data
SHEET

BAScontrol20 — 20-point BACnet/IP Sedona Field Controller

The BAScontrol20 is a 20-point *Powered by Sedona Framework*™ field controller with a direct connection to an Ethernet network. Ideally suited for structured wiring systems, the BAScontrol20 is BACnet/IP compliant with a B-ASC device profile. Having a resident Sedona Virtual Machine (SVM), the unit is freely programmable using tools such as Niagara Workbench or Sedona Workbench. For remote Ethernet I/O applications, the unit can be configured via web pages.

The BAScontrol20 provides a convenient mix of universal inputs, binary inputs and outputs as well as analog outputs. Models exist for both triac and relay binary outputs. The unit is ideal for unitary control or for expanding I/O points in the field via an Ethernet connection.

Versatile Control Device — field controller or remote Ethernet I/O

- BACnet/IP compliant
- B-ASC device profile
- Configurable by Workbench or web browser
- Direct connection to an Ethernet network
- *Powered by Sedona Framework*™

Flexible Input/Output — 20-points of I/O

- Eight configurable universal inputs:
  Thermistor, analog voltage,
  binary input, pulse inputs (4 max)
- Four contact closure inputs
- Four analog voltage outputs
- Four relay or triac outputs (model specific)

BASautomation®

BAScontrol20 — Overview

The BAScontrol20 utilizes a powerful 32-bit ARM7 processor with 512 kB of flash memory plus a 16 Mbit serial flash file system for storing configuration data and an application program. By operating at the BACnet/IP level, the BAScontrol20 can share the same Ethernet network with supervisory controllers and operator workstations. The unit can be configured for a fixed IP address or can operate as a DHCP client receiving its IP address from a DHCP server. A real-time clock with a super-cap backup allows for creating local schedules.

A 10/100 Mbps Ethernet port supports protocols such as BACnet/IP, Sedona SOX, HTTP and FTP. Configuration of universal inputs and virtual points can be accomplished using web pages. Type II and type III thermistors curves are resident in the unit. Current inputs can be measured using external resistors. Contact closures require a voltage-free source. Binary inputs and outputs as well as analog outputs require no configuration. The unit is powered from either a 24VAC/VDC source.

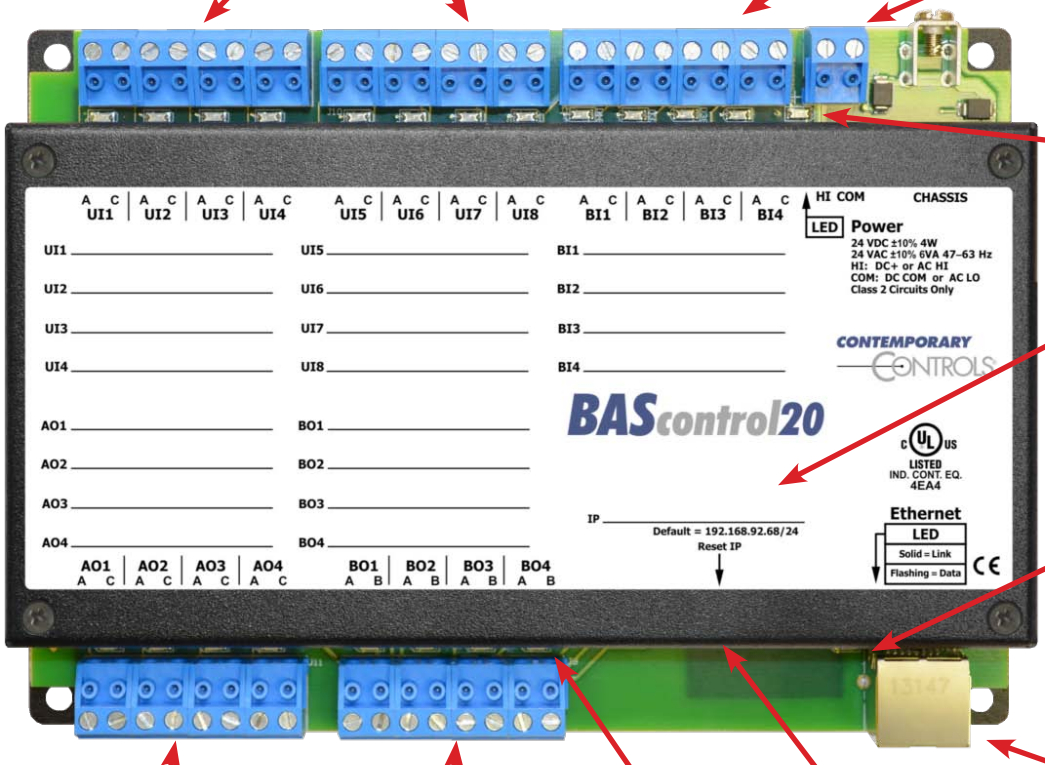
Universal Inputs

Eight input points can be configured — all discoverable as BACnet objects.

- Analog inputs: 0–10 VDC, 12-bit resolution, 0–20 mA (with external resistor)
- Temperature inputs: Type II or Type III 10 kΩ thermistors
- Contact closure, voltage-free
- Pulse input accumulators (UI1–UI4): accommodates active or passive sources (40 Hz max)

Binary Inputs
Four points of voltage-free contact closure

Power Input
24 VAC/VDC 6 VA half-wave rectified allows power sharing with other half-wave devices.



Power LED

IP Address
fixed or DHCP client

Ethernet LED

Ethernet
10/100 Mbps Ethernet with auto-negotiation and Auto-MDIX. Protocols supported include HTTP, IP, UDP, TCP, BACnet/IP and Sedona SOX.

Analog Outputs
0–10 V, 12-bit resolution

Binary Outputs
Four form "A" relays or four triacs for 30 VAC/VDC 2 A loads. Class 2 circuits only.

Point LEDs
for all 20 Points

Reset
to factory IP defaults

Web Page Configuration — Main Page and System

Access to the web pages is intended for the installer or skilled technicians. In order to access any of the web pages authentication is required. The default IP address is 192.68.92.68 and the default User Name and Password is admin/admin. Once on the main page, the System Configuration button can be clicked.

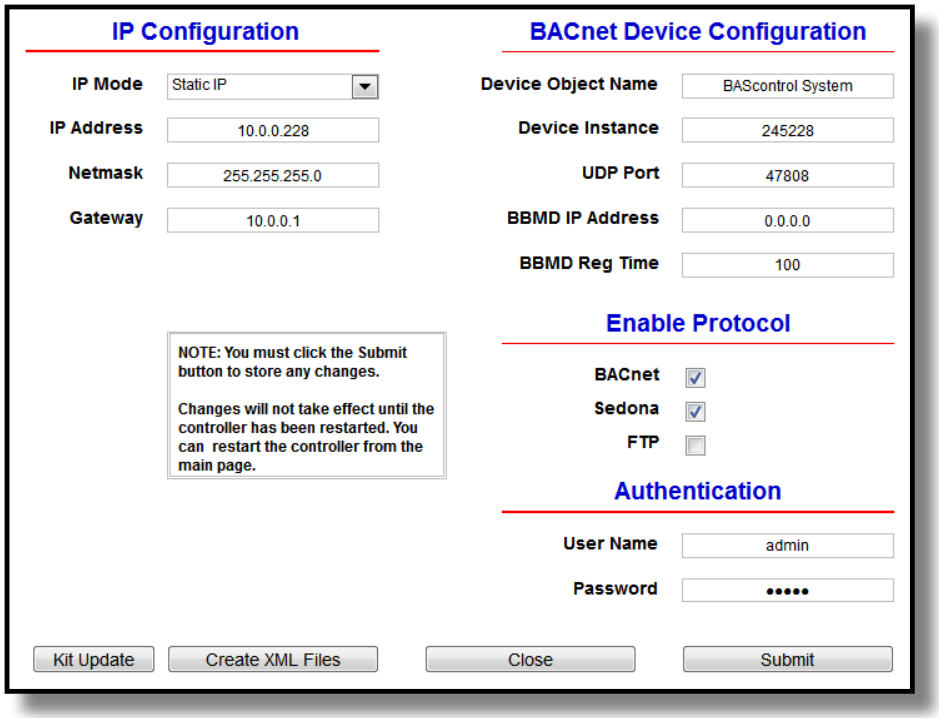
The main web page provides an overview of all real and virtual points plus access to other web pages. Points can be temporary written by entering a value into one of the points. By checking the box adjacent to a point, the value written will be permanent until the box is unchecked. Care must be exercised when forcing values into points. To configure a point, click on the point. To update the data for each point, click Refresh.

The IP settings can be changed to the desired values. Either DHCP or a static IP address can be selected. If a static address is desired, enter the value along with the network mask and gateway address.

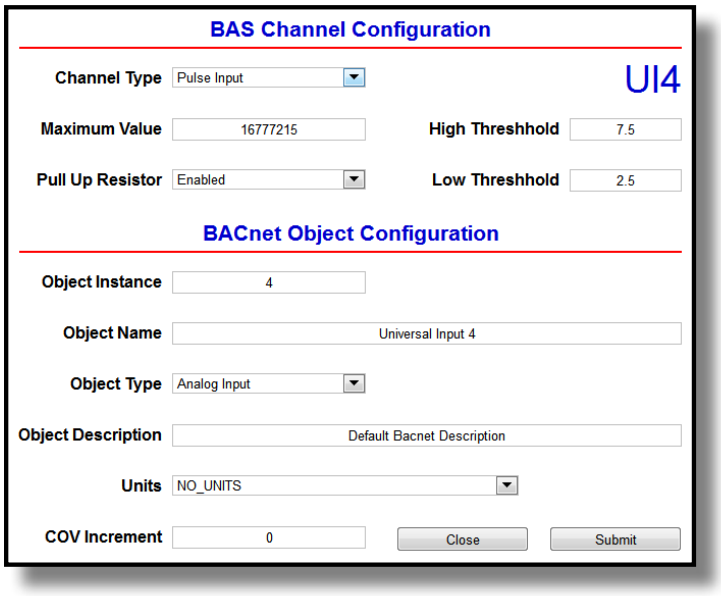
BACnet device data must be entered. Make sure the Device Instance and Device Object Name are both unique over the complete BACnet Internetwork.

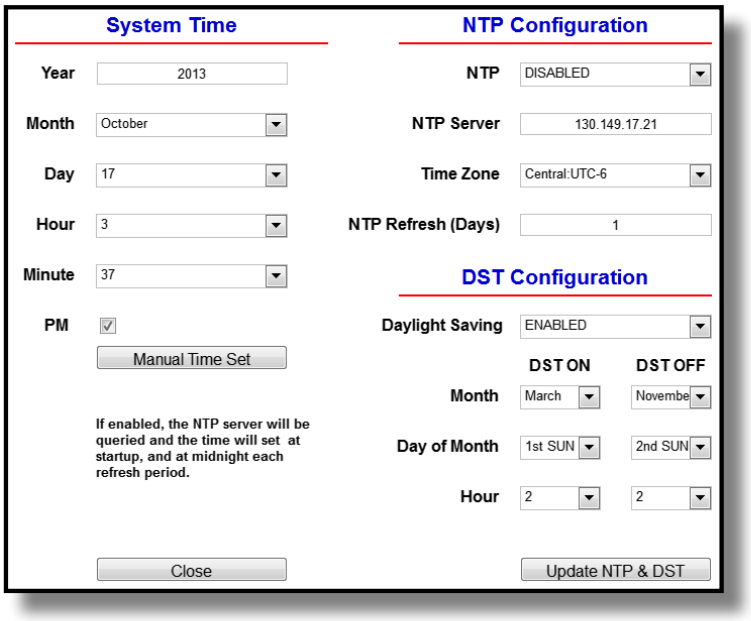
Either BACnet or Sedona protocols or both can be selected.

Authentication credentials can be changed from the default values.



Web Page Configuration — Channel, Time and Web Components

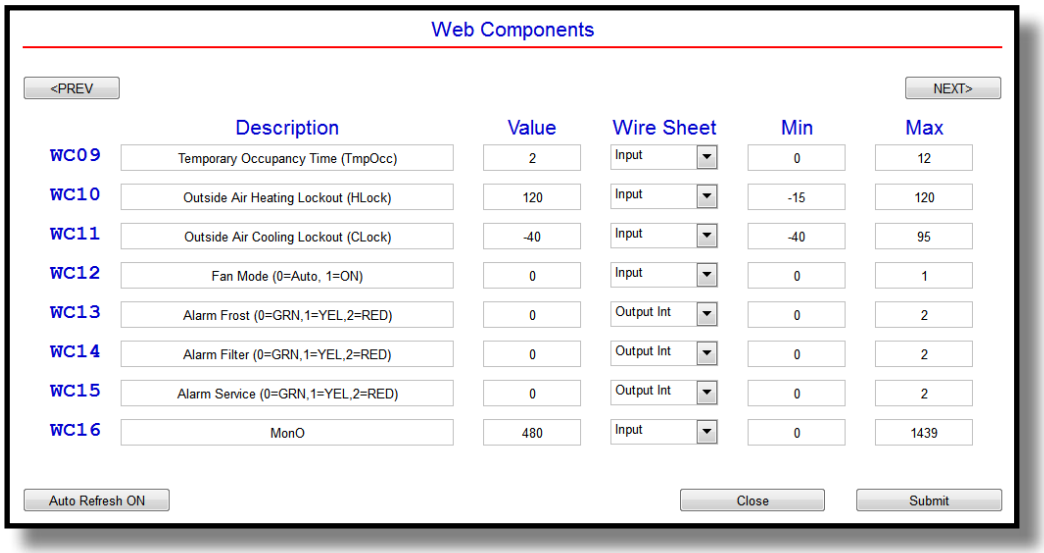




The BAS Channel should be configured first. Universal inputs must first be defined which may lead to more requests for information. Once the BAS Channel is configured, the BACnet Channel Configuration can be accomplished. Although the BACnet Object Instance is predefined, the Object Name and Object Type can be entered and Units can be selected with the drop-down. The COV Increment can be specified for those channels intended for COV reporting by the BACnet client device.

Time and date can be set manually or with the help of a NTP server if access to the Internet is possible. Daylight Savings Time can also be supported. Time is backed up for seven days through the use of a super-cap.

Separate web pages allow for the configuration of up to 48 web components. Web components provide a means to write and read data to and from Sedona wire sheets without the need of a Workbench tool. A web component configured as a wire sheet input can have its input range restricted to minimum and maximum values eliminating the need to add limit detection within the wire sheet logic.



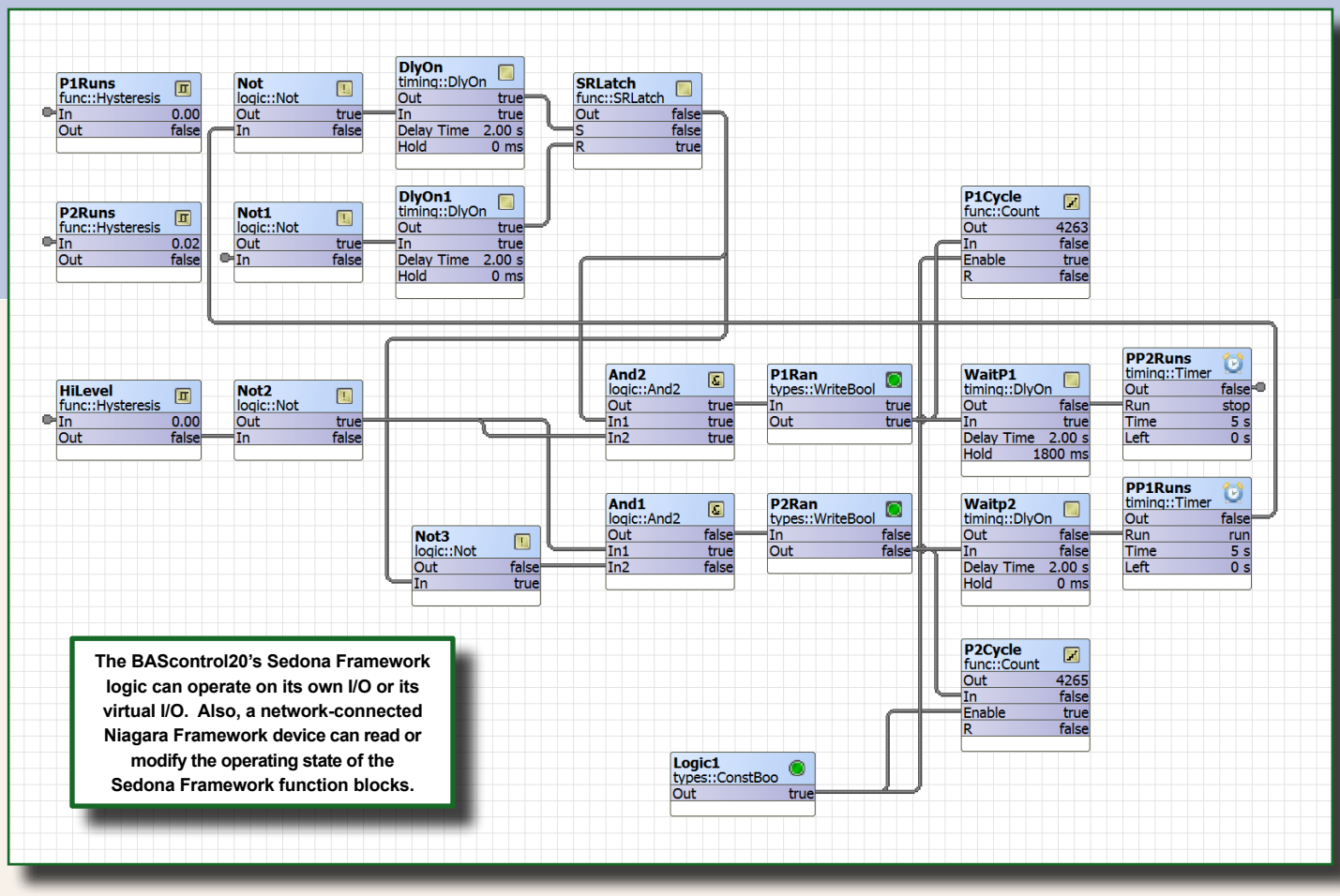
Powered by Sedona Framework™ — for Implementing Control

The BAScontrol20 incorporates Sedona Virtual Machine (SVM) technology developed by Tridium. Using established Tridium tools such as Niagara Workbench or Sedona Workbench, a system integrator can develop a control application using Workbench's powerful drag-and-drop visual programming methodology. Once developed, the program remains stored in the BAScontrol20 and executes by way of the SVM. The application can run standalone in the BAScontrol20 or it can interact with a program in a Tridium JACE supervisory controller over Ethernet.

The number of potential applications is only limited by the imagination of the systems integrator.

The BAScontrol20 includes Tridium's Sedona 1.2 kits of components — and Contemporary Controls' product-specific kits. The BASC20 IO Kit components interface physical points to Sedona plus eight virtual points and four retentive counters. The BASC20 Web Kit has 48 components that share data with onboard user-designed webpages. Input components receive data from hosted webpages. Output components send data to hosted webpages.

Tridium's Sedona Workbench, Niagara Workbench or a third-party tool can be used to program a Sedona application running in the BAScontrol20.



BASC20 Components for Sedona Logic interfacing

UI1–UI8	Universal Inputs — binary, analog voltage, thermistor or accumulator points
BI1–BI4	Binary Inputs — binary input points
AO1–AO4	Analog Outputs — analog voltage points
BO1–BO4	Binary Outputs — binary output points
VT1–VT8	Virtual Points — shared data with BACnet/IP clients
UC1–UC4	Retentive Counters
WC01–WC48	Web Components — share data with BAScontrol20 hosted webpages

Common Components Used In Function Block Programming

The HVAC Group operations that facilitate control	**LSeq**	Linear Sequencer — bar graph representation of input value
	ReheatSeq	Reheat sequence — linear sequence up to four outputs
	Reset	Reset — output scales an input range between two limits
	Tstat	Thermostat — on/off temperature controller
The Scheduling Group scheduling operations based upon time of day	**DailySc**	Daily Schedule Boolean — two-period Boolean scheduler
	DailyS1	Daily Schedule Float — two-period float scheduler
	DateTime	Time of Day — time, day, month, year
The Function Group convenient functions for developing control schemes	**Cmpr**	Comparison math — comparison (<=>) of two floats
	Count	Integer counter — up/down counter with integer output
	Freq	Pulse frequency — calculates the input pulse frequency
	Hysteresis	Hysteresis — setting on/off trip points to an input variable
	IRamp	IRamp — generates a repeating triangular wave with an integer output
	Limiter	Limiter — Restricts output within upper and lower bounds
	Linearize	Linearize — piecewise linearization of a float
	LP	LP — proportional, integral, derivative (PID) loop controller
	Ramp	Ramp — generates a repeating triangular or sawtooth wave with a float output
	SRLatch	Set/Reset Latch — single-bit data storage
	TickTock	Ticking clock — an astable oscillator used as a time base
	UpDn	Float counter — up/down counter with float output
The Priority Group prioritizing actions of Boolean, Float and Integer variables	**PrioritizedBool**	Prioritized boolean output — highest of sixteen inputs
	PrioritizedFloat	Prioritized float output — highest of sixteen inputs
	PrioritizedInt	Prioritized integer output — highest of sixteen inputs
The Types Group variable types and conversion between types	**B2F**	Binary to float encoder — 16-bit binary to float conversion
	ConstBool	Boolean constant — a predefined Boolean value
	ConstFloat	Float constant — a predefined float variable
	ConstInt	Integer constant — a predefined integer variable
	F2B	Float to binary decoder — float to 16-bit binary conversion
	F2I	Float to integer — float to integer conversion
	I2F	Integer to float — integer to float conversion
	L2F	Long to float — long integer to float conversion
	WriteBool	Write Boolean — setting a writable Boolean value
	WriteFloat	Write Float — setting a writable float value
	WriteInt	Write integer — setting an integer value
The Logic Group logical operations using Boolean variables	**ADemux2**	Analog Demux — Single-input, two-output analog de-multiplexer
	And2	Two-input Boolean product — two-input AND gate
	And4	Four-input Boolean product — four-input AND gate
	ASW	Analog switch — selection between two float variables
	ASW4	Analog switch — selection between four floats
	B2P	Binary to pulse — simple mono-stable oscillator (single-shot)
	BSW	Boolean switch — selection between two Boolean variables
	DemuxI2B4	Four-output Demux — integer to Boolean de-multiplexer
	ISW	Integer switch — selection between two integer variables
	Not	Not — inverts the state of a Boolean
	Or2	Two-input Boolean sum — two-input OR gate
	Or4	Four-input Boolean sum — four-input OR gate
	Xor	Two-input exclusive Boolean sum — two-input XOR gate
The Timing Group extended Boolean logic	**DlyOff**	Off delay timer — time delay from a “true” to “false” transition of the input
	DlyOn	On delay timer — time delay from an “false” to “true” transition of the input
	OneShot	Single Shot — provides an adjustable pulse width to an input transition
	Timer	Timer — countdown timer
The Math Group operations on Float, Integer and Boolean variables	**Add2**	Two-input addition — results in the addition of two floats
	Add4	Four-input addition — results in the addition of four floats
	Avg10	Average of 10 — sums the last ten floats while dividing by ten thereby providing a running average
	AvgN	Average of N — sums the last N floats while dividing by N thereby providing a running average
	Div2	Divide two — results in the division of two float variables
	FloatOffset	Float offset — float shifted by a fixed amount
	Max	Maximum selector — selects the greater of two inputs
	Min	Minimum selector — selects the lesser of two inputs
	MinMax	Min/Max detector — records both the maximum and minimum values of a float
	Mul2	Multiply two — results in the multiplication of two floats
	Mul4	Multiply four — results in the multiplication of four floats
	Neg	Negate — changes the sign of a float
	Round	Round — rounds a float to the nearest N places
	Sub2	Subtract two — results in the subtraction of two floats
	Sub4	Subtract four — results in the subtraction of four floats
	TimeAvg	Time average — average value of float over time

BACnet Protocol Implementation Conformance (PIC) Statement

CONTEMPORARY CONTROLS

BAScontrol20

BACnet/IP Sedona Field Controller

BACnet Protocol Implementation Conformance Statement (Annex A)

Date: January 1, 2014
Vendor Name: Contemporary Controls
Product Name: BAScontrol20
Product Model Number: BASC-20R and BASC-20T
Applications Software Version: 1.2.28 **Firmware Revision:** 3.00 **BACnet Protocol Revision:** 2
Product Description: BACnet/IP compliant 20-point field controller or remote I/O that allows a direct connection to Ethernet without the need of a BACnet router.

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-B Data Sharing — ReadProperty – B
DS-WP-B Data Sharing — WriteProperty – B
DS-RPM-B Data Sharing — ReadPropertyMultiple – 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-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.

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):
- ☐ 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
- ☐ IBM™/Microsoft™ DBCS
- ☐ ISO 8859-1
- ☐ ISO 10646 (UCS-2)
- ☐ ISO 10646 (UCS-4)
- ☐ 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.

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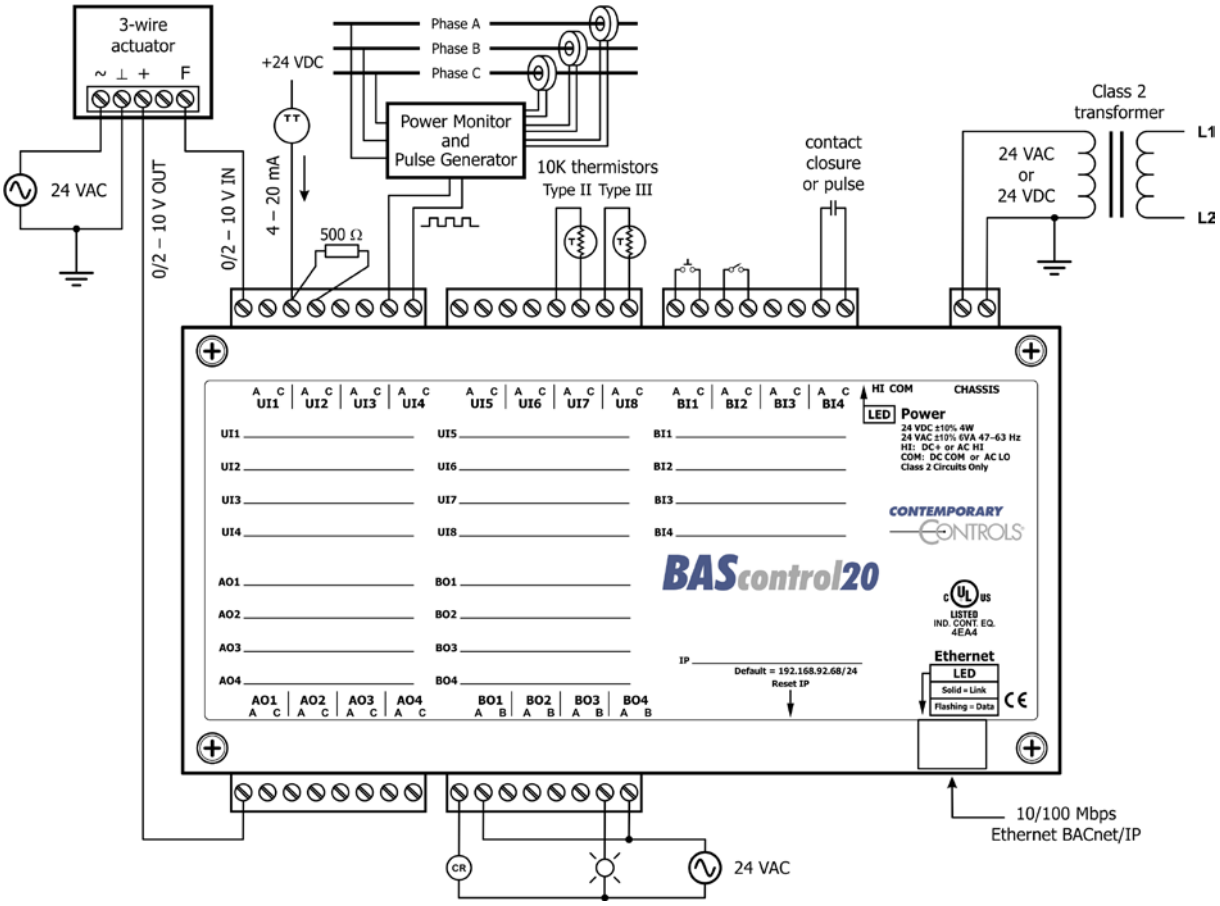
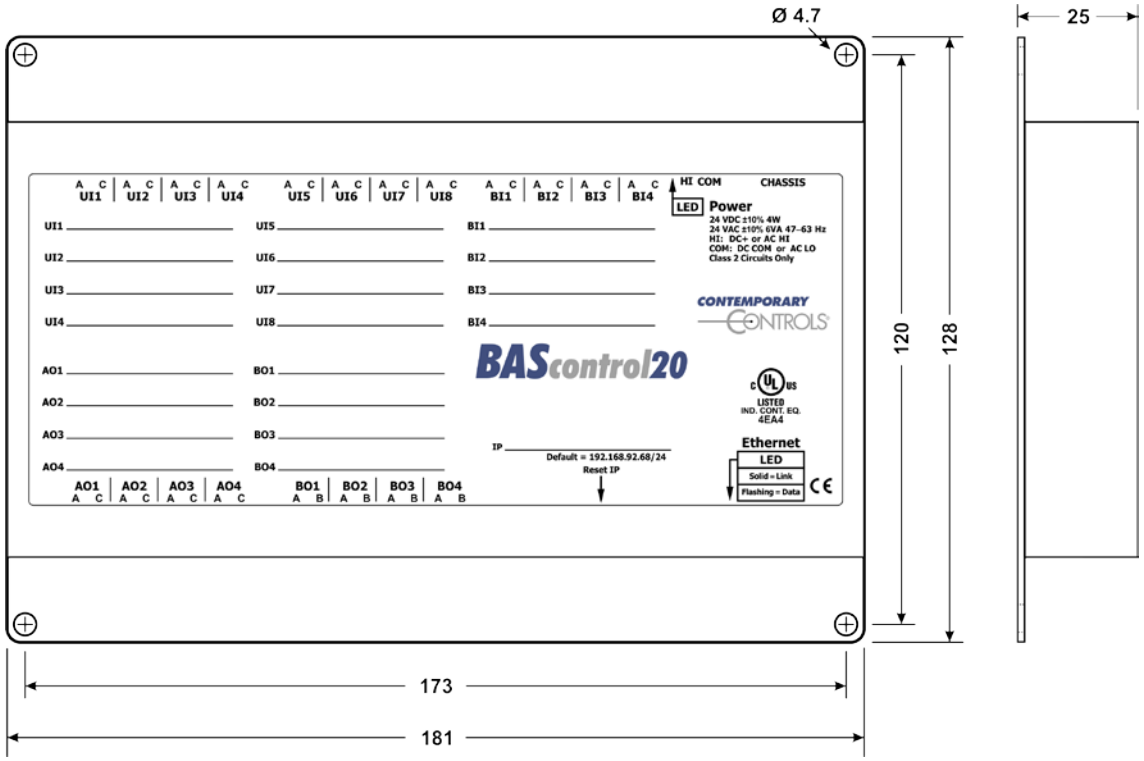
Wiring Diagram



Dimensions (all dimensions are in mm)



Specifications

Universal Inputs (Points UI1 through UI8)

Configured As	*Characteristics*
Analog input	0–10 VDC or 0–20 mA (with external resistor). Input impedance 1 MΩ on voltage.
Temperature input	Type II 10 kΩ thermistors: –10º to +190 ºF (–23.3º to +87.8ºC) Type III 10 kΩ thermistors: –15º to +200 ºF (–26.1º to +93.3ºC)
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 (Points UI1–UI4)	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. Adjustable high and low thresholds.

Binary Inputs (Points BI1 through BI4)

Contact closure	Excitation current 1.2 mA. Open circuit voltage 12 VDC. Sensing threshold 3 VDC (low) and 7 VDC (high). Response time 20 ms.

Analog Outputs (Points AO1 through AO4)

Analog output	0–10 VDC. 12-bit resolution. 4 mA maximum.

Binary Outputs (Points BO1 through BO4) (Class 2 circuits only — requires external power source)

Model BASC-20R	Normally open relay contacts. 30 VAC/VDC 2 A.
Model BASC-20T	Isolated triac. 30 VAC 0.5 A.

Regulatory Compliance

CE Mark; CFR 47, Part 15 Class A; RoHS
UL 508, C22.2 No. 142-M1987

Functional / *Ethernet*

Compliance	IEEE 802.3
Protocols supported	BACnet/IP
Data rate	10 Mbps, 100 Mbps
Physical layer	10BASE-T, 100BASE-TX
Cable length	100 m (max)
Port connector	Shielded RJ-45
LED	Green = Link established Flash = Link activity

Electrical

Input (DC or AC)	*DC*	*AC*
Voltage (V, ± 10%)	24	24
Power	4 W	6 VA
Frequency	N/A	47–63 Hz

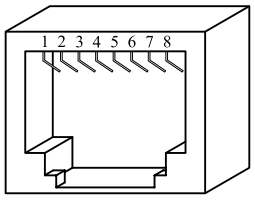
Specifications (continued)

Environmental/Mechanical

Operating temperature	0°C to 60°C
Storage temperature	–40°C to +85°C
Relative humidity	10–95%, noncondensing
Protection	IP30
Weight	0.6 lbs. (.27 kg)

RJ-45 Pin Assignments

10BASE-T/100BASE-TX



Terminal	Usage
1	TD +
2	TD –
3	RD +
6	RD –
Other pins	Not Used

Electromagnetic Compatibility

Standard	*Test Method*	*Description*	*Test Levels*
EN 55024	EN 61000-4-2	Electrostatic Discharge	6 kV contact & 8 kV air
EN 55024	EN 61000-4-3	Radiated Immunity	10 V/m, 80 MHz to 1 GHz
EN 55024	EN 61000-4-4	Fast Transient Burst	1 kV clamp & 2 kV direct
EN 55024	EN 61000-4-5	Voltage Surge	2 kV L-L & 2 kV L-Earth
EN 55024	EN 61000-4-6	Conducted Immunity	10 Volts (rms)
EN 55024	EN 61000-4-11	Voltage Dips & Interruptions	1 Line Cycle, 1 to 5 s @ 100% dip
EN 55022	CISPR 22	Radiated Emissions	Class A
EN 55022	CISPR 22	Conducted Emissions	Class B
CFR 47, Part 15	ANSI C63-4	Radiated Emissions	Class A

Ordering Information

Model	*Description*
BASC-20R	BAScontrol with 20 I/O points, includes 4 relay outputs
BASC-20T	BAScontrol with 20 I/O points, includes 4 triac outputs

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