

HomeWorks QS Palladiom HVAC Solution

Add a Palladiom HVAC solution to a HomeWorks QS system for convenient and aesthetically pleasing control of temperature and for intuitive heating and cooling adjustments.

Features

HomeWorks QS Palladiom Thermostat

- Aesthetically coordinates with Palladiom keypads.
- Available in plastic, glass and metal finishes. See **Colors and Finishes** at the end of the document for more information.
- Backlit screen and buttons that include Dynamic Backlight Management (DBM) to automatically adjust backlight intensity based on ambient lighting conditions.
- Displays temperature in Fahrenheit or Celsius.
- Uses Lutron QS link for power and communication with other QS devices.
- Ships with a sealed wallbox for use in new or existing constructions, specifically for hollow walls that may have air movement in the wall cavity.
- IEC SELV/PELV NEC® Class 2 for 24–30 V \sim
- IEC ELV/NEC® Class 2 for 31–36 V \sim
- IEC, cULus, and NOM compliant.

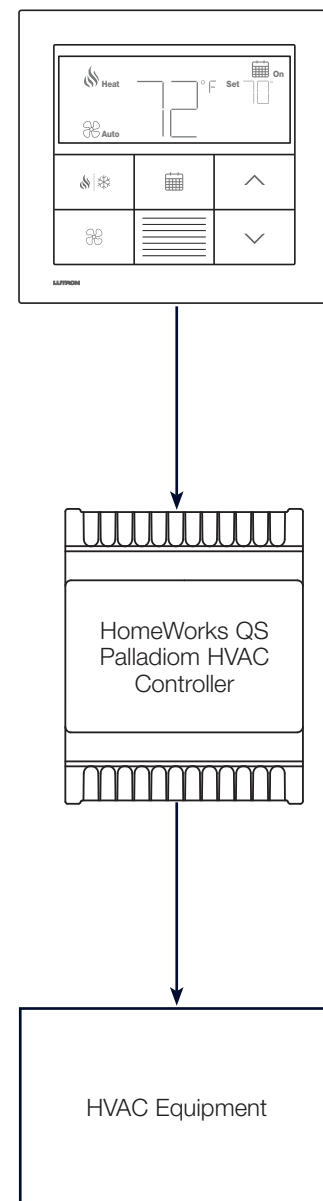
HomeWorks QS Palladiom HVAC Controller

- Works with many residential HVAC systems.
- Uses 12–24 V \sim /24 V \sim and common wiring from HVAC equipment transformer or other 12–24 V \sim /24 V \sim IEC PELV/NEC® Class 2 supply.
- Supports an optional wired remote temperature sensor to allow for flexibility regarding thermostat installation location. The wired remote temperature sensor is used instead of the internal thermostat sensor.
- IEC and cULus compliant.

System

- System features programmed in HomeWorks QS software.
- 7-day programmable schedule.
- Schedule events based on time of day or astronomic time.
- Local hold button disables system timeclock events.
- Select alternate setpoints to save energy while on vacation.
- Local fail safe feature continues operation if communication with the HomeWorks QS system is interrupted.
- Monitor and control thermostat settings via Lutron Connect mobile device.

HomeWorks QS Palladiom Thermostat



HomeWorks QS Palladiom HVAC Solution

Model Numbers

HQWT-T-HW-XXX*-A – HomeWorks QS Palladiom thermostat

SMC55-RESI – HomeWorks QS Palladiom HVAC controller (includes wire harness LR-HVAC-WIRE-120)

LR-TEMP-FLSH – Wired flush mount sensor (optional remote temperature sensor)

*"XXX" in the model number represents color/finish code. See **Colors and Finishes** section at the end of the document for more information.

Compatibility

The HomeWorks QS Palladiom HVAC controller works with residential HVAC systems including:

- Conventional forced air systems using gas, electric, or oil heat, as well as compressor-based cooling-only as split systems or packaged units.
- Fan coil units
- Hydronic or electric underfloor/radiant heating (see **Underfloor Heating Systems** on page 3)
- Specific VRV/VRF systems (see **VRV/VRF Systems** on page 3)

Typical System Configurations

Control wiring is done via conventional isolated relays for stage capacity control. Typical system configurations are:

Heat/Cool Stages (Relays)

- 1 heat/1 cool conventional (W1, Y1, G)
- 1 heat conventional (with or without fan [G]) (W1)
- 1 cool conventional (Y1, G)

Fan Coil Units

- 2-pipe, On/Off valve, 3-speed fan with changeover sensor (valve, G1,G2,G3)
- 2-pipe, On/Off valve, 0–10 V controlled fan with changeover sensor (valve, 0–10 V fan)
- 2-pipe, 0–10 V valve, 3-speed fan with changeover sensor (0–10 V valve, G1, G2, G3)
- 2-pipe, 0–10 V valve, 0–10 V controlled fan with changeover sensor (0–10 V valve, 0–10 V fan)
- 4-pipe, On/Off valve, 3-speed fan (hot valve, cold valve, G1, G2, G3)
- 4-pipe, On/Off valve, 0–10 V controlled fan (hot valve, cold valve, 0–10 V fan)
- 4-pipe, 0–10 V valve, 3-speed fan (0–10 V hot valve, 0–10 V cold valve, G1, G2, G3)
- 4-pipe, 0–10 V valve, 0–10 V controlled fan (0–10 V hot valve, 0–10 V cold valve, 0–10 V fan)

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VRV/VRF Systems

The HomeWorks QS Palladiom thermostat can be used to control the VRV/VRF systems listed below.

Mitsubishi® VRF Systems

Requires one of these hardware options:

- HomeWorks QS Palladiom thermostat with HomeWorks QS processor and CoolAutomation™ interface.* See Application Note #650 (048650) at www.lutron.com
- HomeWorks QS Palladiom thermostat with HomeWorks QS Palladiom HVAC controller and Mitsubishi® thermostat controller interface.* See Application Note #585 (048585) at www.lutron.com

LG® VRF Systems

Requires one of these hardware options:

- HomeWorks QS Palladiom thermostat with HomeWorks QS processor and CoolAutomation™ interface.* See Application Note #650 (048650) at www.lutron.com
- HomeWorks QS Palladiom thermostat with HomeWorks QS Palladiom HVAC controller and LG® thermostat controller interface.* See Application Note #627 (048627) at www.lutron.com

Daikin® VRV Systems

Requires:

- HomeWorks QS Palladiom thermostat with HomeWorks QS processor and CoolAutomation™ interface.* See Application Note #650 (048650) at www.lutron.com

Underfloor Heating Systems

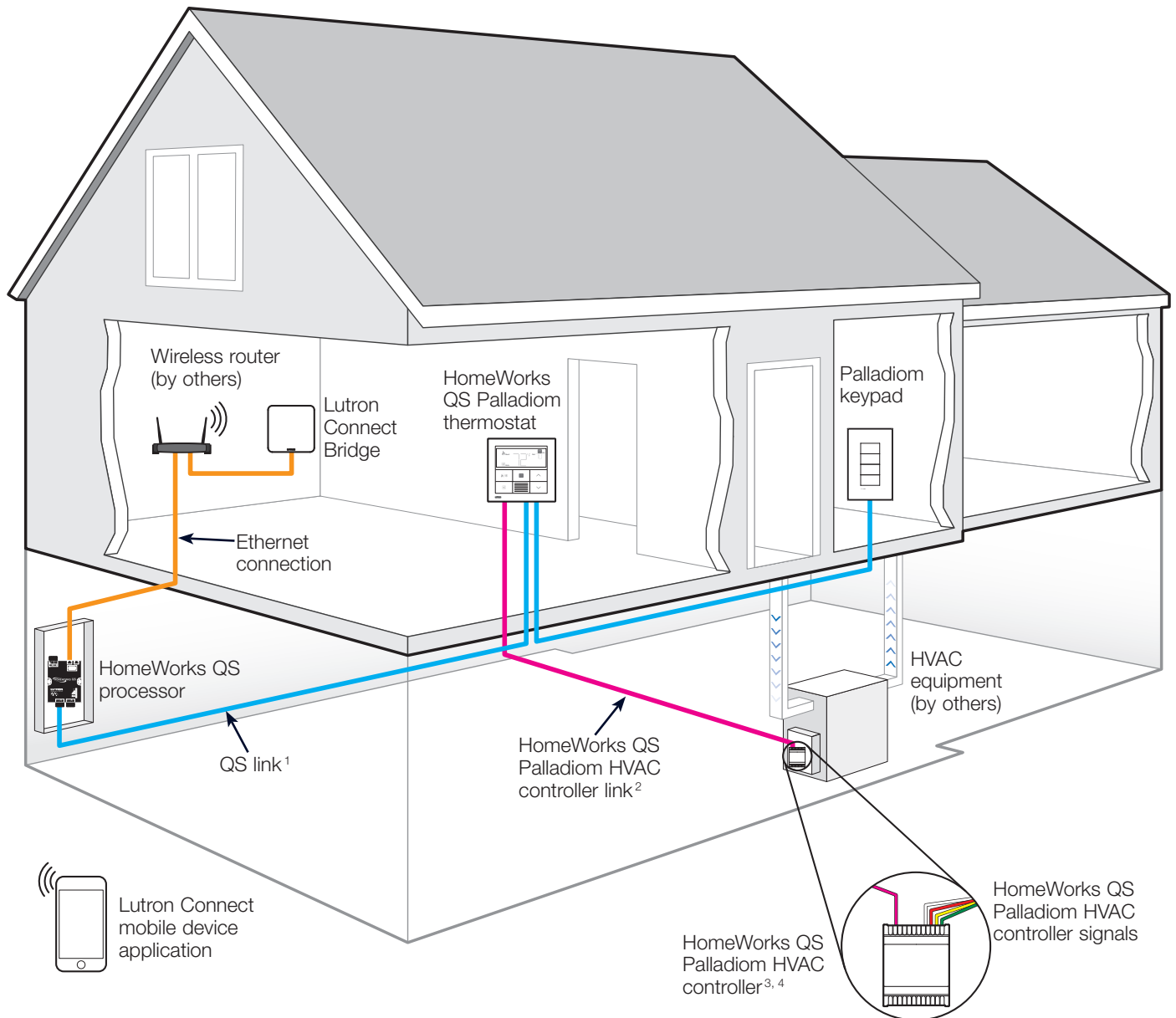
Requires:

- HomeWorks QS Palladiom thermostat with HomeWorks QS processor and Heatmiser interface.* See [Heatmiser HVAC Integration with HomeWorks QS](#) document.

*Provided by others.

HomeWorks QS Palladiom HVAC Solution

System Diagram



¹ For wiring details, see **QS Link** section on page 12.

² For wiring details, see **HomeWorks QS Palladiom HVAC Controller Link** section on page 13.

³ For more information when using a HomeWorks QS Palladiom HVAC controller and a 3rd party interface in VRV/VRF systems, refer to either Application Note #585 (048585) or Application Note #627 (048627) at www.lutron.com

⁴ For more information when using a CoolAutomation™ interface in VRV/VRF systems, see Application Note #650 (048650) at www.lutron.com

HomeWorks QS Palladiom HVAC Solution

Technical Specifications

HomeWorks QS Palladiom Thermostat

Model Number	HQWT-T-HW-XXX*-A
Regulatory Approvals	IEC, cULus, and NOM compliant.
Operating Voltage	24–30 V \equiv IEC SELV/PELV/NEC \circ Class 2 31–36 V \equiv IEC ELV/NEC \circ Class 2 Power provided by QS link power supply.
Typical Power Consumption	10 mA at 24 V \equiv
Maximum Power Consumption	60 mA at 24 V \equiv <i>Test conditions:</i> Backlight on full. 3 Power Draw Units (PDUs). For more information, see Power Draw Units on the QS Link (P/N 369405).
Environment	<i>Ambient operating temperature:</i> 32 °F to 104°F (0 °C to 40 °C) 5% to 90% relative humidity (non-condensing). Indoor use only. IP20 Rating
Communications	Thermostat communicates with the HomeWorks QS system via 4-wire QS link protocol. It also communicates with the HomeWorks QS Palladiom HVAC controller via 3-wire HomeWorks QS Palladiom HVAC controller link.
Room Temperature Sensor	<i>Temperature display range:</i> 32 °F to 99 °F (0 °C to 37 °C) <i>Temperature setpoint range:</i> 50 °F to 90 °F (10 °C to 32 °C) (programmable) <i>Accuracy:</i> At 70 °F: < +/- 1 °F At 25 °C: < +/- 0.5 °C
Power Failure Memory	Should power be interrupted, the thermostat will retain all settings when power is restored.
Mounting	Mount on a clean, dry, interior wall approximately 4 ft to 5 ft (1.2 m to 1.5 m) above the floor. See Mounting section for more information.
Wiring	IEC SELV/PELV/NEC \circ Class 2: 24–30 V \equiv IEC ELV/NEC \circ Class 2: 31–36 V \equiv 22 AWG (0.5 mm ²) and 18 AWG (0.75 mm ²) solid wiring.
Warranty	www.lutron.com/TechnicalDocumentLibrary/warranty.pdf www.lutron.com/TechnicalDocumentLibrary/Intl_warranty.pdf Warranty only valid if installed by a properly trained climate control specialist.

*“XXX” in the model number represents color/finish code. See **Colors and Finishes** section at the end of the document for more information.

HomeWorks QS Palladiom HVAC Solution

Technical Specifications (continued)

HomeWorks QS Palladiom HVAC Controller

Model Number	SMC55-RESI
Regulatory Approvals	IEC and cULus compliant.
Operating Voltage	12–24 V~ 50/60 Hz +/-10% 24 V== +/-10%
Maximum Relay Rating	2 A resistive load at 240 V~ or 30 V== Note: If fan or valves exceed these ratings, interposing relays must be used between the HomeWorks QS Palladiom HVAC controller and the HVAC unit. Note: Do not connect directly to inductive or capacitive loads. For more information, refer to the installation instructions.
Maximum Power Consumption	4 W/6 VA
Environment	<i>Ambient operating temperature:</i> –4 °F to 131°F (–20 °C to 55 °C) 10% to 90% relative humidity (non-condensing). Indoor use only. IP20 Rating
Communications	HomeWorks QS Palladiom HVAC controller communicates with the HomeWorks QS Palladiom thermostat using a 3-wire Modbus protocol.
Power Failure Memory	Should power be interrupted, the HomeWorks QS Palladiom HVAC controller will retain system configuration settings when power is restored.
Mounting	Intended for DIN rail mounting in an enclosure. See Mounting section for more information.
Wiring	<i>HomeWorks QS Palladiom HVAC Controller:</i> LR-HVAC-WIRE-120 required wire harness (included). For relay outputs, use wires at least 20 AWG (0.5 mm ²) with a temperature rating of at least 176 °F (80 °C). <i>Wired Flush Mount Sensor:</i> IEC SELV/PELV/NEC® Class 2; 22 AWG (0.5 mm ²) twisted, shielded pair wiring. Maximum wire length is 100 ft (30.5 m).
Warranty	www.lutron.com/TechnicalDocumentLibrary/warranty.pdf www.lutron.com/TechnicalDocumentLibrary/Intl_warranty.pdf Warranty only valid if installed by a properly trained climate control specialist.

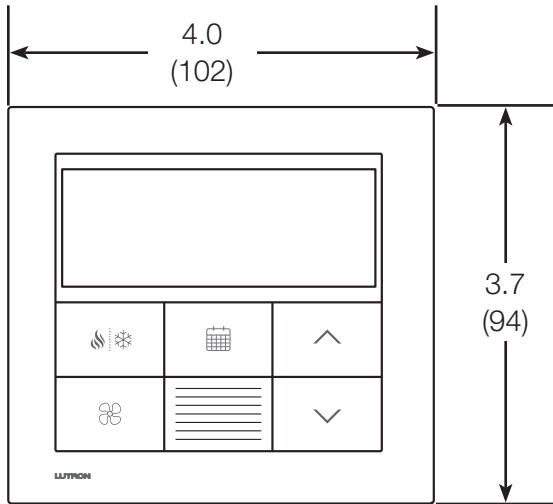
HomeWorks QS Palladiom HVAC Solution

Dimensions

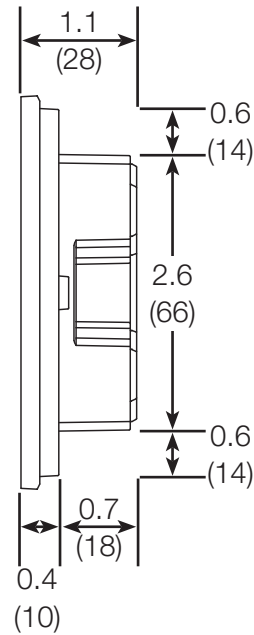
All dimensions shown as: in (mm)

HomeWorks QS Palladiom Thermostat

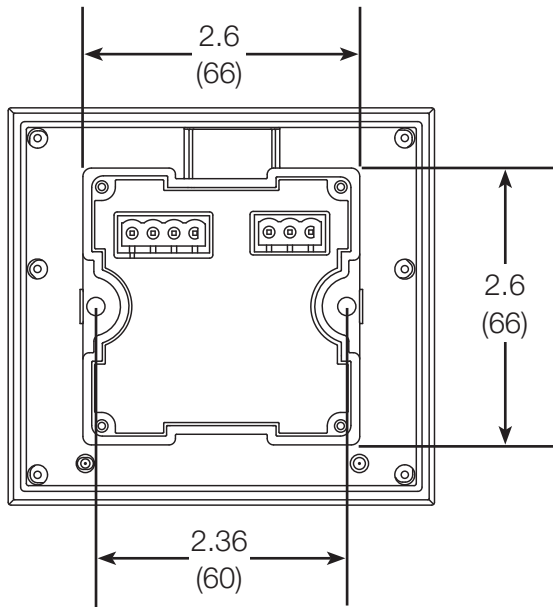
Front View



Side View



Rear View



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HomeWorks QS Palladiom HVAC Solution

Dimensions (continued)

All dimensions shown as: in (mm)

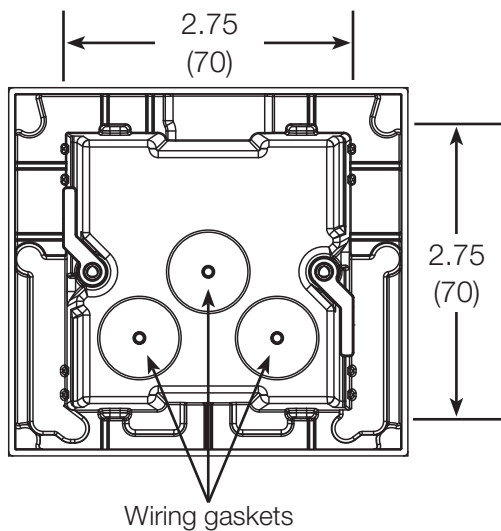
Wallboxes and Wallbox Adapters

Sealed Wallbox (WBOX-HPT-Q1) and Corresponding Wallbox Adapter (included)

Both the sealed wallbox and corresponding wallbox adapter are included with the thermostat for use with hollow walls that may have air movement in the wall cavity.

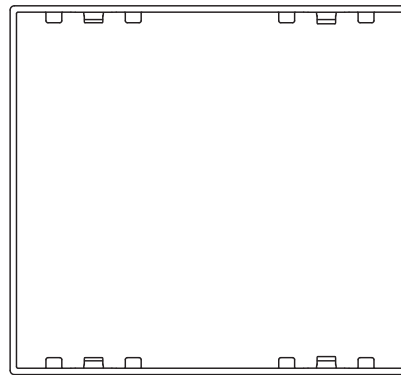
Rear View

Wallbox

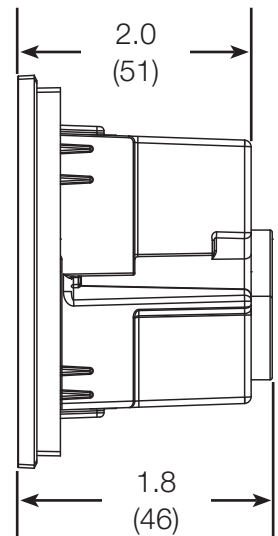


Front View

Adapter



Side View

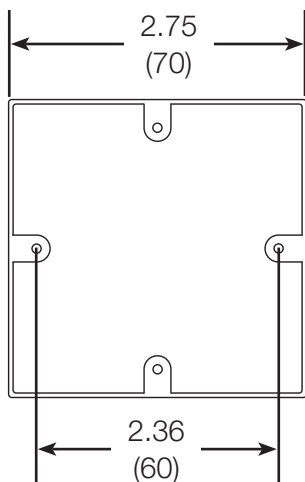


EBB-1-SQ (sold separately) and Corresponding Wallbox Adapter (included)

Square, metal wallbox (sold separately) for use with solid masonry or poured concrete walls with no airflow. Corresponding wallbox adapter included with the thermostat.

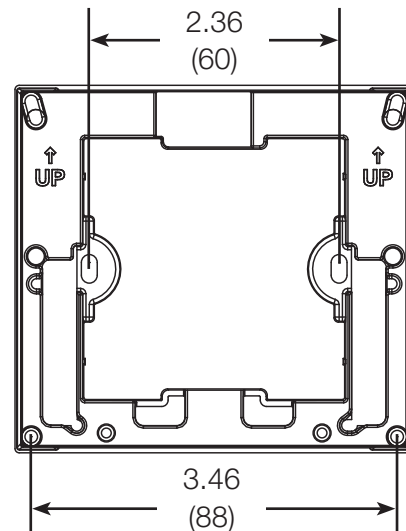
Front View

Wallbox

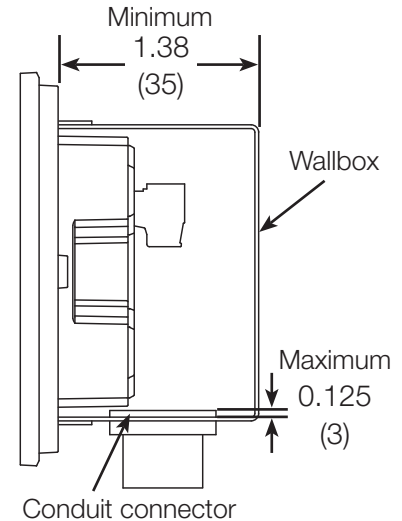


Front View

Adapter



Side View



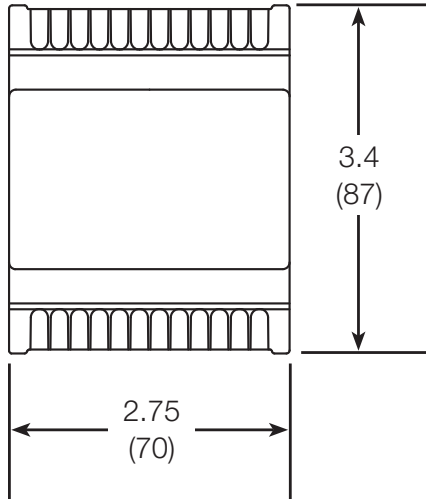
HomeWorks QS Palladiom HVAC Solution

Dimensions (continued)

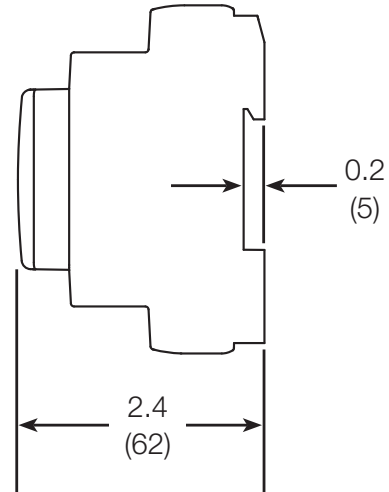
All dimensions shown as: in (mm)

HomeWorks QS Palladiom HVAC Controller

Front View



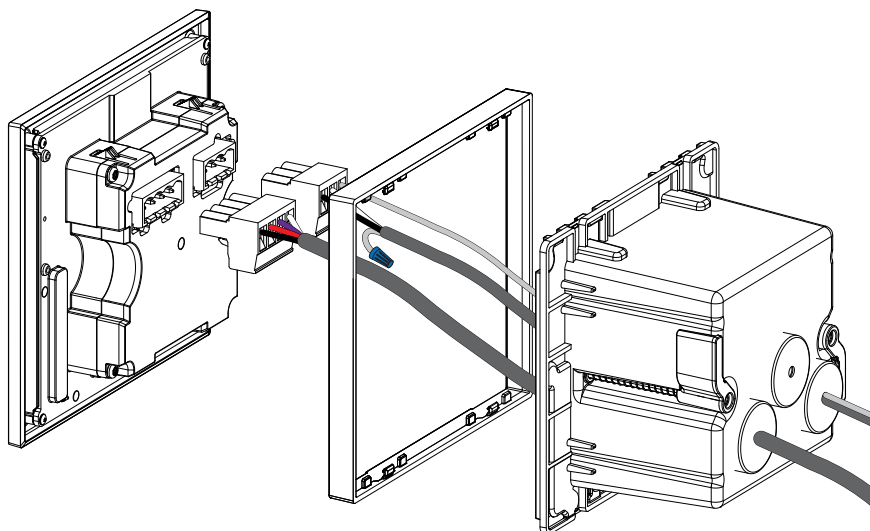
Side View



HomeWorks QS Palladiom HVAC Solution

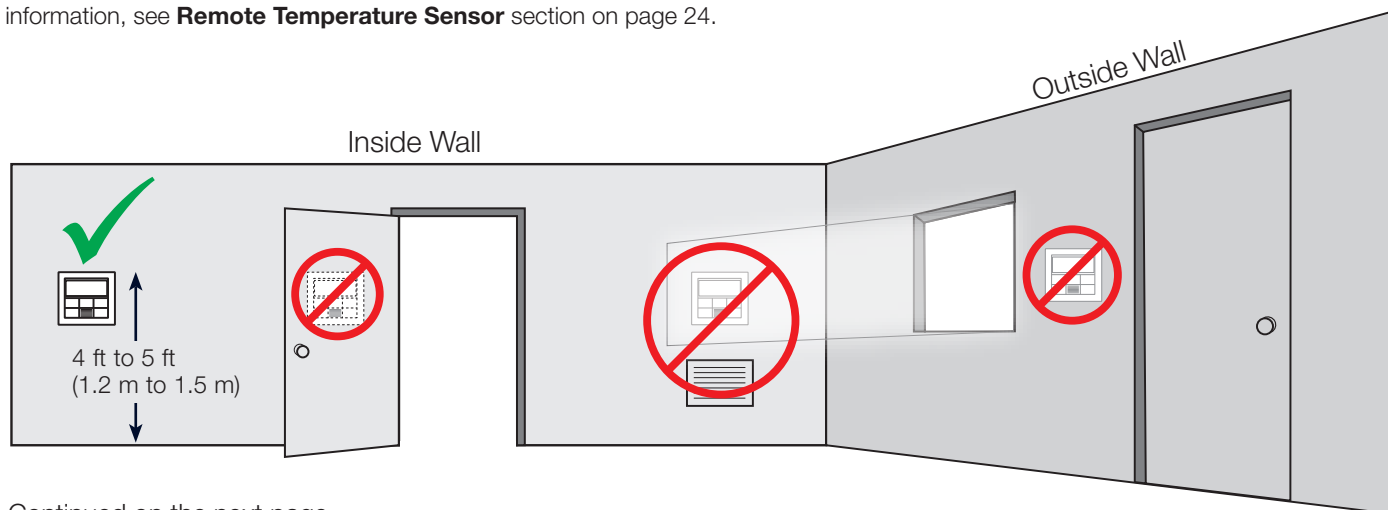
Mounting

HomeWorks QS Palladiom Thermostat



- Mount on a clean, dry, interior wall.
- Mount approximately 4 ft to 5 ft (1.2 m to 1.5 m) above the floor.
- Mount on a wall without pipes, chimneys, or ducts.
- Mount on a wall with good visibility and control access.
- Do not mount on an exterior wall, close to a window, next to a door, or areas with drafts.
- Do not mount in direct airflow from supply and return registers/grilles.
- Do not expose to water (e.g., drips or splashes) or mount in a damp area.
- Do not mount within 4 ft (1.2 m) of heating sources (e.g., direct sunlight, light bulbs, etc.).
- Do not mount in areas with poor circulation (e.g., niches, alcoves, behind curtains, or behind doors).
- Do not mount within 0.75 in (19 mm) of Palladiom keypads.

Note: If it is not possible to follow these guidelines, the use of an indoor remote temperature sensor is recommended. For more information, see **Remote Temperature Sensor** section on page 24.



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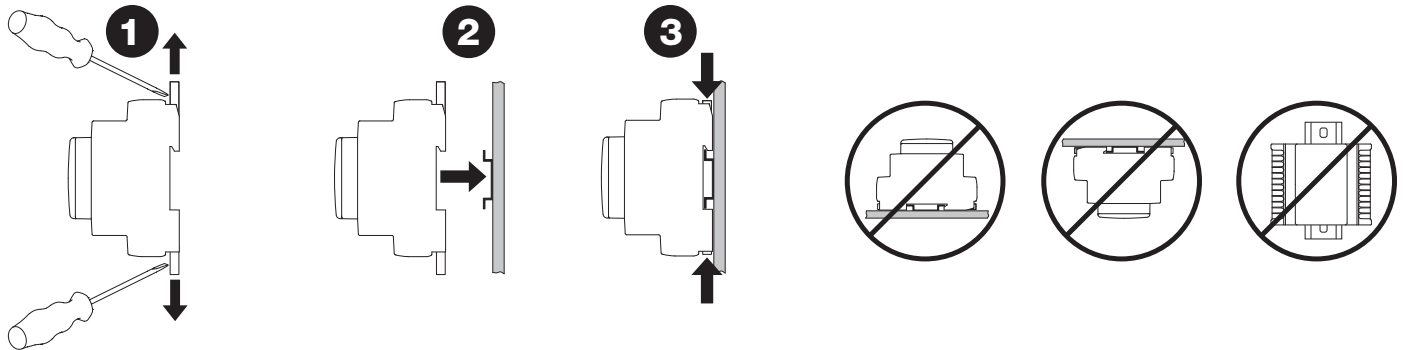
Customer Assistance:
1.844.LUTRON1 (U.S.A. / Canada)
+44.(0)20.7680.4481 (Europe)

HomeWorks QS Palladiom HVAC Solution

Mounting (continued)

HomeWorks QS Palladiom HVAC Controller

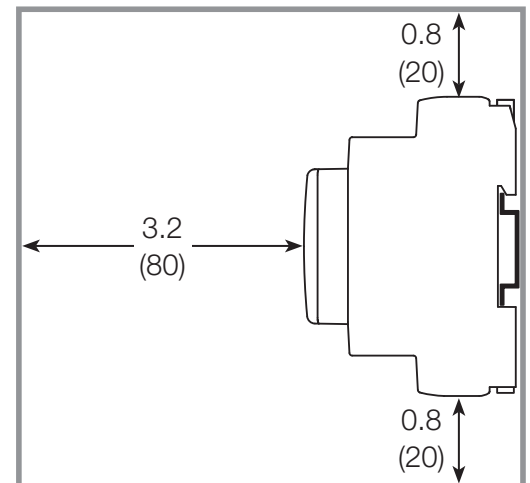
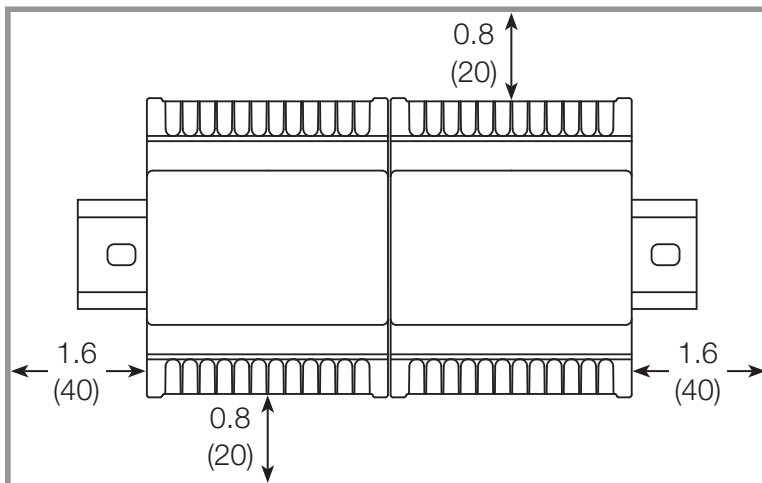
The HomeWorks QS Palladiom HVAC controller is intended for DIN rail mounting and requires a 4 DIN wide mounting location. For DIN rail installation, follow the steps below:



Minimum Clearances

The HomeWorks QS Palladiom HVAC controller has been designed as an IP20 product and must be installed in an enclosure (by others) with the clearances shown below.

All dimensions shown as: in (mm)



Note: Multiple HomeWorks QS Palladiom HVAC controllers can be mounted next to each other.

HomeWorks QS Palladiom HVAC Solution

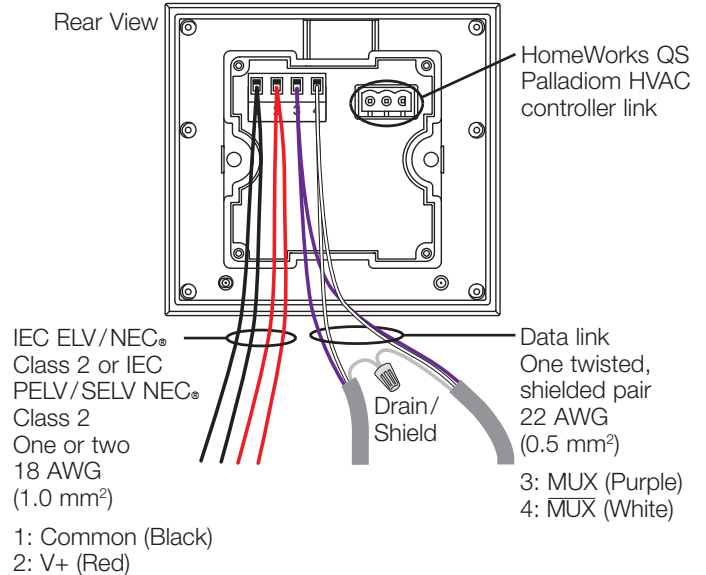
Wiring

QS Link

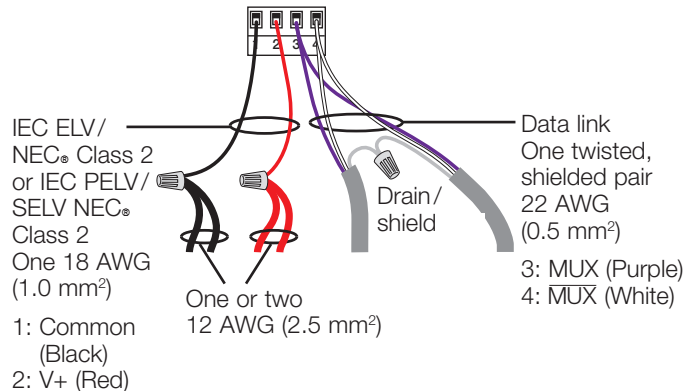
- Use IEC SELV/PELV/NEC® Class 2 (24–30 V $\overline{=}$) or IEC ELV/NEC® Class 2 (31–36 V $\overline{=}$) wiring to connect the thermostat to the QS link for power and communication.
- Connect two 22 AWG (0.5 mm²) shielded, twisted pair wires to terminals 3 and 4. Shielding (drain) of the twisted pair wires must be connected together as shown, but do not connect the shielding to earth/ground or the thermostat and do not allow it to contact the grounded wallbox.
- Connect the appropriate size wires to terminals 1 and 2 for power, according to your link length (see table below).
- Connect Drain/Shield as shown. Do not connect to Ground (Earth) or the thermostat. Connect the bare drain wires and cut off the outside shield.

Note: Use appropriate wire connecting devices as specified by local codes.

Link Wiring < 500 ft (153 m)



Link Wiring 500 ft to 2000 ft (153 m to 610 m)



QS Link Wire Sizes (check compatibility in your area)

QS Link Wiring Length	Wire Gauge	Lutron Cable Part Number
< 500 ft (153 m)	Power (terminals 1 and 2) 1 pair 18 AWG (1.0 mm ²)	GRX-CBL-346S (non-plenum) GRX-PCBL-346S (plenum)
	Data (terminals 3 and 4) 1 twisted, shielded pair 22 AWG (0.5 mm ²)	
500 ft to 2000 ft (153 m to 610 m)	Power (terminals 1 and 2) 1 pair 12 AWG (4.0 mm ²) <i>This will not fit in terminal. Connect as shown above.</i>	GRX-CBL-46L (non-plenum) GRX-PCBL-46L (plenum)
	Data (terminals 3 and 4) 1 twisted, shielded pair 22 AWG (0.5 mm ²)	

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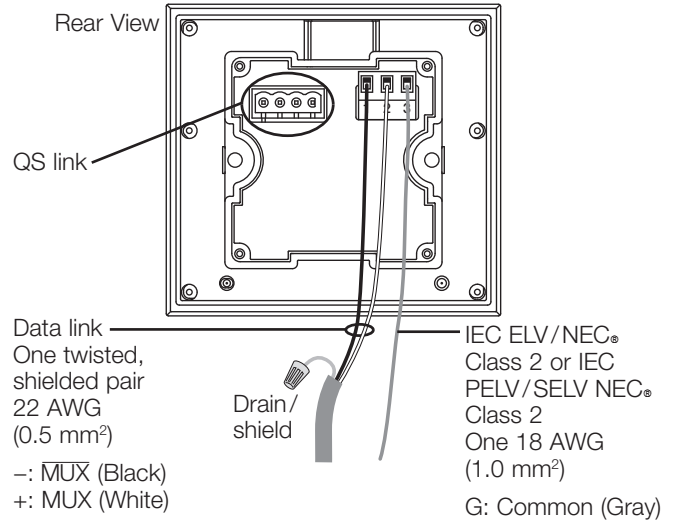
HomeWorks QS Palladiom HVAC Solution

Wiring (continued)

HomeWorks QS Palladiom HVAC controller link

- The HomeWorks QS Palladiom HVAC controller comes with a 3-wire harness in the LR-HVAC-WIRE-120 package. This is to be used on the HomeWorks QS Palladiom HVAC controller link to the thermostat.
- The 3-wire harness can be extended using one 18 AWG (1.0 mm²) or 12 AWG (4.0 mm²) wire and 1 pair 22 AWG (0.5 mm²) twisted, shielded wire. See table below and diagrams to right.
- Do not connect the drain/shield wire to earth/ground or to the thermostat and do not allow it to contact the grounded wallbox

Link Wiring < 500 ft (153 m)



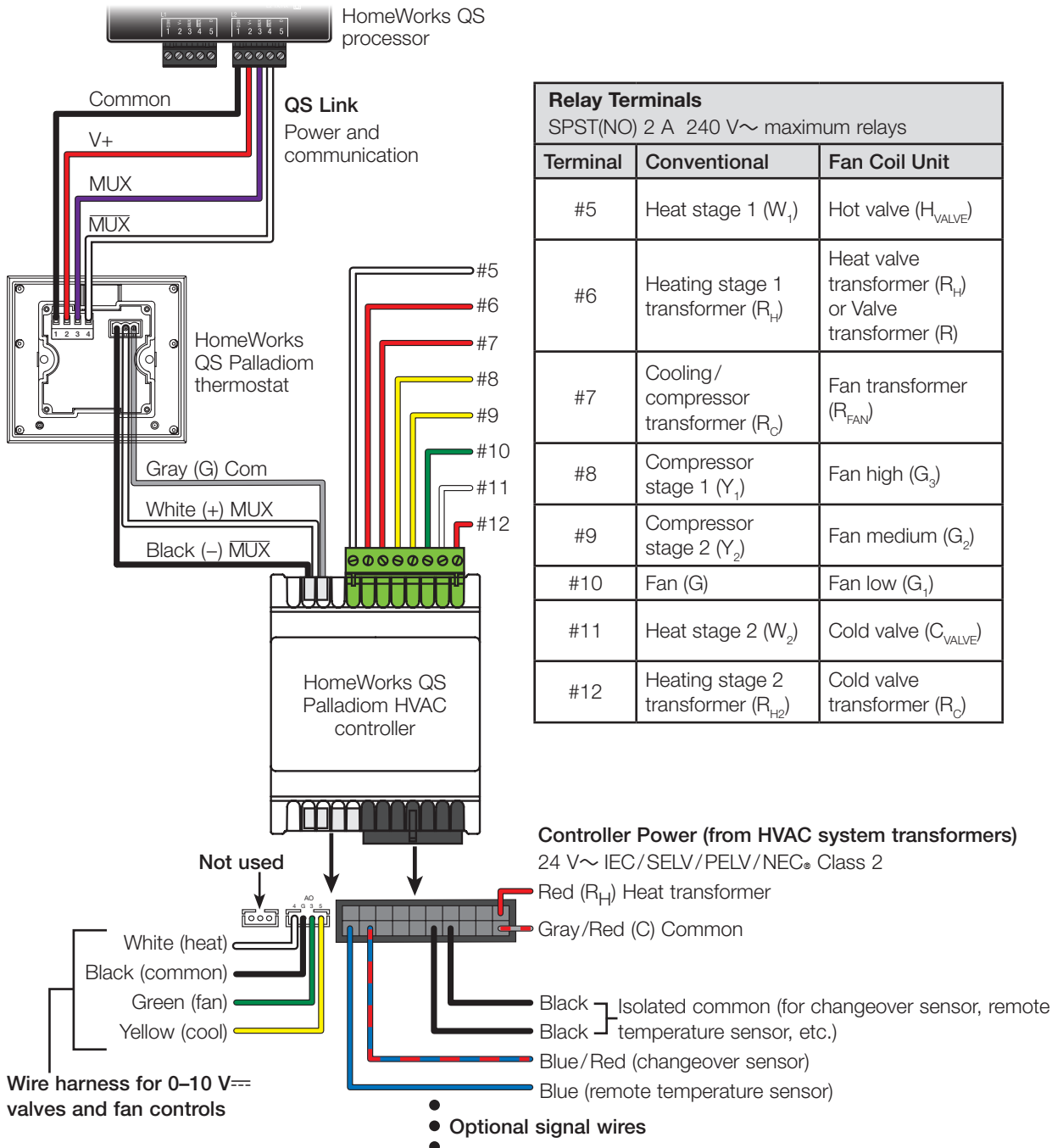
HomeWorks QS Palladiom HVAC Controller Link Wire Sizes (check compatibility in your area)

HomeWorks QS Palladiom HVAC Controller Link Wiring Length	Wire Gauge	Lutron Cable Part Number
< 500 ft (153 m)	Power (COM [G]) One 18 AWG (1.0 mm ²)	GRX-CBL-346S (non-plenum)
	Data (MUX and $\overline{\text{MUX}}$) One twisted, shielded pair 22 AWG (0.5 mm ²)	GRX-PCBL-346S (plenum)

HomeWorks QS Palladiom HVAC Solution

Wiring (continued)

HomeWorks QS Palladiom HVAC controller link (continued)



Note: Wire harnesses can be extended using 18 AWG or 22 AWG (1.0 mm² or 0.5 mm²) wire. Use twisted pair, shielded cables to extend analog I/O and HomeWorks QS Palladiom HVAC controller links. See previous page.

Note: All terminal blocks are removable.

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HomeWorks QS Palladiom HVAC Solution









Wiring (continued)

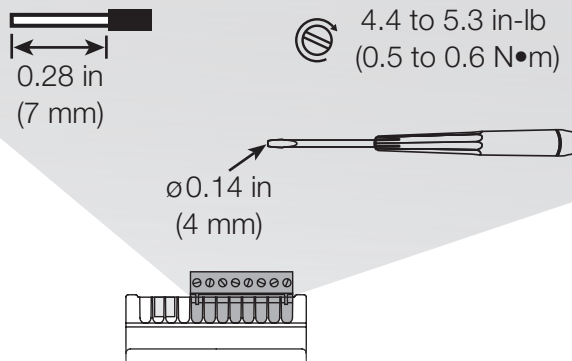
Signal Wiring Guide

Terminal	Description
W ₁	1 st stage heat relay
H _{VALVE}	Hot valve for 4-pipe fan coil units
R _H	Heating power – Connect to secondary side of heating system transformer ¹
R	Valve transformer
R _C	Cooling / compressor power – Connect to secondary side of cooling system transformer ²
R _{FAN}	Fan transformer
Y ₁	1 st stage compressor relay
G (G ₃ , G ₂ , G ₁)	Fan relay (fan high, fan medium, and fan low for fan coil units)
C _{VALVE}	Cold valve for 4-pipe fan coil units
Valve	Single valve control for 2-pipe fan coil units
C	Required common wire from secondary side of transformer

¹Heat stage 1 transformer for conventional systems.

²Compressor and fan transformer.

		Cable Type							
									
Wire Size	AWG	24 to 14	22 to 14	2 x 24 to 18	2 x 24 to 16	2 x 22 to 18	2 x 20 to 16		
	mm ²	0.2 to 2.5	0.25 to 2.5	2 x 0.2 to 1.0	2 x 0.2 to 1.5	2 x 0.25 to 1.0	2 x 0.5 to 1.5		



0.28 in (7 mm)

4.4 to 5.3 in-lb (0.5 to 0.6 N•m)

ø0.14 in (4 mm)

HomeWorks QS Palladiom HVAC Solution

HomeWorks QS Palladiom HVAC Controller Wiring Diagrams (continued)

Conventional Systems

Diagram 1: 1 heat stage/1 cool stage system (1 transformer)

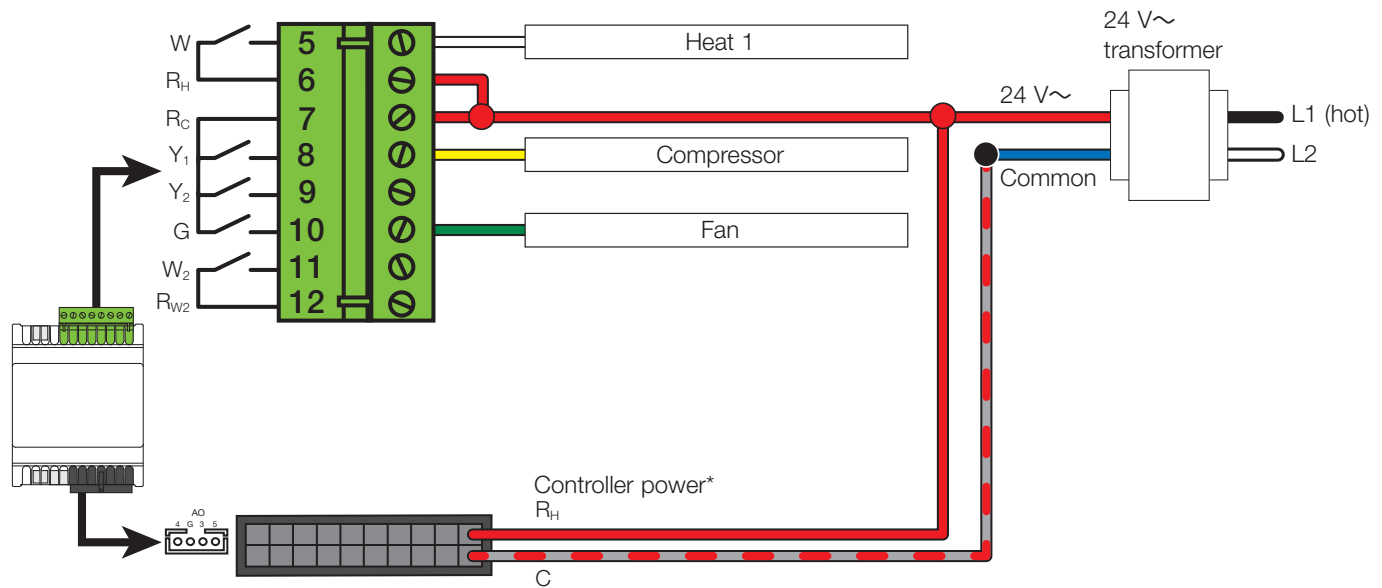
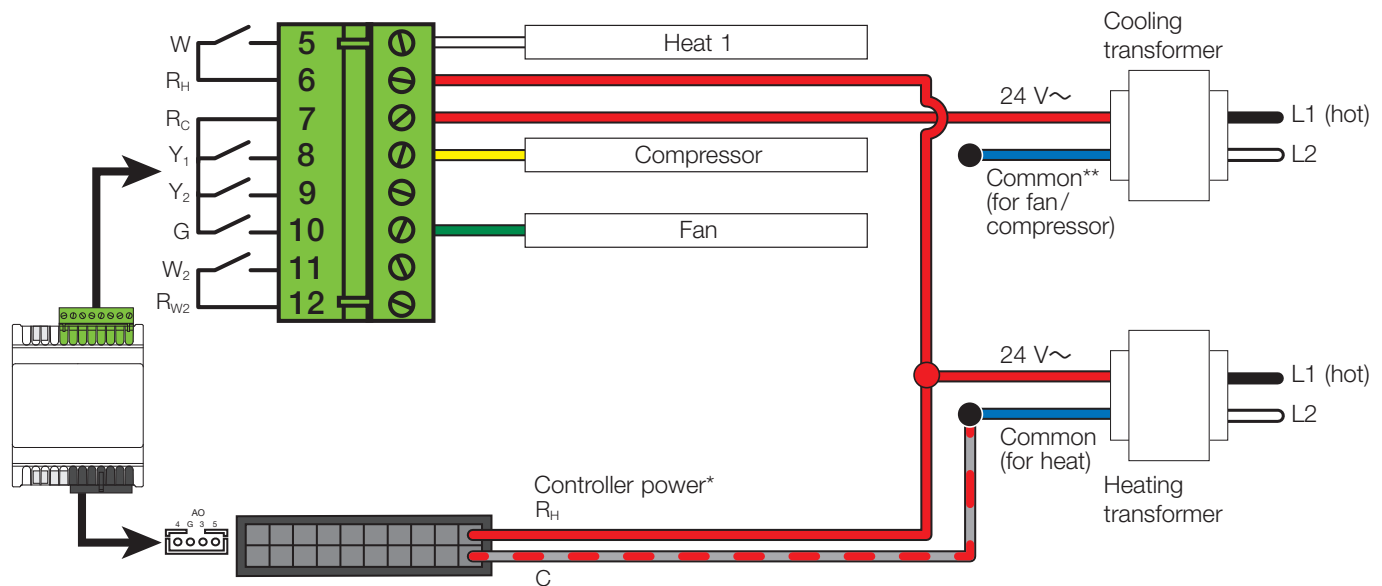


Diagram 2: 1 heat stage/1 cool stage system (2 transformers)



* If the signal source from the HVAC system is not 12–24 V~/24 V=, use a separate supply to power the HomeWorks QS Palladiom HVAC controller.
 ** In a two transformer system it is not necessary to connect the compressor common wires.

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Conventional Systems (continued)

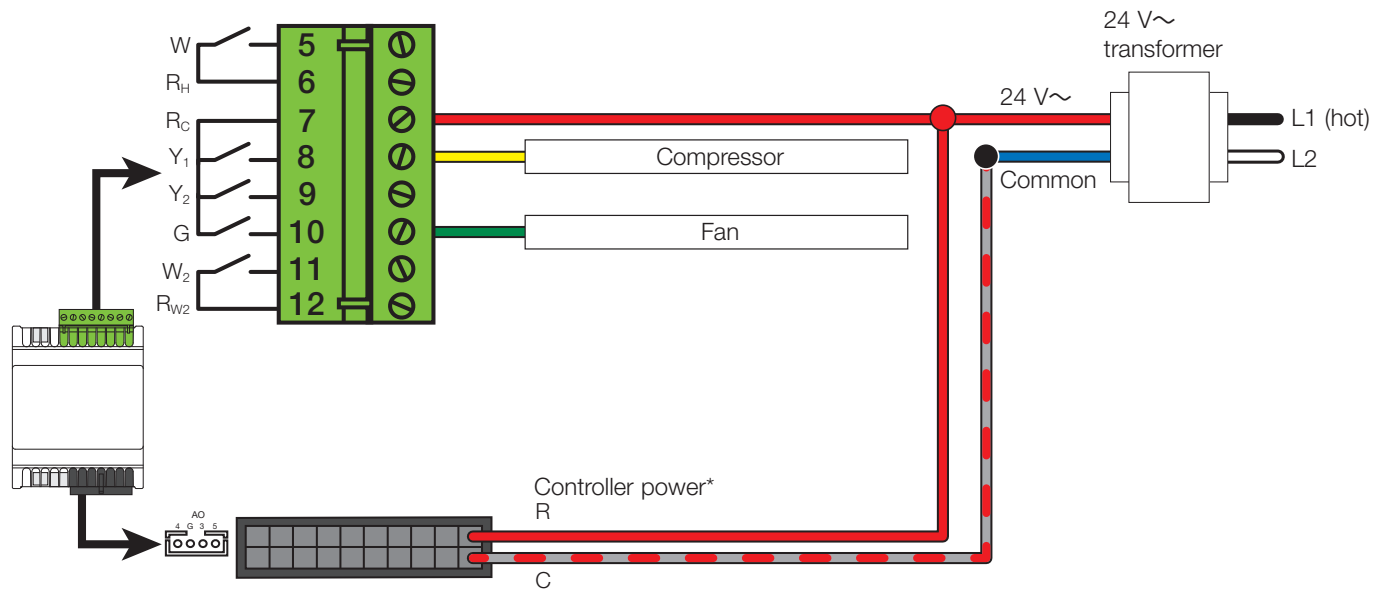
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HomeWorks QS Palladiom HVAC Solution

HomeWorks QS Palladiom HVAC Controller Wiring Diagrams (continued)

Conventional Systems (continued)

Diagram 5: Cool only system



* If a secondary transformer is available to power the auxiliary heat, connect the auxiliary transformer to pin 12 (R_{W2}).

** If the signal source from the HVAC system is not 12–24 V~/24 V=, use a separate supply to power the HomeWorks QS Palladiom HVAC controller.

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HomeWorks QS Palladiom HVAC Solution

HomeWorks QS Palladiom HVAC Controller Wiring Diagrams (continued)

Fan Coil Units (continued)

2-pipe Systems (continued)

Diagram 8: 2-pipe system, 0–10 V valve, 3-speed fan, changeover sensor

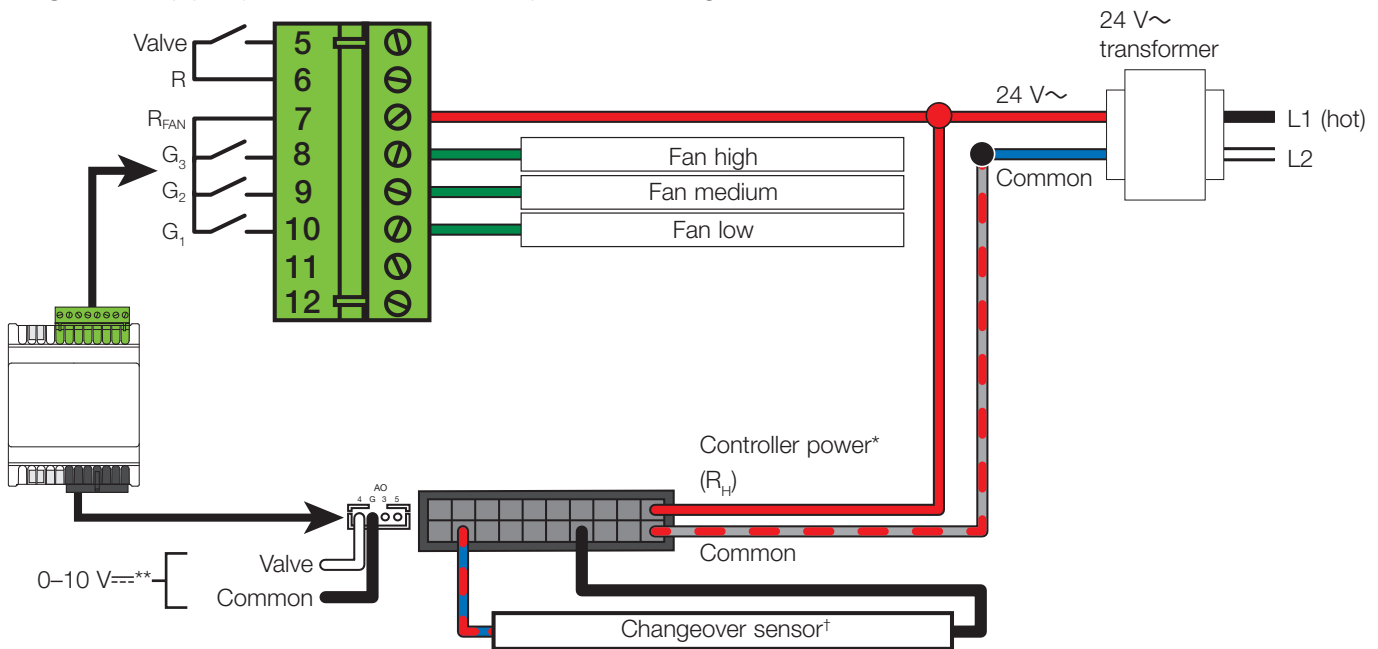
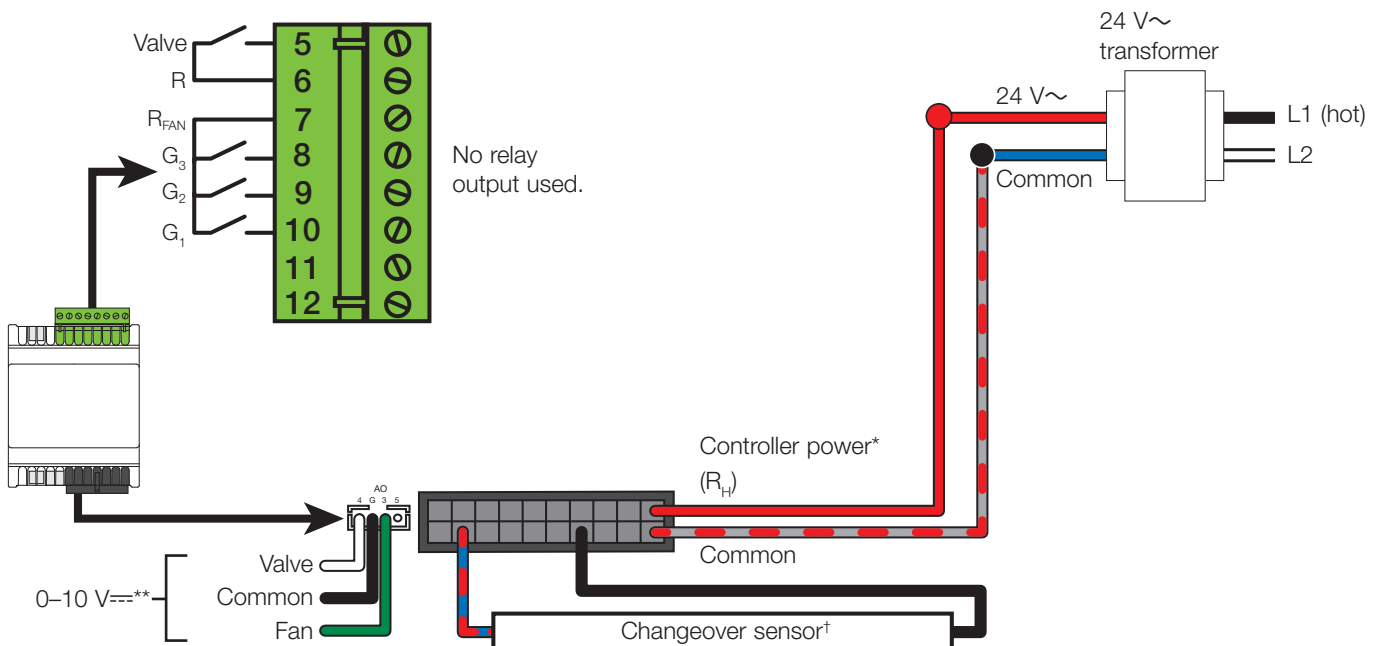


Diagram 9: 2-pipe system, 0–10 V valve, 0–10 V controlled fan, changeover sensor



*If the signal source from the HVAC system is not 12–24 V \sim /24 V \sim , use a separate supply to power the Palladiom HVAC controller.

**When using 0–10 V \sim fan or valve control, a different power supply must be used to power the Palladiom HVAC controller and the 0–10 V \sim fan/valve actuators. For more information, see Application Note #651 (048651) at www.lutron.com

†Semitec 103AT or equivalent – NTC 10 k at 25 °C

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HomeWorks QS Palladiom HVAC Solution

HomeWorks QS Palladiom HVAC Controller Wiring Diagrams (continued)

Fan Coil Units (continued)

4-pipe Systems (continued)

Diagram 12: 4-pipe system, 0–10 V valve, 3-speed fan

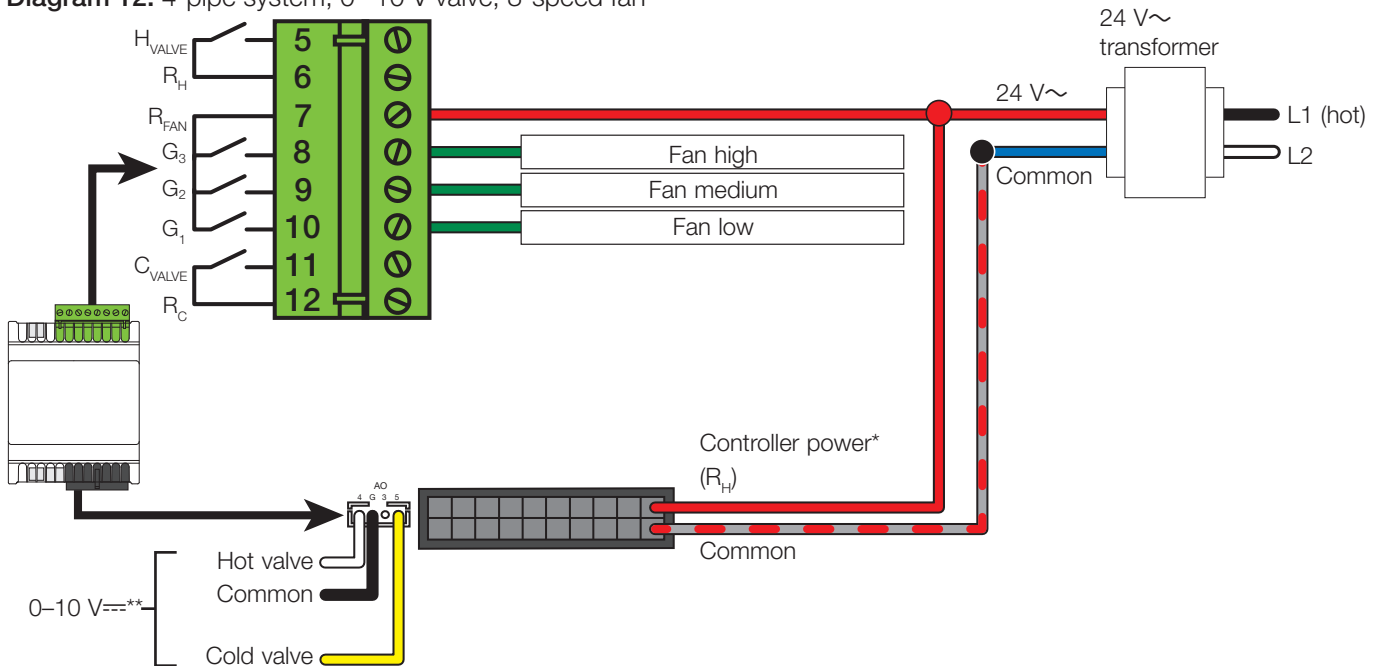
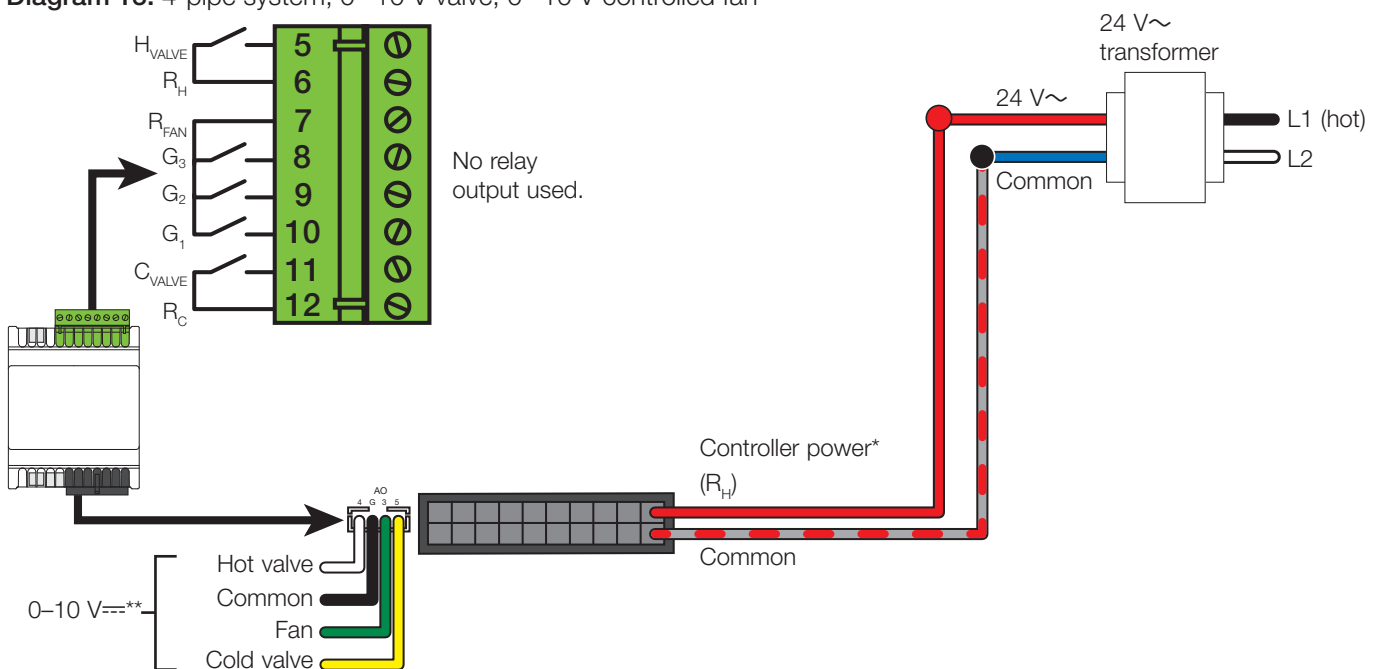


Diagram 13: 4-pipe system, 0–10 V valve, 0–10 V controlled fan

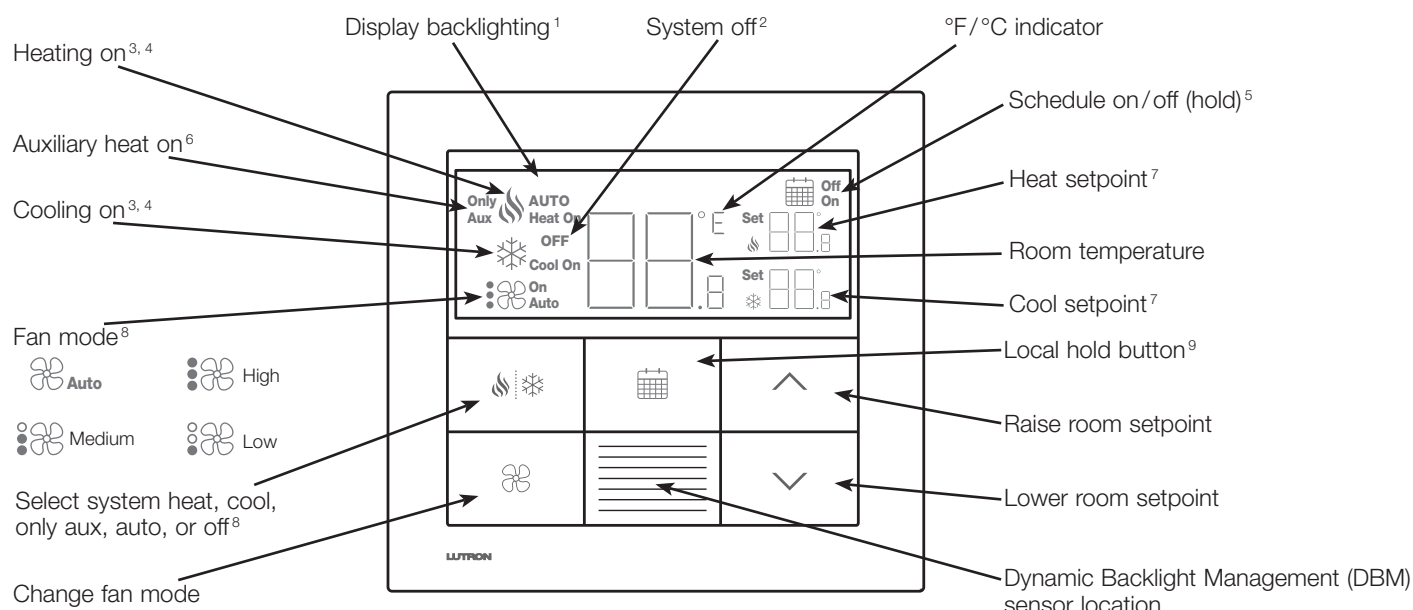


* If the signal source from the HVAC system is not 12–24 V~/24 V==, use a separate supply to power the Palladiom HVAC controller.

** When using 0–10 V== fan or valve control, a different power supply must be used to power the Palladiom HVAC controller and the 0–10 V== fan/valve actuators. For more information, see Application Note #651 (048651) at www.lutron.com

HomeWorks QS Palladiom HVAC Solution

User Interface



¹ Turns on when any button is pressed. Turns off after 10 seconds of inactivity (programmable). Dynamic Backlight Management (DBM) automatically adjusts backlight intensity based on ambient lighting conditions.

² Room temperature and "OFF" are shown when system is off.

³ Icons are animated when system is actively heating/cooling.

⁴ Icons flash if system is temporarily delayed for HVAC equipment protection.

⁵ Indicates HVAC system timeclock event status.

⁶ "Aux" indicates that auxiliary heat is running with the other heat stages. "Only Aux" indicates that auxiliary heat is running without the other heat stages (emergency heat).

⁷ Display shows the heat or cool setpoint. The first raise/lower button press activates the LCD backlight. Additional raise/lower button presses adjust the setpoint.

⁸ Applicable modes are configurable via the HomeWorks QS software.

⁹ Enables/disables HVAC system timeclock events.

HomeWorks QS Palladiom HVAC Solution

Remote Temperature Sensor

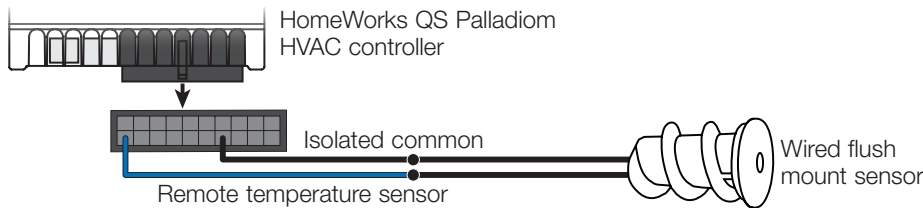
If it is not possible to follow the recommended mounting guidelines on page 10, use an indoor remote temperature sensor for proper temperature control. The internal thermostat sensor must be disabled through advanced programming via the thermostat. See the thermostat programming guide.

Wired Flush Mount Sensor (LR-TEMP-FLSH)

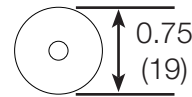
- Flush mount on wall in the area to be controlled.
- Field paintable to match decor.

Wiring

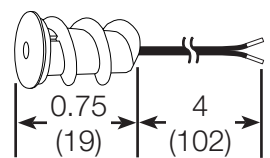
Use 22 AWG (0.5 mm²) twisted, shielded pair wiring. Maximum wire length: 100 ft (30.5 m)



Front View

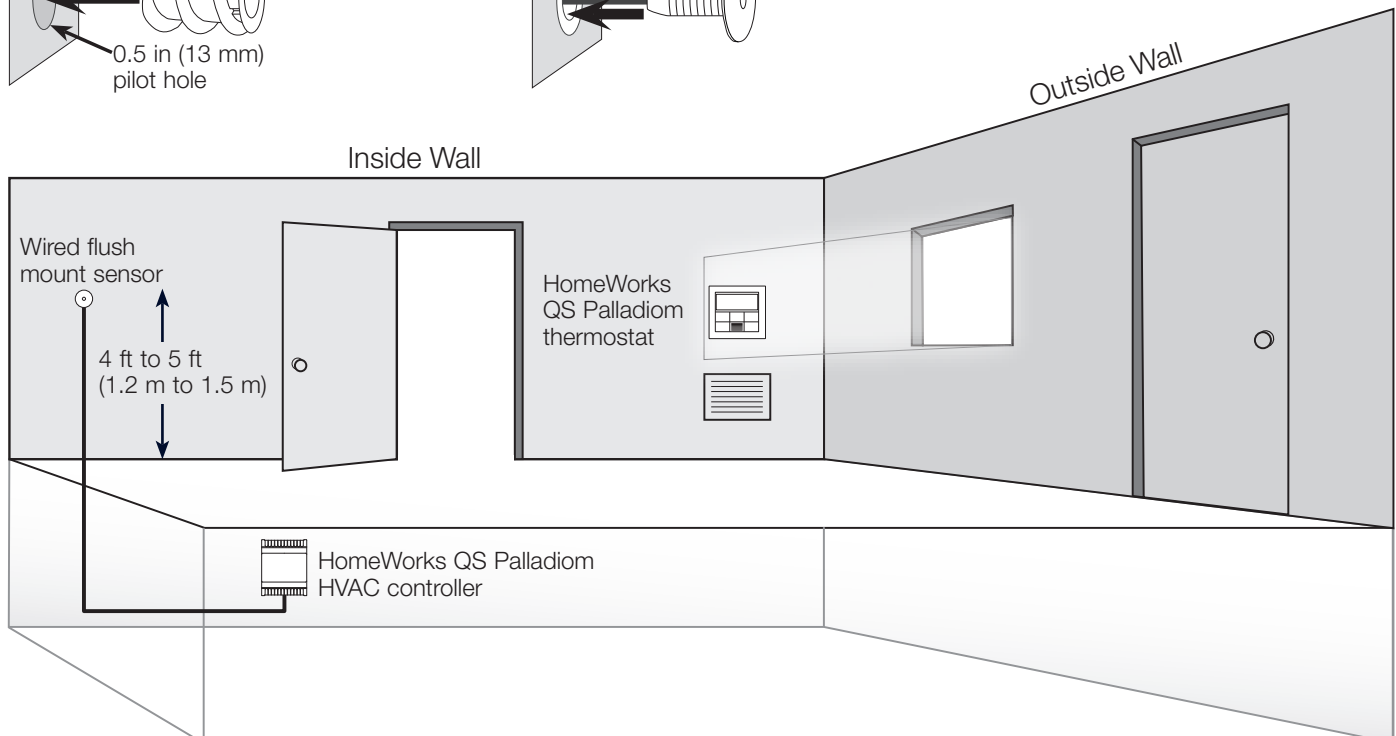
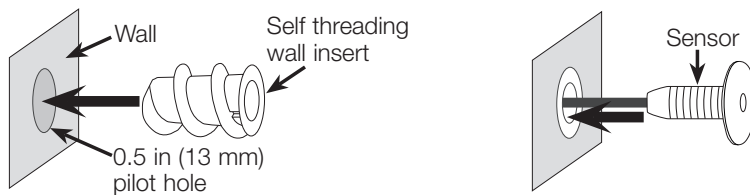


Side View



Mounting

Use appropriate mounting instructions from the **Mounting** section on page 10.



Customer Assistance:
1.844.LUTRON1 (U.S.A. / Canada)
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HomeWorks QS Palladiom HVAC Solution

Colors and Finishes



Architectural Matte Finishes

	Almond AL
	Beige BE
	Black BL
	Brown BR
	Gray GR
	Ivory IV
	Light Almond LA
	Sienna SI
	Taupe TP
	White WH


Architectural Metal Finishes

	Bright Brass BB
	Bright Chrome BC
	Bright Nickel BN
	Satin Brass SB
	Satin Chrome SC
	Satin Nickel SN

Glass Finish

	Clear Black Glass CBL
	Clear White Glass CWH

- Due to printing limitations, colors and finishes shown cannot be guaranteed to perfectly match actual product colors.
- Color chip keychains are available for more precise color matching:
 - Architectural Matte Finishes: AM-CK-1
 - Architectural Metal Finishes: AMTL-CK-1

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