Honeywell

TB7600 Series Communicating RTU Thermostats with Humidity Control

TB7600 Series Thermostat

TB7600 Series Thermostat with Occupancy Sensor

APPLICATION

The TB7600 Series PI thermostat family is specifically designed for single stage and multi-stage control of heating/cooling equipment such as rooftop and self-contained units with a humidifier and/or dehumidifier. The TB7600 Series are communicating thermostats with models available in BACnet® MS/TP and ZigBee® wireless mesh protocols and can be easily integrated into a WEBs-AX building automation system based on the NiagaraAX® platform.

These thermostats feature an embedded complete humidity solution. Accurate temperature and relative humidity control is achieved due to the product's PI time proportional control algorithm, which virtually eliminates temperature offset associated with traditional, differential-based thermostats.

Thermostats equipped with an occupancy sensor cover provide advanced active occupancy logic, which will automatically switch occupancy levels from Occupied to Unoccupied as required by local activity being present or not. This advanced occupancy functionality provides advantageous energy savings during occupied hours without sacrificing occupant comfort. All thermostats are PIR ready and can be ordered with or without Honeywell occupancy sensor. The occupancy sensor cover is available to order separately if a PIR is needed at a later time.

FEATURES

- **Available in BACnet MS/TP and ZigBee wireless protocols**
- **Backlit LCD display with dedicated function menu keys for simple operation**
- **Built in default profile set-up for easier start up and commissioning**
- **Fully integrated advanced occupancy functionality with a PIR accessory cover on some models**
- **Non-volatile EEPROM memory prevents loss of parameters during power outage**
- **Programmable smart fan saves energy during night mode**
- **Humidification and dehumidification control:**
  - Embedded humidification sequence (0-10 Vdc output) and dehumidification sequence (dry contact) simplifies installation and reduces installation costs
  - Internal RH sensor
  - Proportional RH high limit override prevents costly damage due to over-humidification
  - Discharge air humidity sensor (0-10 Vdc) can be used to limit supply RH levels
  - Automatic humidity setpoint reset when outside air temperature value is used to prevent window condensation in colder climates and provide energy savings
- **Password protection to minimize parameter tampering**
- **Three levels of keypad lockout to limit access to change user parameters such as setpoints, system mode, etc.**
- **Compatible with gas, oil, or electric systems**
- **Automatic frost protection to prevents costly freeze damage**
- **Anti short cycle and minimum on/off run time protection to reduce wear and maximize life of mechanical equipment.**
- **Programmable digital input can be used to monitor filter status, activate a remote temporary occupancy switch, and/or used as a general purpose service indicator**
- **Configurable SPST auxiliary output can be used for lighting and/or economizer override**
- **7 day programmable models, 2 or 4 events for use in non-networked applications***

- **Six hour reserve prevents the need to reprogram day/ time after a power outage on programmable models**

* Use programmable models only when installing as stand-alone thermostats that may eventually be added to a WEBs-AX network. When a programmable thermostat is added to a network, schedules should be applied through the WEBStation-AX.

More Information

To learn about additional products in this family visit http:// customer.honeywell.com.

- TB7600 Series Communicating RTU/Heat Pump Thermostats Specification Data (Form No. 63-2706)
- TB7300 Series Communicating Fan Coil Unit Thermostats Specification Data (Form No. 63-2709)
- TB7200 Communicating Zoning Thermostats Specification Data (Form No. 63-2708)
- Sensors Product Overview Brochure (Form No. 63-9285) for a complete listing of compatible sensors

TB7600 Series Model Selection

Table 1. TB7600 Series Communicating RTU Thermostats with Humidity Control

Product Number	Description	Outputs	Scheduling[1]	Occupancy Sensor[2]
BACnet Models				
TB7607B5014B	Humidity Control RTU	2H/2C	No	
TB7607B5514B	Humidity Control RTU	2H/2C	No	X
TB7657B5014B	Humidity Control RTU	2H/2C	Yes	
TB7657B5514B	Humidity Control RTU	2H/2C	Yes	X
Wireless Models				
TB7607B5014W	Humidity Control RTU	2H/2C	No	
TB7607B5514W	Humidity Control RTU	2H/2C	No	X
TB7657B5014W	Humidity Control RTU	2H/2C	Yes	
TB7657B5514W	Humidity Control RTU	2H/2C	Yes	X
Accessories				
TB-PIR-RTU	RTU Occupancy Sensor Cover			
TB-RA-1014	Wireless Remote Antenna Base			
TB-RP5000W	Wireless Repeater for TB7XXX Series Wireless Thermostats			
TBST-5014W	ZigBee Wireless Survey Toolkit			
TB-VWG-APP-1014	TB7XXX Series Wireless Communication Card			
TB-WALL-1014	Room Sensor 10K NTC Type 2			
TB-WALLOVR-1014	Room Sensor with Override 10K NTC Type 2			

1 Use programmable models only when installing as standalone thermostats that may eventually be added to a WEBs-AX network. When a programmable thermostat is added to a network, schedules should be applied through the WEBStation-AX.
2 Thermostats ordered without an occupancy sensor cover can be retrofitted with an occupancy sensor cover later if needed.

THEORY OF OPERATION

The TB7600 uses a proprietary adaptive logic algorithm to control the space temperature. This algorithm controls the heating/air conditioning system to minimize overshoots while still providing comfort. It provides exceptional accuracy due to its unique PI time proportioning control algorithm, which virtually eliminates temperature offset associated with traditional, differential-based on/off thermostats.
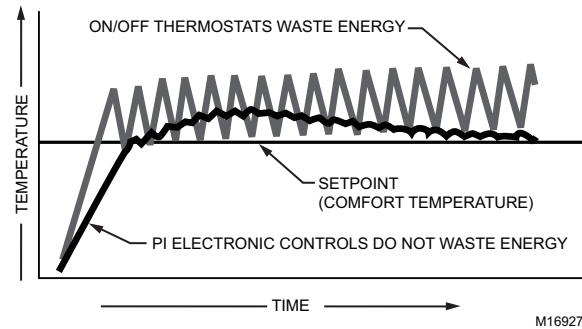

Fig. 1. On/Off mechanical control vs PI electronic control.

Remote sensor accessories

Room humidity sensor with 0-10 Vdc output.
Outdoor humidity sensor, selectable 4-20 mA, 0-10 Vdc, or 0-5 Vdc output.

Table 2. Temperature vs Resistance for 10 Kohm NTC thermistor (R$_{25°C}$ = 10KW±3%, B$_{25/85°C}$ = 3975K±1.5%)

ºF	ºC	Kohm	ºF	ºC	Kohm	ºF	ºC	Kohm	ºF	ºC	Kohm	ºF	ºC	Kohm
-40	-40	324.3197	-4	-20	94.5149	32	0	32.1910	68	20	12.4601	104	40	5.3467
-31	-35	234.4009	5	-15	71.2430	41	5	25.1119	77	25	10.0000	113	45	4.3881
-22	-30	171.3474	14	-10	54.1988	50	10	19.7390	86	30	8.0694	122	50	3.6202
-13	-25	126.6109	23	-5	41.5956	59	15	15.6286	95	35	6.5499	131	55	3.0016

Humidity Setpoint Reset by Outside Air Temperature

If an outdoor air sensor is connected at the thermostat or a value is received from the network, it can be used to reset the humidity setpoint during the cold season to minimize condensation on windows and building structures.

When the outdoor temperature falls below the selected high temperature, parameter **RH HT** (32 F in the example Fig. 2), the humidity setpoint will start to decrease. The lowest humidity setpoint will be reached at selected low temperature, parameter **RH LT** (-20 F).
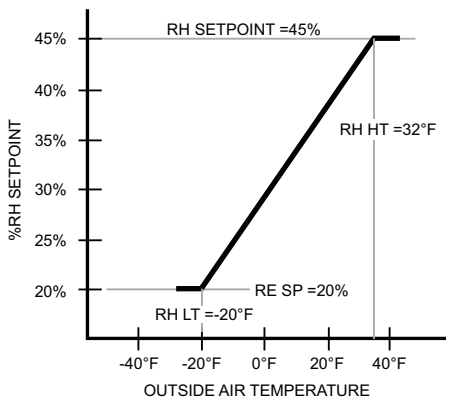
The setpoint decrease from original setpoint to the lowest setpoint determined by the parameter **RE Sp**. In the example, Fig. 2, **RE Sp** was set to 20%, therefore the humidity setpoint dropped from 45% to 20%.

If you don't want to use this feature, set the **RE Sp** parameter to 90% RH.

High limit humidity sensor

The TB7600 Series with humidity includes a high limit sequence. This allows the use of a remote 0 to 10 Vdc humidity sensor to limit the humidity in the supply air. If no sensor is detected at the HL connector, this sequence is disabled at the thermostat.

NOTE: This high limit function is not a safety device. For critical situations, provide installation with normal protections required to ensure a safe operation.

Fig. 2. Humidity setpoint reset by outside air temperature
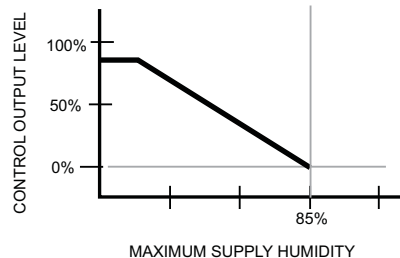
SPECIFICATIONS

Network Protocol: Models available in BACnet MS/TP or ZigBee wireless mesh

WEBs-AX Controllers: Compatible with WEB-2xx, WEB-6xx, and WEB-7xx

Thermostats Per Controller
BACnet: 126 thermostats (BACnet allows 128 but 1 node used by the controller; and when more than 64 devices are on the network a repeater is required so 1 node used by the repeater).
Wireless: WEB-2xx: 30
   WEB-6xx & WEB-7xx: 50

Platform:
   WEB-2xx and WEB-6xx - WEBStation-AX 3.0 or later
   WEB-7xx - WEBStation-AX 3.5 or later

Thermostat power requirements:
   19-30 Vac 50 or 60 Hz; 2 VA (RC and C) Class 2
   RC to RH jumper 2.0 Amps 48 VA maximum

Operating conditions:
   32 F to 122 F (0 C to 50 C)
   0% to 95% R.H. non-condensing

Storage conditions:
   -22 F to 122 F (-30 C to 50 C)
   0% to 95% R.H. non-condensing

Temperature sensor: 10 K NTC thermistor on board

Resolution:
   Temperature: ± 0.2 F (± 0.1 C)
   Humidity: ± 0.1%

63-2707—03

Control accuracy:
 Temp: ± 0.9 F (± 0.5 C) @ 70 F (21 C) typ. calibrated
 Humidity: ± 5% RH from 20 to 0% RH at 50 to 90 F
  (10 to 32 C)

Humidification setpoint range: 10% RH to 90% RH

Dehumidification setpoint range: 15% RH to 95% RH

Occupied and unoccupied setpoint range cooling:
 54 to 100 F (12.0 to 37.5 C)

Occupied and unoccupied setpoint range heating:
 40 F to 90 F (4.5 C to 32 C)

Room and outdoor air temperature range:
 -40 F to 122 F (-40 C to 50 C)

Proportional band for room temperature control:
 Factory set, heating and cooling at: 2.0 F (1.1 C)

Digital input: Relay dry contact only across C terminal to DI1

Analog high limit and remote humidity inputs: 0 to 10 Vdc
 into 10KΩ input load

Contact output rating:
 Each relay output: (Y1, Y2, G, W1, W2 and AU)
 30 Vac, 1 Amp. maximum
 30 Vac, 3 Amp. in-rush

Humidification analog output rating:
 0 to 10 Vdc into 2KΩ resistance min.

Humidification analog output accuracy: ± 3% typical

Wire gauge: 18 gauge maximum, 22 gauge recommended

Dimensions: see Fig. 3.

Approximate shipping weight: 0.75 lb (0.34 kg)

Agency Approvals all models:
UL: UL 873 (US) and CSA C22.2 No. 24 (Canada), File
 E27734 with CCN XAPX (US) and XAPX7 (Canada)

Industry Canada: ICES-003 (Canada)
FCC: Compliant to CFR 47, Part 15, Subpart B, Class A (US)
**CE:** EMC Directive 89/336/EEC (Europe Union)
C-Tick: EN55022:2006, IEC 61326-1:2005

Agency Approvals wireless models
FCC: Compliant to: Part 15, Subpart C. This device complies
 with part 15 of the FCC rules. operation is subject to the fol-
 lowing two conditions: (1) this device may not cause harm-
 ful interference, and (2) this device must accept any
 interference received, including interference that may
 cause undesired operation.
Agency Approvals BACnet models
BTL
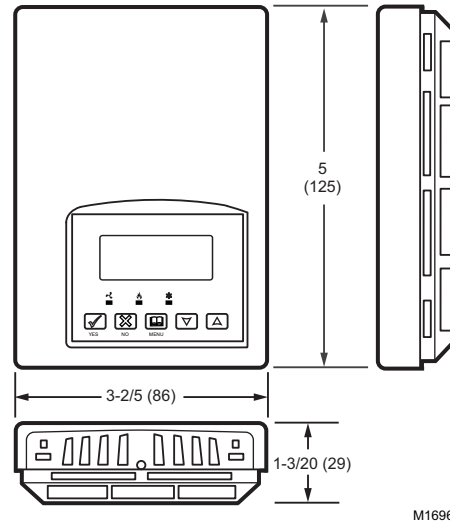
Fig. 3. Thermostat dimensions in inches (mm)

IMPORTANT

 *All TB7600 series controls are for use as operating
 controls only and are not safety devices. These
 instruments have undergone rigorous tests and veri-
 fications prior to shipment to ensure proper and reli-
 able operation in the field. Whenever a control failure
 could lead to personal injury and/or loss of property,
 it becomes the responsibility of the user/installer/
 electrical system designer to incorporate safety
 devices (such as relays, flow switch, thermal protec-
 tions, etc...) and/or alarm system to protect the entire
 system against such catastrophic failures. Tampering
 of the devices or miss application of the device will
 void warranty.*

Honeywell