

Titan Products Technical Manual

BACnet Manual – 8-way Smart I/O Modules

Version 1.0

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Issue Record

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| 05/08/20 | 1.0 | JT | BACnet Manual – Titan Smart IO Modules (4-way variants) |
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Network Configuration

MS/TP allows for only a daisy-chained network configuration, consisting of a single cable routed between controllers. Star and Ring network topologies are not supported.

The network supports a maximum of 254 nodes; addresses 0 to 127 are valid for both master and slave nodes and addresses 128 to 254 are valid only for slave nodes.

To comply with the EIA-485 standard, the maximum number of nodes per segment shall be 32 and any additional nodes will require the use of repeaters. If only Titan controllers are on the MS/TP network, the number of controllers may be increased to 127 dependent on wiring length as specified below.

A termination resistance of 120 ohms shall be connected at each of the two ends of the segment medium.

Cable Specifications

The cable used in an MS/TP EIA-485 network should conform to the following specifications:

| | |
|---------------------|---------------------------------------------------------------------------------------------------------------------------|
| Wire Size: | 22-24 AWG |
| Cable Type: | Twisted-pair, copper wire, tinned and a ground wire which must be connected to all devices on the 485 network. |
| Shield: | Foil or braided |
| Nominal Impedance: | 100 – 130 Ω |
| Capacitance: | < 100 pF/m distributed capacitance between conductors < 200 pF/m distributed capacitance between conductors and shield |
| Max segment length: | 1200 meters (4000 feet) |

The cable shield must be connected to Earth ground at the network router end only.

The recommended cable is Belden 3106A.

Commissioning Settings

The BACnet commissioning settings are set to default values. They can then be changed via USB using Titan Smart IO USB Commissioning Tool software.

The following settings need to be commissioned before connection to the MS/TP network:

MAC Address: Default: 51. This setting corresponds to a unique MAC address on the local MS/TP network and can be in the range 0 to 127. It can be updated either via USB or through the baudrate BACnet object.

Baud Rate: Default: 38400. This setting corresponds to the MS/TP network Baud Rate and should match all other devices on the same local network. It can be updated either via USB or through the baudrate BACnet object. Options are 9600, 19200, 38400, 57600 and 76800.

BACnet Device Object Identifier: Default: 200. This setting can be updated either via USB or through the Device Object properties from a BACnet browser.

A valid Device Object ID in the range 1 to 4194302 can be entered and this will set the Device Object Name to "SmartIO_*DevObjectID*". The device name will update automatically according to the *DevObjectID* until the device name is manually changed (by writing to *DevObjectName* property)

Object Description

The tables below indicate the Objects supported and the functions they perform.

| Object ID | Object Name | Function |
|-----------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| DEVO | Device Object | ID, name, version, etc. |
| AV0 | MAC Address | The current MAC address |
| MSV0 | Baudrate | The current baud rate |
| BV0 | Flash store | Set True to store current values to flash memory so that they are not lost following a reboot |
| BV1 | Build Fail | Is set to True if the primary configuration file fails to build. Unit will run on the secondary configuration until the unit is updated |
| FILE1 | Config | Backup and restore file |
| FILE2 | Firmware | Backup and restore file |
| NC1 | NC1 | Notification Class |
| NC2 | NC2 | Notification Class |

Application specific

The BACnet objects availability depends on the configuration and the hardware device variant.

Four hardware variants exist which differ only by output configuration, these are:-

| | Model | |
|--------------|---------------|----------------------------------------------------------------------------------|
| 1. Relays. | IO-COM-8R | 8 x Relay outputs labelled D01-D08. |
| 2. Triacs. | IO-COM-8DO | 8 x Triac outputs labelled D01-D08. |
| 3. Analogue. | IO-COM-8AO | 8 x Analogue outputs labelled A01-A08. |
| 4. Mixed. | IO-COM-4AO4DO | 4 x Analogue outputs labelled A01-A04 and 4 x Triac outputs labelled D01-D04. |

Universal Input no. 1

| Object ID | Object Name | Function | Availability |
|-----------|----------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|
| MSV100 | UI Config 1 | Configure the Universal Input no.1 | Permanent |
| AI101 | UI1: 10V Analog Input | 0 to 10V Analog Input on Universal Input no.1 | Only if MSV100 set to Analog Input |
| BI102 | UI1: Digital Input | Digital Input state on Universal Input no.1 | Only if MSV100 set to Digital Input |
| AV103 | UI1: Digital Input Pulse Counter | Number of pulses on Universal Input no.1 | Only if MSV100 set to Digital Input |
| BV104 | UI1: Reset Counter | Reset the BI102 counter when set to 1 | Only if MSV100 set to Digital Input |
| AI105 | UI1: Temperature | Temperature on the Universal Input no.1 | Only if MSV100 set to one of the Temperature Inputs |
| AV106 | UI1: Temperature offset | Offset on the temperature on the Universal Input no.1 | Only if MSV100 set to one of the Temperature Inputs |
| AV107 | UI1: Low Pass Filter | Duration of the low pass filter on the Universal Input no.1 | Only if MSV100 set to Analog Input or one of the Temperature Inputs |

Universal Input no. 2

| Object ID | Object Name | Function | Availability |
|-----------|-----------------------|-----------------------------------------------|-------------------------------------------|
| MSV200 | UI Config 2 | Configure the Universal Input no.2 | Permanent |
| AI201 | UI2: 10V Analog Input | 0 to 10V Analog Input on Universal Input no.2 | Only if MSV200 set to Analog Input |

| Object ID | Object Name | Function | Availability |
|-----------|----------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|
| BI202 | UI2: Digital Input | Digital Input state on Universal Input no.2 | Only if MSV200 set to Digital Input |
| AV203 | UI2: Digital Input Pulse Counter | Number of pulses on Universal Input no.2 | Only if MSV200 set to Digital Input |
| BV204 | UI2: Reset Counter | Reset the BI202 counter when set to 1 | Only if MSV200 set to Digital Input |
| AI205 | UI2: Temperature | Temperature on the Universal Input no.2 | Only if MSV200 set to one of the Temperature Inputs |
| AV206 | UI2: Temperature offset | Offset on the temperature on the Universal Input no.2 | Only if MSV200 set to one of the Temperature Inputs |
| AV207 | UI2: Low Pass Filter | Duration of the low pass filter on the Universal Input no.2 | Only if MSV200 set to Analog Input or one of the Temperature Inputs |

Universal Input no. 3

| Object ID | Object Name | Function | Availability |
|-----------|----------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|
| MSV300 | UI Config 3 | Configure the Universal Input no.3 | Permanent |
| AI301 | UI3: 10V Analog Input | 0 to 10V Analog Input on Universal Input no.3 | Only if MSV300 set to Analog Input |
| BI302 | UI3: Digital Input | Digital Input state on Universal Input no.3 | Only if MSV300 set to Digital Input |
| AV303 | UI3: Digital Input Pulse Counter | Number of pulses on Universal Input no.3 | Only if MSV300 set to Digital Input |
| BV304 | UI3: Reset Counter | Reset the BI302 counter when set to 1 | Only if MSV300 set to Digital Input |
| AI305 | UI3: Temperature | Temperature on the Universal Input no.3 | Only if MSV300 set to one of the Temperature Inputs |
| AV306 | UI3: Temperature offset | Offset on the temperature on the Universal Input no.3 | Only if MSV300 set to one of the Temperature Inputs |
| AV307 | UI3: Low Pass Filter | Duration of the low pass filter on the Universal Input no.3 | Only if MSV300 set to Analog Input or one of the Temperature Inputs |

Universal Input no. 4

| Object ID | Object Name | Function | Availability |
|-----------|-------------|------------------------------------|--------------|
| MSV400 | UI Config 4 | Configure the Universal Input no.4 | Permanent |

| Object ID | Object Name | Function | Availability |
|-----------|----------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|
| AI401 | UI4: 10V Analog Input | 0 to 10V Analog Input on Universal Input no.4 | Only if MSV400 set to Analog Input |
| BI402 | UI4: Digital Input | Digital Input state on Universal Input no.4 | Only if MSV400 set to Digital Input |
| AV403 | UI4: Digital Input Pulse Counter | Number of pulses on Universal Input no.4 | Only if MSV400 set to Digital Input |
| BV404 | UI4: Reset Counter | Reset the BI402 counter when set to 1 | Only if MSV400 set to Digital Input |
| AI405 | UI4: Temperature | Temperature on the Universal Input no.4 | Only if MSV400 set to one of the Temperature Inputs |
| AV406 | UI4: Temperature offset | Offset on the temperature on the Universal Input no.4 | Only if MSV400 set to one of the Temperature Inputs |
| AV407 | UI4: Low Pass Filter | Duration of the low pass filter on the Universal Input no.4 | Only if MSV400 set to Analog Input or one of the Temperature Inputs |

Universal Input no. 5

| Object ID | Object Name | Function | Availability |
|-----------|----------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|
| MSV500 | UI Config 5 | Configure the Universal Input no.5 | Permanent |
| AI501 | UI5: 10V Analog Input | 0 to 10V Analog Input on Universal Input no.5 | Only if MSV500 set to Analog Input |
| BI502 | UI5: Digital Input | Digital Input state on Universal Input no.5 | Only if MSV500 set to Digital Input |
| AV503 | UI5: Digital Input Pulse Counter | Number of pulses on Universal Input no.5 | Only if MSV500 set to Digital Input |
| BV504 | UI5: Reset Counter | Reset the BI502 counter when set to 1 | Only if MSV500 set to Digital Input |
| AI505 | UI5: Temperature | Temperature on the Universal Input no.5 | Only if MSV500 set to one of the Temperature Inputs |
| AV506 | UI5: Temperature offset | Offset on the temperature on the Universal Input no.5 | Only if MSV500 set to one of the Temperature Inputs |
| AV507 | UI5: Low Pass Filter | Duration of the low pass filter on the Universal Input no.5 | Only if MSV500 set to Analog Input or one of the Temperature Inputs |

Universal Input no. 6

| Object ID | Object Name | Function | Availability |
|------------------|----------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|
| MSV600 | UI Config 6 | Configure the Universal Input no.6 | Permanent |
| AI601 | UI6: 10V Analog Input | 0 to 10V Analog Input on Universal Input no.6 | Only if MSV600 set to Analog Input |
| BI602 | UI6: Digital Input | Digital Input state on Universal Input no.6 | Only if MSV600 set to Digital Input |
| AV603 | UI6: Digital Input Pulse Counter | Number of pulses on Universal Input no.6 | Only if MSV600 set to Digital Input |
| BV604 | UI6: Reset Counter | Reset the BI602 counter when set to 1 | Only if MSV600 set to Digital Input |
| AI605 | UI6: Temperature | Temperature on the Universal Input no.6 | Only if MSV600 set to one of the Temperature Inputs |
| AV606 | UI6: Temperature offset | Offset on the temperature on the Universal Input no.6 | Only if MSV600 set to one of the Temperature Inputs |
| AV607 | UI6: Low Pass Filter | Duration of the low pass filter on the Universal Input no.6 | Only if MSV600 set to Analog Input or one of the Temperature Inputs |

Universal Input no. 7

| Object ID | Object Name | Function | Availability |
|------------------|----------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|
| MSV700 | UI Config 7 | Configure the Universal Input no.7 | Permanent |
| AI701 | UI7: 10V Analog Input | 0 to 10V Analog Input on Universal Input no.7 | Only if MSV700 set to Analog Input |
| BI702 | UI7: Digital Input | Digital Input state on Universal Input no.7 | Only if MSV700 set to Digital Input |
| AV703 | UI7: Digital Input Pulse Counter | Number of pulses on Universal Input no.7 | Only if MSV700 set to Digital Input |
| BV704 | UI7: Reset Counter | Reset the BI702 counter when set to 1 | Only if MSV700 set to Digital Input |
| AI705 | UI7: Temperature | Temperature on the Universal Input no.7 | Only if MSV700 set to one of the Temperature Inputs |
| AV706 | UI7: Temperature offset | Offset on the temperature on the Universal Input no.7 | Only if MSV700 set to one of the Temperature Inputs |
| AV707 | UI7: Low Pass Filter | Duration of the low pass filter on the Universal Input no.7 | Only if MSV700 set to Analog Input or one of the Temperature Inputs |

Universal Input no. 8

| Object ID | Object Name | Function | Availability |
|------------------|----------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|
| MSV800 | UI Config 8 | Configure the Universal Input no.8 | Permanent |
| AI801 | UI8: 10V Analog Input | 0 to 10V Analog Input on Universal Input no.8 | Only if MSV800 set to Analog Input |
| BI802 | UI8: Digital Input | Digital Input state on Universal Input no.8 | Only if MSV800 set to Digital Input |
| AV803 | UI8: Digital Input Pulse Counter | Number of pulses on Universal Input no.8 | Only if MSV800 set to Digital Input |
| BV804 | UI8: Reset Counter | Reset the BI802 counter when set to 1 | Only if MSV800 set to Digital Input |
| AI805 | UI8: Temperature | Temperature on the Universal Input no.8 | Only if MSV800 set to one of the Temperature Inputs |
| AV806 | UI8: Temperature offset | Offset on the temperature on the Universal Input no.8 | Only if MSV800 set to one of the Temperature Inputs |
| AV807 | UI8: Low Pass Filter | Duration of the low pass filter on the Universal Input no.8 | Only if MSV800 set to Analog Input or one of the Temperature Inputs |

Important: the visibility of the Universal Inputs (AIx01 to AVx07) related objects depends on MSVx00 selection, x being the input number from 1 to 8. If one of the MSV selection is changed, the device object has to be re-scanned to access the unveiled control objects.

Output no. 1

| Object ID | Object Name | Function | Availability |
|------------------|-------------------------|-----------------------------------|----------------------------------------------|
| AO101 | Analog Output 1 AO1 | Voltage on the Analog Output no.1 | 0V to 10V output and mixed hardware variants |
| BO102 | Digital Output 1 D01 | State of the Digital Output no.1 | Relays, Triacs and mixed hardware variants |

Output no. 2

| Object ID | Object Name | Function | Availability |
|------------------|-------------------------|-----------------------------------|----------------------------------------------|
| AO201 | Analog Output 2 AO2 | Voltage on the Analog Output no.2 | 0V to 10V output and mixed hardware variants |
| BO202 | Digital Output 2 DO2 | State of the Digital Output no.2 | Relays, Triacs and mixed hardware variants |

Output no. 3

| Object ID | Object Name | Function | Availability |
|------------------|-------------------------|--------------------------------------|-------------------------------------------------|
| AO301 | Analog Output 3 AO3 | Voltage on the Analog Output no.3 | 0V to 10V output and mixed hardware variants |
| BO302 | Digital Output 3 DO3 | State of the Digital Output no.3 | Relays, Triacs and mixed hardware variants |

Output no. 4

| Object ID | Object Name | Function | Availability |
|------------------|-------------------------|--------------------------------------|-------------------------------------------------|
| AO401 | Analog Output 4 AO4 | Voltage on the Analog Output no.4 | 0V to 10V output and mixed hardware variants |
| BO402 | Digital Output 4 DO4 | State of the Digital Output no.4 | Relays, Triacs and mixed hardware variants |

Output no. 5

| Object ID | Object Name | Function | Availability |
|------------------|-------------------------|--------------------------------------|--------------------------------------------|
| AO501 | Analog Output 5 AO5 | Voltage on the Analog Output no.5 | 0V to 10V output hardware variants only |
| BO502 | Digital Output 5 DO5 | State of the Digital Output no.5 | Relays and Triacs hardware variants |

Output no. 6

| Object ID | Object Name | Function | Availability |
|------------------|-------------------------|--------------------------------------|--------------------------------------------|
| AO601 | Analog Output 6 AO6 | Voltage on the Analog Output no.6 | 0V to 10V output hardware variants only |
| BO602 | Digital Output 6 DO6 | State of the Digital Output no.6 | Relays and Triacs hardware variants |

Output no. 7

| Object ID | Object Name | Function | Availability |
|------------------|-------------------------|--------------------------------------|--------------------------------------------|
| AO701 | Analog Output 7 AO7 | Voltage on the Analog Output no.7 | 0V to 10V output hardware variants only |
| BO702 | Digital Output 7 DO7 | State of the Digital Output no.7 | Relays and Triacs hardware variants |

Output no. 8

| Object ID | Object Name | Function | Availability |
|-----------|-------------------------|--------------------------------------|--------------------------------------------|
| AO801 | Analog Output 8 AO8 | Voltage on the Analog Output no.8 | 0V to 10V output hardware variants only |
| BO802 | Digital Output 8 DO8 | State of the Digital Output no.8 | Relays and Triacs hardware variants |

Object Writable Ranges

If the Objects Present_Value is writable, it may take a value within the range indicated in the tables below.

| Object ID | Object Name | R/W | States |
|-----------|-------------|-----|---------------------|
| MSV100 | UI Config 1 | R/W | Analog Input 0-10V; |
| MSV200 | UI Config 2 | | Digital Input; |
| MSV300 | UI Config 3 | | 10k3A1 Thermistor; |
| MSV400 | UI Config 4 | | 10k4A1 Thermistor; |
| MSV500 | UI Config 5 | | 20k6A1 Thermistor; |
| MSV600 | UI Config 6 | | PT1000; |
| MSV700 | UI Config 7 | | Ni1000; |
| MSV800 | UI Config 8 | | NONE; |

| Object ID | Object Name | R/W | Min | Max | Resolution | Units |
|----------------------------------------------------------------------|--------------------------------------------|------|-----|--------|------------|---------|
| AI101 AI201 AI301 AI401 AI501 AI601 AI701 AI801 | UI1 to UI8: 10V Analog Input | R/W* | 0 | +10 | 0.01 | V |
| AV103 AV203 AV303 AV403 AV503 AV603 AV703 AV803 | UI1 to UI8: Digital Input Pulse Counter | R/W* | 0 | 65,535 | 1 | no unit |
| AI105 AI205 AI305 AI405 AI505 AI605 AI705 AI805 | UI1 to UI8: Temperature | R/W* | -20 | +100 | 0.1 | °C |
| AV106 AV206 AV306 AV406 AV506 AV606 AV706 AV806 | UI1 to UI8: Temperature offset | R/W | -10 | +10 | 0.1 | °C |

| | | | | | | |
|-------|----------------------|-----|---|-----|------|---------|
| AV107 | UI1 to UI8: | R/W | 0 | 60 | 1 | seconds |
| AV207 | Low Pass Filter | | | | | |
| AV307 | | | | | | |
| AV407 | | | | | | |
| AV507 | | | | | | |
| AV607 | | | | | | |
| AV707 | | | | | | |
| AV807 | | | | | | |
| AO101 | Analog Output 1 to 8 | R/W | 0 | +10 | 0.01 | V |
| AO201 | AO1-AO8 | | | | | |
| AO301 | | | | | | |
| AO401 | | | | | | |
| AO501 | | | | | | |
| AO601 | | | | | | |
| AO701 | | | | | | |
| AO801 | | | | | | |

** Present_Value only writable when Out_Of_Service is True*

| Object ID | Object Name | R/W | Inactive State | Active State |
|-----------|----------------------------------|-------------------|----------------|--------------|
| BI102 | UI1 to UI8: Digital Input | R/W* ¹ | 0 | 1 |
| BI202 | | | | |
| BI302 | | | | |
| BI402 | | | | |
| BI502 | | | | |
| BI602 | | | | |
| BI702 | | | | |
| BI802 | | | | |
| BV104 | UI1 to UI8: Reset Counter | R/W | 0 | 1 |
| BV204 | | | | |
| BV304 | | | | |
| BV404 | | | | |
| BV504 | | | | |
| BV604 | | | | |
| BV704 | | | | |
| BV804 | | | | |
| BO102 | Digital Output 1 to 8 DO1-DO8 | R/W | 0 | 1 |
| BO202 | | | | |
| BO302 | | | | |
| BO402 | | | | |
| BO502 | | | | |
| BO602 | | | | |
| BO702 | | | | |
| BO802 | | | | |

*¹ Present_Value only writable when Out_Of_Service is True

Important: the visibility of the Universal Inputs (AIx01 to AVx07) related objects depends on MSVx00 selection, x being the input number from 1 to 8. If one of the MSV selection is changed, the device object has to be re-scanned to access the unveiled control objects.

BACnet Protocol Implementation Conformance Statement

Date: 08 October 2019
Vendor Name: Titan Products Ltd.
Product Name: 8-way Smart IO modules
Product Model Number: TP1286/TP1287
Applications Software Version: Total 1.0.0
Firmware Revision: 1.0.0
BACnet Protocol Revision: 3

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 Blocks Supported (Annex K):

DM-DDB-A/B Device Management – Dynamic Device Binding – A/B
DM-DOB-B Device Management – Dynamic Object Binding – B
DM-DCC-B Device Management – Device Communications Control – B
DM-PT-A/B Device Management – Private Transfer – A/B
DM-TS-B Device Management – Time Synchronization – B
DM-RD-B Device Management – Reinitialize Device – B
DM-BR-B Device Management – Backup and Restore – B

DS-RP-B Data Sharing – Read Property – B
DS-RPM-B Data Sharing – Read Property Multiple – B
DS-WP-B Data Sharing – Write Property – B
DS-WPM-B Data Sharing – Write Property Multiple – B

AE-N-I-B Alarm and Event Notification Internal – B
AE-ACK-B Alarm and Event ACK – B

Segmentation Capability:
 Segmented requests supported Window Size _____

 Segmented responses supported Window Size _____
Standard Object Types Supported:

| Object Type | Property | 1. Optional | 2. Writable | 3. Range Restriction |
|------------------------|---------------------------------|-------------|-------------|------------------------|
| | | 4. | 5. | 6. |
| Device | Object_Identifier | | ✓ | Instance: 1 to 4194302 |
| | Object_Name | | ✓ | 15 characters max |
| | Object_Type | | | |
| | System_Status | | | |
| | Vendor_Name | | | |
| | Vendor_Identifier | | | |
| | Model_Name | | | |
| | Firmware_Revision | | | |
| | Application_Software_Version | | | |
| | Location | ✓ | ✓ | 15 characters max |
| | Description | ✓ | | |
| | Protocol_Version | | | |
| | Protocol_Revision | | | |
| | Protocol_Services_Supported | | | |
| | Protocol_Object_Types_Supported | | | |
| | Object_List | | | |
| | Max_APDU_Length_Accepted | | | |
| | Segmentation_Supported | | | |
| | Local_Time | ✓ | | |
| | Local_Date | ✓ | | |
| APDU_Timeout | | | ✓ | 0 to 60000ms |
| Number_Of_APDU_Retries | | | ✓ | 1 to 10 |
| Max_Masters | ✓ | | | |
| Max_Info_Frames | ✓ | | | |
| Device_Address_Binding | | | | |
| Database_Revision | | | | |
| Configuration_Files | | ✓ | | |

| Object Type | Property | 1. Optional | 2. Writable | 3. Range Restriction |
|----------------------|--------------------------|-------------|----------------|------------------------|
| | | 4. | 5. | 6. |
| | Last_Restore_Time | ✓ | | |
| | Backup_Failure_Timeout | ✓ | ✓ | 0 to 65535 |
| | Active_COV_Subscriptions | ✓ | | |
| | | | | |
| Analog Input | Object_Identifier | | | |
| | Object_Name | | | |
| | Object_Type | | | |
| | Present_Value | | ✓ ¹ | ✓ (Instance dependent) |
| | Description | ✓ | | |
| | Device_Type | ✓ | | |
| | Status_Flags | | | |
| | Event_State | | | |
| | Reliability | ✓ | | |
| | Out_Of_Service | | ✓ | |
| | Units | | | |
| | Min_Pres_Value | ✓ | | |
| | Max_Pres_Value | ✓ | | |
| | Resolution | ✓ | | |
| | Time_Delay | ✓ | ✓ | 0 to 60000 seconds |
| | Notification_Class | ✓ | ✓ | NC1, NC2 |
| | High_Limit | ✓ | ✓ | |
| | Low_Limit | ✓ | ✓ | |
| | Deadband | ✓ | ✓ | |
| | Limit_Enable | ✓ | ✓ | |
| | Event_Enable | ✓ | ✓ | |
| | Acked_Transitions | ✓ | | |
| | Notify_Type | ✓ | ✓ | |
| | Event_Time_Stamps | ✓ | | |
| | COV_Increment | ✓ | ✓ | ✓ (Instance dependent) |
| | | | | |
| Analog Output | Object_Identifier | | | |
| | Object_Name | | | |
| | Object_Type | | | |

| Object Type | Property | 1. Optional | 2. Writable | 3. Range Restriction |
|---------------------|--------------------|-------------|-------------|------------------------|
| | | 4. | 5. | 6. |
| | Present_Value | | ✓ | ✓ (Instance dependent) |
| | Description | ✓ | | |
| | Device_Type | ✓ | | |
| | Status_Flags | | | |
| | Event_State | | | |
| | Out_Of_Service | | | |
| | Units | | | |
| | Min_Pres_Value | ✓ | | |
| | Max_Pres_Value | ✓ | | |
| | Resolution | ✓ | | |
| | Priority_Array | | | |
| | Relinquish_Default | | | |
| | Time_Delay | ✓ | ✓ | 0 to 60000 seconds |
| | Notification_Class | ✓ | ✓ | NC1, NC2 |
| | High_Limit | ✓ | ✓ | |
| | Low_Limit | ✓ | ✓ | |
| | Deadband | ✓ | ✓ | |
| | Limit_Enable | ✓ | ✓ | |
| | Event_Enable | ✓ | ✓ | |
| | Acked_Transitions | ✓ | | |
| | Notify_Type | ✓ | ✓ | |
| | Event_Time_Stamps | ✓ | | |
| | COV_Increment | ✓ | ✓ | ✓ (Instance dependent) |
| | | | | |
| Analog Value | Object_Identifier | | | |
| | Object_Name | | | |
| | Object_Type | | | |
| | Present_Value | | ✓ | ✓ (Instance dependent) |
| | Description | ✓ | | |
| | Status_Flags | | | |
| | Event_State | | | |
| | Out_Of_Service | | | |

| Object Type | Property | 1. Optional | 2. Writable | 3. Range Restriction |
|----------------------|-----------------------|-------------|-------------|------------------------|
| | | 4. | 5. | 6. |
| | Units | | | |
| | Time_Delay | ✓ | ✓ | 0 to 60000 seconds |
| | Notification_Class | ✓ | ✓ | NC1, NC2 |
| | High_Limit | ✓ | ✓ | |
| | Low_Limit | ✓ | ✓ | |
| | Deadband | ✓ | ✓ | |
| | Limit_Enable | ✓ | ✓ | |
| | Event_Enable | ✓ | ✓ | |
| | Acked_Transitions | ✓ | | |
| | Notify_Type | ✓ | ✓ | |
| | Event_Time_Stamps | ✓ | | |
| | COV_Increment | ✓ | ✓ | ✓ (Instance dependent) |
| | | | | |
| Binary Output | Object_Identifier | | | |
| | Object_Name | | | |
| | Object_Type | | | |
| | Present_Value | | ✓ | |
| | Description | ✓ | | |
| | Device_Type | ✓ | | |
| | Status_Flags | | | |
| | Event_State | | | |
| | Out_Of_Service | | | |
| | Polarity | | ✓ | |
| | Inactive_Text | ✓ | | |
| | Active_Text | ✓ | | |
| | Change_Of_State_Time | ✓ | | |
| | Change_Of_State_Count | ✓ | ✓ | 0 |
| | Time_Of_State_Reset | ✓ | | |
| | Priority_Array | | | |
| | Relinquish_Default | | | |
| | | | | |
| Binary Input | Object_Identifier | | | |
| | Object_Name | | | |

| Object Type | Property | 1. Optional | 2. Writable | 3. Range Restriction |
|---------------------|---------------------------|-------------|----------------|----------------------|
| | | 4. | 5. | 6. |
| | Object_Type | | | |
| | Present_Value | | ✓ ¹ | |
| | Description | ✓ | | |
| | Device_Type | ✓ | | |
| | Status_Flags | | | |
| | Event_State | | | |
| | Reliability | ✓ | | |
| | Out_Of_Service | | ✓ | |
| | Polarity | | ✓ | |
| | Inactive_Text | ✓ | | |
| | Active_Text | ✓ | | |
| | Change_Of_State_Time | ✓ | | |
| | Change_Of_State_Count | ✓ | ✓ | 0 |
| | Time_Of_State_Count_Reset | ✓ | | |
| | Time_Delay | ✓ | ✓ | 0 to 60000 seconds |
| | Notification_Class | ✓ | ✓ | NC1, NC2 |
| | Alarm_Value | ✓ | ✓ | |
| | Event_Enable | ✓ | ✓ | |
| | Acked_Transitions | ✓ | | |
| | Notify_Type | ✓ | ✓ | |
| | Event_Time_Stamps | ✓ | | |
| | | | | |
| Binary Value | Object_Identifier | | | |
| | Object_Name | | | |
| | Object_Type | | | |
| | Present_Value | | ✓ | |
| | Description | ✓ | | |
| | Status_Flags | | | |
| | Event_State | | | |
| | Out_Of_Service | | | |
| | Inactive_Text | ✓ | | |
| | Active_Text | ✓ | | |
| | Time_Delay | ✓ | ✓ | 0 to 60000 seconds |
| | Notification_Class | ✓ | ✓ | NC1, NC2 |

| Object Type | Property | 1. Optional | 2. Writable | 3. Range Restriction |
|---------------------------|--------------------|-------------|-------------|----------------------------------|
| | | 4. | 5. | 6. |
| | Alarm_Value | ✓ | ✓ | |
| | Event_Enable | ✓ | ✓ | |
| | Acked_Transitions | ✓ | | |
| | Notify_Type | ✓ | ✓ | |
| | Event_Time_Stamps | ✓ | | |
| | | | | |
| Multi-state Value | Object_Identifier | | | |
| | Object_Name | | | |
| | Object_Type | | | |
| | Present_Value | | ✓ | ✓ (Instance dependent) |
| | Description | ✓ | | |
| | Status_Flags | | | |
| | Event_State | | | |
| | Out_Of_Service | | | |
| | Number_Of_States | | | |
| | State_Text | ✓ | | |
| | | | | |
| Notification Class | Object_Identifier | | | |
| | Object_Name | | | |
| | Object_Type | | | |
| | Description | ✓ | | |
| | Notification_Class | | | |
| | Priority | | ✓ | |
| | Ack_Required | | ✓ | |
| | Recipient_List | | ✓ | x1 BACnet Recipient ² |
| | | | | |
| File | Object_Identifier | | | |
| | Object_Name | | | |
| | Object_Type | | | |
| | Description | ✓ | | |
| | File_Type | | | |
| | File_Size | | ✓ | 0 |

| Object Type | Property | 1. Optional | 2. Writable | 3. Range Restriction |
|-------------|--------------------|-------------|-------------|----------------------|
| | | 4. | 5. | 6. |
| | Modification_Date | | | |
| | Archive | | | |
| | Read_Only | | | |
| | File_Access_Method | | | |

¹ Present_Value only writable when Out_Of_Service True

² Dynamic Device Binding when BACnetRecipient ::= CHOICE { device [0] BACnetObjectIdentifier }

Data Link Layer Options:

- BACnet IP, (Annex J)
- BACnet IP, (Annex J), Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
- ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s) _____
- MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 57600, 76800
- 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, Ethernet-MS/TP, etc.
- Annex H, BACnet Tunneling 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.

- | | | |
|-----------------------------------------------|-----------------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> ANSI X3.4 | <input type="checkbox"/> IBM™/Microsoft™ DBCS | <input type="checkbox"/> ISO 8859-1 |
| <input type="checkbox"/> ISO 10646 (UCS-2) | <input type="checkbox"/> ISO 10646 (UCS-4) | <input type="checkbox"/> JIS C 6226 |

END.