BBGE Series

BACnet MS/TP to BACnet-over-Ethernet (BACnet TCP/IP) Gateways for NT800/NT900 Series BACnet MS/TP Networking Room Thermostats

General

The BBGE Series BACnet MS/TP to BACnet-over-Ethernet (BACnet TCP/IP) gateways route communication traffic between BACnet MS/TP network trunks and BACnet TCP/IP network, which is accessible via an Ethernet port.

The gateways are pre-loaded with a BACnet program, become masters to the connected slave devices and communicate using the BACnet MS/TP protocol on RS-485 network trunks.

Each gateway is available with one RS-485 network trunk. This network trunk can support up to 64 Mega Controls NT800/NT900 Series BACnet MS/TP thermostats. The gateway spontaneously detects the presence of devices that go online in its NET 1 network. These devices must be either NT800 Series or NT900 Series and can be mixed in the same network trunk.

Mounting

It is strongly recommended to mount the gateway inside a metal cabinet for EMI shielding protection, with 2 or 4 screws or rack-mounted in a DIN rail.

Ordering

To order, specify the complete gateway model number.

Specifications

Gateway model number	BBGE-1	BACnet-over-Ethernet gateway for Mega Controls NT800/NT900 Series
Power requirements	Voltage	22-28 V 50/60 Hz or 16-30 VDC
	Current	Maximum 200 mA
Technology	CPU	32-bit ARM at 48M clock
	ROM	256 kB Flash
	RAM	64 kB SRAM
	EEPROM	2 kB
Ethernet communication port	Physical	10Base-T via RJ-45 phone jack
	Protocol	BACnet-over-Ethernet in compliance with ISO-8802-3
	Indicators	Link - red LED on when Ethernet cable plugged in and communicating Speed - red LED flashes to indicate data speed FDX - green LED on at full duplex transmission and off at half duplex
	Device MAC address	Set via DIP switches
	Maximum number	16 BBGE gateways in one BACnet platform
	Service supported	WhoIs, ReadProperty, ReadPropertyMultiple, WriteProperty
	Objects supported	Device, Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Multi-State Input, Multi-State Output
NET 1 communication port	Physical	RS-485 with opto-coupler Isolation
	Baud rate	Field selectable 9600, 19200, 38400 or 76,800 bps set via DIP switches (factory set 38,400 bps)
	Protocol	BACnet MS/TP
	Indicators	Red LED for data receiving and green LED for data transmitting
	Device address	Always 0
	Maximum number	Maximum 64 devices and maximum 1,000 m cable length per network trunk; only 32 devices allowed at 76,800 bps baud rate; a repeater is required required when cable length exceeds 1,000 m
	Service supported	WhoIs, ReadProperty, ReadPropertyMultiple, WriteProperty
	Objects supported	Device, Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Multi-State Input, Multi-State Output
	Object names	Static
Ambient/storage temperature limits	0 to 55 °C / -30 to 50 °C, 10 to 90% RH Non-condensing	
Wiring class	Class II for 24 VAC Power Supply	
Connectors	Removable screw-type terminal connectors	
Power wires	Wire size 1 mm^2 or 18 AWG solid copper recommended	
Ethernet communication wires	Cat 5e cable (twisted pairs)	
NET 1 communication wires	Balanced 100 to 120 Ω nominal Impedance twisted shielded pair (TSP) cable	
Shipping weight	0.25 kg (1 lb)	
Dimensions	110 x 155 x 60 mm (W x L x D)	

The performance specifications above are nominal and subject to tolerances and application variables of generally acceptable industry standards. The manufacturer shall not be liable for damages resulting from misapplication or misuse of its products.

Language and Gateway Instance ID Setup Procedure

System Setting Objects
There are 2 objects for system setup defined as:

Object Name	Object	Value	Unit	Object Type	Read/Write	Priority Array
*** SYS SELECT	10123.AV1	*1	None	Analog Variable	R/W	None
*** SYS VALUE	10123.AV2	*1	None	Analog Variable	R	None

Note: *1 System setting can be changed by writing value to * SYS SELECT.**

Write property value to ***SYS SELECT	Function Description
2012	**Change all descriptions to CHINESE**. New setting will take effect after entering a restart command 3003 followed by reloading descriptors at the BBGE Manager.
2014	**Change all descriptions to ENGLISH**. New setting will take effect after entering a restart command 3003 followed by reloading descriptors at the BBGE Manager. Factory setting is **ENGLISH**.
3003	Restart
2004	**To set device instance ID.** This is a two-step operation: after writing 2004 to ***SYS SELECT, wait until *** SYS VALUE changes to –1, then write an integer 'n' (where 0≤n≤12799) to ***SYS SELECT. Assuming the DIP switches' MAC address is set as 'm', the device instance ID is 'n*100 + m'. New setting will take effect after entering a restart command 3003 followed by a discovering new devices command at the BACnet workstation.
Notes:	After all new entries have taken into effect, the new data will be saved to the EEPROM. Power restart will resume all data saved before power failure.

Gateway MAC Addressing
The DIP switch is a binary switch. Each individual DIP switch represents a unique value, which forms the gateway MAC address when added together. To set the address, simply move the switches that add up to the gateway's desired address to the ON position.
Example: If the gateway is to be address 7 on the network, set the switches numbered 1, 2 and 4 (equals 7) to the ON position.

Default Network IP Addressing (DNA)
The DNA DIP switch is set by factory default to a network IP address of 192.168.10.32 at ON position.

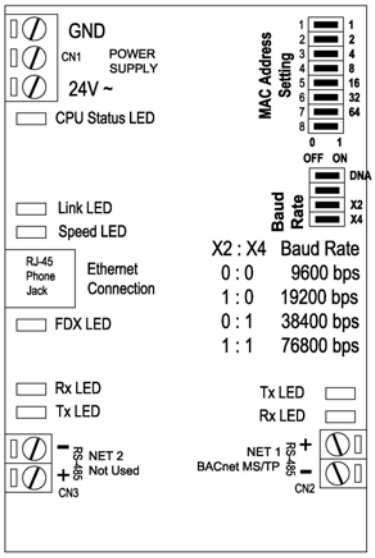
Gateway Baud Rate Setting
Make sure that the baud rate of the BACnet MS/TP devices are set to match the NET 1 network trunk baud rate.
Example: If the BACnet MS/TP devices baud rates are 38,400 bps, set the DIP switches X2 and X4 to OFF and ON respectively.

Auto Detect of BACnet MS/TP devices connected to NET 1 Network Port
When the gateway is powered up first time and initialized, it will automatically detect the model numbers of BACnet MS/TP devices connected to NET 1 port, wait for response from these devices and implement communication based on the model numbers discovered. The device model numbers supported by the gateway are those covered by the NT800/ NT900 Series.
Note: The NET 1 port must be connected to devices of the same series or type. Its network trunk supports up to 64 BACnet MS/TP devices in one gateway. NT800 Series and NT900 Series are treated as the same type of devices and can be mixed in the same network trunk.

Network, Cabling and Step-down Transformer Requirements
To ensure network stability and reliable communications, it is imperative that the following network and cabling requirements are adhered to:

Item	Description
Network Trunk Cabling	It is recommended to use networking cabling that matches the following specifications: • Balanced 100 to 120 ohms nominal impedance, 22 or 24 AWG Twisted Shielded Pair (TSP) Cable • Nominal capacitance of 52 pF/m or lower • Nominal velocity of propagation of 66% or higher • Terminating the shield to ground at one end only for each isolated segment will prevent ground loops in the shield and drain RF energy to ground. Grounding at the BACnet router or controller is preferred.
10Base-T Cabling	Cat 5e cable with twisted pairs are recommended.
Topology	Ensure the BACnet MS/TP network cable is installed as a daisy chain from one device to the next.
Maximum Nodes	The maximum number of devices is 64 per BACnet MS/TP network trunk.
Terminator	A terminator of 120-ohm impedance must be installed at each end of a BACnet MS/TP network. Ensure that this requirement is not overlooked in laying out the network architecture and when ordering product.
Cable Shielding	Use a shielded, twisted pair cable for communications. Never directly ground wire in more than one point on the shield. Doing so can induce large currents and result in communication problem.
Repeater	A repeater is not necessary unless the BACnet MS/TP network trunk exceeds 1,000 m.
Step-down Transformer	A separate isolated double-wound transformer is recommended for supplying 24 VAC power to each gateway.

Termination Diagram



Dimensions in mm