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230 V~ Room Thermostat

The 230 V~ room thermostat adds temperature control to the Lutron® hotel guestroom control solution. Controls 2-pipe, 4-pipe, and 3 fan-speed fan coil units. Compatible with Lutron® Guestroom Control Unit (GCU-HOSP) and integrates into Lutron® HomeWorks® QS system.

LR-HVAC-230-S

Model Number

LR-HVAC-230-S

Available in matte white only

Applications

- Room temperature control (heating or cooling) in individual rooms and zones by:
  - 2-pipe fan coil units with manual heating/cooling changeover
  - 2-pipe fan coil units with automatic heating/cooling changeover
  - 2-pipe fan coil units with electrical heater
  - 4-pipe fan coil units
  - Compressors in DX-type equipment
  - Compressors in DX-type equipment with electrical heater
- Heating/Cooling outputs for any one of the following applications:
  - One or two on/off valve actuators
  - One on/off valve actuator and one 1-stage electrical heater
  - One 3-position valve actuator
  - One 1-stage compressor in DX-type equipment, or one 1-stage compressor with electrical heater
- Fan control outputs for any one of the following applications:
  - One single speed fan
  - One 3-speed fan

Features

- Backlit display, remains backlit for 10 seconds after a button press
- Outputs for on/off or 3-position water valve controls
- Outputs for 3-speed or single speed fans
- Automatic or manual fan speed control
- Built-in room temperature sensor
- Input for external temperature sensor
- Automatic or manual heating/cooling changeover
- Programmable minimum and maximum limits for room temperature setpoint
- Configurable Economy Mode for energy savings when room or home is unoccupied
- Configurable Protection Mode for maximum energy savings when room is unsold, or home is unoccupied for an extended period of time
- Communicates to Lutron® Guestroom Control Unit GCU-HOSP via 3-wire digital link
- Mounts on recessed rectangular conduit box with 60.3 mm screw centers
- 230 V~ operating voltage

Job Name:	Model Numbers:	
Job Number:		

Specifications

Power supply

- Rated voltage: 230 V~
- Frequency: 50/60 Hz
- Power consumption: Maximum 7 VA / 3.7 W
- Standby power consumption: < 0.5 W

Outputs

- Fan control Q1, Q2, Q3-N: 230 V~
  - Rating: Max. 5 A inductive, 2 A resistive
- Control output Y11-N / Y21-N (N.O.): 230 V~
  - Rating: Max. 5 A inductive, 2 A resistive

Inputs

- Two multifunctional inputs X1 and X2
  - Temperature sensor input:
    - Type: QAH11.1 (NTC)
    - Temperature range: 0 °C to 49 °C
    - Cable length: maximum 80 m
  - Digital input:
    - Operating action: Selectable (NO / NC)
    - Contact sensing: SELV 0 V⎓ to 5 V⎓ (5 mA maximum)
    - Parallel connection of several thermostats with one switch: Maximum 20 thermostats / switch
  - Insulation against mains voltage (SELV): 4 kV, reinforced insulation
- Function of inputs: X1 and X2 are selectable
  - External temperature sensor, heating/cooling changeover sensor, operating mode switchover contact, dew point monitor contact, enable electrical heater contact, fault contact

Communications Link

- Interface type: RS485
  - One 0.34 mm^2 to 0.75 mm^2 (22 AWG to 18 AWG) for common/neutral wire
  - Two 0.34 mm^2 to 0.75 mm^2 (22 AWG to 18 AWG) twisted/shielded wire for data link
  - Maximum 600 m total wire length
- Bus current: Maximum 50 mA
- Wiring topology: Free wiring topology
- Maximum of 32 LR-HVAC-230-S units per link

Operational data

- Adjustable switching differential
  - Heating mode: 2 K default, adjustable from 0.5 K to 6 K
  - Cooling mode: 1 K default, adjustable from 0.5 K to 6 K
- Default setpoint settings and range
  - ☼ Comfort: 21 °C default, adjustable from 5 °C to 40 °C
  - ☾ Economy: Default 15 °C heating / 30 °C cooling, adjustable from 5 °C to 40 °C
  - ⏻ Protection: Default is 8 °C heating, OFF for cooling, adjustable from 5 °C to 40 °C or OFF
- Input X1 default setting: Operational mode switchover
- Input X2 default setting: External temperature sensor
- Built-in room temperature sensor
  - Measuring range: 0 °C to 49 °C
  - Accuracy at 25 °C: < ± 0.5 K
  - Temperature calibration range: ± 3.0 K
- Settings and display resolution
  - Setpoints: 0.5 °C
  - Current temperature value displayed: 0.5 °C

Environmental Conditions

- Operation: As per IEC 60721-3-3
  - Climatic conditions: Class 3K5
  - Temperature: 0 °C to 50 °C
  - Humidity: <95% relative humidity, non-condensing
- Transport: As per IEC 60721-3-2
  - Climatic conditions: Class 2K3
  - Temperature: –25 °C to 60 °C
  - Humidity: <95% relative humidity
- Storage: As per IEC 60721-3-1
  - Climatic conditions: Class 1K3
  - Temperature: –25 °C to 60 °C
  - Humidity: <95% relative humidity

Job Name:	Model Numbers:	
Job Number:		

Specifications *(continued)*

Standards and Directives

- CE Conformity
  - EMC directive: 2004/108/EC
  - Low-voltage directive: 2006/95/EC
  - Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS): 2011/65/EU
- Product standards
  - Automatic electrical controls for household and similar use: EN 60730–1
  - Special requirements for temperature-dependent controls: EN 60730–2-9
  - Electronic control type: 2.B (micro-disconnection on operation)
  - Home and Building Electronic Systems: EN 50090-2-2
- Electromagnetic compatibility
  - Emissions (residential) IEC/EN 61000-6-3
  - Immunity (industrial and residential): IEC/EN 61000-6-2
  - Special requirements for temperature-dependent controls: EN 60730–2-9
- Safety class: II as per EN 60730
- Pollution class: Normal
- Degree of protection of housing: IP 30 as per EN 60529

General

- Connection terminals: one 0.4 mm^2 to 1.5 mm^2 (20 AWG to 16 AWG) solid or prepared stranded wire
  Note: For sensors on inputs X1 and X2, the maximum cable length is 80 m.
- Housing front color: RAL 9003 white

Functions

- Maintain room temperature via built-in temperature sensor or external room temperature/return air temperature sensor
- Temperature display options:
  - Current room temperature in either °C or °F
  - Current room temperature in both °C and °F
  - Setpoint temperature in either °C or °F
  - Setpoint temperature in both °C and °F
- Programmable minimum and maximum limits for room temperature setpoint
- Button lock (automatic, manual, or via digital link)
- Two multifunctional inputs that are configurable as any of the following:
  - Operating mode switchover contact (keycard)
  - Automatic heating/cooling changeover sensor
  - External room temperature sensor or return air temperature sensor
  - Dew point sensor (typically for chilled ceiling applications)
  - Electrical heater enabled
  - External fault input (e.g. drain pan sensor)
- Advanced fan control functions: Fan kick, fan start, selectable fan operation (enable, disable, or dependant on heating/cooling mode)
- Purge function together with 2-port valve in a 2-pipe changeover system
- Reminder to clean filters
- Floor heating temperature limit

Job Name:	Model Numbers:	
Job Number:		

Mounting

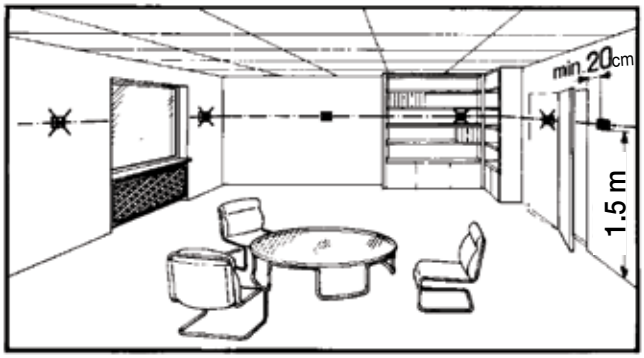
Mount the room thermostat on a recessed rectangular conduit box with 60.3 mm screw centers. Do not mount in niches, or bookshelves, behind curtains, above or near heat sources, or in direct sunlight. Mount the room thermostat approximately 1.5 m above the floor.

The rear of the mounting base contains the screw terminals.

Mount the room thermostat on a clean, dry, indoor wall. Do not mount in direct airflow or expose to water (e.g., drips or splashes).

If there is limited space in the conduit box, use Siemens mounting bracket ARG70.3 to increase the headroom by 10 mm.

See the mounting instructions enclosed with the room thermostat.



The thermostats consist of 2 parts:

- Front panel with electronics, operating elements and built-in room temperature sensor.
- Mounting base with power electronics.

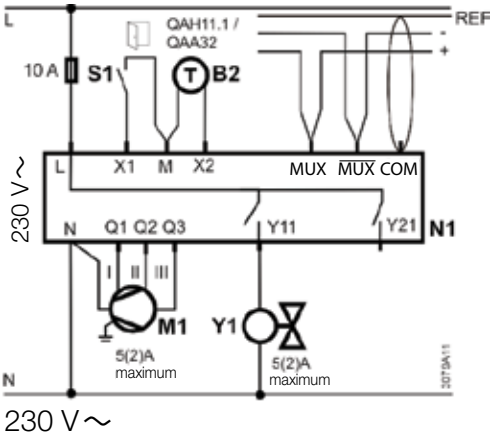
Wiring

- Install and wire in accordance with all local and national codes.
- Use proper size cables to wire the thermostat, fan and valve actuators for 230 V~ mains voltage.
- Use only valve actuators rated for 230 V~.
- The 230 V~ mains supply line must have external over-current protection with a rated current of no more than 10 A.
- If the conduit box carries 230 V~ mains voltage, isolate the SELV inputs (X1-M/X2-M) from mains voltage.
- Inputs X1-M or X2-M of different units (e.g. summer/winter switch) may be connected in parallel with an external switch. Consider overall maximum contact sensing current for switch rating.
- Isolate communication input wires (e.g., MUX, $\overline{\text{MUX}}$, and COM) from mains voltage.
- Do not use metal conduits or cables that have a metal sheath.

Connection Diagrams

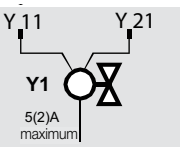
Application

2-pipe, 2-position

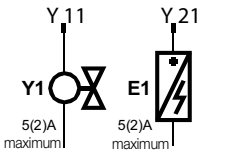


N1	Room thermostat
M1	Single speed or 3-speed fan
Y1	Valve actuator, 2-position or 3-position
Y1, Y2	Valve actuator, 2-position
E1	Electric heater
C1, C2	1-stage compressor
F	External fuse
S1	Switch (e.g., keycard, window contact, or presence detector)
B2	Temperature sensor (e.g., return air temperature, external room temperature, or changeover sensor)
MUX	RS485 connection
$\overline{\text{MUX}}$	RS485 connection
COM	RS485 signal common
5(2)A	5 A resistive, 2 A inductive

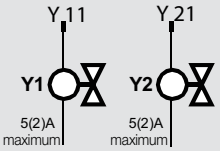
2-pipe, 3-position



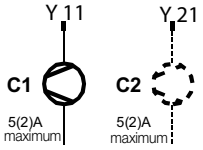
2-pipe and electric heater



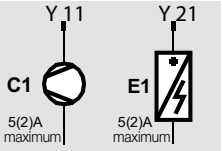
4-pipe



1-stage compressor (heating/cooling)

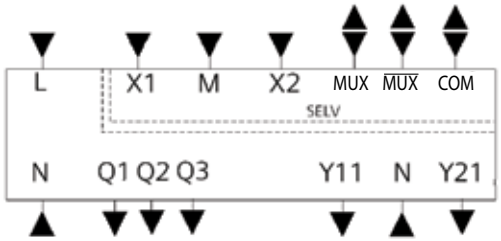


1-stage compressor and electric heater



Job Name:	Model Numbers:	
Job Number:		

Connection Terminals



L, N: Operating voltage 230 V~

Q1: Control output “Fan speed 1 230 V~”

Q2: Control output “Fan speed 2 230 V~”

Q3: Control output “Fan speed 3 230 V~”

Y11,Y21: Control output “Valve” 230 V~ (N.O., for normally closed valves), output for compressor or output for electrical heater

X1, X2 Multifunctional input for temperature sensor (e.g. QAH11.1) or potential-free switch

Factory setting:

X1 = Operating mode switchover contact

X2 = External sensor

(function can be selected via parameter P38/P40).

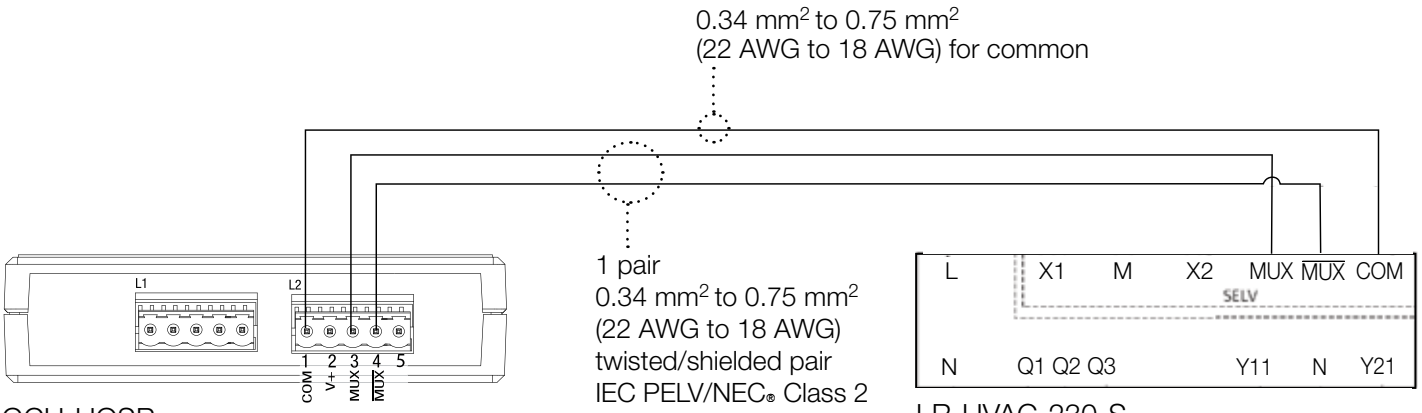
M Measuring neutral for sensor and switch

MUX RS485 connection

$\overline{\text{MUX}}$ RS485 connection

COM RS485 signal common

Connection to the Lutron® Control Unit or Processor



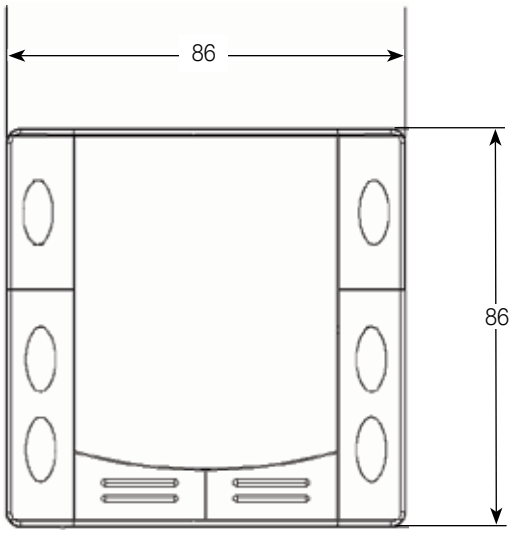
GCU-HOSP
HQP6-2
HQP6-MDU

LR-HVAC-230-S

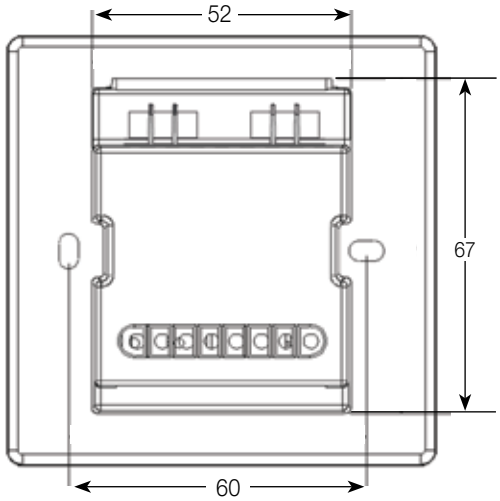
Job Name:	Model Numbers:	
Job Number:		

Dimensions (mm)

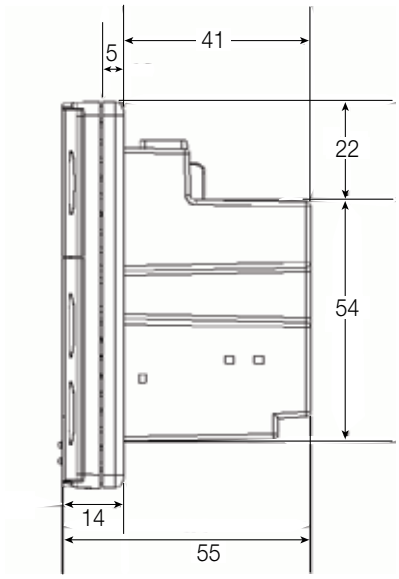
Front View



Rear View



Side View



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