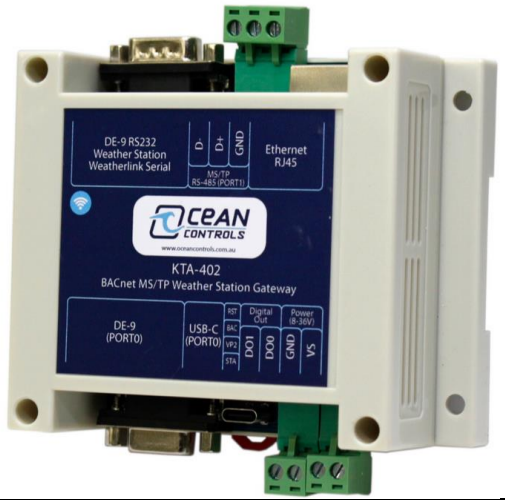


- Connects a Davis Vantage Pro2 or Vantage Vue to a BACnet network
- BACnet MS/TP over RS-485 compatible
- Various selectable metric and imperial unit conversions
- Provide additional alarms on gateway with two digital outputs (0 or 3.3V)

Connections

Connection	Description
VIN	Input Power Positive: 12-36VDC
GND	Input Power Negative (Ground)
DO0	Digital Output 0 (Low - 0V, High – 3.3V)
DO1	Digital Output 1 (Low - 0V, High – 3.3V)
USB-C & Female DE9 (Port 0)	For Firmware Update Only (DE9 and USB-C are mirrored); **USB-C can be used as Power**
D+	BACnet RS-485 Data +
D-	BACnet RS-485 Data-
Male DE9	Connection to Davis Weather Station
Ethernet Port	Not Used

Table 1: Connections to KTA-402

LEDs	Description
RST – Reset Button	Push Button • **RED** – Push button is pressed and held
BAC – BACnet MSTP	BACnet Communication Status LED • **OFF** – BACnet Communication is not/fail to be established, check BACnet Setups and Wiring • **GREEN** – Indicates good communication • **RED** – Push button is pressed and held for more than 3s (release the button to active the WiFi network)
VP2 – Weather Station	Weather Station Communication Status LED • **OFF** – Weather Station Communication is not/fail to be established, check Serial Connection • **GREEN** – Indicates good communication • **RED** – Push button is pressed and held for more than 10s (release the button to active Factory Reset Process)
STA - Status	Status LED • Flash once during start up • **Solid ON**: Normal Operation • **Flash every 1s**: Webpage Configuration Mode Enabled

Table 2: KTA-402 LED Functions

BACnet MS/TP & Unit Conversion Configuration

By default, the device is set as below:

Parameters	Default Value
MAC Address	1
Baud Rate	9600
Pressure Unit	1 – mmHg
Temperature Unit	1 – °C
Wind Speed Unit	1 – m/s
Rain Unit	1 – mm

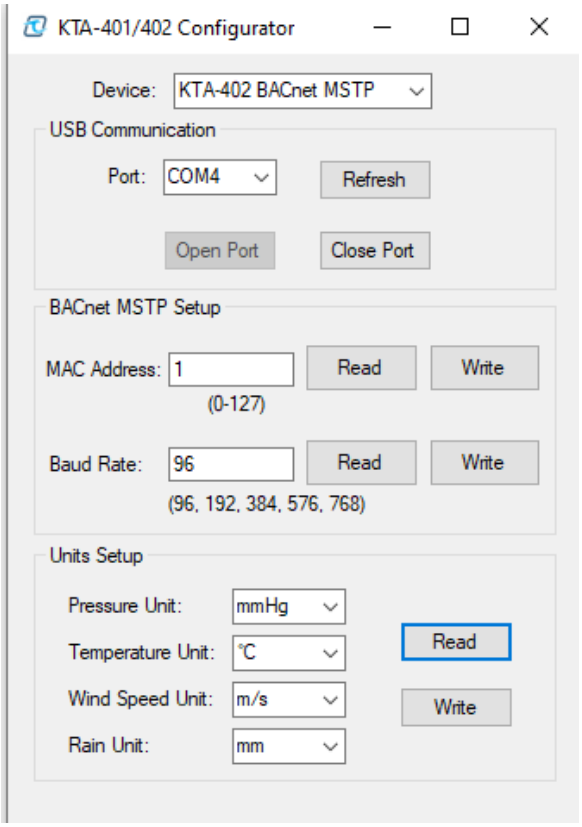
Table 3: Default Setups

There are four ways to adjust the BACnet MS/TP and the units:

1. KTA-401/402 Configurator Software --- via USB C Port
2. Special ASCII Command --- via USB C Port
3. BACnet Write Property Function --- via RS485
4. Webpage --- via WiFi

1. KTA-401/402 Configurator Software

The baud rate for the USB-C port is set to **115200** and cannot be modify. To get started, simply select the appropriate COM port and open port. Once connected, you can easily read or write the MAC address, baud rate and units using the corresponding buttons/text boxes.



2. Special ASCII Command

Like the configuration software, the Baud Rate for the USB-C port is fixed to be **115200** and cannot be modify.

	Command Sent	Command Received
Read MAC	R MAC\n	1\r\n
Write MAC	W MAC 2\n	Write success – OK\r\n Write error – error message
Read Baud Rate	R BAUD\n	96\r\n
Write Baud Rate	W BAUD 192\n	Write success – OK\r\n Write error – error message
Read Units	R UNITS\n	P:1 T:1 S:1 R:1\r\n
Write Units	W UNITS P:0 T:1 S:2 R:0\n	Write success – OK\r\n Write error – error message
Reboot the device	REBOOT\n	"Rebooting…"

Table 4: Special Command Table

For example, the command **"W BAUD 768\n"** will set the BACnet communication baud rate to be **76800**.

For the Read/Write Units command, the *P* is stand for *Pressure Unit*, *T* is *Temperature Unit*, *S* is *Wind Speed Unit*, and *R* is *Rain Unit.*

3. BACnet Write Property Function

The BACnet communication parameters and units can be adjusted through the Properitary-129 Object (see Table 14).

The BACnet MSTP changes will be saved and take effect once a '**TRUE**' value is written to Proprietary Property-1002 and the system is power cycled.

Proprietary-129 Object	Description	Value
Proprietary Property – 1000	BACnet MAC Address	0-127 (Default: 1)
Proprietary Property – 1001	BACnet Baud Rate	96 (Default), 192, 384, 576, 768
Proprietary Property – 1002	Commit BACnet Setup to the memory	Write "TRUE" to save the BACnet setup to the memory

Table 5: BACnet MSTP Setup Related Parameters

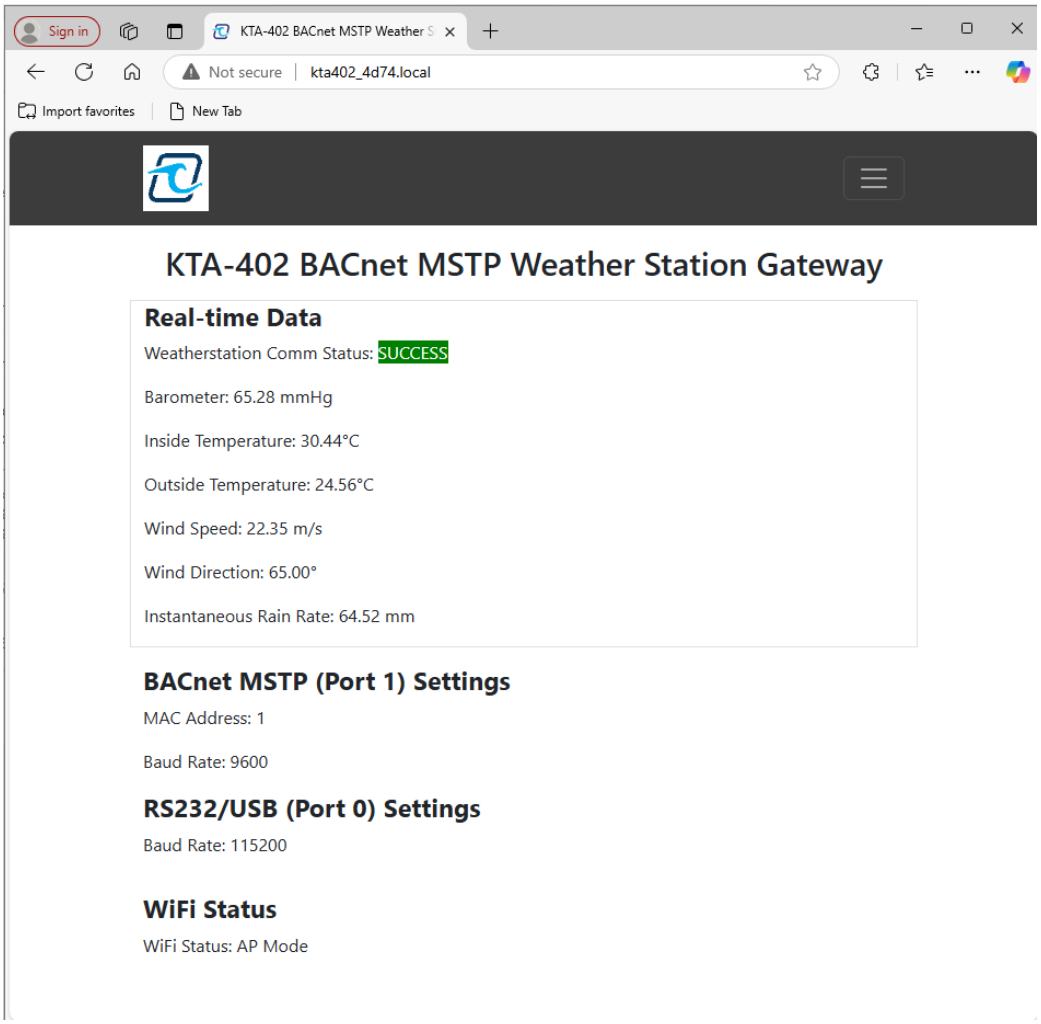
Proprietary-129 Object	Description	Value
Proprietary Property - 1005	Pressure Unit	0 - inHg, 1 - mmHg, 2 - mbar
Proprietary Property - 1006	Temperature Unit	0 - °F, 1 - °C
Proprietary Property - 1007	Wind Speed Unit	0 - mph, 1 - m/s, 2 - fps, 3 - kph
Proprietary Property - 1008	Rain Unit	0 - inch, 1 - mm

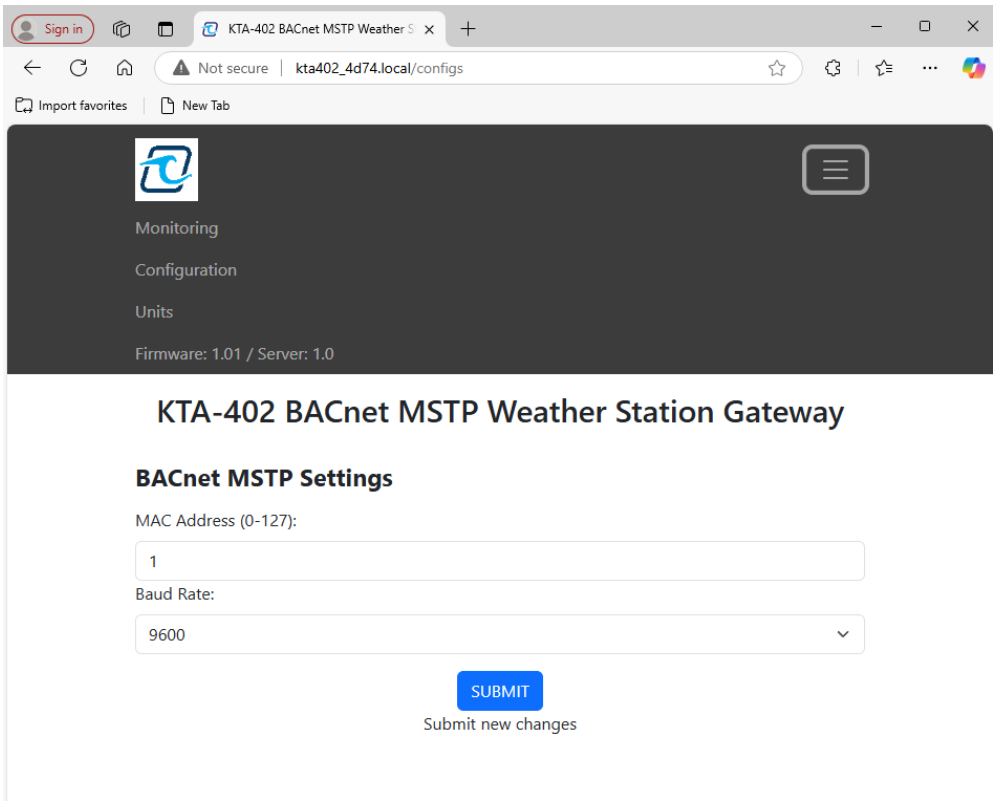
Table 6: Unit Conversion Related Parameters

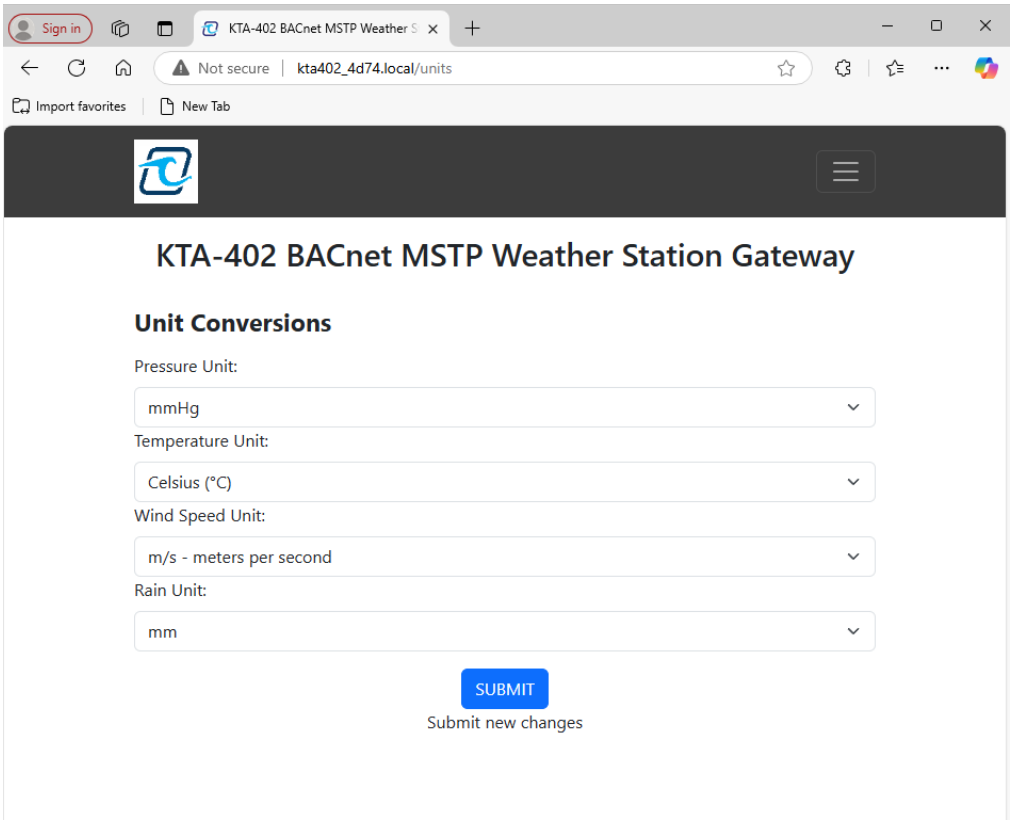
4. Webpage

The KTA-402 comes with a user-friendly web server, allowing users to easily modify the main settings via WiFi. Follow these steps to connect to the network:

- **Enable the KTA-402 WiFi network**: Press and hold the push button for 3s (until the BAC LED turns RED) then release it.
- **Activate network mode:** The status LED will start flashing every 1s, indicating that the network mode is active. This mode will remain active for 30 minutes.
- **Connect your device**: On your laptop or mobile, search for the WiFi network, which should appear as an SSID named "*KTA402_xxxx*" (where "xxxx" is the MAC address).
- **Join the network:** Connect using the default password: "*password*"
- **Access the webserver:** Open a web browser and enter the IP address "*KTA402_xxxx.local*" or "*192.168.4.1*".
- The webserver's configuration interface will open, allowing you to adjust the BACnet setup and providing a view current status of the KTA-402.




Sign in
KTA-402 BACnet MSTP Weather S
Not secure
kta402_4d74.local/configs
Import favorites
New Tab
Monitoring
Configuration
Units
Firmware: 1.01 / Server: 1.0
KTA-402 BACnet MSTP Weather Station Gateway
BACnet MSTP Settings
MAC Address (0-127):
1
Baud Rate:
9600
SUBMIT
Submit new changes


Sign in
KTA-402 BACnet MSTP Weather S
Not secure
kta402_4d74.local/units
Import favorites
New Tab
KTA-402 BACnet MSTP Weather Station Gateway
Unit Conversions
Pressure Unit:
mmHg
Temperature Unit:
Celsius (°C)
Wind Speed Unit:
m/s - meters per second
Rain Unit:
mm
SUBMIT
Submit new changes

Factory Reset (Only for BACnet Communication Setup):

The KTA-402 features a convenient push button for restoring factory settings for BACnet Communication. To reset, press and hold the button for more than 10 seconds until the **RST**, **BAC**, and **VP2 LEDs** light up red, then release the button.

This process will restore the MAC address to 1 and set the Baud Rate to 9600.

Supported BACnet Services

- Read Property
- Read Property Multiple
- Write Property
- Device Communication Control
- Reinitialise Device
- Who-Has
- Who-Is

Supported BACnet Object Types

- Analog Input
- Analog Value
- Binary Value
- Device
- Data Value
- Integer Value
- Proprietary Value
- Time Value

Datalink Layer Option

- BACnet MS/TP Master
- Baud Rates: 9600, 19200, 38400, 57600 and 76800

Device Object

Property Name/ID	Access	Default
Object Identifier	R	838000 + MAC Address
Object Name	R	KTA-402
Object Type	R	Device
System Status	R	Operational
Vendor Name	R	Ocean Controls
Vendor Identifier	R	838
Model Name	R	KTA-402 BACnet
Firmware Revision	R	V1.01
Software Version	R	1.3.6
Protocol Version	R	1
Protocol Revision	R	24
Max APDU Length	R	s
Segmentation	R	None
APDU Timeout	R	3000
Number of APDU Retries	R	3
Max Info Frames	R	2
Max Master	R	127

Table 7: BACnet Device Object Properties

Analog Input Objects

Analog Input Objects are the weather data read from the Davis Weather Station.

Property Name/ID	Access	Default	Note
Object Identifier	R		See table 7
Object Name	R		See table 7
Object Type	R	ANALOG INPUT	
Present Value	R		Value read from Weather Station
Status Flags	R	All false	*Alarm Flag set to TRUE when the Davis Weather Station alarm is reached.
Event State	R	NORMAL	
Out Of Service	R	FALSE	
Units	R		See table 9, 10 & 16

Table 8: BACnet Analog Input Object Properties

*The alarms need to be configured by WeatherLink Software.

Instance	Object Name	Default Unit	Supported Units	Unit Set by Proprietary Property
0	Barometer Trend 3h	No_Units	No_Units	
1	Barometer	mmHg	inHg, mmHg, mbar	1005
2	Inside Temperature	°C	°C, °F	1006
3	Inside Humidity	%	%	
4	Outside Temperature	°C	°C, °F	1006
5	Wind Speed	m/s	mph, m/s, fps, kph	1007
6	Wind Speed 10 Min	m/s	mph, m/s, fps, kph	1007
7	Wind Direction	°	° (Degree Angular)	
8	Extra Temp 1	°C	°C, °F	1006

9	Extra Temp 2	°C	°C, °F	1006
10	Extra Temp 3	°C	°C, °F	1006
11	Extra Temp 4	°C	°C, °F	1006
12	Extra Temp 5	°C	°C, °F	1006
13	Extra Temp 6	°C	°C, °F	1006
14	Extra Temp 7	°C	°C, °F	1006
15	Soil Temp 1	°C	°C, °F	1006
16	Soil Temp 2	°C	°C, °F	1006
17	Soil Temp 3	°C	°C, °F	1006
18	Soil Temp 4	°C	°C, °F	1006
19	Leaf Temp 1	°C	°C, °F	1006
20	Leaf Temp 2	°C	°C, °F	1006
21	Leaf Temp 3	°C	°C, °F	1006
22	Leaf Temp 4	°C	°C, °F	1006
23	Outside Humidity	%	%	
24	Extra Humidity 1	%	%	
25	Extra Humidity 2	%	%	
26	Extra Humidity 3	%	%	
27	Extra Humidity 4	%	%	
28	Extra Humidity 5	%	%	
29	Extra Humidity 6	%	%	
30	Extra Humidity 7	%	%	
31	Rain Rate	mm	inch, mm	1008
32	UV Index	No_Units	No_Units	
33	Solar Radiation	W/m2	W/m2	
34	Storm Rain	mm	in, mm	1008
35	Day Rain	mm	in, mm	1008
36	Month Rain	mm	in, mm	1008
37	Year Rain	mm	in, mm	1008
38	Day ET	mm	in, mm	1008
39	Month ET	mm	in, mm	1008
40	Year ET	mm	in, mm	1008
41	Soil Moisture 1	millibar	millibar	
42	Soil Moisture 2	millibar	millibar	
43	Soil Moisture 3	millibar	millibar	
44	Soil Moisture 4	millibar	millibar	
45	Leaf Wetness 1	No_Units	No_Units	
46	Leaf Wetness 2	No_Units	No_Units	
47	Leaf Wetness 3	No_Units	No_Units	
48	Leaf Wetness 4	No_Units	No_Units	
49	Console Battery Voltage	V	V	
50	Forecast Icon	No_Units	No_Units	
51	Forecast Rule Number	No_Units	No_Units	
52	Wet Bulb	°C	°C, °F	1006
53	Wind Speed 2 Min	m/s	mph, m/s, fps, kph	1007
54	Wind Gust	m/s	mph, m/s, fps, kph	1007
55	Wind Gust Direction	°	° (Degree Angular)	
56	Dew Point	°C	°C, °F	1006
57	Heat Index	°C	°C, °F	1006
58	Wind Chill	°C	°C, °F	1006
59	THSW Index	°C	°C, °F	1006
60	Rain Last 15 Min	mm	in, mm	1008

61	Rain Last Hour	mm	in, mm	1008
62	Rain Last 24 Hour	mm	in, mm	1008
63	Barometric Calibration Number	mmHg	inHg, mmHg, mbar	1005
64	Barometric Sensor Raw Reading	mmHg	inHg, mmHg, mbar	1005
65	Absolute Barometric Pressure	mmHg	inHg, mmHg, mbar	1005

Table 9: Supported Analog Input Objects

Unit	Abbreviation	BACnet Code
Degrees Fahrenheit	°F	64
Degrees Celsius	°C	62
Precent Relative Humidity	%	29
Inches of Mercury	inHg	61
Millimetres of Mercury	mmHg	59
Millibar	mbar	134
Inches	in	32
Millimetres	mm	30
Miles per Hour	mph	78
Meters per Second	m/s	74
Feet per Second	fps	76
Kilometres per Hour	kph	75
Volts	V	5
Degrees Angular	°	90
Watts per Square Meter	W/m²	35
No Units	No_Units	95

Table 10: Supported Analog Units

Time Value Objects

Time Value Objects are read from the Davis Weather Station.

Property Name/ID	Access	Default	Note
Object Identifier	R	0, 1	
Object Name	R	(0) Time of Sunrise (1) Time of Sunset	
Object Type	R	TIME (50)	
Present Value	R		Values are read from Weather Station
Status Flags	R	All false	

Table 11: BACnet Time Value Objects

These values require longitude and latitude to be set. Longitude and latitude can only be set by using the WeatherLink Software.

Date Value Object

Date Value Objects are read from the Davis Weather Station.

Property Name/ID	Access	Default	Note
Object Identifier	R	0	
Object Name	R	(0) Start Date of Current Storm	
Object Type	R	Date (42)	
Present Value	R		Value is read from Weather Station
Status Flags	R	All false	

Table 12: BACnet Date Value Objects

These values require longitude and latitude to be set. Longitude and latitude can only be set by using the WeatherLink Software.

Analog Value Objects

Analog Value Objects define the alarm setpoints. See Alarm Section for more information.

Property Name/ID	Access	Default	Note
Object Identifier	R	0, 1	
Object Name	R	(0) SP0 (1) SP1	
Object Type	R	ANALOG VALUE	
Present Value	R/W	0	
Status Flags	R	All false	
Event State	R	NORMAL	
Out Of Service	R	FALSE	
Units	R	No_Units	
Relinquish Default	R	0	
Proprietary Property - 3306	R/W	0	Alarm Operation Mode: - Data Type: Enumerated Alarm Active when: 0 - Equal Setpoint 1 - Greater than Setpoint 2 - Smaller than Setpoint 3 -Alarm Flag Active

Table 13: BACnet Analog Value Objects

Integer Value Objects

Integer Value Objects define which instance number (analog input object) will be controlled by alarm setpoints. See Alarm Section for more information.

Property Name/ID	Access	Default	Note
Object Identifier	R	0, 1	
Object Name	R	(0) Instance of SP0 (1) Instance of SP1	
Object Type	R	INTEGER VALUE	
Present Value	R/W	0	Instance number of Analog Input Object that should be controlled by alarm
Status Flags	R	All false	
Out Of Service	R/W	TRUE	Write TRUE to disable respective alarm
Units	R	No_Units	
Relinquish Default	R	0	

Table 14: BACnet Integer Value Objects

Binary Value Objects

Binary Value Objects show the status of the alarm outputs (digital outputs on the gateway). See Alarm Section for more information.

Property Name/ID	Access	Default	Note
Object Identifier	R	0, 1	
Object Name	R	(0) Digital Output 1 (1) Digital Output 2	
Object Type	R	BINARY VALUE	
Present Value	R	0	Status of Output: 0 – LOW, 0V 1 – HIGH, 3.3V
Status Flags	R	All false	
Event State	R	NORMAL	
Out Of Service	R	FALSE	
Polarity	R	NORMAL	

Table 15: BACnet Binary Value Objects

These two digital outputs CANNOT be used to power another device. They are ONLY intended as a digital signal output with a maximum voltage of 3.3VDC.

Symbol	Parameter	Min	Max
V_{OH}	High-Level Voltage Output	2.64V	3.3V
V_{OL}	Low-Level Voltage Output	0V	0.33V

Table 16: Digital Output Electrical Parameters

Note: For hardware version 2.1, it comes with Open Collector Outputs instead of dry contact outputs.

Proprietary Object - 129

The Proprietary Objects contains all the BACnet MSTP communication parameters, the status of the Weather Station Communication and unit conversion.

Property Name/ID	Access	Default	Note
Object Identifier	R	0	
Object Name	R	Configuration/Status	
Object Type	R	Proprietary Object - 129	
Proprietary Property - 1000	R/W	1	BACnet MAC Address - Data Type: Unsigned - 0-127
Proprietary Property - 1001	R/W	96 (9600)	BACnet MAC Address - Data Type: Unsigned - 96, 192, 384, 576, 768
Proprietary Property - 1002	R/W	FALSE	Commit BACnet Setup - Data Type: Boolean - Write "TRUE" to save the BACnet MAC Address and Baud Rate to the memory
Proprietary Property - 1003	R	FALSE	Weather Station Loop 1 Status - Data Type: Boolean
Proprietary Property - 1004	R	FALSE	Weather Station Loop 2 Status - Data Type: Boolean
Proprietary Property - 1005	R/W	1	Pressure Unit - 0: inHg - 1: mmHg - 2: mbar
Proprietary Property - 1006	R/W	1	Pressure Unit - 0: °F - 1: °C
Proprietary Property - 1007	R/W	1	Wind Speed Unit - 0: mph - 1: m/s - 2: ft/s - 3: km/h
Proprietary Property - 1008	R/W	1	Rain Unit - 0: inch - 1: mm

Table 17: BACnet Proprietary Object

Alarms/Digital Outputs

The KTA-402 BACnet Gateway provides two configurable alarms which can enable or disable two digital outputs.

To enable the alarm function, the user needs to set FALSE to the OUT_OF_SERVICE property of the Integer Value Objects and configure the desirable parameters.

* When weather station communication is down, digital outputs will stay at its previous status.

Alarm 0/Digital Output 0

Object Name	Object Name	Property	
Integer Value 0	Instance of SP0	Out Of Service	Enable or Disable the alarm
Integer Value 0	Instance of SP0	Present Value	Write the instance number of the analog input object to be controlled
Analog Value 0	SP0 (Setpoint 0)	Present Value	Write the desirable setpoint
Analog Value 0	SP0 (Setpoint 0)	Proprietary Property - 3306	Active the alarm when: 0 - Equal Setpoint 1 - Greater than Setpoint 2 - Smaller than Setpoint 3 -Alarm Flag Active
Binary Value 0	Digital Output 0	Present Value	Indicate the status of the DO1

Table 18: Alarm 1 Related Parameters

Alarm 1/Digital Output 1

Object Name	Object Name	Property	
Integer Value 1	Instance of SP1	Out Of Service	Enable or Disable the alarm
Integer Value 1	Instance of SP1	Present Value	Write the instance number of the analog input object to be controlled
Analog Value 1	SP1 (Setpoint 1)	Present Value	Write the desirable setpoint
Analog Value 1	SP1 (Setpoint 1)	Proprietary Property - 3306	Active the alarm when: 0 - Equal Setpoint 1 - Greater than Setpoint 2 - Smaller than Setpoint 3 -Alarm Flag Active
Binary Value 1	Digital Output 1	Present Value	Indicate the status of the DO2

Table 19: Alarm 2 Related Parameters

Additional Information

Device Communication Control (DCC)

The DCC function enables or disables communication for devices on the BACnet network. When communication is disabled, the device will not respond to any requests except for RD or DCC requests. For security, this function is password protected - "**KTA-402_1234**".

Reinitialized Device (RD)

The RD function allows users to restart or reboot the gateway via BACnet.

For security, this function is password protected - "**KTA-402_1234**".