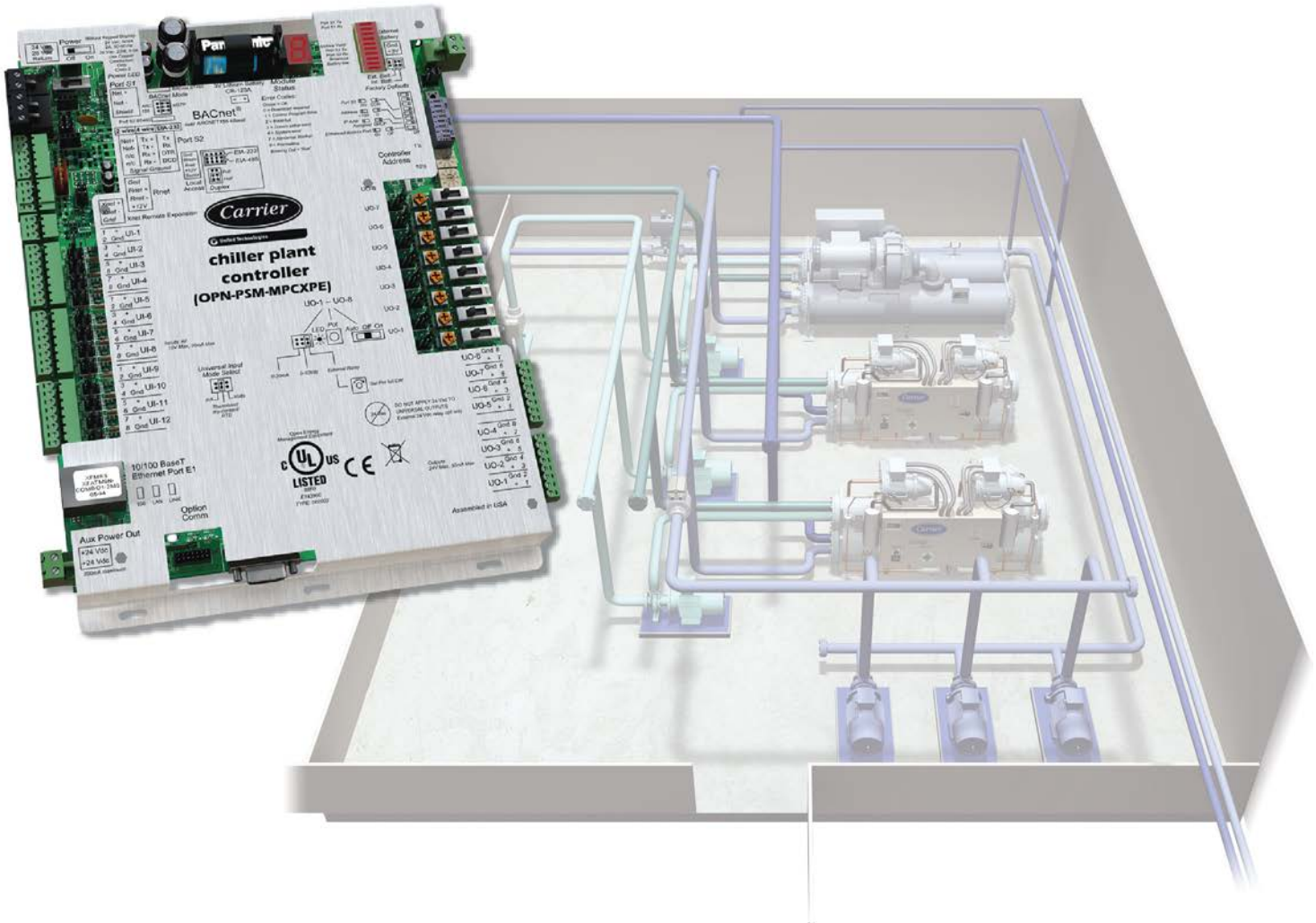
Carrier® ChillerVu™ (OPN-PSM-MPCXPE) Installation and Start-up Guide



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 Verify that you have the most current version of this document from **www.hvacpartners.com** or your local Carrier office.

Important changes are listed in **Document revision history** at the end of this document.

Contents

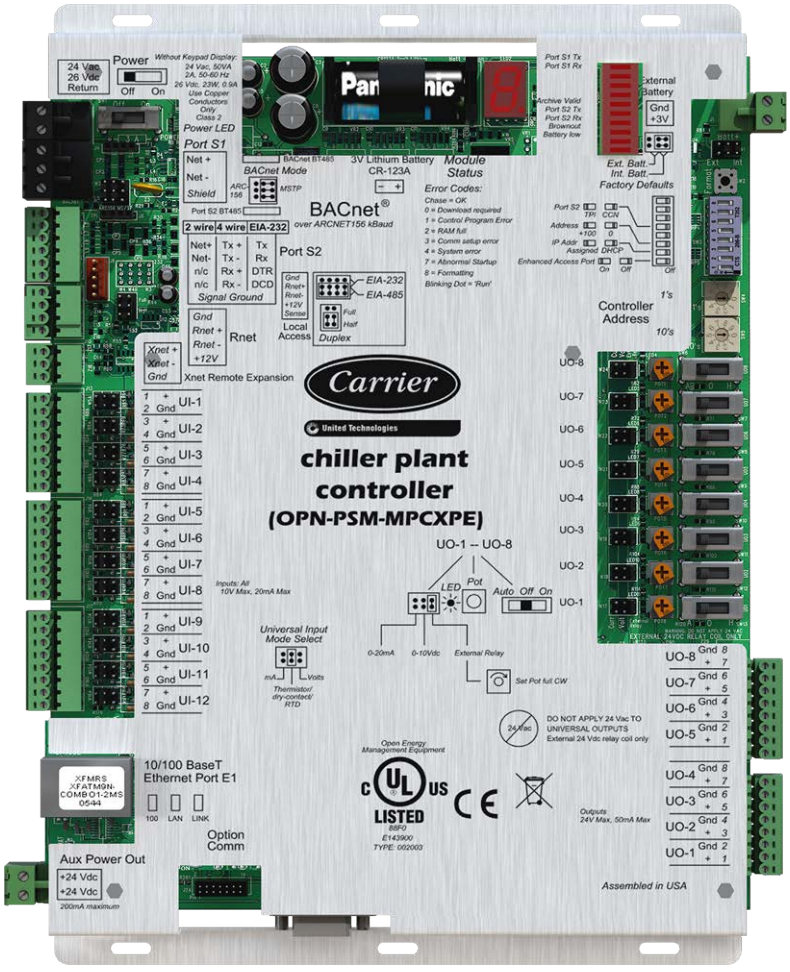
What is the Carrier® ChillerVu™?

Carrier part #OPN-PSM-MPCXPE

The Carrier® ChillerVu™ provides full and advanced chiller plant management using an EquipmentBuilder library of validated algorithms and strategies that enhance opreation. You can apply the algorithms as designed or customize them in the Snap application. You can also integrate the Carrier® ChillerVu™ with third party equipment using open protocols.

You can integrate with the following protocols:

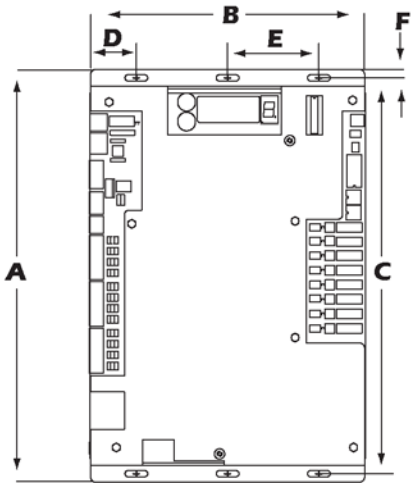
- BACnet/MS/TP
- BACnet ARC156
- BACnet TCP/IP
- Modbus
- LonWorks Explicit
- CCN



Carrier® ChillerVu™ specifications

Driver	drv_psmio_6.02.028 or later
Maximum number of control programs*	999
Maximum number of BACnet objects*	12000
Maximum number of third-party integration points using Snap*†	1000
* Depends on available memory † BACnet third-party integration points are not counted.	
Power	24 Vac ±10%, 50–60 Hz 50 VA power consumption 26 Vdc (25 V min, 30 V max), 23 W Single Class 2 source only, 100 VA or less
10/100 BaseT Ethernet Port	For communication on the Ethernet at 10 or 100 Mbps, half duplex For LAN, BACnet/Ethernet, BACnet/IP, and/or Modbus TCP/IP communications
BACnet port S1	For communication with the controller network using BACnet ARC156 (156 kbps) or BACnet MS/TP (9600 bps – 76.8 kbps)
Port S2	For communication on EIA-232 or EIA-485 (2-wire or 4-wire) Network protocol selectable for: • CCN • Modbus • LonWorks Option Card • LonWorks SLTA
Option Comm	For LonWorks Option Card
Rnet port	The standard control programs that are included with the Carrier® ChillerVu™ library do not use communicating sensors or the Equipment Touch. A custom control program could allow you to use and connect the following to the Rnet port: • Up to 15 ZS sensors (5 per control program) • One Wireless Adapter that communicates with up to 15 wireless sensors • One Equipment Touch • Up to 4 SPT Standard sensors and one SPT Plus, SPT Pro, or SPT Pro-F sensor **NOTE** ZS sensors, a Wireless Adapter, and an Equipment Touch can share the Rnet, but not SPT sensors.
Local Access port	For system start-up and troubleshooting
Xnet Remote Expansion port	For communication with expanders MPC Open XPIO48 and/or MPC Open XPIO816. Up to 6 expanders with a maximum of 164 points between the Carrier® ChillerVu™ and the expanders.
Inputs	12 inputs, configurable for 0–5 Vdc, 0–10 Vdc, 0–20 mA, RTD, thermistor, or dry contact

Input resolution	14 bit A/D
Input pulse frequency	40 pulses per second. Minimum pulse width (on or off time) required for each pulse is 12.5 msec.
Outputs	8 outputs for 24 Vdc relay driver, 0–10 Vdc, or 0-20 mA. Does not support dry contact output channels.
Output resolution	12 bit D/A
Memory	16 MB non-volatile battery-backed RAM (with 12 MB available for use), 8 MB Flash memory, 32-bit memory bus
Real-time clock	Battery-backed real-time clock keeps track of time in event of power failure
Battery	10-year Lithium CR123A battery ensures the following data is retained for a maximum of 720 hours during power outages: • Control Programs • Schedules • Trends • Driver To conserve battery life, you can set the driver to turn off battery backup after a specified number of days and depend on the archive function to restore data when the power returns. A low battery is indicated by the **Battery Low** LED or a low battery alarm in the i-Vu® application or a touchscreen device.
Protection	Incoming power - replaceable 3 Amp Pico® fuse Network connections - non-replaceable internal solid-state polyswitches reset themselves when fault clears Power, network, I/O connections - protected against voltage transient and surge events
BT485 connector	You can install a BT485 (#BT485 - sold separately) to a Carrier® ChillerVu™ at the beginning and end of a network segment to add bias and to terminate a network segment.
Status indicators	LED's indicate status of communications and low battery status. Seven segment display indicates running, error, and power status.
Environmental operating range	0 to 140° F (-18 to 60°C), 0 to 90% relative humidity, non-condensing
Storage temperature range	-24 to 140°F (-30 to 60°C), 0 to 90% relative humidity, non-condensing
Physical	Rugged aluminum cover, removable screw-type terminal blocks



Overall dimensions	A: B:	11-5/16 in. (28.7 cm) 7-1/2 in. (19 cm)
Mounting dimensions	C: D: E: F:	10-7/8 in. (27.6 cm) 1-1/4 in. (3.2 cm) 2-1/2 in. (6.4 cm) 1/4 in. (.6 cm)
Depth	1-7/16 in. (3.7 cm)	
Weight	1.7 lbs (0.8 kg)	
Listed by	UL-916 (PAZX), cUL-916 (PAZX7), FCC Part 15-Subpart B-Class A, CE	

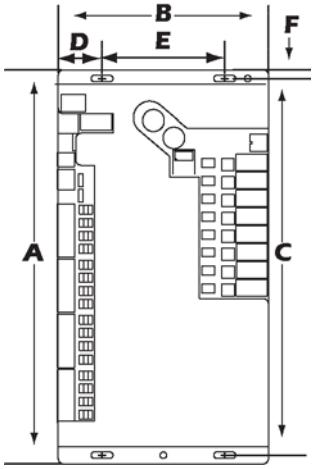
Using expanders

The MPC Open XPIO48 (#OPN-MPCXPIO48) and MPC Open XPIO816 (#OPN-MPCXPIO816) are expanders that connect to the Carrier® ChillerVu™ to increase the number of inputs and outputs. You can attach up to 6 expanders, using any combination of MPC Open XPIO48 and/or MPC Open XPIO816 expanders connected to the Xnet.

See *MPC Open EXPIO expander installation* (page 12).

MPC Open XPIO48 and MPC Open XPIO816 specifications

Power	**MPC Open XPIO48** 24 Vac ±10%, 50–60 Hz 40 VA power consumption 26 Vdc (25 V min, 30 V max), 21 W Single Class 2 source only, 100 VA or less **MPC Open XPIO816** 24 Vac ±10%, 50–60 Hz 45 VA power consumption 26 Vdc (25 V min, 30 V max), 21 W Single Class 2 source only, 100 VA or less
Inputs	**MPC Open XPIO48** 8 inputs, configurable for 0–5 Vdc, 0–10 Vdc, 0–20 mA, RTD, thermistor, or dry contact **MPC Open XPIO816** 16 inputs, configurable for 0–5 Vdc, 0–10 Vdc, 0–20 mA, RTD, thermistor, or dry contact
Input resolution	14 bit A/D
Input pulse frequency	40 pulses per second. Minimum pulse width (on or off time) required for each pulse is 12.5 msec.
Outputs	**MPC Open XPIO48** 4 outputs for 24 Vdc relay driver, 0–10 Vdc, or 0-20 mA **MPC Open XPIO816** 8 outputs for 24 Vdc relay driver, 0–10 Vdc, or 0-20 mA
Output resolution	12 bit D/A
Microprocessor	8-bit microprocessor with 60 kB Flash memory, 2 kB SRAM, and CAN controller
Protection	Incoming power - 2 replaceable 3 Amp Pico® fuses Power, network, I/O connections - protected against voltage transient and surge events
Status indicators	LED's indicate status of communications, running, errors, and outputs
Environmental operating range	-20 to 140°F (-29 to 60°C), 10–90% relative humidity, non-condensing **NOTE** Install in a UL Listed enclosure only.
Storage temperature range	-24 to 140°F (-30 to 60°C), 0 to 90% relative humidity, non-condensing
Physical	Rugged aluminum cover, removable screw-type terminal blocks



Overall dimensions	A: B:	9 in. (22.9 cm) 4-13/16 in. (12.2 cm)
Mounting dimensions (in a panel)	C: D: E: F:	8-5/8 in. (21.8 cm) 1 in. (2.5 cm) 2-13/16 in (7.1 cm) 1/4 in. (.6 cm)
Depth	1-7/16 in. (3.7 cm)	
Weight	13.3 oz. (.377 kg)	
Listed by	UL-916 (PAZX), cUL-916 (PAZX7), FCC Part 15-Subpart B-Class A, CE	

Safety considerations

WARNING Disconnect electrical power to the Carrier® ChillerVu™ before wiring it. Failure to follow this warning could cause electrical shock, personal injury, or damage to the controller.

Mounting the Carrier® ChillerVu™

WARNING

When you handle the Carrier® ChillerVu™:

- Do not contaminate the printed circuit board with fingerprints, moisture, or any foreign material.
- Do not touch components or leads.
- Handle the board by its edges.
- Isolate from high voltage or electrostatic discharge.
- Ensure that you are properly grounded.

Screw the Carrier® ChillerVu™ into an enclosed panel using the mounting slots on the cover plate. Leave about 2 in. (5 cm) on each side of the controller for wiring. See mounting dimensions in Specifications.

If using expanders, see *Installing an expander* (page 12) before mounting the controller.

Wiring the Carrier® ChillerVu™ for power

WARNING Do not apply line voltage (mains voltage) to the controller's ports and terminals.

CAUTIONS

- The Carrier® ChillerVu™ is powered by a Class 2 power source. Take appropriate isolation measures when mounting it in a control panel where non-Class 2 circuits are present.
- Carrier controllers can share a power supply as long as you:
  - Maintain the same polarity.
  - Use the power supply only for Carrier controllers.

To wire for power

1. Turn off the Carrier® ChillerVu™'s power switch to prevent it from powering up before you can verify the correct voltage.
2. Remove primary power from the 24 Vac transformer.
3. Pull the screw terminal connector from the controller's power terminals labeled **Return** and **24 Vac/26 Vdc**.
4. Connect the transformer wires to the screw terminal connector.
5. Apply primary power to the transformer.
6. Measure the voltage at the controller's power screw terminal connector to verify that the voltage is within the operating range of 21.6 - 26.4 Vac.
7. Insert the screw terminal connector into the controller's power terminals.
8. Turn on the Carrier® ChillerVu™'s power switch.
9. Verify that the Power LED is on and the Run LED is blinking.

Addressing the Carrier® ChillerVu™

The Carrier® ChillerVu™ needs two addresses, one for the BACnet system and one for the IP network.

The Carrier® ChillerVu™ needs...	That is unique on the...	Notes	See...
A BACnet Device Instance	BACnet system	You set the Carrier® ChillerVu™ address on the controller's rotary switches. **NOTE** The Carrier® ChillerVu™ address is also used to autogenerate the BACnet Device Instance/Name for the router and the MS/TP network number for the Open network. See *Configuring BACnet device instance and network number*.	To set the controller's Device Instance
An IP address	IP network	You can use one of the following:	
		• The **default** IP address that your system creates: ○ IP address = 192.168.168.**x** where **x** is the controller network MAC address. ○ Subnet mask = 255.255.255.0	*To use a default IP address* (page 10)
		• A DHCP IP address	*To use a DHCP IP address* (page 11)
		• Assign a **custom** IP address	*To use a custom IP address* (page 11)

NOTES

- Carefully plan your addressing scheme to avoid duplicating addresses. If third-party devices are integrated into the system, make sure your addresses do not conflict with their addresses.
- The controller's BACnet network and IP address can be configured using the Local Access port. See *To communicate through the Local Access port with a USB Link* (page 52).

To choose an IP addressing scheme

Carefully plan your addressing scheme to avoid duplicating addresses.

By default, the Carrier® ChillerVu™ is set up for assigned IP addressing. The default IP address settings are as follows:

- IP address = 192.168.168.x, where x = Carrier® ChillerVu™ address (rotary switch settings)
- Subnet Mask = 255.255.255.0
- Default Gateway = 192.168.168.254

- **DHCP** — If there is a DHCP server on the network, and if you have a single Carrier® ChillerVu™ or multiple Carrier® ChillerVu™s that exist on the SAME subnet, use DHCP addressing. Skip to the section *To obtain an IP address using DHCP* (page 11).
- **Custom IP addressing** — If you have multiple Carrier® ChillerVu™s that reside on different subnets, you cannot use DHCP addressing. Instead, give each Carrier® ChillerVu™ an assigned IP address. Skip to the section *To assign a custom IP address* (page 11).

  NOTE This network configuration also requires that you configure IP Broadcast Management Devices (BBMDs). See *To set up BACnet Broadcast Management Devices.* (page 41)

To use a default IP address

CAUTION The IP address must be unique on the Ethernet.

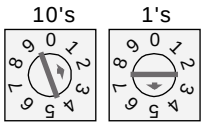
1 If wired for power, turn off the controller's power.

2 The controller only reads the rotary switch positions during power up or upon reset.

3 Set the **IP Addr** DIP switch to **Assigned** (**On**).

4 Use the rotary switches to set the Carrier® ChillerVu™'s address. Set the **Tens** (**10's**) switch to the tens digit of the address, and set the **Ones** (**1's**) switch to the ones digit.

  EXAMPLE If the controller's address is 25, point the arrow on the **Tens** (**10's**) switch to 2 and the arrow on the **Ones** (**1's**) switch to 5.



5 Set the **+100/0** DIP switch to **On** to add 100 to **x** in the IP address.

  EXAMPLE If you turn on this DIP switch and the controller network MAC address is 25, the IP address is 192.168.168.125.

6 Connect Port E1, which is the only port that speaks BACnet over IP.

The default address is an intranet address. Data packets from this address are not routable to the Internet.

To obtain an IP address using DHCP

1. Turn the Carrier® ChillerVu™'s power off.
2. Check the communications wiring for shorts and grounds.
3. Set the **IP Addr** DIP switch to **DHCP** (**Off**).
4. Set **Enhanced Access Port** DIP switch to **Off**.
5. Connect Port E1, which is the only port that speaks BACnet over IP.
6. Turn the Carrier® ChillerVu™'s power on. The DHCP server assigns an IP address to the Carrier® ChillerVu™.
7. Set a unique Device Instance number using a touchscreen device, Hyperterminal, or PuTTY.
8. Turn the controller's power off, then on again.

To assign a custom IP address

1. Obtain the IP address, subnet mask, and default gateway address for the controller from the facility network administrator.
2. Turn off the controller's power
3. Set the Carrier® ChillerVu™'s **Enhanced Access** DIP switch to **ON**.
4. Set the **IP Addr** DIP switch **Assigned** to **On**.
5. Turn on the controller's power.
6. Use *PuTTY* (page 53) or Hyperterminal to set the custom IP address, Subnet mask, and default Gateway.
7. When finished, turn off the controller's power and set the Carrier® ChillerVu™'s **Enhanced Access** DIP switch to **Off** to restore normal functionality to the **Local Access** port.
8. Connect Port E1, which is the only port that communicates BACnet over IP.

   Wiring Specifications

   - 328 feet (100 meters)
   - Use one of the following CAT5 or higher Ethernet cables:
     - A cross-over cable to connect the Carrier® ChillerVu™ directly to the third-party device
     - A straight-through cable to connect the Carrier® ChillerVu™ to a hub or switch, and a second straight-through cable to connect the hub or switch to the third-party device

   NOTE Use the same polarity throughout the network segment.
9. Turn on the controller's power.

Installing an MPC Open XPIO expander

To install the MPC Open XPIO48 and/or the MPC Open XPIO816:

1 *Mount the expander* (page 12).

2 *Wire the expander for power* (page 14).

3 *Attach the expander* (page 14).

4 *Address the expander* (page 15).

5 *Wire inputs and outputs* (page 16).

To mount an expander

WARNING

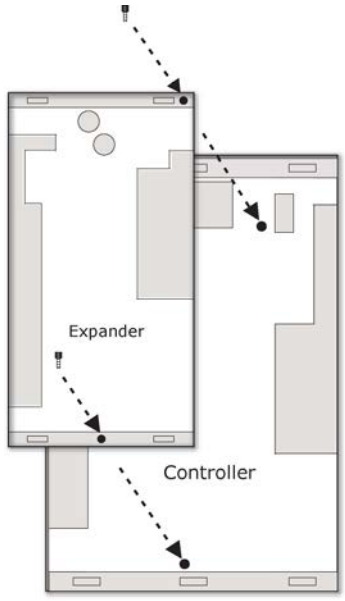
When you handle the expander:
- Do not contaminate the printed circuit board with fingerprints, moisture, or any foreign material.
- Do not touch components or leads.
- Handle the board by its edges.
- Isolate from high voltage or electrostatic discharge.
- Ensure that you are properly grounded.

Wiring restrictions for connecting the expander to the Carrier® ChillerVu™

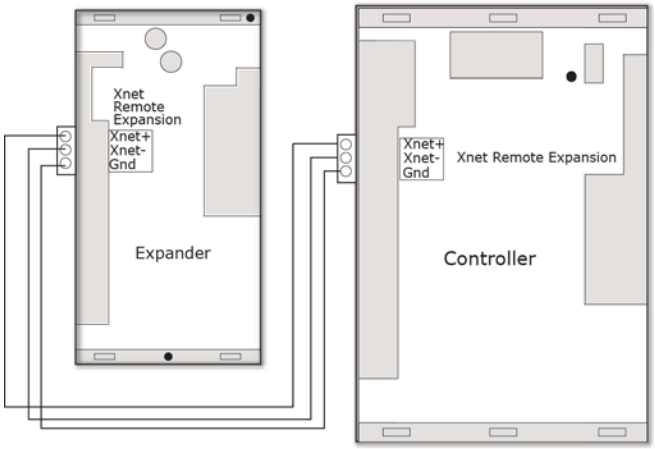
- Maximum length: 100 feet (30 meters)
- 22 or 24 AWG, low-capacitance, twisted, stranded, shielded copper wire

You can mount the expander in one of the following locations:

- On top of a Carrier® ChillerVu™, using the two allen cap screws provided. Connect **Gnd** to **Gnd**, **Xnet-** to **Xnet-**, **Xnet+** to **Xnet+**.



- Beside the Carrier® ChillerVu™, by screwing the expander into an enclosed panel using the mounting slots on the coverplate. Leave about 2 in. (5 cm) on each side of the expander for wiring. Mounting hole dimensions 1.5" from the left (width) by 10.2" (height). Connect **Gnd** to **Gnd**, **Xnet-** to **Xnet-**, **Xnet+** to **Xnet+**. You can mount the expander up to 100 ft away from the controller.



To wire the expander for power

CAUTIONS

- The expanders are powered by a Class 2 power source. Take appropriate isolation measures when mounting it in a control panel where non-Class 2 circuits are present.
- For the Carrier® ChillerVu™ to recognize an attached expander, you must turn on the expander before you turn on the controller.

1. Verify that the expander's power switch is in the **Off** position.
2. Connect the 24 Vac power source to the **24 Vac/26 Vdc** and **Return** terminals, being sure to maintain proper polarity if power is being shared.
3. Turn on the expander's power switch.
4. Verify that the expander's **Power** LED is on and the **Run** LED is blinking.

To attach expanders

Do not exceed 100 feet total wire length.

1. Wire the controller's **Xnet Remote Expansion** port to the same port on the expander.

   Connect:

   - Gnd to Gnd
   - Xnet- to Xnet-
   - Xnet+ to Xnet+

   NOTE To use more than one expander, wire their **Xnet Remote Expansion** ports together in a daisy-chain configuration. The Carrier® ChillerVu™ must be the first device on the expander network.

2. You must set the Xnet baud rate to 500 kbps in the i-Vu® interface on the driver's **Xnet** page. See To set up the driver.
3. If the expander network has more than one expander, place the **Term** jumper in the down position or remove it from all expanders except the one at the end of the expander network. The **Term** jumper must be in the up position on the expander at the end of the network.

To set the expander's address

You must give the expanders an address that is unique on the expander network.

1 If wired for power, turn off the expander's power and the attached controller's power.

2 Set the expander's address on the rotary switch.

EXAMPLE If the controller's address is 2, point the arrow on the switch to 2.

NOTE The Carrier® ChillerVu™ can have a maximum of 6 expanders. You MUST address the expanders as 1 through 6. Higher addresses will not work.

3 Turn on the expander's power and then turn on the attached controller's power. The controller reads the powered expander's address each time you turn on the controller.

⚠ **CAUTION** The first time the controller communicates with an expander, it triggers a software download. This may occur if the expander(s) are blank (not a normal condition) and in cases where the controller's driver has been updated. During that time, the red **Error** LED and the green **Run** LED on the expander(s) flash in sequence. This process may take several minutes to complete. Do not disconnect power or communications wiring during this download.

Wiring inputs and outputs

WARNING Do not apply line voltage (mains voltage) to the controller's ports and terminals.

See the *Appendix* (page 63) to print a blank wire list.

Input wiring specifications

Input	Maximum length	Minimum gauge	Shielding
0–5 Vdc 0–10 Vdc	500 feet (152 meters)	22 AWG	100 feet Unshielded 100 - 500 feet Shielded
0–20 mA	1000 feet (305 meters)	22 AWG	100 feet Unshielded 100 - 1000 feet Shielded
Thermistor Dry contact Pulse counter TLO	500 feet (152 meters)	22 AWG	100 feet Unshielded 100 - 500 feet Shielded
RTD	100 feet (30 meters)	22 AWG	Shielded
ZS or SPT sensors	500 feet (152 meters)	18 AWG 22 AWG	Shielded or unshielded
Wireless Adapter for Wireless sensors	500 feet (152 meters)	22 AWG	Shielded or unshielded
Equipment Touch device	500 feet (152 meters)	22 AWG (7x0096) bare copper	If shielded, Aluminum/Mylar shield (100% coverage) with TC drain wire

Inputs

The Carrier® ChillerVu™ and expanders have universal inputs that accept the signal types described below.

Signal Type	Description
Thermistor [1]	Precon type 2 (10 kOhm at 77°F). Input voltages should be from 0.489 Vdc to 3.825 Vdc for thermistors. Thermistor 5 kOhm at 77°F (25°C)
Dry contact	A 5 Vdc wetting voltage detects contact position, resulting in a 1 mA maximum sense current when the contacts are closed.
0–5 Vdc 0–10 Vdc	The output impedance of a 0–5 Vdc or a 0–10 Vdc source must not exceed 200 Ohms. The input impedance of the Carrier® ChillerVu™ is approximately 20 kOhm.
0–20 mA	The input resistance on the positive (+) terminal is 250 Ohms. The **Aux Power Out** connector is capable of supplying 24 Vdc to multiple 4–20 mA transducers, but the total current demanded must not exceed 200 mA. If the voltage measured from the **Aux Power Out** connector to **Gnd** is less than 18 Vdc, you need to use an external power supply.
RTD [1]	Platinum - 1 kOhm at 32°F (0°C) Nickel/Iron - 1 kOhm at 70°F (21°C) Balco TS8000 - 1 kOhm at 70°F (21°C) Input voltages should be from 0.6–1.2 V **NOTE** For improved accuracy, Carrier recommends using an external current transducer-type RTD, when RTD's are required with the Carrier® ChillerVu™. Be aware that milliamp-type sensors require different jumper settings and different wiring arrangements.
Pulse counter [2]	Pulse counting up to 40 pulses per second. Minimum pulse width (on or off time) required for each pulse is 12.5 msec.

[1] To use a thermistor or RTD not listed above, you can set up a custom translation table for your sensor.

[2] The Carrier® ChillerVu™ can perform pulse counting for dry contact or voltage inputs if you assign the input to a Pulse to Analog Input microblock.

NOTE If you have one or more RTD's connected to the inputs, the total current draw of all Thermistor, RTD, and Dry contact devices wired to the inputs should not exceed 10 mA. Exceeding this limit affects the accuracy of the RTD's. Use the following approximations as a reference:

- 10 kOhm Thermistor draws approximately 0.334 mA.
- 1 kOhm RTD draws approximately 0.834 mA.
- Dry contact draws approximately 1 mA.

For example, if using an expander with 12 RTD's connected to the inputs, the remaining 4 inputs cannot be used. This assumes negligible wiring impedance (<10 Ohms) for each RTD input, with up to 100 feet of 22 AWG cable.

Output wiring specifications

To size output wiring, consider the following:

- Total loop distance from the power supply to the controller, and then to the controlled device

  NOTE Include the total distance of actual wire. For 2-conductor wires, this is twice the cable length.

- Acceptable voltage drop in the wire from the controller to the controlled device
- Resistance (Ohms) of the chosen wire gauge
- Maximum current (Amps) the controlled device requires to operate

Outputs

The Carrier® ChillerVu™ and expanders have universal outputs that you can use as binary outputs or analog outputs. The outputs support:

- driving external 24 Vdc relays
- 0-10 Vdc devices
- 0-20 mA devices

WARNING Binary outputs are powered, 24 Vdc channels. Dry contact binary outputs are not supported in this product line. Do NOT apply 24 Vac to these universal outputs.

If output controls a...	Resistance to ground must be...
0–10 Vdc device	500 Ohms minimum
0–20 mA device	800 Ohms maximum

NOTES

- The device must share the same ground as the controller.
- The total output current from all outputs and the **Aux Power Out** connection must not exceed:

  500 mA at 115°F
  300 mA at 140°F

  For temperatures above 115°F, use the following equation to calculate the total current at 8 mA per degree:

  500mA - ((max. expected temp. - 115°F) * 8mA)

To wire inputs and outputs

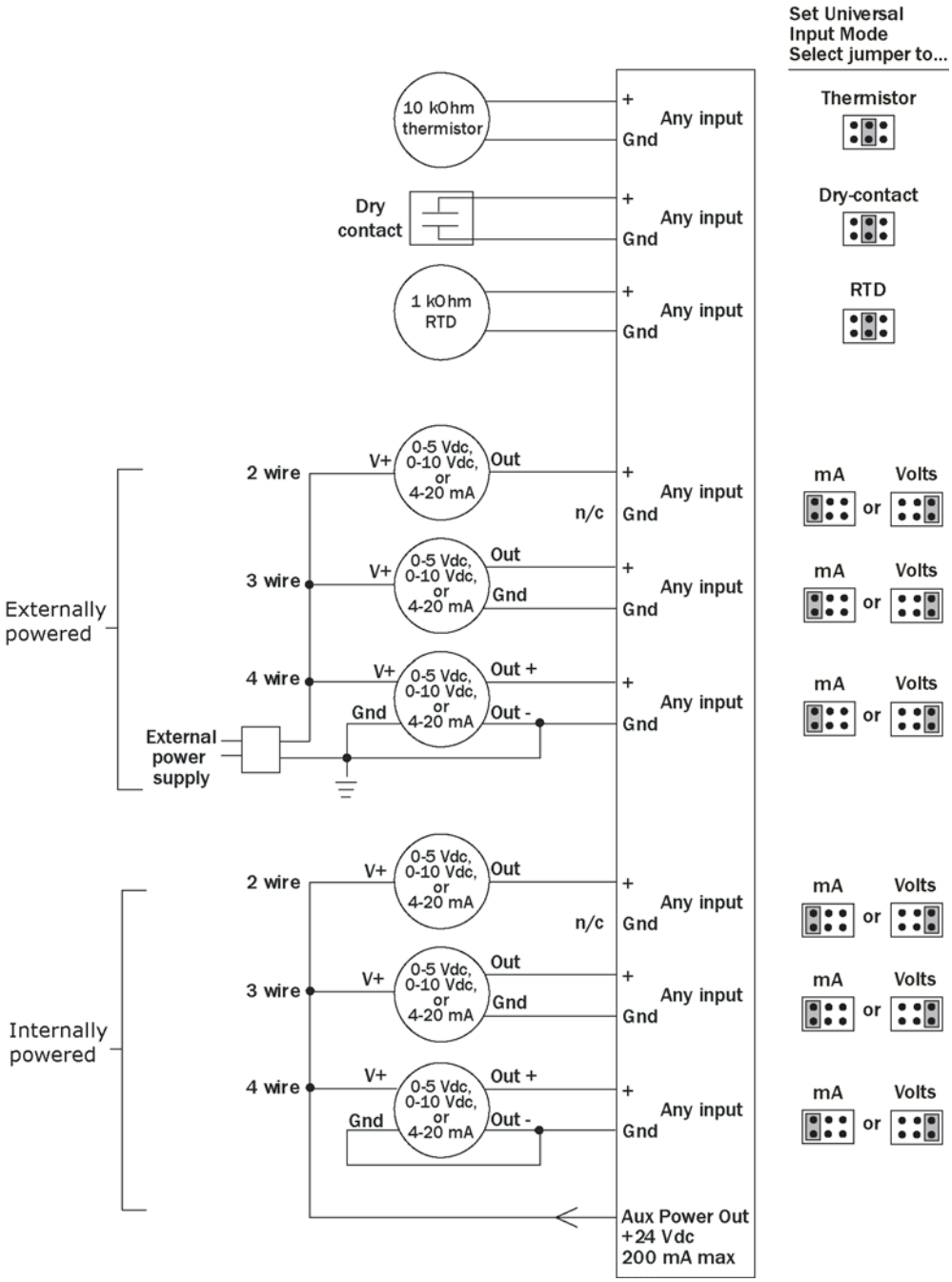
WARNING Do not apply line voltage (mains voltage) to the controller's ports and terminals.

The following applies to the inputs and outputs on the Carrier® ChillerVu™ and expanders.

1. Verify that the Carrier® ChillerVu™'s power and communications connections work properly.
2. Turn **off** the Carrier® ChillerVu™'s power.
3. Connect the input wiring to the screw terminals on the controller or expander. See figure below.

   NOTES

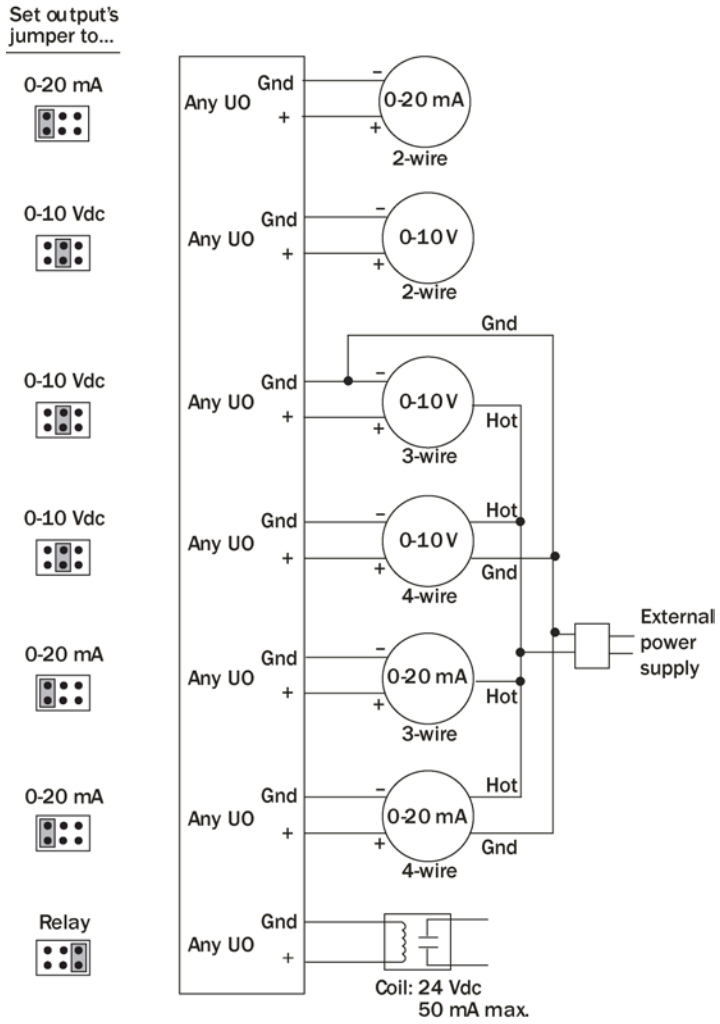
   - Connect the shield wire to the **GND** terminal with the ground wire.
   - For a loop-powered 4-20 mA sensor, wire the sensor's positive terminal to the **+** terminal on the Carrier® ChillerVu™'s **Aux Power Out** connector. Wire the sensor's negative terminal to an input's **+** terminal.



4 Set each input's **Universal Input Mode Select** jumper to indicate the type of input.

5 Connect digital and analog output wiring to the **UO** screw terminals on the Carrier® ChillerVu™ and to the controlled device. Connect the ground wire to the UO's **Gnd** terminal.

WARNING! Binary outputs are powered, 24 Vdc channels. Dry contact binary outputs are not supported in the Carrier® ChillerVu™ product line. Do NOT apply 24 Vac to these universal outputs.



6 Set each output's jumper to the type of device wired to the output.

7 For each digital output, turn the output's potentiometer clockwise until it stops (maximum output).

8 Turn **on** the Carrier® ChillerVu™'s power.

To use the Auto-Off-On switches

You can control an output using the **Auto-Off-On** switch.

Set the switch to...	To...
On	Turn on the output.
Off	Turn off the output.
Auto	Let the control program control the output.

The potentiometer, located between the **Auto-Off-On** switch and the jumper, allows you to manually control the output level of an analog output. Place the **Auto-Off-On** switch in the **On** position, then turn the potentiometer counterclockwise to reduce the output, or clockwise to increase the output.

WARNING! The output potentiometer is NOT used for binary output channels. For a binary output, turn the potentiometer clockwise until it stops (maximum output) and leave it in this position. Failure to do so may result in relay-chattering or failure of the relay to energize when the **Auto-Off-On** switch is in the **On** position.

Wiring for communications

The Carrier® ChillerVu™ communicates using BACnet and/or third-party protocols, and can connect to a variety of port types at multiple baud rates. See table below.

Port	Protocol	Port type(s)	Baud rate(s)
BACnet Port S1	BACnet MS/TP	EIA-485 (2-wire)	9600 bps 19.2 kbps 38.4 kbps 76.8 kbps (default)
	BACnet ARC156		156 kbps
Port E1	BACnet/IP Modbus/IP Telnet Diagnostics	Ethernet	10/100 BaseT
CCN Port S2	CCN	EIA-485 (2-wire)	9600 bps (default) 19.2 kbps 38.4 kbps (Set CCN baud rate in Driver Properties)
TPI Port S2	Modbus	EIA-232 EIA-485 (2-wire) EIA-422 (EIA-485 4-wire)	Various
TPI Port S2	LonWorks Explicit mode	LonWorks Option Card connects to the Option Comm port	[2]38.4 kbps
		LonWorks SLTA-10 connect to 5-pin S2 Port	[2]57.6 kbps (configurable)
Local Access	Enhanced Access	Rnet[1]	115.2 kbps

[1] See *Local access to the Carrier® ChillerVu™* (page 51).

[2] This baud rate is only between the Carrier® ChillerVu™ and the LonWorks Option Card or the SLTA-10. The LonWorks network must use 78.6 kbps baud rate.

Ethernet, BACnet MS/TP, ARC156, and CCN wiring specifications

For...	Use...	Maximum Length
Ethernet	CAT5e or higher Ethernet cable	328 feet (100 meters)
BACnet MS/TP* BACnet ARC156*	22 or 24 AWG, low-capacitance, twisted, stranded, shielded copper wire	2000 feet (610 meters)
CCN	• 3-conductor • 18 or 20 AWG stranded tinned copper wire • Polyethylene insulation, PVC jacket • Shielded with a drain wire • Belden wire P#8772 or similar **NOTE** Must meet the above requirements	1000 feet (305 meters)

*For details see the *Open Controller Network Wiring Guide*.

WARNING Do not apply line voltage (mains voltage) to the controller's ports and terminals.

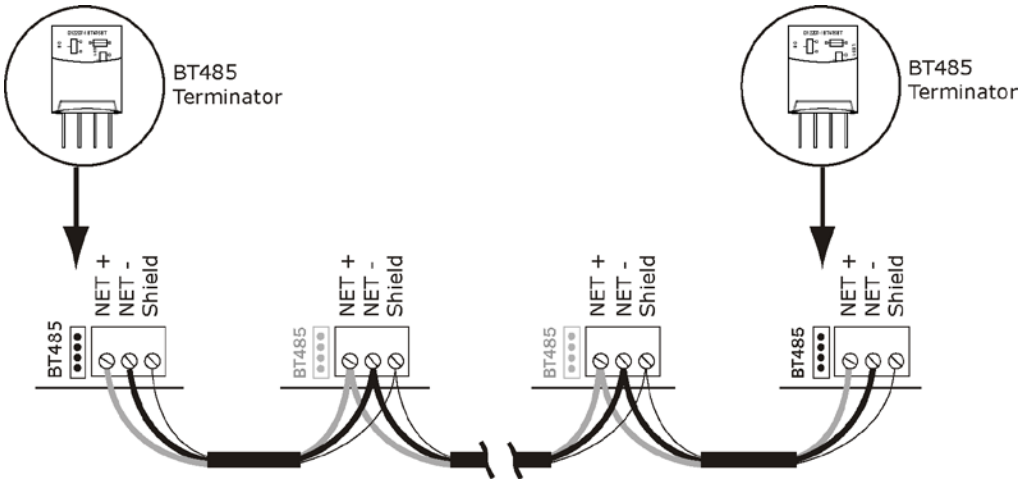
To wire the controller to the BACnet MS/TP or ARC156 network

1. Pull the screw terminal connector from the controller's power terminals labeled **24 Vac/26 Vdc** and **Return** (Ground).
2. Check the communications wiring for shorts and grounds.
3. Connect the communications wiring to the controller's screw terminals labeled **Net +**, **Net -**, and **Shield**.

   NOTE Use the same polarity throughout the network segment.
4. Set the communication type and baud rate.

For...	Set BACnet Mode jumper to...	Set the baud rate...
MS/TP	**BACnet MS/TP**	See To set a port's baud rate using PuTTY.
ARC156	**BACnet ARC156**	N/A. Baud rate is automatically set to 156 kbps.

   NOTE Use the same baud rate for all controllers on the network segment.
5. Wire the controllers on a BACnet MS/TP or BACnet ARC156 network segment in a daisy-chain configuration.
6. Install a BT485 on the first and last controller on a network segment to add bias and prevent signal distortions due to echoing.



1 Insert the power screw terminal connector into the Carrier® ChillerVu™'s power terminals.

2 Turn **on** the Carrier® ChillerVu™'s power.

3 Verify communication with the network by viewing a Module Status report in the i-Vu® interface.

See the *Open Controller Network Wiring Guide* for more details.

To connect the Carrier® ChillerVu™ to the Ethernet

Connect an Ethernet cable to the Ethernet port.

NOTES

- If your system has controllers on different IP subnets separated by an IP router, you must configure one controller on each subnet as a BACnet Broadcast Management Device (BBMD). Do not configure more than one BBMD per subnet as this would cause circular routes. To avoid this problem:
- Use the BBMD Configuration Tool to make sure that a controller's BBMD table does not contain the IP addresses of other controllers on the same IP subnet.

To wire to the BACnet over IP network (DHCP)

1 Turn **off** the Carrier® ChillerVu™'s power.

2 Check the communications wiring for shorts and grounds.

3 Set the **Assigned/DHCP** DIP switch to the **DHCP** position.

4 Set the **+100/0** DIP switch to **On** to add 100 to **x** in the IP address.

EXAMPLE If you turn on this DIP switch and the MAC address is 25, the IP address is 192.168.168.125.

NOTE The DHCP address is an intranet address. Data packets from this address are not routable to the Internet.

5 Verify DIP switch **1** is set to **Off**.

6 Connect Port E1, which is the only port that speaks BACnet over IP.

Wiring Specifications

- 328 feet (100 meters)
- Use one of the following CAT5 or higher Ethernet cables:
  - A cross-over cable to connect the Carrier® ChillerVu™ directly to the third-party device
  - A straight-through cable to connect the Carrier® ChillerVu™ to a hub or switch, and a second straight-through cable to connect the hub or switch to the third-party device

NOTE Use the same polarity throughout the network segment.

7 Turn **on** the Carrier® ChillerVu™'s power.

To wire to a BACnet over IP network (assign a custom IP)

1 Turn **off** the Carrier® ChillerVu™'s power.

2 Using the rotary switches, set the Carrier® ChillerVu™'s address BACnet Device Instance. Set the Tens (10's) switch to the tens digit of the address, and set the **Ones** (**1**'s) switch to the ones digit.

EXAMPLE If the controller's address is 25, point the arrow on the **Tens** (**10**'s) switch to 2 and the arrow on the **Ones** (**1**'s) switch to 5.

10's 

1's 

3 Obtain the IP address, subnet mask, and default gateway address for the controller from the facility network administrator.

4 Set the **Assigned/DHCP** DIP switch to the **Assigned** position.

5 Set the following using a touchscreen device, Hyperterminal, or PuTTY.

- IP address
- Subnet mask
- Default Gateway

6 Connect Port E1, which is the only port that speaks BACnet over IP.

Wiring Specifications

- 328 feet (100 meters)
- Use one of the following CAT5 or higher Ethernet cables:
  - A cross-over cable to connect the Carrier® ChillerVu™ directly to the third-party device
  - A straight-through cable to connect the Carrier® ChillerVu™ to a hub or switch, and a second straight-through cable to connect the hub or switch to the third-party device

NOTE Use the same polarity throughout the network segment.

7 Turn **on** the Carrier® ChillerVu™'s power.

To wire to a CCN network

1 Turn **off** the Carrier® ChillerVu™'s power.

2 Verify that DIP switch **5** is set to **CCN**.

3 Verify that Port S2 is set up for EIA-485 2-wire (Half Duplex). .

4 Connect the Carrier® ChillerVu™'s Port S2 to the CCN bus. Use the same polarity throughout the network segment.

Wire this Port S2 terminal	To this CCN device terminal
Signal Ground (Pin 5)	**G**
Net- (Pin 2)	**-**
Net+ (Pin 1)	**+**

NOTE The CCN Shield should be tied/taped back or daisy chained if the Carrier® ChillerVu™ is not at one end of the bus.

5 Turn **on** the Carrier® ChillerVu™'s power.

NOTE The default CCN address for the Carrier® ChillerVu™ is Bus 0, Element 1. See *To scan and download CCN devices* (page 34).

Wiring for third party protocols

You can connect third party protocols after you set up BACnet. The drv_psmio for the Carrier® ChillerVu™ allows access to the following third party protocols. Additional drivers are not required.

You can use these combinations of protocols or a subset of them:

- Port S1 (1 protocol) AND Port S2 (1 of 3 protocols) AND Port E1 (all 4 protocols or any combination of them)
- Port S1 (1 protocol) AND the Option Comm (1 protocol).

Port	Protocol(s)
Port S1	BACnet MS/TP or BACnet ARC156
Port S2	1 of the following 3 protocols - DIP switch selectable (TPI or CCN) • Modbus RTU • Lonworks via SLTA • CCN
Option Comm	LonWorks Option Card
Port E1	All 4 or any combination of the following protocols: • Modbus/IP • BACnet/IP • BACnet/Ethernet • CCN/IP

To wire to Modbus RTU on Port S2

NOTE You can use Port S2 for CCN or Modbus RTU or LON SLTA-10, but not at the same time.

1. Turn **off** the Carrier® ChillerVu™'s power.
2. Set DIP switch 5 to **TPI**.
3. Set jumpers to **EIA-485** and **Half Duplex**.
4. Connect the communications wiring to Port S2. Connect to **Net+**, **Net-**, and **Gnd**.

   Wiring specifications

   - A dedicated 24 AWG to 18 AWG twisted pair wire (EIA-485)
   - 2000 feet (610 meters) for 76.8 kbps
   - 3000 feet (914.4 meters) for 9600 bps, 19.2 or 38.4 kbps, before needing a Repeater

- Devices should be daisy chained and not star wired
- If the Carrier® ChillerVu™ is at either end of a network segment, connect a BT485 to the Carrier® ChillerVu™

NOTE Use the same polarity throughout the network segment.

5 In the i-Vu® interface, go to **Driver Properties** > **Protocols** > **Modbus** and enter the baud rate.

6 Turn **on** the Carrier® ChillerVu™'s power.

To wire to a Modbus over IP network

1 Turn **off** the Carrier® ChillerVu™'s power.

2 Check the communications wiring for shorts and grounds.

3 Connect Port E1 to the third-party device.

NOTE Port E1 will still be capable of BACnet communication.

Wiring Specifications

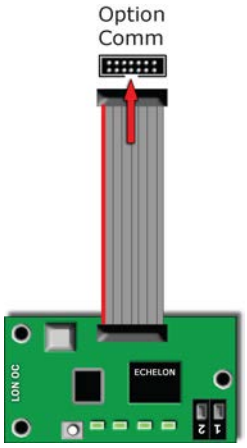
- 328 feet (100 meters)
- Use one of the following CAT5 or higher Ethernet cables:
  - A cross-over cable to connect the Carrier® ChillerVu™ directly to the third-party device
  - A straight-through cable to connect the Carrier® ChillerVu™ to a hub or switch, and a second straight-through cable to connect the hub or switch to the third-party device

NOTE Use the same polarity throughout the network segment.

4 Turn **on** the Carrier® ChillerVu™'s power.

To connect to the LonWorks network using the LonWorks Option Card

1. Turn **off** the Carrier® ChillerVu™'s power.
2. Set DIP switch 5 to **TPI**.
3. Plug the 's ribbon cable into the Option Comm port on the Carrier® ChillerVu™.



CAUTIONS

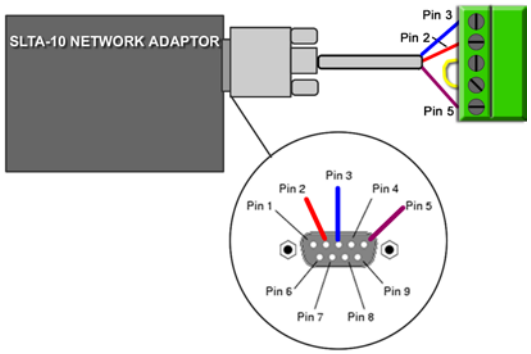
- You **MUST** ground the Carrier® ChillerVu™ to earth ground, using the Rnet Gnd connector.
- The controller must be **OFF** before being connected.

4. Connect LON network to pins **1** and **2** on the Option Card.
5. Turn **on** the Carrier® ChillerVu™'s power.

To connect to the LonWorks network using the SLTA-10

1. Turn **off** the Carrier® ChillerVu™'s power.
2. Set DIP switch 5 to **TPI**.
3. Set the jumper to EIA-232.

4 Connect the communications wiring to Port S2.



Wire Specifications

- 18–28 AWG; twisted pair preferable
- 50 feet (15.24 meters) maximum length

NOTE Do not power the device from the same transformer that powers the Carrier® ChillerVu™.

5 Set the SLTA-10 DIP switches as shown below.

NOTE Switches 6 - 8 set the baud rate to 57.6 kbps for communication between the controller and the SLTA-10.

6 In the i-Vu® interface, right-click the Carrier® ChillerVu™ in the navigation tree, select **Driver Properties**.> **Protocols** > **LonWorks**, and set the baud rate to 57.6 kbps.

7 Turn **on** the Carrier® ChillerVu™'s power.

To set the IP address using PuTTY

1 Download and install PuTTY from the *PuTTY website* (*http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html*).

2 Connect a computer to the Carrier® ChillerVu™'s **Local Access** port. See *To communicate through the local access port* (page 52).

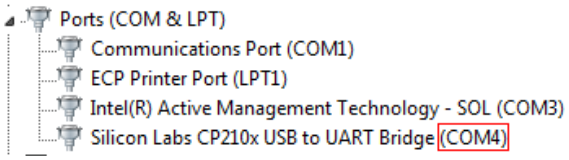
3 Set the Carrier® ChillerVu™'s **Enhanced Access** DIP switch to **ON**.

4 Turn the Carrier® ChillerVu™'s power **Off**, then **On**.

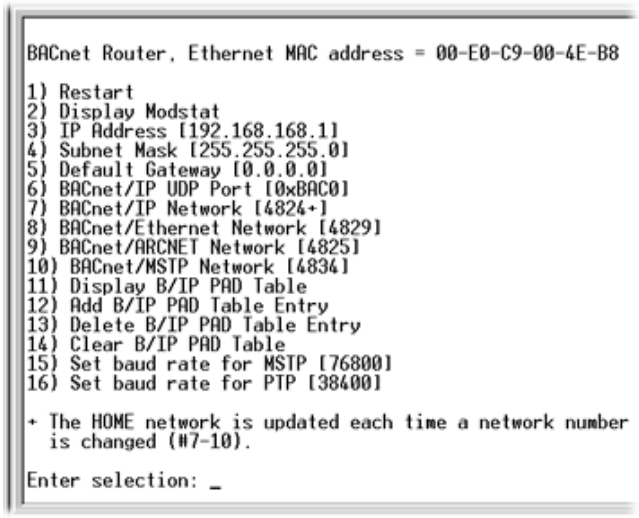
5 Start PuTTY.

6 Under **Category** > **Connection**, select **Serial**.

7 Under **Options controlling local serial lines**, enter the following settings:

Field	Value
Serial line to connect to	Replace X with the computer's port number that the USB Link Kit cable is connected to. **NOTE** To find the port number, select **Start** > **Control Panel** > **System** > **Device Manager** > **Ports (Com & LPT)**. The COM port number is beside **Silicon Labs CP210x USB to UART Bridge**. 
Speed (baud)	115200
Data Bits	8
Stop Bits	1
Parity	None
Flow Control	None

8 Click **Open**. A window similar to the one below appears.



9 Type 3 and press **Enter**.

10 Type the IP address and press **Enter**.

11 Repeat steps 9 and 10 to enter the Subnet Mask and default Gateway.

12 Type 1, then press **Enter** to restart the controller.

13 When finished, set the Carrier® ChillerVu™'s **Enhanced Access** DIP switch to **OFF** to restore normal functionality to the **Local Access** port.

14 Turn the Carrier® ChillerVu™'s power **Off**, then **On**.

Wiring devices to the Carrier® ChillerVu™'s Rnet port

The standard control programs that are included with the Carrier® ChillerVu™ library do not use communicating sensors or the Equipment Touch.

A custom control program could allow you to use and connect the following to the Rnet port:

- Up to 15 ZS sensors (5 per control program)
- One Wireless Adapter that communicates with up to 15 wireless sensors
- One Equipment Touch
- Up to 4 SPT Standard sensors and one SPT Plus, SPT Pro, or SPT Pro-F sensor

NOTE ZS sensors, a Wireless Adapter, and an Equipment Touch can share the Rnet, but not SPT sensors.

To configure the control program for the desired user interaction with the ZS or wireless sensors, see the *ZS Sensor Application Guide or* the *Wireless Sensor Application Guide*.

For detailed installation instructions, see the *Carrier Sensors Installation Guide* for SPT sensor information, *ZS Sensor Installation Guide*, *Wireless Sensor Installation Guide*, or the *Equipment Touch Installation and Setup Guide*.

Adding the Carrier® ChillerVu™ into the i-Vu® or Field Assistant system

The following instructions assume that you have already installed the i-Vu® and Field Assistant application.

If the Carrier® ChillerVu™ is a CCN Gateway (the default), you must first find and upload it as an Open controller in the i-Vu® interface.

NOTE If the Carrier® ChillerVu™ is used on a CCN network, you cannot use Field Assistant to find CCN equipment or download CCN applications. You MUST use the i-Vu® application.

To prepare to create your system

You must create the control program before building your Carrier® ChillerVu™ system.

The Carrier® ChillerVu™ accepts any of the following:

- Applications from the psm (plant system manager) equipment SAL library

  NOTE These applications will not load into any controller except the Carrier® ChillerVu™ controller.
- UC applications from the Universal Controller equipment sal library
- Air Handler applications from the AHU Builder library
- CCN applications from the ivu-6.0 or 6.5-discovery library
- User-created Snap programs

  NOTE When creating your program in the Snap interface, you must select **Control Program** > **PSM**, **Open (non PIC)**, or **CCN** to be able to download the program into the controller.

The EquipmentBuilder or Snap application

1 Use the EquipmentBuilder or Snap application to create control program(s) for your Carrier® ChillerVu™.

2 If applicable, print the Sequence of Operation, which includes the points list.

NOTE You can create a points list under **Reports** in the i-Vu® application.

This Installation Guide

1 Prepare a wire list. See the *Appendix* (page 63).

2 Use the wire list to install and wire I/O points to your Carrier® ChillerVu™ and expanders, if applicable.

Find and upload the Carrier® ChillerVu™ as an Open router

1 Select the system level in the navigation tree in the i-Vu® interface.

2 On the **Devices** page > **Manage** tab, click **Find Devices** to discover your Carrier® ChillerVu™.

3 If you have Open controllers connected to the Carrier® ChillerVu™ MS/TP network, select the Carrier® ChillerVu™ in the left-hand navigation tree and click **Find Devices** again.

4 Once controllers are found, you must upload content to theCarrier® ChillerVu™. Select one or more devices in the list on the **Manage** tab and click **Upload All Content** to upload drivers, graphics, touch files, and control programs to the i-Vu® application. Use **Ctrl+click**, **Shift+click**, or both to select multiple items.

NOTE If **Show Control Programs** is checked, all control programs are listed. If you have multiple control programs in one controller, you will see every control program in the list. If it is not checked, the list only shows the individual controllers and their model. The same information is uploaded, this option just controls what you see on the **Manage** tab and you can toggle back and forth.

5 Click **OK** when you see the message **This will upload all content for the controller. Are you sure you want to do this?**. When complete, a check mark under **Status** indicates a successful upload.

NOTES

- If an error message appears, click on the message to view an explanation.
- Uploading can be time consuming, especially for multiple controllers. You may want to create the navigation tree for the **User** view while waiting. See Create navigation tree.
- The MAC address shows to the left of the controller name in the **Installer** navigation tree only. Programmable controllers show multiple equipment listings with the same MAC address, based on control programs downloaded from EquipmentBuilder or Snap.
- To view the driver names after uploading, select the **Advanced** tab or right-click the controller in the navigation tree and select **Driver Properties** or **Module Status**.

To scan in and download CCN devices

NOTE You cannot use Field Assistant to find CCN equipment or download CCN applications. You MUST use the i-Vu® application.

If you have not already found the Carrier® ChillerVu™ in the i-Vu® application, do the following before you scan CCN devices into your system:

1 In the navigation tree, from the system level, go to the **Devices** page > **Manage** tab.

2 Click **Find Devices**.

3 Select the Carrier® ChillerVu™ in the list on the **Manage** tab and click **Upload All Content**.

Set up CCN Information

1 Follow these steps to set the Carrier® ChillerVu™ as the Gateway (default) or Bridge.

NOTE

a) Set the Carrier® ChillerVu™'s **Port S2** DIP switch **TPI** to **CCN** (Off) and cycle the controller's power.

b) Right-click the Carrier® ChillerVu™ and select **Driver Properties**.

c) Expand **Protocols** and select **CCN**.

d) Select the correct baud rate (default is 9600 bps) from drop-down list.

e) If it is the Gateway, select **CCN Gateway** for **Device Type**. If it is a Bridge, select **CCN Bridge**.

NOTE If the Carrier® ChillerVu™ is being uploaded into an i-Vu® Standard or Plus system and there is

already a CCN Gateway, you cannot configure the Carrier® ChillerVu™ as another CCN Gateway.

f) Change the **Element** number from the default (1).

g) Continue with the steps below.

Connect to a CCN system

1 In the i-Vu® interface, select the system in the navigation tree.

2 On the **Devices** page > **CCN Setup** tab, enter your CCN Gateway IP address and click **Connect to Gateway**.

NOTE If using the i-Vu® Pro application, and the server has more than 1 NIC, type the IP address the server will use to connect to controllers.

3 After connecting to the Gateway, select it in the navigation tree.

4 On the **Devices** page > **CCN Discovery** tab, verify that **Discover Tables** is checked.

NOTE The scanning time for discovering tables increases based on the number of devices. You may choose to discover tables at a later time for a faster scan.

5 Enter the **Bus** and **Element** ranges that encompass all your devices.

NOTE Depending on your number of devices, it could be faster to scan several small ranges.

6 Click **Start Scan**. When the process is complete, a message appears showing the number of control programs found.

NOTES

- If the scan does not begin, wait a minute and try again. There may be a delay when first starting the system.
- If an error message appears, click on the message to view an explanation.

7 Click **Download CCN** to download the control programs, drivers, and parameters.

8 In the i-Vu® navigation tree, right-click the Carrier® ChillerVu™ and select **Driver Properties** from the drop-down list.

9 Under **Driver**, expand **Protocols**.

10 On the **CCN** tab, under **Broadcast Configuration**:

- If the Carrier® ChillerVu™ will be the time broadcaster on the CCN network, check **Time Broadcast Enable**.
- If there is another CCN device already set as the time broadcaster, check **Use CCN Time Sync** so the Carrier® ChillerVu™ synchronizes its clock with the CCN network.

11 Click **Accept**.

TIPS

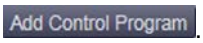
- indicates you need to download the device by clicking **Download CCN**.
- Click to view a log of activity on the **Devices** page in the current session. **Copy to Clipboard** lets you copy the text to paste it into another application.
- Status messages are color coded as follows:
  - Red - reports an error
  - Blue - requires action
  - Green - indicates an upload or download is in process

To add control programs and graphics in the i-Vu® interface

Use the following procedure to add all of the control programs (.equipment files) that you need to run your system.

1 Select the Carrier® ChillerVu™ in the navigation tree.

2 On the **Devices** > **Manage** tab, select the Carrier® ChillerVu™ in the list on the page.

3 Click the **Add Control Program** button 

. A dialog window appears.

4 Type a **Display Name** for the control program.

5 Select the **Controller** that you are adding the program to.

NOTE If you already have the maximum number of control programs for a controller, it will not appear in the list.

6 To add the control program, do the following:

If the control program is...	
In the **Control Program** drop-down list	1. Select the control program that you generated in EquipmentBuilder or Snap. 2. Click **Accept**.
Not in the **Control Program** drop-down list	1. Click **Add New**. 2. Browse to select the control program. 3. Click **Open**. 4. Click **Continue**. 5. Click **Close**. 6. Click **Accept**.

1 To add a graphic, click **Add New** under **Views** and browse to your .view file.

2 Click **Continue**. When message appears **File added successfully**, click **Close**.

3 Click **Close** again.

4 Right-click on the controller in the controller list and select **Check Status** from the list. The status of the controller should say **File Mismatch**.

5 Click the **Download All Content** button.

6 Configure the controller on the **Properties** page > **Control Program** tab.

7 Check out and commission the equipment.

Configuring third party protocols in the i-Vu® interface

After you download the driver and control program(s) to the Carrier® ChillerVu™, you must configure the protocol properties in the i-Vu® interface.

Modbus RTU on Port S2

1. Verify the **Port S2** DIP switch (5) **TPI** is **On** and the controller's power has been cycled.
2. In the i-Vu® navigation tree, right-click the Carrier® ChillerVu™ and select **Driver Properties** from the drop-down menu.
3. Under **Driver**, expand **Protocols,** then select **Modbus**.
4. Under **Port Configuration**, check **Enable** under **Port S2**.
5. Select **EIA-485** for **Communication Type**,
6. Enter your **Baud** rate.
7. Under **Protocol Configuration**, select the correct option for **Is this device a Master?**.
8. Accept all other default settings.
9. Click **Accept**.

NOTE You can configure the Carrier® ChillerVu™ for either Modbus RTU or Modbus IP, not both at the same time.

Modbus over IP network

1. Verify the **Port S2** DIP switch (5) **TPI** is **On** and the controller's power has been cycled.
2. Turn the controller off and then on again.
3. In the i-Vu® navigation tree, right-click the Carrier® ChillerVu™ and select **Driver Properties** from the drop-down menu.
4. Under **Driver**, expand **Protocols** > **Modbus TCP/IP**.
5. Select **TCP/IP** for **Communication Type**.
6. Under **Modbus Protocol Configuration**:
   - If your Carrier® ChillerVu™ is a client:
     1. Select **Yes** for **This device is a Client**.
     2. Click **Accept**.
     3. In the navigation tree, under **Protocols** > **Modbus TCP/IP**, go to **IP Index Table** and follow the directions at the bottom of the page to fill in the **Server IP Addresses**.
   - If your Carrier® ChillerVu™ is a server, select **No** for **This device is a Client**.
7. Accept all other default settings.
8. Click **Accept**.

NOTE You can configure the Carrier® ChillerVu™ for either Modbus RTU or Modbus IP, not both at the same time.

LonWorks network using the LonWorks Option Card

1. Verify the **Port S2** DIP switch (5) **TPI** is **On** and the controller's power has been cycled.
2. Turn the controller off and then on again.
3. In the i-Vu® navigation tree, right-click the Carrier® ChillerVu™ and select **Driver Properties** from the drop-down menu.

4 Under **Driver**, expand **Protocols** > **LonWorks**.

5 Select **Port S2 is connected to the LonWorks network**.

6 Select **Option Card**.

7 Set **Baud** to 38.4 kbps.

NOTE This is the the baud rate between the LonWorks Option Card and the Carrier® ChillerVu™, not the LonWorks network.

8 Select **Explicit** for **Addressing Mode**.

9 Accept all other default settings.

10 Click **Accept**.

LonWorks network using the SLTA-10

1 Verify the **Port S2** DIP switch (5) **TPI** is **On** and the controller's power has been cycled.

2 In the i-Vu® navigation tree, right-click the Carrier® ChillerVu™ and select **Driver Properties** from the drop-down menu.

3 Under **Driver**, expand **Protocols** > **Lonworks**.

4 Under **Port Configuration**, select **Port S2** for **is connected to the LonWorks network**, then select **SLTA**.

5 Set **Baud** to 57.6 kpbs.

NOTE This is the the baud rate between the LonWorks SLTA-10 and the Carrier® ChillerVu™, not the LonWorks network.

6 Accept all other default settings.

7 Click **Accept**.

Configuring CCN PIC files to communicate with Chiller Manager

Before proceeding, you must have already:

- Created your i-Vu® database
- Discovered and downloaded the CCN PIC's to the Carrier® ChillerVu™ controller
- Created and added the Chiller Manager control programs to the i-Vu® database

To enable the CCN PIC equipment files to communicate with the Chiller Manager program, you must edit the **Reference Name** for the chillers.

Right-click on the Carrier® ChillerVu™ in the navigation tree and select **Configure**.

1 Change the **Reference Name** to `#chiller_x`, where `x` is the chiller number.

EXAMPLE For a 3-chiller system, the chiller reference names are:

- #chiller_1
- #chiller_2
- #chiller_3

2 Click **OK**.

3 Repeat steps 1 and 2 to rename every chiller.

4 To verify your chiller connections in the i-Vu® interface, select the Chiller Manager program in the navigation tree and go to the **Properties** > **Network Points** tab. If you see any errors on the pre-configured network points, review your **Reference Name** edits.

Configuring BACnet Device Instance and network number

All BACnet Open controllers must have a unique Device Instance and Name. These BACnet addresses are automatically generated and usually do not require modification. However, sometimes you need to override the automatic addressing assignments.

Autogenerated addressing scheme:

The Carrier® ChillerVu™'s rotary address setting determines the automatic BACnet addressing scheme for the connected Open network.

Legend

16 = Carrier's BACnet Vendor ID
xx = Carrier® ChillerVu™'s rotary switch address (BACnet Device Instance address)
yy = Open controller's rotary switch address (MS/TP MAC address)

For the Carrier® ChillerVu™:

- BACnet Device Instance Number = 1600xx
- BACnet Device Instance Name = device1600xx
- BACnet IP Network Number = 1600
- BACnet MS/TP Network Number = 161xx
- BACnet ARC156 Network Number = 163xx
- Port S1 MS/TP MAC Address = 0 (fixed)

For the Open controllers connected to the Carrier® ChillerVu™

- BACnet MS/TP Device Instance Number = 161xxyy
- BACnet ARC156 Device Instance Number = 163xxyy
- BACnet MS/TP Device Instance Name = device161xxyy
- BACnet ARC156 Device Instance Name = device163xxyy
- BACnet MS/TP or ARC156 MAC Address = yy
- BACnet MS/TP Network Number = 161xx (learned from the router, defaults to 16101 if no Carrier® ChillerVu™ is operating)

If the BACnet automatic settings need to be changed, launch the **Router Configuration** utility using a terminal program. See To assign a custom IP address for instructions on connecting to and using a terminal program.

To change the BACnet settings:

1 Enter the BACnet selection# from the menu. Type the new setting and click **Enter**. The new setting will appear on the **Router Configuration** screen.

2 Cycle power to the router for the new settings to take effect.

NOTE If the BACnet MS/TP or ARC156 network number of the router is assigned and not auto-generated, and the Open controllers connected to that router are set such that their BACnet settings are auto-generated, then the Open controller BACnet settings will be auto-generated based on the assigned MS/TP network number in the router:

Example A router's BACnet MS/TP or ARC156 network has been assigned to 200.

If the connected Open controllers are using autogenerate, then their settings will be:

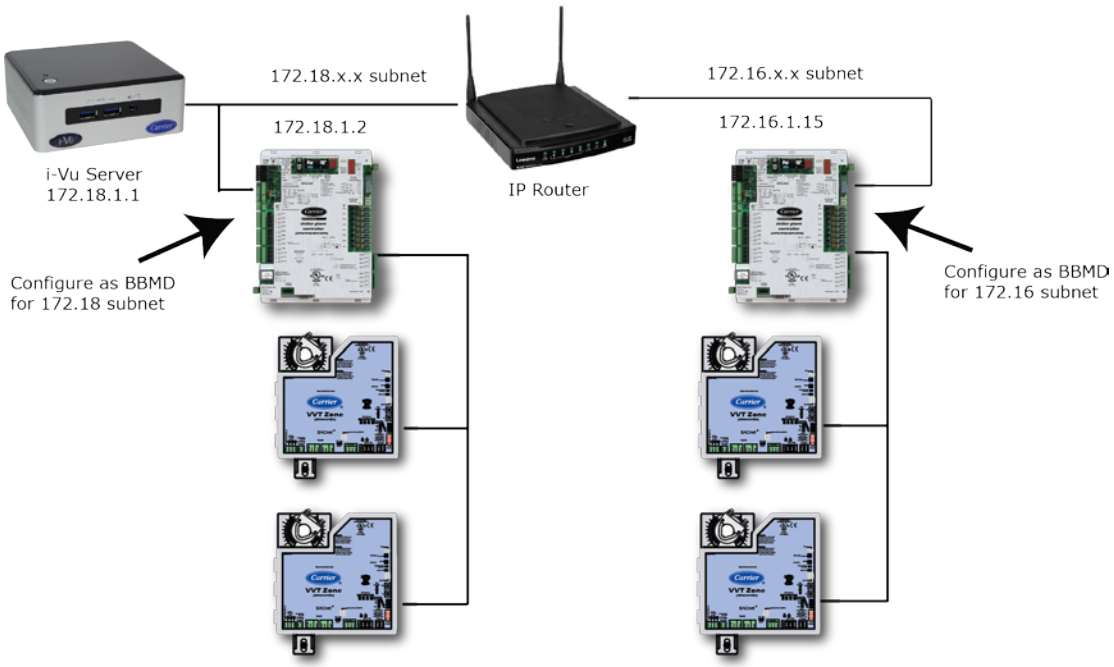
BACnet MS/TP Network Number = 200

BACnet Device Instance Number = 200yy

BACnet Device Instance Name = device200yy

BACnet MS/TP MAC Address = yy

To set up BACnet Broadcast Management Devices (BBMDs)



If your system has multiple routers that reside on different IP subnets, you must set up one router on each IP subnet as a BACnet/IP Broadcast Management Device (BBMD).

Every subnet with a router must have a BBMD configured in order for broadcasts from controllers on that subnet to reach the rest of the routers on the network.

NOTES

- The i-Vu® Standard or Plus application - If the i-Vu® web server is on a separate subnet than the rest of the routers, the internal router must be assigned an IP address and configured as a BBMD.
- The i-Vu® Pro application - If the i-Vu® Pro server is on a separate subnet than the rest of the routers, you must register it as a foreign device.

Use the **BBMD Configuration Tool** to:

- Define the **Broadcast Distribution Table** (BDT) in each BBMD
- Enable an i-Vu® Control System to find routers that are on different subnets
- Allow controllers on one subnet to communicate with controllers on other subnets
- Enable the i-Vu® application to see, upload, or configure controllers on different subnets

To set up BBMDs using the BBMD Configuration Tool

1 Assign an IP address, subnet mask, and default gateway for each Carrier® ChillerVu™ on the IP network. See Addressing the Carrier® ChillerVu™.

2 Acquire the **BBMD Configuration Tool** from the Tech Tools DVD or from the *Carrier Control Systems Support Site http://www.hvacpartners.com/*. This is a stand-alone executable file and no installation is necessary.

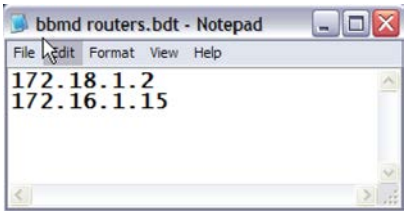
3 Make a list of the IP addresses for each router that will function as a BBMD in your system.

In the above illustration, the Carrier® ChillerVu™, address 172.18.1.2, must be configured as a BBMD for the 172.18 subnet, while the Carrier® ChillerVu™, address 172.16.1.15, must be configured as a BBMD for the 172.16 subnet.

CAUTIONS

- Define only one BBMD per subnet. Multiple BBMD's on an IP subnet disrupt network communications.
- Unless explicitly modified, the UDP Port for BACnet/IP is 0xBAC0 (47808). Do not change this parameter unless you made a change in the router.

4 In a text editor such as Notepad, create a list of the routers that will be BBMD's. List each IP address on a separate line. (Maximum of 50 IP addresses per file)



5 Save the file to your folder of choice with a .bdt extension instead of .txt.

NOTE ".bdt" is a **Broadcast Distribution Table** file.

6 Open the **BBMD Configuration Tool**.

7 In the **IP Address** or **Host Name** field, type the IP address of the router that functions as the BBMD (BACnet Broadcast Management Device) for its subnet.

8 To check if the router has an existing BBMD table, click the **Broadcast Distribution Table Read** button.

9 If the **Broadcast Distribution Table** contains IP addresses that are not in your .bdt file, verify that they are valid BBMD's and, if so, add them to your .bdt file.

NOTES

- The BDT's in each BBMD should be identical. Repeat this entire process whenever a BBMD is added.
- If needed, disable the checkbox next to **Show Broadcast** to limit the amount of scrolling text that is displayed.

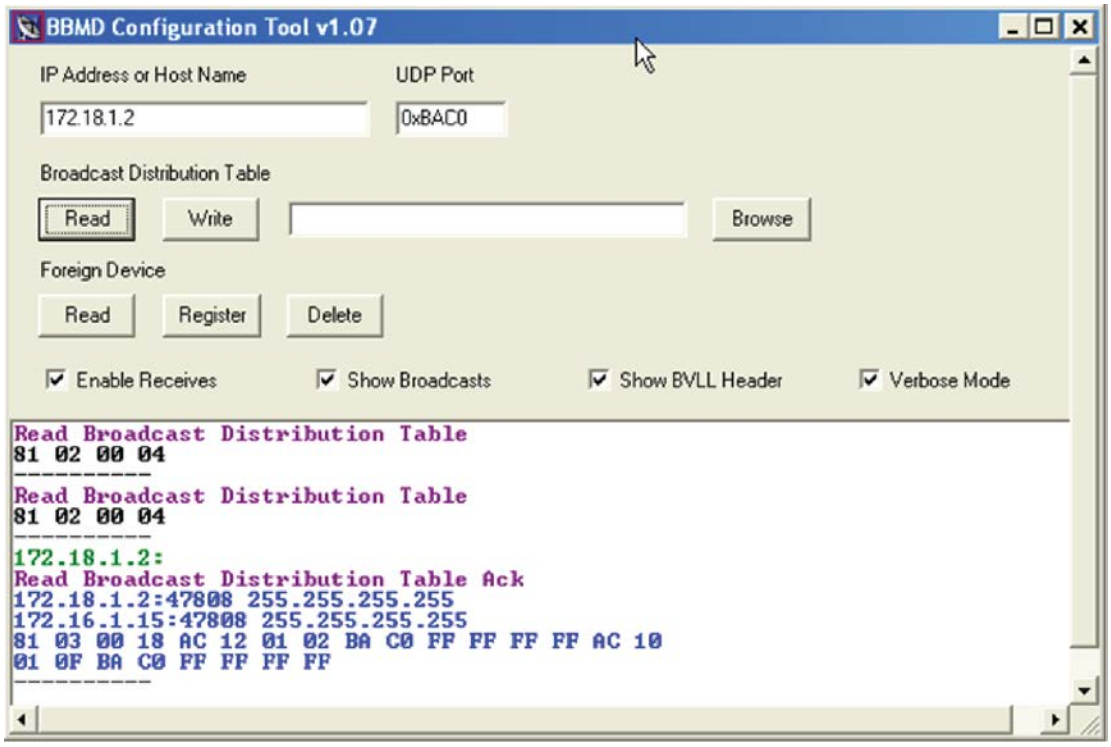
10 Click the **Broadcast Distribution Table Browse** button and select the .bdt file that you made in step 4.

11 Verify that the appropriate IP address is still in the **IP Address** or **Host Name** field.

12 Click the **Broadcast Distribution Table Write** button.

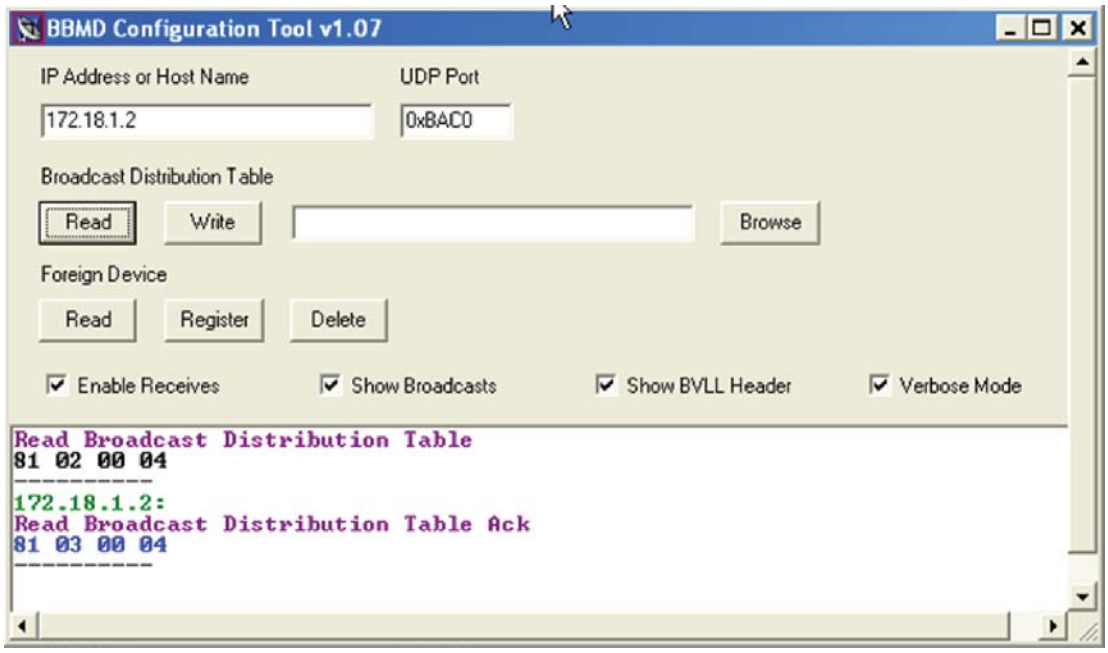
13 Click **Read** again to verify that the new .bdt file was written to the router. See example below.

NOTE If you have a large BDT, you may have to re-size the **BBMD Configuration Tool** window to see the **Broadcast Distribution Table**.



14 Using the next IP address in the .bdt file, repeat steps 7 through 14 until every file has been updated.

NOTE To clear the BBMD entries from a router, follow the steps above using an empty (blank) .bdt file. A cleared BBMD table contains just the router's IP address without entries in the BBMD table, as shown below.



To set up the driver

If you have a new Carrier® ChillerVu™, you may have to ascertain if it has a driver that allows i-Vu® or Field Assistant to find it. If the controller is not already equipped with the v6.02.028 or later driver, or you are not sure which driver is in the Carrier® ChillerVu™, you must ascertain the present driver and download the correct one. You can use AppLoader or PuTTY to determine the driver in the controller in a Modstat.

You may want to change the driver's properties in the i-Vu® interface to suit your application.

1 In the i-Vu® navigation tree, right-click the Carrier® ChillerVu™ and click **Driver Properties** from the drop-down menu.

2 Make changes as needed on the **Properties** page for **Driver**.

Driver

On the **Driver** page, you can change the following properties:

- Backup battery conservation settings. See table below.
- Module clock synchronization and failure. See table below.
- Network Input microblock communication properties.

Backup Battery	
Turn off internal backup battery after ___ days to conserve battery life (shutoff date/time)	How long backup battery should run after power loss. **TIP** Downloading activates the battery backup. To conserve battery life when you know the Carrier® ChillerVu™ will be without power for an extended period after downloading (for example, during shipment): 1 Verify the **Archive Valid** LED is lit, then set this field to 0. 2 After you install the Carrier® ChillerVu™ and apply power, enter a number greater than 0.
TouchScreen Control	
TouchScreen Schedule Edit Enable	Check this field to allow a user to edit this controller's schedules from an Equipment Touch's Schedules screen.
Module Clock	
Clock Fail Date and Time	Date and time the control program uses when controller's real-time clock is invalid. **TIP** Use an occupied date and time (such as a Tuesday at 10 a.m.) so the equipment does not operate in unoccupied mode if the controller loses power during occupancy.

Time Synch Sensitivity (seconds)	When the controller receives a time sync request, if the difference between the controller's time and the time sync's time is greater than this field's value, the controller's time is immediately changed. If the difference is less than this field's value, the controller's time is slowly adjusted until the time is correct.
Network Microblocks	
Number of poll retries before Network Input Microblocks indicate failure	The maximum number of retries after the initial attempt that a Network microblock will attempt to communicate with its target device. If unsuccessful, the point will transition to an idle state for 30 seconds before attempting to communicate again. Change this field only if directed by Technical Support.
Periodic rebinding interval	If a microblock uses a wildcard in its address, this timer determines how often the microblock will attempt to find the nearest instance of its target. For example, if an outside air temperature address uses a wildcard, a VAV application will look for the outside air temperature on the same network segment or on the nearest device containing that object.
BACnet COV Throttling	
Enable COV Throttling	Under normal circumstances, COV Throttling should be enabled to prevent excessive network traffic if an object's COV Increment is set too low. See EXCEPTION below. When enabled, if an object generates excessive COV broadcasts (5 updates in 3 seconds), the driver automatically throttles the broadcasts to 1 per second. Also, if the object's value updates excessively for 30 seconds, an alarm is sent to the i-Vu® application listing all objects that are updating excessively. A Return-to-normal alarm is sent only after all objects have stopped updating excessively. EXCEPTION: In rare circumstances, such as process control, a subscribing object may require COV updates more frequently than once per second. For these situations, clear this checkbox, but make sure that your network can support the increased traffic. You will also need to disable the **Excessive COV** alarms under the driver's **Common Alarms**.
Trend Sampling	
Collect a daily midnight sample for all points in this controller that are sampling on COV	For values that change infrequently, select to verify at midnight daily that the point is still able to communicate trend values.

Device

On the **Device** page, you can change the following properties:

- BACnet device object properties for the Carrier® ChillerVu™
- Carrier® ChillerVu™ communication

Configuration	**NOTE** The three APDU fields refer to all networks over which the Carrier® ChillerVu™ communicates.
Max Masters and Max Info Frames	Apply only if the Carrier® ChillerVu™'s MS/TP network is enabled.

Notification Classes

Alarms in the i-Vu® application use Notification Class #1. A BACnet alarm's Notification Class defines:

- Alarm priority for Alarm, Fault, and Return to Normal states
- Options for BACnet alarm acknowledgment
- Where alarms should be sent (recipients)

Priorities	**NOTE** BACnet defines the following Network message priorities for Alarms and Events.

Priority range	**Network message priority**
00–63	Life Safety
64–127	Critical Equipment
128–191	Urgent
192–255	Normal

Priority of Off-Normal	BACnet priority for Alarms.
Priority of Fault	BACnet priority for Fault messages.
Priority of Normal	BACnet priority for Return-to-normal messages.
Ack Required for Off-Normal, Fault, and Normal	Specifies whether alarms associated with this Notification Class require a BACnet Acknowledgment for Off-Normal, Fault, or Normal alarms. **TIP** You can require operator acknowledgment for an Alarm or Return-to-normal message (stored in the i-Vu® database). In the i-Vu® interface on the **Alarm** > **Enable/Disable** tab, change the acknowledgment settings for an alarm source or an alarm category.
Recipient List	
Recipients	The first row in this list is the i-Vu® application. Do not delete this row. Click **Add** if you want other BACnet devices to receive alarms associated with this Notification Class.
Recipient Description	Name that appears in the **Recipients** table.
Recipient Type	Use **Address** (static binding) for either of the following: • Third-party BACnet device recipients that do not support dynamic binding • When you want alarms to be broadcast (you must uncheck **Issue Confirmed Notifications**). This use is rare.
Days and times	The days and times during which the recipient will receive alarms.
Recipient Device Object Identifier	Type the **Device Instance** from the network administrator for third-party devices) in the **#** field.
Process Identifier	Change for third-party devices that use a BACnet Process Identifier other than 1. The i-Vu® application processes alarms for any 32-bit Process Identifier.
Issue Confirmed Notifications	Select to have a device continue sending an alarm message until it receives delivery confirmation from the recipient.
Transitions to Send	Uncheck the types of alarms you do not want the recipient to get.

Calendars

Calendars are provided in the driver for BACnet compatibility only. Instead, use the **Schedules** feature in the i-Vu® interface.

Common and Specific Alarms

On these pages, you can enable/disable, change BACnet alarm properties, or set delays for the following BACnet alarms:

Common alarms:

- Module Halted
- All Programs Stopped
- Duplicate Address
- Locked I/O
- Control Program
- Program Stopped
- Excessive COV

Specific alarm:

- Dead Module Timeout
- Low Battery Alarm

NOTE To set up alarm actions for controller generated alarms, see "Setting up alarm actions" in i-Vu® Help.

Module Generated Alarm	
Description	Short message shown on the **Alarms** page or in an alarm action when this type of alarm is generated.
Events	
Alarm Category and Alarm Template	See "Alarms" in i-Vu® Help.
Enable	Clear these checkboxes to disable Alarm or Return to normal messages of this type from this controller.
Notification Class	Do not change this field.

Custom Translation Tables

You can set up a translation table that an analog input will use to translate the raw data from a non-linear sensor to the engineering units you want it to output on the wire. In the navigation tree, select **Custom Translation Table #1**, **#2**, or **#3**. The **Properties** page has instructions. For the input to use the translation table, navigate to the input, select the **Details** tab, then set **Sensor Type (Scaling Method)** to **Non-Linear, Custom Table #__**.

BACnet router properties

On the **BACnet router properties** page, you can change the following properties:

- IP address of the router in the controller and the system database
- BACnet routing settings
- Color and prime variable caching settings

IP Configuration	
Allow remote management of IP configuration	For future use.
Enable IP configuration changeover	Select to remotely change the router's **IP Address**, **Subnet Mask**, and **Default Gateway Address**. Type the new addresses and the **UDP Port** that your server is using to communicate to all controllers. In the **Changeover timeout** field, enter: • 0:00 to have the controller use the **Next** settings as soon as the controller can communicate with the **Next Default Gateway Address**. • A specific length of time to have the controller use the **Next** settings as soon as the controller can communicate with the **Next Default Gateway Address**, or when the timeout expires, whichever occurs first. See "To remotely change a controller's IP address" in i-Vu® Help for more information on using this feature.
BACnet Router Options	
Ignore all Reject-Message-to-Network, Reason=1 messages	Clear to delete and rediscover a router if a network's router indicates that the network is no longer present (reason=1). Select to continue routing messages to a network even if its router indicates that the network is no longer present.
Color/Prime Variable Caching	
Disable Color Cache	Clear (enable) to improve responsiveness in retrieving colors. Select (disable): • To reduce network traffic to third-party (non-color-supporting) devices • If using the Carrier® ChillerVu™ on the controller network, not as a router **NOTE** Selecting this checkbox also disables dead module alarms.
Dead Module Timeout	After this period (minutes:seconds) of non-response from a controller, the router sends an alarm to the server.

BACnet firewall

Requires v6-02 or later driver

If this IP controller is accessible from the Internet, you can increase security by enabling its BACnet firewall. When enabled, this feature prevents the controller from receiving BACnet messages from unidentified sources and allows communication only with IP addresses that you define. These can be all private IP addresses and/or a list of IP addresses. Follow the instructions in the i-Vu® interface to set up the BACnet firewall.

Protocols

On the **Protocols** page, you can enable or disable Telnet diagnostics. This allows you to write to a text file the communication between the controller and a third party device. This file is used for troubleshooting.

Xnet

If the Carrier® ChillerVu™ has MPC Open XPIO expanders attached, you can change the baud rate and communications timeout on the **Xnet** page.

Xnet Configuration	
Data Rate	Set at 500 kbps.
Comm. Timeout (seconds)	If the expander does not receive communication from the controller for this amount of time, the expander will reset itself. The range is 15–300 seconds.

Local access to the Carrier® ChillerVu™

You can use the following items as a local user interface to an Open controller. These items let you access the controller information, read sensor values, and test the controller.

Connect...	To the controller's...	For...
Field Assistant[1] application	Local Access port	Temporary user interface for start-up
Equipment Touch[2] touchscreen device	Rnet port	Temporary or permanent user interface for start-up

[1] Requires a USB Link (Part #USB-L)

[2] See the *Equipment Touch Installation and Setup Guide* for detailed instructions.

CAUTION If multiple controllers share power but polarity was not maintained when they were wired, the difference between the controller's ground and the computer's AC power ground could damage the USB Link and the controller. If you are not sure of the wiring polarity, use a USB isolator between the computer and the USB Link. Purchase a USB isolator online from a third-party manufacturer.

These are accessory items that do not come with the controller.

Communicating through the Local Access port with a USB Link

Using a computer and a USB Link, you can communicate locally with the Carrier® ChillerVu™ to download or to troubleshoot.

CAUTIONS

- Maintain polarity when controllers share power.
- Failure to maintain polarity while using the USB Link on a computer that is grounded via its AC adapter may damage the USB Link and the controller.
- If multiple controllers share power but polarity was not maintained when they were wired, the difference between the controller's ground and the computer's AC power ground could damage the USB Link and the controller. If you are not sure of the wiring polarity, use a USB isolator between the computer and the USB Link. Purchase a USB isolator online from a third-party manufacturer. Plug the isolator into your computer's USB port, and then plug the USB Link cable into the isolator.

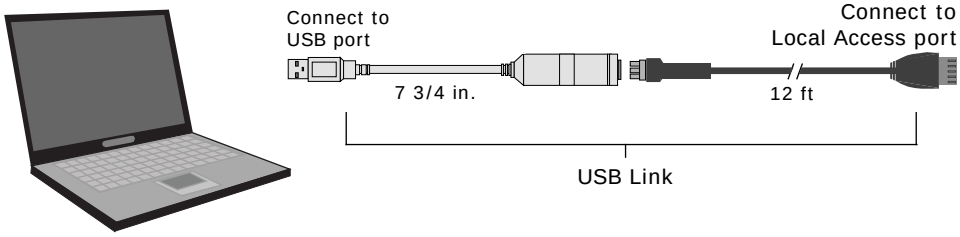
PREREQUISITES

- For the i-Vu® application to communicate with the controller, the controller must have been downloaded with at least its driver.
- Laptop with USB port
- USB Link (Part #USB-L)

Using a USB Link

1 The USB Link driver is installed with an i-Vu® v5 or later system. But if needed, you can get the latest driver from *http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx*. Install the driver before you connect the USB Link to your computer.

2 Connect the laptop to the Local Access port of the controller using the USB Link cable(s).



NOTE If using a USB isolator, plug the isolator into your computer's USB port, and then plug the USB Link cable into the isolator.

3 Set the controller's **Enhanced Access** DIP switch.

To communicate in...	Set switch to...
The i-Vu® application	Off
PuTTY or HyperTerminal	On

4 Turn the controller's power off, then on again.

To communicate using PuTTY

You can connect a computer to a controller's Local Access port and use PuTTY, a free open source terminal emulation program, to:

- Set the baud rate for Port S1 on the Carrier® ChillerVu™
- Set controller properties, such as IP address and network information
- Retrieve a Modstat

PREREQUISITES

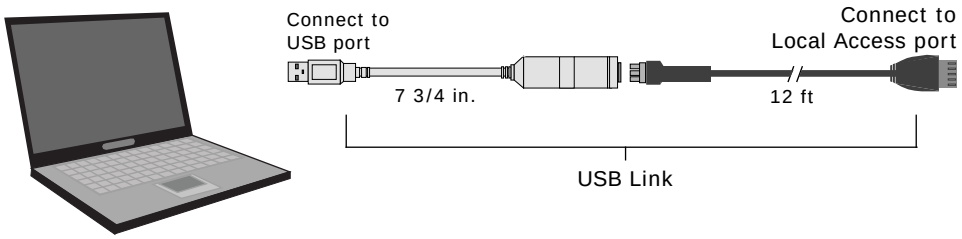
- A computer with a USB port
- A USB Link cable
  NOTE The USB Link driver is installed with an i-Vu® v5 or later system. But if needed, you can get the latest driver from *http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx*. Install the driver before you connect the USB Link to your computer.

CAUTION If multiple controllers share power but polarity was not maintained when they were wired, the difference between the controller's ground and the computer's AC power ground could damage the USB Link and the controller. If you are not sure of the wiring polarity, use a USB isolator between the computer and the USB Link. Purchase a USB isolator online from a third-party manufacturer.

Using PuTTY

1 Download and install PuTTY from the *PuTTY website* (*http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html*).

2 Connect the laptop to the controller or sensor using the appropriate USB Link cable(s).



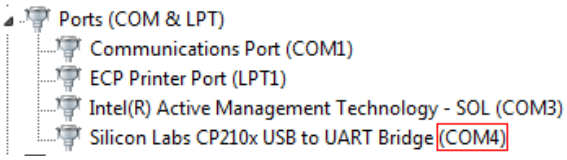
NOTE If using a USB isolator, plug the isolator into your computer's USB port, and then plug the USB Link cable into the isolator.

3 To change a router's IP address, subnet mask, or default gateway, set its **IP Address** DIP switch to **Assigned**.

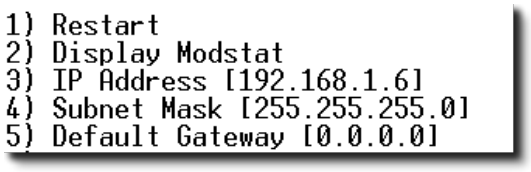
4 Start PuTTY.

5 Under **Category** > **Connection**, select **Serial**.

6 Under **Options controlling local serial lines**, enter the following settings:

Field	Value
Serial line to connect to	Replace X with the computer's port number that the USB Link cable is connected to. **NOTE** To find the port number, select **Start** > **Control Panel** > **System** > **Device Manager** > **Ports (Com & LPT)**. The COM port number is beside **Silicon Labs CP210x USB to UART Bridge**. 
Speed (baud)	115200
Data Bits	8
Stop Bits	1
Parity	None
Flow Control	None

7 Click **Open**. A window similar to the one below appears.



8 Do one of the following:

- To change a property value:
  a. Type the number of the property, then press **Enter**.
  b. Type the new value, then press **Enter**.
- To take an action, type number of the action, then press **Enter**.

9 If you changed a value, type 1, then press **Enter** to restart the controller.

10 Close PuTTY.

Troubleshooting

If you have problems mounting, wiring, or addressing the Carrier® ChillerVu™ or the expander, contact Carrier Control Systems Support.

NOTE To help you troubleshoot, obtain a Module Status (Modstat) from the controller and review the System Error and Warning details.

Controller LED's

The **Module Status** LED can display the following error codes. Verify the LED patterns by cycling power to the controller and noting the lights and flashes.

Error Code...	Indicates...	Possible solutions
0	The control program or driver has not been downloaded.	Download All Content to the Carrier® ChillerVu™.
1	A control program error	Obtain a Module Status Report (Modstat) and look for error messages. See i-Vu® Help for instructions on obtaining a Modstat. If you cannot determine the error from the Modstat, contact Carrier Control Systems Support.
2	The controller's memory is full	In the i-Vu® interface, reduce the amount of trend data and/or control programs stored in the controller.
3	A setup error	Verify: • The address has been set on the rotary switches. See Addressing the Carrier® ChillerVu™. • The address is unique on the network • DIP switches are set correctly
4	A system error	Obtain a Module Status Report (Modstat) and look for error messages. See i-Vu® Help for instructions on obtaining a Modstat. If you cannot determine the error from the Modstat, contact Carrier Control Systems Support.
7	Abnormal Startup	Obtain a Module Status Report (Modstat) and look for error messages. See the i-Vu® application or Field Assistant Help for instructions on obtaining a Modstat. If you cannot determine the error from the Modstat, contact Carrier Control Systems Support.

Error Code...	Indicates...	Possible solutions
8	Factory defaults are being restored	The number 8 should display only during the short restoring period. If this number displays continuously or flashes intermittently with another number, try each of the following: • Turn the Carrier® ChillerVu™'s power off, then on. • Restore factory defaults. See *Restore factory defaults* (page 58). • Download the controller. • Replace the Carrier® ChillerVu™.

Other LED's show the status of certain functions.

If this LED is on...	Status is...
Power	The Carrier® ChillerVu™ has power.
Link	The controller is connected to the Ethernet.
LAN	The Ethernet port is transmitting or receiving data.
100	The connection speed is 100 Mbps. If LED is not lit, the connection speed is 10 Mbps.
Port S1 Tx	The Carrier® ChillerVu™ is transmitting data from the BACnet **Port S1**.
Port S1 Rx	The Carrier® ChillerVu™ is receiving data from BACnet **Port S1**.
Archive Valid	The controller's memory backup is valid.
Port S2 Tx	The Carrier® ChillerVu™ is transmitting data from **Port S2**.
Port S2 Rx	The Carrier® ChillerVu™ is receiving data from **Port S2**.
Brownout	Incoming power is low.
Battery low	The battery is low.

Expander LED's

The LED's show the status of certain functions.

If this LED is on...	Status is...
Power	The Carrier® ChillerVu™ has power
Rx	The Carrier® ChillerVu™ is receiving data from the network segment
Tx	The Carrier® ChillerVu™ is transmitting data over the network segment
UO#	The binary output is active
Run	Lights based on expander health. See table below
Error	Lights based on expander health. See table below

The **Run** and **Error** LED's indicate expander and network status.

If Run LED shows...	And Error LED shows...	Status is..
2 flashes per second	Off	Normal
5 flashes per second	2 flashes per second	Boot is running or driver is updating
5 flashes per second	On	Fatal error. Replace expander or return for repair.

To restore factory defaults

CAUTION This erases all archived information and user-configuration settings. You will have to reconfigure all custom settings. It is recommended to restore the factory defaults only under the guidance of Carrier Control Systems Support.

To erase volatile memory data and restore factory default configuration settings:

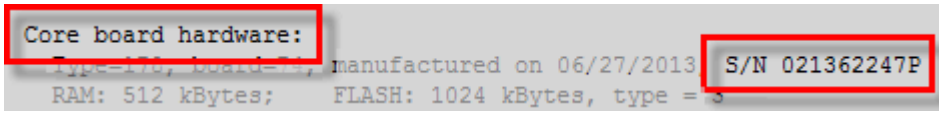
1. Turn off the Carrier® ChillerVu™'s power switch.
2. Make sure the address switches are not set to 0, 0.
3. Hold down the controller's **Factory Defaults** button while you turn its power on.
4. Continue to hold down the **Factory Defaults** button until the controller displays **8** and then the chase pattern, then release the button.
5. Turn on the Carrier® ChillerVu™'s power switch.

CAUTION If you have a CCN network and you restore factory defaults, you must download to the Carrier® ChillerVu™ from the i-Vu® application and NOT upload it. Uploading results in losing your CCN communication.

To get the serial number

If you need the Carrier® ChillerVu™'s serial number when troubleshooting, the number is on:

- a sticker on the back of the main controller board
- a Module Status report (Modstat) under **Core** (or **Main**) **board hardware**



To obtain a modstat in the i-Vu® interface:

1. Select the Carrier® ChillerVu™ in the navigation tree.
2. Right-click and select **Module Status**.

To replace the Carrier® ChillerVu™'s battery

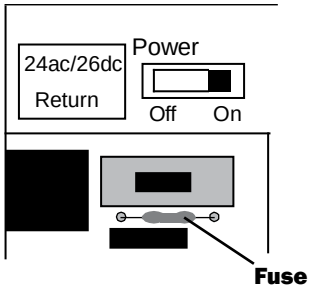
The Carrier® ChillerVu™'s 10-year Lithium CR123A battery retains the following data for a maximum of 720 hours during power outages: time, control programs, editable properties, schedules, and trends.
To conserve battery life, you can set the driver to turn off battery backup after a specified number of days and depend on the archive function to restore data when the power returns.
A low battery is indicated by the **Battery low** LED or a low battery alarm in the i-Vu® application. You can purchase replacement batteries from any retailer that sells a CR-123A battery.

1. Verify that the Carrier® ChillerVu™'s power is on.
2. Using a small flathead screwdriver, pry up each side of the black battery clip until it is free and you can remove it.
3. Remove the battery from the expander, making note of the battery's polarity.
4. Insert the new battery into the expander, matching the polarity of the battery you removed.
5. Push the black clip back onto the battery until you hear both sides click in place.
6. Download the Carrier® ChillerVu™.

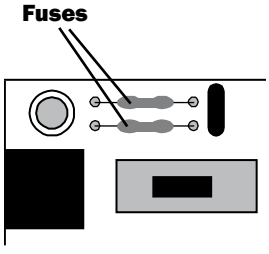
To replace the fuse

If you turn on the Carrier® ChillerVu™'s power switch and the Power LED is not lit, use a multimeter to see if one of the 3 Amp Pico fuses that protects the incoming power is blown.

Controller



Expander



You can order replacement 3 Amp Pico fuses from a local or online retailer.

Before replacing the fuse, try to determine why the fuse blew.

- Check the Power wiring polarity of the Carrier® ChillerVu™, any attached expanders, and any other controllers that share the power supply. Use the same polarity for all of them.
- Verify that outputs are wired to the appropriate types of devices. See *Outputs* (page 18). For example, you cannot wire a 24 Vac device to an output.
- **Carrier® ChillerVu™** - If the **Aux Power Out** port is used, verify that it is wired correctly. See *To wire inputs and outputs* (page 18).

To replace the fuse:

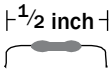
1 Turn **off** the Carrier® ChillerVu™'s power.

2 If the fuse is on an expander, remove the coverplate.

3 Using needle-nose pliers, pull the bad fuse from the Carrier® ChillerVu™.

4 Cut the wires on the new fuse so that the total length is approximately 1 inch and the fuse is centered.

5 Bend the wire ends so that the length is approximately 1/2 inch.



6 Use the pliers to grip one wire end of the fuse and push into a fuse socket on the Carrier® ChillerVu™.

7 Grip the other wire end of the fuse and push into the other fuse socket.

8 If working on an expander, replace the coverplate.

9 Turn on the power and verify that the Power LED is lit.

To take the Carrier® ChillerVu™ out of service

If needed for troubleshooting or start-up, you can prevent the i-Vu® application from communicating with the Carrier® ChillerVu™ by shutting down communication from the controller to the i-Vu® application. When **Out of Service**, i-Vu® no longer communicates properties, colors, trends, etc..

1 On the i-Vu® navigation tree, select the Carrier® ChillerVu™.

2 On the **Properties** page, check **Out of Service**.

3 Click **Accept**.

Compliance

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION Changes or modifications not expressly approved by the responsible party for compliance could void the user's authority to operate the equipment.

CE Compliance

WARNING This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Appendix A: To identify the driver in a Carrier® ChillerVu™ in the i-Vu® Pro v6.5 application

If you have the i-Vu® Pro application and the Carrier® ChillerVu™ does not already have the driver v6.02.028 or later, you must complete the following procedures to successfully install your Carrier® ChillerVu™ into the i-Vu® Pro system. Use the Help in the referenced software for detailed descriptions of these procedures.

You can use AppLoader or PuTTY to determine the driver in the controller in a Modstat.

1. If you have not created your system yet, open SiteBuilder and select **File** > **New**. Enter the **System Name**, click **Next**, and click **Next** again.
2. In SiteBuilder, on the **Network** tree, verify that the BACnet/IP network is correct for your system.
3. To the BACnet/IP network, right-click and select **BACnet Device Router**.
   a) Enter the controller's **Name**.
   b) Change the **Device Definition** to **PSM-IO** to add the driver.
   c) If necessary, on the **General** tab, click **Browse**, and then select drv_psmio_<latest version>.driver.
   d) On the **Address** tab, check **Specify a custom or DHCP IP Address**.
   e) Enter the controller's **IP address**, **Subnet Mask**, and **Default Gateway Address**.
4. If you have a CCN system:

   On the **CCN tab**:

   1. If the controller will serve as the CCN Gateway, check **This device is the CCN Gateway**. If this controller will be a CCN Ethernet Bridge, fill in the **CCN Gateway IP Address** of the CCN Gateway.
   2. In the **Element Number** field, fill in a unique **Element Number**.
   3. Click **OK**.
5. If the Carrier® ChillerVu™ will have an MS/TP network attached, right-click on the PSM-IO icon in the network tree and choose **Add BACnet Network**. In the general tab give the network a name and set the Network Number.
6. Close SiteBuilder.
7. Open the i-Vu Server and then the i-Vu® application.
8. To set up the CCN network, follow the steps in *To scan in and download CCN devices* (page 34).
9. To set up the MS/TP network, follow the steps in *To add the control program and graphic in the i-Vu® interface* (page 36).

Appendix B: Carrier® ChillerVu™ wire lists

Carrier® ChillerVu™ wire list

i-Vu® chiller plant system network
controller

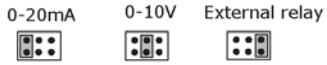
Project Name: **Location:**	**Controller:** **Network Number:** **MAC Address:**

Aux Power Out	1		24 Vdc					
	2		24 Vdc					

Universal Input Mode Select (Jumper Position of Pins)

Point/ Cable#	Universal Inputs (+)	(G)	Input Type	Jumper Position of Pins	I/O	Sensor code	Equipment Name	Point Name
1	1	2	0-20 mA	Left	UI-1			
	1	2	Thermistor Dry contact RTD	Middle				
	1	2	0-10 V	Right				
2	3	4	0-20 mA	Left	UI-2			
	3	4	Thermistor Dry contact RTD	Middle				
	3	4	0-10 V	Right				
3	5	6	0-20 mA	Left	UI-3			
	5	6	Thermistor Dry contact RTD	Middle				
	5	6	0-10 V	Right				
4	7	8	0-20 mA	Left	UI-4			
	7	8	Thermistor Dry contact RTD	Middle				
	7	8	0-10 V	Right				
5	9	11	0-20 mA	Left	UI-5			
	9	11	Thermistor Dry contact RTD	Middle				
	9	11	0-10 V	Right				
6	10	11	0-20 mA	Left	UI-6			
	10	11	Thermistor Dry contact RTD	Middle				
	10	11	0-10 V	Right				
7	12	14	0-20 mA	Left	UI-7			

	12	14	Thermistor Dry contact RTD	Middle				
	12	14	0-10 V	Right				
8	13	14	0-20 mA	Left	UI-8			
	13	14	Thermistor Dry contact RTD	Middle				
	13	14	0-10 V	Right				
9	15	17	0-20 mA	Left	UI-9			
	15	17	Thermistor Dry contact RTD	Middle				
	15	17	0-10 V	Right				
10	16	17	0-20 mA	Left	UI-10			
	16	17	Thermistor Dry contact RTD	Middle				
	16	17	0-10 V	Right				
11	18	20	0-20 mA	Left	UI-11			
	18	20	Thermistor Dry contact RTD	Middle				
	18	20	0-10 V	Right				
12	19	20	0-20 mA	Left	UI-12			
	19	20	Thermistor Dry contact RTD	Middle				
	19	20	0-10 V	Right				



Universal Output Mode Select (Jumper Position of Pins)

Point/ Cable#	Universal Outs (+)	(G)	Output Type	Jumper Position of Pins	I/O	Sensor code	Equipment Name	Point Name
1	1	2	0-20 mA	Left	UO-1			
			0-10 Vdc	Middle				
			Relay	Right				
2	3	4	0-20 mA	Left	UO-2			
			0-10 Vdc	Middle				
			Relay	Right				
3	5	6	0-20 mA	Left	UO-3			
			0-10 Vdc	Middle				
			Relay	Right				
4	7	8	0-20 mA	Left	UO-4			
			0-10 Vdc	Middle				
			Relay	Right				
5	1	2	0-20 mA	Left	UO-5			
			0-10 Vdc	Middle				
			Relay	Right				
6	3	4	0-20 mA	Left	UO-6			
			0-10 Vdc	Middle				

			Relay	Right				
7	5	6	0-20 mA	Left	UO-7			
			0-10 Vdc	Middle				
			Relay	Right				
8	7	8	0-20 mA	Left	UO-8			
			0-10 Vdc	Middle				
			Relay	Right				

MPC Open XPIO48 wire list

System network

MPC Open XPIO48 expander

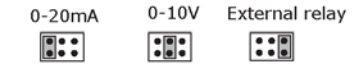
Project Name: **Location:**	**Controller:** **Network Number:** **MAC Address:**

Aux Power Out	1		24 Vdc					
	2		24 Vdc					

Universal Input Mode Select (Jumper Position of Pins)

Point/ Cable#	Universal Inputs (+)	(G)	Input Type	Jumper Position of Pins	I/O	Sensor code	Equipment Name	Point Name
1	1	2	0-20 mA	Left	UI-1			
	1	2	Thermistor Dry contact RTD	Middle				
	1	2	0-10 V	Right				
2	3	4	0-20 mA	Left	UI-2			
	3	4	Thermistor Dry contact RTD	Middle				
	3	4	0-10 V	Right				
3	5	6	0-20 mA	Left	UI-3			
	5	6	Thermistor Dry contact RTD	Middle				
	5	6	0-10 V	Right				
+4	7	8	0-20 mA	Left	UI-4			
	7	8	Thermistor Dry contact RTD	Middle				
	7	8	0-10 V	Right				
5	1	2	0-20 mA	Left	UI-5			

	1	2	Thermistor Dry contact RTD	Middle				
	1	2	0-10 V	Right				
6	3	4	0-20 mA	Left	UI-6			
	3	4	Thermistor Dry contact RTD	Middle				
	3	4	0-10 V	Right				
7	5	6	0-20 mA	Left	UI-7			
	5	6	Thermistor Dry contact RTD	Middle				
	5	6	0-10 V	Right				
8	7	8	0-20 mA	Left	UI-8			
	7	8	Thermistor Dry contact RTD	Middle				
	7	8	0-10 V	Right				



Universal Output Mode Select (Jumper Position of Pins)

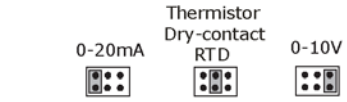
Point/ Cable#	Universal Outs (+)	(G)	Output Type	Jumper Position of Pins	I/O	Sensor code	Equipment Name	Point Name
1	1	2	0-20 mA	Left	UO-1			
			0-10 Vdc	Middle				
			Relay	Right				
2	3	4	0-20 mA	Left	UO-2			
			0-10 Vdc	Middle				
			Relay	Right				
3	5	6	0-20 mA	Left	UO-3			
			0-10 Vdc	Middle				
			Relay	Right				
4	7	8	0-20 mA	Left	UO-4			
			0-10 Vdc	Middle				
			Relay	Right				

MPC Open XPIO816 wire list

System network
MPC Open XPIO816 expander

Project Name: **Location:**	**Controller:** **Network Number:** **MAC Address:**

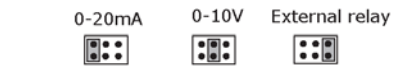
Aux Power Out	1		24 Vdc					
	2		24 Vdc					



Universal Input Mode Select (Jumper Position of Pins)

Point/ Cable#	Universal Inputs (+)	(G)	Input Type	Jumper Position of Pins	I/O	Sensor code	Equipment Name	Point Name
1	1	2	0-20 mA	Left	UI-1			
	1	2	Thermistor Dry contact RTD	Middle				
	1	2	0-10 V	Right				
2	3	4	0-20 mA	Left	UI-2			
	3	4	Thermistor Dry contact RTD	Middle				
	3	4	0-10 V	Right				
3	5	6	0-20 mA	Left	UI-3			
	5	6	Thermistor Dry contact RTD	Middle				
	5	6	0-10 V	Right				
4	7	8	0-20 mA	Left	UI-4			
	7	8	Thermistor Dry contact RTD	Middle				
	7	8	0-10 V	Right				
5	1	2	0-20 mA	Left	UI-5			
	1	2	Thermistor Dry contact RTD	Middle				
	1	2	0-10 V	Right				
6	3	4	0-20 mA	Left	UI-6			
	3	4	Thermistor Dry contact RTD	Middle				
	3	4	0-10 V	Right				
7	5	6	0-20 mA	Left	UI-7			
	5	6	Thermistor Dry contact RTD	Middle				
	5	6	0-10 V	Right				
8	7	8	0-20 mA	Left	UI-8			

	7	8	Thermistor Dry contact RTD	Middle				
	7	8	0-10 V	Right				
9	1	2	0-20 mA	Left	UI-9			
	1	2	Thermistor Dry contact RTD	Middle				
	1	2	0-10 V	Right				
10	3	4	0-20 mA	Left	UI-10			
	3	4	Thermistor Dry contact RTD	Middle				
	3	4	0-10 V	Right				
11	5	6	0-20 mA	Left	UI-11			
	5	6	Thermistor Dry contact RTD	Middle				
	5	6	0-10 V	Right				
12	7	8	0-20 mA	Left	UI-12			
	7	8	Thermistor Dry contact RTD	Middle				
	7	8	0-10 V	Right				
13	1	2	0-20 mA	Left	UI-13			
	1	2	Thermistor Dry contact RTD	Middle				
	1	2	0-10 V	Right				
14	3	4	0-20 mA	Left	UI-14			
	3	4	Thermistor Dry contact RTD	Middle				
	3	4	0-10 V	Right				
15	5	6	0-20 mA	Left	UI-15			
	5	6	Thermistor Dry contact RTD	Middle				
	5	6	0-10 V	Right				
16	7	8	0-20 mA	Left	UI-16			
	7	8	Thermistor Dry contact RTD	Middle				
	7	8	0-10 V	Right				



Universal Output Mode Select (Jumper Position of Pins)

Point/ Cable#	Universal Outs (+)	(G)	Output Type	Jumper Position of Pins	I/O	Sensor code	Equipment Name	Point Name
1	1	2	0-20 mA	Left	UO-1			
			0-10 Vdc	Middle				
			Relay	Right				
2	3	4	0-20 mA	Left	UO-2			

			0-10 Vdc	Middle				
			Relay	Right				
3	5	6	0-20 mA	Left	UO-3			
			0-10 Vdc	Middle				
			Relay	Right				
4	7	8	0-20 mA	Left	UO-4			
			0-10 Vdc	Middle				
			Relay	Right				
5	1	2	0-20 mA	Left	UO-5			
			0-10 Vdc	Middle				
			Relay	Right				
6	3	4	0-20 mA	Left	UO-6			
			0-10 Vdc	Middle				
			Relay	Right				
7	5	6	0-20 mA	Left	UO-7			
			0-10 Vdc	Middle				
			Relay	Right				
8	7	8	0-20 mA	Left	UO-8			
			0-10 Vdc	Middle				
			Relay	Right				

Document revision history

Important changes to this document are listed below. Minor changes such as typographical or formatting errors are not listed.

Date	Topic	Change description	Code*
8/7/17	Adding the Carrier® ChillerVu™ into the i-Vu or Field Assistant system To scan in and download CCN devices	Increased the visibility of statement about not being able to use Field Assistant for a CCN system.	C-AE-BL-E
4/27/17	Ethernet, BACnet MS/TP, ARC156, and CCN wiring specifications	Added CCN specs	C-TS-JN-E-RD
4/7/17	To scan in and download CCN devices	Defaults to a Gateway now instead of Bridge.	C-TS-JN-E
	To identify a driver in a Carrier® ChillerVu™ in the i-Vu Pro v6.5 application	New topic.	C-TS-JN-E
	To wire a BAcnet over IP network	Corrected for new driver. Use rotary switches to set the BACnet Device Instance address.	C-TS-JN-E
	Inputs	Added 5 kOhm thermistor	CA-TS-JN-E
	BACnet firewall	new topic	X-D-RD-E-BL
	Zone sensors Equipment Touch	Deleted topics.	C-AE-BL-O-WB
	Wiring devices to the Carrier® ChillerVu™'s Rnet port	Removed device details and clarified lack of support except in a custom control program.	C-AE-BL-O-WB
	Input wiring specifications	Added Wireless Adapter for Wireless sensors	C-D
	To wire the controller to the BACnet MS/TP or ARC156 network	Added ARC156	C-D
	Wiring for communications	Added ARC156	C-D
	Carrier® ChillerVu™ specifications	Added driver, ARC156, Wireless sensors, and Wireless Adapter	C-D
	Cover What are the MPC Open XP and MPC Open XP expanders?	Changed Carrier® ChillerVu™ to new silkscreen	C-D
	To choose an IP address scheme	New topic	C-TS-JN-E
	To scan in and download CCN devices	Changed name - formerly, To find and download CCN devices.	C-TS-JN-E
	To wire to a CCN network	Deleted Network Service Tool instructions. - Use the i-Vu® interface instead.	C-TS-JN-E
	To wire to a BACnet MS/TP network	Setting MAC address using rotary address switches removed.	C-TS-JN-E
	Wiring for communications	Added clarification on baud rate for connecting to a LonWorks SLTA or Option Card.	C-TS-JN-E
	To assign a custom IP address	Corrected DIP switch setting to Enhanced Access and Assigned to On. Added wiring specifications.	C-TS-JN-E
	To obtain an IP address using DHCP	Corrected DIP switch setting to IP Addr > DHCP to Off. Added wiring specifications.	C-TS-JN-E
	To use a default IP address	Corrected DIP switch name to IP Addr. Added rotary address info and wiring specifications.	C-TS-JN-E
	To set the controller's MAC address	removed - N/A	C-TS-JN-E
	Addressing the Carrier® ChillerVu™	Changed MAC address information to Device Instance Changed Ethernet to IP	C-TS-JN-E
5/6/16	Where appropriate.	Removed references to SiteBuilder except when using multi-CCN.	C-D-E-RR

Important changes to this document are listed below. Minor changes such as typographical or formatting errors are not listed.

Date	Topic	Change description	Code*
	Configuring BACnet device instance and network number	New topic	C-D-E-RR
	Adding the Carrier® ChillerVu™ into the i-Vu® system and all subtopics	Updated to include i-Vu Standard and Plus and auto-generation.	C-D-E-RR
2/9/16	To attach expanders	Added step explaining jumper settings for connecting more than one expander.	X-TS-RD-E-BR
12/3/15	To connect to LonWorks network using the SLTA-10	Added step to enter the baud rate in Driver Properties	C-TR-GG-E-JN
	To wire to Modbus RTU on Port S2	Added step to enter the baud rate in Driver Properties	C-TR-GG-E-JN
	To set up the driver	Correction - Expanders driver page removed.	C-D
	Wiring for communications	Corrected table to show BACnet/Ethernet and Telnet Diagnostics	C-D-DS

* For internal use only

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