

MULTI-VARIABLE MONITOR

MVM Series



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INTRODUCTION

General

In this manual, you will find information regarding:

- Multi-Variable Monitor (MVM) Specifications
- How to install the MVM
- Detailed description of MVM display navigation and configuration
- Troubleshooting information

Product Overview

The Multi-Variable Monitor (MVM) is a touchscreen monitor that can be used to display and adjust settings from multiple devices on a BACnet network. The MVM supports both BACnet MS/TP and BACnet IP to connect with room level devices.

Some of its key features include:

- Easy-To-Use interface
- Displays any BACnet point including alarm status, room temperature, humidity, room pressure, air change per hour and occupancy
- Connects with multiple devices in order to display critical information for multiple rooms
- Audible alarms available locally and remotely
- Password protection to change room settings

Technical Specifications

MVM Size	7"	15"
Environmental (Operating)	50°F to 105°F (10°C to 40°C), 10% to 90% R.H. (non-condensing)	
Input Power	24 VAC +/- 10%, 50/60 Hz, 14 VA, Class 2	24 VAC +/- 10%, 50/60 Hz, 25 VA, Class 2
Display Type	Capacitive touch, 7.0 in. (178 mm), dimmable	Capacitive touch, 15.0 in. (381 mm), dimmable
Indicators	LCD Screen, Speaker	LCD Screen, Speaker
Resolution	800 px × 480 px, 262144 colors	1024 px × 768 px, 262144 colors
Face	Glass, IP54	
Communication Protocol	BACnet MS/TP, BACnet IP	



CAUTION ▼

This mark indicates an important point for the proper function of the MVM. Improper setup may cause unit failure. Pay close attention to all caution points throughout this manual.

For local area support, please contact your local Antec Controls Representative.

For more information visit www.AntecControls.com



GETTING STARTED WITH THE MULTI-VARIABLE MONITOR (MVM)

In the Box

For each of the available options, the order includes the following components outlined in this section.



Multi-Variable Monitor (MVM)

The following components will be included for both the 7 in. (178 mm) and 15 in. (381 mm) MVM.

Component	Quantity	Description
Multi-Variable Monitor	1	Single MVM
Mounting Bracket (optional)	1	Bracket used to mount the MVM



CAUTION ▼

Please ensure you have all components before proceeding. Inspect components for shipping damage. Do not install any components that appear damaged, contact your local Antec Controls Representative for replacements.

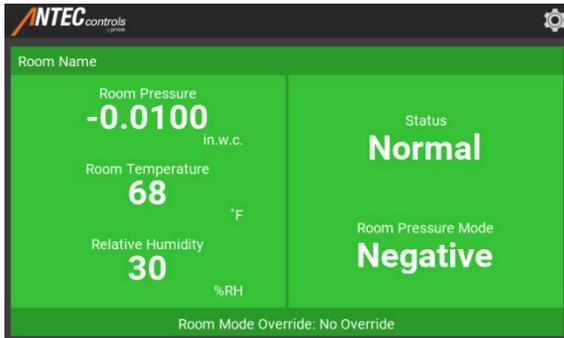
For the latest information and videos please visit www.AntecControls.com

Standard Configurations

The below standard configurations are available for the Multi-Variable Monitor (MVM) from the factory. These configurations are also available for download from AntecControls.com.

If a custom graphic is required, please contact your local Antec Controls rep for more information.

One-Room Configurations:



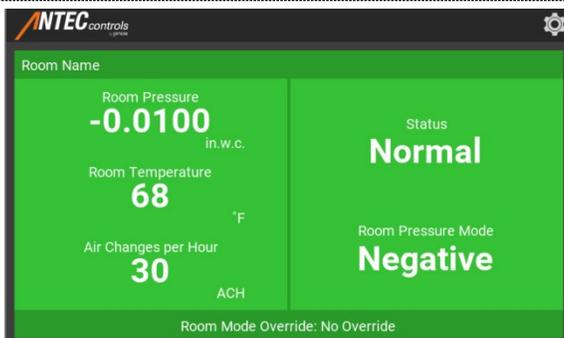
Configuration Type: (1)

Display Points: (RMP-RMT-RMRH)

The following points are included with this standard configuration.

Point	Description
Room Pressure	The current Room Pressure reading.
Room Temperature	The current Room Temperature reading.
Relative Humidity	The current Relative Humidity reading.
Status	Displays the operational state of the room. When used with the PMT, status will include the following text. This also displays the appropriate color for the state, defined below: <ol style="list-style-type: none"> 1. Normal (GREEN): The room is in its required pressure range. 2. Setback (BLUE): The room is currently not in use. 3. Caution (YELLOW): The status of the room should be verified. 4. Alarm (RED): The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Pressure Mode	Indicates whether the room is configured for Negative or Positive pressurization.
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



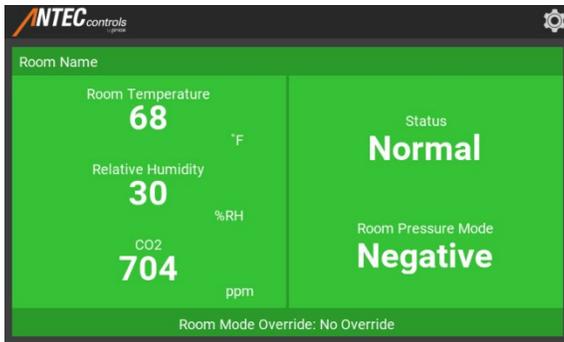
Configuration Type: (2)

Display Points: (RMP-RMT-ACH)

The following points are included with this standard configuration.

Point	Description
Room Pressure	The current Room Pressure reading.
Room Temperature	The current Room Temperature reading.
Air Changes per Hour	The current air change rate in the room.
Status	Displays the operational state of the room, when used with the PMT, status will include the following text. This also displays the appropriate color for the state, defined below: <ol style="list-style-type: none"> 1. Normal (GREEN): The room is in its required pressure range. 2. Setback (BLUE): The room is currently not in use. 3. Caution (YELLOW): The status of the room should be verified. 4. Alarm (RED): The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Pressure Mode	Indicates whether the room is configured for Negative or Positive pressurization.
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



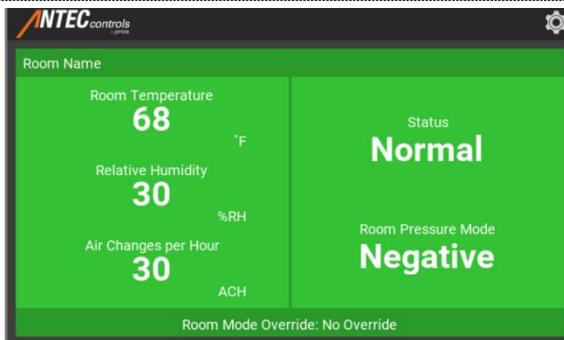
Configuration Type: (3)

Display Points: (RMT-RMRH-CO2)

The following points are included with this standard configuration.

Point	Description
Room Temperature	The current Room Temperature reading.
Relative Humidity	The current Relative Humidity reading.
CO2	The current CO2 reading.
Status	Displays the operational state of the room, when used with the PMT, status will include the following text. This also displays the appropriate color for the state, defined below: <ol style="list-style-type: none"> 1. Normal (GREEN): The room is in its required pressure range. 2. Setback (BLUE): The room is currently not in use. 3. Caution (YELLOW): The status of the room should be verified. 4. Alarm (RED): The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Pressure Mode	Indicates whether the room is configured for Negative or Positive pressurization.
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



Configuration Type: (4)

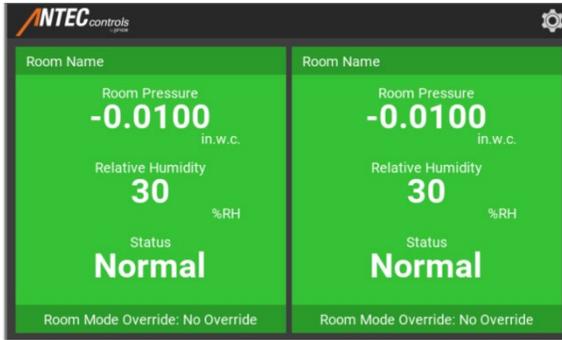
Display Points: (RMT-RMRH-ACH)

The following points are included with this standard configuration.

Point	Description
Room Temperature	The current Room Temperature reading.
Relative Humidity	The current Relative Humidity reading.
Air Changes per Hour	The current air change rate in the room.
Status	Displays the operational state of the room, when used with the PMT, status will include the following text. This also displays the appropriate color for the state, defined below: <ol style="list-style-type: none"> 1. Normal (GREEN): The room is in its required pressure range. 2. Setback (BLUE): The room is currently not in use. 3. Caution (YELLOW): The status of the room should be verified. 4. Alarm (RED): The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Pressure Mode	Indicates whether the room is configured for Negative or Positive pressurization.
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.

Two-Room Configurations:



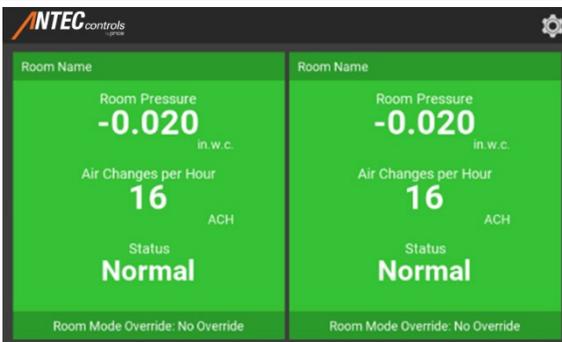
Configuration Type: (5)

Display Points: (RMP-RMRH)

The following points are included for each room in this standard configuration.

Point	Description
Room Pressure	The current Room Pressure reading.
Relative Humidity	The current Relative Humidity reading.
Status	Displays the operational state of the room, when used with the PMT, status will include the following text. This also displays the appropriate color for the state, defined below: <ol style="list-style-type: none"> 1. Normal (GREEN): The room is in its required pressure range. 2. Setback (BLUE): The room is currently not in use. 3. Caution (YELLOW): The status of the room should be verified. 4. Alarm (RED): The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



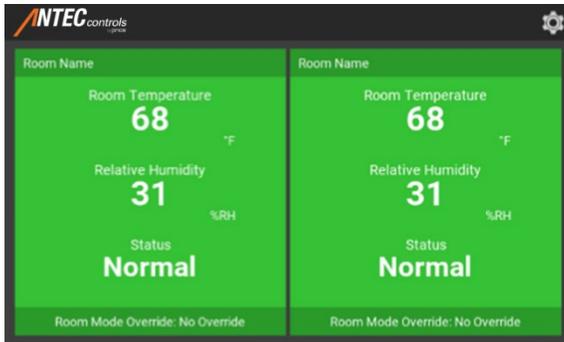
Configuration Type: (6)

Display Points: (RMP-ACH)

The following points are included with this standard configuration.

Point	Description
Room Pressure	The current Room Pressure reading.
Air Changes per Hour	The current air change rate in the room.
Status	Displays the operational state of the room, when used with the PMT, status will include the following text. This also displays the appropriate color for the state, defined below: <ol style="list-style-type: none"> 1. Normal (GREEN): The room is in its required pressure range. 2. Setback (BLUE): The room is currently not in use. 3. Caution (YELLOW): The status of the room should be verified. 4. Alarm (RED): The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



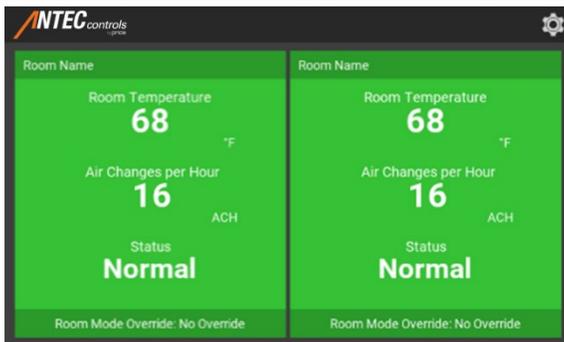
Configuration Type: (7)

Display Points: (RMT-RMRH)

The following points are included with this standard configuration.

Point	Description
Room Temperature	The current Room Temperature reading.
Relative Humidity	The current Relative Humidity reading.
Status	Displays the operational state of the room, when used with the PMT, status will include the following text. This also displays the appropriate color for the state, defined below: <ol style="list-style-type: none"> 1. Normal (GREEN): The room is in its required pressure range. 2. Setback (BLUE): The room is currently not in use. 3. Caution (YELLOW): The status of the room should be verified. 4. Alarm (RED): The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



Configuration Type: (8)

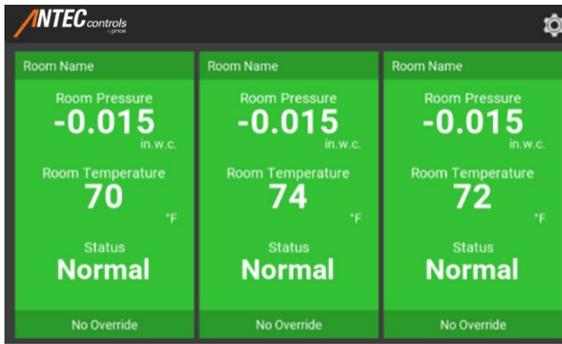
Display Points: (RMT-ACH)

The following points are included with this standard configuration.

Point	Description
Room Temperature	The current Room Temperature reading.
Air Changes per Hour	The current air change rate in the room.
Status	Displays the operational state of the room, when used with the PMT, status will include the following text. This also displays the appropriate color for the state, defined below: <ol style="list-style-type: none"> 1. Normal (GREEN): The room is in its required pressure range. 2. Setback (BLUE): The room is currently not in use. 3. Caution (YELLOW): The status of the room should be verified. 4. Alarm (RED): The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.

Three-Room Configurations:



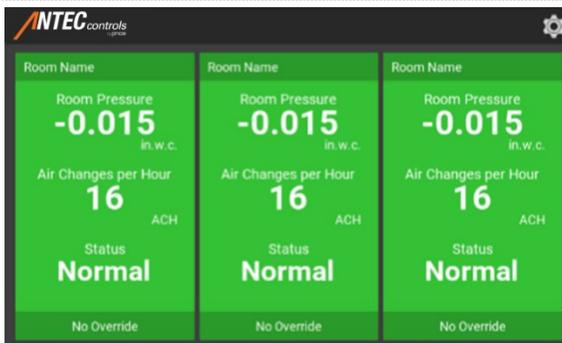
Configuration Type: (9)

Display Points: (RMP-RMT)

The following points are included with this standard configuration.

Point	Description
Room Pressure	The current Room Pressure reading.
Room Temperature	The current Room Temperature reading.
Status	Displays the operational state of the room, when used with the PMT, status will include the following text. This also displays the appropriate color for the state, defined below: <ol style="list-style-type: none"> 1. Normal (GREEN): The room is in its required pressure range. 2. Setback (BLUE): The room is currently not in use. 3. Caution (YELLOW): The status of the room should be verified. 4. Alarm (RED): The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



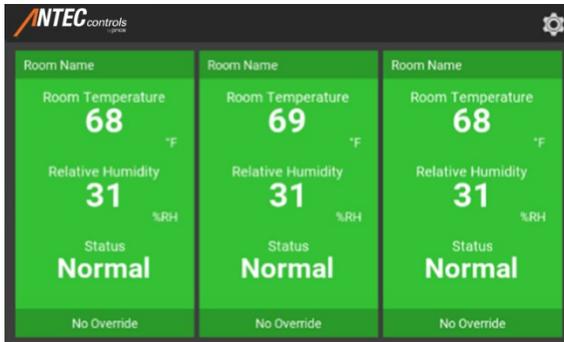
Configuration Type: (10)

Display Points: (RMP-ACH)

The following points are included with this standard configuration.

Point	Description
Room Pressure	The current Room Pressure reading.
Air Changes per Hour	The current air change rate in the room.
Status	Displays the operational state of the room, when used with the PMT, status will include the following text. This also displays the appropriate color for the state, defined below: <ol style="list-style-type: none"> 1. Normal (GREEN): The room is in its required pressure range. 2. Setback (BLUE): The room is currently not in use. 3. Caution (YELLOW): The status of the room should be verified. 4. Alarm (RED): The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



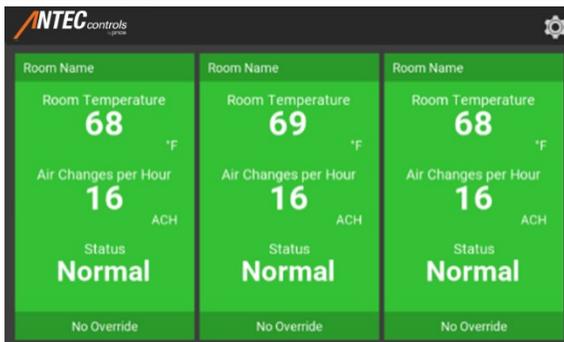
Configuration Type: (11)

Display Points: (RMT-RMRH)

The following points are included with this standard configuration.

Point	Description
Room Temperature	The current Room Temperature reading.
Relative Humidity	The current Relative Humidity reading.
Status	Displays the operational state of the room, when used with the PMT, status will include the following text. This also displays the appropriate color for the state, defined below: <ol style="list-style-type: none"> 1. Normal (GREEN): The room is in its required pressure range. 2. Setback (BLUE): The room is currently not in use. 3. Caution (YELLOW): The status of the room should be verified. 4. Alarm (RED): The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



Configuration Type: (12)

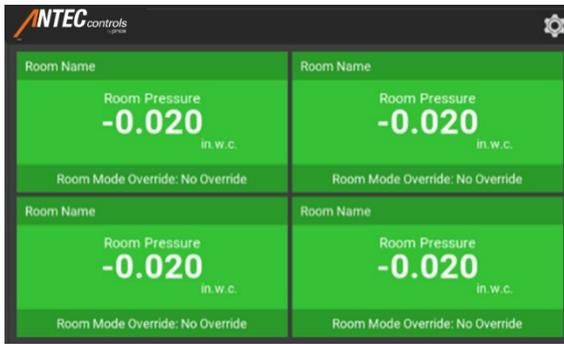
Display Points: (RMT-ACH)

The following points are included with this standard configuration.

Point	Description
Room Temperature	The current Room Temperature reading.
Air Changes per Hour	The current air change rate in the room.
Status	Displays the operational state of the room, when used with the PMT, status will include the following text. This also displays the appropriate color for the state, defined below: <ol style="list-style-type: none"> 1. Normal (GREEN): The room is in its required pressure range. 2. Setback (BLUE): The room is currently not in use. 3. Caution (YELLOW): The status of the room should be verified. 4. Alarm (RED): The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.

Four-Room Configurations:



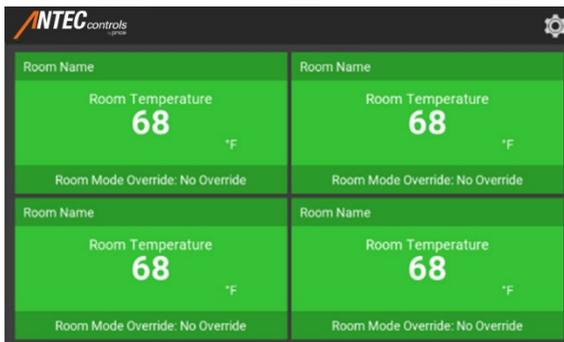
Configuration Type: (13)

Display Points: (RMP)

The following points are included with this standard configuration.

Point	Description
Room Pressure	The current Room Pressure reading.
Status	Displays the operational state of the room, when used with the PMT, be indicated by the following colors: <ol style="list-style-type: none"> 1. GREEN: The room is in its required pressure range. 2. BLUE: The room is currently not in use. 3. YELLOW: The status of the room should be verified. 4. RED: The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



Configuration Type: (14)

Display Points: (RMT)

The following points are included with this standard configuration.

Point	Description
Room Temperature	The current Room Temperature reading.
Status	Displays the operational state of the room, when used with the PMT, be indicated by the following colors: <ol style="list-style-type: none"> 1. GREEN: The room is in its required pressure range. 2. BLUE: The room is currently not in use. 3. YELLOW: The status of the room should be verified. 4. RED: The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



Configuration Type: (15)

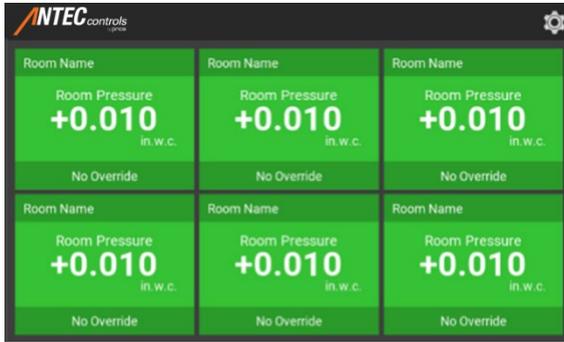
Display Points: (ACH)

The following points are included with this standard configuration.

Point	Description
Air Changes per Hour	The current air change rate in the room.
Status	Displays the operational state of the room, when used with the PMT, be indicated by the following colors: <ol style="list-style-type: none"> 1. GREEN: The room is in its required pressure range. 2. BLUE: The room is currently not in use. 3. YELLOW: The status of the room should be verified. 4. RED: The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.

Six-Room Configurations:



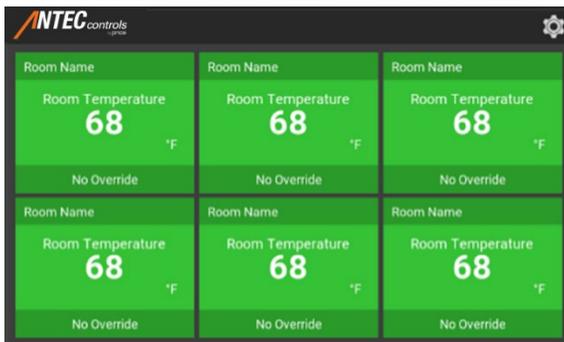
Configuration Type: (16)

Display Points: (RMP)

The following points are included with this standard configuration.

Point	Description
Room Pressure	The current Room Pressure reading.
Status	Displays the operational state of the room, when used with the PMT, be indicated by the following colors: <ol style="list-style-type: none"> 1. GREEN: The room is in its required pressure range. 2. BLUE: The room is currently not in use. 3. YELLOW: The status of the room should be verified. 4. RED: The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



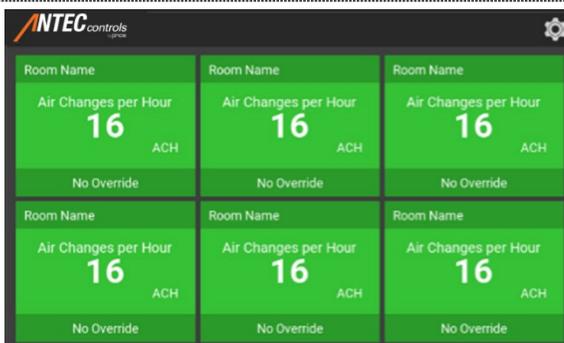
Configuration Type: (17)

Display Points: (RMT)

The following points are included with this standard configuration.

Point	Description
Room Temperature	The current Room Temperature reading.
Status	Displays the operational state of the room, when used with the PMT, be indicated by the following colors: <ol style="list-style-type: none"> 1. GREEN: The room is in its required pressure range. 2. BLUE: The room is currently not in use. 3. YELLOW: The status of the room should be verified. 4. RED: The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



Configuration Type: (18)

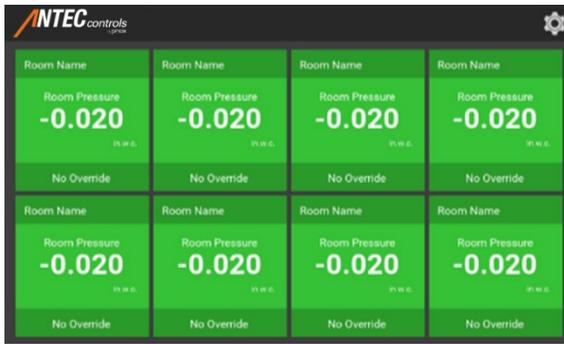
Display Points: (ACH)

The following points are included with this standard configuration.

Point	Description
Air Changes per Hour	The current air change rate in the room.
Status	Displays the operational state of the room, when used with the PMT, be indicated by the following colors: <ol style="list-style-type: none"> 1. GREEN: The room is in its required pressure range. 2. BLUE: The room is currently not in use. 3. YELLOW: The status of the room should be verified. 4. RED: The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.

Eight-Room Configurations:



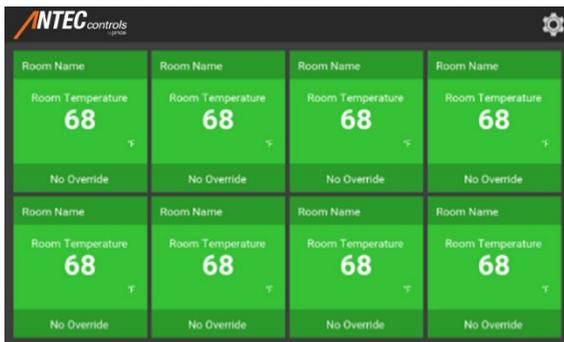
Configuration Type: (19)

Display Points: (RMP)

The following points are included with this standard configuration.

Point	Description
Room Pressure	The current Room Pressure reading.
Status	Displays the operational state of the room, when used with the PMT, be indicated by the following colors: <ol style="list-style-type: none"> 1. GREEN: The room is in its required pressure range. 2. BLUE: The room is currently not in use. 3. YELLOW: The status of the room should be verified. 4. RED: The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



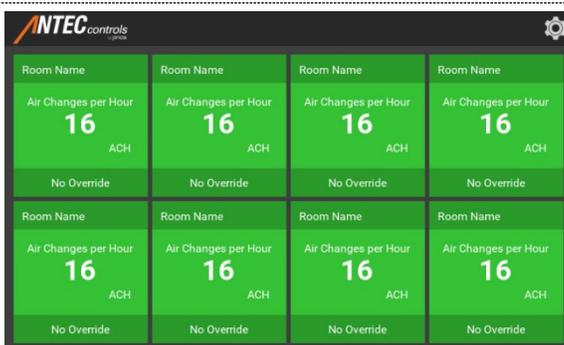
Configuration Type: (20)

Display Points: (RMT)

The following points are included with this standard configuration.

Point	Description
Room Temperature	The current Room Temperature reading.
Status	Displays the operational state of the room, when used with the PMT, be indicated by the following colors: <ol style="list-style-type: none"> 1. GREEN: The room is in its required pressure range. 2. BLUE: The room is currently not in use. 3. YELLOW: The status of the room should be verified. 4. RED: The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

NOTE: The standard configuration does not include password protection for this item.



Configuration Type: (21)

Display Points: (ACH)

The following points are included with this standard configuration.

Point	Description
Air Changes per Hour	The current air change rate in the room.
Status	Displays the operational state of the room, when used with the PMT, be indicated by the following colors: <ol style="list-style-type: none"> 1. GREEN: The room is in its required pressure range. 2. BLUE: The room is currently not in use. 3. YELLOW: The status of the room should be verified. 4. RED: The room is outside of its required pressure range.
Alarm/Caution Reason	Indicates to the user the reason for the caution or alarm status (if present).
Room Mode Override	Allows the user to change the room to Setback.

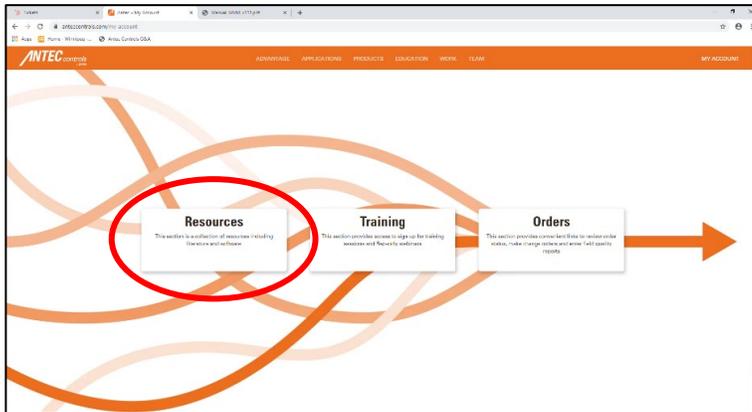
NOTE: The standard configuration does not include password protection for this item.

Software Installation Instructions

System Requirements

System requirements to program the MVM:

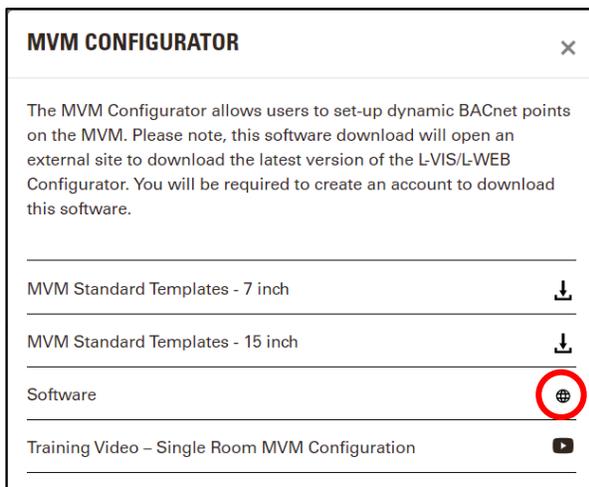
- Operating System: Windows 7 or higher
- CPU: 2 Gigahertz or faster
- RAM: 4 Gigabytes or more
- Hardware: Ethernet port or USB port and USB to Ethernet adapter



LVIS Configurator Install Instructions

Use the following instructions to download the LVIS Configurator from the Antec Controls website.

- Ensure an internet connection is present
- Go to www.antecontrols.com and enter the login section
 - If you do not have login access, please request an account
- Enter the *Resources* tab
- Go to *Software* → *MVM Configurator*
- Select the web icon  beside *Software* to navigate to the LOYTEC website
- Run through the InstallShield Wizard for LOYTEC LVIS Configurator

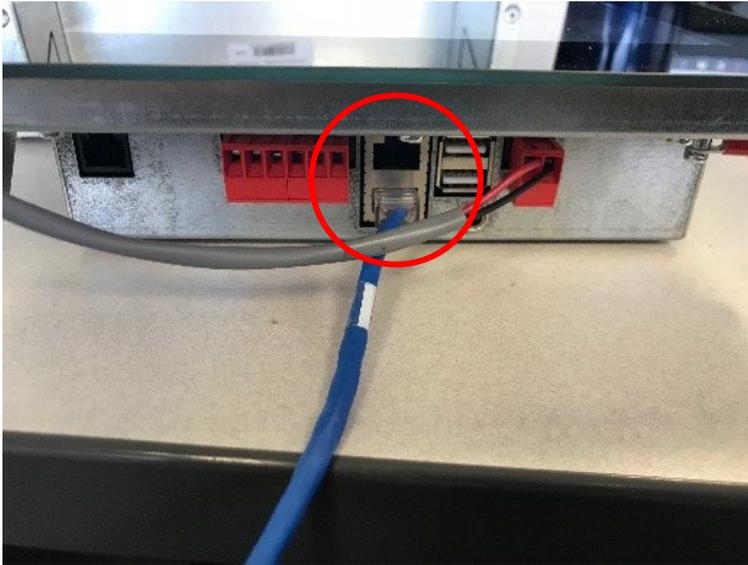


Connecting to the Multi-Variable Monitor (MVM)

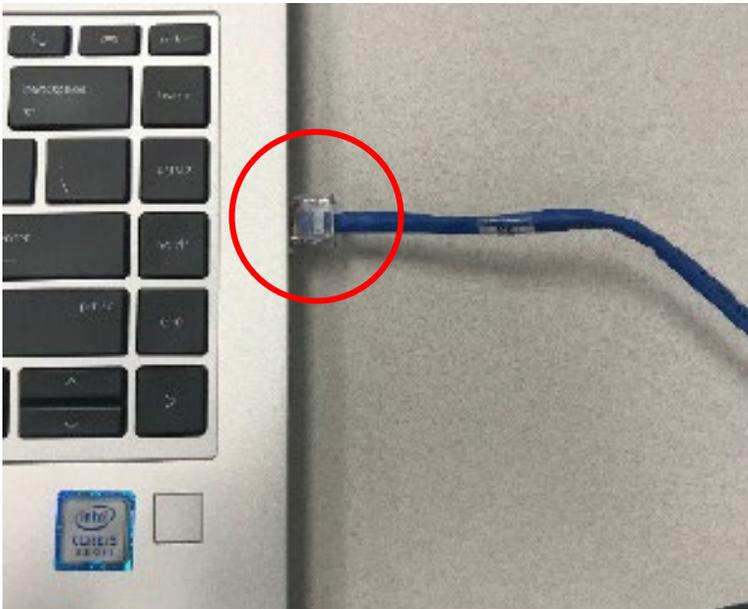
Tools required

- Laptop
- Ethernet Cable (RJ-45 to RJ-45)
- LVIS Software
- Power wired into the MVM

Physical Connection

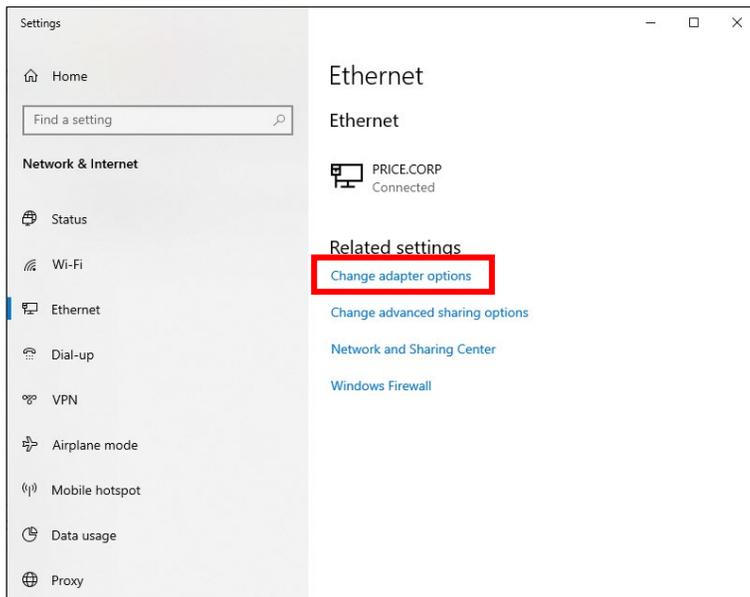


Connect one end of the RJ-45 cable into the bottom of the MVM and the other end into the Ethernet port of your computer



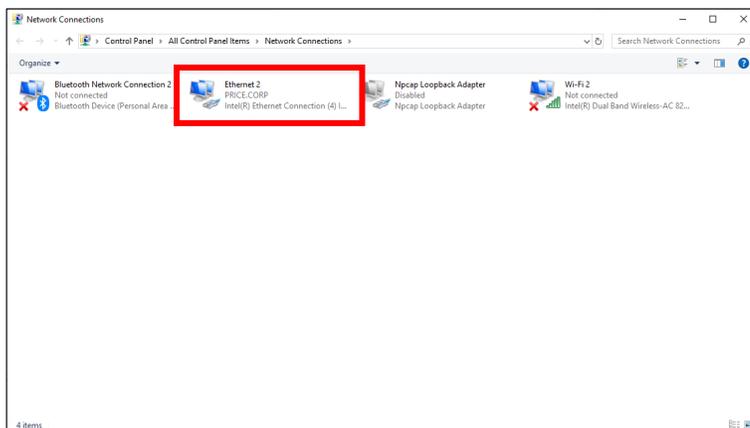
Connection Instructions

The following steps will allow the user to connect to a Multi Variable Monitor (MVM).



STEP 1

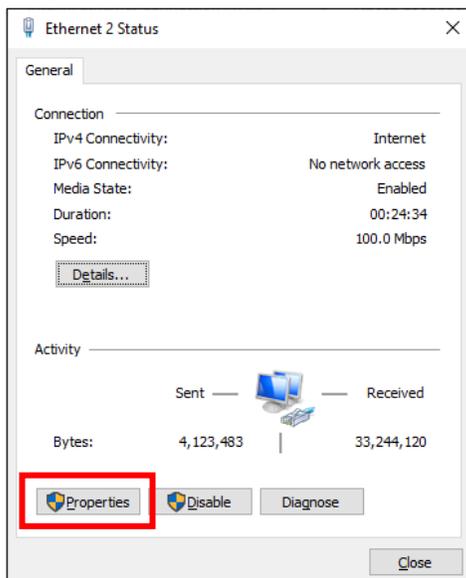
Open the Ethernet settings on your computer and select *Change adapter options*.



STEP 2

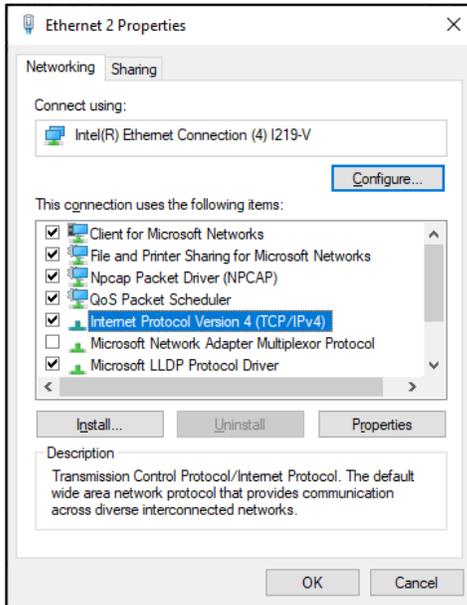
Select the Ethernet port to which the MVM is connected.

NOTE: In this case Ethernet 2 is selected. The Ethernet port may be different on the user's computer. Ensure to configure the settings for the Ethernet port to which the MVM is physically connected.



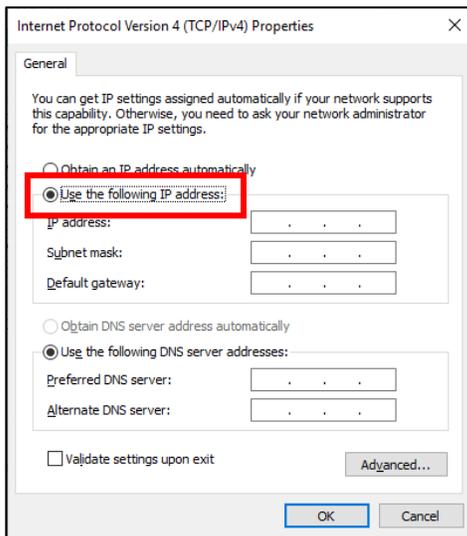
STEP 3

In the Ethernet status menu select *Properties*.



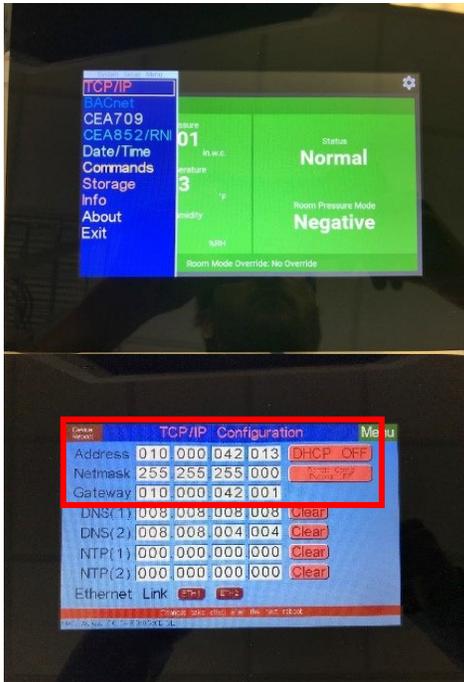
STEP 4

Enter the *Internet Protocol Version 4 (TCP/IPv4)* menu.



STEP 5

Select *Use the following IP address.*



STEP 6

Go to the TCP/IP menu in the MVM. Ensure that DHCP is turned off.

Record the address and netmask from the top of the menu. In this case:

Address: 010 000 042 013

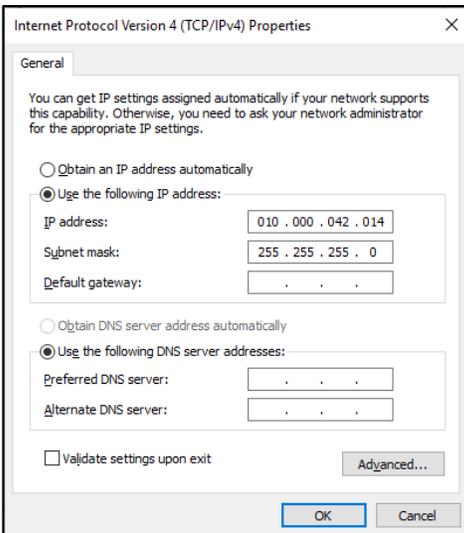
Netmask: 255 255 255 000

Gateway: 010 000 042 001

User Recording Table:

Address				
Netmask				
Gateway				

NOTE: Ensure that the first three numbers of the gateway (010 000 042 ***) match the address on the MVM.



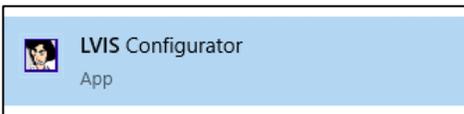
STEP 7

Enter the IP address but with the final three digits one number greater or lower than the MVM address.

In this case:

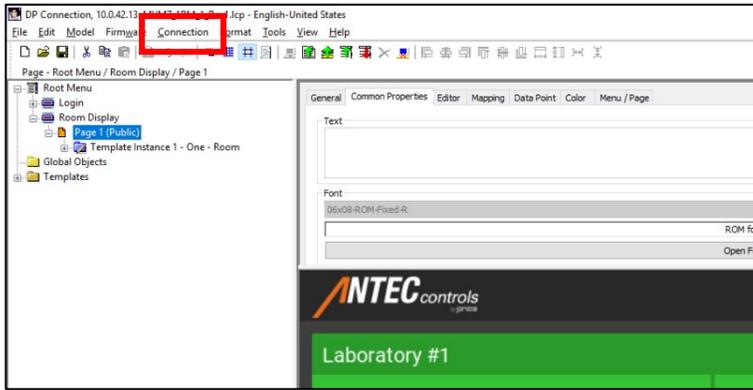
IP address: 010 000 042 **014**

NOTE: The final three digits of the IP address **MUST** be different from the MVM's IP address.



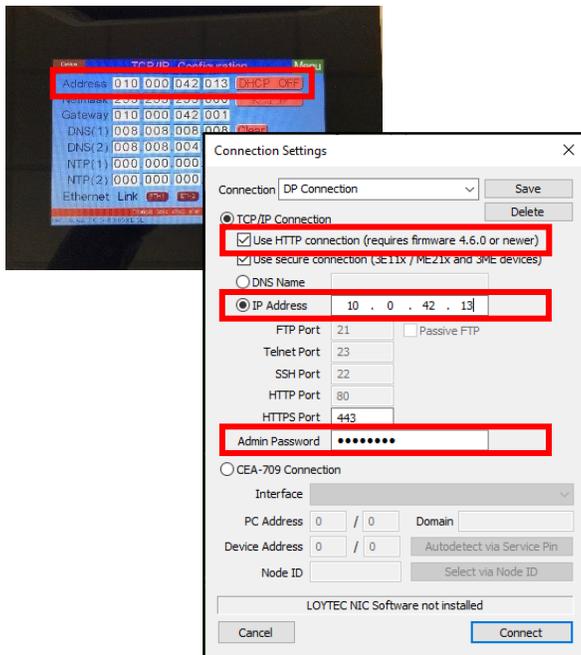
STEP 8

Open the LVIS Configurator software.



STEP 9

Select the *Connection* drop down at the top of the screen and select *Connect to Device*.



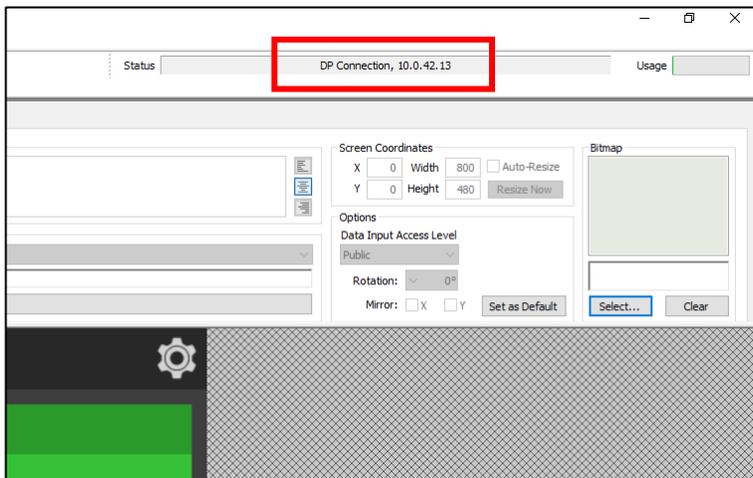
STEP 10

Ensure that *Use HTTP connection* is selected.

Enter the IP address that was recorded from the TCP/IP menu of the MVM in STEP 6.

Enter the Admin Password: **loytec4u**

NOTE: This password will be saved and only needs to be entered the first time you connect to an MVM.



STEP 11

The status bar will display "Loading Dynamic Points List" and then display "DP Connection, 10.0.42.13" once you have successfully connected.

NOTE: The user's IP address will be different than what is used here.

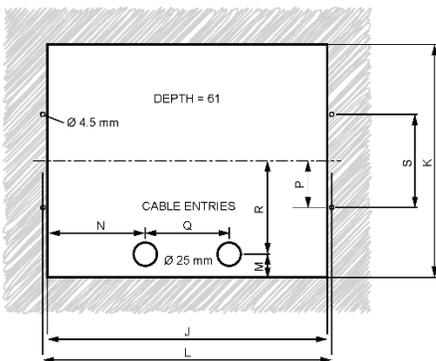
MECHANICAL INSTALLATION

Wall Cut-out and Bracket Installation



CAUTION ▼

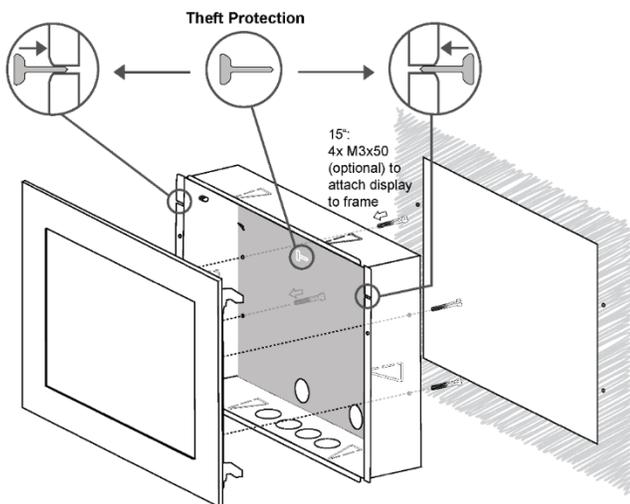
Please ensure you have all components necessary for installation. Inspect components for signs of shipping/handling damage. Do not proceed if you suspect any components are damaged.



Wall Mount Dimensions

Use the following dimensions for wall mounting.

Dim.	7"	15"
J	7.677" (195.0 mm)	13.976" (355.0 mm)
K	5.63" (143.0 mm)	11.614" (295.0 mm)
L	8.11" (206.0 mm)	14.37" (365.0 mm)
M	0.827" (21.0 mm)	1.87" (47.5 mm)
N	2.441" (62.0 mm)	5.217" (132.5 mm)
P	1.181" (30.0 mm)	1.839" (46.7 mm)
Q	2.756" (70.0 mm)	3.543" (90.0 mm)
R	1.969" (50.0 mm)	3.937" (100.0 mm)
S	1.969" (50.0mm)	3.937" (100.0 mm)



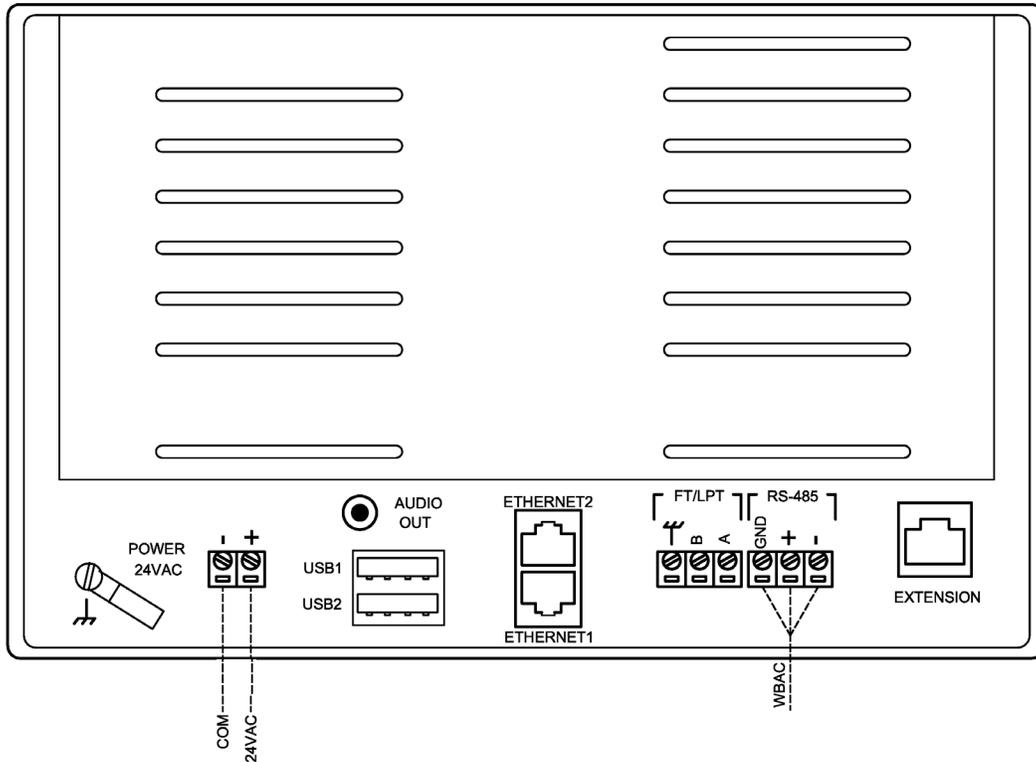
Bracket Installation

- 1) If Theft Protection is required, remove the Theft Protection tabs before installing the bracket.
- 2) Install the bracket into the wall cut-out.
- 3) Use the hooks on the Multi-Variable Monitor (MVM) to attach the MVM to the bracket.
- 4) Install Theft Protection tabs after unit has been configured.

NOTE: Do not install theft protection tabs prior to completing configuration to ensure start-up technicians have easy access to the back of the MVM.

ELECTRICAL INSTALLATION

Sample Wiring Diagram



Legend:	
	Factory Wiring
	Field Wiring

NOTES:

1. For further information, please see the [BACnet MS/TP](#) section of the manual.
2. All wire connections to the monitor screw connection terminals must be between 12-26 AWG wire.
3. Current and voltage drop should be taken into consideration when selecting wire gauge.
4. Wiring above may not reflect those required for your project. Refer to your Antec Controls Project Submittals for project specific wiring diagrams.

BACnet

What is BACnet?

BACnet is a communication protocol for communication between the Multi-Variable Monitor (MVM) and the devices with which it is communicating. BACnet communication allows the MVM to communicate with other BACnet MS/TP or BACnet IP devices to display environmental and status values from those devices.

Network Addressing

When configuring the MVM, the user needs to assign the unique identifying address for the room.

On any BACnet network:

- MAC Address can be between 0 and 127 and must be unique to the MS/TP segment
- Device Instance can be between 0 and 4,194,303 and must be unique to the facility
- Baud Rate can be 9,600, 19,200, 38,400, or 76,800 and must match that of the Router/System Controller for the MS/TP segment

Physical Connection for BACnet MS/TP

BACnet MS/TP consists of a 3-wire network architecture. Daisy chain the +, -, and COM connections of all devices on the network segment as shown in the figure below.

A BACnet segment has a limit of:

- Maximum of 32 devices
- Maximum length of 1050 feet (320 meters) for the whole segment

When using shielded cable, ground the shield at one end of the network segment only. Connect the shield of the cable entering a device to that of the cable exiting the device.

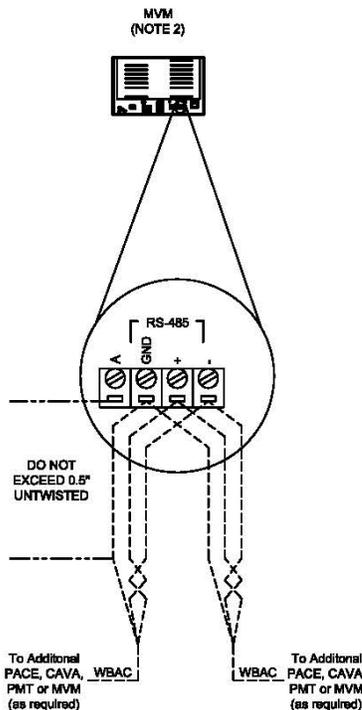
Terminate the MS/TP network segment at each end of the network segment by connecting a 120-ohm resistor between the + and - network terminals. Remove the termination resistor or disable any network terminations on all devices when adding devices to an existing network segment.

BACnet IP can also be used to connect the MVM to an existing IP network. It can then communicate with other BACnet IP devices. If using this method, ensure the MVM's DHCP setting is enabled or that a static IP has been assigned to the MVM.

Wiring Requirements

Refer to your Antec Controls Wiring Diagram Package for typical wiring requirements and recommendations.

Typical BACnet MS/TP Wiring



NOTE: Installer must use a 120-ohm resistor at the BACnet MS/TP end of line termination on the MVM.

DISPLAY NAVIGATION

Functionality

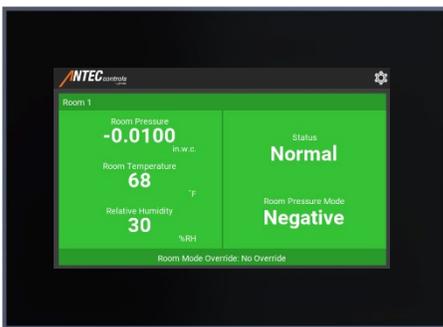
The Multi-Variable Monitor (MVM) is designed to provide ease of use monitoring of multiple variables from BACnet devices.

The MVM Home Screen provides monitoring information in a simple format displaying information including Room Status and Isolation Mode.

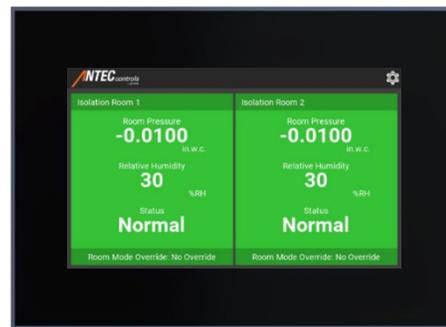
Features

- 1) Password protected menus.
- 2) Monitor up to 8 rooms simultaneously.
- 3) Audible Alarms – available locally and remotely.

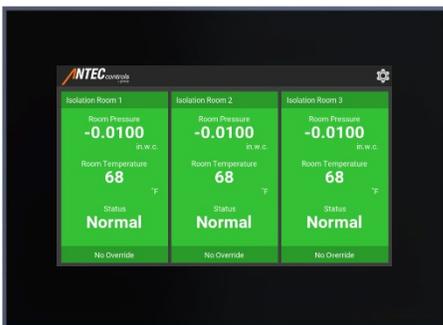
The home page will display in one of the following configurations, depending on the number of rooms that are being monitored.



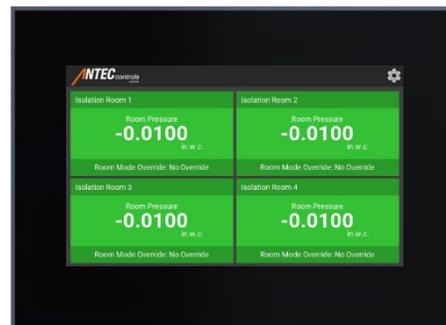
SINGLE ROOM CONFIGURATION



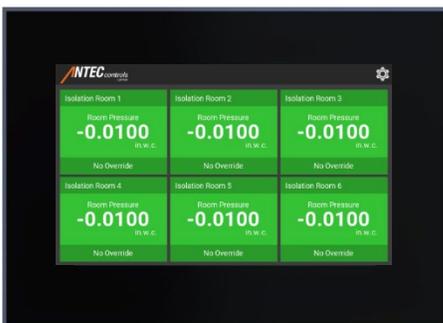
TWO ROOM CONFIGURATION



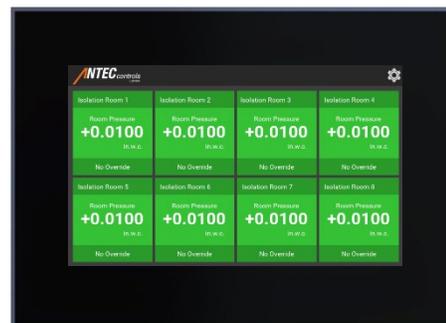
THREE ROOM CONFIGURATION



FOUR ROOM CONFIGURATION



SIX ROOM CONFIGURATION

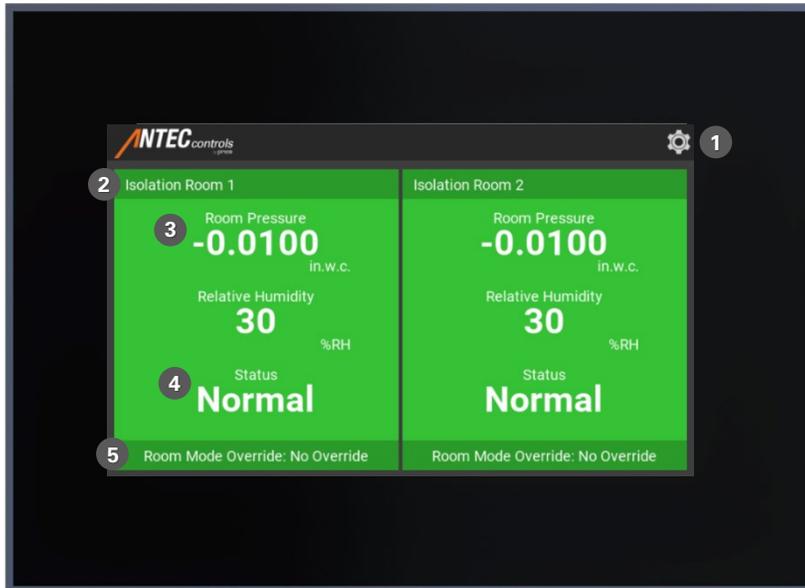


EIGHT ROOM CONFIGURATION

Home Screen

Upon start-up of the Multi-Variable Monitor (MVM), the Home Screen is displayed.

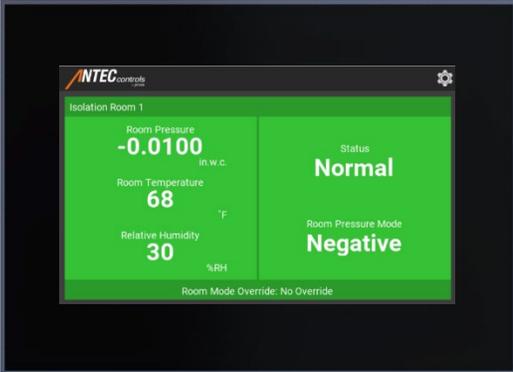
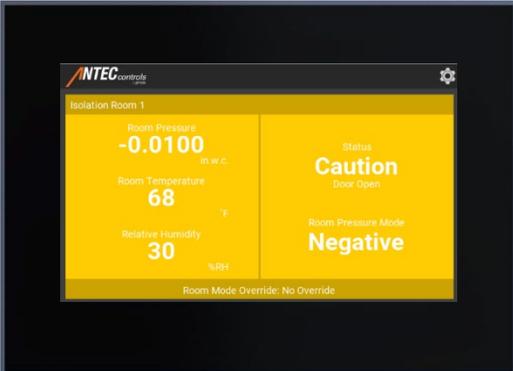
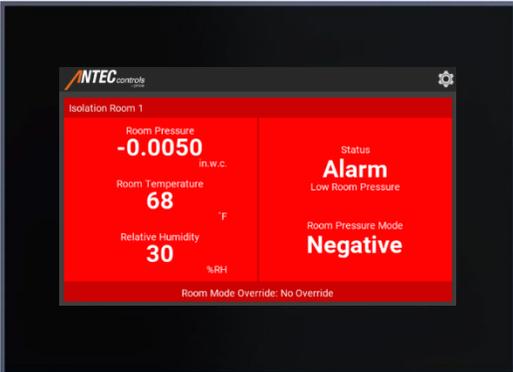
This Home Screen provides the user with a clear indication of the room mode, status, and pressure reading.



Display Component	Description
1 Menu Button	Opens the navigation menu which allows access to the login screen and the settings menu.
2 Room Name	Displays the name of the room being monitored. This is configurable and password protected.
3 Room Pressure	The current room pressure reading.
4 Room Status	Indicates whether the room is maintaining the desired setpoints in its current mode.
5 Room Mode Override	Indicates whether the room has an override present.

Multi-Variable Monitor (MVM) Operation

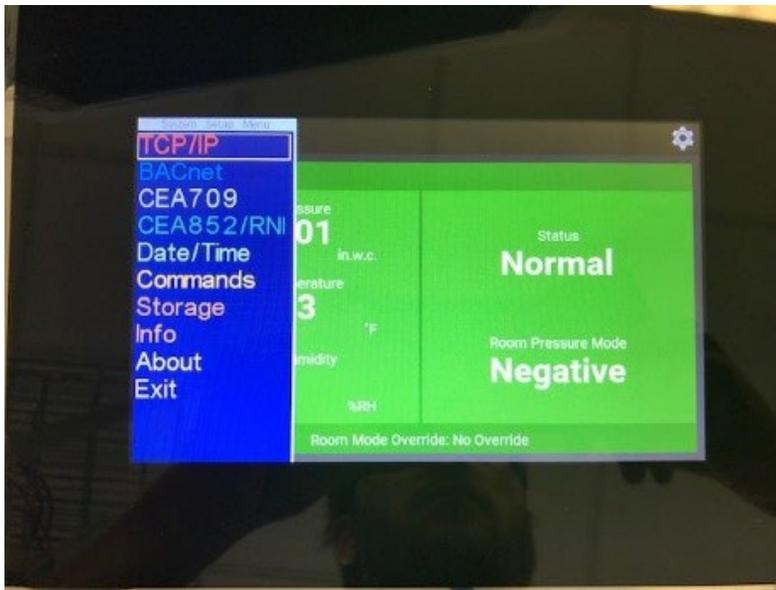
When fully set up, the MVM can be interfaced with any BACnet device to monitor environmental measurements and room status. The MVM will change its display to match the room status of the controller that is being monitored.

LCD Display	Status
	<p>Normal – Pressure reading within low/high set points</p>
	<p>Caution – Example: Door Open</p>
	<p>Alarm – Example: Pressure reading outside low/high alarm set points</p>
	<p>Setback – Pressure measured but alarms inactive</p>

Settings

The Settings are accessible through the Home Screen and are password protected (see Home Screen section).

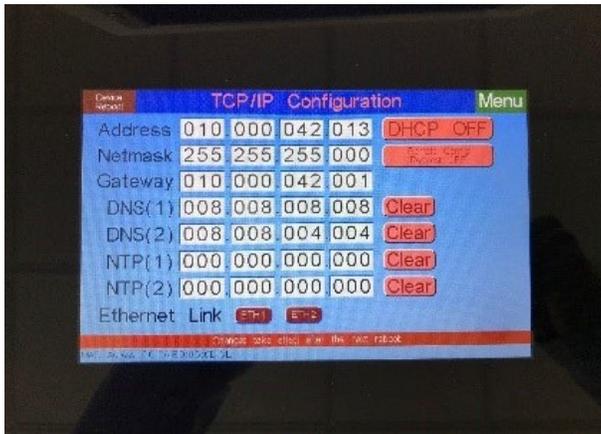
These menus allow the user to change any of the configurable options on the Multi-Variable Monitor (MVM).



Display Component	Description
TCP/IP	Allows the user to adjust the IP address of the device when connecting to a local network.
BACnet	Allows the user to adjust the BACnet settings of the MVM.
CEA709	Not required.
CEA852/RNI	Not required.
Date/Time	Can be used to set the date and time of the device.
Commands	Allows the user to perform several commands such as calibrating the touch screen or resetting the device.
Storage	Not required.
Info	Allows the user to adjust the screen brightness and the speaker volume.
About	Shows the device firmware.
Exit	Closes the setup menu.

The Multi-Variable Monitor (MVM) setup menu is accessible through the touchscreen interface. To enter the setup menu, use the default passcode of **1-6-6-4**.

NOTE: The passcode is user configurable using the LVIS Configurator software.

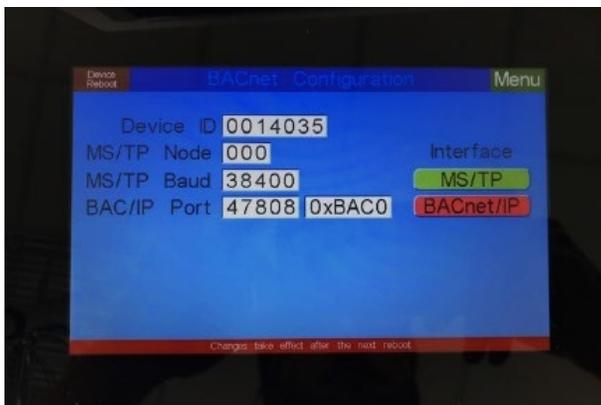


TCP/IP Configuration Menu

Used to configure the TCP/IP settings for the MVM. The menu presents information that allows the user to connect to the MVM.

Variable Name	Available Options/Range	Description
Address		Allows the user to set the IP address.
Netmask		Allows the user to set the netmask address.
Gateway		Allows the user to set the gateway.
DNS (1)		Allows the user to set the DNS.
DNS (2)		
NTP (1)		Allows the user to set the NTP.
NTP (2)		
Ethernet Link		Shows the active Ethernet ports on the MVM.
DHCP ON	On Off	Allows the user to turn DHCP on or off.
Remote Config Request	On Off	Sets the remote configuration request on or off.

NOTE: This setting is usually set to off.



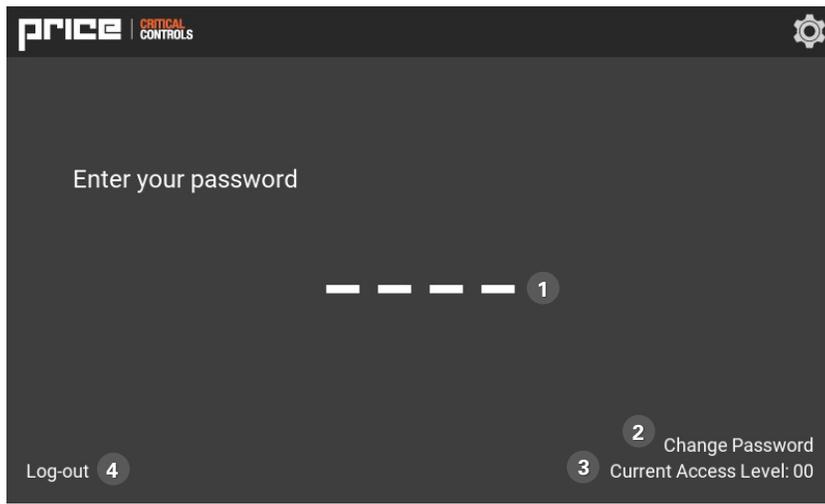
BACnet Configuration Menu

Used to configure the BACnet settings for the front-end system. This allows the front-end system to discover all necessary points on the MVM.

Variable Name	Available Options/Range	Description
Device ID	1-4, 194, 303	Sets the device instance. NOTE: The device instance must be unique on your building site.
MS/TP Node	1-127	Allows the user to set the BACnet MAC address. NOTE: Ensure that no duplicate MAC addresses exist on any network segment.
MS/TP Baud	9,600 19,200 38,400 78,600	Allows the user to set the Baud Rate.
Interface	MS/TP BACnet/IP	Allows the user to set the method of pulling point into the MVM.

Login Screen

The Login Screen is used to enter passcodes to gain access to locked features.



Display Component	Description
1 Password Entry	Press to enter the assigned passcode.
2 Change Password	Press to change password.
3 Current Access Level	Displays current access level. Up to 15 levels of access can be assigned.
4 Log-out	Press to log-out and revert access level back to 0.

CONFIGURATION

Before Arriving On-Site

Before scanning the BACnet network, it is important to determine which devices are being used for the information that will be displayed on the Main Screen.

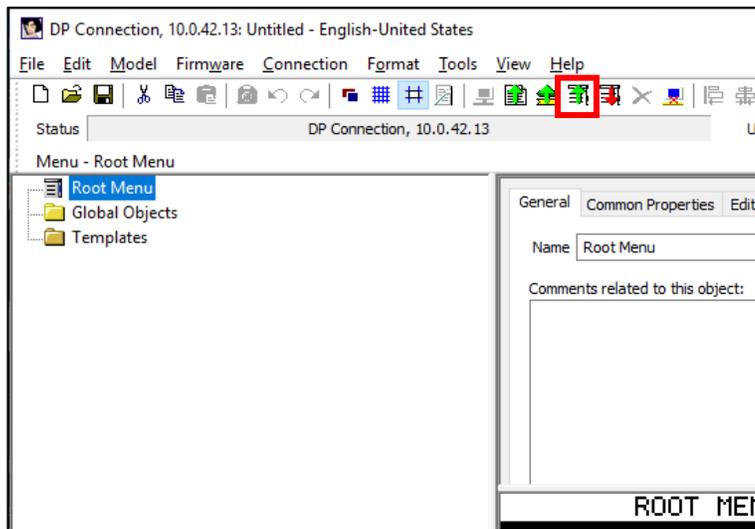
Below is a chart that can be used to map out the necessary information required for the Main Screen.

MVM Object	BACnet Device	BACnet Point Name	BACnet Object Number
Status_Value			
Status_Background			
Room Mode_Override			
Pressure Mode_Value			
Alarm Reason_Value			
Caution Reason_Value			
Temperature_Value			
Temperature_Units			
Pressure_Value			
Pressure_Units			
Humidity_Value			
Humidity_Units			
ACH_Value			
ACH_Units			

NOTES:

- Not all points listed above will be required. Refer to the Configuration Type (found in the Antec Controls submittal schedule) being used to know which points will be required on the screen.
- Gather this information before going to the site to streamline the process for performing the [BACnet Network Scanning](#) and [Adding Data Points to the Device](#) steps in this manual.
- If configuring an MVM for multi-room displays, then this table should be completed for each room.

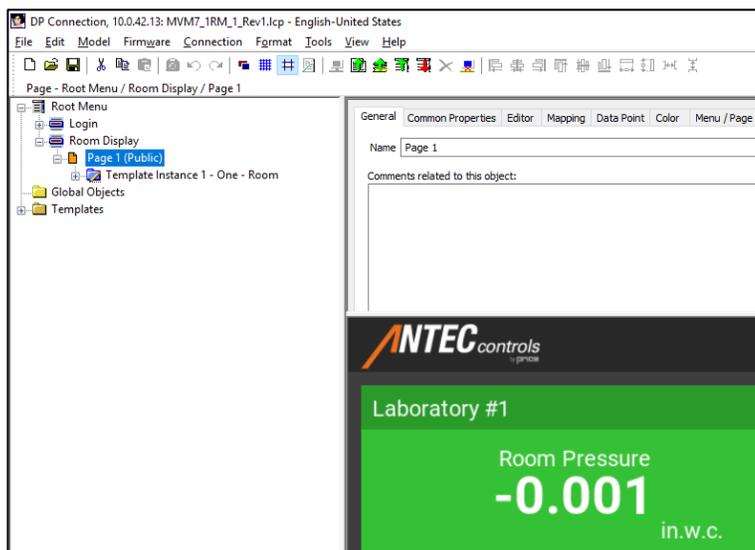
Accessing the LVIS Configurator File using the LVIS Configurator Software



STEP 1

Open LVIS Configurator.

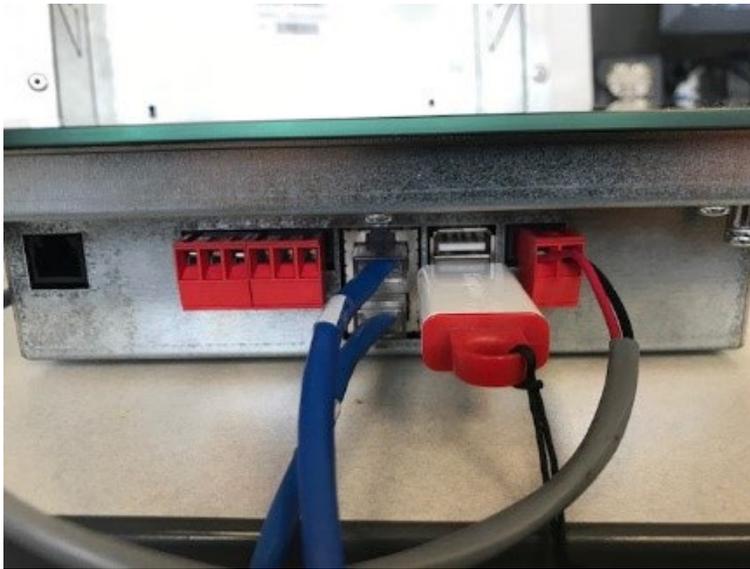
After successfully connecting to the MVM using the [Connect to the MVM through LVIS Configurator](#) section, select *Read Project from Device*.



STEP 2

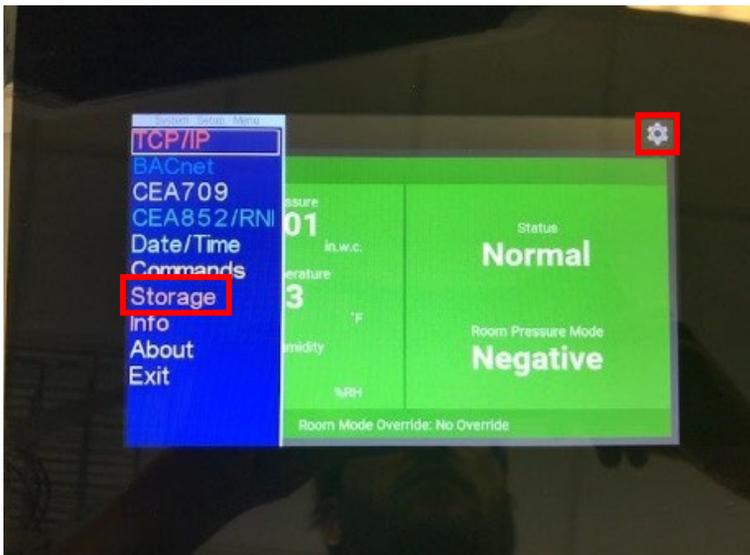
Once *Read Project from Device* has been selected, the LVIS file will appear in the software.

Accessing the LVIS Configurator File using a USB Memory Stick



STEP 1

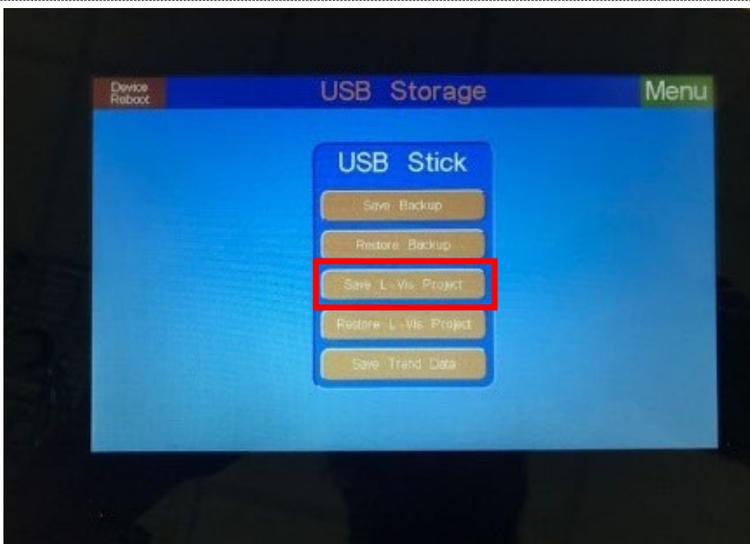
Plug USB into one of the two ports on the bottom of the MVM.



STEP 2

Enter the settings menu of the MVM by clicking the gear button in the top right corner.

Select *Storage*.



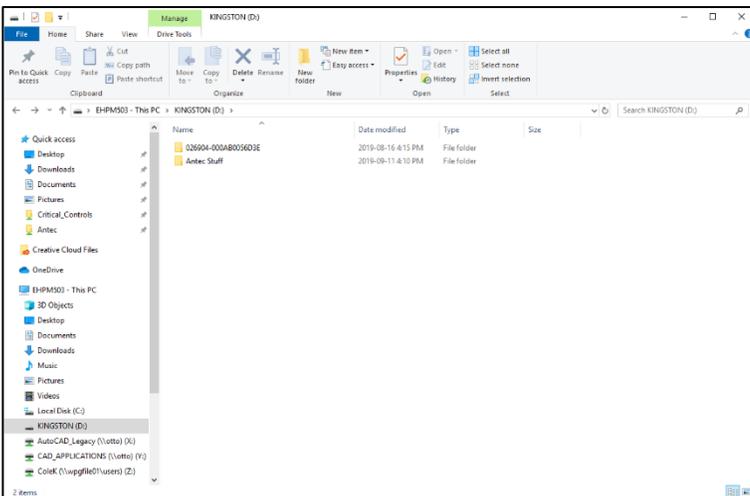
STEP 3

Select *Save L-VIS Project*.



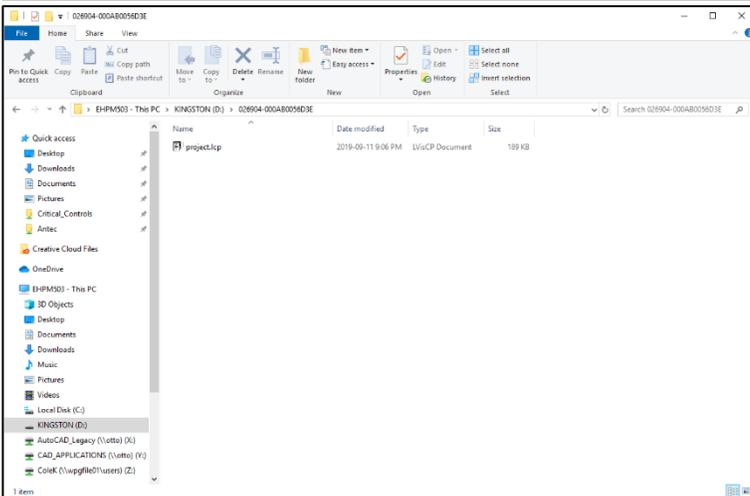
STEP 4

Remove the USB from MVM and insert it into your computer.



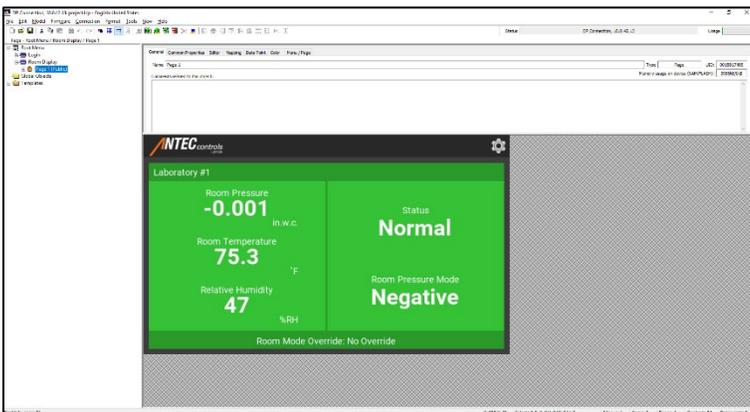
STEP 5

Open the folder with the project inside and select the file that is labeled as *project.lcp*.

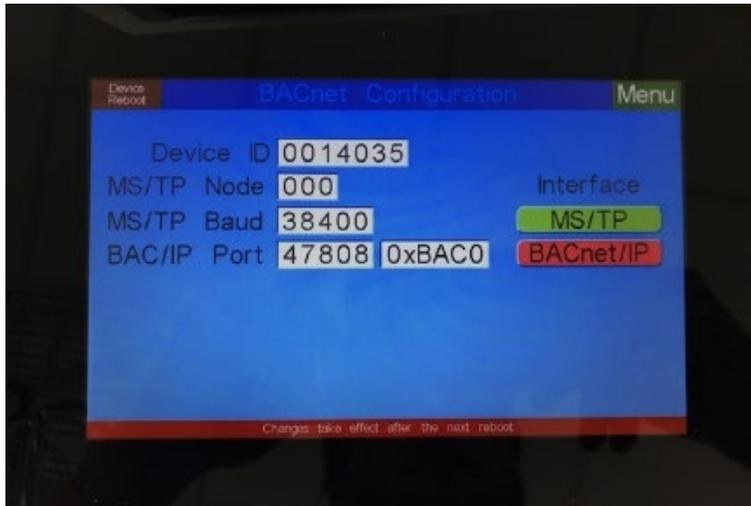


STEP 6

Once the project has been opened, reconnect to the MVM.



BACnet Network Scanning



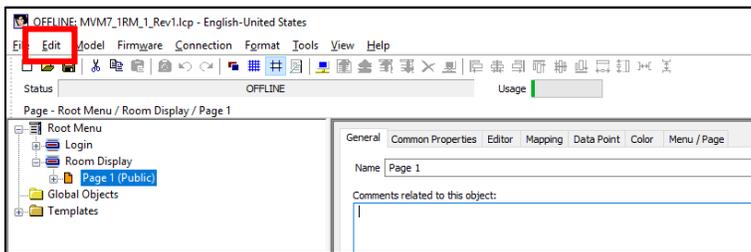
STEP 1

Plug USB into one of the two ports on the bottom of the MVM.



Ensure the Device ID, MS/TP Node, and MS/TP Baud Rate have been configured before scanning for BACnet points.

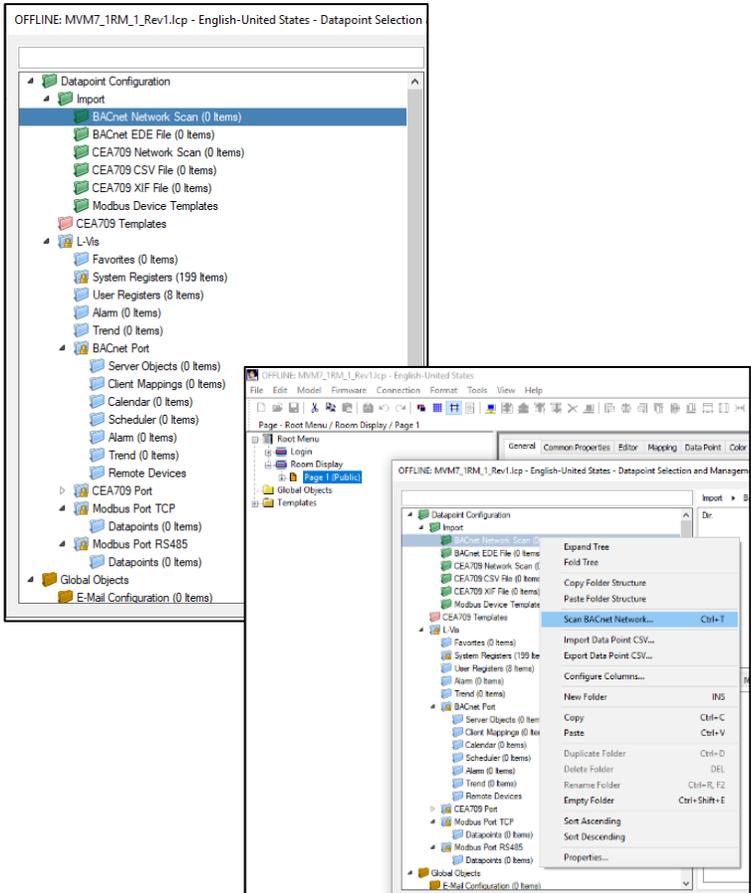
Select only an interface option for the physical connections to the MVM. If BACnet IP is not being used, then ensure it is not enabled in green (displayed in image).



STEP 2

Select *Edit* in the top bar of the configurator program.

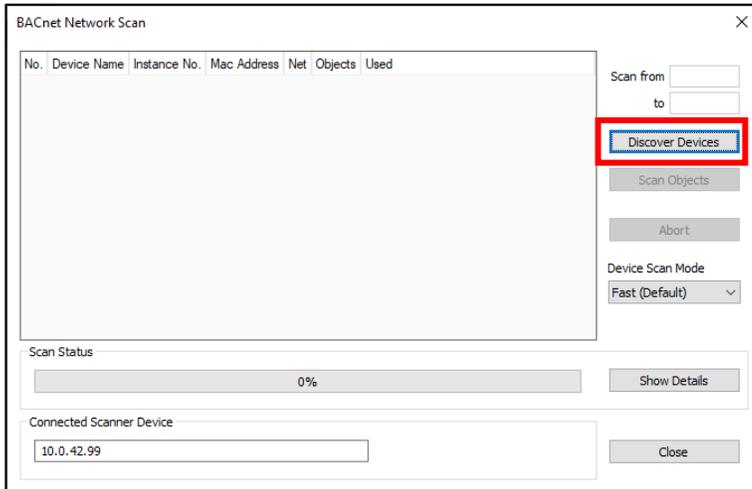
Select *Data Points* in the *Edit* dropdown menu.



STEP 3

Right click the green *BACnet Network Scan* folder.

Navigate the dropdown menu and select *Scan BACnet Network*.



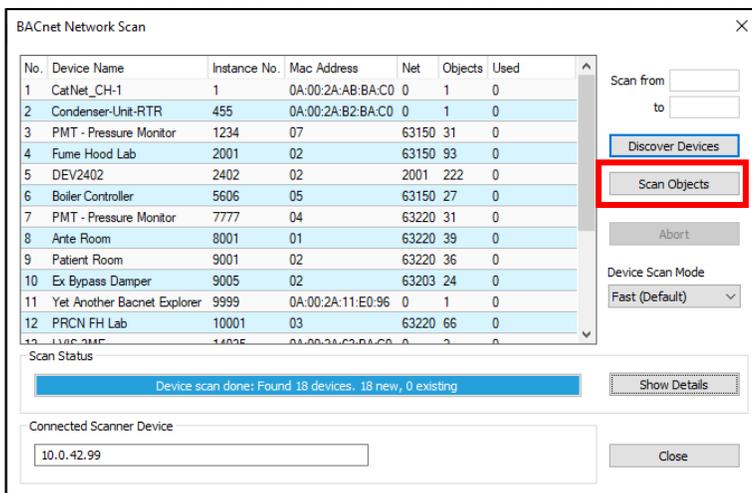
STEP 4

Select *Discover Devices*. This will pull in all the devices connected via MS/TP or BACnet IP.



CAUTION ▼

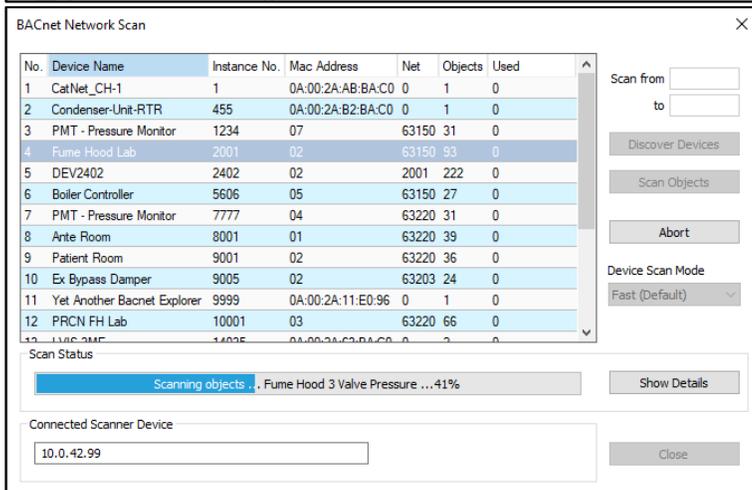
The list will auto-populate based on what the MVM is able to discover on the BACnet MS/TP or BACnet IP network. If having trouble finding the correct device, please check network settings and wiring.

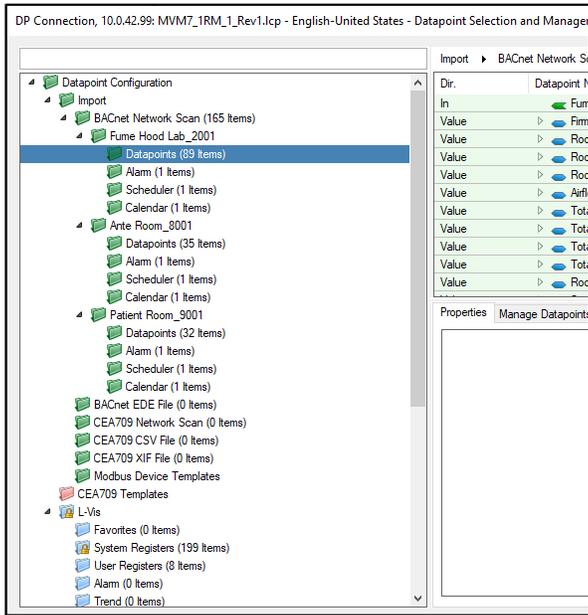


STEP 5

To discover the objects required, select the required device (Controller) so it is highlighted in blue. Then select *Scan Objects*. After all objects have been scanned, select *Close*.

NOTE: It may take a few minutes for the object scan to be completed.





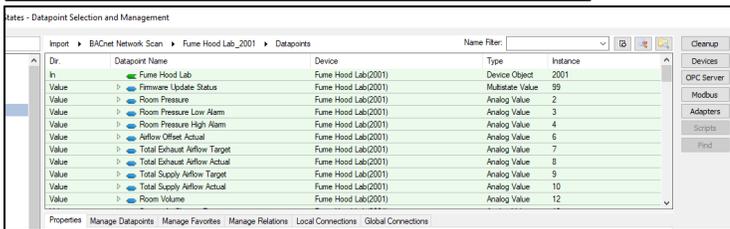
STEP 6

Select *Datapoints* underneath the object that was previously scanned.

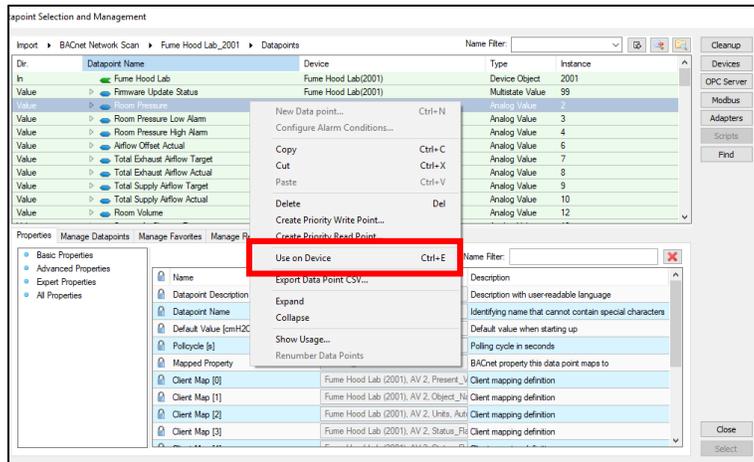
It will be located in the left-hand bar underneath:

BACnet Network Scan → *(Name of Object Scanned)* → *Datapoints*

NOTE: Once *Datapoints* has been selected and highlighted in blue, all associated datapoints will appear in the window to the right.



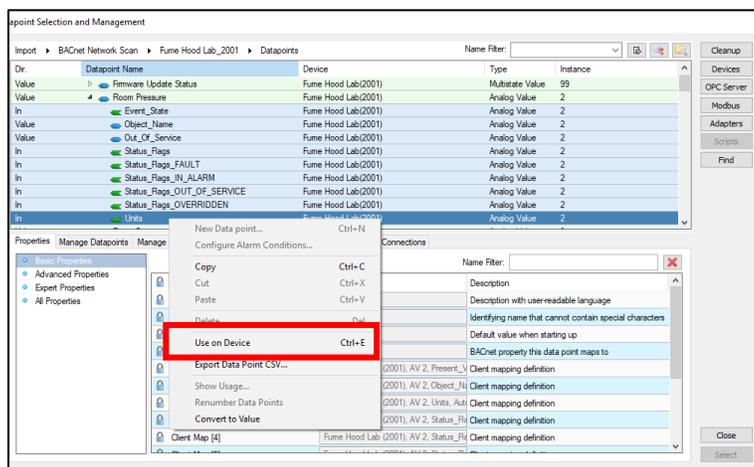
Adding Data Points to the Device



STEP 1

Underneath *Datapoint Name* find the datapoint you would like to pull information to the MVM. In this case we are pulling in *Room Pressure*.

Right click the point and select *Use on Device*.

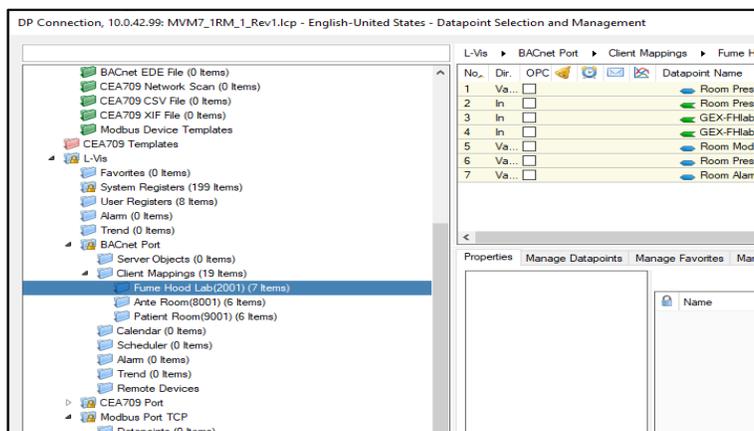


STEP 2

Select the clear arrow  to the left of the datapoint value. This will open more options for the point such as the *Object_Name* and *Units*. Right click on each of the datapoints and select *Use on Device*.

This will need to be completed for each datapoint on the MVM graphic. The usual points are *Room Pressure*, *Room Temperature*, *Relative Humidity*, *Room Mode*, *Room Pressure Mode* and *Occupancy*.

NOTE: If there are multiple rooms, the datapoints will need to be selected as *Use on Device* for each individual room.



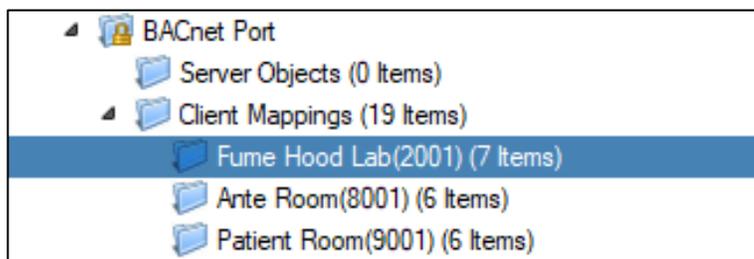
STEP 3

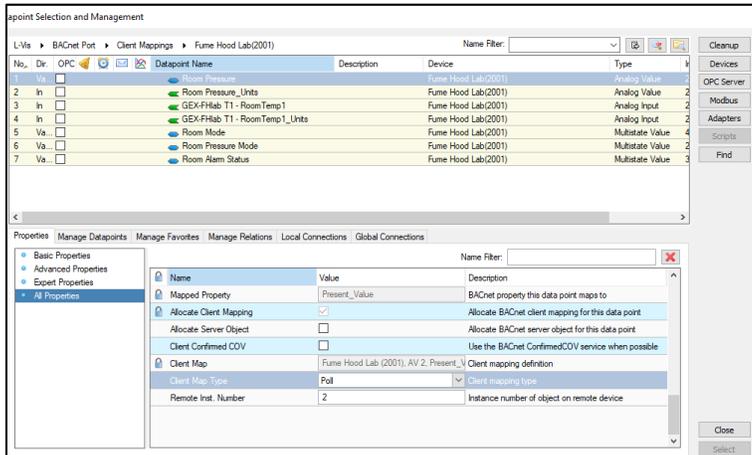
The points that were selected to be *Used on Device* will appear under blue folders:

BACnet Port → *Client Mappings* →
Device Name(Device Instance)(Number of Items)

To have the datapoints appear in the datapoint window, click and highlight the desired room.

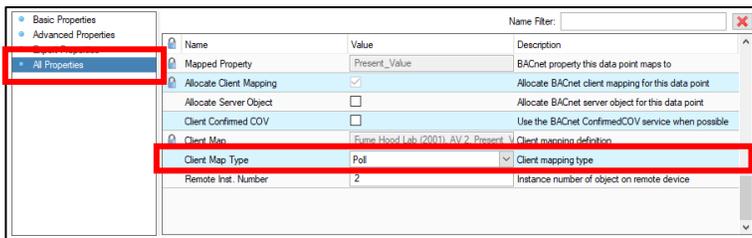
NOTE: In our example the Fume Hood Lab is highlighted and the 7 associated items are displayed in the datapoint window.





STEP 4

In the datapoint window, select the first datapoint by highlighting it in blue.



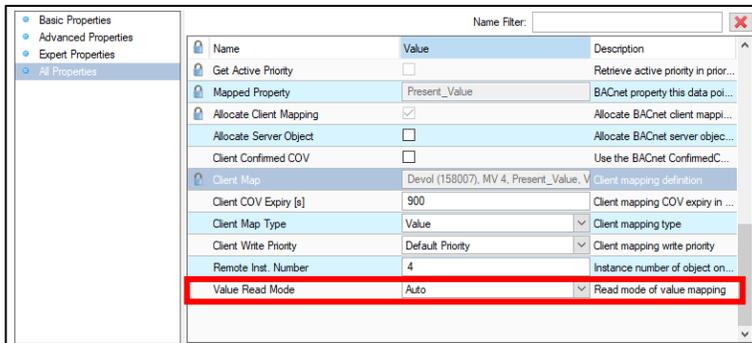
STEP 5

Select *All Properties* so it is highlighted in blue.

For any **Analog Inputs** or **Outputs** (Object types AI or AO):
 Scroll down to the bottom of the properties menu and find *Client Map Type*. Change this to *Poll*.

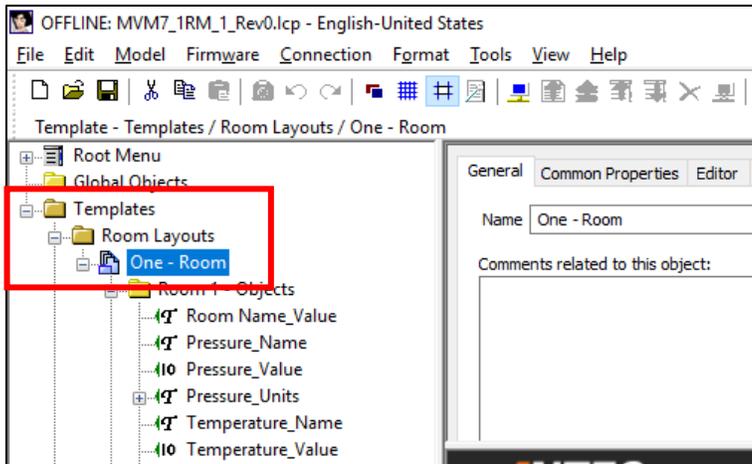
For any **Analog Values** or **Multistate Values** (Object types AV or MV):

Scroll down to the bottom of the properties menu and find *Value Read Type*. Change this to *Poll*.



This is a very important step to ensure the MVM is able to read and display the points.

Adding Data Points to the Main Screen

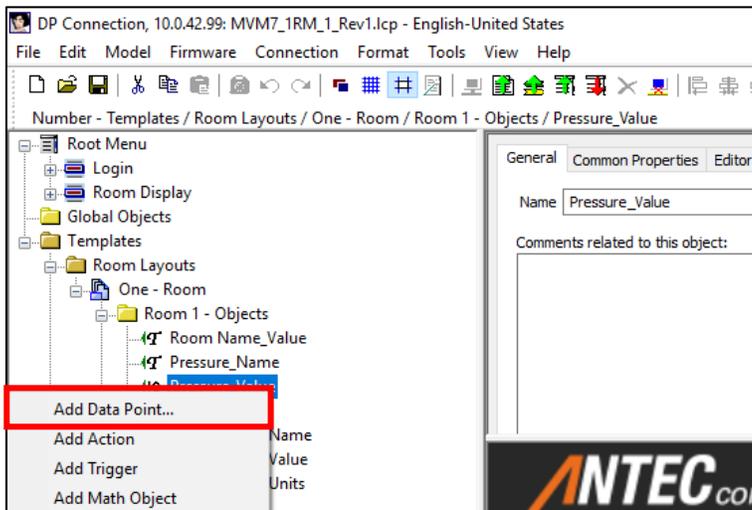


STEP 1

Expand the *Templates* tab in the left bar of the LVIS Configurator software.

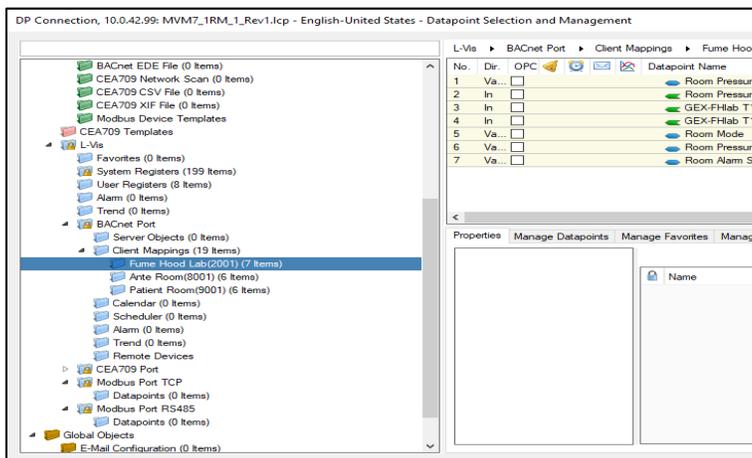


Do not work in the *Root Menu* portion of the software, as this may cause display issues that require further configuration.



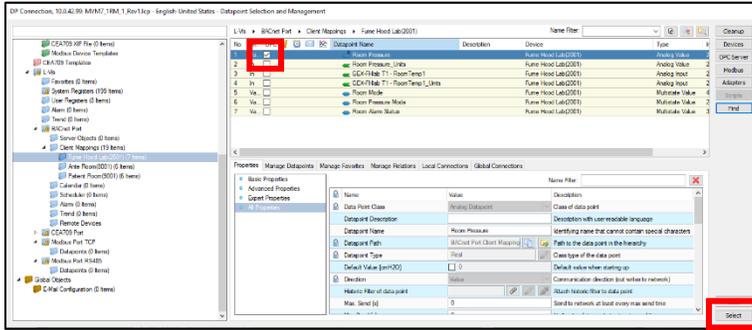
STEP 2

On the home screen in the *Room Layouts* menu, drop down the *Room - Objects* folder. Right click the datapoint value desired. Select *Add Data Point*.



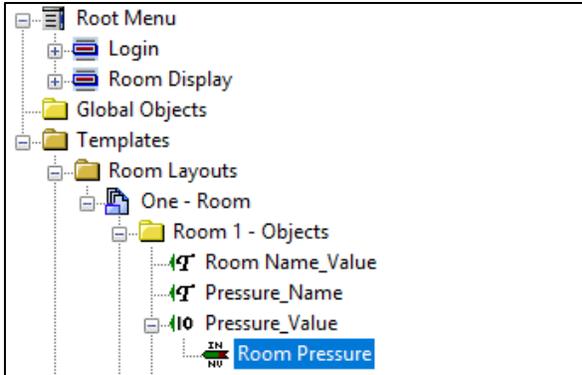
STEP 3

Scroll down the left-hand bar to *Client Mappings*. Underneath *Client Mappings*, select the room where the datapoints were added in the [Adding Data Points to the Device](#) section. Once the selection is highlighted in blue, the datapoints associated with that room will appear in the datapoint window.



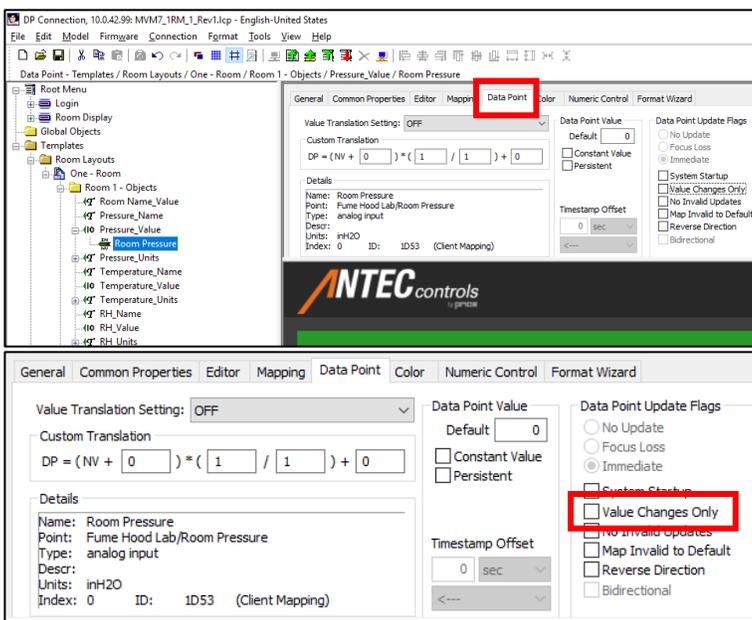
STEP 4

Select the check box for the desired point.
Press *Select* to add the datapoint to the main screen.



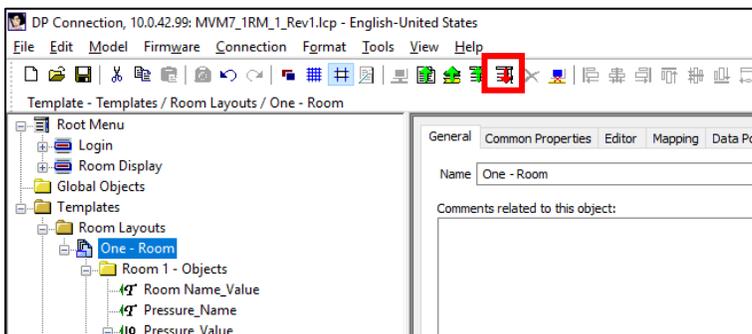
STEP 5

The selected datapoint should appear underneath the corresponding name.



STEP 6

In the top bar select the *Data Point* tab.
Ensure that the *Value Changes Only* box is deselected.
Repeat STEPS 1-6 for all required datapoints.



STEP 7

Once all points have been added, select the *Write Project to Device* button.

TROUBLESHOOTING

The following information is provided in the event the Multi-Variable Monitor (MVM) does not appear to be functioning normally after installation.

Problem	Solution
BACnet Communication Errors	<p>1. BACnet MS/TP is based on a RS-485 network. It must be wired in 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.</p> <div data-bbox="678 485 1214 646" style="text-align: center;"> </div> <p>Do not use Star, Bus, "T" or any other type of network configuration. Any of these other network configurations will result in an unreliable network and will make troubleshooting difficult.</p> <p>Correct polarity is imperative on MS/TP wiring. Always ensure that the positive terminal on a device has the same color wire connected to it throughout the network and same for the negative terminal, e.g. two wire conductor with black and white wire – black to the positive terminal and white to the negative terminal. Keep this consistent throughout the network.</p> <p>2. The network should be terminated twice: once at the beginning and again at the end of each run. This is strongly recommended. The network speed or Baud Rate must be the same throughout the network.</p> <p>NOTE: The default speed for Antec Controls BACnet MS/TP controls is 76,800. BACnet MS/TP currently supports 4 standard speeds which are: 9,600, 19,200, 38,400, 76,800.</p> <p>3. Binary address must be unique for each device on the network. No two devices can have the same address. This includes if you are incorporating an Antec Controls product onto an existing network. Determine the existing addressing scheme for the existing network. The address is set using the Network service menu.</p> <p>4. Ensure all connected devices are programmed with the predetermined device instances and mac addresses. If devices are not addressed correctly, then they will not display on the MVM or will display in the incorrect location.</p>
MVM screen not clearly visible (dim)	Adjust the brightness setting in the <i>Info</i> section of the Setup Menu.
MVM screen goes black when MS/TP wiring is connected	Check the polarity of the power wiring on the bottom of the MVM.
MVM goes blue after saving the configuration	Re-write the project to the device. Do not unplug your computer or close the software before re-writing the project.
Issue opening LVIS Configurator (VCRUNTIME140_1.dll)	<ol style="list-style-type: none"> 1. Go to the following website and download the latest version of the dll file: https://www.dll-files.com/vcruntime140_1.dll.html2. 2. Extract the dll file from the downloaded zip folder. 3. Right click on the LVIS Configurator program and select "Open file location" 4. Copy and paste the extracted dll file into the folder with the lviscp.exe file. 5. Restart your computer and then try reopening the LVIS Configurator program.
USB not connecting to MVM	Format of the USB stick should not be exFAT.

Replacement Parts

Replacement parts are available. Please contact your local Antec Controls Representative.

Technical Support

If technical support is required, please contact us:

By Email: Applications@AntecControls.com

By Phone: 866.884.3524

Hours of Operation: Monday – Friday, 8:00 AM to 4:30 PM CT

NOTE: If you will need support after hours, please contact us 48 hours in advance.



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The complete product catalog can be viewed online at AntecControls.com
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