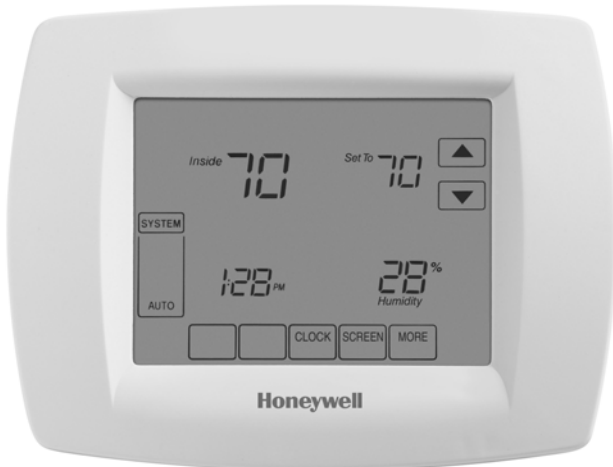


**Honeywell**

# BACnet® Fixed Function Thermostat

## FOR FAN COIL/HEAT PUMP/CONVENTIONAL SYSTEMS

**SPECIFICATION DATA**



### FEATURES

- 19 pre-loaded applications for a quick, out-of-the-box solution.
- Optional integrated wireless receiver saves wiring time and costs, provides more location options.
- Internal temperature and humidity sensors, 3 universal inputs, 6 relay outputs, 2 analog outputs.
- BACnet-compliant on MS/TP LAN at up to 76.8 Kbps with an internal DDC logic loop of 100 msec.
- A configurable device that is capable of stand-alone or integrated operation.
- Sleek sophisticated design with touch screen display with dual setpoints.

### DESCRIPTION

The BACnet FF thermostats are available in two models, as described in Table 1.

**Table 1. Thermostat Configurations.**

Thermostat Model	UI (Universal Input)	AO (Analog Output)	DO (Relay Output)	Integrated Wireless Receiver
TB3026B	3	2	6	NO
TB3026B-W	3	2	6	YES

Both thermostat models are configurable and come with 19 factory-loaded applications. The TB3026B-W includes an integral wireless receiver providing compatibility with wireless occupancy sensors.

### Equipment Control Options

- 2-Pipe Fan Coil, 4-Pipe Fan Coil, Water/Air Source Heat Pump, Roof Top Unit
- On/Off, Three Speed or VFD Controlled Fan
- Floating, Two-Position or Analog Cooling/Heating Valve Control
- On/Off Compressor and Heating Stages
- Floating or Analog Economizer Control
- Space, Outdoor or Supply Air Remote Sensors

### APPLICATION

The BACnet Fixed Function (BACnet FF) thermostats are configurable devices with 19 factory-loaded applications for specific and common projects including fan coil, heat pump and roof top equipment control.

The BACnet FF thermostats come in two models, the standard TB3026B and the wireless enabled TB3026B-W. Each model is a communicating, intelligent sensor-controller combination with built-in temperature and humidity sensors used to control the pre-loaded applications. They provide a cost effective solution for occupancy and crowd monitoring in hotel rooms, conference rooms, schools, office buildings and more. The large, easy-to-see display and easy-to-use interface allows for the complexity of direct digital control (DDC) in a user friendly package.

The BACnet FF thermostats communicate over an MS/TP LAN so each device operates as a fully functioning BACnet controller while easily integrating with the building automation system. These devices are configured using the Niagara Framework® software where a configuration wizard will enable an intuitive setup.



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31-00096-02

## SPECIFICATIONS

### Power

24VAC power from a UL Listed Class-2 24VAC transformer (not provided). The BACnet FF uses a half-wave rectifier to convert the AC power supply to onboard power. This enables multiple devices with half-wave power supplies to be powered from a single, grounded transformer.

### WARNING

**Half wave devices and full wave devices must not use the same AC transformer.**

You must maintain wiring polarity. Failure to do so can result in equipment damage.

If the HVAC equipment has an internal circuit board that is powered by the same transformer that will power the BACnet FF, verify that it is NOT full wave.

Min. Load = 17VA (all BOs OFF).

Max. Load = 89VA (all BOs ON).

If BO power jumper is not removed, then all BOs are powered from the controller's transformer.

Minimum load includes controller and analog outputs at full load (20mA into 500 Ohms).

All BOs are N.O. (Normally Open) contacts with a maximum switch rating of 24VAC @ 0.5A (12VA).

Maximum load assumes all 6 relay output loads are powered from the controller transformer and connected loads are the maximum allowed (24VAC @ 0.5A). Actual power requirements depend on connected loads.

### Wireless Receiver (TB3026B-W only)

433.92 Mhz; range is 50 feet.

### Inputs

3 universal inputs with 12-bit accuracy, providing controlled voltage, current and resistive modes. Requires a 10k type 2 thermistor when using remote sensors.

### Internal Sensors

1 internal temperature sensor, 0–120 deg. F (-17.8–48.9 deg. C); 1 internal humidity, 5–95% RH, non-condensing.

### Relay Outputs

6 relay outputs; normally open contacts with a maximum switch rating of 24VAC @ 0.5A (12VA). BO-0, BO-2 and BO-5 are powered from the controller transformer. BO-1, BO-3 and BO-4 are powered from control transformer through removable jumper, allowing these BOs to be powered from a separate power source.

### Universal Analog Outputs

2 outputs with 12-bit resolution. Each auto-detects for 0–10VDC or 4–20mA. 4–20mA outputs are sourced by the BACnet FF. Connected loads must return to the BACnet FF ground. The BACnet FF automatically switches from 0–10V mode to 4–20mA current mode when it detects a load value of less than 500 Ohms.

### Processor & Memory

Powerful 32-bit processor with extensive flash memory and RAM resources. Flash memory provides nonvolatile program and data storage, and allows for encrypted updates to the program for future product enhancements.

### Environmental

Residential, commercial and light-industrial environments. 0–120 deg. F (-17–49 deg. C). 0–95% RH, non-condensing.

### Communications

BACnet MS/TP LAN up to 76.8Kbps.

### Ratings

Listed Temperature Sensing Controls for US and Canada (XACX, XACX7 under UL 60730-2-9, CSA C22.2 No. 60730-2-9, File E481079.

EMC Directive (European CE Mark) EN 60950 (TB30326B-W model only).

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This Class B digital apparatus complies with Canadian ICES-003.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

## Communications

Each device uses a BACnet MS/TP communications port. The device's data is presented to other devices over a twisted-pair MS/TP network, which uses the EIA-485 signaling standard capable of the following baud rates: 9.6, 19.2, 38.4, or 76.8 kilobits per second (configured at global controller). The BACnet FFs are master devices on the

MS/TP network. Each BACnet FF device uses a high-quality EIA-485 transceiver and exerts 1/4 unit load on the MS/TP network.

Cabling should be selected that meets or exceeds the BACnet Standard which specifies the following: an MS/TP EIA-485 network shall use shielded, twisted-pair cable with characteristic impedance between 100 and 130 ohms. Distributed capacitance between conductors shall be less than 100 pF per meter (30 pF per foot). Distributed capacitance between conductors and shield shall be less than 200 pF per meter (60 pF per foot). Foil or braided shields are acceptable. The Honeywell tested and recommended MS/TP cable is Honeywell Cable 3322 (18 AWG, 1-Pair, Shielded, Low Cap, Plenum cable), alternatively Honeywell Cable 3251 (22 AWG, 1-Pair, Shielded, Plenum cable) is available and meets the BACnet Standard requirements ([www.honeywellcable.com](http://www.honeywellcable.com)).

The BACnet MS/TP network is polarity sensitive. The maximum BACnet MS/TP network Bus segment length is 4,000 ft. (1,219 m) using recommended wire. Repeaters must be used when making runs longer than 4,000 ft. (1,219 m). A maximum of three repeaters can be used between any two devices.

## MS/TP MAC Address

The MS/TP MAC address for each device must be set to a unique value in the range of 0-127 on an MS/TP network segment. The MAC address is set using the installer setup menu through the device's display. The factory default MAC address is 0.

## Device Instance Number

The Device Instance Number must be unique across the entire BACnet system network because it is used to uniquely identify the BACnet devices. It may be used to conveniently identify the BACnet device from other devices during installation. The Device Instance Number is set using the installer setup menu through the device's display or over the BACnet network. The Device Instance Number can be changed by the user, which may be necessary when integrating with a third party or when attempting to replace an existing device and it is desired to maintain the existing Device Instance Number. The factory default Device Instance Number is 0009999 and can range from 0-4194302.

NOTE: For complete instructions on how to set the MS/TP MAC address or set the Device Instance Number refer to the Installation Instructions, form 31-00093.

## Termination Resistors

Matched terminating resistors wired across MS/TP+ and MS/TP- are required at the last device on each end of the MS/TP segment for signal integrity.

Optimum segment performance typically requires "tuning," a process by which the value of the terminating resistors is selected based on the wave form of signals on the

segment. View wave forms using an industrial scope meter. The goal is to have as square a wave form as possible with an amplitude greater than 200 mV. Resistors affect the wave form as follows:

- When the resistance value decreases, the amplitude of the wave form decreases and becomes more square.
  - When the resistance value increases, the amplitude of the wave form increases and becomes less square.
- Typically, precision resistors in the range 80-130 Ohms (+1%) yield acceptable results. Ideally, the value of the terminating resistors should match the rated characteristic impedance of the installed cable. For example, if the installed

MS/TP cable has a listed characteristic impedance of 100 Ohm, install 100 Ohm matched precision resistors.

## Grounding MS/TP LAN Shield

Proper shield grounding of the MS/TP cabling can help minimize the risk of communications problems and damage to equipment because of transient voltage spikes (for example, lightning strikes).

Follow these guidelines for grounding MS/TP cable shields:

- Each MS/TP segment should have a single point of shield ground, preferably as close to the middle of the cabling run as possible.
- Do not ground the MS/TP shield using a BACnet FF terminal.
- Never ground both ends of a shield; differences in potential between the grounds may induce current on the shield, causing interference.
- At termination connecting points, tie the shield through with a wire nut.
- At ungrounded, exposed shield points (the end of a segment), tape back the shield to the wire jacket or, for optimum transient shunting, use 100 V gas discharge tubes or 120 V MOVs between shield and ground.

**Table 2. BACnet Interoperability Building Blocks (BIBBs) Supported.\***

DS-RP-A,B	DM-DOB-B
DS-RPM-B	DM-DCC-B
DS-WP-A,B	DM-PT-A,B
DS-WPM-B	DM-TS-B
SCHED-I-B	DM-UTC-B
DM-DDB-A,B	DM-RD-B

\* Refer to the PICS (Protocol Implementation Conformance Statement) for complete details, 31-00102.

## Accessories

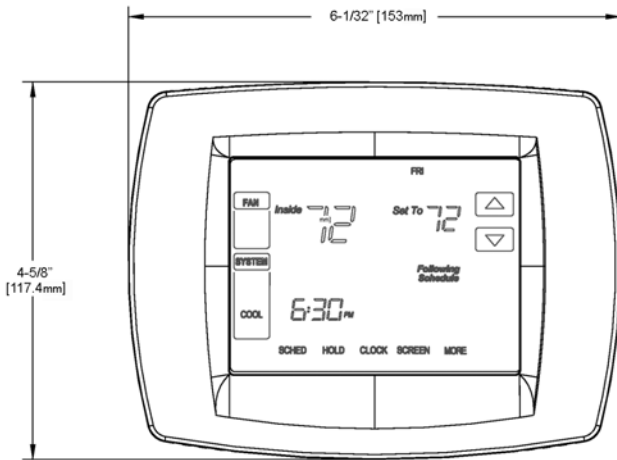
- 50037735-001 Wireless door/window sensor
- 50037736-001 Wireless passive infrared (PIR) motion sensor

## Mounting

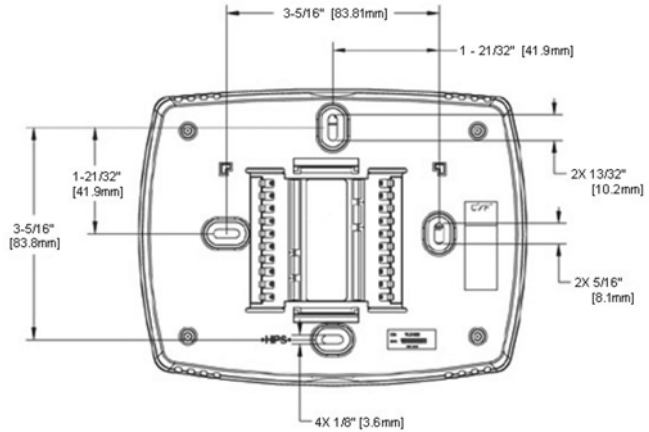
The thermostat consists of a front cover and back plate. The device is wired on the back plate where the terminals are located. Indicator arrows on the back plate will show the proper orientation of the device. To prevent damage during installation, align the pins on the front cover with the terminal blocks for proper assembly.

NOTE: The thermostat must be mounted in a position that allows clearance for wiring, servicing, and removal.

NOTE: For complete mounting information, refer to the Installation Instructions, form 31-00093.



**Fig. 1. BACnet FF thermostat front cover, dimensions in in. [mm].**



**Fig. 2. BACnet FF thermostat back plate, dimensions in in. [mm].**

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## Automation and Control Solutions

Honeywell International Inc.  
1985 Douglas Drive North  
Golden Valley, MN 55422  
customer.honeywell.com

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