

## RDF Series Room Temperature Controllers

### Product Description

Room Temperature Controllers with LCD for two-pipe (with and without an electrical heater) and four-pipe fan coil units.

### Product Numbers

Part Number	Application
RDF10U	Two-pipe fan coil units
RDF20U	Two-pipe fan coil units with electrical heater
RDF30U	Four-pipe fan coil units
RDF50.1U	Two-pipe fan coil units with 0 to 10 Vdc output
RDF60.1U	Two-pipe fan coil units with floating output

### Required Tools

- Small, flat-blade screwdriver
- Wire strippers
- Electric drill

### Expected Installation Time

30 minutes

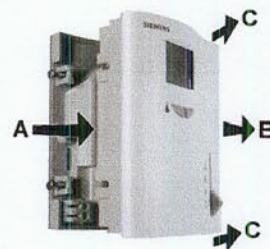
### Accessories

- 141-570 Lockable Thermostat Guard
- ARG70 Wall Plate Adapter
- QAH11.1 Remote/Changeover Sensor

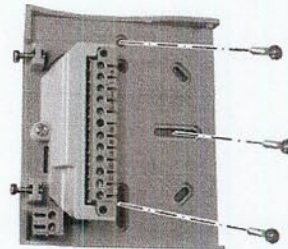
### Installation



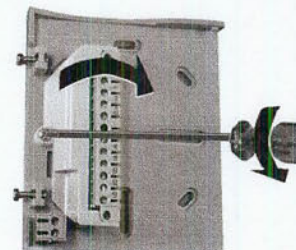
Step 1. Loosen retaining screws.



Step 2. Remove controller housing.

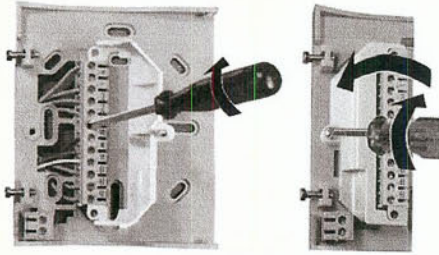


Step 3. Mount base plate to wall.

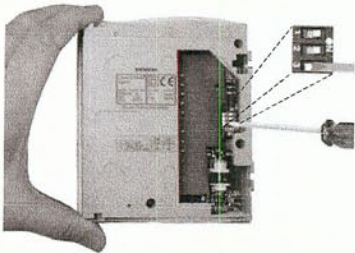


Step 4. Remove screw and open terminal cover.

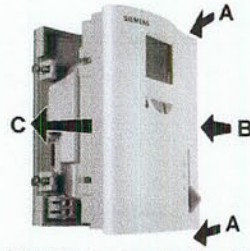
## Installation, Continued



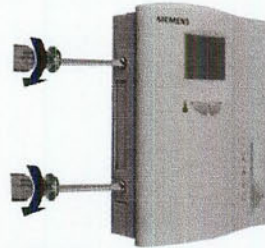
**Step 5. Terminate wires (see wiring diagrams), close cover terminal cover and replace screw.**



**Step 6. Set DIP switches.**



**Step 7. Replace controller housing.**

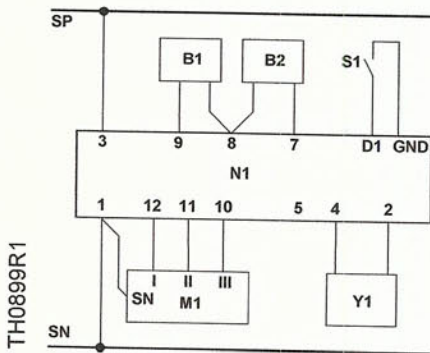


**Step 8. Tighten retaining screws.**

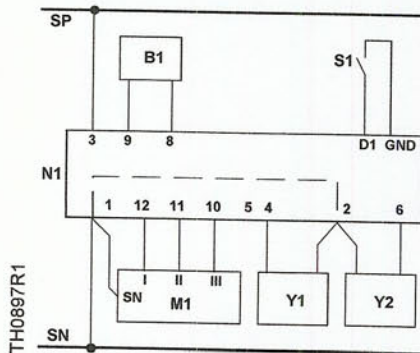
The installation is now complete.

## Wiring Diagrams

- B1 Remote temperature sensor
- B2 Changeover sensor
- E1 Electric heat
- M1 Three-speed fan motor
- S1 Digital input for day/night changeover
- Y1 Control valve, heat/cool or two-pipe system
- Y2 Cooling control valve for four-pipe system



**Figure 1. RDF10U.**



**Figure 2. RDF30U.**

Terminal Position	RDF10U and RDF30U Terminal Function
1	Operating voltage 24 Vac negative
2	Operating voltage 24 Vac negative
3	Operating voltage 24 Vac positive
4	Heating/cooling output NO
5	Heating/cooling output NC
6	Second stage Heating/Cooling output NO (RDF30U only)
7	Heat/Cool changeover sensor (RDF10U only)
8	Measuring Neutral, remote or changeover sensor
9	Remote air sensor
10,11, 12	Fan Speed output III, II, I
D1, GND	Signal input for potential-free operating mode changeover switch



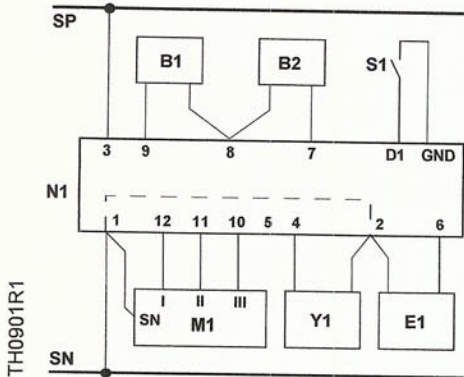


Figure 3. RDF20U.

Terminal Position	RDF20U Terminal Function
1	Ground for control signal
2	Operating voltage 24 Vac negative
3	Operating voltage 24 Vac positive
4	Heating/cooling output NO
5	Heating/cooling output NC
6	Electric heater output NO
7	Heat/Cool changeover sensor
8	Measuring Neutral
9	Remote air sensor
10,11, 12	Fan speed output III, II, I
D1, GND	Signal input for potential-free operating mode changeover switch

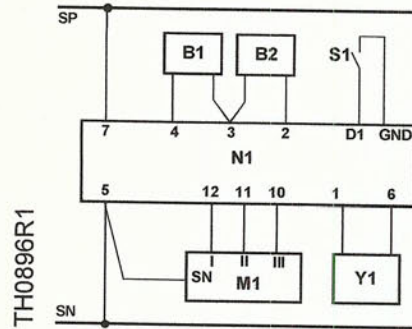


Figure 4. RDF50.1U.

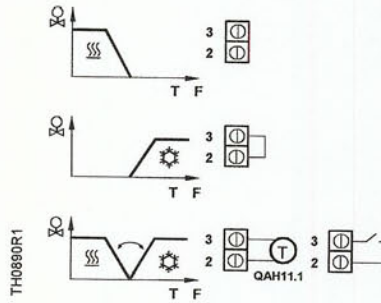


Figure 5. RDF50.1U.

Terminal Position	RDF50.1U Terminal Function
1	0 to 10 Vdc output for valve
2	Heat/Cool changeover sensor
3	Measuring neutral
4	Return air sensor
5	Operating voltage 24 Vac, negative
6	Operating voltage 24 Vac, negative
7	Operating voltage 24 Vac positive
10,11,12	Fan speed output III, II, I
D1, GND	Signal input for potential-free operating mode changeover switch

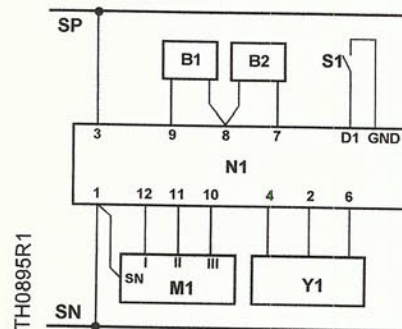


Figure 6. RDF60.1U.

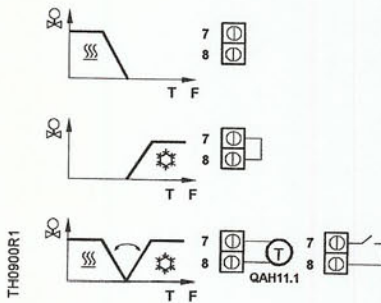


Figure 7. RDF10U, RDF20U, and RDF60.1U.

Terminal Position	RDF60.1U Terminal Function
1	Operating voltage 24 Vac negative
2	Operating voltage 24 Vac positive
3	Operating voltage 24 Vac positive
4	Control signal "Opening" 24 Vac
6	Control signal "Closed" 24 Vac
7	Heat/Cool changeover Input
8	Measuring neutral
9	Remote air sensor
10,11, 12	Fan speed output III, II, I
D1, GND	Signal input for potential-free operating mode changeover switch

## Dimensions

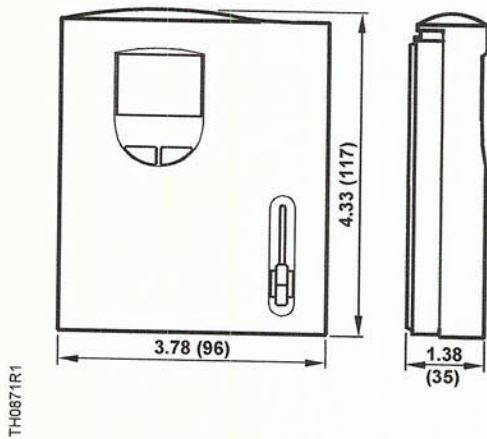


Figure 8. RDF Controller Dimensions in Inches (mm).

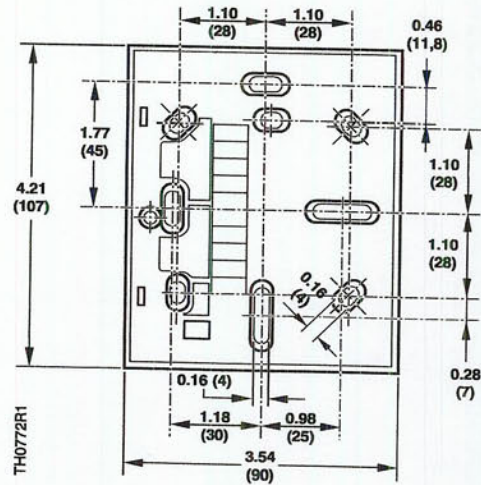
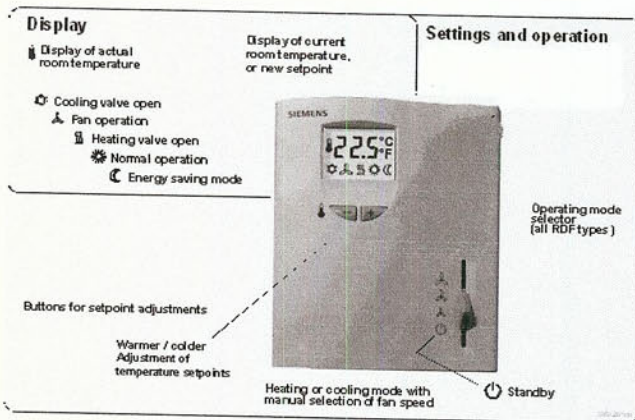


Figure 9. Base Plate Dimensions.

## Operating Instructions



**Normal Operation**

The +/- buttons allow you to increase or decrease the current room temperature setpoint in steps of 1°F (0.5°C). To do this, proceed as follows:

- Press and hold or once. The setpoint display starts flashing.
- Press the buttons again to change the room temperature setpoint in the range 41°F to 95°F (5°C to 35°C). The new temperature setpoint will automatically be stored 10 seconds after the last adjustment is made. The display will then stop flashing.

### Changing from Heating to Cooling Mode

- Automatic changeover
- Display shows that heating valve is open
- Display shows that cooling valve is open

### Selecting the Three Fan Speeds with the Operating Mode Selector

- High
- Medium
- Low

### Changing from Heating or Cooling Mode to Standby

With all RDF types, the operating mode selector is used to manually change from Heating or Cooling mode to Standby .


In Standby , all controller types maintain the adjusted lower heating setpoint P03 or higher cooling setpoint P04.

### Changing from Normal Operation to Economy Mode


- Changeover from normal operation to Economy mode takes place automatically via an external contact (window switch/remote operation switch, etc.).
- Display shows normal operation.
- Display shows Economy mode.



## Economy Mode

 If you want to change the factory-set temperature setpoints (61°F [16°C] for heating and 82°F [28°C] for cooling), see *Changing the Control Parameters* and *Commissioning*.

### Important:

The Economy mode setpoint can be set to 0. This means **OFF** so that the controller is not active in Economy mode and symbol  will not appear.



### CAUTION:

When turned **OFF**, the controller will not provide valve control, which could result in freeze conditions.

## Changing the Control Parameters

To optimize the control performance, a number of control parameters can be adjusted. Adjustments can be made during operation without opening the controller.

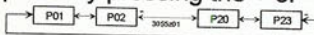
**NOTE:** For factory settings, see *Commissioning*

To change the parameters for:

- Setpoints for independent heating and cooling in Economy mode
- Setpoints for independent heating and cooling in Standby mode
- Upper and lower limit stops in Normal mode
- Heat/cool changeover points
- Sensor calibration
- Heat/cool switching differentials
- Fan control
- Dead zone between heating and cooling (RDF30U),

proceed as follows:

1. Set operating mode selector to Standby.
2. Press the + and – buttons simultaneously for a minimum of 3 seconds and a maximum of 5 seconds. Release them and within 2 seconds, press the + button again for 3 seconds. The display will show "P01".
3. Select the required parameter by repeatedly pressing the + or – button:



4. Press the + and – buttons simultaneously, to show the current value of the selected parameter, which can be changed by repeatedly pressing the + or – button.




5. Press buttons + and – simultaneously again or wait 5 seconds after the last press of a button, to display the last parameter.



6. If you wish to display and change additional parameters, repeat steps 3 through 5.

7. All changes will be stored 10 seconds after the last display or setting.

8. Switch to normal operation  with the operating mode selector.

## Recalibrating the Sensor

If the room temperature displayed by the controller does not agree with the actual room temperature, the temperature sensor can be recalibrated by changing parameter P09.



See *Changing the Control Parameters* and follow steps 1 through 3 to select parameter P09.

With step 4, the room temperature displayed can now be matched to the actual room temperature. Each push of the + or – button changes the temperature by +/- 1°F (0.5°C) up to a maximum of +/- 5.5°F (3°C).

With step 7, the recalibration is automatically stored 10 seconds after the last readjustment.

## DIP Switch Settings

	Switch Number	Description	Position ON (Factory Setting)	Position OFF
RDF10U, RDF50.1U, and RDF60.1U	1	Fan control	Fan control is temperature-independent in Normal mode	Fan control is temperature-dependent in Normal mode
	2	Temperature or setpoint display	Room (or return air) temperature display	Setpoint display
	3	Operating action of switch for external operating mode changeover	Changeover is activated when switch is closed (NO)	Changeover is activated when switch is open (NC)
RDF20U	1	Fan control	Fan control is temperature-independent in Normal mode	Fan control is temperature-dependent in all operating modes
	2	Temperature or setpoint display	Room (or return air) temperature display	Setpoint display
	3	Operating action of switch for external operating mode changeover	Changeover is activated when switch is closed (NO)	Changeover is activated when switch is open (NC)
	4	Electrical heater	Active in cooling mode	Inactive in cooling mode
RDF30U	1	Fan control	Fan control is temperature-independent in Normal mode	Fan control is temperature-dependent in all operating modes
	2	Temperature or setpoint display	Room (or return air) temperature display	Setpoint display
	3	Operating action of switch for external operating mode changeover	Changeover is activated when switch is closed (NO)	Changeover is activated when switch is open (NC)
	4	Output sequence	Heating and cooling (four-pipe)	Two-stage cooling



**Commissioning (by qualified HVAC Installer)**

Parameter	Controller's parameter factory settings:	Default settings	Setting range (all settings can be made in increments of 0.5°K)	RDF100U	RDF20U	RDF30U	RDF50.1U	RDF60.1U
P01	Setpoint of heating in night setback (Economy) mode (operating mode changeover switch activated)	61°F (16°C)	OFF, 41°F to 68°F (5°C to 20°C)					
P02	Setpoint of cooling in night setback (Economy) mode (operating mode changeover switch activated)	82°F (28°C)	OFF, 70°F to 95°F (21°C to 35°C)					
P03	Setpoint of heating in Freeze Protection (standby) position $\cup$	46°F (8°C)	OFF, 41°F to 68°F (5°C to 20°C)					
P04	Setpoint of cooling in standby position $\cup$	OFF	OFF, 70°F to 95°F (21°C to 35°C)					
P05	Minimum (lower) setpoint limit stop in normal mode	41°F (5°C)	41°F to WmaxNorm (5°C to WmaxNorm)					
P06	Maximum (upper) setpoint limit stop in normal mode	95°F (35°C)	WminNorm to 95°F (WminNorm to 35°C)					
P07	Heat/cool changeover switching point cooling	61°F (16°C)	50°F to 77°F (10°C to 25°C)			X		
P08	Heat/cool changeover switching point heating	82°F (28°C)	81°F to 104°F (27°C to 40°C)			X		
P09	Sensor calibration	0 (0K)	-3 K to +3 K (-5.5°F to 5.5°F)					
P10	Switching differential in heating mode *	2 K (3.6°F)	1°F to 7°F (0.5 K to 4 K)					
P11	Switching differential in cooling mode *	1 K (1.8°F)	1°F to 7°F (0.5 K to 4 K)					
P12	Integration time	5 minutes	1 to 10 minutes					
P13	Dead zone in normal operationc *	2 K (3.6°F)	1°F to 18°F (0.5 K to 10 K)	X	X	X	X	X
P14	Active temperature sensor (no setting, display only)	-	1: room temperature sensor active 2: return air temperature sensor active	X	X	X	X	X
P15	Value of current room temperature reading (no setting, display only)	-	32°F to 120°F (0°C to 49°C) = current temperature value					
P16	Value of current heat-cool changeover temperature reading including indication of current mode $\text{---}$ (no setting, display only)	-	100 = input open (no sensor connected, heating mode $\text{---}$ ) 32°F to 120°F (0°C to 49°C) = current temp. value 00 = input bridged, cooling mode $\text{---}$ )			X		
P17	Purging function	0 minutes	0 minutes: not active 1 to 5 minutes active with selected duration					
P18	Fan control in energy saving mode OFF: fan is off in the dead zone. ON: fan is on in the dead zone.	OFF	ON: running in selected speed or in speed one if in standby $\cup$ position					
P19	Setpoint differential *	2 K (3.6°F)	1°F to 9°F (0.5 K to 5 K)	X				X
P20	Test mode for checking the actuator direction (note that this parameter can be quit only if the setting is back at "..." and by pressing buttons + and - simultaneously)	---	"..." = no signal on outputs Y1 and Y2 OPE = output Y1 forced open CLO = output Y2 forced closing	X	X	X	X	X
P21	Minimum output on-time	1 minute	1 to 20 minutes (in increments of 1 minute)					
P22	Minimum output off-time	1 minute	1 to 20 minutes (in increments of 1 minute)					
P23	Fan overrun	see list	0 to 300 seconds (in increments of 10 seconds)	X	(60s)	(0 s)	X	X
P24	Point of reference for setpoint in Normal mode	HA	HA: heating sequence CL: cooling sequence	X				X
P25	Display unit of measurement	°F	°F °C					

\* Note: This parameter is in degrees Kelvin, 1°K = 1.8°F).

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