



# BACnet Protocol

## Implementation Conformance Statement

Version: 2.0

Date: 2014-02-11

**BECKHOFF**



# Table of contents

<b>1</b>	<b>Foreword</b>	<b>3</b>
1.1	Notes on the documentation	3
1.1.1	Liability conditions	3
1.1.2	Delivery conditions	3
1.1.3	Brands	3
1.1.4	Patents	3
1.1.5	Copyright	3
1.2	Safety instructions	4
1.2.1	Description of safety symbols	4
<b>2</b>	<b>BACnet Protocol Implementation Conformance Statement</b>	<b>5</b>
<b>3</b>	<b>BACnet Interoperability Building Blocks</b>	<b>6</b>
<b>4</b>	<b>Standard Object Types Supported</b>	<b>7</b>
4.1	Object Types	8
4.1.1	Accumulator	8
4.1.2	Analog Input	9
4.1.3	Analog Output	10
4.1.4	Analog Value	11
4.1.5	Averaging	12
4.1.6	Binary Input	13
4.1.7	Binary Output	14
4.1.8	Binary Value	15
4.1.9	Calendar	16
4.1.10	Command	16
4.1.11	Device	17
4.1.12	Event Enrollment	18
4.1.13	File	19
4.1.14	Group	19
4.1.15	Loop	20
4.1.16	Multi-state Input	21
4.1.17	Multi-state Output	22
4.1.18	Multi-state Value	23
4.1.19	Notification Class	23
4.1.20	Pulse Converter	24
4.1.21	Program	25
4.1.22	Schedule	25
4.1.23	Structured View	26
4.1.24	Trend Log	26

4.2	Data Link Layer Options	28
<b>5</b>	<b>Appendix</b>	<b>30</b>
5.1	Support and Service	30
5.1.1	Beckhoff's branch offices and representatives	30
5.1.2	Beckhoff company headquarters	30

# 1 Foreword

## 1.1 Notes on the documentation

### 1.1.1 Liability conditions

This documentation has been prepared with care. The products described are, however, constantly under development. For this reason, the documentation may not always have been fully checked for consistency with the performance data, standards or other characteristics described. If it should contain technical or editorial errors, we reserve the right to make changes at any time and without notice. No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

### 1.1.2 Delivery conditions

In addition, the general delivery conditions of the company Beckhoff Automation GmbH apply.

### 1.1.3 Brands

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### 1.1.4 Patents

The EtherCAT technology is patent protected, in particular by the following patent applications and patents: DE10304637, DE102004044764, DE102005009224, and DE102007017835 with the corresponding applications and registrations in various other countries.

### 1.1.5 Copyright

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## 1.2 Safety instructions

This description is only intended for the use of trained specialists in control and automation technology who are familiar with the applicable national standards. It is essential that the following notes and explanations are followed when installing and commissioning these components. The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

### 1.2.1 Description of safety symbols

The following safety symbols are used in this documentation. They are intended to alert the reader to the associated safety instructions.

 <b>DANGER</b>	<p><b>Serious risk of injury!</b></p> <p><b>Failure</b> to follow the safety instructions associated with this symbol directly endangers the life and health of persons.</p>
 <b>WARNING</b>	<p><b>Risk of injury!</b></p> <p><b>Failure</b> to follow the safety instructions associated with this symbol endangers the life and health of persons.</p>
 <b>CAUTION</b>	<p><b>Personal injuries!</b></p> <p><b>Failure</b> to follow the safety instructions associated with this symbol can lead to injuries to persons.</p>
 <b>Warning</b>	<p><b>Damage to the environment or devices</b></p> <p><b>Failure</b> to follow the instructions associated with this symbol can lead to damage to the environment or equipment.</p>
 <b>Note</b>	<p><b>Tip or pointer</b></p> <p>This symbol indicates information that contributes to better understanding.</p>

## 2 BACnet Protocol Implementation Conformance Statement

Date: 11.02.2014

Vendor Name: Beckhoff Automation GmbH

Product Name: TwinCAT BACnet/IP

Product Model Number: CX9020, CX5020, CX5010, CX8091

Application Software Version: 2.0.2.2

Firmware Revision: 2.0.2.2

BACnet Protocol Revision 12

### Product Description

TwinCAT BACnet/IP is a real-time software implementation of BACnet/IP, running on Windows operating systems, including Windows 7 and Windows CE. TwinCAT BACnet/IP can be executed on X86/X64 and ARM systems. Using Beckhoff's modular IO-System various Hardware devices can be coupled to the BACnet world.

### BACnet Standardized Device Profile (Annex L)

- BACnet Operator Workstation (B-OWS)
- BACnet Advanced Operator Workstation (B-AWS)
- BACnet Operator Display (B-OD)
- 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)

## 3 BACnet Interoperability Building Blocks

### Data-Sharing BIBBs

- Data Sharing Read-Property-A (DS-RP-A)
- Data Sharing Read-Property-B (DS-RP-B)
- Data Sharing Read-Property-Multiple-A (DS-RPM-A)
- Data Sharing Read-Property-Multiple-B (DS-RPM-B)
- Data Sharing Write-Property-A (DS-WP-A)
- Data Sharing Write-Property-B (DS-WP-B)
- Data Sharing Write-Property-Multiple-B (DS-WPM-B)
- Data Sharing COV-A (DS-COV-A)
- Data Sharing COV-B (DS-COV-B)
- Data Sharing COVP-A (DS-COVP-A)
- Data Sharing COVP-B (DS-COVP-B)
- Data Sharing COV-Unsolicited-A (DS-COVU-A)
- Data Sharing COV-Unsolicited-B (DS-COVU-B)

### Alarm and Event BIBBs

- Alarm and Event Notification-Internal (AE-N-I-B)
- Alarm and Event-Notification External (AE-N-E-B)
- Alarm and Event Acknowledge-B (AE-ACK-B)
- Alarm and Event Information-B (AE-INFO-B)
- Alarm and Event Alarm Summary-B (AE-ASUM-B)
- Alarm and Event Enrollment Summary-B (AE-ESUM-B)

### Scheduling BIBBs

- Scheduling-Internal-B (SCHED-I-B)
- Scheduling-External-B (SCHED-E-B)

### Trending BIBBs

- Trending Viewing and Modifying Trends Internal-B (T-VMT-I-B)
- Trending Viewing and Modifying Trends External-B (T-VMT-E-B)
- Trending Automated Trend Retrieval-B (T-ATR-B)

### Device Management BIBBs

- Device Management Dynamic Device Binding-A (DM-DDB-A)
- Device Management Dynamic Device Binding-B (DM-DDB-B)
- Device Management Dynamic Object Binding-B (DM-DOB-B)
- Device Management DeviceCommunicationControl-B (DM-DCC-B)
- Device Management TimeSynchronization-A (DM-TS-A)
- Device Management TimeSynchronization-B (DM-TS-B)
- Device Management UTCTimeSynchronization-A (DM-UTC-A)
- Device Management UTCTimeSynchronization-B (DM-UTC-B)
- Device Management Automatic Time Synchronisation- A (DM-ATS-A)
- Device Management ReinitializeDevice-B (DM-RD-B)
- Device Management Backup and Restore-B (DM-BR-B)
- Device Management Restart-B (DM-R-B)
- Device Management List Manipulation-B (DM-LM-B)
- Device Management-Object Creation and Deletion-B (DM-OCD-B)

### Segmentation Capability

- Able to transmit segmented messages      Window Size   16
- Able to receive segmented messages      Window Size   16



## 4 Standard Object Types Supported

Object Type	Dynamically Createable	Dynamically Deleteable
Accumulator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Analog Input	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Analog Output	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Analog Value	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Averaging	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Binary Input	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Binary Output	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Binary Value	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Calendar	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Command	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Device	<input type="checkbox"/>	<input type="checkbox"/>
Event Enrollment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
File	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Group	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Loop	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Multi-state Input	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Multi-state Output	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Multi-state Value	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Notification Class	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Schedule	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Structured View	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Program	<input type="checkbox"/>	<input type="checkbox"/>
Pulse Converter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Trend Log	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

A detailed description of all supported properties is displayed in the following tables. Some common comments on the property list:

- All properties are listed with their data types and conformance code as defined in the BACnet specification
- Write access can be “R” for read-only properties, “W” represents writable properties
- If not other defined all properties support the required ranges defined in the specification
- All CharacterString data types support up to 255 characters

## 4.1 Object Types

### 4.1.1 Accumulator

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Present_Value	Unsigned	R	W
Description	CharacterString	O	W
Device_Type	CharacterString	O	R
Status_Flags	BACnetStatusFlags	R	R
Event_State	BACnetEventState	R	R
Reliability	BACnetReliability	O	R
Out_Of_Service	BOOLEAN	R	W
Scale	BACnetScale	R	R
Units	BACnetEngineeringUnits	R	W
Prescale	BACnetPrescale	O	W
Max_Pres_Value	Unsigned	R	W
Value_Change_Time	BACnetDateTime	O	R
Value_Before_Change	Unsigned	O	R
Value_Set	Unsigned	O	W
Pulse_Rate	Unsigned	O	R
High_Limit	Unsigned	O	W
Low_Limit	Unsigned	O	W
Limit_Monitoring_Interval	Unsigned	O	W
Notification_Class	Unsigned	O	W
Time_Delay	Unsigned	O	W
Limit_Enable	BACnetLimitEnable	O	W
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	R
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Logging_Record	BACnetAccumulatorRecord	Ø	R
Logging_Object	BACnetObjectIdentifier	Ø	W
Profile_Name	CharacterString	Ø	

### 4.1.2 Analog Input

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Present_Value	REAL	R	R
Description	CharacterString	O	W
Device_Type	CharacterString	O	R
Status_Flags	BACnetStatusFlags	R	R
Event_State	BACnetEventState	R	R
Reliability	BACnetReliability	O	R
Out_Of_Service	BOOLEAN	R	W
Update_Interval	Unsigned	O	R
Units	BACnetEngineeringUnits	R	W
Min_Pres_Value	REAL	O	W
Max_Pres_Value	REAL	O	W
Resolution	REAL	O	R
COV_Increment	REAL	O	W
Time_Delay	Unsigned	O	W
Notification_Class	Unsigned	O	W
High_Limit	REAL	O	W
Low_Limit	REAL	O	W
Deadband	REAL	O	W
Limit_Enable	BACnetLimitEnable	O	W
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	R
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Profile_Name	CharacterString	⊕	
Scale_Offset (512)	REAL	O	R
Io_Bus_Nr (513)	Unsigned (0 .. 255)	O	R
Io_Module_Nr (514)	Unsigned (1 .. 65535)	O	R
Io_Channel_Nr (515)	Unsigned (1 .. 65535)	O	R

### 4.1.3 Analog Output

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Present_Value	REAL	W	W
Description	CharacterString	O	W
Device_Type	CharacterString	O	R
Status_Flags	BACnetStatusFlags	R	R
Event_State	BACnetEventState	R	R
Reliability	BACnetReliability	O	R
Out_Of_Service	BOOLEAN	R	W
Units	BACnetEngineeringUnits	R	W
Min_Pres_Value	REAL	O	W
Max_Pres_Value	REAL	O	W
Resolution	REAL	O	R
Priority_Array	BACnetPriorityArray	R	R
Relinquish_Default	REAL	R	R
COV_Increment	REAL	O	R
Time_Delay	Unsigned	O	W
Notification_Class	Unsigned	O	W
High_Limit	REAL	O	W
Low_Limit	REAL	O	W
Deadband	REAL	O	W
Limit_Enable	BACnetLimitEnable	O	W
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	W
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Profile_Name	CharacterString	⊕	
Scale_Offset (512)	REAL	O	R
Io_Bus_Nr (513)	Unsigned (0 .. 255)	O	R
Io_Module_Nr (514)	Unsigned (1 .. 65535)	O	R
Io_Channel_Nr (515)	Unsigned (1 .. 65535)	O	R
Active_Priority (517)	Unsigned (1 .. 17)	O	R

#### 4.1.4 Analog Value

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Present_Value	REAL	R	W
Description	CharacterString	O	W
Status_Flags	BACnetStatusFlags	R	R
Event_State	BACnetEventState	R	R
Reliability	BACnetReliability	O	R
Out_Of_Service	BOOLEAN	R	W
Units	BACnetEngineeringUnits	R	W
Priority_Array	BACnetPriorityArray	O	R
Relinquish_Default	REAL	O	R
COV_Increment	REAL	O	R
Time_Delay	Unsigned	O	W
Notification_Class	Unsigned	O	W
High_Limit	REAL	O	W
Low_Limit	REAL	O	W
Deadband	REAL	O	W
Limit_Enable	BACnetLimitEnable	O	W
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	W
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Profile_Name	CharacterString	Ø	
Active_Priority (517)	Unsigned (1 .. 17 )	O	R

### 4.1.5 Averaging

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Minimum_Value	REAL	R	R
Minimum_Value_Timestamp	BACnetDateTime	O	R
Average_Value	REAL	R	R
Variance_Value	REAL	O	R
Maximum_Value	REAL	R	R
Maximum_Value_Timestamp	BACnetDateTime	O	R
Description	CharacterString	O	W
Attempted_Samples	Unsigned	R	W
Valid_Samples	Unsigned	R	R
Object_Property_Reference	BACnetDeviceObject PropertyReference	R	W
Window_Interval	Unsigned	R	W
Window_Samples	Unsigned	R	W
Profile_Name	CharacterString	Ø	

### 4.1.6 Binary Input

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Present_Value	BACnetBinaryPV	R	R
Description	CharacterString	O	W
Device_Type	CharacterString	O	R
Status_Flags	BACnetStatusFlags	R	R
Event_State	BACnetEventState	R	R
Reliability	BACnetReliability	O	R
Out_Of_Service	BOOLEAN	R	W
Polarity	BACnetPolarity	R	W
Inactive_Text	CharacterString	O	W
Active_Text	CharacterString	O	W
Change_Of_State_Time	BACnetDateTime	O	R
Change_Of_State_Count	Unsigned	O	W
Time_Of_State_Count_Reset	BACnetDateTime	O	R
Elapsed_Active_Time	Unsigned32	O	W
Time_Of_Active_Time_Reset	BACnetDateTime	O	R
Time_Delay	Unsigned	O	W
Notification_Class	Unsigned	O	W
Alarm_Value	BACnetBinaryPV	O	W
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	R
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
<b>Profile_Name</b>	<b>CharacterString</b>	<b>Ø</b>	
Io_Bus_Nr (513)	Unsigned (0 .. 255)	O	R
Io_Module_Nr (514)	Unsigned (1 .. 65535)	O	R
Io_Channel_Nr (515)	Unsigned (1 .. 65535)	O	R

### 4.1.7 Binary Output

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Present_Value	BACnetBinaryPV	W	W
Description	CharacterString	O	W
Device_Type	CharacterString	O	R
Status_Flags	BACnetStatusFlags	R	R
Event_State	BACnetEventState	R	R
Reliability	BACnetReliability	O	R
Out_Of_Service	BOOLEAN	R	W
Polarity	BACnetPolarity	R	W
Inactive_Text	CharacterString	O	R
Active_Text	CharacterString	O	R
Change_Of_State_Time	BACnetDateTime	O	R
Change_Of_State_Count	Unsigned	O	W
Time_Of_State_Count_Reset	BACnetDateTime	O	R
Elapsed_Active_Time	Unsigned32	O	W
Time_Of_Active_Time_Reset	BACnetDateTime	O	R
Minimum_Off_Time	Unsigned32	O	R
Minimum_On_Time	Unsigned32	O	R
Priority_Array	BACnetPriorityArray	R	R
Relinquish_Default	BACnetBinaryPV	R	R
Time_Delay	Unsigned	O	W
Notification_Class	Unsigned	O	W
Feedback_Value	BACnetBinaryPV	O	R
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	R
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Profile_Name	CharacterString	Ø	
Io_Bus_Nr (513)	Unsigned (0 .. 255)	O	R
Io_Module_Nr (514)	Unsigned (1 .. 65535)	O	R
Io_Channel_Nr (515)	Unsigned (1 .. 65535)	O	R
Active_Priority (517)	Unsigned (1 .. 17)	O	R



### 4.1.8 Binary Value

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Present_Value	BACnetBinaryPV	R	W
Description	CharacterString	O	W
Status_Flags	BACnetStatusFlags	R	R
Event_State	BACnetEventState	R	R
Reliability	BACnetReliability	O	R
Out_Of_Service	BOOLEAN	R	W
Inactive_Text	CharacterString	O	R
Active_Text	CharacterString	O	R
Change_Of_State_Time	BACnetDateTime	O	R
Change_Of_State_Count	Unsigned32	O	W
Time_Of_State_Count_Reset	BACnetDateTime	O	R
Elapsed_Active_Time	Unsigned32	O	W
Time_Of_Active_Time_Reset	BACnetDateTime	O	R
Minimum_Off_Time	Unsigned32	O	R
Minimum_On_Time	Unsigned32	O	R
Priority_Array	BACnetPriorityArray	O	R
Relinquish_Default	BACnetBinaryPV	O	R
Time_Delay	Unsigned	O	W
Notification_Class	Unsigned	O	W
Alarm_Value	BACnetBinaryPV	O	R
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	W
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Profile_Name	CharacterString	⊕	
Active_Priority (517)	Unsigned (1 .. 17)	O	R

### 4.1.9 Calendar

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Description	CharacterString	O	W
Present_Value	BOOLEAN	R	R
Date_List	List of BACnetCalendarEntry	R	W
Profile_Name	CharacterString	Ø	

### 4.1.10 Command

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Description	Description	O	W
Present_Value	Present_Value	W	W
In_Process	In_Process	R	R
All_Writes_Successful	All_Writes_Successful	R	R
Action	Action	R	W
Action_Text	Action_Text	O	W
Profile_Name	Profile_Name	Ø	

### 4.1.11 Device

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
System_Status	BACnetDeviceStatus	R	R
Vendor_Name	CharacterString	R	R
Vendor_Identifier	Unsigned16	R	R
Model_Name	CharacterString	R	R
Firmware_Revision	CharacterString	R	R
Application_Software_Version	CharacterString	R	R
Location	CharacterString	O	W
Description	CharacterString	O	W
Protocol_Version	Unsigned	R	R
Protocol_Revision	Unsigned	R	R
Protocol_Services_Supported	BACnetServicesSupported	R	R
Protocol_Object_Types_Supported	BACnetObjectTypesSupported	R	R
Object_List	BACnetARRAY[N] of BACnetObjectIdentifier	R	R
Structured_Object_List	BACnetARRAY[N] of BACnetObjectIdentifier	O	R
Max_APDU_Length_Accepted	Unsigned	R	R
Segmentation_Supported	BACnetSegmentation	R	R
Max_Segments_Accepted	Unsigned	O	R
VT_Classes_Supported	List of BACnetVTClass	Ø	
Active_VT_Sessions	List of BACnetVTSession	Ø	
Local_Time	Time	O	R
Local_Date	Date	O	R
UTC_Offset	INTEGER	O	W
Daylight_Savings_Status	BOOLEAN	O	W
APDU_Segment_Timeout	Unsigned	O	W
APDU_Timeout	Unsigned	R	W
Number_Of_APDU_Retries	Unsigned	R	W
List_Of_Session_Keys	List of BACnetSessionKey	O	
Time_Synchronization_Recipients	List of BACnetRecipient	O	W
Max_Master	Unsigned(1..127)	O	
Max_Info_Frames	Unsigned	O	
Device_Address_Binding	List of BACnetAddressBinding	R	R
Database_Revision	Unsigned	R	R
Configuration_Files	BACnetARRAY[N] of BACnetObjectIdentifier	O	R
Last_Restore_Time	BACnetTimeStamp	O	R
Backup_Failure_Timeout	Unsigned16	O	W
Backup_Preparation_Time	Unsigned16	O	R

Property	Data type	Conformance Code	Write Access
Restore_Preparation_Time	Unsigned16	O	R
Restore_Completion_Time	Unsigned16	O	R
Backup_And_Restore_State	BACnetBackupState	O	R
Profile_Name	CharacterString	Ø	
Active_COV_Subscriptions	List of BACnetCOVSubscription	O	R
Slave_Proxy_Enable	BACnetArray[N] of BOOLEAN	Ø	
Manual_Slave_Address_Binding	List of BACnetAddressBinding	Ø	
Auto_Slave_Discovery	BACnetArray[N] of BOOLEAN	Ø	
Slave_Address_Binding	List of BACnetAddressBinding	Ø	
Last_Restart_Reason	BACnetRestartReason	O	R
Time_Of_Device_Restart	BACnetTimeStamp	O	R
Restart_Notification_Recipients	List of BACnetRecipient	O	W
UTC_Time_Synchronization_Recipients	List of BACnetRecipient	O	W
Time_Synchronization_Interval	Unsigned	O	W
Align_Intervals	BOOLEAN	O	W
Interval_Offset	Unsigned	O	W
Persist_Data (516)	Enumerated	O	W
LastConfirmedServiceAccess (518)	CharacterString	O	R

#### 4.1.12 Event Enrollment

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Description	CharacterString	O	W
Event_Type	BACnetEventType	R	W
Notify_Type	BACnetNotifyType	R	W
Event_Parameters	BACnetEventParameter	R	W
Object_Property_Reference	BACnetDeviceObjectPropertyReference	R	W
Event_State	BACnetEventState	R	R
Event_Enable	BACnetEventTransitionBits	R	W
Acked_Transitions	BACnetEventTransitionBits	R	R
Notification_Class	Unsigned	R	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	R	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Data_Request_Mode (519)	Enumerated	O	W
Data_Polling_Interval (520)	Unsigned	O	W

Enrollment_Cov_Resubscription_Interval (521)	Unsigned	O	W
Profile_Name	CharacterString	Ø	

#### 4.1.13 File

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Description	CharacterString	O	W
File_Type	CharacterString	R	R
File_Size	Unsigned	R	W
Modification_Date	BACnetDateTime	R	R
Archive	BOOLEAN	W	W
Read_Only	BOOLEAN	R	W
File_Access_Method	BACnetFileAccessMethod	R	R
File_Name (522)	CharacterString	O	W
Record_Count	Unsigned	Ø	
Profile_Name	CharacterString	Ø	

#### 4.1.14 Group

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Description	CharacterString	O	W
List_Of_Group_Members	List of ReadAccessSpecification	R	W
Present_Value	List of ReadAccessResult	R	R
Profile_Name	CharacterString	Ø	

## 4.1.15 Loop

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Present_Value	REAL	R	W
Description	CharacterString	O	W
Status_Flags	BACnetStatusFlags	R	R
Event_State	BACnetEventState	R	R
Reliability	BACnetReliability	O	R
Out_Of_Service	BOOLEAN	R	W
Update_Interval	Unsigned	O	R
Output_Units	BACnetEngineeringUnits	R	W
Manipulated_Variable_Reference	BACnetObjectPropertyReference	R	W
Controlled_Variable_Reference	BACnetObjectPropertyReference	R	W
Controlled_Variable_Value	REAL	R	R
Controlled_Variable_Units	BACnetEngineeringUnits	R	W
Setpoint_Reference	BACnetSetpointReference	R	W
Setpoint	REAL	R	W
Action	BACnetAction	R	W
Proportional_Constant	REAL	O	W
Proportional_Constant_Units	BACnetEngineeringUnits	O	W
Integral_Constant	REAL	O	W
Integral_Constant_Units	BACnetEngineeringUnits	O	W
Derivative_Constant	REAL	O	W
Derivative_Constant_Units	BACnetEngineeringUnits	O	W
Bias	REAL	O	W
Maximum_Output	REAL	O	W
Minimum_Output	REAL	O	W
Priority_For_Writing	Unsigned	R	W
COV_Increment	REAL	O	W
Time_Delay	Unsigned	O	W
Notification_Class	Unsigned	O	W
Error_Limit	REAL	O	W
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	R
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Deadband	REAL	O	W
Profile_Name	CharacterString	O	

#### 4.1.16 Multi-state Input

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Present_Value	Unsigned	R	R
Description	CharacterString	O	W
Device_Type	CharacterString	O	R
Status_Flags	BACnetStatusFlags	R	R
Event_State	BACnetEventState	R	R
Reliability	BACnetReliability	O	R
Out_Of_Service	BOOLEAN	R	W
Number_Of_States	Unsigned (1..1000)	R	W
State_Text	BACnetARRAY[N]of CharacterString	O	W
Time_Delay	Unsigned	O	W
Notification_Class	Unsigned	O	W
Alarm_Values	List of Unsigned	O	W
Fault_Values	List of Unsigned	O	W
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	W
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Profile_Name	CharacterString	⊕	
Io_Bus_Nr (513)	Unsigned (0 .. 255)	O	R
Io_Module_Nr (514)	Unsigned (1 .. 65535)	O	R
Io_Channel_Nr (515)	Unsigned (1 .. 65535)	O	R

#### 4.1.17 Multi-state Output

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Present_Value	Unsigned	W	W
Description	CharacterString	O	W
Device_Type	CharacterString	O	R
Status_Flags	BACnetStatusFlags	R	R
Event_State	BACnetEventState	R	R
Reliability	BACnetReliability	O	R
Out_Of_Service	BOOLEAN	R	W
Number_Of_States	Unsigned (1..1000)	R	W
State_Text	BACnetARRAY[N]of CharacterString	O	W
Priority_Array	BACnetPriorityArray	R	R
Relinquish_Default	Unsigned	R	W
Time_Delay	Unsigned	O	W
Notification_Class	Unsigned	O	W
Feedback_Value	Unsigned	O	W
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	W
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Profile_Name	CharacterString	⊖	
Io_Bus_Nr (513)	Unsigned (0 .. 255)	O	R
Io_Module_Nr (514)	Unsigned (1 .. 65535)	O	R
Io_Channel_Nr (515)	Unsigned (1 .. 65535)	O	R
Active_Priority (517)	Unsigned (1 .. 17 )	O	R



#### 4.1.18 Multi-state Value

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Present_Value	Unsigned	R	W
Description	CharacterString	O	W
Status_Flags	BACnetStatusFlags	R	R
Event_State	BACnetEventState	R	R
Reliability	BACnetReliability	O	R
Out_Of_Service	BOOLEAN	R	W
Number_Of_States	Unsigned (1..1000)	R	W
State_Text	BACnetARRAY[N] of CharacterString	O	W
Priority_Array	BACnetPriorityArray	O	R
Relinquish_Default	Unsigned	O	W
Time_Delay	Unsigned	O	W
Notification_Class	Unsigned	O	W
Alarm_Values	List of Unsigned	O	W
Fault_Values	List of Unsigned	O	W
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	W
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Profile_Name	CharacterString	Ø	
Active_Priority (517)	Unsigned (1 .. 17 )	O	R

#### 4.1.19 Notification Class

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Description	CharacterString	O	W
Notification_Class	Unsigned	R	R
Priority	BACnetARRAY[3] of Unsigned	R	W
Ack_Required	BACnetEventTransitionBits	R	W
Recipient_List	List of BACnetDestination	R	W
Profile_Name	CharacterString	Ø	

### 4.1.20 Pulse Converter

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Description	CharacterString	O	W
Present_Value	REAL	R	R
Input_Reference	BACnetObjectPropertyReference	O	W
Status_Flags	BACnetStatusFlags	R	R
Event_State	BACnetEventState	R	R
Reliability	BACnetReliability	O	W
Out_Of_Service	BOOLEAN	R	W
Units	BACnetEngineeringUnits	R	W
Scale_Factor	REAL	R	W
Adjust_Value	REAL	W	W
Count	Unsigned	R	R
Update_Time	BACnetDateTime	R	R
Count_Change_Time	BACnetDateTime	R	R
Count_Before_Change	Unsigned	R	W
COV_Increment	REAL	O	W
COV_Period	Unsigned	O	W
Notification_Class	Unsigned	O	W
Time_Delay	Unsigned	O	W
High_Limit	REAL	O	W
Low_Limit	REAL	O	W
Deadband	REAL	O	W
Limit_Enable	BACnetLimitEnable	O	W
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	W
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Profile_Name	CharacterString	Ø	

### 4.1.21 Program

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Program_State	BACnetProgramState	R	R
Program_Change	BACnetProgramRequest	W	W
Reason_For_Halt	BACnetProgramError	O	R
Description_Of_Halt	CharacterString	O	W
Program_Location	CharacterString	O	W
Description	CharacterString	O	W
Instance_Of	CharacterString	O	W
Status_Flags	BACnetStatusFlags	R	R
Reliability	BACnetReliability	O	R
Out_Of_Service	BOOLEAN	R	W
Profile_Name	CharacterString	Ø	

### 4.1.22 Schedule

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Present_Value	Any	R	R
Description	CharacterString	O	W
Effective_Period	BACnetDateRange	R	W
Weekly_Schedule	BACnetARRAY[7] of BACnetDailySchedule	O	W
Exception_Schedule	BACnetARRAY[N] of BACnetSpecialEvent	O	W
Schedule_Default	Any	R	W
List_Of_Object_Property_References	List of BACnetDeviceObject PropertyReference	R	W
Priority_For_Writing	Unsigned(1..16)	R	W
Status_Flags	BACnetStatusFlags	R	R
Reliability	BACnetReliability	R	R
Out_Of_Service	BOOLEAN	R	W
Profile_Name	CharacterString	Ø	

### 4.1.23 Structured View

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Description	CharacterString	O	W
Node_Type	BACnetNodeType	R	W
Node_Subtype	CharacterString	O	W
Subordinate_List	BACnetARRAY[N] of BACnetDeviceObjectReference	R	R
Subordinate_Annotations	BACnetARRAY[N] of CharacterString	O	W
Profile_Name	CharacterString	Ø	

### 4.1.24 Trend Log

Property	Data type	Conformance Code	Write Access
Object_Identifier	BACnetObjectIdentifier	R	R
Object_Name	CharacterString	R	W
Object_Type	BACnetObjectType	R	R
Description	CharacterString	O	W
Log_Enable	BOOLEAN	W	W
Start_Time	BACnetDateTime	O	W
Stop_Time	BACnetDateTime	O	W
Log_DeviceObjectProperty	BACnetDeviceObjectPropertyReference	O	W
Log_Interval	Unsigned	O	W
COV_Resubscription_Interval	Unsigned	O	W
Client_COV_Increment	BACnetClientCOV	O	W
Stop_When_Full	BOOLEAN	R	W
Buffer_Size	Unsigned32	R	R
Log_Buffer	List of BACnetLogRecord	R	R
Record_Count	Unsigned32	W	W
Total_Record_Count	Unsigned32	R	R
Notification_Threshold	Unsigned32	O	W
Records_Since_Notification	Unsigned32	O	R
Last_Notify_Record	Unsigned32	O	R
Event_State	BACnetEventState	R	R
Notification_Class	Unsigned	O	W
Event_Enable	BACnetEventTransitionBits	O	W
Acked_Transitions	BACnetEventTransitionBits	O	R
Notify_Type	BACnetNotifyType	O	W
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O	R

Event_Message_Texts	BACnetARRAY[3] of CharacterString	O	R
Profile_Name	CharacterString	Q	
Logging_Type	BACnetLoggingType	R	W
Align_Intervals	BOOLEAN	O	W
Interval_Offset	Unsigned	O	W
Trigger	BOOLEAN	O	W
Status_Flags	BACnetStatusFlags	R	R
Reliability	BACnetReliability	O	W

## 4.2 Data Link Layer Options

- BACnet IP, (Annex J)
- BACnet IP, (Annex J), Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
- ATA 878.1, EIA-485 ARCNET (Clause 8), baud rate(s) \_\_\_\_\_
- MS/TP master (Clause 9), baud rate(s): \_\_\_\_\_
- MS/TP slave (Clause 9), baud rate(s): \_\_\_\_\_
- Point-To-Point, EIA 232 (Clause 10), baud rate(s): \_\_\_\_\_
- Point-To-Point, modem, (Clause 10), baud rate(s): \_\_\_\_\_
- LonTalk, (Clause 11), medium: \_\_\_\_\_
- BACnet/ZigBee (ANNEX O)
- 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

Does the BBMD support network address translation?  Yes  No

### Network Security Options

- Non-secure Device - is capable of operating without BACnet Network Security
- Secure Device - is capable of using BACnet Network Security (NS-SD BIBB)
  - Multiple Application-Specific Keys
  - Supports encryption (NS-ED BIBB)
  - Key Server (NS-KS BIBB)

**Character Sets Supported**

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

- |   |  |  |
|---|--|--|
| <input checked="" type="checkbox"/> ISO 10646 (UTF-8) | <input checked="" type="checkbox"/> IBM™/Microsoft™ DBCS | <input checked="" type="checkbox"/> ISO 8859-1 |
| <input checked="" type="checkbox"/> ISO 10646 (UCS-2) | <input checked="" type="checkbox"/> ISO 10646 (UCS-4)    | <input checked="" type="checkbox"/> JIS X 0208 |

If this product is a communication gateway, describe the types of non-BACnet equipment/networks(s) that the gateway supports:

## 5 Appendix

### 5.1 Support and Service

Beckhoff and their partners around the world offer comprehensive support and service, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

#### 5.1.1 Beckhoff's branch offices and representatives

Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products!

The addresses of Beckhoff's branch offices and representatives round the world can be found on her internet pages: <http://www.beckhoff.com>

You will also find further documentation for Beckhoff components there.

#### 5.1.2 Beckhoff company headquarters

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E-mail: [info@beckhoff.com](mailto:info@beckhoff.com)  
Web: [www.beckhoff.com](http://www.beckhoff.com)

#### Beckhoff Support

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