctly the CT may damage the thermostat.

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User Interface

Panel Controls

Front panel controls are shown below.

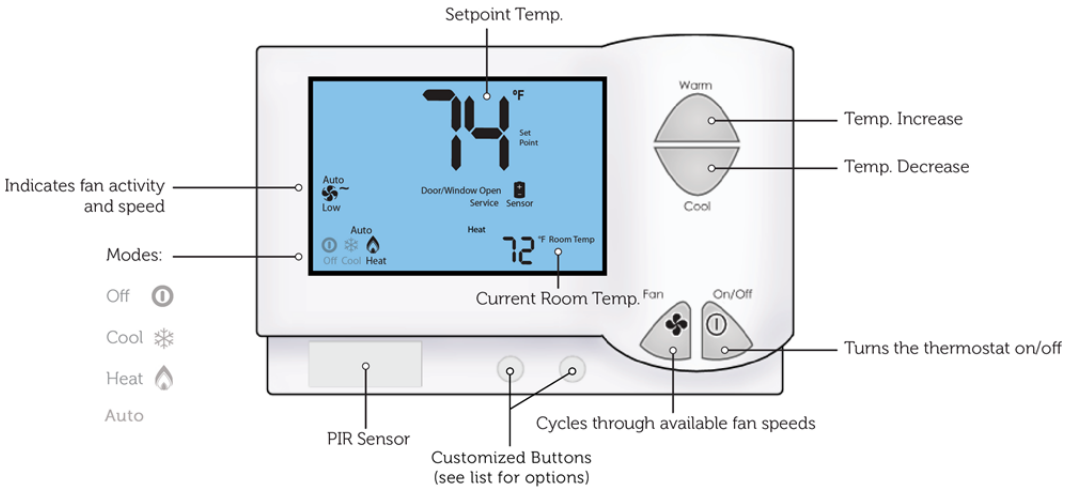

Figure 12: User Controls and Icons

The buttons on the SS6010 are designed to be easy to use and understand.

Table 1: SS6010 Buttons

Up/Down Arrows	For occupants, the up and down arrows increment the setpoint temperature by one degree.
On/Off Button	The On/Off button typically toggles the power to the thermostat, but can be set to cycle the Heat/Cool/Off modes as well.
Fan Button	The Fan button either increments the fan speed or turns the fan on and off. This function will depend on whether the property has independent fans or more than one fan speed.
Soft Buttons	The two soft buttons near the bottom of the thermostat can have numerous functions, depending on the desire of the property. See Figure 13.

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User Interface

Figure 13: Soft Buttons

The most common uses for the soft buttons are **Fahrenheit/Celsius, Heat, Cool, Heat/Cool**.

- **Grey button**: can be programmed for nearly any function the property chooses.

The Maintenance Menu

The Maintenance Menu is for approved staff to make adjustments to the operational settings of the SS6010.

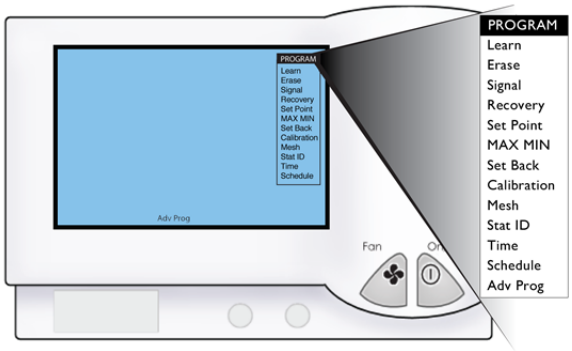

Figure 14: The Maintenance Menu

Navigate the Maintenance Menu

Procedure: Display and Navigate the Maintenance Menu as shown in Figure 14**.**

Step 1 Press and hold the **Fan button** for 10 seconds.

Step 2 Press the **On/Off button**.

Step 3 Use the buttons on the face of the SS6010 to navigate through the Maintenance Menu. Their functions are shown in Maintenance Menu

Table 6.

Step 4 The last menu item is "Advanced Programming". When you press the up/down arrows to scroll down to the bottom of the screen, the last menu item is Adv Prog, the screen will display "Adv Prog" in the middle of the bottom of the screen. See Advanced Command Menu

Table 7. All menu items are saved automatically when you set them.

Troubleshooting

Problem	Potential Cause	Potential Solution
HVAC unit does not operate.	Main electrical failure to the unit. Many units operate on 230 or 277VAC circuits, so although power is available to the 110VAC plugs in the room, the branch circuit supplying HVAC power may be interrupted.	Dispatch maintenance. Verify mains continuity to the unit.
	GFI within the HVAC has tripped. Some models of HVAC systems (often PTAC/PTHP units) contain integral GFI (Ground-Fault Interrupt) systems. Occasionally, often after a power outage, inrush current when power returns can cause GFIs to trip. Most times, this does not indicate issues with the unit.	Check and reset units' GFI systems.
	SS6010 has failed.	Replace the SS6010 with a known-good unit as a comparison-check. If the replacement unit functions properly, contact Telkonet and begin the RMA process. If the replacement unit does not function properly, consult a local HVAC technician to inspect your HVAC unit.
	Door contact is not connected.	Ensure that all door contacts are connected.
	Window or outside door is open.	Ensure that no monitored windows or patio doors are open.

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Troubleshooting

Problem	Potential Cause	Potential Solution
Occupant returns to room and finds it too hot or too cold.	During an Unoccupied period, the EcoSmart system allows the temperature in the room to drift away from the occupants' setpoint. Telkonet's Recovery Time technology is enabled to return the room to the occupants' setpoint within a time defined in advance by the Property Manager (this varies by property, but it usually between 8 and 20 minutes).	Advise the occupant to wait 8 – 20 minutes. (This is the typical range of defined Recovery Times requested by customers in most installations.)
Service sensor appears on thermostat.	One or more sensors have lost association to the thermostat.	Dispatch Maintenance to the room. Re-associate all sensors via procedures. Replace the batteries in all sensors within the room. Evaluate the wiring between each sensor and the thermostat.
Occupant reports HVAC shuts down while they sleep.	Sensor is not accurately detecting occupancy. This is typically seen in deployments where the bed placement within the room was changed after installation, such that the pillow area of the bed(s) is further than 10-15 feet from the sensor.	Assess the room, sensor placement, and bed location(s). Verify that the sensor(s) are deployed in accordance with the Recommended Best Practices. Corrective strategies may include: a. Moving the sensor b. Adding an additional sensor to accommodate the new room layout c. Changing the room layout d. Adjusting sensor settings (contact Telkonet to discuss options) e. Adjusting night delay (contact Telkonet support for assistance)

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Troubleshooting

Problem	Potential Cause	Potential Solution
Occupant reports one mode (heating/cooling) works but the other does not.	Heat pump jumper is reversed or changeover signal is backwards, or it may be that the heat/cool jumpers are reversed.	Remove thermostat from backplate, and identify jumper J3. Insert jumper and replace thermostat.
Room does not achieve setpoint within Recovery Time.	The most common cause is that the EcoSmart system is designed to recover the temperature within a Comfort Zone. The Comfort Zone is programmable by Telkonet, and is chosen by management before installation. The thermostat may be programmed with settings not appropriate to the specific deployment scenario.	Contact Telkonet Customer Support. Telkonet will research the deployment history, and determine whether a completed Settings Sheet was provided to us prior to thermostat shipment. Note that Professional Services fees may apply if a reported anomaly is later determined to have been caused by default settings when specific preferences were not communicated to Telkonet prior to device shipment.
	Often an HVAC unit is in need of servicing. For example, a unit with a failing compressor or under-charged refrigerant may not be able to efficiently return the room to the occupants' desired setpoint.	Ensure the PTAC unit is in good working order. Service and correct internal thermostat anomalies per PTAC manufacturer's recommended best practices.
	There may be a failed control circuit within the HVAC system	Ensure the PTAC unit is in good working order. Service and correct internal thermostat anomalies per PTAC manufacturer's recommended best practices.
	The setpoint cannot be achieved within the current environmental conditions. For example, on an extremely hot or humid day, the HVAC system may not be able to achieve a setpoint of 60°.	Ensure the PTAC unit is in good working order. Service and correct internal thermostat anomalies per PTAC manufacturer's recommended best practices.

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Troubleshooting

Problem	Potential Cause	Potential Solution
Thermostat reboots repeatedly	The thermostat wiring is coming in from the J8 hole and is placed directly over the J8 pins on its way to the terminal block.	Re-route the wiring along the bottom of the backplate until reaching the screw terminals.

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Appendix A: Pinout Tables

Table 2: J3 Thermostat Wiring Harness*

Pin	Label on Backplate	High Voltage Wire color	Low Voltage Wire color	Function
1	R (Power)	BLACK	RED	Power from HVAC, used to power the thermostat and AUX output
2	C (Common)	WHITE	BLUE	AC Common
3	AUX (Auxiliary)	BROWN	BLACK	User defined
4	W1 (Heat) (Strip)	PINK	WHITE	Heat call or strip heat call (depends on programming)
5	Switched Power 1 (W1/Y1)	ORANGE	PINK	Input for W1 and Y1
6	Y1 (Cool) (Comp)	YELLOW	YELLOW	Cool/Compressor call
7	G (Fan)	RED	GREEN	Fan Call - Low speed
8	O (B) (G2) (Y2) (Changeover)	BLUE	ORANGE	Multi-use - depends on programming and site requirements: • Changeover • 2nd Stage Fan • 2nd Stage Cooling
9	Switched Power 2	PURPLE	GREY	Input for G, O, and W2
10	W2 (Y2) (G2) (G3) (Multi-speed)	GREY	BROWN	Multi-use - depends on programming and site requirements: • 2nd stage heat • Electric heat (for HPs with strip heat, etc.) • Emergency heat

* See the Rating Schedule section for electrical ratings and usage constraints.

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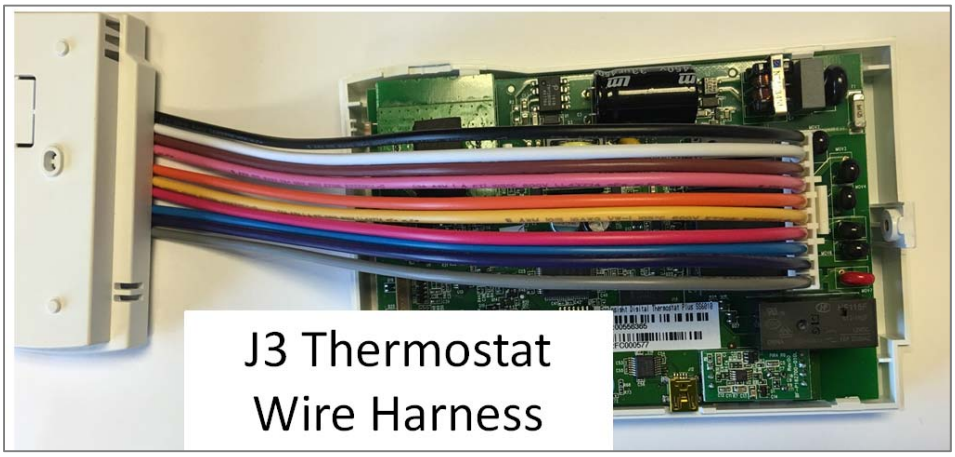
Appendix A: Pinout Tables



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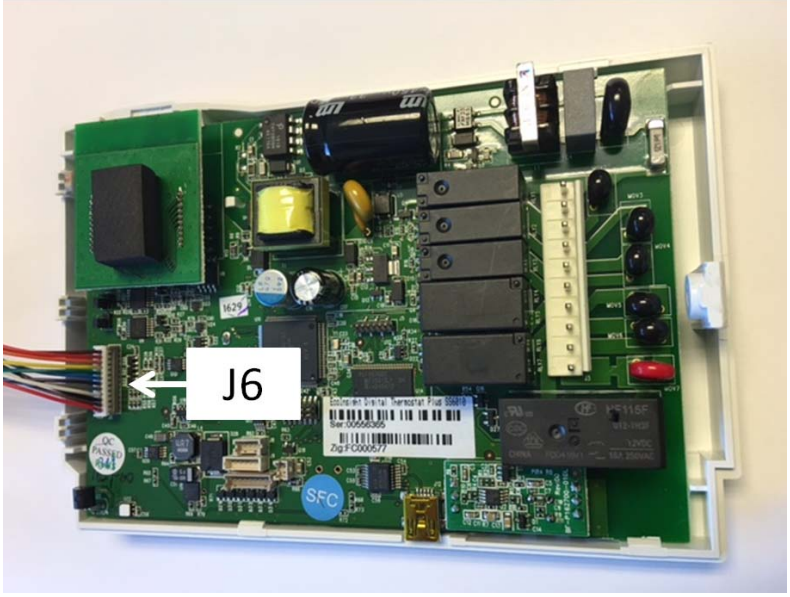
Appendix A: Pinout Tables

Table 3-J6 Pinout

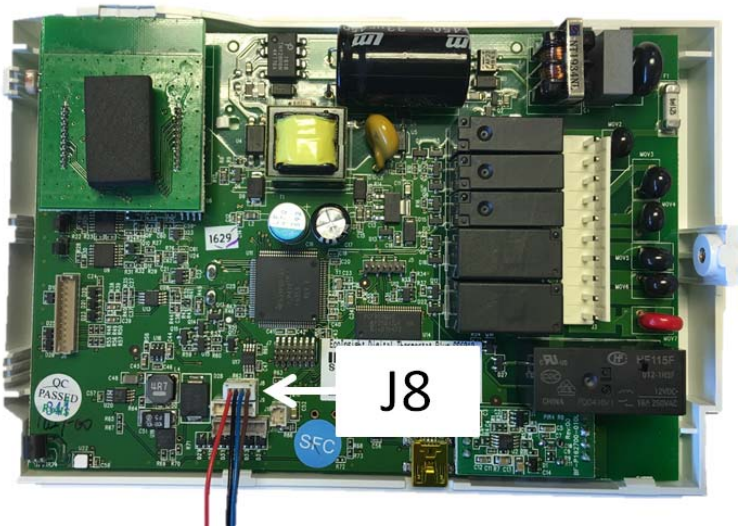
PIN	SIGNAL	COLOR
1	GND	BROWN
2	+10V	RED
3	AOUT 1	ORANGE
4	AOUT 2	YELLOW
5	NTC A1	GREEN
6	NTC A2	BLUE
7	NTC B1	PURPLE
8	NTC B2	GREY
9	CT A1	WHITE
10	CT A2	BLACK
11	CT B1	BROWN
12	CT B2	RED



Appendix A: Pinout Tables

Table 4-J8 Pinout

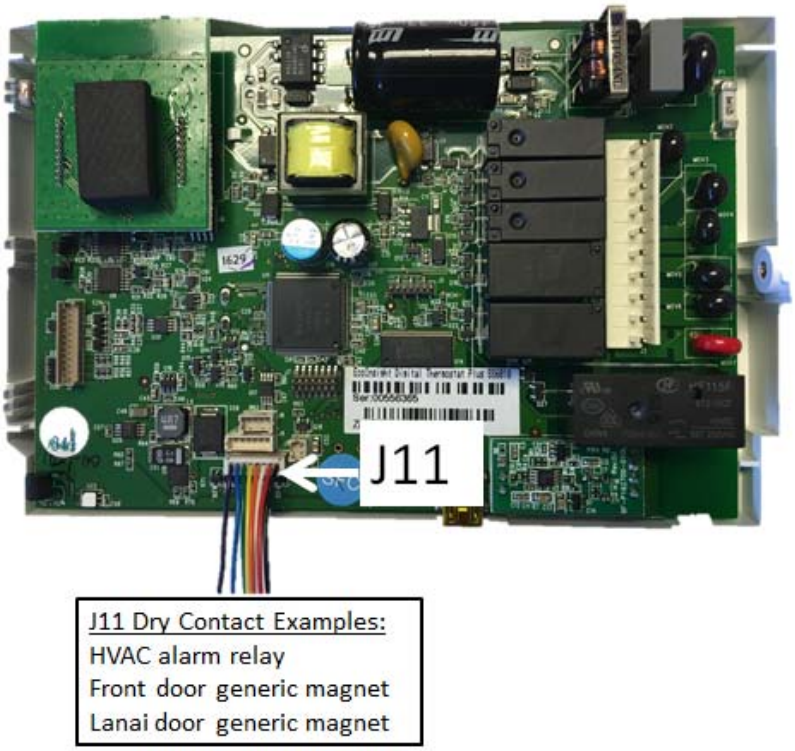
PIN	SIGNAL	COLOR
1	RS485N	BROWN
2	RS485P	BLUE
3	GND	BLACK
4	3.3V	RED



Appendix A: Pinout Tables

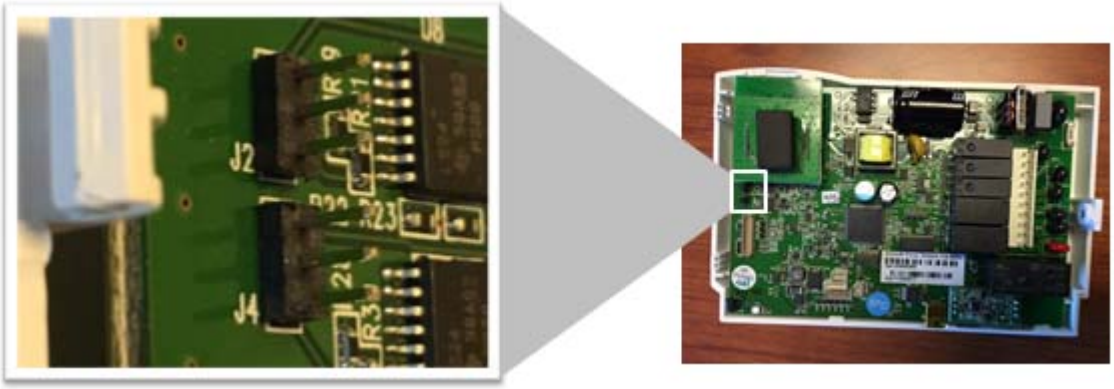
Table 5-J11 Pinout

PIN	SIGNAL	COLOR
1	GND	BLACK
2	3.3V	RED
3	RXD	WHITE
4	TXD	ORANGE
5	SW1	YELLOW
6	SW2	GREEN
7	SW3	BLUE
8	SW4	PURPLE

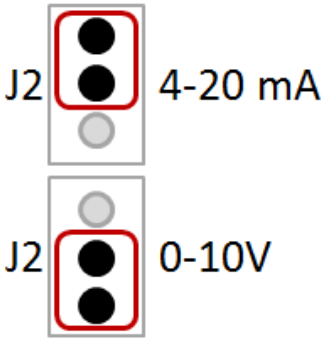


Appendix B

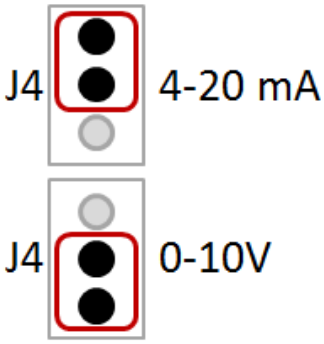
Proportional Valve Control



Pin	Signal	Color
J6-3	AOUT1	ORANGE



Pin	Signal	Color
J6-4	AOUT2	YELLOW



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Appendix B

Analog Outputs

(VO model only)

The Analog outputs can be used to control multiple functions. The desired function must be specified at the time of programming.

1. Fan Coils Variable Valve Control 0-10V or 4-20mA (Both Heat & Cool)
2. ECM Fan motor variable control between speeds. (0-10VDC)

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Appendix C: JBOX Mounting Options

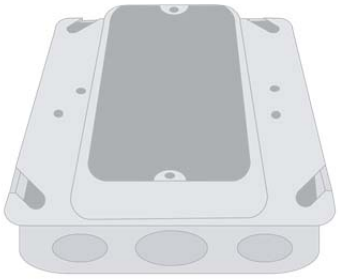

Figure 15: Vertical Single Gang Mud Ring & Single Gang Junction Box

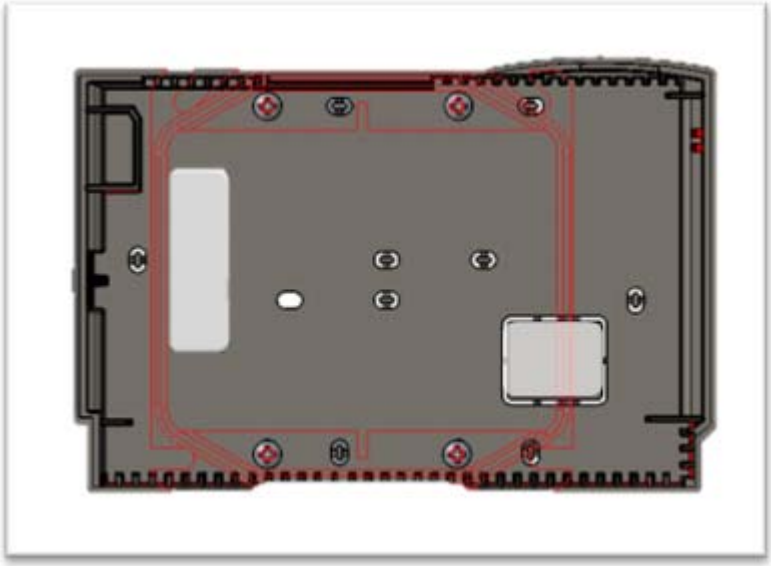

Figure 16-JBOX Vertical Mounting with Double Gang Mud Ring, plus Adapter Plate

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Appendix C: JBOX Mounting Options

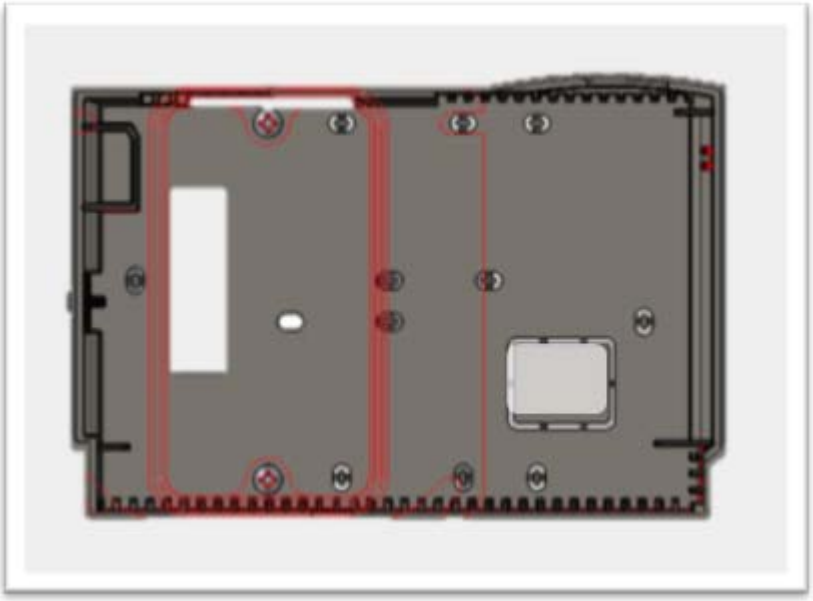

Figure 17-JBOX Vertical Mounting Single Gang Mud Ring, plus Adapter Plate

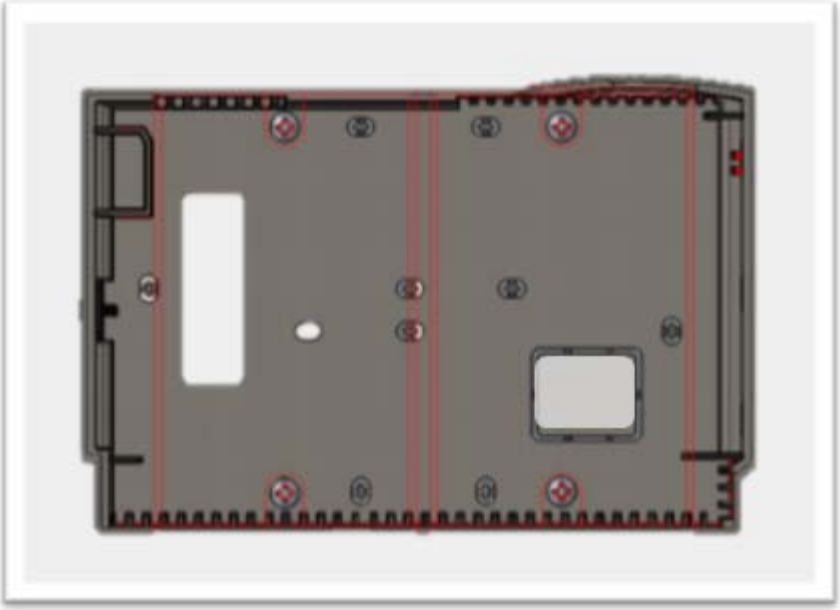

Figure 18-High Voltage with Low Voltage Connections to Separate Box, plus Adapter Plate

Appendix C: JBOX Mounting Options

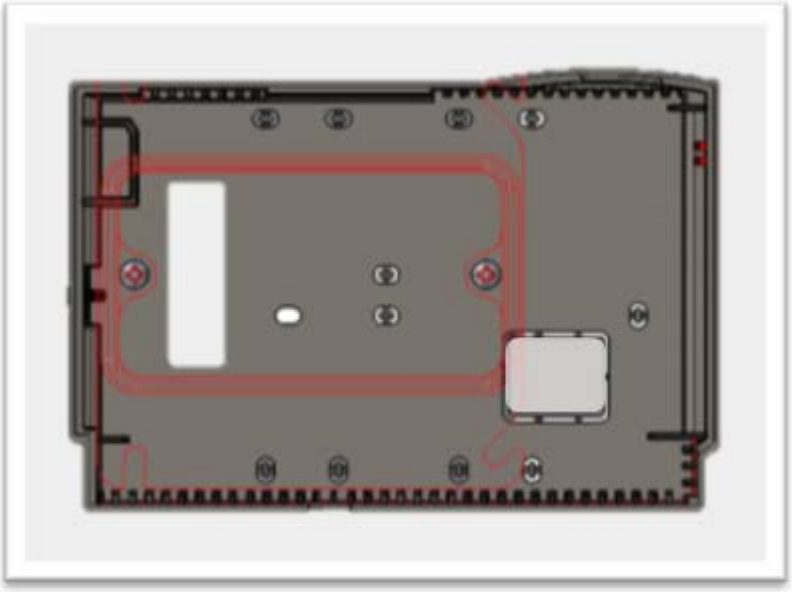

Figure 19-JBOX Horizontal Mounting Single Gang Mud Ring, plus Adapter Plate

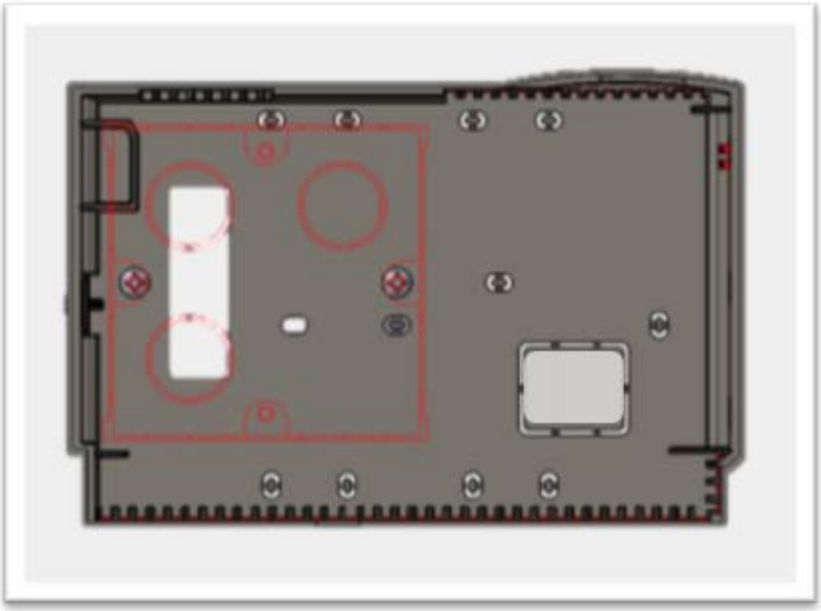

Figure 20-European Mounting (Horizontal), plus Adapter Plate

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Appendix D: Types of Radio Modules

Internal high-power: default

External high-power: An optional external antenna is available for systems that will be enclosed inside metal HVAC systems to improve network reliability. See Figure 21 and Figure 22.

Figure 21: High-Power Radio Module with Antenna Attached

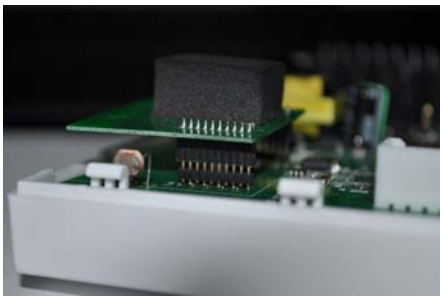

Figure 22: Radio Board Properly Seated

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Regular Maintenance

Procedure: Visual Inspection

Step 1 Verify that components have not been tampered with, destroyed or stolen.

Step 2 Verify that the components are securely mounted on their respective surfaces.

	Sensors may be mounted on walls or ceilings; either location is permissible and will have been determined during installation.

Step 3 If applicable, verify that the AC power is being supplied to the HVAC system.

Step 4 If units are hard-wired, verify that the power/data wiring between the SS6010 and the EcoSense are intact and connected.

Step 5 Check for a **Service** icon on the SS6010 display. This icon indicates loss of association with one or more sensors.

Step 6 If the icon appears, first check the batteries. Replace batteries if necessary.

Step 7 If batteries are not the cause of the Service icon, **erase and** re-associate all sensors per instructions in the *EcoSmart Firmware 2.x Device Association Guide.*

Procedure: Functional Inspection

Step 1 Observe whether the HVAC system is operating (e.g. drive cycle) after entering the room.

	In most cases, entering the room will have initiated an HVAC drive cycle after the Sensor detected occupancy. Possible exceptions: -If the temperature in the room is within hysteresis of the HVAC setpoint, a drive cycle may not commence -A delay may have been programmed into the SS6010 thermostat, instructing the unit to wait for a particular duration before triggering a drive. (Although uncommon, this feature is sometimes requested by a property. In almost all cases, the delay is less than 3 minutes.)

Step 2 If a drive cycle does not initiate within 5 minutes of entry, force a drive cycle by temporarily setting the thermostat to some arbitrary high or low temperature (ensure the HVAC mode is set correctly).

	SS6010 thermostats default to *Occupied* status if communication with the SS6010 or sensor(s) is lost for any reason. This permits the units to continue to maintain the room temperature. However, in this state energy savings will be lost. If in doubt whether the sensors are associated, re-associate all Sensors per the *EcoSmart Firmware 2.x Device Association Guide.*

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Maintenance Menu

Table 6: Maintenance Menu Functions

Menu Item	Function
Learn	Used to associate the SS6010 to other EcoSmart wireless devices in the room, such as an EcoSense, EcoContact, EcoGuard, or EcoSwitch. For step-by-step instructions on associating devices, see *EcoSmart Firmware 2.x Device Association Guide*.
Erase	Will tell the SS6010 to forget all of the wireless devices it has been associated with, such as an EcoSense, EcoContact, EcoGuard or EcoSwitch. The large number shown in the Erase menu indicates the number of devices currently associated with the SS6010. Press On/Off to erase all associated devices.
Signal	Advanced command, which should only be changed with the assistance of Telkonet.
Recovery	Sets the value for the number of minutes for Recovery Time. The number displayed indicates the current recovery time, and can be incremented using the up or down arrows. **Setting a value of zero (0) will disable the energy manage set back feature.**
Setpoint MAX	Indicates the current maximum temperature that a user can set. Can be incremented by using the up and down arrows. This value must be lower than the MAX Setback.
Setpoint MIN	Indicates the current minimum temperature that a user can set. Can be incremented by using the up and down arrows. This value must be higher than the MIN Setback.
MAX Setback	Indicates the maximum temperature a room can reach, either through guest setting or an unoccupied drift.
MIN Setback	Indicates the minimum temperature a room can reach, either through guest setting or an unoccupied drift.
Calibration	Allows authorized personnel to calibrate the ambient temperature to ensure accurate readings.
Mesh	The Mesh submenu contains advanced commands for adjusting the ZigBee mesh network. These options should only be changed with the assistance of Telkonet.
Stat ID	This is an advanced command, which should only be changed with the assistance of Telkonet.
Time	Allows authorized personnel to set the time on the thermostat.
Schedule	If Schedules are in use, allows authorized personnel to select a schedule for the thermostat to use.
Adv Prog	This section contains multiple advanced commands that can be run on the SS6010. For details on what Advanced Commands are available, please contact your Telkonet Project Manager or Technical Support for a command list.

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Advanced Command Menu

Table 7: Advanced Program Commands

Cmd #	Function
01	Profile: Selects one of the three default configurations stored in the thermostat. Note that these default configurations are separate from the profiles available through Advanced Command 13 or EcoCentral.
02	Sets the desired relay configuration from available defaults. Relay Config -AdvCmd 02 Option to change between embedded default Relay Configs. Embedded options will vary per customer. Talk to your Telkonet support representative to find out what relay options are available within your firmware. Alternatively EcoSmart Serial Utility can be used to make a custom relay config or to load a relay config file that is sent from the Telkonet support team.
03	Sets the desired speed configuration from available defaults. Speed Config -Adv Cmd 03 Option to change between embedded default speed configs. Embedded options will vary per customer. Talk to your Telkonet support representative to find out what speed config options are available within your firmware. Alternatively EcoSmart Serial Utility can be used to make a custom speed config or to load a speed config file that is sent from the Telkonet support team.
04	Sets the changeover value for Heat Pump operation (c/o heat).
05	Sets the changeover value for Heat Pump operation (c/o cool)
06	Sets the minimum temperature for Deep Setback mode*.
07	Sets the maximum temperature for Deep Setback mode*.
08	Choosing (01) selects a heat only interface, selecting (00) removes the heat only interface. If cool only is also selected, the system will default to auto only.
09	Choosing (01) selects a cool only interface, selecting (00) removes the cool only interface. If heat only is also selected, the system will default to auto only.
10	Sets the auto mode overshoot required for opposing mode to be called.
11	Sets the Door Contact configuration to N/O (00) or N/C (01) (normally open or normally closed).
12	Displays the RH% in the bottom right corner of the screen if RH sensor is installed.
13	**Permanent Profiles:**

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Advanced Command Menu

	Each SS6010 can hold 7 different collections of settings. Each collection of settings is defined as a "profile". Typically each SS6010 will ship with at least 3 profiles pre-loaded into the thermostats memory. Most common will include: Sold- This profile contains the settings for operating when a hotel room is in the Sold state from a PMS. UnSold - This profile contains more aggressive setback temperature values because the room is not rented. VIP - This profile contains either no setback value or very restrictive setback for rooms that you do not want to turn off the HVAC in. Profiles are completely configurable by the facility and can be changed at any time with network systems. When using Advanced Command 13 to change the profile, the thermostat will continue to operate in that profile until it is manually changed again, either through EcoCentral or the front panel of the thermostat.
14	**Temporary Profiles** (not available at all locations) Advanced Command 14 also changes the profile of the thermostat, but unlike Advanced Command 13, it is a temporary change. The profile will only be in effect for a set amount of time (for example, 24 hours) or until the room is unoccupied for longer than a set amount of time (for example, no occupancy sensed for 8 consecutive hours). After the required time has passed, the thermostat will revert to its previous profile.
15	This changes the polarity of the relay for the Multi-speed pin, 0 means N/O, 1 means N/C.
16	This changes the polarity of the relay for the (O) changeover, 0 means N/O, 1 means N/C.
17	This changes the polarity of the relay for the (G) pin, 0 means N/O, 1 means N/C.
18	This changes the polarity of the relay for the (Y1) cooling pin, 0 means N/O, 1 means N/C.
19	This changes the polarity for the (W1) heating , 0 means N/O, 1 means N/C.
20	This changes the polarity of the relay for the AUX, 0 means N/O, 1 means N/C. This allows further setback after 24 hours of no occupancy.

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