BACnet Protocol Implementation Conformance Statement

Date:	21.04.2022
Vendor Name:	WAREMA Renkhoff SE
Product Name:	BACnet 4M230.8I AP
Product Model Number:	2047 065
Application Software Version:	1.0
Firmware Revision:	1.0
BACnet Protocol Revision:	16

Product Description:

BACnet MS/TP Application Specific Controller providing 8 Digital Inputs and 4 two-stage Relays.

BACnet Standardized Device Profile (Annex L):

BACnet Application Specific Controller (B-ASC)

List all BACnet Interoperability Building Blocks Supported (Annex K):

Data Sharing-ReadProperty-B	(DS-RP-B)
Data Sharing-WriteProperty-B	(DS-WP-B)
Data Sharing-ReadPropertyMultiple-B	(DS-RPM-B)
Data Sharing-COV-B	(DS-COV-B)
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, no Password)
Device Management-ReinitializeDevice-B	(DM-RD-B, no Password)
Device Management-Backup and Restore-B	(DM-BR-B, no Password)

Standard Object Types Supported:

An object type is supported if it may be present in the device.
For each standard Object Type supported provide the following data:

1) Whether objects of this type are dynamically creatable using the CreateObject service: None
2) Whether objects of this type are dynamically deletable using the DeleteObject service: None
3) List of the optional properties supported
4) List of all properties that are writable where not otherwise required by this standard
5) List of all properties that are conditionally writable where not otherwise required by this standard: None
6) List of proprietary properties and for each its property identifier, datatype, and meaning: None
7) List of any property range restrictions

Segmentation Capability:

☒ Able to transmit segmented messages Window Size 1
☐ Able to receive segmented messages Window Size _____

Data Link Layer Options:

☒ MS/TP master (Clause 9)
☒ MS/TP slave (Clause 9) baud rate(s): 9600, 19200, 38400, 57600, 76800, 115200

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

Network Security Options:

☒ Non-secure Device - is capable of operating without BACnet Network Security

Character Sets Supported:

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

☒ ISO 10646 (UTF-8) ☐ IBM™/Microsoft™ DBCS ☐ ISO 8859-1
☐ ISO 10646 (UCS-2) ☐ ISO 10646 (UCS-4) ☐ JIS X 0208

Default object names can be restored by writing an empty string.

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

☐ Yes ☒ No

DIP switch for baud rate

Baud Rate	9600	19200	38400	57600	76800	115200
DIP 1	off	on	off	on	off	on
DIP 2	off	off	on	on	off	off
DIP 3	off	off	off	off	on	on

DIP switch for MS/TP address

An 8 contact DIP switch is provided for binary entry of the MS/TP address.
Switch 1 is the least significant bit … switch 8 the most significant.

The device works as MS/TP master, if network address 0x00 … Max_Master (see Device Object) is used.
The device works as MS/TP slave, if network address Max_Master + 1 … 0xFE is used.

1 Device Object

Property	Remark / Value	Conf.
Object_Type	DEVICE (8)	R
Object_Identifier	device, default instance: 1345000 + Network-Address, default may be restored by writing 4194303	RW-N
Object_Name	max. 60 Bytes, default “BACnet_4M230.8I_AP_” + Network-Address (Hexadecimal)	RW-N
Property_List		R
Description	max. 120 Bytes, default “”	OW-N
Location	max. 60 Bytes, default “”	OW-N
Vendor_Name	“WAREMA Renkhoff SE”	R
Vendor_Identifier	1345	R
Model_Name	“BACnet 4M230.8I AP”	R
Firmware_Revision	“1.0”	R
Application_Software_Version	“1.0”	R
Protocol_Version	1	R
Protocol_Revision	16	R
System_Status	OPERATIONAL (0)	R
Protocol_Services_Supported	read-property, read-property-multiple, write-property, subscribe-cov, who-has, who-is, read-range, device-communication-control, reinitialize-device, atomic-read-file, atomic-write-file	R
Protocol_Object_Types_Supported	DEVICE, ANALOG_VALUE, BINARY_INPUT, BINARY_VALUE, MULTI_STATE_VALUE, GROUP, FILE	R
Object_List	device, analog-value 1…57, binary-input 1…8, binary-value 0…10, multistate-value 1…5, group 1, file 1…2	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	SEGMENTED_TRANSMIT (1) if MS/TP master NO_SEGMENTATION (3) if MS/TP slave	R
Max_Segments_Accepted	1	C
APDU_Segment_Timeout	1…65535, default 5000	CW-N
APDU_Timeout	1…65535, default 6000	RW-N
Number_Of_APDU_Retries	1…10, default 3	RW-N
Device_Address_Binding	-	R
Database_Revision		R-N
Max_Master	0…127, default 127	RW-N
Max_Info_Frames	1…255, default 1	RW-N
Active_COV_Subscriptions	readable by services Read-Property / Read-Range, max. 20 Subscriptions, binary-input 1-8, analog-value 9-16, Confirmed / Unconfirmed, Lifetime = 0…65534 sec.	C
Configuration_Files	file 1	O
Last_Restore_Time	unspecified	O
Backup_Failure_Timeout	default 10 sec.	OW-N
Backup_And_Restore_State		O

Conf.: R: Required, O: Optional, W: Writable, P: Writable with Priority,
C: Conditional property only exists if working as MS/TP master
Write: -V: Volatile, -N: Nonvolatile (storage in flash memory)

2 Analog Value Objects

Property	Remark / Value	Conf.
Object_Type	ANALOG_VALUE (2)	R
Object_Identifier	analog-value, instance 1 … 57	R
Object_Name	max. 60 bytes, default see table below	RW-N
Property_List		R
Description	max. 120 bytes, default “”	OW-N
Present_Value	default (min…max) see below	
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 / 1 see below OUT_OF_SERVICE: 0	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Units	see table below	R
COV_Increment	instance 9…12: default 5 instance 13…16: default 20 others: property does not exist min … max: 0.1 … 1000	OW-N
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (storage in flash memory)		

If binary-value 5 (Safety run) is active, then writing Present_Value of analog-value 1…8 is inhibited and only their Status_Flag OVERRIDDEN is set.

Analog Values					
Instance	Object_Name	Present_Value default	(min…max)	Units	Present_Value conf.
1 - 4	“Blind length 1” …	0	(0…100)	percent (98)	RW-V
5 - 8	“Slat position 1” …	0	(-180…180)	degrees-angular (90)	RW-V
9 - 12	“Blind lengthFB 1” …	0	(0…100)	percent (98)	R
13 - 16	“Slat positionFB 1” …	0	(-180…180)	degrees-angular (90)	R
17 - 20	“Run time UP 1” …	90	(0…655)	seconds (73)	RW-N
21 - 24	“Run time DOWN 1” …	90	(0…655)	seconds (73)	RW-N
25 - 28	“Slat min. angle 1” …	-75	(-180…180)	degrees-angular (90)	RW-N
29 - 32	“Slat max. angle 1” …	75	(-180…180)	degrees-angular (90)	RW-N
33 - 36	“Slat turning time 1” …	1600	(0…655000)	milliseconds (159)	RW-N
37 - 40	“Slat step angle 1” …	15	(-180…180)	degrees-angular (90)	RW-N
41 - 44	“Slat DOWN angle 1” …	38	(-180…180)	degrees-angular (90)	RW-N
45 - 48	“Additional run time UP 1” …	3	(0…655)	seconds (73)	RW-N
49 - 52	“Additional run time DOWN 1” …	0	(0…655)	seconds (73)	RW-N
53 - 56	“Switchover pause 1” …	500	(0…655000)	milliseconds (159)	RW-N
57	“Long push of the button”	2	(0…655)	seconds (73)	RW-N

3 Multistate Value Objects 1…4

Property	Remark / Value	Conf.
Object_Type	MULTISTATE_VALUE (19)	R
Object_Identifier	multistate-value, instance 1…4	R
Object_Name	max. 60 bytes, default “Blind 1” …	RW-N
Property_List		R
Description	max. 120 bytes, default “”	OW-N
State_Text	max. 30 bytes, default see table below	OW-N
Present_Value	default 1 (OFF)	RW-V
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Number_Of_States	6	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (storage in flash memory)		

States	
State	State_Text default
1	"OFF"
2	"STOP"
3	"UP”
4	"DOWN"
5	"TURN UP"
6	"TURN DOWN"

4 Binary Value Objects

Property	Remark / Value	Conf.
Object_Type	BINARY_VALUE (3)	R
Object_Identifier	binary-value, instance 1 … 10	R
Object_Name	max. 60 Bytes, default see table below	RW-N
Property_List		R
Description	max. 120 Bytes, default “”	OW-N
Inactive_Text	max. 30 Bytes, default see table below	OW-N
Active_Text	max. 30 Bytes, default see table below	OW-N
Present_Value	INACTIVE (0) / ACTIVE (1) see table below	
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (storage in flash memory)		

Binary Values					
Instance	Object_Name default	Inactive_Text default	Active_Text default	Present_Value default	Present_Value conf.
1 - 4	“Blind 1 in motion” …	“stopped”	“running”	0	R
5	“Safety run”	“off”	“on”	0	RW-V
6	“Reference run”	“off”	“on”	0	RW-V
7 - 10	“Direction of motor rotation 1” …	“normal”	“reverse”	0	RW-N

5 Binary Input Objects

- Inputs for connection of external UP and DOWN keys
- Internal UP and DOWN keys are reported as overridden

Property	Remark / Value	Conf.
Object_Type	BINARY_INPUT (3)	R
Object_Identifier	binary-input, instance 1 … 8	R
Object_Name	max. 60 Bytes, default “Input 1 UP”, “Input 1 DOWN” …	RW-N
Property_List		R
Description	max. 120 Bytes, default “”	OW-N
Inactive_Text	max. 30 Bytes, default “off”	OW-N
Active_Text	max. 30 Bytes, default “on”	OW-N
Present_Value	INACTIVE (0) / ACTIVE (1)	R
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 / 1 (internal key pressed) OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW-V
Polarity	NORMAL (0)	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (storage in flash memory)		

Function Table for Binary Input					
Out_Of_ Service	Internal Key	Input Terminal	Present_ Value	OVER_ RIDDEN	OUT_OF_ SERVICE
0	0	0 1	0 1	0	0
0	1	0 1	1	1	0
1	0	0 1	x	0	1
1	1	0 1	x	0	1
x: Present_Value is writable and not affected by inputs or keys					

6 Group Object

Property	Remark / Value	RW
Object_Type	GROUP (11)	R
Object_Identifier	group, instance 1	R
Object_Name	max. 60 bytes, default “Group 1”	RW-N
Property_List		R
Description	max. 120 bytes, default “”	OW-N
Present_Value	Present_Value of Binary Inputs 1…8	R
List_Of_Group_Members	Present_Value of Binary Inputs 1…8	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (storage in flash memory)		

7 File Objects

Property	Remark / Value	Conf.
Object_Type	FILE (10)	R
Object_Identifier	file, instance 1…2	R
Object_Name	max. 60 Bytes, default “Configuration file”, “Update file”	RW-N
Property_List		R
Description	max. 120 Bytes, default “”	OW-N
File_Type	max. 30 Bytes, default “config”, “update”	RW-N
File_Size	config: may be written with 0 while Restore procedure update: max. 86016, may be written with 0	RW-V RW-V
Modification_Date	Date-Time unspecified	R
Archive	config: FALSE (0) / TRUE (1) update: FALSE (0) / TRUE (1)	RW-N RW-V
Read_Only	FALSE (0)	R
File_Access_Method	FILE_ACCESS_STREAM (1)	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (storage in flash memory)		

The configuration file can be read and written by using the backup and restore procedure. It can also be read or written directly by only using read/write-file requests. Also see the following chapter.

The update file cannot be read but only be written by using write-file requests to install a program update. The update is activated by service Reinitialize-Device / Coldstart. Also see the following chapter.

For data consistency reasons the files must be read and written sequentially from begin to end using multiple read/write-file requests.

The configuration file data and its File_Size may change after every change of nonvolatile properties of the device. File_Size may be written with 0 (deletion) only before writing new file data. File truncation or expansion with other values is inhibited for data consistency, file deletion is optional.

8 Multistate Value Object 5, File Access

Property	Remark / Value	Conf.
Object_Type	MULTISTATE_VALUE (19)	R
Object_Identifier	multistate-value, instance 5	R
Object_Name	max. 60 bytes, default “File access”	RW-N
Property_List		R
Description	max. 120 bytes, default “”	OW-N
State_Text	max. 30 bytes, default see below	OW-N
Present_Value	default 1	RW-V
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Number_Of_States	8	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (storage in flash memory)		

This object controls file accesses. Reading the configuration file is possible in states 1…7.
The states indicate status or enable different access functions.
They are defined as follows including default State_Text and value:

“IDLE OK” (1), “IDLE ERROR” (2)
The configuration file is updated by every change of a nonvolatile object property.
The two states distinguish the result of “ACTIVATE CONFIG” or Restore.
OK: no configuration had an error, ERROR: at least one configuration had an error.

“BACKUP CONFIG” (3), “RESTORE CONFIG” (4)
The configuration file is locked by the Backup and Restore procedures.
Other accesses are inhibited. These states are status only.

“READ CONFIG” (5)
When this state is set the configuration file is copied to a buffer.
Then the configuration file buffer can be read consistently without being changed.

“WRITE CONFIG” (6)
When this state is set the configuration file is copied to a buffer.
Then the configuration file buffer can be read, cleared and written.

“ACTIVATE CONFIG” (7)
The newly written configuration file buffer is stored permanently to object properties.

“WRITE UPDATE” (8)
The update file can be written after this state is set.
After being written it is activated by service Reinitialize-Device / Coldstart.