Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

Add Lutron® Comfort Controls to your light and shade / drapery systems for convenient control of all aspects of an environment—natural light, artificial light, and temperature—from the touch of a button. Lutron® Comfort Controls allow heating and cooling systems to integrate seamlessly with Lutron® systems and must be located within 30 ft (9 m) of an RF signal repeater.

The HVAC Controller connects to and controls HVAC equipment using standard 24 V∼ thermostat wiring. It can be mounted out of sight, near the equipment being controlled. Communication with a Lutron® total home control system is accomplished using Lutron® Clear Connect™ RF technology.

The HVAC Controller can utilize either Lutron® Wireless Temperature Sensors or Wired Flush Mount Sensors to read the temperature in the area being controlled. The Wireless Temperature Sensor is battery powered, making it easy to install in existing spaces. A 5-year battery life and Lutron® Clear Connect™ RF communication ensure reliable operation.

Lutron® Comfort Controls can only be used in RadioRA® 2 and HomeWorks® QS systems programmed using the PC Programming Tool.

HVAC Controller

Wireless Temperature Sensor

Wired Return Air Duct Sensor

Wired Flush Mount Sensor

Model Numbers

LRF2-TWRB-XX*	Wireless Temperature Sensor
LR-TEMP-FLSH**	Wired Flush Mount Sensor

Packages:

LR-HVAC-PKG-WH	System package includes: -1 HVAC Controller** -1 seeTemp™ Wall Display (°F) (WH) -1 Wireless Temperature Sensor (SW) -1 Wired Return Air Duct Sensor
LR-HVAC-PKG-C-WH	System package includes: -1 HVAC Controller** -1 seeTemp™ Wall Display (°C) (WH) -1 Wireless Temperature Sensor (SW) -1 Wired Return Air Duct Sensor
LR-HVAC-INT-XX*	System package includes: -1 HVAC Controller** -1 Wireless Temperature Sensor* -1 Wired Return Air Duct Sensor
LR-HVAC-INT-FLSH	System package includes: -1 HVAC Controller** -1 Wired Flush Mount Sensor**

*Available in Snow (SW) and Midnight (MN).
**Only available in White (WH).

Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

Specifications

Model Numbers	**Temperature Sensors:** LRF2-TWRB-XX, LR-TEMP-FLSH **Packages:** LR-HVAC-PKG-WH, LR-HVAC-INT-XX, LR-HVAC-PKG-C-WH, LR-HVAC-INT-FLSH
Power	**HVAC Controller:** 24 V∼ IEC PELV/NEC® Class 2 **Wireless Temperature Sensor:** 3 V⎓ (one CR2450 battery included)
Typical Power Consumption	**HVAC Controller:** 3 W; Test conditions: two LEDs on
Regulatory Approvals	**HVAC Controller:** UL, cUL, FCC, IC, COFETEL **WirelessTemperature Sensor:** UL, cUL, FCC, IC, COFETEL
Environment	**HVAC Controller:** Ambient operating temperature: 32 °F to 160 °F (0 °C to 71 °C), 0% to 90% humidity, non-condensing. Indoor use only. **Wireless Temperature Sensor, Wired Return Air Duct Sensor, and Wired Flush Mount Sensor:** Ambient operating temperature: 32 °F to 104 °F (0 °C to 40 °C), 0% to 90% humidity, non-condensing. Indoor use only.
Communications	Lutron® Comfort Controls communicate with the system through Radio Frequency (RF) and must be located within 30 ft (9 m) of a repeater. System devices operate on frequencies between 431.0 MHz and 437.0 MHz.
ESD Protection	Tested to withstand electrostatic discharge without damage or memory loss, in accordance with IEC 61000-4-2.
Surge Protection	Tested to withstand surge voltages without damage or loss of operation, in accordance with IEEE C62.41-1991 Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
Power Failure	Power failure memory: should power be interrupted, the Comfort Controls will retain their programming when power is restored.
Mounting	**HVAC Controller:** Mount on flat surface using supplied screws. **Wireless Temperature Sensor:** Adhesive strip provided for temporary mounting and testing. Wall anchor and screw provided for permanent mounting. **Wired Return Air Duct Sensor:** Mount in return air duct using supplied screws. **Wired Flush Mount Sensor:** Surface mount in area to be controlled.
Wiring	**HVAC Controller:** IEC PELV/NEC® Class 2, 22 AWG (0.5 mm^2) to 18 AWG (0.75 mm^2) solid wiring. Requires transformer common connection. **Wired Return Air Duct Sensor:** IEC PELV/NEC® Class 2, 22 AWG (0.5 mm^2) to 18 AWG (0.75 mm^2) twisted, shielded pair wiring. Maximum wire length is 100 ft (30.5 m). **Wired Flush Mount Sensor:** IEC PELV/NEC® Class 2, 22 AWG (0.5 mm^2) twisted, shielded pair wiring. Maximum wire length is 100 ft (30.5 m).
Warranty	http://www.lutron.com/TechnicalDocumentLibrary/Warranty.pdf Warranty only valid if installed by climate control specialist.

Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

Design Features

HVAC Controller

- Connects to HVAC equipment.
- Uses RF to communicate with the Wireless Temperature Sensors, seeTemp™ Wall Displays, and other Lutron® wireless devices.
- Requires 24 V∼ wiring from HVAC equipment transformer.
- Requires 1 Wired Sensor per HVAC Controller, wired in the system as a backup sensor in case the Wireless Temperature Sensor is not communicating.

Wireless Temperature Sensor

- Flexible mounting options require no wiring.
- 5 year battery life.
- Multiple sensor averaging possible.
- Use up to 4 Wireless Temperature Sensors per HVAC Controller.
- Use up to 5 Wireless Temperature Sensors per Main Repeater (RadioRA® 2) or per RF link (HomeWorks® QS).
- A Wireless Temperature Sensor assigned to a Main Repeater (RadioRA® 2) or RF link (HomeWorks® QS) and attached to an HVAC Controller that is assigned to a second Main Repeater/RF link will count towards the 5 Wireless Temperature Sensor limit on both Main Repeaters/RF links.
- Accurate to +/- 1 °F.

Wired Return Air Duct Sensor

- Mount in the return air duct. If there is no return air duct available, use the Wired Flush Mount Sensor or contact Lutron® Technical Assistance.

Wired Flush Mount Sensor

- Surface mount on wall in the area to be controlled.
- Field paintable to match decor.

System Features

- 7-day programmable schedule.
- Select alternate set points to save energy when on vacation or away from home.
- System features are programmed in the PC tool.

Control from Dynamic Keypads in HomeWorks® QS systems

- Control temperature from Dynamic Keypads.
- The Dynamic Keypad provides full control of multiple HVAC Controllers from a single location without the need for seeTemp™ Wall Displays.
- Multiple Dynamic Keypads can be used to control one HVAC Controller from multiple locations.

Control from Mobile Devices

- Control temperature from Lutron® Home Control+ mobile device application.
- Set and edit up to seven different daily schedules from your mobile device.

Lutron® Comfort Controls
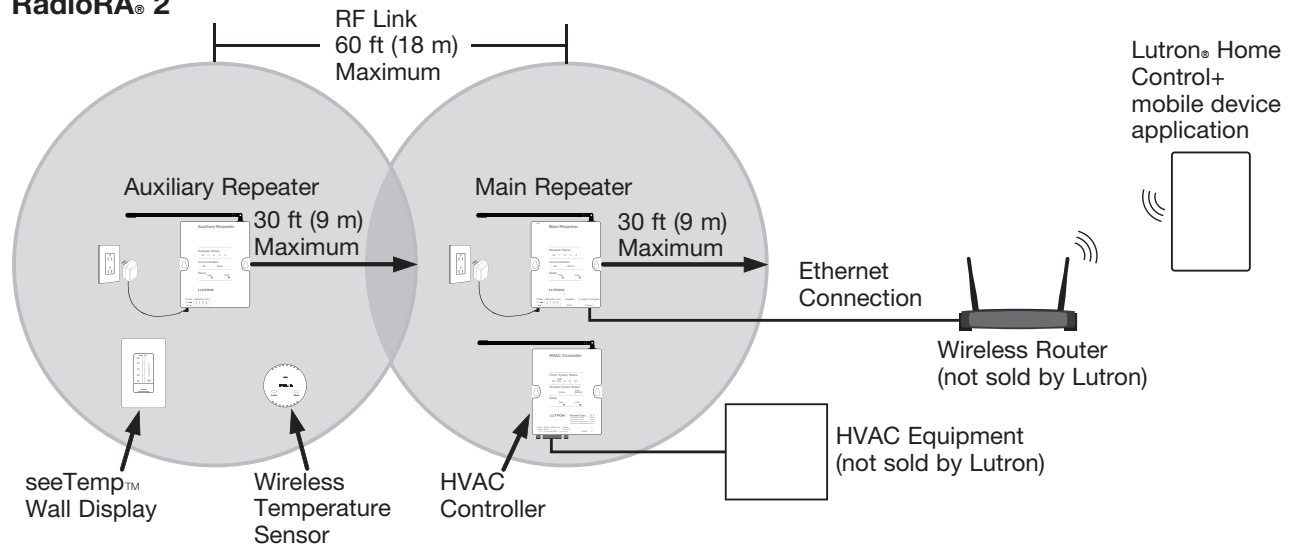## HVAC Controller and Temperature Sensors

Compatibility

HVAC Type	Compatible?
Single Stage Cool	Yes
Two Stage Cool	Yes
Single Stage Heat	Yes
Two Stage Heat	Yes
Packaged Roof Top Units	Yes
Heat Pump	Yes
Dual Fuel Systems	Yes - Requires a separate Fossil Fuel Kit (not sold by Lutron)
Geothermal Heat Pump	Yes
Heat Pump with Auxiliary Electric (Emergency) Heat	Yes
Typical Variable Speed Fan (Equipment Controlled)	Yes
Multi-Zone Systems (Controllable Dampers)	Yes - Requires a separate Zone Controller (not sold by Lutron)
In-Floor Radiant Heat	Yes
Line Voltage Electric Baseboard	No
Mili-Volt System	No
Proprietary/Digital Control systems	No
Variable Speed Fan (Independent Relays)	No
Humidity Control	No
Humidity Sensing	No
Outdoor Temperature Sensing	No
VAV/VRV Systems	No

Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

System Examples

RadioRA® 2

RF Link
60 ft (18 m)
Maximum

Lutron® Home
Control+
mobile device
application

Auxiliary Repeater

30 ft (9 m)
Maximum

Main Repeater

30 ft (9 m)
Maximum

Ethernet
Connection

Wireless Router
(not sold by Lutron)

seeTemp™
Wall Display

Wireless
Temperature
Sensor

HVAC
Controller

HVAC Equipment
(not sold by Lutron)

HomeWorks® QS

Wireless
Temperature
Sensor

Dynamic
Keypad (RF)

Lutron® Home
Control+
mobile device
application

Hybrid Repeater

30 ft (9 m)
Maximum

24 V⎓
Input

Ethernet
Connection

Processor

Wireless Router
(not sold by Lutron)

Dynamic
Keypad (wired)

seeTemp™
Wall Display

HVAC
Controller

HVAC Equipment
(not sold by Lutron)

Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

Dimensions

All dimensions are shown as $\frac{in}{(mm)}$ unless otherwise noted.

HVAC Controller

Front View
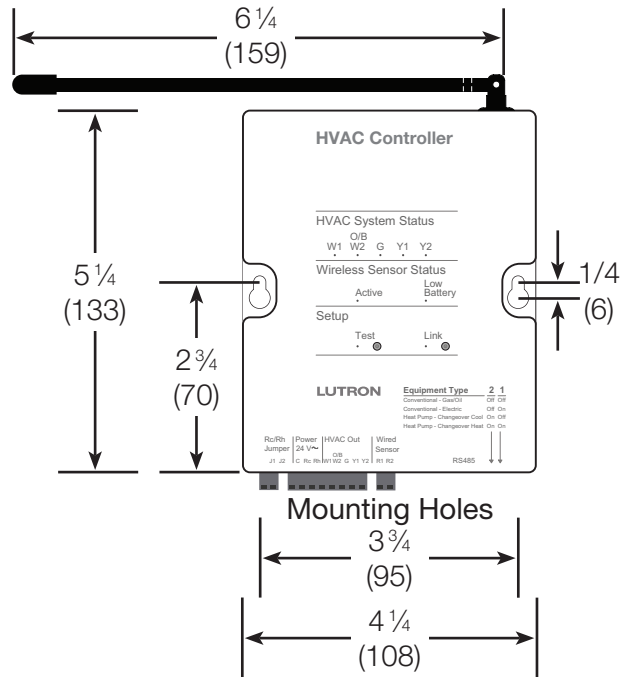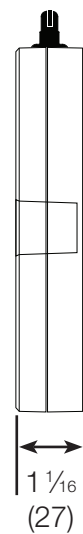
6 ¼
(159)

HVAC Controller

HVAC System Status
O/B
W1 W2 G Y1 Y2

Wireless Sensor Status
Active   Low Battery

Setup
Test   Link

LUTRON   Equipment Type   2 1
Conventional – Gas/Oil   Off Off
Conventional – Electric   Off On
Heat Pump – Changeover Cool   On Off
Heat Pump – Changeover Heat   On On

Rc/Rh   Power   HVAC Out   Wired
Jumper   24 V~   O/B   Sensor
J1 J2   C Rc Rh W1 W2 G Y1 Y2   R1 R2   RS485

5 ¼
(133)

2 ¾
(70)

1/4
(6)

Mounting Holes

3 ¾
(95)

4 ¼
(108)

Side View

1 ¹⁄₁₆
(27)

Continued on next page...

Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

Dimensions *(continued)*

All dimensions are shown as $\frac{in}{(mm)}$ unless otherwise noted.

Wireless Temperature Sensor

Front View

Side View

1 ⅝
(41)

3/4
(18)
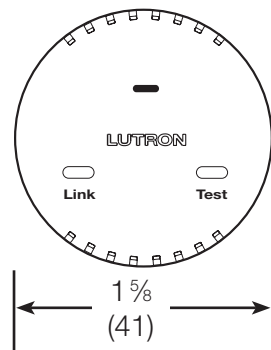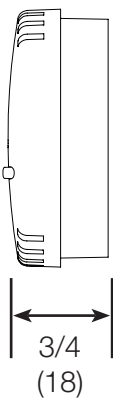
Wired Return Air Duct Sensor

Front View

Side View

Approximately

13/16
(21)

9/16
(15)

2 ¼
(58)

12
(305)

1/4
(6)
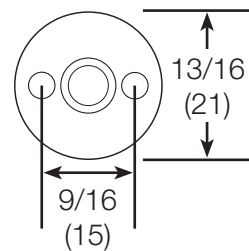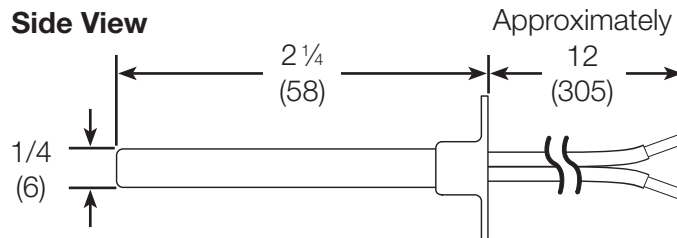
Wired Flush Mount Sensor

Front View
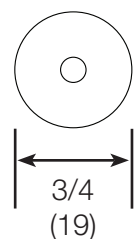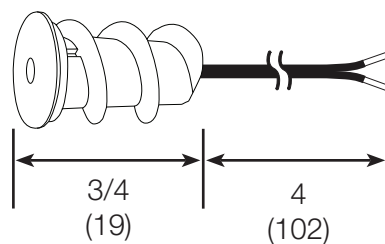
Side View

3/4
(19)

3/4
(19)

4
(102)

Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

Mounting and Parts Identification

HVAC Controller
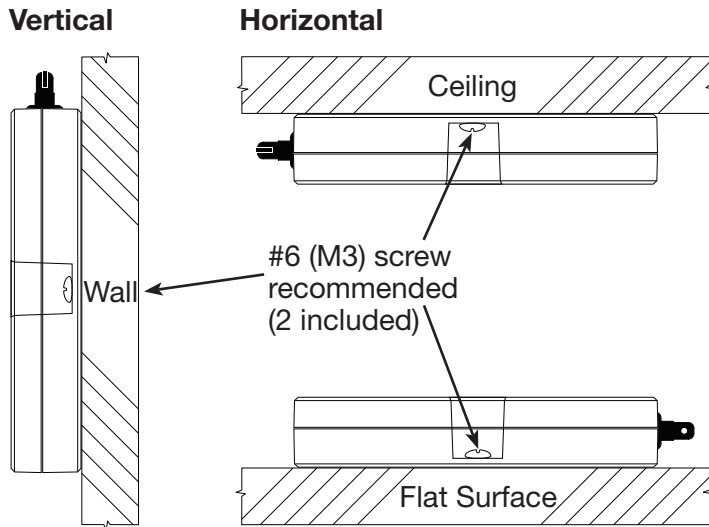
Vertical   **Horizontal**

Ceiling

#6 (M3) screw
recommended
(2 included)

Wall

Flat Surface

Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

Mounting and Parts Identification *(continued)*

Wireless Temperature Sensor
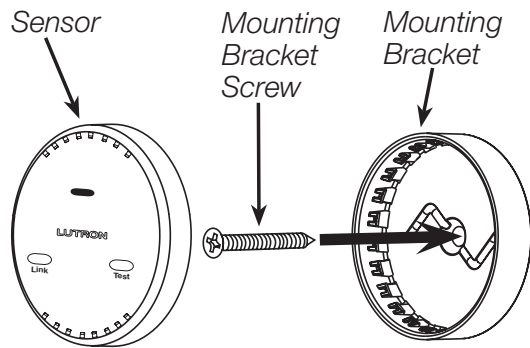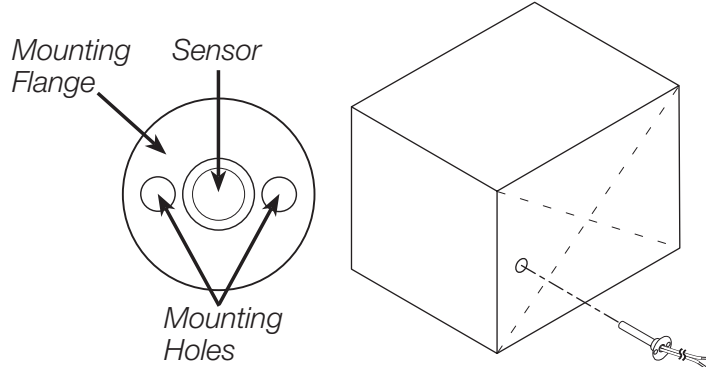
Sensor *Mounting Bracket Screw* *Mounting Bracket*

Wired Return Air Duct Sensor

Mounting Flange *Sensor*

Mounting Holes

Wired Flush Mount Sensor

Wall *Self Threading Wall Insert* *Sensor*

1/2 in (13 mm) Pilot Hole
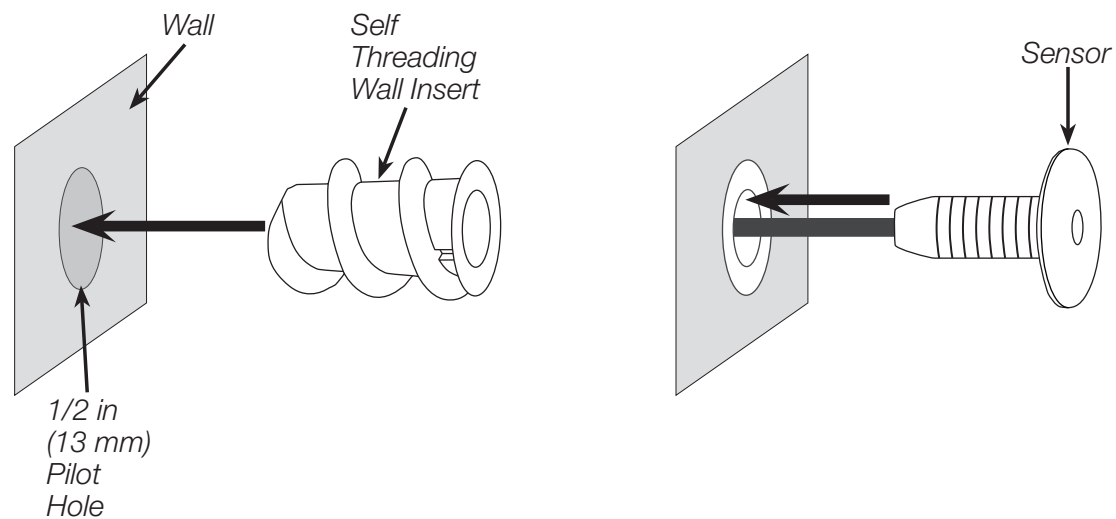
Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

Operation

HVAC Controller
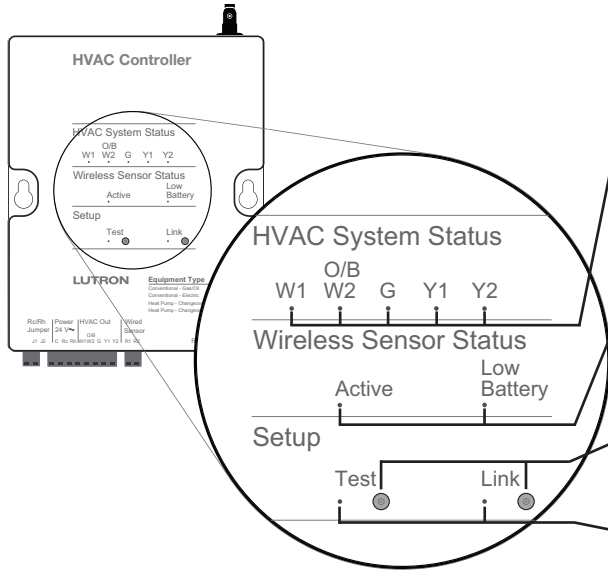
HVAC System Status LEDs
Indicate the status of the control outputs. When an LED is lit the corresponding relay is closed.
W1 - Heat stage 1, auxiliary heat
W2 O/B - Heat stage 2, changeover valve
G - Fan
Y1 - Compressor stage 1
Y2 - Compressor stage 2

Wireless Sensor Status LEDs
Solid - All Wireless Temperature Sensors are active.
Flashing - One or more Wireless Temperature Sensors are not active or a wired sensor is not connected.
Off - No active Wireless Temperature Sensors.

Test and Link Buttons
Press and hold to troubleshoot (Test) and set up (Link) the RF connection.

Test and Link LEDs
Flashes green to indicate that the system is in Test mode or Link mode.

Wireless Temperature Sensor
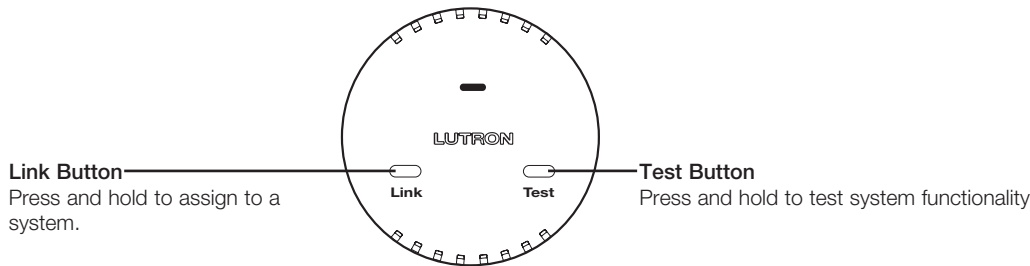
Link Button
Press and hold to assign to a system.

Test Button
Press and hold to test system functionality

Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

Wiring Diagrams *(continued)*

HVAC Controller

Note: HVAC Controller must be wired by a qualified HVAC climate control specialist.

Relay Contact Ratings

Voltage	Resistive Load	Inductive Load
Up to 24 V∼	1 A	0.1 A

HVAC Out
Terminal connections for connecting to the HVAC system
W1 - Heat stage 1, auxiliary heat
W2 O/B - Heat stage 2, changeover valve
G - Fan
Y1 - Compressor stage 1
Y2 - Compressor stage 2

Power 24 V∼
(from HVAC system transformers)
IEC PELV / NEC® Class 2 cable
Heat Transformer - **Rh**
Cool Transformer - **Rc**
Common - **C**

Wired Sensor
Connection for Wired Sensor.
IEC PELV / NEC® Class 2, 22 AWG (0.5 mm²) twisted, shielded pair wiring. Maximum wire length is 100 ft (30.5 m).

Rc/Rh Jumper
Required in single transformer systems

RS485 Connector
Lutron use only.

Contact Closure Terminal Blocks
IEC PELV / NEC® Class 2 cable
Maximum 1000 ft (305 m)
Each terminal holds one 22 AWG (0.5 mm²) to 18 AWG (0.75 mm²) wire.

HVAC Setup
2 DIP switches for selecting HVAC system type

Equipment Type	2	1	Fan Controlled by
Conventional - Gas/Oil	Off	Off	Air Handler
Conventional - Electric	Off	On	HVAC Controller
Heat Pump - Changeover Cool	On	Off	HVAC Controller
Heat Pump - Changeover Heat	On	On	HVAC Controller

Continued on next page...

Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

Wiring Diagrams *(continued)*

Conventional Systems

Conventional Gas/Oil Heat System • 1 Stage Heat / 1 Stage Cool
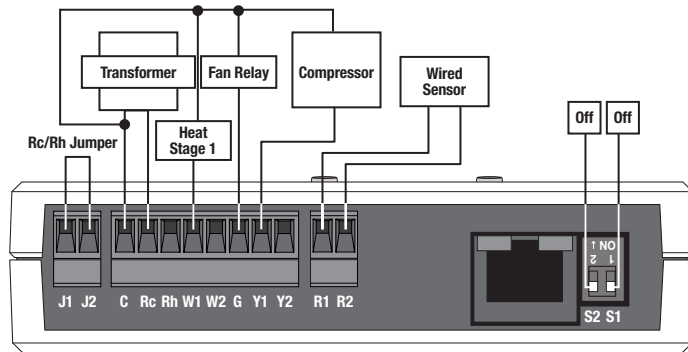
Conventional Electric Heat System • 1 Stage Heat / 1 Stage Cool
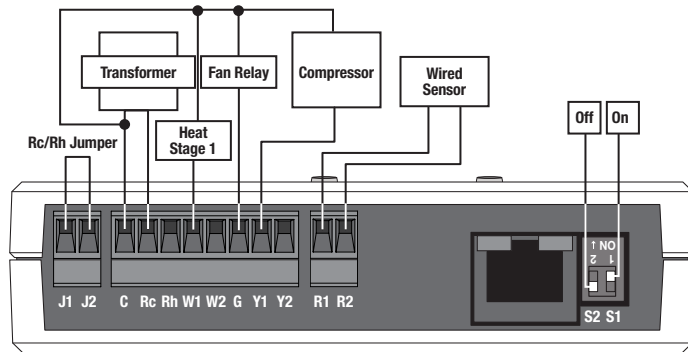
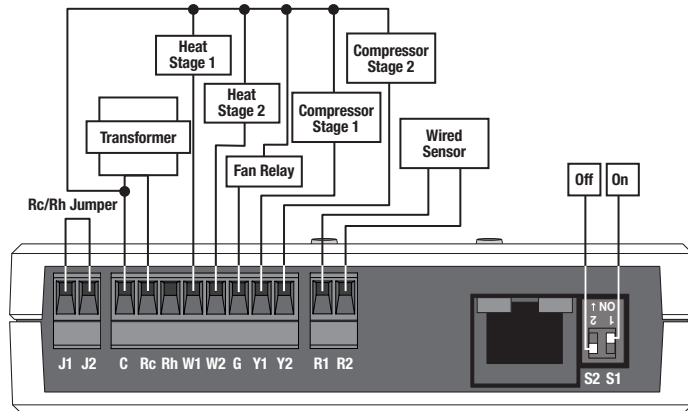Conventional Gas/Oil Heat System • 2 Stage Heat / 2 Stage Cool
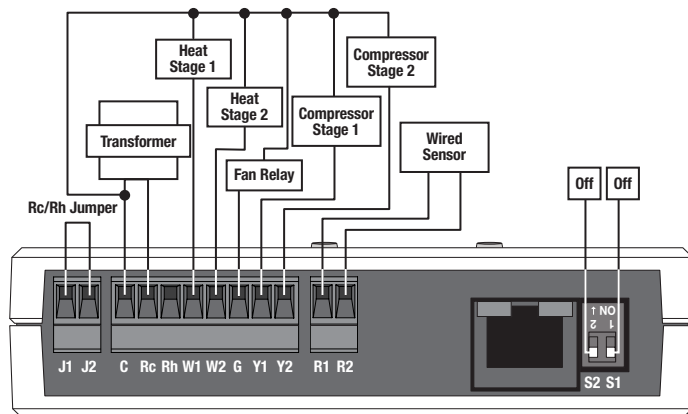
Continued on next page...

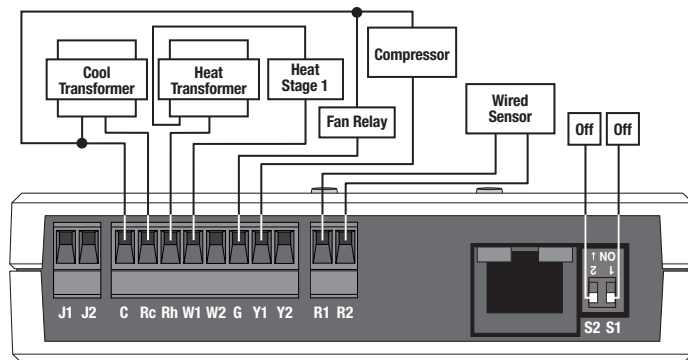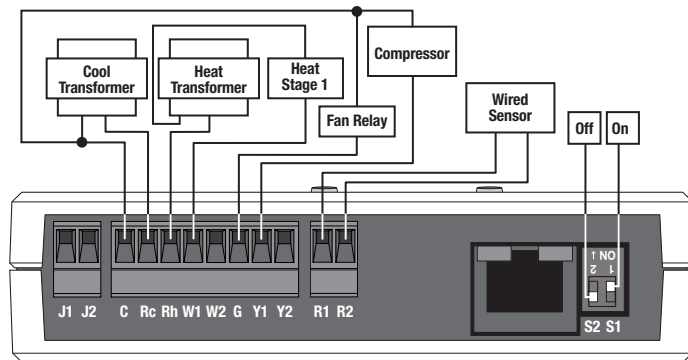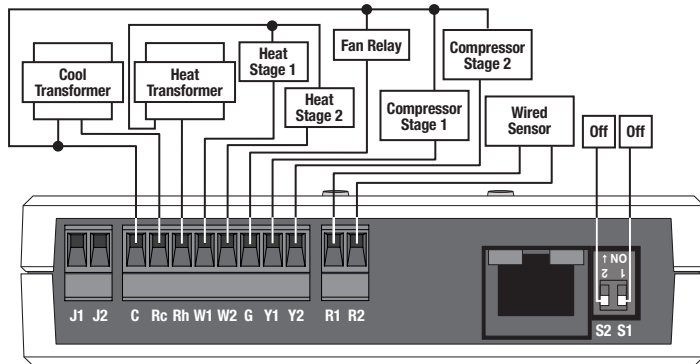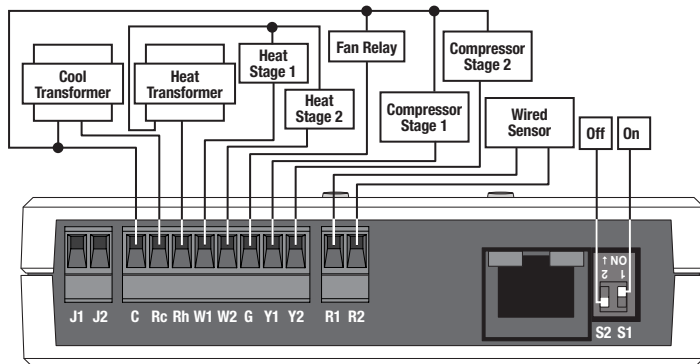# Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

Wiring Diagrams *(continued)*

Conventional Systems *(continued)*

Conventional Electric Heat System • 2 Stage Heat / 2 Stage Cool

Conventional Gas/Oil Heat System • 1 Stage Heat / 1 Stage Cool, 2 Transformers

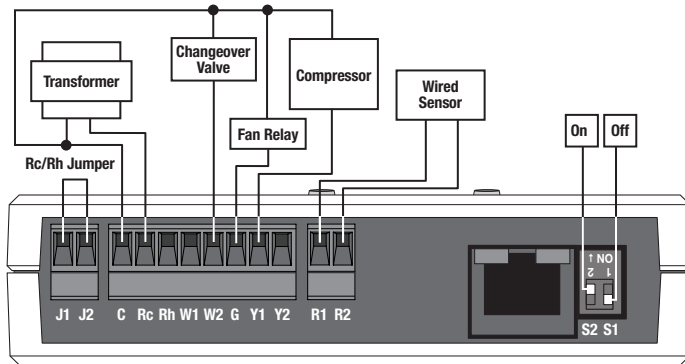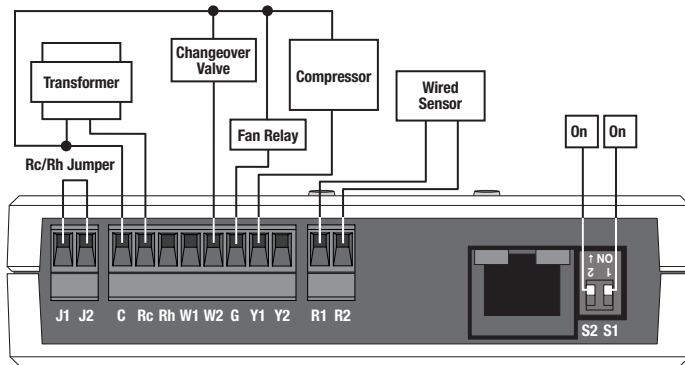Conventional Electric Heat System • 1 Stage Heat / 1 Stage Cool, 2 Transformers

Continued on next page...

Lutron® Comfort Controls
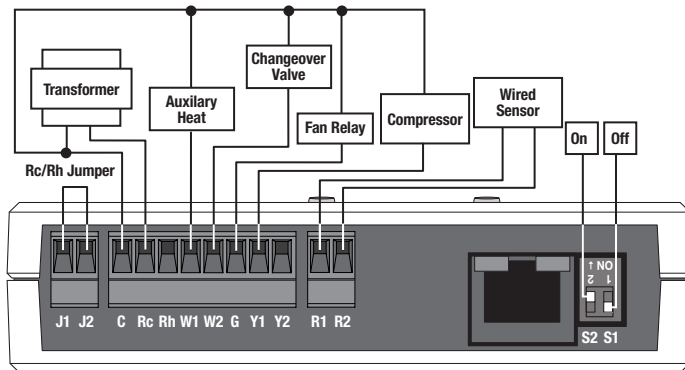HVAC Controller and Temperature Sensors

Wiring Diagrams *(continued)*

Conventional Systems *(continued)*

Conventional Gas/Oil Heat System • 2 Stage Heat / 2 Stage Cool, 2 Transformers

Conventional Electric Heat System • 2 Stage Heat / 2 Stage Cool, 2 Transformers

24/7 Technical Support—800.523.9466

Lutron® Comfort Controls
HVAC Controller and Temperature Sensors

Wiring Diagrams *(continued)*

Heat Pump Systems

Single Stage Heat Pump (Changeover = Cool)

Single Stage Heat Pump (Changeover = Heat)

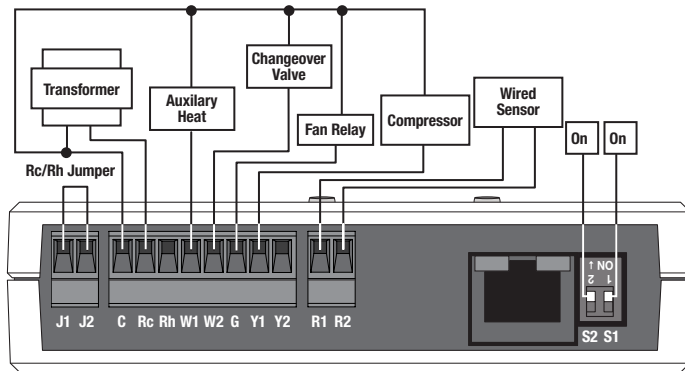Single Stage Heat Pump w/ Auxiliary Heat (Changeover = Cool)

Continued on next page...

Lutron® Comfort Controls
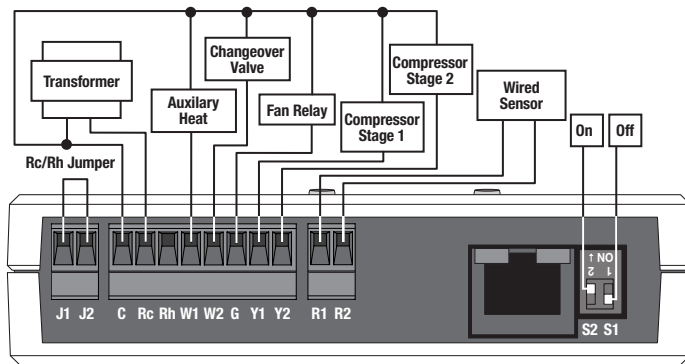HVAC Controller and Temperature Sensors

Wiring Diagrams *(continued)*
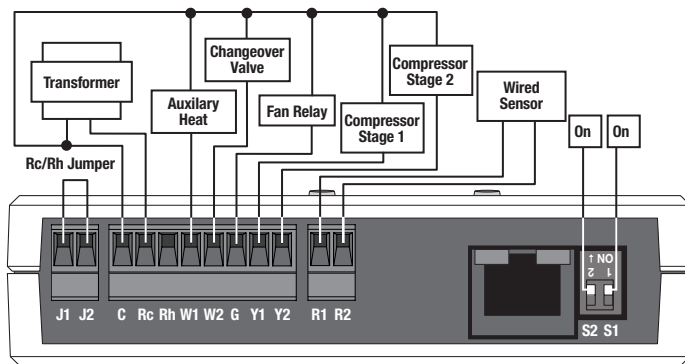
Heat Pump Systems *(continued)*

Single Stage Heat Pump w/ Auxiliary Heat (Changeover = Heat)

2 Stage Heat Pump w/ Auxiliary Heat (Changeover = Cool)

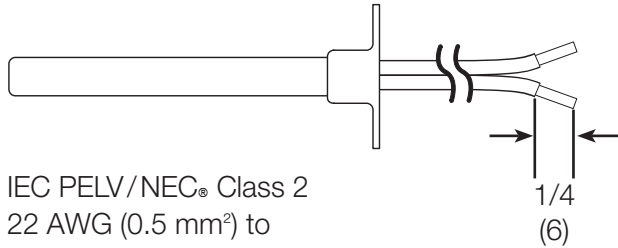
2 Stage Heat Pump w/ Auxiliary Heat (Changeover = Heat)

Lutron® Comfort Controls
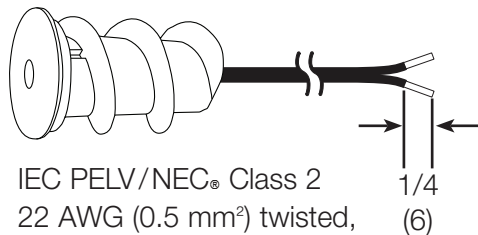HVAC Controller and Temperature Sensors

Wiring Diagrams *(continued)*

Wired Return Air Duct Sensor

IEC PELV / NEC® Class 2
22 AWG (0.5 mm²) to
18 AWG (0.75 mm²) twisted,
shielded pair wiring.

1/4
(6)

Wired Flush Mount Sensor

IEC PELV / NEC® Class 2
22 AWG (0.5 mm²) twisted,
shielded pair wiring.

1/4
(6)