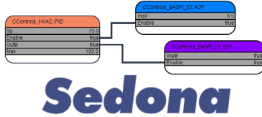# BASpi-Edge – 12-Point Cloud Connected BACnet Controllers

The BASpi-Edge series are programmable, BACnet networked, and Azure IoT Central cloud connected controllers with enhanced features and data processing at the Edge functionality, powered by Raspberry Pi. The two BASpi-Edge controller models only differ in the makeup of their outputs. The BASpi-Edge 6/6 has 6 universal inputs and 6 relay outputs while the BASpi-Edge 6/4/2 has 6 universal inputs, 4 relay outputs, and 2 analog outputs. BACnet/IP client/server communication over Ethernet or Wi-Fi, a secure cloud connection, and Sedona function block programmable control logic and data processing at the Edge come standard.

The BASpi-Edge are fully web page configurable with quick and easy cloud connectivity to the Azure IoT Central (SaaS) cloud solution, providing the option to make any attached equipment a cloud-connected asset. Additional features such as email alarms/notifications, schedules with holidays/exceptions, weather web service, as well as graphical dashboards served over Ethernet, Wi-Fi, or directly out of the resident HDMI port make the BASpi-Edge ideal for standalone or BACnet supervised automation applications.

BASpi-Edge controllers communicate with the local operational network and supervisory stations, or other Edge controllers, using the industry standard protocol – BACnet. Optionally, a REST API can be used to interface between third-party, legacy, or non-BACnet devices, applications, data servers, etc. Housed in a compact DIN rail or panel mounted enclosure with 24 VAC/VDC power input and hardened with a resilient 8 GB pSLC micro SD card, gives them performance and convenience advantages, making them suitable for a wide array of applications. No licensing requirements, free programming, archiving, and emulation PC software tools, provide ease of deployment and maximum convenience.
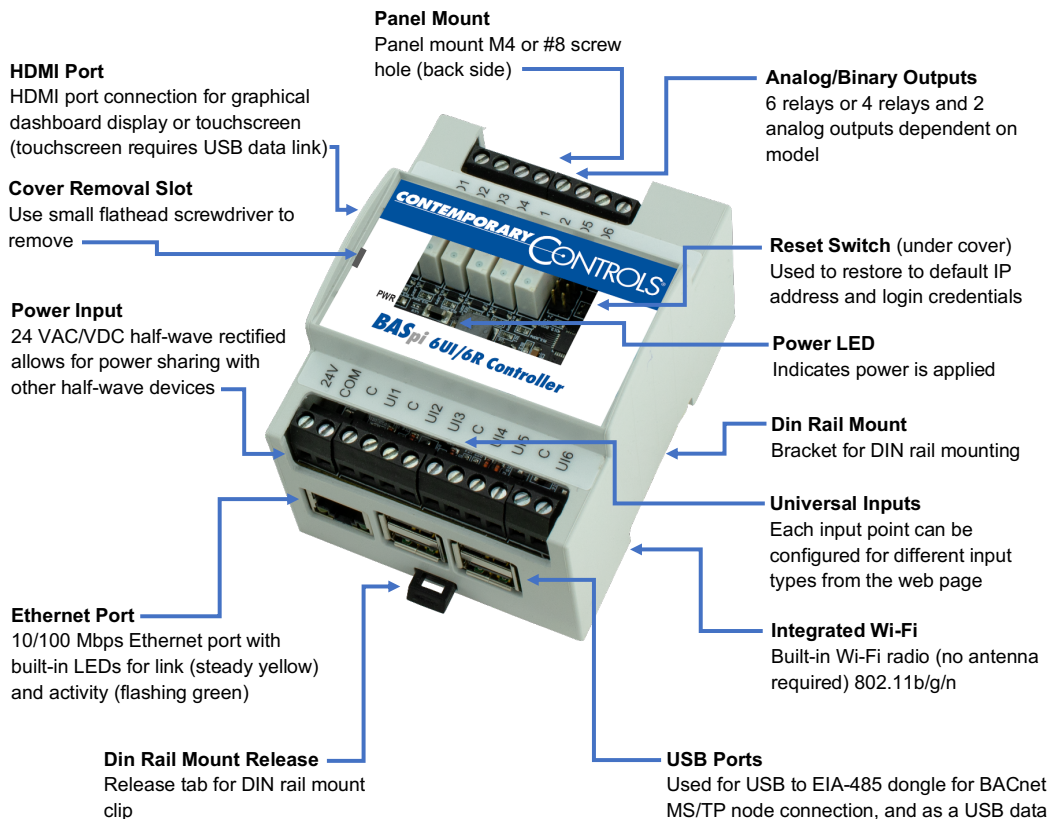
Versatile Control Device

- BACnet/IP client/server over Ethernet or Wi-Fi (BACnet Client limited to 5 devices/20 points)

- Optional BACnet MS/TP client/sever node connection using USB to EIA-485 dongle (BACnet Client limited to 5 devices/20 points)

- Azure IoT Central (SaaS) cloud connected

- Resident Sedona Virtual Machine (SVM) with function block programming

- Sedona programmable over Ethernet or Wi-Fi

- Web page configurable over Ethernet or Wi-Fi

- Graphical dashboard served over Ethernet, Wi-Fi, or direct HDMI output

- Schedules with holidays/exceptions

- Email alarms/notifications

- Weather station web service (openweathermap.org)

- Sunrise/sunset calculation based on geolocation

- NTP server or manually settable clock

- Free BAScontrol Toolset for programming, archiving, and emulation

- Free pre-built Sedona control applications

Flexible Input/Output — 12-points of physical I/O

- Six configurable universal inputs:
  - Analog input (0-10V), binary input, resistance
  - Thermistor (10kT2, 10kT3, 20k)
  - Pulse input (40Hz max with retention on power loss)

- Six or four relay outputs (30 V @ 2A max current) - model dependent

- Two or zero analog outputs (0-10 V) - model dependent

- 48 Virtual Points (VT) communicate with BACnet clients and supervisory workstations

- 48 Web Components (WC) communicate with web browser for monitoring and configuration

- COV (Change of Value) BACnet notifications on all physical and virtual points 54 analog/60 binary for the BASpi-Edge 6/6 and 56 analog /58 binary for the BASpi-Edge 6/4/2

- REST API for interfacing with third-party, legacy, or non-BACnet devices, applications, data servers, etc.

- 24 VAC/VDC input power and compact DIN rail or panel mounted enclosure

HDMI Port
HDMI port connection for graphical dashboard display or touchscreen (touchscreen requires USB data link)

Cover Removal Slot
Use small flathead screwdriver to remove

Power Input
24 VAC/VDC half-wave rectified allows for power sharing with other half-wave devices

Ethernet Port
10/100 Mbps Ethernet port with built-in LEDs for link (steady yellow) and activity (flashing green)

Din Rail Mount Release
Release tab for DIN rail mount clip

Panel Mount
Panel mount M4 or #8 screw hole (back side)

Analog/Binary Outputs
6 relays or 4 relays and 2 analog outputs dependent on model

Reset Switch (under cover)
Used to restore to default IP address and login credentials

Power LED
Indicates power is applied

Din Rail Mount
Bracket for DIN rail mounting

Universal Inputs
Each input point can be configured for different input types from the web page

Integrated Wi-Fi
Built-in Wi-Fi radio (no antenna required) 802.11b/g/n

USB Ports
Used for USB to EIA-485 dongle for BACnet MS/TP node connection, and as a USB data link for HDMI touchscreens

BASpi-Edge – Overview

BASpi-Edge controllers utilize the powerful 1.2 GHz 64-bit CPU in the Raspberry Pi 3 with 1 GB of RAM memory for lightning fast operation, its Ethernet and Wi-Fi adapters for versatile network connectivity, as well as its HDMI port for human-machine interface for touchscreen or display options. Our field-proven, resilient I/O and power circuit board installed on top hardens the Raspberry Pi and allows it to safely interface with standard building automation input/output control signals and industry standard power supplies. A resilient 8 GB pSLC micro SD card (1-Bit/Cell Mode, 2 voltage states to represent 0 or 1) ensures reliable operation and sufficient storage space. 24 VAC/VDC power input and a compact DIN rail or panel mounted enclosure make it convenient to install.

The BASpi-Edge is fully web page configurable with secure web page authentication. Its IP address on either Ethernet or Wi-Fi adapters can be configured for fixed IP, or can receive an IP address automatically from a DHCP server on the network. By operating at the BACnet/IP level with a B-ASC device profile, BASpi-Edge controllers can share the same Ethernet or Wi-Fi network with BACnet supervisory controllers and operator workstations.

Universal input channels are set for 0-10 V input by default and are configurable for type II and type III 10 kΩ thermistor curves, a 20 kΩ thermistor curve, pulse inputs with or without pull up at up to 40 Hz, or binary contact closure inputs (require a voltage-free source). An NTP server or manually-settable clock allows for creating local schedules. The weekly schedules are web page configurable and allow for entry of special events/holidays schedule exceptions. Schedule Sedona components are used to trigger control logic. The BASpi-Edge can send email alarms/notifications with custom text body and point values. Email alarms are also web page configurable and allow for multiple BASpi-Edge points or direct wire sheet values to be included in the sent email. A configurable weather service using www.openweathermap.org weather server provides timely weather data parameters right to your wire sheet logic, BACnet/IP network, graphical dashboard, or pushed to the Azure IoT dashboard and used there.

Cloud Connected

By leveraging open IoT protocols such as MQTT, proven security mechanisms such as Transport Layer Security (TLS), and the robust and ready to use Azure IoT Central software-as-a-service (SaaS) cloud solution, BASpi-Edge controllers can easily and securely connect to the cloud, effectively making any attached equipment a cloud connected asset. The cloud connection allows the user to upload select, processed, triggered, or all point data to the cloud securely where it can be trended, visualized, analyzed, alarmed, and accessed from anywhere – giving your applications the mobility and global accessibility you have been looking for.

Graphical Dashboards

Graphical dashboards can be customized and accessed over Ethernet, Wi-Fi, or directly out of the resident HDMI port. A built-in library of graphical widgets such as gauges, charts, sliders, or buttons is used to display and/or control BASpi-Edge point values. Dashboards are accessible over the network, but can also be displayed on an HDMI-connected screen. If a touchscreen is used to connect to the HDMI port, an additional USB connection allows for touch control on graphical widgets tied to writable points. Graphical dashboards allow you to easily visualize your automation application and/or provide a human-machine interface.
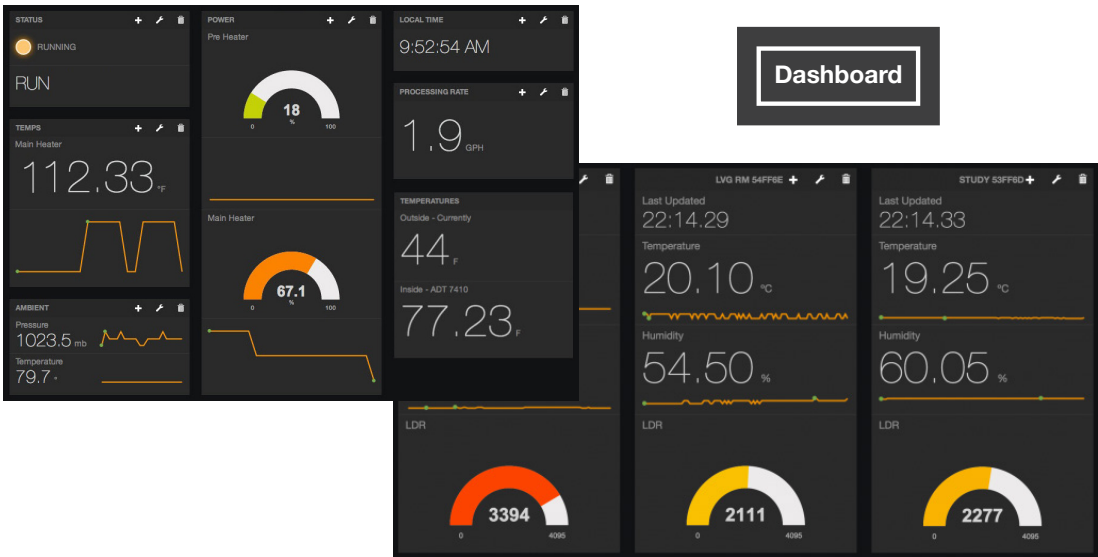
Powered by a Sedona Virtual Machine – for Implementing Control

The BASpi-Edge incorporates Sedona Virtual Machine (SVM) open source technology. Using tools such as the free Sedona Application Editor the user can develop a control application using powerful drag-and-drop visual programming methodology. Once developed, the program remains stored in the BASpi-Edge and executes in the SVM. The application can run standalone in the BASpi-Edge, or it can interact with a program in a supervisory BACnet controller over Ethernet or Wi-Fi. The number of potential applications is unlimited. The BASpi-Edge includes Sedona 1.2 release kits of components — and Contemporary Controls' enhanced platform dependent and platform independent kits. The BASpi-Edge IO Kit components provide 12 physical points, 48 BACnet Virtual Points, and 6 Universal Counters.

BASpi-Edge Web Kit has 48 components which share data with its web page and can be used for configuration points. Input web components receive data from the web page. Output web components send data to the web page. The Contemporary Controls' Email and Schedule kits allow for schedules and emails to be triggered. Function, Function2, HVAC, and Math kits provide enhanced logic functionality. A set of kits is pre-installed on the BASpi-Edge. In order to install additional compatible kits such as custom kits developed or obtained through third parties, use the Kit Manager in Sedona Application Editor (SAE). For complete details on Sedona, SAE, and Sedona component functionality refer to the Sedona Open Control Reference Manual.

BASpi-Edge Software Tools

The BAScontrol Toolset is offered as a free download. Sedona programming can be accomplished over Ethernet or Wi-Fi using the Sedona Application Editor (SAE) as part of the toolset. The free toolset for Windows PC also includes BASbackup and BASemulator software tools. For complete details on the available tools refer to the BAScontrol Toolset.
The BAScontrol Toolset consists of:

Sedona Application Editor (SAE) – used to connect to Sedona devices such as BASpi-Edge and program function block wire sheet control applications and saving or loading local wire sheet application (SAX file) on a Windows PC/laptop.

BASemulator – is a software emulator for the BASpi-Edge series which runs on a Windows PC/laptop. This BASpi-Edge emulator allows you to work on your projects even when the unit is not in front of you - program your Sedona wire sheet application and configure parameters such as I/O channel configuration, BACnet settings, and network settings before deploying onto real controllers. BASpi-Edge project

files are transferred between real and emulated BASpi-Edge using BASbackup.

BASbackup – allows you to store complete BASpi-Edge projects (wire sheet logic and web page configuration) to a single file. This file can be used as a backup for archiving, or a template for similar future projects. The transferrable backup file (template) can be used to clone controllers or quickly reproduce controllers with slightly altered settings to save time.
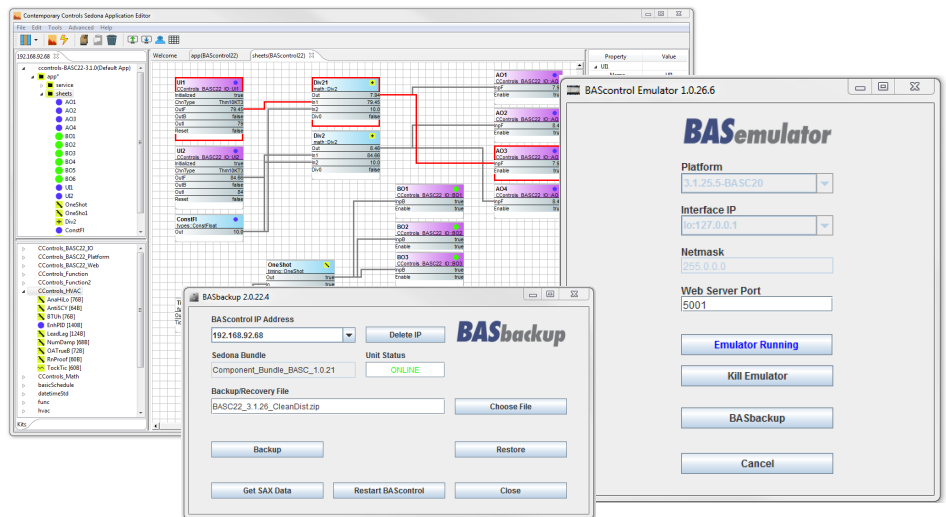
Feature Rich Custom Components

VT01 – VT48 Virtual Points — share wire sheet data with BACnet clients
Virtual points are server points used to share wire sheet data with a BACnet client. A BACnet client can "read" wire sheet data such as a calculated value or it can "write" to the wire sheet with a set-point or command. Virtual points can be a BACnet binary value (BV) or BACnet analog value (AV).

OAT	
CControls_BASCAO2E_IO::VT38	
Initialized	true
ChnType	FloatInput
Reset	false
FloatV	73.92
BinaryV	true
WireSheet	InputTo

WC01 – WC48 Web Components — share wire sheet data with BASpi-Edge web pages
Web components provide a convenient method of sharing data between web page and the wire sheet. Mostly used for configuration and simple reporting, web components can input data to a web page or output binary, integer or float data to a web page.

WC01	
CControls_BASCAO2E_Web::WC01	
WcType	BinaryOutput
MinVal	0.0
MaxVal	100.0
FltVal	0.0
IntVal	0
BinVal	false

NetV – Network Variable – command single BACnet object of type AI, AO, AV, BI, BO and BV
Network variables are BACnet client points used to share wire sheet data with a BACnet server. BASpi-Edge can "write" wire sheet data such as a command value to a BACnet server or it can "read" to the wire sheet the status or data from a BACnet server. Variable types can be analog input (AI), output (AO) or value (AV), or binary input (BI), output (BO) or value (BV).

NetV	
CControls_BASCAO2E_NETV::NetV	
DevInstance	1075
ObjInstance	21
ObjType	BinaryOutput
Priority	10
DefOutF	0.0
DefOutB	false
DefOutI	0
ValF	0.0
ValB	false
ValI	0
Relinquish	false
Enabled	false
Status	Online

Email – binary triggered email alarm/notification message with point data
Multiple emails can be configured to be sent to different email addresses for alarm or notification purposes. Emails are secure using SSL/TLS encryption while supporting most common secure email servers. The values of any or all BASpi-Edge variables can be embedded in the message.

Email	
CControls_BASCAO2E_Email::Email	
MessageID	1
Sv1	0.0
Sv2	75.5
Sv3	213.0
Trigger	false
Reset	false
Status	Success

Sched – Schedule – binary trigger of weekly schedule with holidays and exceptions
Multiple weekly schedules with configurable holidays and exceptions are web page configurable. A corresponding schedule component for each schedule is used to trigger wire sheet control logic.

Sched	
CControls_BASCAO2E_Schedule::Sched	
SchedName	RTU1
IsOccupied	false
MinToOccupied	1440
HeadActive	false
HeadOccupied	false
Status	Configured

Sunrise – Time to Sunrise – calculates minutes to sunrise/sunset based upon configured geolocation
By configuring geolocation, the time before sunrise and the time before sunset can be used to control actions. For simpler control schemes, there is a daytime indicator.

Sunrise	
CControls_BASCAO2E_IO::Sunrise	
IsDaytime	true
MinToSunrise	1440
MinToSunset	146

Weather – weather forecast data
Weather forecast data obtained from the free weather web service openweathermap.org can be assigned to virtual points. Temperature, pressure, humidity, wind speed, wind direction, rainy condition, snow condition, and cloudy condition weather parameters are supported.

Contemporary Controls' Developed Sedona Kits and Components

BASpi-Edge I/O Kit **BASpi-Edge platform** **platform dependent**	UI1 – UI6 AO1 – AO2 BO1 – BO6 ScanTim Sunrise UC1 – UC6 VT01 – VT48	Universal input — binary, analog voltage, thermistor, resistance or pulse input Analog output — analog output point (6/4/2 model only) Binary output — binary output point (BO1-BO6 for 6/6 model, BO1-BO4 for 6/4/2 model) Scan Time Monitor — records the minimum, maximum and average scan times Time to Sunrise — calculates minutes to sunrise/sunset based on configured geolocation Universal counters — up/down counters with retention Virtual points — share wire sheet data with BACnet clients
BASpi-Edge Web Kit **BASpi-Edge platform** **platform dependent**	WC01 – WC48	Web components — share wire sheet data with BASpi-Edge web pages
BASpi-Edge NETV Kit **BASpi-Edge platform** **platform dependent**	NetV NETVAI4 NETVAO4 NETVBI4 NETVBO4	Network Variable — command single BACnet object of type AI, AO, AV, BI, BO, or BV Network Variable AI4 — initiate read of up to four BACnet objects of type AI Network Variable AO4 — initiate read or write of up to four BACnet objects of type AO Network Variable BI4 — initiate read of up to four BACnet objects of type BI Network Variable BO4 — initiate read or write of up to four BACnet objects of type BO
BASpi-Edge Email Kit **platform dependent**	Email	Email — binary triggered email alarm/notification message with point data
BASpi-Edge Schedule Kit **platform dependent**	Sched	Schedule — binary trigger of weekly schedule with holidays and exceptions
Contemporary Controls Function Kit **platform independent**	Cand2 Cand4 Cand6 Cand8 Cmt Cor2 Cor4 Cor6 Cor8 CtoF Dff FtoC HLpre PsychrE PsychrS SCLatch	Two-input Boolean product — two-input AND/NAND gate with complementary outputs Four-input Boolean product — four-input AND/NAND gate with complementary outputs Six-input Boolean product — six-input AND/NAND gate with complementary outputs Eight-input Boolean product — eight-input AND/NAND gate with complementary outputs Comment — comment field up to 64 characters Two-input Boolean sum — two-input OR/NOR gate with complementary outputs Four-input Boolean sum — four-input OR/NOR gate with complementary outputs Six-input Boolean sum — six-input OR/NOR gate with complementary outputs Eight-input Boolean sum — eight-input OR/NOR gate with complementary outputs °C to °F — Celsius to Fahrenheit Temperature Conversion "D" Flip-Flop — D-style Edge-triggered Single-bit Storage °F to °C — Fahrenheit to Celsius Temperature Conversion High — Low Preset – defined logical true and false states Psychrometric Calculator — English Units Psychrometric Calculator — SI Units Set/Clear Latch — single-bit level-triggered single-bit data storage
Contemporary Controls Function 2 Kit **platform independent**	ASWC ASW4C BSWC ISWC CmprC MAXE	Analog switch — selection between two float variables Analog switch — selection between four floats Boolean Switch — selection between two Boolean variables Integer switch — selection between two integer variables Comparison math — comparison (<=>) of two floats Max Enumeration — maximum integer valve from weighted inputs
Contemporary Controls HVAC Kit **platform independent**	AnaHiLo AntiSCY BTUh EnhPID LeadLag NumDamp OATrueB RnProof TockTic	Analog High/Low — initiates an alarm or limit on an analog point or both Anti-Short Cycle — protects equipment from short cycling BTU/hr. Calculator — calculates power based upon flow and temperature differential Enhanced PID Loop — programmable output control when disabling PID loop Lead/Lag Sequencer — two to four pump sequencing control with backup Numeric Dampener — digital filter reduces the volatility of an input signal Outside Air True Blend — calculates percentage of outside air based upon OAT, MAT and RAT Run Proving — acknowledges that commanded equipment has indeed started Period Driven Clock — slow-speed square-wave clock with period programming
Contemporary Controls Math Kit **platform independent**	Add Div Mul Sub	Two-input float addition — addition of floats without need for ConstFloats Two-input float division — division of floats without need for ConstFloats Two-input float multiplication — multiplication of floats without need for ConstFloats Two-input float subtraction — subtration of floats without need for ConstFloats

Sedona 1.2 Release Platform Independent Kits and Components

The Schedule Group basic schedulers	**DailyScheduleBool** **DailyScheduleFloat**	Daily Schedule Boolean — two-period Boolean scheduler Daily Schedule Float — two-period float scheduler
The HVAC Group operations that facilitate control	**LSeq** **ReheatS** **Reset** **Tstat**	Linear Sequencer — bar graph representation of input value Reheat sequence — linear sequence up to four outputs Reset — output scales an input range between two limits Thermostat — on/off temperature controller
The Function Group convenient functions for developing control schemes	**Cmpr** **Count** **Freq** **Hysteresis** **IRamp** **Limiter** **Linearize** **LP** **Ramp** **SRLatch** **TickTock** **UpDn**	Comparison math — comparison (<=>) of two floats Integer counter — up/down counter with integer output Pulse frequency — calculates the input pulse frequency Hysteresis — setting on/off trip points to an input variable IRamp — generates a repeating triangular wave with an integer output Limiter — restricts output within upper and lower bounds Linearize — piecewise linearization of a float LP — proportional, integral, derivative (PID) loop controller Ramp — generates a repeating triangular or sawtooth wave with a float output Set/Reset Latch — single-bit data storage Ticking clock — an astable oscillator used as a time base Float counter — up/down counter with float output
The Priority Group prioritizing actions of Boolean, Float and Integer variables	**PrioritizedBool** **PrioritizedFloat** **PrioritizedInt**	Prioritized boolean output — highest of sixteen inputs Prioritized float output — highest of sixteen inputs Prioritized integer output — highest of sixteen inputs
The Types Group variable types and conversion between types	**B2F** **ConstBool** **ConstFloat** **ConstInt** **F2B** **F2I** **I2F** **L2F** **WriteBool** **WriteFloat** **WriteInt**	Binary to float encoder — 16-bit binary to float conversion Boolean constant — a predefined Boolean value Float constant — a predefined float variable Integer constant — a predefined integer variable Float to binary decoder — float to 16-bit binary conversion Float to integer — float to integer conversion Integer to float — integer to float conversion Long to float — long integer to float conversion Write Boolean — setting a writable Boolean value Write Float — setting a writable float value Write integer — setting an integer value
The Logic Group logical operations using Boolean variables	**ADemux2** **And2** **And4** **ASW** **ASW4** **B2P** **BSW** **DemuxI2B4** **ISW** **Not** **Or2** **Or4** **Xor**	Analog Demux — Single-input, two-output analog de-multiplexer Two-input Boolean product — two-input AND gate Four-input Boolean product — four-input AND gate Analog switch — selection between two float variables Analog switch — selection between four floats Binary to pulse — simple mono-stable oscillator (single-shot) Boolean switch — selection between two Boolean variables Four-output Demux — integer to Boolean de-multiplexer Integer switch — selection between two integer variables Not — inverts the state of a Boolean Two-input Boolean sum — two-input OR gate Four-input Boolean sum — four-input OR gate Two-input exclusive Boolean sum — two-input XOR gate
The Timing Group time-based components	**DlyOff** **DlyOn** **OneShot** **Timer**	Off delay timer — time delay from a "true" to "false" transition of the input On delay timer — time delay from an "false" to "true" transition of the input Single Shot — provides an adjustable pulse width to an input transition Timer — countdown timer
The Math Group math-based components	**Add2** **Add4** **Avg10** **AvgN** **Div2** **FloatOffset** **Max** **Min** **MinMax** **Mul2** **Mul4** **Neg** **Round** **Sub2** **Sub4** **TimeAvg**	Two-input addition — results in the addition of two floats Four-input addition — results in the addition of four floats Average of 10 — sums the last ten floats, divides by ten thereby providing a running average Average of N — sums the last N floats, divides by N thereby providing a running average Divide two — results in the division of two float variables Float offset — float shifted by a fixed amount Maximum selector — selects the greater of two inputs Minimum selector — selects the lesser of two inputs Min/Max detector — records both the maximum and minimum values of a float Multiply two — results in the multiplication of two floats Multiply four — results in the multiplication of four floats Negate — changes the sign of a float Round — rounds a float to the nearest N places Subtract two — results in the subtraction of two floats Subtract four — results in the subtraction of four floats Time average — average value of float over time

BACnet Protocol Implementation Conformance (PIC) Statement

CONTEMPORARY CONTROLS®

BASpi-Edge 6/6 and BASpi-Edge 6/4/2
Cloud Connected BACnet Controller

BACnet Protocol Implementation Conformance Statement (Annex A)

Date: October 7, 2020

Vendor Name: Contemporary Controls

Product Name: BASpi-Edge 6/6 and BASpi-Edge 6/4/2

Product Model Number: BASPI-E6U6R and BASPI-E6U4R2A

Applications Software Version: 1.2.28   **Firmware Revision:** 1.0.33   **BACnet Protocol Revision:** 14

Product Description: BACnet/IP compliant 12-point cloud connected controller that allows a direct connection to Ethernet or WiFi.

BACnet Standardized Device Profile (Annex L):
- ☐ BACnet Operator Workstation (B-OWS)
- ☐ BACnet Building Controller (B-BC)
- ☐ BACnet Advanced Application Controller (B-AAC)
- ☒ BACnet Application Specific Controller (B-ASC)
- ☐ BACnet Smart Sensor (B-SS)
- ☐ BACnet Smart Actuator (B-SA)

List all BACnet Interoperability Building Block Supported (Annex K):

DS-RP-A Data Sharing — ReadProperty – A
DS-RP-B Data Sharing — ReadProperty – B
DS-WP-A Data Sharing — WriteProperty – A
DS-WP-B Data Sharing — WriteProperty – B
DS-RPM-B Data Sharing — ReadPropertyMultiple – B
DS-WPM-B Data Sharing — WritePropertyMultiple – B
DS-COV-B Data Sharing — ChangeOfValue – B

DM-DDB-B Device Management — Dynamic Device Binding – B
DM-DOB-B Device Management — Dynamic Object Binding – B
DM-DCC-B Device Management — Device Communication Control – B
DM-TS-A Device Management — Time Synchronization – A
DM-TS-B Device Management — Time Synchronization – B

Segmentation Capability:
- ☐ Able to transmit segmented messages   Window Size:
- ☐ Able to receive segmented messages   Window Size:

Standard Object Types Supported:

Object Type Supported	Can Be Created Dynamically	Can Be Deleted Dynamically
Analog Input	No	No
Analog Output*	No	No
Analog Value	No	No
Binary Input	No	No
Binary Output	No	No
Binary Value	No	No
Device	No	No

No optional properties are supported. *Only available on the BASPI-E6U4R2A model

Data Link Layer Options:
- ☒ BACnet IP, (Annex J)
- ☒ BACnet IP, (Annex J), Foreign Device
- ☐ ISO 8802-3, Ethernet (Clause 7)
- ☐ ANSI/ATA 878.1, EIA-485 ARCNET (Clause 8), baud rate(s):
- ☒ MS/TP master* (Clause 9), baud rate(s): 9600, 19200, 38400, 57600, 76800, 115200
- ☐ MS/TP slave (Clause 9), baud rate(s):
- ☐ Point-To-Point, EIA 232 (Clause 10), baud rate(s):
- ☐ Point-To-Point, modem, (Clause 10), baud rate(s):
- ☐ LonTalk, (Clause 11), medium:
- ☐ Other:

Device Address Binding:
Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.)
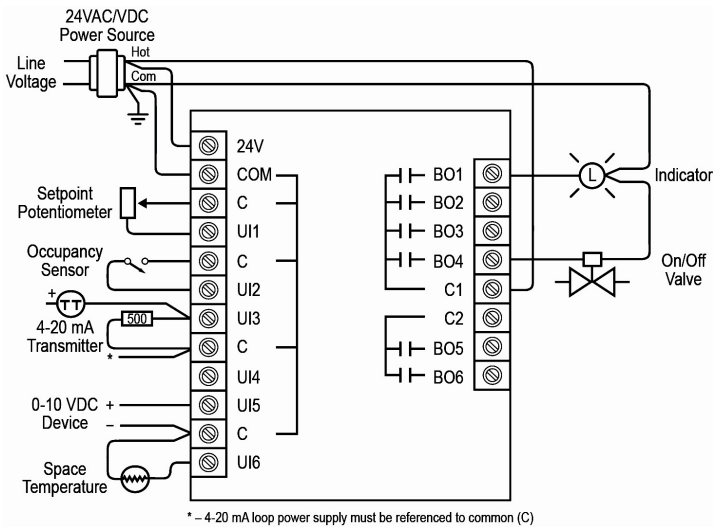- ☐ Yes   ☒ No

Networking Options:
- ☐ Router, Clause 6 – List all routing configurations, e.g., ARCNET-Ethernet-MS/TP, etc.
- ☐ Annex H, BACnet Tunnelling Router over IP
- ☐ BACnet/IP Broadcast Management Device (BBMD)
    - Does the BBMD support registrations by Foreign Devices?   ☐ Yes   ☐ No

Character Sets Supported:
Indicating support for multiple character sets does not imply that they can all be supported simultaneously.
- ☒ ANSI X3.4
- ☐ ISO 10646 (UCS-2)
- ☐ IBM™/Microsoft™ DBCS
- ☐ ISO 10646 (UCS-4)
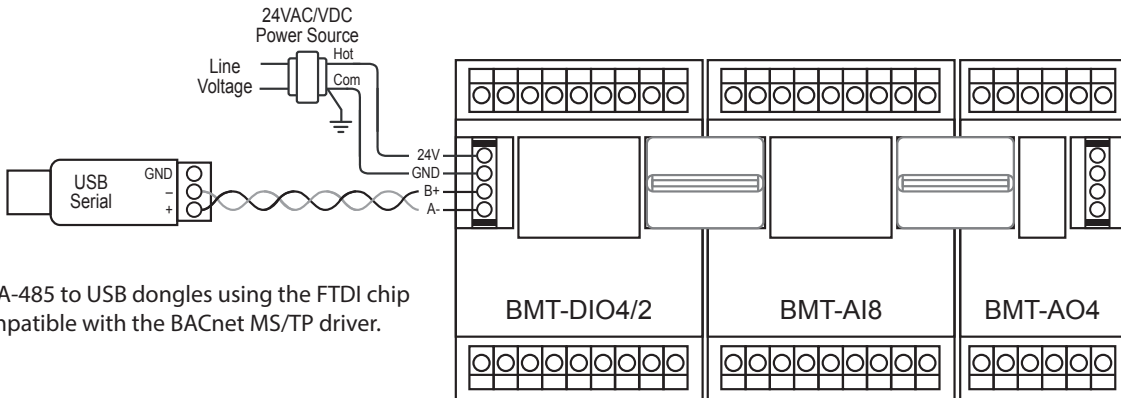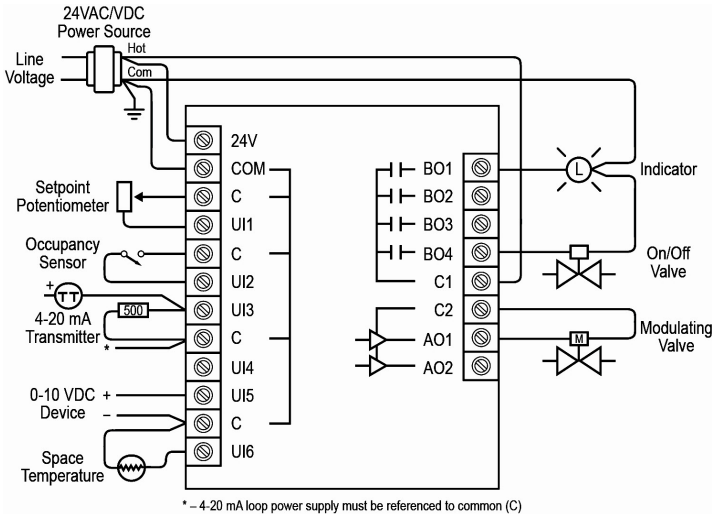- ☐ ISO 8859-1
- ☐ JIS C 6226

If this product is a communication gateway, describe the types of non-BACnet equipment/network(s) that the gateway supports: No gateway support.

*After adding the USB to RS-485 adapter

7 October 2020   PI-BASPIED6-AA0

BASpi-Edge 6/6 Wiring Diagram

* – 4-20 mA loop power supply must be referenced to common (C)

BASpi-Edge 6/4/2 Wiring Diagram

* – 4-20 mA loop power supply must be referenced to common (C)

BMT-DIO4/2   BMT-AI8   BMT-AO4
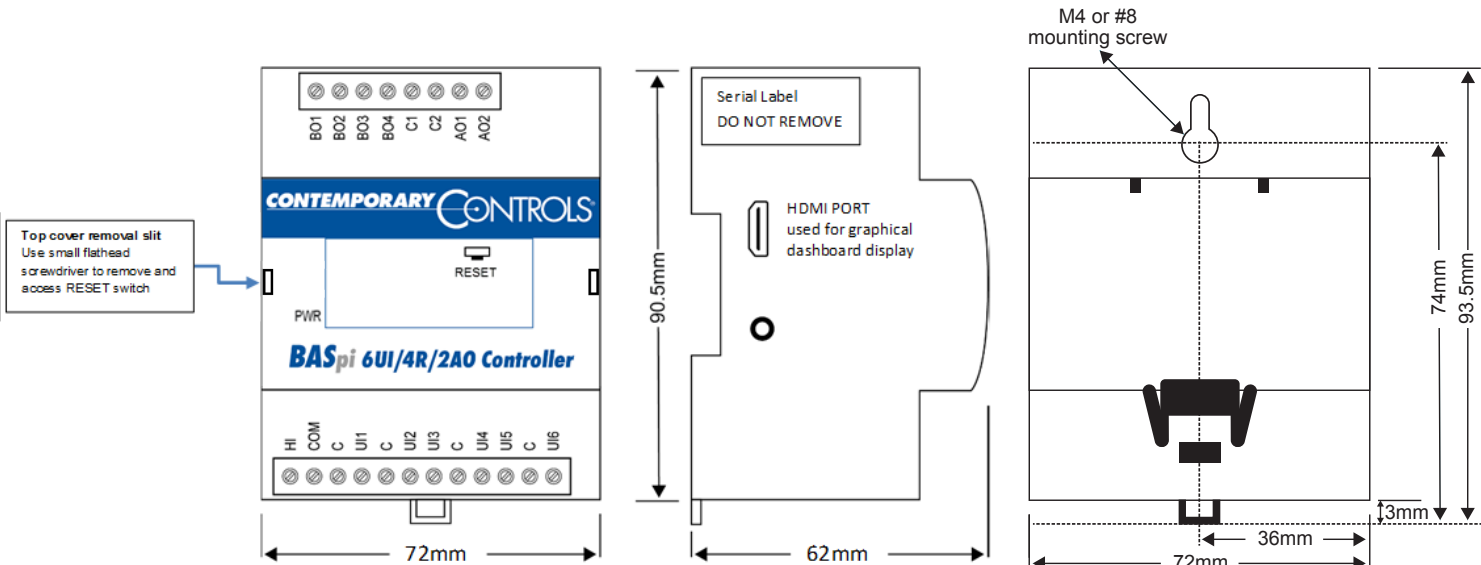
Only EIA-485 to USB dongles using the FTDI chip are compatible with the BACnet MS/TP driver.

As an option, MS/TP devices such as the Cube I/O can be commanded by the BASpi using an USB to Serial Port dongle connected to one of the BASpi's USB ports. Observe polarity of signal connections. When sharing the same half-wave power source, observe the polarity of the Hot and Com power connections.

BASpi-Edge Dimensions

Top cover removal slit
Use small flathead screwdriver to remove and access RESET switch

M4 or #8 mounting screw

Serial Label
DO NOT REMOVE

HDMI PORT used for graphical dashboard display

Specifications

Universal Inputs

Configured As	*Characteristics*
Analog input	0-10 VDC or 0-20 mA (with external resistor). 10-bit resolution Input impedance 1 MΩ on voltage
Temperature input	Type II 10 kΩ thermistors: −10° to +190°F (−23.3° to +87.8°C) Type III 10 kΩ thermistors: −15° to +200°F (−26.1° to +93.3°C) 20 kΩ thermistors: +15° to +215°F (−9° to +101°C)
Contact closure input	Excitation current 0.5 mA. Open circuit voltage 12 VDC. Sensing threshold 3 VDC (low) and 7 VDC (high). Response time 20 ms.
Pulse input	0–10 VDC for active output devices 0–12 VDC for passive devices (configured for internal pull-up resistor) 40 Hz maximum input frequency with 50% duty cycle. Retention on power loss - data stored every 30 minutes. Web page adjustable high and low thresholds
Resistance	1 kΩ -100 kΩ range

Analog Outputs (6/4/2 model only)

Analog output	0–10 VDC. 10-bit resolution. 4 mA maximum output

Binary Outputs

Binary output	Normally open relay contacts. 30 VAC/VDC 2 A max

Storage

8 GB pSLC micro SD card. Pseudo SLC NAND flash (1-Bit/Cell Mode, 2 voltage states to represent 0 or 1)

Networking

	Ethernet/Wi-Fi	*EIA-485 (Optional USB dongle)*
Protocols supported	BACnet/IP, Sedona SOX, HTTP, SMTP, SSH, SFTP, MQTT, TLS, REST	BACnet MS/TP
Data rate	Ethernet - 10/100 Mbps Wi-Fi - 802.11b/g/n	9600, 19200, 38400, 57600, 76800, 115200 Kbps

Display Interface

HDMI Standard Type A port for screen or touchscreen (USB data link also required for touchscreen) applications

Serial Interface

4x USB 2.0 Type A ports used for optional EIA-485 to USB dongle for BACnet MS/TP client/ server node connection and USB data link for HDMI port touchscreen/HMI applications

Electrical

Input (DC or AC)	*DC*	*AC*
Voltage (V, ± 10%)	24	24
Power	7 W	12.5 VA
Frequency	N/A	47–63 Hz

Environmental

|	
Operating temperature:	+32° to +131°F (0°C to +55°C)
Storage temperature:	−40° to +185°F (−40°C to +85°C)
Relative humidity:	10–95%, non-condensing
Processor cooling:	Passive - using aluminum heat sink

HDMI Touchscreen Human-Machine Interface

Unique to the BASpi-Edge controllers are an HDMI display port and multiple USB ports. To set up a touchscreen human-machine interface, both HDMI and USB connections are used. Some of the widgets such as buttons and sliders can be utilized as touchable and bound to writable points on the BASpi-Edge. The user is free to develop the perfect human interface for the required application demonstrating the versatility of the BASpi-Edge.
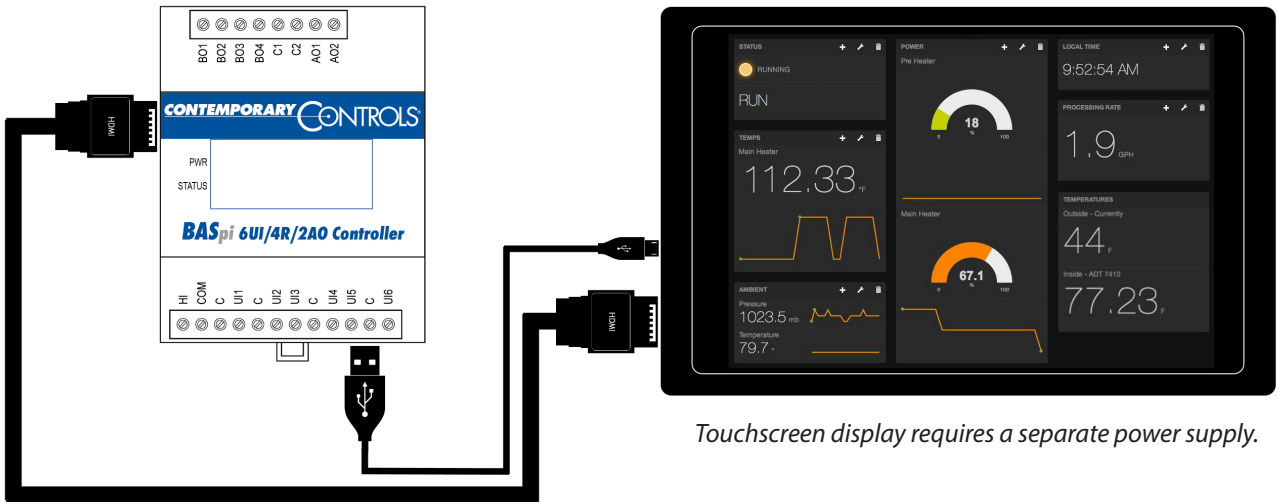
Touchscreen display requires a separate power supply.

Ordering Information

Model	Description
BASPI-E6U6R	BACnet Edge Controller with 6UI/6 Relay
BASPI-E6U4R2A	BACnet Edge Controller with 6UI/4 Relay/2 Analog Out

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