

070B CO IP Gateway KNX-BACnet 983603

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1 Use of the application program

Product family: Communication
Product type: Interfaces
Manufacturer: Siemens

Name: IP Gateway KNX-BACnet N 143/01
Order no.: 5WG1143-1AB01

This application program can only be applied to firmware version V3.0 or higher.

The update of the firmware is described in this document → Chapter 6 Firmware Update

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2 Functional description

Changes to previous version:

- **Max. text length** for object names increased from 18 to **48 characters**.
- Expansion from the previous 255 to up to 512 group addresses and links
- **Cyclic polling** of group address values (2 - 180min) with a definable value if there is no feedback (last value, 0, 1, maximum value in the value range).
- Extension of the content of the EDE file that can be generated.
- **Extension of units** for all DPT e.g. ppm for CO2 value transmission, etc..
- Firmware update deactivated by default, can be activated via ETS parameters.
- Info web server deactivated by default, can be activated via ETS parameters.
- KNXnet/IP interface deactivated by default, can be activated via ETS parameters.
- Integrated KNXnet/IP interface supports "LongFrame" for faster download.
- **Master reset** on the device by pressing and holding the programming button.

The device is a DIN rail mounted device connecting a KNX installation with a system using BACnet communication. The device provides up to 250 communication objects. Via these objects KNX functions (group addresses) are transposed to BACnet objects.

The communication objects can be configured optionally as:

| Length | Type | Datapoint type | Description / Unit |
|--------|----------|----------------|---------------------------------------|
| 1 bit | | 1.* | Binary (on/off, true/false, 1/0, ...) |
| 1 Byte | unsigned | 5.001 | Percentage (0...100 %) |
| | | 5.010 | Counter pulses |
| | | 5.004 | Percentage (0...255 %) |
| | | 17.001 | Scene number |
| | | 18.001 | Scene control |
| | signed | 6.010 | Counter pulses |
| | | 6.001 | Percentage (-128...127 %) |
| 2 Byte | unsigned | 7.001 | Pulses |
| | | 7.013 | Brightness lux |
| | signed | 8.001 | Pulses difference |
| | | Float | 9.* |
| | 9.001 | | Temperature °C |
| | 9.001 | | Temperature °F (KNX value in °C) |
| | 9.006 | | Pressure hPa (KNX value in Pa) |
| | 9.006 | | Pressure Pa |
| | 9.024 | | Power kW |
| | 9.022 | | Power density W/m ² |
| | 9.005 | | Speed m/s |
| | 9.005 | | Speed km/h (KNX value in m/s) |

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| Length | Type | Datapoint type | Description / Unit |
|--------|--------------|----------------|----------------------------------|
| | | 9.004 | Brightness lux |
| | | 9.007 | Humidity % |
| | | 9.010 | Time s |
| | | 9.021 | Current A (KNX value in mA) |
| | | 9.021 | Current mA |
| | | 9.020 | Voltage V (KNX value in mV) |
| | | 9.020 | Voltage mV |
| | | 9.008 | Parts/million ppm |
| | | 9.009 | Flow rate m ³ /h |
| | | 9.027 | Temperature °F |
| 4 Byte | Unsigned | 12.001 | Counter pulses |
| | Signed value | 13.001 | Counter pulses |
| | | 13.010 | Active energy Wh |
| | | 13.013 | Active energy kWh |
| | | 13.002 | Flow rate m ³ /h |
| | | 14.* | Float value |
| | Float | 14.068 | Temperature °C |
| | | 14.068 | Temperature °F (KNX value in °C) |
| | | 14.058 | Pressure hPa (KNX value in Pa) |
| | | 14.058 | Pressure Pa |
| | | 14.056 | Power W |
| | | 14.056 | Power kW (KNX value in W) |
| | | 14.031 | Energy J |
| | | 14.031 | Energy kWh (KNX value in J) |
| | | 14.033 | Frequency Hz |
| | | 14.010 | Area m ² |

The device is configured entirely with ETS.

The configuration of the KNX communication objects automatically generates the corresponding BACnet objects. The following BACnet objects are being used:

- Binary Input
- Binary Output
- Binary Value
- Analog Input
- Analog Output
- Analog Value

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No special knowledge about BACnet is required for the commissioning.

The KNX objects configured with ETS are automatically “translated” by the device into BACnet objects according to the following process:

The BACnet object instance number is identical to the object number of the ETS. Objects with a 1 bit datapoint type are translated into “binary” objects. All others become “analog” objects. The parameter “Object Mode” (INPUT, OUTPUT, VALUE) completes the transformation to a BACnet object.

On BACnet the device appears as an Application Specific Controller (B-ASC) with up to 250 BACnet objects. BACnet clients may set up to 455 BACnet change-of-value (COV) subscriptions for these 250 BACnet objects. A common memory space is available for the administration of the COV subscriptions and priority arrays. This resource optimization is based on the fact that subscriptions are required for objects which send from KNX to BACnet whilst priority arrays are for objects sending from BACnet to KNX.

The maximum number of possible subscriptions is 455 if no priority arrays are used. As each priority array has a size of 64 Byte (16 priority levels of 4 Byte each), the number of possible subscriptions decreases accordingly. The maximum possible number of subscriptions is displayed on the device website once the configuration is complete.

When a subscription is registered the BACnet object sends its current value, if a value is available for this object. The validity of a value can be verified via the status property (Failure flag). Initially, the status failure flag for the object types Binary Input, Binary Value, Analog Input and Analog Value is set to TRUE. Once a value is transmitted from the KNX bus or from BACnet (for Binary Value or Analog Value) this status flag is set to FALSE. When using a Priority Array with all Priority Array positions released then the last received KNX value is sent as “relinquish default”, if the value is valid.

All Analog and Binary BACnet objects supported by the device support the writeable Out-Of-Service property. When this property is set to TRUE, the communication of the respective object with KNX is inhibited. Values of Input objects can then be changed from the BACnet side, which otherwise would not be possible. Value changes of objects with set Out-Of-Service property are also indicated via the object status flag Overridden. The Out-Of-Service flag handling is especially important for finding errors in complex systems.

When the description of an object is requested from the BACnet side (ReadProperty “Description”), the description text is automatically generated and assembled from the object name, BACnet identifier and KNX group address data separated by a colon (“:”).

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2.1 Integrated Webserver

The device is equipped with a web server presenting the configuration and current values in an overview page. This presentation is helpful for testing purposes and for documentation of the interface between KNX and BACnet.

Note

The web server is disabled in the ETS parameters for security reasons. To use it, it must first be activated by a corresponding ETS parameter under "Options".

The web page contains a header section showing general device specific information:

- Device name
- Device description
- Installation location
- BACnet instance number of the device
- Firmware version
- Physical KNX address
- IP address
- Netmask
- Gateway address
- MAC address
- Number of configured objects
- Maximum number of possible COV subscriptions
- Current number of COV subscriptions
- Number of binary input objects
- Number of binary output objects
- Number of binary value objects
- Number of analog input objects
- Number of analog output objects
- Number of analog value objects
- Device status
- Revision number
- Priority: This displays the priority array, which is used to transmit events from KNX to BACnet

| Device Name | Instance Number | 0 | IP Address | 192.168.11 | Object Count | 250 | Binary Inputs | 0 | Analog Inputs | 0 |
|--------------|-----------------|---------------|-----------------|---------------|--------------------|--------------|----------------|---|----------------|---|
| Description | Version | | Netmask | 255.255.255.0 | Max Subscriptions | 455 | Binary Outputs | 0 | Analog Outputs | 0 |
| Location | Revision No. | 0 | Gateway Address | 192.168.10.1 | Cur. Subscriptions | 0 | Binary Values | 0 | Analog Values | 1 |
| Device State | OPERATIONAL | Physical Addr | 1.1.11 | MAC | 00-05-29-90-... | KNX Priority | NA | | | |

| OBJECT TABLE | | | | | | | | | |
|--------------|--|------------------|-------------|----------------|-----------|---|------|--------|--------|
| No. | Name | BACnet Object Id | KNX Address | Data Type | T | R | Unit | Status | Value |
| 1 | 12345678901234567890123456789012345678901234567890123456789012345678 | binary-value(1) | unassigned | binary | on-change | Y | - | Fail | OFF |
| 2 | 12345678901234567890123456789012345678901234567890123456789012345678 | analog-value(2) | 1/1/100 | 2 byte (float) | on-change | Y | ppm | Ok | 499.84 |

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Beneath the header is a table listing all configured objects. The table is divided into the following columns:

- Object number
- Object name
- BACnet object ID
- KNX group address
- Datapoint type
- Transmission mode
- Reading during initialisation
- Unit
- Object value

Object values are not dynamically up-dated on the website. To up-date the objects, please re-load the website.

The revision number increases on every download on ETS.

An EDE (Engineering Data Exchange) list can be exported as csv file format via the button „Export EDE“ on the right side of the web page.

Note

In general, the webpage is coded for the UTF-8 character set. A selection field on the web page allows switching between UTF-8 and ISO 8859-1 encoding.

When ETS is used for configuration then texts (including special characters) are coded dependent on the settings in ETS. The encoding is set in ETS for the project under General - Codepage. The UTF-8 character set should be selected.

Texts to be communicated via BACnet are transmitted as entered in ETS.

2.2 Integrated KNXnet/IP interface

The device also has a KNXnet/IP interface to enable a connection to the ETS for remote parameterization. This interface can be deactivated via an ETS parameter.

Hint

The KNXnet/IP interface is deactivated in the ETS parameters for security reasons. To use it, it must first be activated by a corresponding ETS parameter under "Options".

2.3 Behavior at bus voltage failure / recovery

Failure of the auxiliary power (DC 24V) results in a functional failure of the device.

A bus voltage failure results in a functional failure of the device.

On bus voltage recovery the configured actions are executed and, if applicable, new status values are reported.

The device sends "I am" onto BACnet.

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2.4 Factory default state

In the factory default state, the device has no gateway function.

IP Address: 192.168.1.135

Physical address: 15.15.255

Physical address IP interface 15.15.255

Ports used:

| Service | Port | Conditions |
|----------------------|--------------------|--|
| FTP/Firmware updates | TCP 20 / TCP 21 | Activate possibility of firmware updates = yes |
| BACnet | UDP 47808 | Set via parameter "BACnet Communication Port" |
| HTTP / Webserver | TCP 80 | Activate webserver = yes |
| DHCP | UDP 68 | IP address assignment = DHCP Server |
| KNXnet/IP | UDP 3671 | KNXnet/IP Interface active = yes |

2.5 Behavior on unloading the application program

When the application program is unloaded with ETS the device does not function.

All BACnet objects are still visible but are set to "out of service".

The property "revision number" in the BACnet Device is incremented by one.

The web server stays in operation.

2.6 Resetting the device to factory default settings

To bring the ETS configuration data into the delivery state, a master reset can be performed. To do this, the following steps are necessary:

- Supply the device with 24 V voltage.
- Disconnect the KNX bus from the device.
- Press and hold the programming button for 5 seconds until the Error LED starts flashing.
- If the programming button is still pressed (Error LED flashes), connect the bus to the device.
- Release the programming button.

The device is restarted without ETS data and with the physical address 15.15.255.

Note: The IP address is reset to 192.168.1.135.

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2.7 Possible further security measures are

- Operate the device only in a secure network environment.
- Set up a separate IP network with its own hardware for BACnet communication.
- Restrict access to the (BACnet) IP network to an authorized group of people through user IDs and strong passwords.
- Additionally secure remote access to the device via a VPN connection.
- A virtual private network (VPN) establishes an encrypted and authorized connection (VPN tunnel) from a remote location to a network over the Internet. This VPN connection allows for a secure and overheard-protected communication between a remote device and the KNX installation.
- If Wi-Fi is used, change the default SSID from the wireless access point. Encrypt the Wi-Fi with a secure procedure (currently e.B. WPA2) and a strong password.
- Document network settings and hand them over to the building owner/operator or the LAN administrator.
- Manage access rights to this BACnet device on an IP network with the appropriate IP network administrator.
- Since the DCC (DeviceCommunicationControl) password is stored in the device, the ETS BCU password must be set to protect this password.
- For security reasons, the FTP port may only be opened for a firmware download and must be closed again after the update.
- For security reasons, the HTTP port may only be opened during troubleshooting and commissioning and must then be closed again.
- The configuration of the device must be backed up. To do this, an ETS BCU password must be set and KNXnet/IP must be deactivated.

2.8 Actions after replacing a device on the network

If a BACNET gateway is stolen from a network or replaced due to a defect, the BACnet DCC (DeviceCommunicationControl) password must be changed and a different BAU password must be assigned to the new BACnet gateway.

This is necessary because it cannot be ruled out that the passwords that are in a protected area of the device can be read.

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3 Communication objects

Maximum number of group addresses: 512

Maximum number of assignments: 512

Note

The number and names of communication objects visible can vary depending on the parameter settings.

The application program already has been loaded in the factory.

The device is configured and commissioned with the ETS (Engineering Tool Software) version ETS5 or later. With the ETS (Engineering Tool Software) the specific parameters and addresses are assigned appropriately and downloaded into the device.

The following list shows all objects of the device.

Which objects are visible and linkable to group addresses is defined via the functions assigned to the inputs. The objects and associated parameter settings are described with the functions.

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4 Functions (Objects, Parameters)

For the functions of the IP Gateway KNX/BACnet first general configuration settings and then the configuration of the 250 Objects must be done.

Note

The number and names of the parameter windows in the ETS menus may vary as they are controlled via parameter settings. Another parameter window may appear if due to dynamically added parameters the space in the first parameter window is exhausted.

4.1 General settings

| Parameter | Settings |
|--|---|
| Device name (max. 30 char) | IP_Gateway_KNX-BACnet_N_143 |
| This parameter assigns a name with up to 30 characters to the IP Gateway KNX/BACnet N 143. This name is used for easy recognition of the device when searched by a KNXnet/IP visualization or the ETS. | |
| IP address assignment | IP Settings DHCP Server |
| This parameter specifies the type of IP address assignment. If "DHCP Server" is selected, the IP address is automatically assigned by a DHCP service. If you select "IP settings", another tab "IP settings" is added for manually entering the IP address, subnet mask and gateway. | |
| Start delay for read on init | 10 s 20 s 30 s 1 min 2 min 3 min 4 min 5 min |
| This parameter determines the time delay after bus voltage recovery before Read requests of status objects are started. | |

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| Parameter | Settings |
|---|--|
| Delay between read requests | 100 ms 200 ms 500 ms 1 s 2 s |
| This parameter determines the time delay between Read requests of the individual status objects. | |
| Device Instance (must be unique) | 0... 4194303 |
| This parameter defines the unique device ID. The ID is an integer value with range [0... 4194302]. | |
| BACnet communication port | 0 ... 65535 |
| Use this parameter to change the port number of the BACnet server. The pre-set port is 47808. | |
| DCC Password | 12345 |
| This parameter defines the password to control the device on the BACnet side (up to 8 characters). By using the BACnet Service DeviceCommunicationControl the device can be temporarily "muted" for diagnostic purposes. This means all BACnet services apart from DCC are de-activated in order to re-set the device to its normal status. | |
| BACnet communication timeout | 100 ms 200 ms ... 900 ms 1 s |
| This parameter determines the time to wait for the BACnet acknowledgement. | |
| BACnet communication retries | 1 2 3 |
| Use this parameter to determine how many times you would like to repeat a request in case of wrong acknowledgement. | |
| KNXnet/IP Interface active | no yes |
| This option must be activated in order to use the KNXnet/IP interface. The IP interface can be deactivated for security reasons. | |

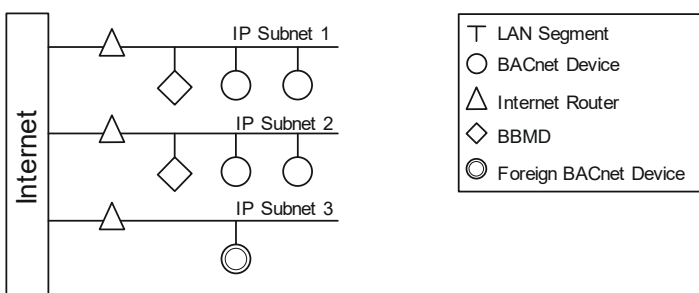
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| Parameter | Settings |
|--|-----------|
| Activate possibility of firmware updates | no yes |
| This option must be activated in order to carry out a firmware update. For security reasons, it is recommended to deactivate this option again after a firmware update. Further information is explained in the Firmware Update chapter. | |
| Activate webserver | no yes |
| The web server is activated via this parameter in order to display the overview page in a browser. The content of the web page is explained in the chapter above. | |

4.2 Parameter „Optional settings“

| Parameter | Settings |
|--|-----------|
| Device location | |
| This parameter can be used to enter an installation location of the device for easier localization in the building. Up to 30 characters can be used. | |
| Device description | |
| This parameter can be used to enter a brief device description for the device. Up to 30 characters can be used. | |
| Usage of priority arrays | no yes |
| This parameter generally determines if priority arrays are available for use. The BACnet standard assumes the usage of priority arrays for the BACnet object types Binary Output, Binary Value, Analog Output and Analog Value supported by the device. According to the standard the device supports 16 priority levels for each priority supporting BACnet object. The output value of the highest priority (this is the lowest priority number) is active. All other values with lower priority are stored (one value per priority level and object). In most cases this functionality is not required. By default priority arrays are disabled to have the highest possible memory space for COV subscriptions | |

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| Parameter | Settings |
|--|-----------------|
| Registration as foreign device at BBMD | no yes |
| <p>If this parameter is set to "Yes" then the gateway can register as a 3rd party device with a BBMD (BACnet Broadcast Management Device). In this case all telegrams are sent to the BBMD.</p>  <p>The diagram illustrates a network topology where an Internet Router connects to three IP Subnets (IP Subnet 1, IP Subnet 2, and IP Subnet 3). Each subnet contains BACnet Devices and a Foreign BACnet Device. A BBMD (Broadcast Management Device) is also shown connected to the subnets. A legend identifies the symbols: T for LAN Segment, O for BACnet Device, Δ for Internet Router, ◇ for BBMD, and ⊙ for Foreign BACnet Device.</p> | |
| <p>See: http://www.bacnet.org/Tutorial/BACnetIP/sld015.html</p> | |
| BBMD IP address | 0.0.0.0 |
| <p>This parameter determines the BBMD IP address.</p> | |
| BBMD Port Number | 0 ... 65535 |
| <p>Use this parameter to change the port number of the BBMD server within range 0 ... 65535. The pre-set port is 47808.</p> | |
| Re-registration time (Time to live) [min] | 60 2 ... 240 |
| <p>The BBMD registration has to be regularly updated. The update period can be set with this parameter. Note: If the first registration is not successful, then the registration is repeated every 30 s. After a successful registration the update period set by this parameter is applied.</p> | |

4.3 Parameter „IP settings“

| Parameter | Settings |
|---|---------------|
| IP address | 192.168.1.135 |
| <p>This parameter determines the IP address if the IP settings are manually assigned. The factory default value for the IP address is 192.168.1.135. This preset value must be replaced with a valid IP address for the target network.</p> | |
| Subnet mask | 255.255.255.0 |
| <p>This parameter determines the IP subnet mask if the IP settings are manually assigned.</p> | |

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| Parameter | Settings |
|--|----------|
| The factory default value for the IP subnet mask is 255.255.255.0. This preset value must be replaced with a valid IP subnet mask for the target network. Valid subnet mask may be e.g. 255.255.255.0 or 255.255.255.240.. | |
| Gateway address | 0.0.0.0 |
| This parameter determines the standard gateway address if the IP settings are manually assigned. This preset value must be replaced with a valid standard gateway address for the target network. The standard gateway forwards IP datagrams to e.g. a computer with an address outside of the local network. If the device shall be configured without a standard gateway then the address 0.0.0.0 shall be used. | |

4.4 Objects

Note

Representative for all 250 objects only the configuration options for object 1 are described.

| Obj | Object name | Function | Datapoint type | Flags |
|-----|------------------|----------|----------------|-------|
| 1 | Object 1, [Text] | binary | 1.* | CWTU |

Via this object, dependent on the configuration, the bus telegrams are received from KNX and then sent onto BACnet or data is received from BACnet and then sent to KNX.

4.5 Parameter „Object 1“

| Parameter | Settings |
|---|----------|
| Object 1, description | Text |
| This parameter is used to enter a text, which is displayed in the web server as name of the object. The length of the text is limited to 48 characters. | |

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| Parameter | Settings | | | | | | | | | | | | |
|---|---|------------------------|------------------|--------------------|-----------------|-------|--|-----------------|--------|--|-----------------|-------|--|
| Datapoint type | 1 bit 1 Byte 5.001 Percentage (0...100%) 1 Byte unsigned 1 Byte signed 2 Byte unsigned 2 Byte 8.001 signed 2 Byte float value 4 Byte 12.001 unsigned 4 Byte signed 4 Byte float value - | | | | | | | | | | | | |
| <p>The datapoint type of the communication object is defined here. This parameterization can be carried out for all objects. The exact datapoint type including the unit can be selected via the additional parameter "Datapoint type" Optional setting of the datapoint type.</p> <p><u>Attention:</u> 4 byte values with and without a sign are only transmitted up to 7 digits as BACnet real values.</p> | | | | | | | | | | | | | |
| Transmission direction | KNX ---> BACnet (input) KNX <--- BACnet (output) KNX <--> BACnet (value) | | | | | | | | | | | | |
| <p>This parameter determines the transmission direction, which corresponds with the BACnet object type (Input, Output, Value).</p> <table border="0"> <tr> <td>Transmission direction</td> <td>corresponds with</td> <td>BACnet object type</td> </tr> <tr> <td>KNX ---> BACnet</td> <td>Input</td> <td></td> </tr> <tr> <td>KNX <--- BACnet</td> <td>Output</td> <td></td> </tr> <tr> <td>KNX <--> BACnet</td> <td>Value</td> <td></td> </tr> </table> | | Transmission direction | corresponds with | BACnet object type | KNX ---> BACnet | Input | | KNX <--- BACnet | Output | | KNX <--> BACnet | Value | |
| Transmission direction | corresponds with | BACnet object type | | | | | | | | | | | |
| KNX ---> BACnet | Input | | | | | | | | | | | | |
| KNX <--- BACnet | Output | | | | | | | | | | | | |
| KNX <--> BACnet | Value | | | | | | | | | | | | |
| Transmission to BACnet | on change on all events | | | | | | | | | | | | |
| <p>This parameter determines when information is sent to BACnet.</p> <p><u>on change:</u> Send on change of the object value.</p> <p><u>on all events:</u> Send when any value is received for the object.</p> <p><u>Note:</u> Values coming in from BACnet are always forwarded to KNX.</p> | | | | | | | | | | | | | |

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| Parameter | Settings |
|--|--------------------------------------|
| Enable read on init | no yes |
| This parameter determines if on startup of the device a Read request for the object value is sent onto the KNX bus. | |
| Enable read requests cyclically | no yes |
| Here it can be defined for each object whether cyclic Read requests should be sent to the bus in order to check critical object states. | |
| Cycle time for read requests | 2 min ... 30 min ... 3 h |
| The time interval between 2 read requests is defined here. Read requests are only sent if no KNX event has been received within this time. The cycle time is restarted after each event. | |
| Default value in faulty case | last value 0 1 max. value |
| In the event that no response to a Read requests is received, the desired value that is assigned to the BACnet object can be set here. In addition, the BACnet status flag is set to "Fault" in the event of an error. | |

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4.6 Optional settings of datapoint types

| Selection of unit type 1 byte unsigned | |
|--|---|
| Parameter | Settings |
| Unit type | 5.001 Percentage (0...100 %) 5.010 Counter pulses 5.004 Percentage (0...255 %) 17.001 Scene number 18.001 Scene control |
| The unit type of the 1-byte unsigned unit type can be selected here. | |

| Selection of unit type 1 byte signed | |
|--|---|
| Parameter | Settings |
| Unit type | 6.010 Counter pulses 6.001 Percentage (-128...127 %) |
| The unit type of the 1-byte signed unit type can be selected here. | |

| Selection of unit type 2 byte unsigned | |
|--|--------------------------------------|
| Parameter | Settings |
| Unit type | 7.001 Pulses 7.013 Brightness lux |
| The unit type of the 2-byte unsigned unit type can be selected here. | |

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| Selection of unit type 2 byte float value | |
|---|--|
| Parameter | Settings |
| Unit type | 9.* Float value 9.001 Temperature °C 9.001 Temperature °F (KNX value in °C) 9.006 Pressure hPa (KNX value in Pa) 9.006 Pressure Pa 9.024 Power kW 9.022 Power density W/m ² 9.005 Speed m/s 9.005 Speed km/h (KNX value in m/s) 9.004 Brightness lux 9.007 Humidity % 9.010 Time s 9.021 Current A (KNX value in mA) 9.021 Current mA 9.020 Voltage V (KNX value in mV) 9.020 Voltage mV 9.008 Parts/million ppm 9.009 Flow rate m ³ /h 9.027 Temperature °F |
| The unit type of the 2-byte float value unit type can be selected here. | |

| Selection of unit type 4 byte signed | |
|--|--|
| Parameter | Settings |
| Unit type | 13.001 Counter pulses 13.010 Active energy Wh 13.013 Active energy kWh 13.002 Flow rate m ³ /h |
| The unit type of the 4-byte signed unit type can be selected here. | |

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| Selection of unit type 4 byte float value | |
|---|---|
| Parameter | Settings |
| Unit type | 14.* Float value 14.068 Temperature °C 14.068 Temperature °F (KNX value in °C) 14.058 Pressure hPa (KNX value in Pa) 14.058 Pressure Pa 14.056 Power W 14.056 Power kW (KNX value in W) 14.031 Energy J 14.031 Energy kWh (KNX value in J) 14.033 Frequency Hz 14.010 Area m ² |
| The unit type of the 4-byte float value unit type can be selected here. | |

4.7 Device status

| Obj | Object name | Function | Datapoint type | Flags |
|--|---------------|----------|----------------|-------|
| 251 | Device status | Status | 1.002 | CRT |
| <p>Via this object the device status is transmitted. The device status indicates if the device is in a not active BACnet communication status (DCC Disabled). This state can be configured via the Device Communication Control Service. The status of the communication object is also displayed by a flashing Error LED (ERR) on the device.</p> | | | | |

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5 BACnet Stack

5.1 Application Services

| Application Service | Initiate | Execute |
|------------------------------|----------|---------|
| AcknowledgeAlarm | | |
| ConfirmedCOVNotification | X | |
| ConfirmedEventNotification | | |
| GetAlarmSummary | | |
| GetEnrollmentSummary | | |
| Subscribe COV | | X |
| UnconfirmedCOVNotification | X | |
| UnconfirmedEventNotification | | |
| AtomicReadFile | | |
| AtomicWriteFile | | |
| AddListElement | | |
| RemoveListElement | | |
| CreateObject | | |
| DeleteObject | | |
| ReadProperty | | X |
| ReadPropertyConditional | | |
| ReadPropertyMultiple | | X |
| WriteProperty | | X |
| WritePropertyMultiple | | |
| DeviceCommunicationControl | | X |
| ConfirmedPrivateTransfer | | |
| UnconfirmedPrivateTransfer | | |
| ReinitializeDevice | | X |
| ConfirmedTextMessage | | |
| UnconfirmedTextMessage | | |
| TimeSynchronization | | |
| Who-Has | | X |

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| Application Service | Initiate | Execute |
|---------------------|----------|---------|
| I-Have | X | |
| Who-Is | | X |
| I-Am | X | |
| VT-Open | | |
| VT-Close | | |
| VT-Data | | |
| Authenticate | | |
| Request Key | | |

5.2 BACnet Objects

5.2.1 BACnet Device Object

The obligatory BACnet „device“ object administers central device features. Some of these can be configured via ETS whilst others are implemented statically and cannot be changed. They can only be read as information.

| Object type | Properties | Access | Description |
|---------------|-------------------|--------|--|
| Analog Input | object-identifier | R | For example: analog input(1) |
| | object-name | R | Name as configured in ETS |
| | object-type | R | Analog input |
| | present-value | R | Present value |
| | status-flags | R | Always FALSE; in case of KNX fault, „out of service“ is set to TRUE. |
| | event-state | R | Always NORMAL |
| | out-of-service | RW | Identical to status flag „out-of-service“ |
| | units | R | According to ETS configuration |
| | description | R | Description text = <object-name>:<object-identifier>:<KNX-group-address> Example: „Temperatur1:analog-input(9):10/0/5“ |
| Analog Output | object-identifier | R | For example: analog-output(2) |
| | object-name | R | Name as configured in ETS |
| | object-type | R | Analog-output |

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| Object type | Properties | Access | Description |
|--------------|--------------------|--|---|
| | present-value | RW | Present value |
| | status-flags | R | Always FALSE; in case of KNX fault, "out of service" is set to TRUE. |
| | event-state | R | Always NORMAL |
| | out-of-service | RW | Identical to status flag "out-of-service" |
| | units | R | According to ETS configuration |
| | priority-array | RW | Priority array |
| | relinquish-default | R | Pre-set "0" , in case of invalid KNX value |
| | description | R | Description text = <object-name>:<object-identifier>:<KNX-group-address> Example: „Temperatur2:analog-output(2):10/0/6“ |
| Analog Value | object-identifier | R | For example: analog-value(3) |
| | object-name | R | Name as configured in ETS |
| | object-type | R | Analog-input |
| | present-value | R | Present value |
| | status-flags | R | Always FALSE; in case of KNX fault, "out of service" is set to TRUE. |
| | event-state | R | Always NORMAL |
| | out-of-service | RW | Identical to status flag "out-of-service" |
| | units | R | According to ETS configuration |
| | priority-array | RW | Priority array |
| | relinquish-default | R | Pre-set "0" , in case of invalid KNX value |
| description | R | Description text = <object-name>:<object-identifier>:<KNX-group-address> Example: „Temperatur2:analog-value(3):10/0/6“ | |
| Binary Input | object-identifier | R | For example: binary-input(4) |
| | object-name | R | Name as configured in ETS |
| | object-type | R | Binary-input |

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| Object type | Properties | Access | Description |
|---------------|--------------------|---|--|
| | present-value | R | Present value |
| | status-flags | R | Always FALSE; in case of KNX fault, "out of service" is set to TRUE. |
| | event-state | R | Always NORMAL |
| | out-of-service | RW | Identical to status flag "out-of-service" |
| | polarity | R | Always NORMAL |
| | description | R | Description text = <object-name>:<object-identifier>:<KNX-group-address> Example: „Switch1:binary-input(4):10/1/8“ |
| Binary Output | object-identifier | R | For example: binary-output(5) |
| | object-name | R | Name as configured in ETS |
| | object-type | R | binary-output |
| | present-value | R | Present value |
| | status-flags | R | Always FALSE; in case of KNX fault, "out of service" is set to TRUE. |
| | event-state | R | Always NORMAL |
| | out-of-service | RW | Identical to status flag "out-of-service" |
| | polarity | R | Always NORMAL |
| | priority-array | RW | Priority array |
| | relinquish-default | R | Pre-set "inactive" , in case of invalid KNX value |
| description | R | Description text = <object-name>:<object-identifier>:<KNX-group-address> Example: „Switch1:binary-output(5):10/1/9“ | |
| Binary Value | object-identifier | R | For example: binary-value(6) |
| | object-name | R | Name as configured in ETS |
| | object-type | R | binary-value |
| | present-value | R | Present value |
| | status-flags | R | Always FALSE; in case of KNX fault, "out of service" is set to TRUE. |

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| Object type | Properties | Access | Description |
|-------------|--------------------|--------|---|
| | event-state | R | Always NORMAL |
| | out-of-service | RW | Identical to status flag "out-of-service" |
| | polarity | R | Always NORMAL |
| | priority-array | RW | Priority array |
| | relinquish-default | R | Pre-set "inactive", in case of invalid KNX value |
| | description | R | Description text = <object-name>:<object-identifier>:<KNX-group-address> Example: „Switch3:binary-value(6):10/1/10“ |

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5.2.2 Supported Object Types

| Object type | Properties | Access | Description |
|---------------|--------------------|--------|--|
| Analog Input | object-identifier | R | For example: analog input(1) |
| | object-name | R | Name as configured in ETS |
| | object-type | R | Analog input |
| | present-value | R | Present value |
| | status-flags | R | Always FALSE; in case of KNX fault, „out of service“ is set to TRUE. |
| | event-state | R | Always NORMAL |
| | out-of-service | RW | Identical to status flag “out-of-service” |
| | units | R | According to ETS configuration |
| | description | R | Description text = <object-name>:<object-identifier>:<KNX-group-address> Example: „Temperatur1:analog-input(9):10/0/5“ |
| Analog Output | object-identifier | R | For example: analog-output(2) |
| | object-name | R | Name as configured in ETS |
| | object-type | R | Analog-output |
| | present-value | RW | Present value |
| | status-flags | R | Always FALSE; in case of KNX fault “out of service” is set to TRUE. |
| | out-of-service | RW | Identical to status flag “out-of-service” |
| | units | R | According to ETS configuration |
| | priority-array | RW | Priority array |
| | relinquish-default | R | Pre-set “0” if no valid KNX value is present. |
| | description | R | Description text = <object-name>:<object-identifier>:<KNX-group-adress> Example: „Temperatur2:analog-output(2):10/0/6“ |

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| Object type | Properties | Access | Description |
|--------------|--------------------|--------|---|
| Analog Value | object-identifier | R | For example: analog-value(3) |
| | object-name | R | Name as configured in ETS |
| | object-type | R | Analog-input |
| | present-value | R | Present value |
| | status-flags | R | Always FALSE; in case of KNX fault, „out of service“ is set to TRUE. |
| | out-of-service | RW | Identical to status flag “out-of-service” |
| | units | R | According to ETS configuration |
| | priority-array | RW | Priority array |
| | relinquish-default | R | Pre-set “0” if no valid KNX value is present. |
| | description | R | Description text= <object-name>:<object-identifier>:<KNX-group-address> Example: „Temperatur2:analog-value(3):10/0/6” |
| Binary Input | object-identifier | R | For example: binary-input(4) |
| | object-name | R | Name as configured in ETS |
| | object-type | R | Binary-input |
| | present-value | R | Present value |
| | status-flags | R | Always FALSE; in case of KNX fault, „out of service“ is set to TRUE. |
| | out-of-service | RW | Identical to status flag “out-of-service” |
| | polarity | R | Always NORMAL |
| | description | R | Description text = <object-name>:<object-identifier>:<KNX-group-address> Example: „Switch1:binary-input(4):10/1/8” |

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| Object type | Properties | Access | Description |
|---------------|--------------------|--------|---|
| Binary Output | object-identifier | R | For example: binary-output(5) |
| | object-name | R | Name as configured in ETS |
| | object-type | R | binary-output |
| | present-value | R | Present value |
| | status-flags | R | Always FALSE; in case of KNX fault. "out of service" is set to TRUE. |
| | out-of-service | RW | Identical to status flag "out-of-service" |
| | polarity | R | Always NORMAL |
| | priority-array | RW | Priority array |
| | relinquish-default | R | Pre-set "inactive" if no valid KNX value is present. |
| | description | R | Description text= <object-name>:<object-identifier>:<KNX-group-address> Example: „Switch1:binary-output(5):10/1/9“ |
| Binary Value | object-identifier | R | For example: binary-value(6) |
| | object-name | R | Name as configured in ETS |
| | object-type | R | binary-value |
| | present-value | R | Present value |
| | status-flags | R | Always FALSE; in case of KNX fault, "out of service" is set to TRUE. |
| | out-of-service | RW | Identical to status flag "out-of-service" |
| | polarity | R | Always NORMAL |
| | priority-array | RW | Priority array |
| | relinquish-default | R | Pre-set "inactive" if no valid KNX value is present. |
| | description | R | Description text = <object-name>:<object-identifier>:<KNX-group-address> Example: „Switch3:binary-value(6):10/1/10“ |

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6 Firmware update

The current firmware version can be read out via the activated website of the device.

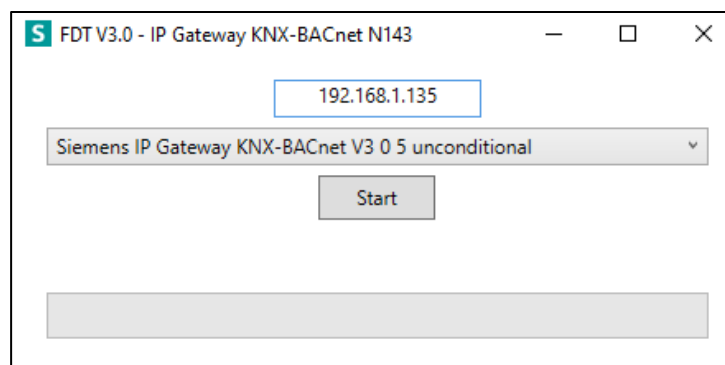
Any necessary update of the firmware is carried out via the IP connection.

The prerequisite is the release via an ETS parameter, which may only temporarily activate the connection.

The firmware update itself is loaded by a separate firmware download tool provided on www.siemens.com/gamma-td?ssn=5WG1143-1AB01. Further information can be found there in the software package available in the SW column.

By updating the firmware, the loaded configuration is deleted, and the addresses are reset to the delivery status.

When starting the firmware download tool (exe file), the current IP address of the device must be specified. By double-clicking on the set IP address, it can be adjusted.



Follow the instructions that appear.

After a successful update, it should be noted that the IP address has been reset to the default IP address 192.168.1.135 and the physical addresses (device and KNXnet/IP interface) to 15.15.255.

Returning to an old firmware version is excluded.

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7 Additional information

A common storage area is available for managing COV subscriptions and priority arrays. This resource optimization is because subscriptions are required for objects that send from KNX to BACnet, while priority arrays are required for objects that send from BACnet to KNX.

The maximum number of possible subscriptions is 455 if no priority arrays are used.

Since each priority array contains 64 bytes (16 priority levels of 4 bytes of value each), this reduces the number of possible subscriptions. The maximum possible number of subscriptions can be found on the device's website after completion of the configuration.

By registering a subscription, the BACnet object sends its current value, if there is a value for this object. The validity of a value can be checked via the status property (failure flag). Initially, the status flag Failure is set to TRUE for the object types binary-input, binary-value, analog-input, and analog-value, i.e. error state. As soon as a value is transmitted from the KNX bus or BACnet side (for binary-value or analog-value), this status flag is reset to FALSE.

All analog and binary BACnet objects supported by the device support the writable out-of-service property. If this property is set to TRUE, communication with the KNX bus is prevented for the corresponding object. Values of input object types can then also be changed on the BACnet side, which is otherwise not possible. Value changes for objects with the Out-Of-Service Property set are also displayed via the Overridden object status flag. For objects whose ETS setting "Activate query at start" is set, a Read request is sent to the KNX bus when the Out-Of-Service Property (FALSE) is reset. In addition, for objects that have an active COV subscription, the last value set is sent as a COV notification. The treatment of out-of-service property is particularly important for troubleshooting complex systems.

If the description of an object is queried on the BACnet side (Read Property "Description"), the description text is automatically generated and composed of the data object name, BACnet identifier and KNX group address separated by colon (":").

When using a priority array and releasing all array positions, the last KNX value received is sent as "relinquish default", if valid.

If no valid ETS program is loaded when the device is started or the connection to the KNX is not available, this is indicated by the control of the error LED.

The device is also not accessible via the website or via BACnet.

If the bus connection to KNX is interrupted during normal operation, the BACnet device property "system-status" is set to the value STATUS_NON_OPERATIONAL and the error LED lights up. If no ETS application is loaded, the BACnet device property "system-status" is set to the value STATUS_DOWNLOAD_REQUIRED.

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8 Appendix: BACnet

| | |
|------------------------------|----------------------------------|
| Date | : January 31, 2014 |
| Vendor name | : Siemens (Vendor ID 7) |
| Product name | : IP Gateway KNX/BACnet N 143/01 |
| Product model number | : 1.0 |
| BACnet protocol version | : 10 |
| Application software version | : 1.0 |
| Firmware revision | : 1.0 |

8.1 Product description

The device connects a KNX installation with a BACnet IP System.

In maximum 250 communication objects (KNX group addresses) could be mapped to BACnet objects.

8.1.1 BACnet standardized device profile (Annex L)

| | | |
|-------------------------------------|--|---------|
| <input type="checkbox"/> | BACnet Advanced Workstation | (B-AWS) |
| <input type="checkbox"/> | BACnet Operator Workstation | (B-OWS) |
| <input type="checkbox"/> | BACnet Operator Display | (B-OD) |
| <input type="checkbox"/> | BACnet Building Controller | (B-BC) |
| <input type="checkbox"/> | BACnet Advanced Application Controller | (B-AAC) |
| <input checked="" type="checkbox"/> | BACnet Application Specific Controller | (B-ASC) |
| <input type="checkbox"/> | BACnet Smart Sensor | (B-SS) |
| <input type="checkbox"/> | BACnet Smart Actuator | (B-SA) |
| | | |

8.1.2 BACnet interoperability building blocks supported (Annex K)

Data sharing

| | | |
|-------------------------------------|--|----------|
| <input type="checkbox"/> | Data Sharing – Read Property-A | DS-RP-A |
| <input checked="" type="checkbox"/> | Data Sharing – Read Property-B | DS-RP-B |
| <input type="checkbox"/> | Data Sharing – Read Property Multiple-A | DS-RPM-A |
| <input checked="" type="checkbox"/> | Data Sharing – Read Property Multiple-B | DS-RPM-B |
| <input type="checkbox"/> | Data Sharing – Write Property-A | DS-WP-A |
| <input checked="" type="checkbox"/> | Data Sharing – Write Property-B | DS-WP-B |
| <input type="checkbox"/> | Data Sharing – Write Property Multiple-A | DS-WPM-A |

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| | | |
|-------------------------------------|--|-----------|
| <input type="checkbox"/> | Data Sharing – Write Property Multiple-B | DS-WPM-B |
| <input type="checkbox"/> | Data Sharing – Change of Value -A | DS-COV-A |
| <input checked="" type="checkbox"/> | Data Sharing – Change of Value -B | DS-COV-B |
| <input type="checkbox"/> | Data Sharing – Change of Value Property -A | DS-COVP-A |
| <input type="checkbox"/> | Data Sharing – Change of Value Property -B | DS-COVP-B |
| <input type="checkbox"/> | Data Sharing – Change of Value-Unsolicited-A | DS-COVU-A |
| <input type="checkbox"/> | Data Sharing – Change of Value-Unsolicited-B | DS-COVU-B |
| <input type="checkbox"/> | Data Sharing – View-A | DS-V-A |
| <input type="checkbox"/> | Data Sharing – Advanced View-A | DS-AV-A |
| <input type="checkbox"/> | Data Sharing – Modify-A | DS-M-A |
| <input type="checkbox"/> | Data Sharing – Advanced Modify-A | DS-AM-A |

Alarm and event management

| | | |
|--------------------------|---|-----------|
| <input type="checkbox"/> | Alarm and Event – Notification-A | AE-N-A |
| <input type="checkbox"/> | Alarm and Event – Notification Internal-B | AE-N-I-B |
| <input type="checkbox"/> | Alarm and Event – Notification External-B | AE-N-E-B |
| <input type="checkbox"/> | Alarm and Event – ACK-A | AE-ACK-A |
| <input type="checkbox"/> | Alarm and Event – ACK-B | AE-ACK-B |
| <input type="checkbox"/> | Alarm and Event – Alarm Summary-B | AE-ASUM-B |
| <input type="checkbox"/> | Alarm and Event – Enrollment Summary-B | AE-ESUM-B |
| <input type="checkbox"/> | Alarm and Event – Information-B | AE-INFO-B |
| <input type="checkbox"/> | Alarm and Event – Life Safety-A | AE-LS-A |
| <input type="checkbox"/> | Alarm and Event – Life Safety-B | AE-LS-B |
| <input type="checkbox"/> | Alarm and Event – View Notifications-A | AE-VN-A |
| <input type="checkbox"/> | Alarm and Event – Advanced View Notifications-A | AE-AVN-A |
| <input type="checkbox"/> | Alarm and Event – View and Modify-A | AE-VM-A |
| <input type="checkbox"/> | Alarm and Event – Advanced View and Modify-A | AE-AVM-A |
| <input type="checkbox"/> | Alarm and Event – Alarm Summary View-A | AE-AS-A |
| <input type="checkbox"/> | Alarm and Event – Event Log View-A | AE-ELV-A |

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| | | |
|--------------------------|---|-----------|
| <input type="checkbox"/> | Alarm and Event – Event Log View and Modify-A | AE-ELVM-A |
| <input type="checkbox"/> | Alarm and Event – Event Log Internal-B | AE-EL-I-B |
| <input type="checkbox"/> | Alarm and Event – Event Log External-B | AE-EL-E-B |

Historical/Deprecated BIBBs

| | | |
|--------------------------|--|-----------|
| <input type="checkbox"/> | Alarm and Event – Alarm Summary-A | AE-ASUM-A |
| <input type="checkbox"/> | Alarm and Event – Enrollment Summary-A | AE-ESUM-A |
| <input type="checkbox"/> | Alarm and Event – Information-A | AE-INFO-A |

Scheduling

| | | |
|--------------------------|---|--------------|
| <input type="checkbox"/> | Scheduling – Internal-B | SCHED-I-B |
| <input type="checkbox"/> | Scheduling – External-B | SCHED-E-B |
| <input type="checkbox"/> | Scheduling – Advanced View Modify-A | SCHED-AVM-A |
| <input type="checkbox"/> | Scheduling – View Modify-A | SCHED-VM-A |
| <input type="checkbox"/> | Scheduling – Weekly Schedule-A | SCHED-WS-A |
| <input type="checkbox"/> | Scheduling – Weekly Schedule Internal-B | SCHED-WS-I-B |
| <input type="checkbox"/> | Scheduling – Readable-B | SCHED-R-B |

Historical/Deprecated BIBBs

| | | |
|--------------------------|----------------|---------|
| <input type="checkbox"/> | Scheduling – A | SCHED-A |
|--------------------------|----------------|---------|

Trending

| | | |
|--------------------------|--|------------|
| <input type="checkbox"/> | Trending – Viewing and Modifying Trends-A | T-VMT-A |
| <input type="checkbox"/> | Trending – Viewing and Modifying Internal-B | T-VMT-I-B |
| <input type="checkbox"/> | Trending – Viewing and Modifying External-B | T-VMT-E-B |
| <input type="checkbox"/> | Trending – Viewing and Modifying Multiple Values-A | T-VMMV-A |
| <input type="checkbox"/> | Trending – Viewing and Modifying Multiple Values Internal-B | T-VMMV-I-B |
| <input type="checkbox"/> | Trending – Viewing and Modifying Multiple Values External -B | T-VMMV-E-B |
| <input type="checkbox"/> | Trending – Automated Multiple Value Retrieval-A | T-AMVR-A |
| <input type="checkbox"/> | Trending – Automated Multiple Value Retrieval-B | T-AMVR-B |

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| | | |
|--------------------------|--|---------|
| <input type="checkbox"/> | Trending – View-A | T-V-A |
| <input type="checkbox"/> | Trending – Advanced View and Modify-A | T-AVM-A |
| <input type="checkbox"/> | Trending – Archival-A | T-A-A |
| <input type="checkbox"/> | Trending – Automated Trend Retrieval-A | T-ATR-A |
| <input type="checkbox"/> | Trending – Automated Trend Retrieval-B | T-ATR-B |

Historical/Deprecated BIBBs

| | | |
|--------------------------|--|----------|
| <input type="checkbox"/> | Trending – Viewing and Modifying Trends-A | T-VMT-A |
| <input type="checkbox"/> | Trending – Viewing and Modifying Multiple Values-A | T-VMMV-A |

Device management

| | | |
|-------------------------------------|--|----------|
| <input type="checkbox"/> | Device Management – Dynamic Device Binding-A | DM-DDB-A |
| <input checked="" type="checkbox"/> | Device Management – Dynamic Device Binding-B | DM-DDB-B |
| <input type="checkbox"/> | Device Management – Dynamic Object Binding-A | DM-DOB-A |
| <input checked="" type="checkbox"/> | Device Management – Dynamic Object Binding-B | DM-DOB-B |
| <input type="checkbox"/> | Device Management – Device Communication Control-A | DM-DCC-A |
| <input checked="" type="checkbox"/> | Device Management – Device Communication Control-B | DM-DCC-B |
| <input type="checkbox"/> | Device Management – Private Transfer-A | DM-PT-A |
| <input type="checkbox"/> | Device Management – Private Transfer-B | DM-PT-B |
| <input type="checkbox"/> | Device Management – Text Message-A | DM-TM-A |
| <input type="checkbox"/> | Device Management – Text Message-B | DM-TM-B |
| <input type="checkbox"/> | Device Management – Time Synchronization-A | DM-TS-A |
| <input type="checkbox"/> | Device Management – Time Synchronization-B | DM-TS-B |
| <input type="checkbox"/> | Device Management – UTC Time Synchronization-A | DM-UTC-A |
| <input type="checkbox"/> | Device Management – UTC Time Synchronization-B | DM-UTC-B |
| <input type="checkbox"/> | Device Management – Reinitialize Device-A | DM-RD-A |
| <input checked="" type="checkbox"/> | Device Management – Reinitialize Device-B | DM-RD-B |
| <input type="checkbox"/> | Device Management – Backup and Restore-A | DM-BR-A |
| <input type="checkbox"/> | Device Management – Backup and Restore-B | DM-BR-B |

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| | | |
|--------------------------|--|----------|
| <input type="checkbox"/> | Device Management – Restart-A | DM-R-A |
| <input type="checkbox"/> | Device Management – Restart-B | DM-R-B |
| <input type="checkbox"/> | Device Management – List Manipulation-A | DM-LM-A |
| <input type="checkbox"/> | Device Management – List Manipulation-B | DM-LM-B |
| <input type="checkbox"/> | Device Management – Object Creation and Deletion-A | DM-OCD-A |
| <input type="checkbox"/> | Device Management – Object Creation and Deletion-B | DM-OCD-B |
| <input type="checkbox"/> | Device Management – Virtual Terminal-A | DM-VT-A |
| <input type="checkbox"/> | Device Management – Virtual Terminal-B | DM-VT-B |
| <input type="checkbox"/> | Device Management – Automatic Network Mapping-A | DM-ANM-A |
| <input type="checkbox"/> | Device Management – Automatic Device Mapping-A | DM-ADM-A |
| <input type="checkbox"/> | Device Management – Automatic Time Synchronization-A | DM-ATS-A |
| <input type="checkbox"/> | Device Management – Manual Time Synchronization-A | DM-MTS-A |

Network management

| | | |
|--------------------------|---|---------|
| <input type="checkbox"/> | Network Management – Connection Establishment-A | NM-CE-A |
| <input type="checkbox"/> | Network Management – Connection Establishment-B | NM-CE-B |
| <input type="checkbox"/> | Network Management – Router Configuration-A | NM-RC-A |
| <input type="checkbox"/> | Network Management – Router Configuration-B | NM-RC-B |

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8.2 Standard object types supported

| Object type | Supported | Can be created dynamically | Can be deleted dynamically |
|--------------------|-------------------------------------|----------------------------|----------------------------|
| Analog Input | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Analog Output | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Analog Value | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Binary Input | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Binary Output | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Binary Value | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Calendar | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Command | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Device | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Event Enrollment | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| File | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Group | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Loop | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Multi-State Input | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Multi-State Output | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Notification Class | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Program | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Schedule | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Averaging | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Multi-State Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Trend Log | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Life-Safety-Point | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Life-Safety-Zone | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Accumulator | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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| | | | |
|------------------------|--------------------------|--------------------------|--------------------------|
| Pulse-Converter | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Event Log | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Global Group | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Trend Log Multiple | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Load Control | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Structured-View | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Access Door | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (unassigned) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Access Credential | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Access Point | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Access Rights | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Access User | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Access Zone | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Credential Data Input | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Network Security | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Bitstring Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Characterstring Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Date Pattern Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Date Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Datetime Pattern Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Datetime Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Integer Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Large Analog Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Octetstring Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Positive Integer Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Time Pattern Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Time Value | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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| Analog Input Properties | supported | Readable/ Writable | Range restrictions |
|-------------------------|-------------------------------------|-----------------------|--------------------|
| Object_Identifier | <input checked="" type="checkbox"/> | R | |
| Object_Name | <input checked="" type="checkbox"/> | R | |
| Object_Type | <input checked="" type="checkbox"/> | R | |
| Present_Value | <input checked="" type="checkbox"/> | R | |
| Description | <input checked="" type="checkbox"/> | R | |
| Device_Type | <input type="checkbox"/> | | |
| Status_Flags | <input checked="" type="checkbox"/> | R | |
| Event_State | <input checked="" type="checkbox"/> | R | |
| Reliability | <input type="checkbox"/> | | |
| Out_Of_Service | <input checked="" type="checkbox"/> | W | |
| Update_Interval | <input type="checkbox"/> | | |
| Units | <input checked="" type="checkbox"/> | R | |
| Min_Pres_Value | <input type="checkbox"/> | | |
| Max_Pres_Value | <input type="checkbox"/> | | |
| Resolution | <input type="checkbox"/> | | |
| COV_Increment | <input type="checkbox"/> | | |
| Time_Delay | <input type="checkbox"/> | | |
| Notification_Class | <input type="checkbox"/> | | |
| High_Limit | <input type="checkbox"/> | | |
| Low_Limit | <input type="checkbox"/> | | |
| Deadband | <input type="checkbox"/> | | |
| Limit_Enable | <input type="checkbox"/> | | |
| Event_Enable | <input type="checkbox"/> | | |
| Acked_Transitions | <input type="checkbox"/> | | |
| Notify_Type | <input type="checkbox"/> | | |
| Event_Time_Stamps | <input type="checkbox"/> | | |

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| Analog Input Properties | supported | Readable/ Writable | Range restrictions |
|-------------------------|--------------------------|-----------------------|--------------------|
| Profile_Name | <input type="checkbox"/> | | |

| Analog Output Properties | supported | Reada- ble/ Writa- ble | Range restrictions |
|--------------------------|-------------------------------------|---------------------------------|--------------------|
| Object_Identifier | <input checked="" type="checkbox"/> | R | |
| Object_Name | <input checked="" type="checkbox"/> | R | |
| Object_Type | <input checked="" type="checkbox"/> | R | |
| Present_Value | <input checked="" type="checkbox"/> | W | |
| Description | <input checked="" type="checkbox"/> | R | |
| Device_Type | <input type="checkbox"/> | | |
| Status_Flags | <input checked="" type="checkbox"/> | R | |
| Event_State | <input checked="" type="checkbox"/> | R | |
| Reliability | <input type="checkbox"/> | | |
| Out_Of_Service | <input checked="" type="checkbox"/> | W | |
| Units | <input checked="" type="checkbox"/> | R | |
| Min_Pres_Value | <input type="checkbox"/> | | |
| Max_Pres_Value | <input type="checkbox"/> | | |
| Resolution | <input type="checkbox"/> | | |
| Priority_Array | <input checked="" type="checkbox"/> | W | |
| Relinquish_Default | <input checked="" type="checkbox"/> | R | |
| COV_Increment | <input type="checkbox"/> | | |
| Time_Delay | <input type="checkbox"/> | | |
| Notification_Class | <input type="checkbox"/> | | |
| High_Limit | <input type="checkbox"/> | | |
| Low_Limit | <input type="checkbox"/> | | |
| Deadband | <input type="checkbox"/> | | |

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| Analog Output Prop- erties | sup- ported | Reada- ble/ Writa- ble | Range restrictions |
|-------------------------------|--------------------------|---------------------------------|--------------------|
| Limit_Enable | <input type="checkbox"/> | | |
| Event_Enable | <input type="checkbox"/> | | |
| Acked_Transitions | <input type="checkbox"/> | | |
| Notify_Type | <input type="checkbox"/> | | |
| Event_Time_Stamps | <input type="checkbox"/> | | |
| Profile_Name | <input type="checkbox"/> | | |

| Analog Value Prop- erties | sup- ported | Readable/ Writable | Range restrictions |
|------------------------------|-------------------------------------|-----------------------|--------------------|
| Object_Identifier | <input checked="" type="checkbox"/> | R | |
| Object_Name | <input checked="" type="checkbox"/> | R | |
| Object_Type | <input checked="" type="checkbox"/> | R | |
| Present_Value | <input checked="" type="checkbox"/> | R | |
| Description | <input checked="" type="checkbox"/> | R | |
| Status_Flags | <input checked="" type="checkbox"/> | R | |
| Event_State | <input checked="" type="checkbox"/> | R | |
| Reliability | <input type="checkbox"/> | | |
| Out_Of_Service | <input checked="" type="checkbox"/> | W | |
| Units | <input checked="" type="checkbox"/> | R | |
| Priority_Array | <input checked="" type="checkbox"/> | W | |
| Relinquish_Default | <input checked="" type="checkbox"/> | R | |
| COV_Increment | <input type="checkbox"/> | | |
| Time_Delay | <input type="checkbox"/> | | |
| Notification_Class | <input type="checkbox"/> | | |
| High_Limit | <input type="checkbox"/> | | |
| Low_Limit | <input type="checkbox"/> | | |

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| Analog Value Properties | supported | Readable/ Writable | Range restrictions |
|-------------------------|--------------------------|-----------------------|--------------------|
| Deadband | <input type="checkbox"/> | | |
| Limit_Enable | <input type="checkbox"/> | | |
| Event_Enable | <input type="checkbox"/> | | |
| Acked_Transitions | <input type="checkbox"/> | | |
| Notify_Type | <input type="checkbox"/> | | |
| Event_Time_Stamps | <input type="checkbox"/> | | |
| Profile_Name | <input type="checkbox"/> | | |

| Binary Input Properties | supported | Readable/ Writable | Range restrictions |
|---------------------------|-------------------------------------|-----------------------|--------------------|
| Object_Identifier | <input checked="" type="checkbox"/> | R | |
| Object_Name | <input checked="" type="checkbox"/> | R | |
| Object_Type | <input checked="" type="checkbox"/> | R | |
| Present_Value | <input checked="" type="checkbox"/> | R | |
| Description | <input checked="" type="checkbox"/> | R | |
| Device_Type | <input type="checkbox"/> | | |
| Status_Flags | <input checked="" type="checkbox"/> | R | |
| Event_State | <input checked="" type="checkbox"/> | R | |
| Reliability | <input type="checkbox"/> | | |
| Out_Of_Service | <input checked="" type="checkbox"/> | W | |
| Polarity | <input checked="" type="checkbox"/> | R | |
| Inactive_Text | <input type="checkbox"/> | | |
| Active_Text | <input type="checkbox"/> | | |
| Change_Of_State_Time | <input type="checkbox"/> | | |
| Change_Of_State_Count | <input type="checkbox"/> | | |
| Time_Of_State_Count_Reset | <input type="checkbox"/> | | |
| Elapsed_Active_Time | <input type="checkbox"/> | | |

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| Binary Input Properties | sup-ported | Readable/ Writable | Range restrictions |
|---------------------------|--------------------------|-----------------------|--------------------|
| Time_Of_Active_Time_Reset | <input type="checkbox"/> | | |
| Time_Delay | <input type="checkbox"/> | | |
| Notification_Class | <input type="checkbox"/> | | |
| Alarm_Value | <input type="checkbox"/> | | |
| Event_Enable | <input type="checkbox"/> | | |
| Acked_Transitions | <input type="checkbox"/> | | |
| Notify_Type | <input type="checkbox"/> | | |
| Event_Time_Stamps | <input type="checkbox"/> | | |
| Profile_Name | <input type="checkbox"/> | | |

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| Binary Output Properties | supported | Readable/ Writable | Range restrictions |
|---------------------------|-------------------------------------|-----------------------|--------------------|
| Object_Identifier | <input checked="" type="checkbox"/> | R | |
| Object_Name | <input checked="" type="checkbox"/> | R | |
| Object_Type | <input checked="" type="checkbox"/> | R | |
| Present_Value | <input checked="" type="checkbox"/> | W | |
| Description | <input checked="" type="checkbox"/> | R | |
| Device_Type | <input type="checkbox"/> | | |
| Status_Flags | <input checked="" type="checkbox"/> | R | |
| Event_State | <input checked="" type="checkbox"/> | R | |
| Reliability | <input type="checkbox"/> | | |
| Out_Of_Service | <input checked="" type="checkbox"/> | W | |
| Polarity | <input checked="" type="checkbox"/> | R | |
| Inactive_Text | <input type="checkbox"/> | | |
| Active_Text | <input type="checkbox"/> | | |
| Change_Of_State_Time | <input type="checkbox"/> | | |
| Change_Of_State_Count | <input type="checkbox"/> | | |
| Time_Of_State_Count_Reset | <input type="checkbox"/> | | |
| Elapsed_Active_Time | <input type="checkbox"/> | | |
| Time_Of_Active_Time_Reset | <input type="checkbox"/> | | |
| Minimum_Off_Time | <input type="checkbox"/> | | |
| Minimum_On_Time | <input type="checkbox"/> | | |
| Priority_Array | <input checked="" type="checkbox"/> | W | |
| Relinquish_Default | <input checked="" type="checkbox"/> | R | |
| Time_Delay | <input type="checkbox"/> | | |
| Notification_Class | <input type="checkbox"/> | | |
| Feedback_Value | <input type="checkbox"/> | | |

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| Binary Outoput Proper- ties | sup- ported | Readable/ Writable | Range restrictions |
|--------------------------------|--------------------------|-----------------------|--------------------|
| Event_Enable | <input type="checkbox"/> | | |
| Acked_Transitions | <input type="checkbox"/> | | |
| Notify_Type | <input type="checkbox"/> | | |
| Event_Time_Stamps | <input type="checkbox"/> | | |
| Profile_Name | <input type="checkbox"/> | | |

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| Binary Value Properties | sup-ported | Readable/ Writable | Range restrictions |
|--------------------------------|-------------------------------------|-----------------------|--------------------|
| Object_Identifier | <input checked="" type="checkbox"/> | R | |
| Object_Name | <input checked="" type="checkbox"/> | R | |
| Object_Type | <input checked="" type="checkbox"/> | R | |
| Present_Value | <input checked="" type="checkbox"/> | R | |
| Description | <input checked="" type="checkbox"/> | R | |
| Status_Flags | <input checked="" type="checkbox"/> | R | |
| Event_State | <input checked="" type="checkbox"/> | R | |
| Reliability | <input type="checkbox"/> | | |
| Out_Of_Service | <input checked="" type="checkbox"/> | W | |
| Inactive_Text | <input type="checkbox"/> | | |
| Active_Text | <input type="checkbox"/> | | |
| Change_Of_State_Time | <input type="checkbox"/> | | |
| Change_Of_State_Count | <input type="checkbox"/> | | |
| Time_Of_State_Count_Re set | <input type="checkbox"/> | | |
| Elapsed_Active_Time | <input type="checkbox"/> | | |
| Time_Of_Ac- tive_Time_Reset | <input type="checkbox"/> | | |
| Minimum_Off_Time | <input type="checkbox"/> | | |
| Minimum_On_Time | <input type="checkbox"/> | | |
| Priority_Array | <input checked="" type="checkbox"/> | W | |
| Relinquish_Default | <input checked="" type="checkbox"/> | R | |
| Time_Delay | <input type="checkbox"/> | | |
| Notification_Class | <input type="checkbox"/> | | |
| Alarm_Value | <input type="checkbox"/> | | |
| Event_Enable | <input type="checkbox"/> | | |
| Acked_Transitions | <input type="checkbox"/> | | |
| Notify_Type | <input type="checkbox"/> | | |

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| Binary Value Properties | sup-ported | Readable/ Writable | Range restrictions |
|-------------------------|--------------------------|-----------------------|--------------------|
| Event_Time_Stamps | <input type="checkbox"/> | | |
| Profile_Name | <input type="checkbox"/> | | |

| Device Properties | sup-ported | Reada-ble/ Writable | Range restrictions |
|---------------------------------|-------------------------------------|------------------------|--------------------|
| Object_Identifier | <input checked="" type="checkbox"/> | R | |
| Object_Name | <input checked="" type="checkbox"/> | R | |
| Object_Type | <input checked="" type="checkbox"/> | R | |
| System_Status | <input checked="" type="checkbox"/> | R | |
| Vendor_Name | <input checked="" type="checkbox"/> | R | |
| Vendor_Identifier | <input checked="" type="checkbox"/> | R | |
| Model_Name | <input checked="" type="checkbox"/> | R | |
| Firmware_Revision | <input checked="" type="checkbox"/> | R | |
| Application_Software_Version | <input checked="" type="checkbox"/> | R | |
| Location | <input checked="" type="checkbox"/> | R | |
| Description | <input checked="" type="checkbox"/> | R | |
| Protocol_Version | <input checked="" type="checkbox"/> | R | |
| Protocol_Revision | <input checked="" type="checkbox"/> | R | |
| Protocol_Services_Supported | <input checked="" type="checkbox"/> | R | |
| Protocol_Object_Types_Supported | <input checked="" type="checkbox"/> | R | |
| Object_List | <input checked="" type="checkbox"/> | R | |
| Structured_Object_List | <input type="checkbox"/> | | |
| Max_APDU_Length_Accepted | <input checked="" type="checkbox"/> | R | |
| Segmentation_Supported | <input checked="" type="checkbox"/> | R | |

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| Device Properties | sup-ported | Reada-ble/ Writable | Range restrictions |
|---------------------------------|-------------------------------------|------------------------|--------------------|
| Max_Segments_Accepted | <input type="checkbox"/> | | |
| VT_Classes_Supported | <input type="checkbox"/> | | |
| Active_VT_Sessions | <input type="checkbox"/> | | |
| Local_Time | <input type="checkbox"/> | | |
| Local_Date | <input type="checkbox"/> | | |
| UTC_Offset | <input type="checkbox"/> | | |
| Daylight_Savings_Status | <input type="checkbox"/> | | |
| APDU_Segment_Timeout | <input type="checkbox"/> | | |
| APDU_Timeout | <input checked="" type="checkbox"/> | R | |
| Number_Of_APDU_Retries | <input checked="" type="checkbox"/> | R | |
| List_Of_Session_Keys | <input type="checkbox"/> | | |
| Time_Synchronization_Recipients | <input type="checkbox"/> | | |
| Max_Master | <input type="checkbox"/> | | |
| Max_Info_Frames | <input type="checkbox"/> | | |
| Device_Address_Binding | <input checked="" type="checkbox"/> | R | |
| Database_Revision | <input checked="" type="checkbox"/> | R | |
| Configuration_Files | <input type="checkbox"/> | | |
| Last_Restore_Time | <input type="checkbox"/> | | |
| Backup_Failure_Timeout | <input type="checkbox"/> | | |
| Backup_Preparation_Time | <input type="checkbox"/> | | |
| Restore_Preparation_Time | <input type="checkbox"/> | | |
| Restore_Completion_Time | <input type="checkbox"/> | | |
| Backup_And_Restore_State | <input type="checkbox"/> | | |
| Active_COV_Subscriptions | <input checked="" type="checkbox"/> | R | |
| Slave_Proxy_Enable | <input type="checkbox"/> | | |
| Manual_Slave_Adress_Binding | <input type="checkbox"/> | | |

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| Device Properties | sup-ported | Reada-ble/ Writable | Range restrictions |
|-------------------------------------|-------------------------------------|------------------------|--------------------|
| Auto_Slave_Discovery | <input type="checkbox"/> | | |
| Slave_Address_Binding | <input type="checkbox"/> | | |
| Last_Restart_Reason | <input type="checkbox"/> | | |
| Time_Of_Device_Restart | <input type="checkbox"/> | | |
| Restart_Notification_Recipients | <input type="checkbox"/> | | |
| UTC_Time_Synchronization_Recipients | <input type="checkbox"/> | | |
| Time_Synchronization_Interval | <input type="checkbox"/> | | |
| Align_Intervals | <input type="checkbox"/> | | |
| Interval_Offset | <input type="checkbox"/> | | |
| Profile_Name | <input type="checkbox"/> | | |
| Priority | <input checked="" type="checkbox"/> | W | 1 - 16 |

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Segmentation capability

| | | | |
|--------------------------|-------------------------------------|-------------|--|
| <input type="checkbox"/> | Able to transmit segmented messages | Window size | |
| <input type="checkbox"/> | Able to receive segmented messages | Window size | |

8.3 Data Link Layer optiFdescripons

The simultaneously supported Data Link Layers of a product are listed with the product model number.

| | | |
|-------------------------------------|--|---|
| <input checked="" type="checkbox"/> | BACnet IP, (Annex J) | |
| <input checked="" type="checkbox"/> | BACnet IP, (Annex J), Foreign Device | |
| <input type="checkbox"/> | ISO 8802-3, Ethernet (Clause 7) | |
| <input type="checkbox"/> | ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8) | |
| <input type="checkbox"/> | ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s) | |
| <input type="checkbox"/> | MS/TP master (Clause 9), baud rate(s) | : 9600 : 19200 : 38400 : 76800 : 115200 |
| <input type="checkbox"/> | MS/TP slave (Clause 9), baud rate(s) | |
| <input type="checkbox"/> | Point-To-Point, EIA 232 (Clause 10), baud rate(s) | : 38400 |
| <input type="checkbox"/> | Point-To-Point, modem, (Clause 10), baud rate(s) | : 38400 |
| <input type="checkbox"/> | LonTalk, (Clause 11), medium | : TP/FT-10 |
| <input type="checkbox"/> | Other | |

8.4 Device address binding

| | | |
|-------------------------------------|------------------------------|--|
| Is static device binding supported? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
|-------------------------------------|------------------------------|--|

8.5 Networking options

| | |
|--------------------------|--|
| <input type="checkbox"/> | Router, Clause 6 (remote management functionality/BACnet PTP) |
| <input type="checkbox"/> | Annex H, BACnet Tunnelling Router over IP |
| <input type="checkbox"/> | BACnet/IP Broadcast Management Device (BBMD) Number of BDT entries: Number of FDT entries: |
| | Does the BBMD support registrations by foreign devices? <input type="checkbox"/> Yes <input type="checkbox"/> No |

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8.6 Character sets supported

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

| | | |
|---|---|--|
| <input type="checkbox"/> UTF-8 (or ANSI X3.4) | <input type="checkbox"/> IBM / Microsoft DBCS | <input checked="" 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 |