

RAA Series

Room Thermostats



RAA20...

Description Two-wire, gas diaphragm-based room thermostats for use in heating and/or cooling only (two-pipe) systems.

- Features**
- Two-point control algorithm (on-off)
 - 24 to 120 Vac, 277 Vac operating voltage
 - Two mounting styles: electrical wall box or drywall
 - Wall plate adapter (ARG70) included with electrical wall box mount styles
 - Dual setpoint temperature scale (RAA20..) or tamperproof (concealed) setpoint (RAA10..)
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Product Numbers See Table 1.

Accessory ARG70 Wall box adapter

- Application** Typically used in:
- Schools
 - Public buildings
 - Storage rooms
 - Maintenance rooms
 - Temporary heat for building construction
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Used in commercial and light industrial buildings in conjunction with:

- Zone valves
 - Gas, fuel burners
 - Fans
 - Pumps
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Table 1. Product Numbers.

Mounting Style	Product Number	Control	Switch	Scale
Electrical Wall Box (with wall box adapter)	RAA10CW	Heating only or cooling only	None	Celsius (concealed)
	RAA20UW	Heating only or cooling only	None	Fahrenheit and Celsius
Drywall ¹	RAA10C	Heating only or cooling only	None	Celsius (concealed)
	RAA20U	Heating only or cooling only	None	Fahrenheit and Celsius

Operation

The room thermostat is based on a two-wire, gas membrane technology.



When the room temperature falls below the selected setpoint, the thermostat closes the heating contact. If the room temperature is over the selected setpoint, the cooling contact is closed.

Adjustments

A rotating setpoint adjuster inside the thermostat can select the required temperature.

- RAA10... No adjustments can be made outside the thermostat. The cover must be removed to adjust setpoint.
- RAA20... High and low setpoint limit stops can be engaged to limit temperature range.

Warning/Caution Notations

WARNING:		Personal injury, or loss of life may occur if you do not perform a procedure as specified.
CAUTION:		Equipment damage, or loss of data may occur if you do not follow a procedure as specified.

Specifications

Operating voltage	24 to 120 Vac, 277 Vac
Frequency	50/60 Hz
Setpoint adjustment range	50°F to 85°F (10°C to 30°C)
Setpoint limit stops are adjustable (except RAA10...)	
Switching differential (SD)	≤1.8°F (1°C), fixed
Switch rating	6A RES, 3.5A FLA, 12A LRA
Switch action	Single-Pole, Double-Throw (SPDT)
Output	Two-position (On/Off)
Weight	5 oz. (0.14 kg)
Dimensions	
RAA10...	3.80 × 3.92 × 1.42 inches (96.4 × 99.6 × 36 mm)
RAA20...	3.80 × 3.92 × 1.68 inches (96.4 × 99.6 × 42.8 mm)
Color	Ivory white

Ambient Conditions	Operation	
	Temperature	32°F to 122°F (0°C to 50°C)
	Relative humidity	<95%
	Transport/Storage	
	Temperature	-4°F to 122°F (-20°C to 50°C)
	Relative humidity	<95%
Housing	Material	Plastic
	Enclosure rating	NEMA1
	Bellows	Environmentally-friendly gas
Wiring	Screw terminals for wires of	2 × 16 AWG or 1 × 14 AWG minimum 20 AWG
Agency Certification		Conforms to CE requirements UL listed to 873 (E35918) cUL listed to Canadian standard C22.2 No. 24-93

Table 2. Control Valves.

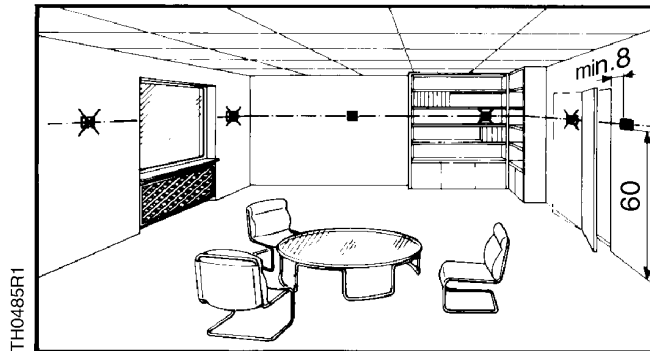
Part Number	Description	Technical Instructions
SFA71U	24V NC	155-321P25
SFA11U	120V NC	
SFA208U/25	208V NC	
SFA277U/25	277V NC	
STA71	24V NC	155-709
599 Series Zone Valves	Two-way Three-way	155-320P25

Mounting

Locate the unit where the air temperature can be sensed as accurately as possible. Do not mount in direct sunlight or near other heat or refrigeration sources.

Mounting height is approximately 60 inches (1.5 m) above the floor.

The unit can be fitted to most commercially available recessed conduit boxes or directly on the wall.



**Figure 1. Recommended Mounting Locations.
(Dimensions in Inches)**



WARNING:

1. This unit can be installed by authorized personnel only.
 2. The unit must be de-energized and the operating voltage checked before opening.
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- An ARG70 wall plate adapter (provided with electrical wall box mount models) must be used to mount to a 2 x 4-inch or 4 x 4-inch electrical wall box.
 - An ARG70 wall plate adapter must be used to meet UL and cUL requirements.
 - The thermostat must be mounted on a flat wall.
 - All local electrical regulations must be complied with.
 - If there are radiator valves in the room, set them to their fully open position.

Setpoint Limit Stops Adjustment

To set limit stops, remove gray tabs located on the setpoint knob and position high and low stops around the perimeter of knob as required. Each position on the setpoint dial is 1.8°F.

Installation

Required Tools

- Small, flat-blade screwdriver
- 1/4-inch drill bit
- Drill motor
- Small mallet
- Pencil

Drywall Mounting

1. Loosen the two screws at the bottom of thermostat.
2. Lift the bottom of the thermostat cover from the thermostat base and push up to remove cover.
3. Remove sub-base from back of thermostat.
4. Using the sub-base (packed with thermostat) as a template, mark the hole locations with a pencil.
5. Drill two 1/4-inch diameter holes for plastic wall anchors (provided).
6. Using a mallet, tap in the plastic wall anchors flush with wall.
7. Pull the wiring through the opening in the upper portion of the sub-base.
8. Level the mounting plate.
9. Using the two wood screws provided, fasten sub-base to wall. Thermostat is not position sensitive.
10. Pull the wiring through the thermostat housing.
11. Position thermostat housing over the two mounting lugs located at the top of the sub-base, and press down on cover until bottom lugs snap in place.
12. Terminate wires per wiring instructions on the inside of thermostat cover.

Optional: To set limit stops, remove gray tabs located on the setpoint knob and position high and low stops around perimeter of knob as required. See Figure 2.

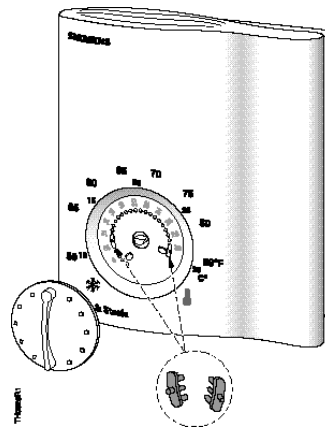


Figure 2. Setpoint Limit Stops.

13. Insert the top of the thermostat cover into the slots located on the top of the thermostat and press down.
 14. Tighten the two screws at the bottom of the thermostat.
- The installation is now complete.
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4 × 4-inch Electrical Wall Box Mounting

An ARG70 wall plate adapter is required to mount an RAA... thermostat to a 4 × 4-inch electrical wall box. The ARG70 wall plate adapter is included with electrical wall box mount models.

1. Loosen the two screws at the bottom of thermostat.
2. Lift the bottom of the thermostat cover from the thermostat base and push up to remove cover.
3. Using the four screws provided, fasten wall box adapter (3) to plaster ring (2), supplied by others.
4. Pull wires through plaster ring (2).
5. Flex adapter mask (4) and snap in place inside wall box adapter (3).
6. Fasten sub-base (5), included with thermostat, to wall box adapter assembly (3) and (4) with one No. 4-24 × 5/8-inch long screw (provided with the thermostat) at the bottom only.
7. Pull wires through the sub-base (5).
8. Clip thermostat base (6) at the top of the sub-base and snap the bottom in place.
9. Level the thermostat base and fasten at the top with a No. 4-24 × 5/8-inch long screw.
10. Follow *Drywall Mounting* Steps 10 through 16.

The installation is now complete.

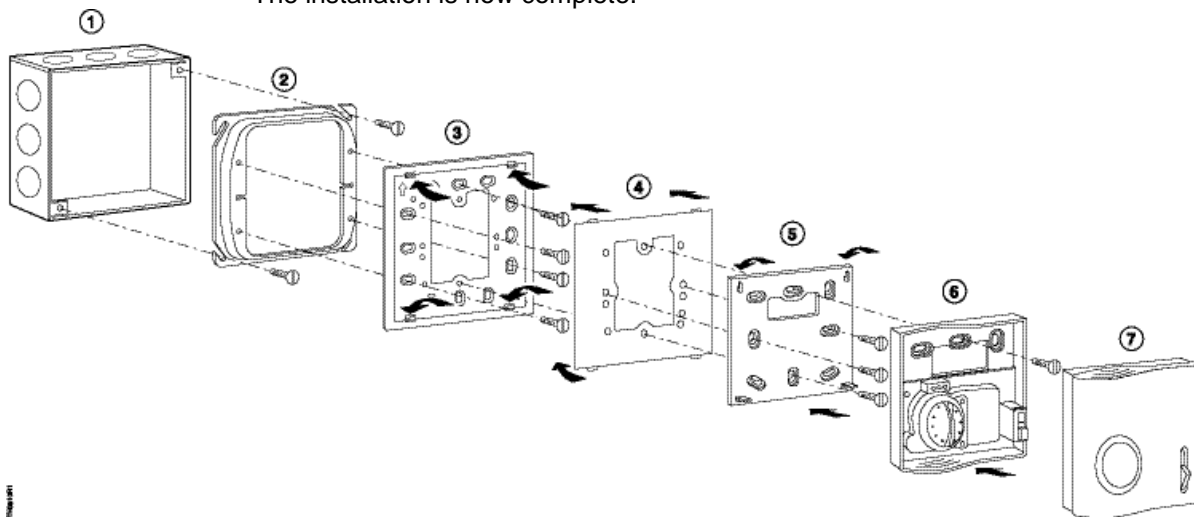


Figure 3. 4 × 4-inch Electrical Wall Box Installation.

- | | | | |
|---|---------------------|---|------------------|
| 1 | Electrical wall box | 5 | Sub-base |
| 2 | Plaster ring | 6 | Thermostat base |
| 3 | Wall box adapter * | 7 | Thermostat cover |
| 4 | Adapter mask * | | |

* Included with ARG70

2 x 4-inch Electrical Wall Box Mounting

An ARG70 wall plate adapter is required to mount an RAA... thermostat to a 2 x 4-inch electrical wall box. The ARG70 wall plate adapter is included with electrical wall box mount models.

1. Loosen the two screws at the bottom of thermostat.
2. Lift the bottom of the thermostat cover from the thermostat base and push up to remove cover.
3. Using the two screws provided, fasten wall box adapter (3) to plaster ring (2), supplied by others.
4. Pull wires through plaster ring (2).
5. Flex adapter mask (4) and snap in place inside wall box adapter (3).
6. Fasten sub-base (5), included with thermostat, to wall box adapter assembly (3) and (4) with one No. 4-24 x 5/8-inch long screw (provided with the thermostat) at the bottom only.
7. Pull wires through the sub-base (5).
8. Clip thermostat base (6) at the top of the sub-base and snap the bottom in place.
9. Level the thermostat base and fasten at the top with a No. 4-24 x 5/8-inch long screw.
10. Follow *Drywall Mounting* Steps 10 through 16.

The installation is now complete.

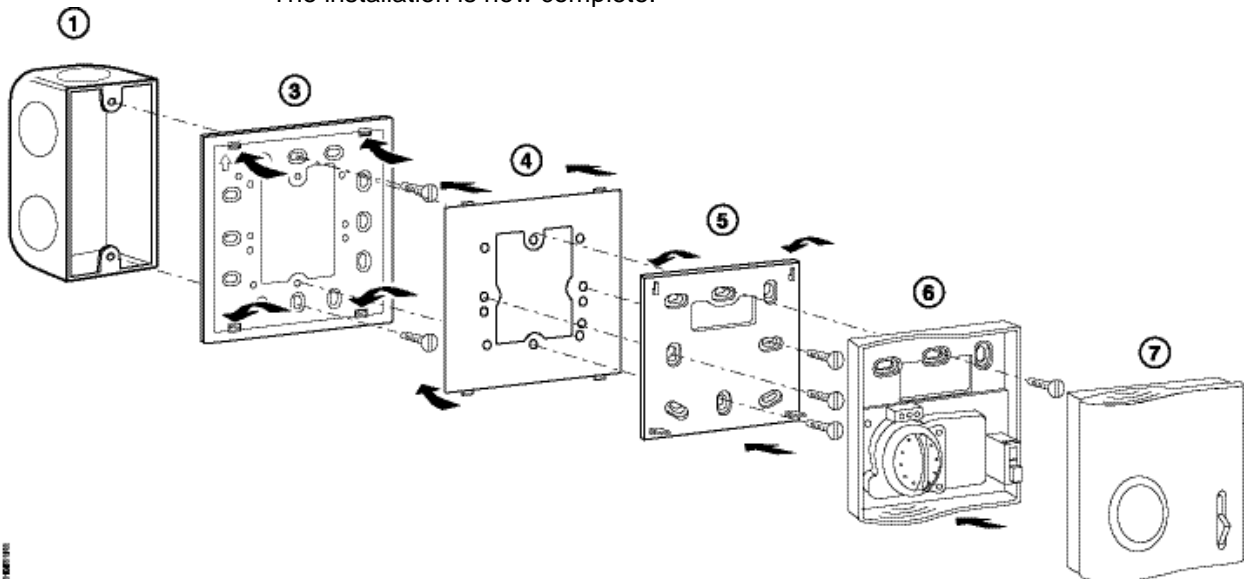


Figure 4. 2 x 4-inch Electrical Wall Box Installation.

- | | |
|-----------------------|--------------------|
| 1 Electrical wall box | 5 Sub-base |
| 3 Wall box adapter * | 6 Thermostat base |
| 4 Adapter mask * | 7 Thermostat cover |

* Included with ARG70

Maintenance

The room thermostat is completely maintenance-free. If inoperable, replace entire unit.



WARNING:

High voltage. Disconnect power before servicing. Metal part is not grounded.

Wiring Diagrams

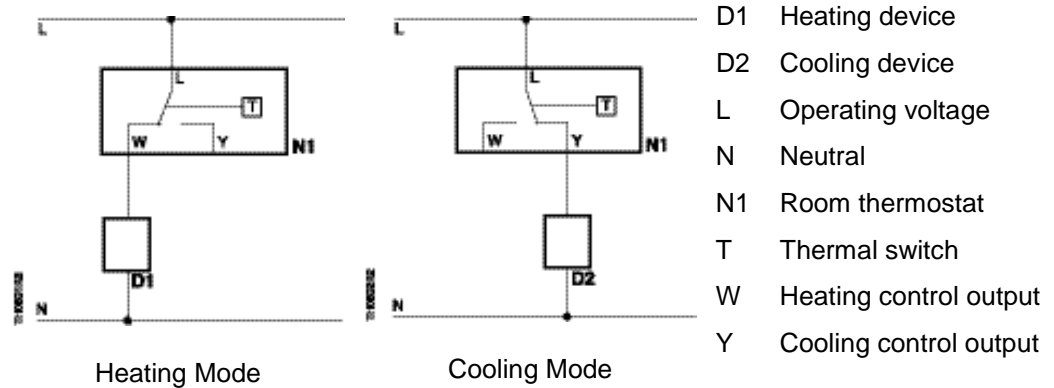


Figure 5. RAA10...and RAA20... Wiring.

Operating Diagrams

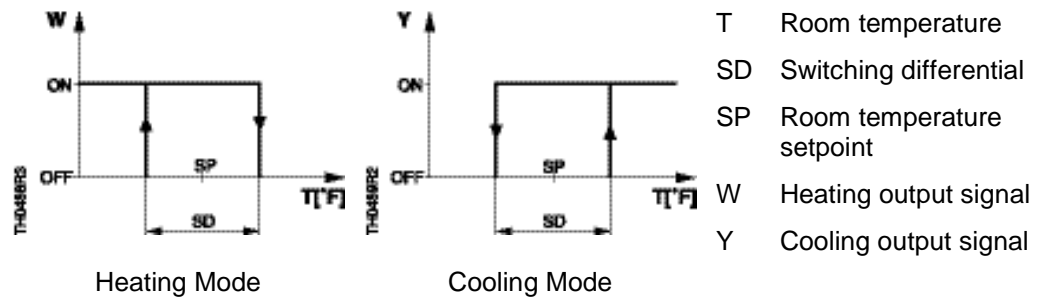


Figure 6. RAA10... and RAA20 Operating.

Dimensions

Dimensions in inches
 (millimeters)

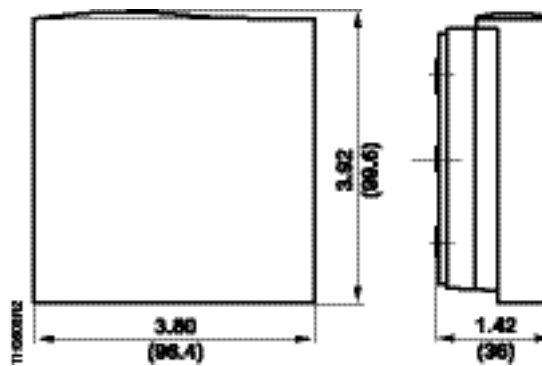


Figure 7. RAA10... Unit.

**Dimensions,
 Continued**

Dimensions in inches
 (millimeters)

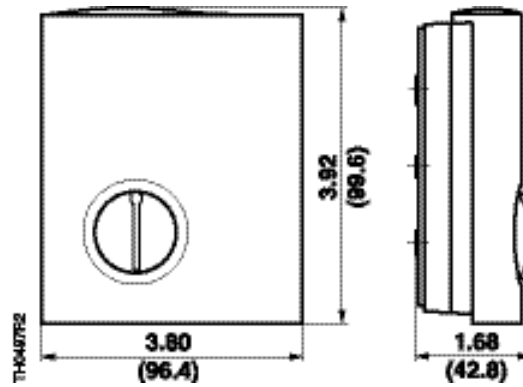


Figure 8. RAA20... Unit.

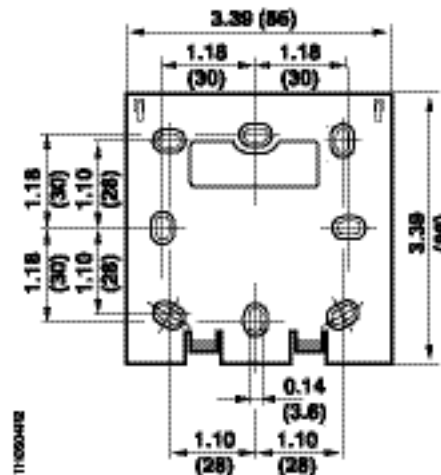


Figure 9. Base Plate.

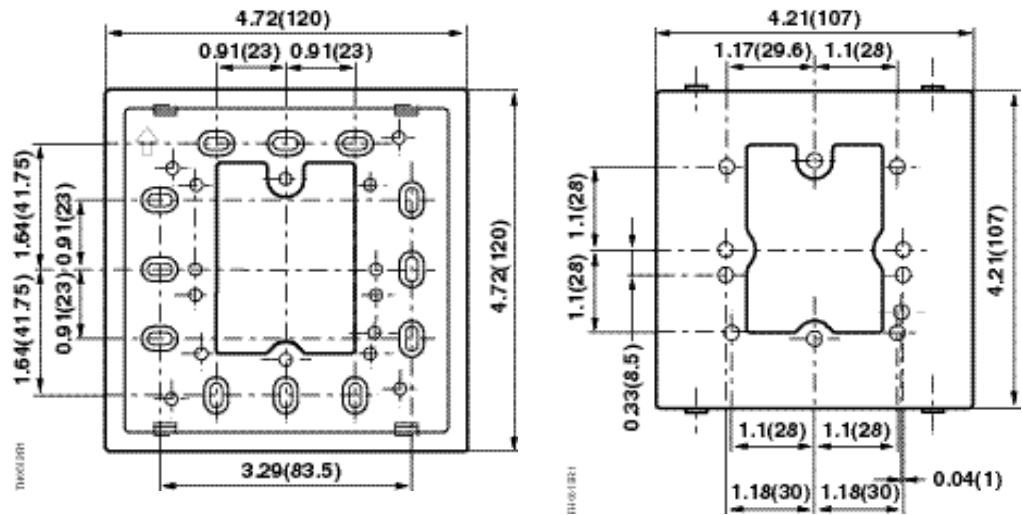


Figure 10. ARG70.

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