Siemens Thermostats

RDY2000BN Thermostat
RDY2000BN –
BACnet Commercial Thermostat

Maximize comfort and Indoor Air Quality

Bring more buildings and zones under control

Reduce energy costs

Helping more buildings work for you!
Applications

A More Detailed Look at the RDY2000BN application capabilities and some examples
Meet the RDY2000BN

Wide range of support for Heat Pump / DX Applications

• Compatible with HVAC system with 24Vac controls
• Familiar terminal conventions
  • RC/RC/C = 24Vac input power
  • W = Heating
  • Y = Cooling
  • G = Fan
  • O/B = Reversing Valve
• Pre-loaded applications for multi-stage conventional systems and heat pumps
• Fully programmable with BACnet schedule
• Onboard temperature and humidity sensors
• Fits standard North American electrical boxes and includes hardware for mounting direct to wall.
• Same “footprint” as market-leading thermostats
Standard Applications

• Conventional systems
  • Forced air / hydronic / steam / electric
  • Roof tops / split systems
  • Up to 3 stages cooling and 3 stages heating

• Heat pump systems
  • Air / water source / etc with 24Vac controls
  • Up to 2 stages of compressors and 2 stages of auxiliary heat
  • Configurable reversing valve operation

Safeties and Lockouts

• Interlocks prevent simultaneous heating and cooling
• Minimum run timers and time delays protect equipment
• Dead-bands prevent short cycling and hunting
• Relay outputs shut down on overcurrent
RDY2000BN: Applications

Built In Advanced Applications

• Humidity control
  • 2 relay outputs for activation of humidification / dehumidification equipment
  • Individual setpoints for humidify and dehumidify
  • Interlock prevents simultaneous operation

• Economizer enable
  • Relay energized when in cooling mode or anytime space is occupied
  • Wire to “N” terminal on economizer control
  • Pre-purge function enables economizer and energizes fan relay 1-3 hours prior to scheduled occupancy

• Indoor air quality
  • When measured CO2 > setpoint, fan relay and ventilation relay are energized
  • Requires additional sensor (QPA2000)

• Semi-Continuous fan keeps fan relay energized during periods of scheduled occupancy

• Occupancy relay is energized per schedule or if external sensor indicates occupant presence.
RDY2000BN: Relay Outputs

“Typical” HVAC outputs

• Y1 = Cooling stage 1 or compressor stage 1
• Y2 = Cooling stage 2 or compressor stage 2
• W1 = Heating stage 1 or stage 1 auxiliary heat
• W2 = Heating stage 2 or stage 2 auxiliary heat
• O/B = Reversing valve
• G = Fan

3 Configurable outputs

• OUT1 and OUT2 are switchable 24Vac
• OUT3 is switchable 24Vac but can be converted to dry contact by removing jumper
• Outputs configured via Installer Setup Menu
  • Humidification
  • Dehumidification
  • Economizer enable
  • Occupancy
  • Ventilation
## RDY2000BN: Configurable Inputs

<table>
<thead>
<tr>
<th>Configurable Option</th>
<th>Purpose</th>
<th>Input Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote Indoor Temp</td>
<td>Enables thermostat to be mounted in a secure location while controlling temperature in a public space. Onboard temp sensor is overridden.</td>
<td>• 10k Ω Type II thermistor&lt;br&gt;• 0-10V (adjustable from -58F to +250F)</td>
</tr>
<tr>
<td>Average Indoor Temp</td>
<td>Enables remote temp sensor to be averaged with onboard temp sensor.</td>
<td>• 10k Ω Type II thermistor&lt;br&gt;• 0-10V (adjustable from -58F to +250F)</td>
</tr>
<tr>
<td>Remote Humidity</td>
<td>Enables thermostat to be mounted in a secure location while controlling humidity in a public space. Onboard humidity sensor is overridden.</td>
<td>• 0-10V (0-100%)</td>
</tr>
<tr>
<td>CO2</td>
<td>Ventilation relay will be energized when measured CO2 exceeds setpoint.</td>
<td>• 0-10V (0-2000ppm)</td>
</tr>
<tr>
<td>Occupancy</td>
<td>Digital input from occupancy sensor will send thermostat to comfort (occupied) set points if currently operating in economy (set-back) mode.</td>
<td>• Digital input</td>
</tr>
<tr>
<td>Fault</td>
<td>Accepts input from external device (e.g., low water cut-off, pressure switch, etc.). Activates “Service Required” message.</td>
<td>• Digital input</td>
</tr>
<tr>
<td>Supply/Return Temp</td>
<td>Enables display of supply and/or return temperatures for system troubleshooting.</td>
<td>• 10k Ω Type II thermistor&lt;br&gt;• 0-10V (adjustable from -58F to +250F)</td>
</tr>
<tr>
<td>Outdoor Temp</td>
<td>Enables display of outdoor temperature at thermostat.</td>
<td>• 10k Ω Type II thermistor&lt;br&gt;• 0-10V (adjustable from -58F to +250F)</td>
</tr>
</tbody>
</table>
RDY2000BN: Front Panel

• Adjustable limits on setpoint override
  • Override degree can be limited or completely restricted
  • Override time can be limited

• Four levels of keypad lockout
  • Unrestricted: (Installer & Expert menus remain password protected)
  • Partial: (only temp setpoint can be adjusted – within set limits)
  • Total Lockout: No user adjustments possible
  • Restricted: No user adjustments possible and display is blank.

• Warmer / Cooler display
  • Only displays adjustable band + / - instead of set point or room temperature

• Allows HVAC unit number to be displayed on home screen
**RDY2000BN: EZ to Install and Commission**

**Universal Mounting Plate**
- Fits any 2” x 4” North American electrical box
  - Vertical
  - Horizontal
- Includes screws and anchors for mounting direct to wall
- Clearly marked terminal block attached to mounting plate
- Mounting plate has molded in UP arrow
- Thermostat secured to plate with screws
- 1/32” pins are virtually unbendable

**Setup Wizard enables rapid commissioning**
- Appears at initial powerup
- Walks installer through common parameters that are critical to system start up.
  - System type
  - Key BACnet network configuration parameters
  - Heating / cooling stages
  - Reversing valve operation (if HP)
  - Scheduler configuration
  - F or C
**RDY2000BN: Advanced Parameters**

**Expert Parameters**
- Access requires additional password
- Used to configure staging timers, deadbands, etc.
- Rarely, if ever, required for “normal” HVAC systems

**Relay Testing Parameters**
- Enable technician to force relays open and closed during commissioning process
- Overrides all timers and lockouts

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
<th>Display</th>
<th>Value Range</th>
<th>Default</th>
<th>Extended Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>901</td>
<td>Test Compressor 1</td>
<td>COMP 1 TST</td>
<td>YES NO</td>
<td>NO</td>
<td>NO = Relay not energized YES = Relay energized</td>
</tr>
<tr>
<td>T902</td>
<td>Test Compressor 2</td>
<td>COMP 2 TST</td>
<td>YES NO</td>
<td>NO</td>
<td>NO = Relay not energized YES = Relay energized</td>
</tr>
<tr>
<td>903</td>
<td>Test Reversing Valve</td>
<td>O/B TEST</td>
<td>YES NO</td>
<td>NO</td>
<td>NO = Relay not energized YES = Relay energized</td>
</tr>
</tbody>
</table>
# Simple Application Configurations

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
<th>Suggested Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic</td>
<td>RDY2000BN Thermostat only</td>
<td>Use everywhere</td>
</tr>
<tr>
<td>Demand Control Ventilation</td>
<td>RDY2000BN with CO₂ sensor for demand control ventilation.</td>
<td>• Medical offices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Car dealerships</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Professional offices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Manufacturing facilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Residential</td>
</tr>
<tr>
<td>Demand Control Ventilation / Occupancy</td>
<td>RDY2000BN with CO₂ sensor for demand control ventilation and occupancy sensor for schedule override.</td>
<td></td>
</tr>
<tr>
<td>Remote Sensing</td>
<td>RDY2000BN with remote sensor(s). Enables room comfort control while eliminating possibility of unauthorized adjustments.</td>
<td>• Schools</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Restaurants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Retail establishments</td>
</tr>
</tbody>
</table>
Standard IAQ with Damper

The RDY2000BN can receive a 0-10V CO2 signal and close a relay to energize a 24Vac spring return damper actuator when measured CO2 exceeds CO2 setpoint.
The RDY2000BN can receive a 0-10V CO2 signal and close a relay to activate an intake or exhaust fan.

An external relay is required to switch line voltage.
Variable IAQ with Damper

The CO2 output from the QPA2002 sends an occupancy based signal to the RDY2000BN.

When measured CO2 exceeds setpoint, the air quality relay in the RDY2000BN closes, enabling the VOC signal to modulate the damper based on actual air quality.
Variable IAQ with Ventilation Fan

The CO2 output from the QPA2002 sends an occupancy based signal to the RDY2000BN.

When measured CO2 exceeds setpoint, the air quality relay in the RDY2000BN closes, enabling the VOC signal to modulate the fan speed based on actual air quality.
Interface with Economizer Controllers

The CO2 output from the QPA2002 sends an occupancy based signal to the RDY2000BN.

The VOC signal from the QPA2002 sends an air quality signal to the POL220 Economizer Control.

The POL220 will position the damper via the actuator to the appropriate position to meet cooling / ventilation requirements.
By routing the occupancy sensor signal through the RDY2000BN, it enables remote control of lights and remote monitoring of occupancy via BACnet.
# RDY2000BN
## Optional Sensors

<table>
<thead>
<tr>
<th>Application</th>
<th>Details</th>
<th>Req’d Sensor</th>
<th>Description</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand Control Ventilation</td>
<td>Thermostat activates fresh air damper or enables economizer enable based on CO2 level.</td>
<td>QPA2000</td>
<td>CO2 Sensor</td>
<td><img src="sensor.png" alt="" /></td>
</tr>
<tr>
<td>Remote Sensing</td>
<td>Enables thermostat to be mounted in a secure location (e.g., manager’s office) while controlling comfort in a public space (e.g., dining area).</td>
<td>QAA2230.EWSN</td>
<td>Remote Temp</td>
<td><img src="sensor.png" alt="" /></td>
</tr>
<tr>
<td>Duct Sensing</td>
<td>Enables comfort control of a space where wall mounted devices are not desirable.</td>
<td>QAM2030.010</td>
<td>Duct Temp</td>
<td><img src="sensor.png" alt="" /></td>
</tr>
<tr>
<td>Outdoor Temp</td>
<td>Convenient access to outdoor temp from thermostat display.</td>
<td>QAC2030</td>
<td>Outdoor Temp Sensor</td>
<td><img src="sensor.png" alt="" /></td>
</tr>
</tbody>
</table>