



# VH7200 Humidistat Series For Humidification & Dehumidification Control For Commercial HVAC Applications

## BACnet Integration Manual ITG-VH72xx-BAC-E00

(028-6017\_R0 Issue Date: October 21, 2008)



## Product Overview

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The VH7200 humidity controller family is specifically designed for control of humidification and dehumidification equipment such as steam header direct injection, desiccant wheel, or stand alone humidification / dehumidification equipment. The product features a complete embedded humidity control solution with an intuitive backlit LCD display that walks the installer through the configuration steps, making the process extremely simple. Accurate relative humidity control is achieved due to the product's unique PI time proportional control algorithm, which virtually eliminates humidity offset associated with traditional, differential-based humidity controllers.

All models contain a binary input, which can be set by the user to monitor an electrode humidifier canister service status or may be used as a general purpose service indicator. Models are available which contain more advanced features such as discharge humidity proportional high limit, and indoor humidity setpoint reset based upon outdoor air temperature to conserve energy and eliminate condensation on windows and structure.



Fig.1 VH7200 series humidistat

The additional following documentation is available on [www.viconics.com](http://www.viconics.com)

- Detailed information on the humidistat (VH72xxX1000x), is available on document: *LIT-VH72x0-Exx.doc*

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## VH72XX series Protocol Implementation Conformance Statement (PICS) \_\_\_\_\_

**Vendor Name:** Viconics

**Vendor ID:** 140

**Product Name:** VH72XX Humidistat Series

Product Model Number: VH7270K1000B, VH7270F1000B and VH7200A1000B

### **Product Description:**

The VH72xx series BACnet communicating humidistat have been specifically designed for humidifier and dehumidifier applications to be monitored on a BACnet MS-TP® network.

### **Supported BACnet Services**

The BACnet communicating humidistat meets all requirements for designation as an Application Specific Controller (B-ASC). The BACnet humidistat series supports the following BACnet Interoperability Building Blocks (BIBBs).

<b>Application Service</b>	<b>Designation</b>
Data Sharing – Read Property - B	DS-RP-B
Data Sharing – Read Property Multiple - B	DS-RPM-B
Data Sharing – Write Property - B	DS-WP-B
Device Management - Device Communication Control - B	DM-DCC-B
Device Management – Dynamic Device Binding - B	DM-DDB-B
Device Management – Dynamic Object Binding - B	DM-DOB-B

**Note 1:** The humidistat does not support segmented requests or responses.

## Device Object Table

Object Name	Type and Instance	Object Property	Humidistat Parameter
VH72xxX1000B	Device	Object_Identifier Property 75 (R,W)	Unique ID number of a device on a network
		Object_Name Property 77 (R,W)	Unique name of a Device on a network
		Model Name Property 70 (R)	Humidistat Model number
		Firmware Revision Property 44 (R)	Current BACnet firmware revision used by the humidistat
		Protocol Version Property 98 (R)	Current BACnet firmware protocol version Default is Version 1
		Protocol Revision Property 139 (R)	Current BACnet firmware protocol revision Default is Version 2
		Max ADPU Length Property 62 (R)	Maximum ADPU Length accepted Default is 244
		ADPU Timeout Property 10 (R)	ADPU timeout value Default is 60 000 ms
		Application-Software-Version Property 12 (R)	Humidistat base application software version Default is based on current released version
		Max_Master (R,W)	Maximum master devices allowed to be part of the network. 0 to 127, default is 127
		MS/TP_Address Property 1001 (R,W)	BACnet MS-TP MAC Address. Proprietary attribute. Default is as assigned by configuration
		MS/TP_Baud_Rate Property 1002 (R,W)	BACnet MS-TP Baud-Rate. Proprietary attribute. Range is: 1 = 9.6 KBps, 2 = 19.2 KBps, 3 = 38.4 KBps, 4 = 76.8 KBps and 5 = Auto Baud Rate. Index 5 is <i>Write only</i> . Reading attribute will state current Baud rate used. Writing index 1 to 4 will fix the Baud rate to the desired value.

**Objects Table**

Object Name	Type and Instance	Object Property	VH7200A1000B	VH7270F1000B	VH7270K1000B
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Room Temperature	AV 7	Present_Value (R,W)	√	√	√
Room Temp Override	BV 8	Present_Value (R,W)	√	√	√
Outdoor Temperature	AV 9	Present_Value (R,W)	√	√	√
Outdoor Temp Override	BV 10	Present_Value (R,W)	√	√	√
Sequence of Operation	MV 11	Present_Value (R,W)	√	√	√
System Mode	MV 12	Present_Value (R,W)	√	√	√
Keypad Lockout	MV 13	Present_Value (R,W)	√	√	√
Room Humidity	AV 14	Present_Value (R)	√	√	√
Supply RH	AI 15	Present_Value (R)		√	√

Control Output	GRP 16	Present_Value (R)	√	√	√
Humidification Demand	AV 17	Present_Value (R)	√	√	√

Controller Status	GRP 18	Present_Value (R)	√	√	√
Dehumidification Output Status	BI 19	Present_Value (R)	√	√	√
Humidification Output Status	BI 20	Present_Value (R)	√		√
BI Status	BI 21	Present_Value (R)	√	√	√
Humidifier Output	AV 22	Present_Value (R)		√	√

Controller Alarms	GRP 23	Present_Value (R)	√	√	√
Canister Alarm	BI 24	Present_Value (R)	√	√	√
Service Alarm	BI 25	Present_Value (R)	√	√	√

Object Name	Type and Instance	Object Property	VH7200A1000B	VH7270F1000B	VH7270K1000B
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Humidity Setpoints	GRP 26	Present_Value (R)	√	√	√
Dehumidification RH Setpoint	AV 27	Present_Value (R,W)	√	√	√
Humidification RH Setpoint	AV 28	Present_Value (R,W)	√	√	√
Eff (Effective) Reset Humidification RH Spt (Setpoint)	AV 29	Present_Value (R)	√	√	√
Humidification High Limit Spt (Setpoint)	AV 30	Present_Value (R,W)		√	√

General Options 1	GRP 31	Present_Value (R)	√	√	√
Temperature Scale	BV 32	Present_Value (R,W)	√	√	√
Dehumidification Setpoint Limit	AV 33	Present_Value (R,W)	√	√	√
Humidification Setpoint Limit	AV 34	Present_Value (R,W)	√	√	√
Menu Scroll	BV 35	Present_Value (R,W)	√	√	√

General Options 2	GRP 36	Present_Value (R)	√	√	√
BI Configuration	MV 37	Present_Value (R,W)	√	√	√
Dehumidification CPH	MV 38	Present_Value (R,W)	√	√	√
Humidification CPH	MV 39	Present_Value (R,W)	√		√
Dehumidification Low OA Lockout	AV 40	Present_Value (R,W)	√	√	√
Humidification High OA Lockout	AV 41	Present_Value (R,W)	√	√	√
High Limit Hysterisys	AV 42	Present_Value (R,W)			√
Low RH Setpoint	AV 43	Present_Value (R,W)	√	√	√
Low Temp Reset RH Setpoint	AV 44	Present_Value (R,W)	√	√	√
High Temp Reset RH Setpoint	AV 45	Present_Value (R,W)	√	√	√

## Standard Object Types Supported

Object Type	Supported Objects	Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
Analog Input	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reliability	Out_of_Service
Analog Value	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reliability	Present_Value <sup>a</sup> Out_of_Service <sup>a</sup> Object_Name <sup>b</sup>
Binary Input	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reliability Active_Text Inactive_Text	Out_of_Service
Binary Value	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reliability Active_Text Inactive_Text	Present_Value Out_of_Service
Device	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max_Master Max_Info_frames	Object_Identifier Object_name Max_Master
Group	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A
Multi-state Value	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reliability States_Text	Present_Value Out_of_Service
Schedule	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Weekly_schedule	Present_Value Weekly_Schedule

a: The following AV's are defined as read only. When Out\_of\_Service properties is set to true, the Present\_Value if written is not derived to the application level of the humidistat.

- Room Humidity (AV14)
- Humidification Demand (AV17)
- Eff Reset Humidification RH Spt (AV29)
- Humidifier Output (AV22)

b: Object\_Name property is writable for 1 object only :

- Room\_Temperature (AV7)

## List of Proprietary Properties

Property name	ID	BACnet Data type	Description
Major_Version	1000	CharacterString	The version number of the BACnet communications module. This the hardware version number
MS/TP_Address	1001	Unsigned	Display the MAC layer address of the module
MS/TP_Baud_Rate	1002	Unsigned	Display the communication baud rate of the module
Sensor_Offset	1005	REAL	Display the temperature or humidity calibration value. The range is -5.0 deg F to 5.0 deg F for a temperature and -15% to 15% for humidity.

**List of Property Value Range Restrictions for AI and AV objects**

Object name	Object Type and instance	Under range value	Over range value	Default value
Room Temperature	AV 7	-40°F (-40°C)	122°F (50°C)	N/A
Outdoor Temperature	AV 9	-40°F (-40°C)	122°F (50°C)	N/A
Room Humidity	AV 14	0%	100%	N/A
Supply RH	AI 15	0%	100%	N/A
Humidification Demand	AV 17	0%	100%	0%
Humidifier Output	AV 22	0%	100%	0%
Dehumidification RH Setpoint	AV 27	15%	95%	70%
Humidification RH Setpoint	AV 28	10%	90%	50%
Eff (Effective) Reset Humidification RH Spt (Setpoint)	AV 29	0%	100%	N/A
Humidification High Limit Spt (Setpoint)	AV 30	50%	90%	85%
Dehumidification Setpoint Limit	AV 33	15%	95%	15%
Humidification Setpoint Limit	AV 34	10%	90%	90%
Dehumidification Low OA Lockout	AV 40	-40°F (-40°C)	122°F (50°C)	-40°F (-40°C)
Humidification High OA Lockout	AV 41	-15°F (-26°C)	120°F (49°C)	120°F (49°C)
High Limit Hysterisys	AV 42	2%	20%	5%
Low RH Setpoint	AV 43	10%	90%	20%
Low Temp Reset RH Setpoint	AV 44	-40°F (-40°C)	15°F (-9.5°C)	-20°F (-29°C)
High Temp Reset RH Setpoint	AV 45	20°F (-6.5°C)	55°F (13°C)	32°F (0.0°C)

**List of Property Enumeration Sets for BI and BV objects**

Object Name	Object Type and instance	Inactive_Text	Active_Text	Default value
Room Temp Override	BV 8	Normal	Override	Normal
Outdoor Temp Override	BV 10	Normal	Override	Normal
Dehumidification Output Status	BI 19	Off	On	Off
Humidification Output Status	BI 20	Off	On	Off
BI Status	BI 21	Activated	Not Activated	Not Activated
Canister Alarm	BI 24	Off	On	Off
Service Alarm	BI 25	Off	On	Off
Temperature Scale	BV 32	°C	°F	°F
Menu Scroll	BV 35	No Scroll	Scroll Active	Scroll Active



List of Property Enumeration Sets for MV Objects

Object Name	Object Type and instance	BACnet Index	Text	Default value
Sequence Of Operation	MV11	1	Ahu	Model dependent
		2	2Phu	
		3	2Pdh	
		4	Ahu 2Pdh	
		5	2Phu2Pdh	

Not all indexes are supported by all models of humidistat. Supported sequences of operation are as table below:

Viconics number	VH7200A1000B	VH7270F1000B	VH7270K1000B
1 = Ahu	Not used	x	x
2 = 2Phu	x	Not used	x
3 = 2Pdh	x	x	x
4 = Ahu 2Pdh	Not used	x	x
5 = 2Phu2Pdh	x	Not used	x

Object Name	Object Type and instance	BACnet Index	Text	Default value
System Mode	MV12	1	Off	Sequence of operation dependent
		2	Auto	
		3	Humidification	
		4	Dehumidification	

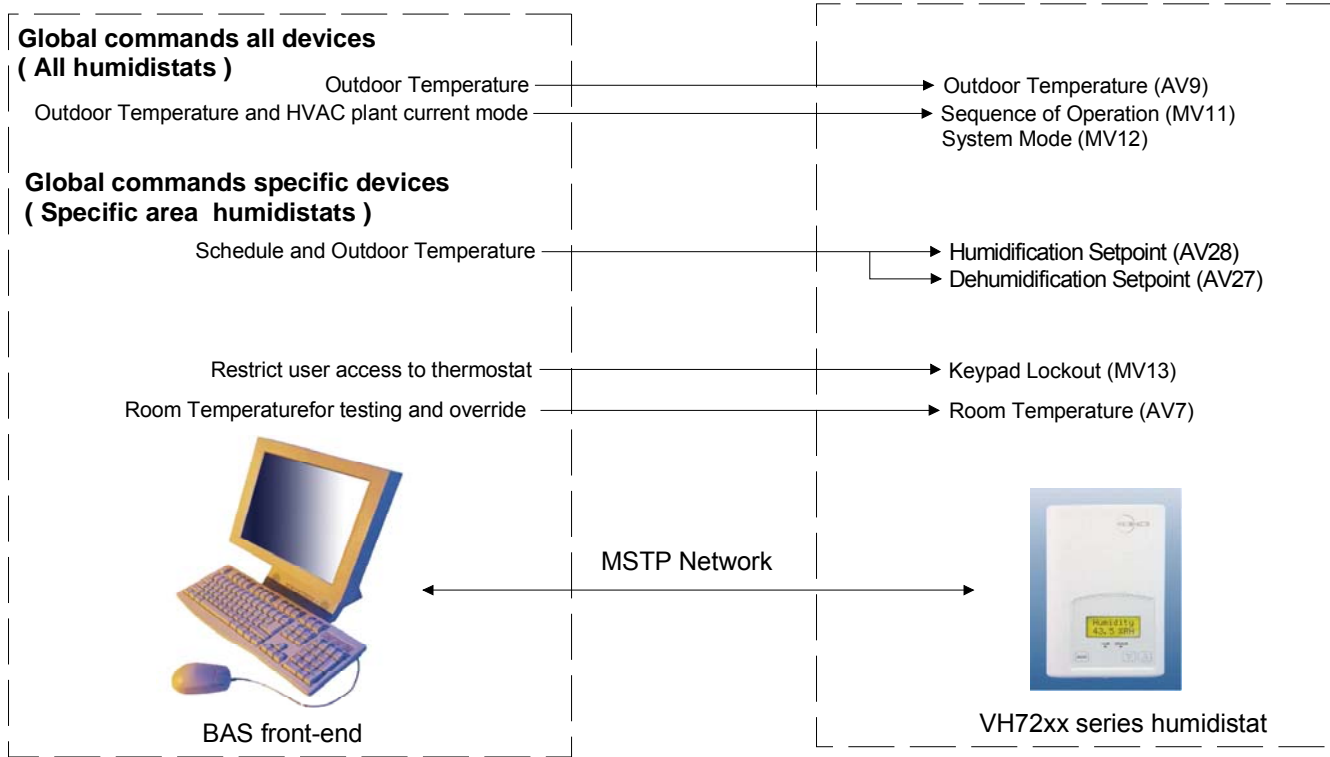
Available and supported indexes for MV12 is dependent on current sequence of operation MV11

MV11	MV11 Selected sequence of operation	MV12 System modes available	MV12 Default mode
1 = Ahu	0-10V Analog humidification only	Off - Humid	Humid
2 = 2Phu	2 position On-Off humidification	Off - Humid	Humid
3 = 2Pdh	2 position On-Off dehumid only	Off - Dehumid	Dehumid
4 = Ahu 2Pdh	Analog humidification & 2 position On-Off dehumidification	Off – Humid – Dehumid - Auto	Auto
5 = 2Phu2Pdh	2 position On-Off humidification & 2 position On-Off dehumidification	Off – Humid – Dehumid - Auto	Auto

Object Name	Object Type and instance	BACnet Index	Text	Default value
Keypad Lockout	MV13	1	Level 0	Level 0
		2	Level 1	
BI Configuration	MV37	1	None	None
		2	<i>Not Used</i>	
		3	<i>Not Used</i>	
		4	Canister	
		5	Service	
Dehumidification CPH	MV53	1	3 CPH	4 CPH
		2	4 CPH	
		3	5 CPH	
		4	6 CPH	
		5	7 CPH	
		6	8 CPH	
Humidification CPH	MV54	1	3 CPH	4 CPH
		2	4 CPH	
		3	5 CPH	
		4	6 CPH	
		5	7 CPH	
		6	8 CPH	

## Integration – Global Commands

The following figure shows, which objects from the humidistat, can be monitored and commanded from the BAS front-end.



**Global Command Control Level**

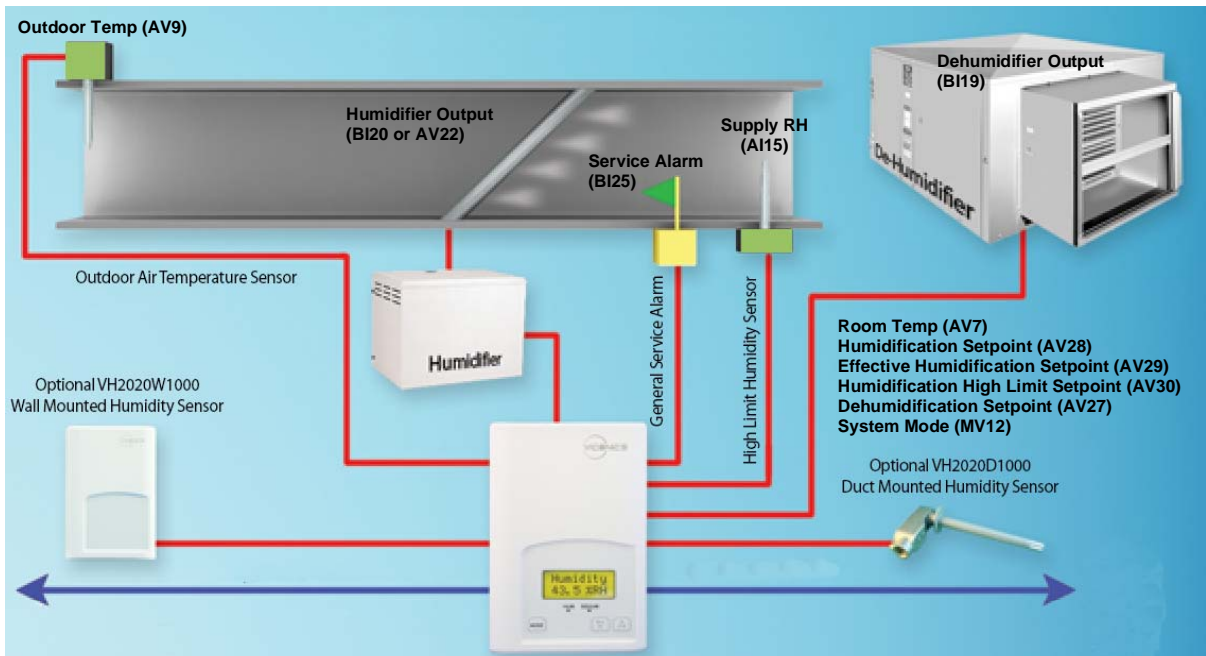
**Device Level**

Figure 1: Global commands from a BAS front-end to a VH72XX series humidistat

## Integration – Typical Graphic User Interface (GUI) Objects

The following objects should be typically used in a GUI:

- Room Temperature (AV7);
- Room Humidity (AV14);
- Supply Humidity (AI15)
- Humidification and Dehumidification Setpoints (AV 27 and AV28);
- Effective Humidification Setpoint (AV29)
- Humidification High Limit Setpoint (AV30)
- Outdoor Temperature (AV9);
- Effective Occupancy (MV34);
- Sequence of Operation (MV11);
- System Mode (MV12);
- Humidification Demand (AV17);
- Humidifier Output (AV22);
- Dehumidification Output Status (BI19);
- Humidification Output Status (BI20);
- BI 1 Status (BI21);
- Service Alarm (BI25) (if available);
- Canister Alarm (BI24) (if available);



Typical GUI for a VT7200F1000B Humidistat

## Configuration Objects

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The following objects and group objects should be typically used for configuration purposes:

- General Options 1 Group GRP 31 and its complete list of objects;
- General Options 2 Group GRP 36 and its complete list of objects;

If your BAS allows you to remove objects from your database, Viconics recommends removing all configuration objects once your setup is complete. This will prevent unnecessary polling of non used objects and will help speed up the network.

## Wiring guide

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### Overview

Viconics uses EIA-485 as the physical layer between their devices and supervisory controllers

For clarity we will use the term “Device” to represent any product with an active EIA-485 network connection, including Viconics and non-Viconics controllers.

### Summary Specifications:

Parameter	Details
Media	Twisted pair 22AWG-24 AWG, shielded recommended
Characteristic Impedance	100-130 ohms
Distributed capacitance	Less than 100 pF per meter (30 pF per foot)
Maximum length per segment	1200 meters (4000 feet) Note: AWG 18 cable
Polarity	Polarity sensitive
Multi-drop	Daisy-chain (no T connections)
Terminations	<ol style="list-style-type: none"><li><b>Viconics’ devices are installed at both ends of the MSTP network:</b> 120 Ohms resistor should be installed at each end.</li><li><b>A Viconics device is installed at one end of the MSTP network and a 3<sup>rd</sup> party device is installed at the other end:</b> Install an End-Of-Line resistor value that matches the 3<sup>rd</sup> party device instruction regarding the End-Of-Line resistors</li><li><b>3<sup>rd</sup> party devices are installed at both ends of the MSTP network:</b> Follow the 3<sup>rd</sup> party device instructions regarding the End-Of-Line resistors.</li></ol>
Network Bias Resistors	510 ohms per wire (max. of two sets per segment)
Maximum number of nodes per segment	64 (Viconics devices only)
Maximum number of nodes per network	128
Baud rate	9600, 19200, 38400, 76800 (Auto detect)

**Table 1: Summary of Specifications for a Viconics’ EIA-485 Network**

## Cable Type

Viconics recommends the use of balanced 22-24 AWG twisted pair with a characteristic impedance of 100-130 ohms, capacitance of 30 pF/ft or lower. A braided shield is also recommended.

## Impedance

A value based on the inherent conductance, resistance, capacitance and inductance that represent the impedance of an infinitely long cable. The nominal impedance of the cable should be between 100Ω and 120Ω. However using 120Ω will result in a lighter load on the network.

## Capacitance (pF/ft)

The amount of equivalent capacitive load of the cable, typically listed in a per foot basis. One of the factors limiting total cable length is the capacitive load. Systems with long lengths benefit from using low capacitance cable (i.e. 17pF/ft or lower).

## Network Configuration

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EIA-485 networks use a daisy chain configuration. A daisy chain means that there is only one main cable and every network device is connected directly along its path.

Figure 3 illustrates two improper network configurations and the proper daisy chain configuration.

Other methods of wiring an EIA-485 network may give unreliable and unpredictable results. There are no troubleshooting methods for these types of networks. Therefore, a great deal of site experimentation may have to be done, making this a difficult task with no guarantee of success. Viconics will only support daisy chain configurations.

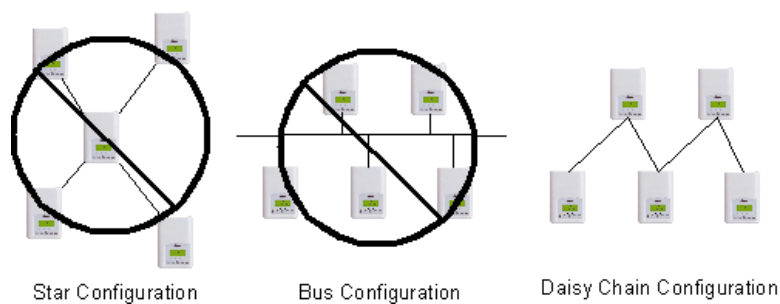


Figure 3: Three different network configurations: star, bus, and daisy chain. Only the daisy chain configuration is correct for an EIA-485 network.

## Maximum Number of Devices

A maximum of 64 nodes is allowed on a single daisy chain segment. A node is defined as any device (Panel, Zone, Repeater, etc) connected to the RS485 network. Terminators do not count as a node.

To determine the number of nodes on a network, add the following:

- One node for each device, including main panels
- One node for each repeater on the chain

For the example in Figure 4, we have one node for the main Panel, plus 4 for the controllers, for a total of 5 nodes.

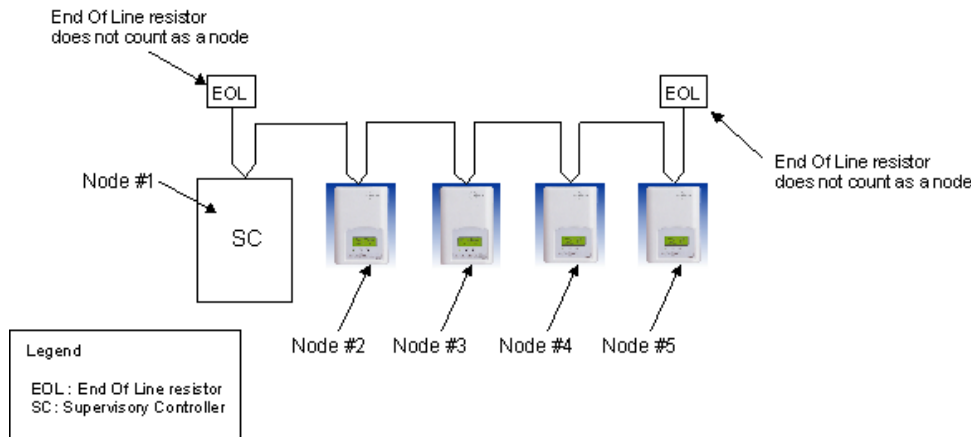


Figure 4: Five nodes network example.

If you have more than 64 devices, then repeaters are required to extend the network.

## Maximum Cable Length

The maximum length of a chain is related to its transmission speed. The longer the chain, the slower the speed. Using proper cable, the maximum length of an EIA-485 daisy chain is 4000-ft (1200 m). This will only work reliably for data rates up to 100,000 bps. Viconics' maximum data rate is 76,800 bps.

If you require a maximum network length of more than 4000 feet, then repeaters are required to extend the network.

## EIA-485 Repeaters

If you have more than 64 devices, or require a maximum network length of more than 4000 feet, then repeaters are required to extend the network. The best configuration is to daisy chain the repeaters to the main panel. From each of these repeaters, a separate daisy chain will branch off. Figure 5 demonstrates a valid use of repeaters in an EIA-485 network.

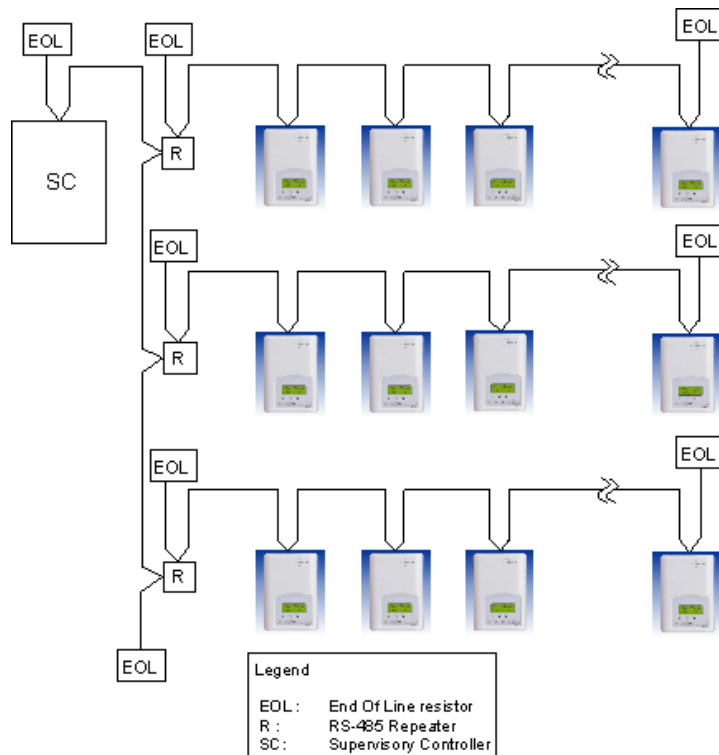


Figure 5: Correct usage – repeaters are daisy chained to the supervisory controller and separate daisy chains branch from each repeater.

Do not install repeaters in series, as this may result in network reliability problems. Figure 6 demonstrates an incorrect use of a repeater in an EIA-485 network.

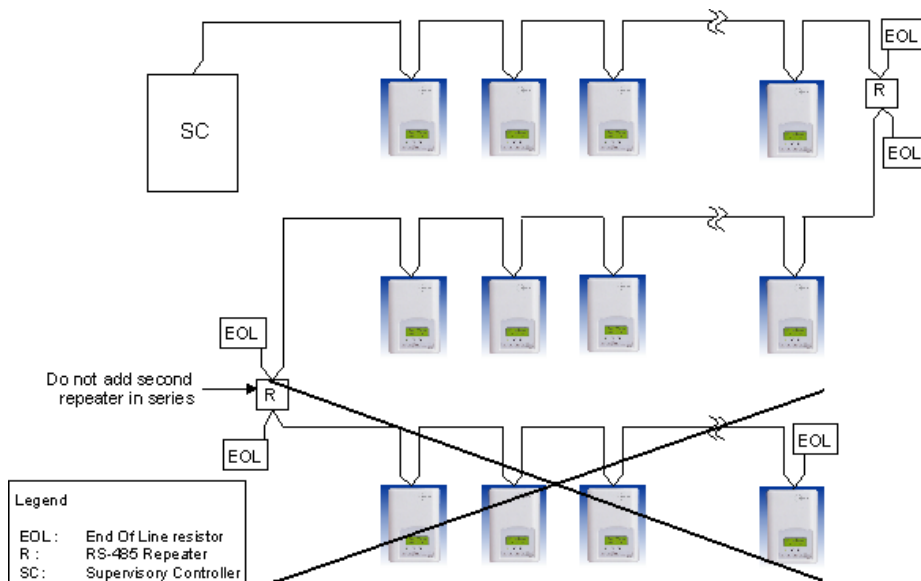


Figure 6: Incorrect usage – the second repeater in series may result in an unreliable system

## End Of Line (EOL) Resistors

MS/TP network must be properly terminated. For daisy chain configurations, you must install an EOL resistor at each end of the daisy chain. Depending on your MSTP network configuration, the resistance value of the EOL resistor may change:

- **Viconics' devices are installed at both ends of the MSTP network:**  
120 Ohms resistor should be installed at each end.
- **A Viconics device is installed at one end of the MSTP network and a 3<sup>rd</sup> party device is installed at the other end:**  
Install an End-Of-Line resistor value that matches the 3rd party devices instructions regarding its EOL resistor value;
- **3<sup>rd</sup> party devices are installed at both ends of the MSTP network:**  
Follow the 3rd party devices instructions regarding its EOL resistor value.

## Network Adapter

The polarity of the connection to the cable is important. From one module to the other it is important that the same coloured wire be connected to "plus" or "+" and the other coloured wire be connected to the "minus" or "-". Figure 7 shows the proper MS/TP connections and the location of the Status LED. This Status LED may help to troubleshoot network problems.

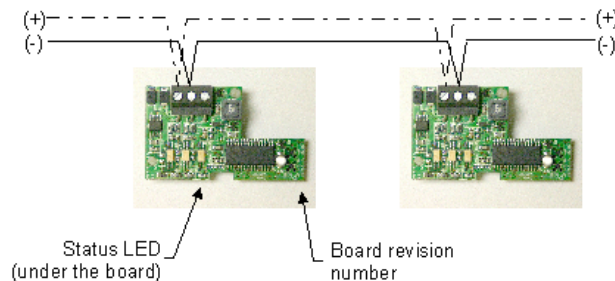


Figure 7: Correct MS/TP connections and location of a Status LED on a BACnet module

**IMPORTANT NOTE:** The Ref terminal should **NEVER** be used to wire shields. The 2 shields from each feed of the network connection to a humidistat should be wired together in the back of the humidistat and properly protected to prevent any accidental connection to the ground.

The joined shield connection should then be grounded at a **SINGLE** point on the whole segment. More than one ground connection to a shielded wire may induce ground loop noises and affect communication.



Table 2 shows the different possibilities with the Status LED behaviour of the BACnet module.

Condition of the Status LED	Possible Cause	Solution
➤ 1 short blink	BACnet communication NOT active at default MAC address = 254	Change MAC address to another value from 0 to 127
	A T7600 BACnet module has been installed on a VH72XX humidistat	Install a VH72XX BACnet module on the humidistat
	A VH72XX module has been installed on a T7600 humidistat	Install the BACnet module on a VH72XX humidistat model
➤ 2 short blink (no wires connected to the module)	The right module has been installed on the right humidistat model	N/A
➤ 2 short blink (wires connected to the module)	Module is not at the same baud rate as the network	Power off and on the humidistat
➤ 2 short blinks and a longer blink (wires connected to the module)	The module has detected the presence of a network	N/A
➤ Right after power is applied: 2 long blinks and then no blinking	Polarity has been reversed at the module	Reverse polarity at the module

Table 2: Status LED condition and possible solutions

#### Default Device Name and default Device ID

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Default **Device Name** is set to: Model number – MAC:

- Where MAC is the current MAC address of the device.
- Where Model number is Viconics part number.

The device name will be upgraded as soon as there is a change to the device MAC address.

- Default **Device ID** is set to: 76000 + MAC
- Where MAC is the current MAC address of the device.

The device ID will also be upgraded as soon as there is a change to the device's MAC.

For example, when a VH7200FB1000B humidistat with a MAC address of 63 is connected to a network, its default Device Name will be VH7200F1000B-63 and its default Device ID will be 72063.

Device Name and Device ID properties are writable in Viconics' device object. Both properties can be renamed from any BACnet network management tool as long as the tool itself can write to these properties.

## Integrating Viconics' Devices on an MSTP Network

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Before doing any BACnet integration, make sure to have Viconics' PICS (Protocol Implementation Conformance Statement).

This PICS document lists all the BACnet Services and Object types supported by a device and can be found at [www.viconics.com](http://www.viconics.com).

Viconics' devices do not support the COV service. COV reporting allows an object to send out notices when its Present-Value property is incremented by a pre-defined value. Since this is not supported at Viconics' end, special attention should be given to the polling time settings at the Supervisory Controller and Workstation level when using a graphic interface or an application program to read or write to a Viconics' object.

### Graphical interfaces

For example, some graphic interface might poll every data linked to the graphic page on a COV basis. If the 3<sup>rd</sup> party device does not support COV, the graphic interface then relies on a pre-configured polling interval, which is usually in hundredths of milliseconds. Any device containing a monitored object could be subject to network traffic congestion if such a polling interval is used. Viconics strongly recommend a polling interval of 5 seconds minimum for any graphic interface. This becomes even more critical in area graphics where a single representation might poll many devices. If proper poll rate is not respected, devices may be reported offline by certain front end by saturating the traffic handling capacity of BACnet MSTP without COV subscription.

### Free programmed object or loops

As for the application program, you might want to read and write any MSTP data on an "If Once" basis or a "Do Every" loop basis instead of reading or writing to a 3<sup>rd</sup> party device's object directly in the program. Otherwise, any read or write request will occur at the Supervisory Controller's program scan rate, which might as well be in hundredths of milliseconds. This can easily bog down a network as single commands can be sent to all ASC devices down the MSTP trunks every hundredth of milliseconds

Programs writing to the devices should have a structure similar to the following:

```
If Once Schedule = On then
    MV11 = Occupied
End If
If Once Schedule = Off Then          OR
    MV11 = Unoccupied
End If
Do Every 5min
    If Schedule = On Then
        MV11= Occupied
    Else
        MV11 = Unoccupied
    End If
End Do
```

### Retries and Timeouts

Another thing to look for in a BACnet integration is the Device object of the Supervisory Controller (and the Operator's Workstation). This object contains the 2 following required properties:

- 1) Retry Timeout;
- 2) Number of APDU Retries;

1) The Retry Timeout property specifies the time between re-transmissions if the acknowledgement has not been received. When you are experiencing problems with controllers dropping off-line, increasing this value may help.

2) The Number of APDU Retries property specifies the number of times unsuccessful transmissions will be repeated. If the receiving controller has not received the transmission successfully after this many attempts, no further attempts will be made.

For example, if one of the humidistat does not reply to a Supervisory Controller (SC) request, and the SC's Retry Timeout is set to 2000 msec and the Number of APDU Retries is set to 1 (still at the SC level), then the SC will send one other request, 2 sec later. If the MSTP device does not reply, it will be considered Off-line by the workstation.

So having a Retry Timeout value of 10000 msec and a Number of APDU Retries property set to 3 at the SC level may prevent device from dropping Off-line. These properties should also be changed at the Workstation level since the workstation will likely issue requests to any MSTP devices when the graphics are used.

## Tips and Things You Need To Know

- Each humidistat is delivered from the factory with the default MAC address set at 254. At this value, the BACnet communication is NOT active and the device will not participate in the token pass either. The local LED status for the communication adapter at this point is one short flash only. To enable the BACnet communication, set the local MAC address configuration property of the humidistat to any valid value from 0 to 127.
- After the initial configuration of your device and if your BAS allows you to remove objects, we suggest that you remove all the configuration objects to prevent unnecessary polling of non used objects and to help speed up the network.
- All configuration objects are available and accessible locally from the device itself using the local configuration routine. Please refer to the Technical Manual *LIT-VH72X0-PIR-Exx* for details.
- In its default mode of operation, the device will automatically match its baud rate to the baud rate of the network. Automatic baud rate detection will occur when the MS/TP communication port is initialized (on power up). If the network speed is changed, the device will keep listening at the previously detected speed for 10 minutes before resuming auto-bauding. Re-powering the devices will force right away auto-bauding.
- If the device should go off-line, the following binded humidistat parameters will be released:
  - Room Temperature
  - Outdoor Temperature
- The BACnet Data Link layer has two key parameters: the device object name and the device object ID. The device object name must be unique from any other BACnet device object name on the BACnet network (i.e. not just the MS/TP sub-network). The device object ID must be unique from any other BACnet device object ID on the entire BACnet network (i.e. not just the MS/TP sub-network).
- Device Name and Device ID properties are writable in Viconics' device object. Both properties can be renamed from any BACnet network management tool as long as the tool itself give access to write to these properties.

## Troubleshooting Section

Error / Trouble Condition	Possible Cause	Solution
<b>Humidistat does not come online</b>	Two or more controllers have the same MAC address.	Modify each duplicate address to a unique number.
	The MS/TP network has too many devices.	Do not exceed the maximum number of devices and maximum length allowed by the EIA-485 specifications.
	Too many devices were installed without any repeaters.	Repeaters need to be installed as specified in this document.
	The MS/TP cable runs are broken	Locate the break and correct wiring
	MS/TP connections at the module were reversed	Respect polarity of the wires on a MS/TP network.
	The humidistat does not have power	Apply power to the humidistat

## Document Control

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