

# BAST-221C-B2

## BACnet® MS/TP Thermostat

The BASstat series of BACnet-compliant wired communicating thermostats are BTL listed to ensure effortless integration into BACnet MS/TP (EIA-485) networks. These thermostats are suited for single or multi-stage heating, cooling and ventilation binary output control applications such as RTU or AHU. Configurable control algorithm parameters allow adaptability to the specific application. Adaptive control algorithm applied to multi-stage on/off control saves energy and ensures seamless comfort for the occupants. Built-in temperature sensor, input for remote temperature sensor, or temperature override network command from Building Automation System. Occupancy status can be set from thermostat buttons or over the BACnet network. Thermostat buttons are optionally lockable to prevent unauthorized control. Digital display with graphical icons is easy to read and understand. Several icons indicate parameters such as: Active Mode, Cooling stage 1 or 2, Heating stage 1 or 2, Ventilation Only, Fan Active, Occupied / Unoccupied state, and Clock icon to indicate Short Cycle Delay or Max Cycles per hour active waiting state. Four main control types are available: *Cooling and Heating with Auto-changeover*, *Cooling or Heating with Manual-changeover*, *Cooling only*, and *Heating only*. These control types are selectable from *Engineering Menu* (tyPE) or BACnet object MSV8.

### Installation

The BASstat requires **24 VAC** while drawing no more than 5 VA of power. The recommended conductor size is 16–18 AWG or up to 2x 1.5mm wires.

**WARNING:** Internally, this device utilizes a half-wave rectifier and therefore can only share the same AC power source with other half-wave rectified devices. Sharing AC power with full-wave rectified devices is NOT recommended. Devices powered from a common AC source could be damaged if a mix of half-wave and full-wave rectified devices exists.

The BASstat does not provide End-of-Line termination. If the BASstat is the first or last device on the MS/TP bus, a termination resistor (120Ω) must be applied across pins 16 and 17 of the EIA-485 input terminal to avoid network errors or failure.

BASstat mounts directly onto wall, panel, standard 65x65mm junction box (hole pitch 60 mm) or standard 2x4 inch vertical junction box (hole pitch 83.5 mm). To mount on electric box, separate back plate from the controller by loosening the screw. Align the mounting holes of the back plate to the screw holes of the electric box. Fix the back plate to the electric box using screws. Suggested screws for use are Phillips wide “truss head” or “washer head” screws #6-32 x 3/4” (20mm). Wire the controller and mount on top of back plate. Secure by tightening the mount screw at the bottom.

**WARNING:** DO NOT let the back-mount screw heads rise above the back plate or it may touch the circuit board and cause a short.

### Installation Guide

#### Electrical (Class 2 Circuits Only)

INPUT	<b>AC only</b>
Voltage (±10%):	24 VAC
Power:	5 VA
Frequency:	47-63 Hz

#### Environmental

Operating temperature:	0°C to 60°C
Storage temperature:	-40°C to +85°C
Relative humidity:	10–95%, non-condensing

#### Functional

Physical Layer:	<b>MS/TP</b> EIA-485
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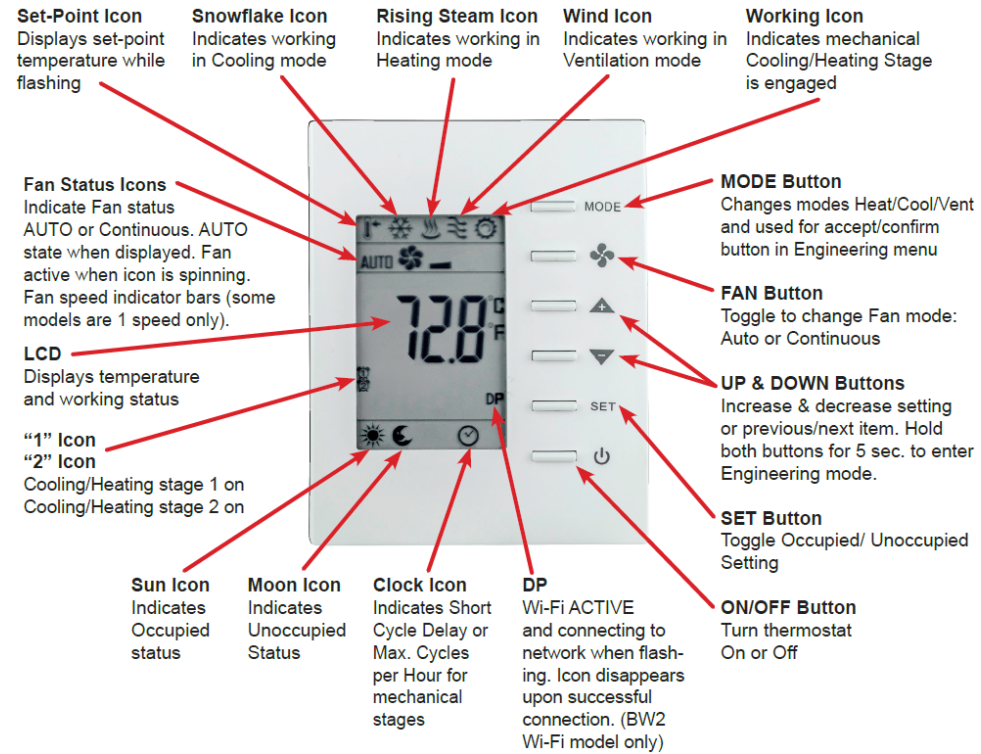
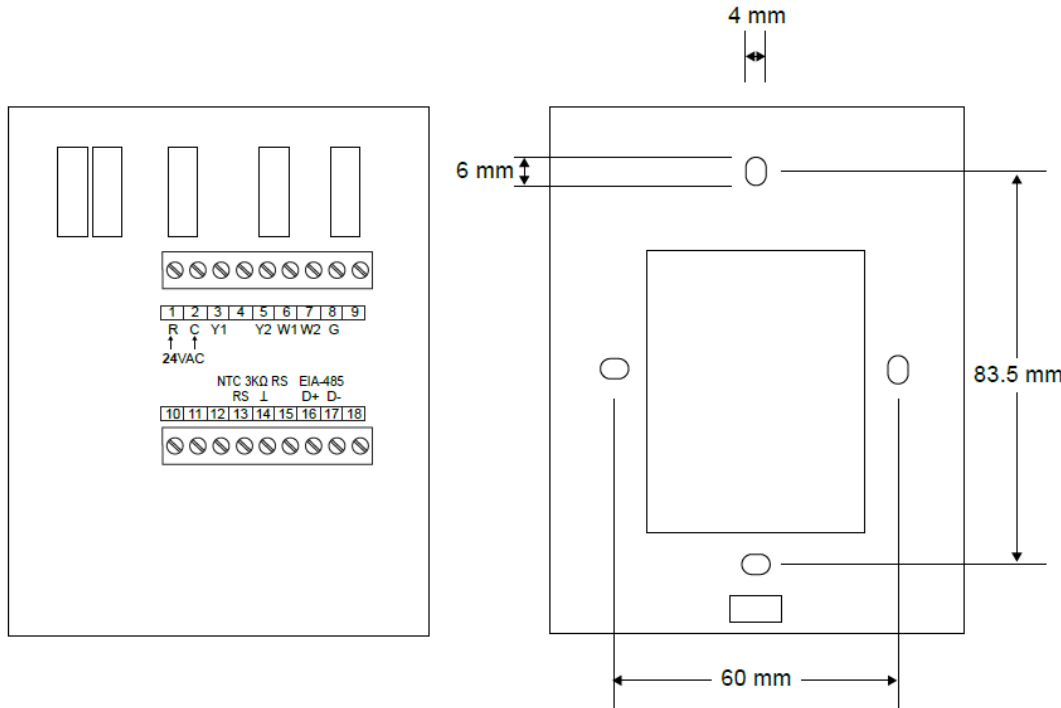
Cable length limit:	4000 ft / 1200 m @76800 bps max
MS/TP data rate (bps):	9600 – 76800 bps
MS/TP node limit:	32 full-load devices max per segment



BACnet MS/TP configuration requires setting the baud rate (9.6kbps – 76.8kbps) or using the default baud rate of 38.4kbps. A unique MS/TP MAC address is required to distinguish each thermostat from other MS/TP devices on the bus (default MAC address is 1).

When more than one BASstat is installed at the same time on the same EIA-485 bus, their MAC addresses must be configured prior to communicating with all thermostats on the MS/TP bus, or communication will fail due to duplicate MAC addresses. The MAC address can be set from Engineering Menu item (Addr) with values of 1 - 127. The baud rate can be set from menu item (bAud) 9.6kbps – 76.8kbps. A unique Device Instance number throughout the entire BACnet internetwork is also required to distinguish the device from all other BACnet devices. Device instance can be modified in Engineering Menu items (dEVH) – high bytes and (dEVL) – low bytes;  $Device\ Instance = (dEVH) * 1000 + (dEVL)$ . Max masters setting can be set from menu item (AdrH), default value is 127.

To enter the *Engineering Menu*, hold down the *UP* and *DOWN* buttons simultaneously for 5 seconds. Use the *UP* and *DOWN* buttons to navigate through the menu and change menu item values. Use the *MODE* button to enter a menu item and accept/confirm a selected value. To exit the Engineering Menu, navigate to menu item (End) and press *MODE*, or the menu will exit automatically when not used.



The BASstat has a built-in space temperature sensor with provision for remote wired 3kΩ NTC thermistor sensor or temperature value can be sent by another device over the BACnet network.

The default control type is *Cooling and Heating with Auto-changeover*. Four main control types are available: *Cooling and Heating with Auto-changeover*, *Cooling or Heating with Manual-changeover*, *Cooling only*, and *Heating only*. These control types are selectable from *Engineering Menu* (tyPE) or BACnet object *MSV8*.

User-side comfort control is accomplished with six buttons – mode (*Heat, Cool, or Ventilation* – dependent on control type chosen from *Engineering Menu* (tyPE) or BACnet object *MSV8*), fan, raise, lower, set, and power. There are also options to lock select buttons or all buttons on the thermostat. A large LCD display indicates setpoint, space temperature and current mode of operation using graphical icons.

By default, the BASstat thermostat will not provide *Fan* output signal when in *Heat Mode* since most HVAC comfort systems provide their own *Fan* control signal based on a delay after a call for heating. This can be configured from *Engineering Menu* item (F-Ht) or BACnet object *BV15* with a default value of 0. To enable *Fan* control signal output for heating, set this value to 1.

**Reset settings** can be performed from Engineering Menu item (rSt) which will reset all parameters including communication (MAC and Device Instance) and all control algorithm values back to factory-programmed defaults.

For complete datasheet and details on BASstat, support, or compliance information, please download our BASstat User Manual and Data Sheet at:  
<https://www.ccontrols.com/basautomation/basstat.php>