Software description PICS BACnet MS/TP

Summary

Description of the standard software of BACnet MS/TP modules:

BMT-DO4

BACnet Protocol Implementation Conformance Statement

Date: 10.01.2014
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-DO4
Product Model Number: 110 886 13 21
Application Software Version: 1.0
Firmware Revision: 1.3
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing 4 Relay Outputs.

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)**

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-COV-B (DS-COV-B)
Data Sharing-COV-Unsolicited-B (DS-COVU-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)
Device Management-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

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

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: No
2) Whether objects of this type are dynamically deletable using the DeleteObject service: No
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
6) List of proprietary properties and for each its property identifier, data type, and meaning
7) List of any property range restrictions

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), bit rate(s) _____
☒ MS/TP master (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☒ MS/TP slave (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐ Point-To-Point, EIA 232 (Clause 10), bit rate(s):_____
☐ Point-To-Point, modem, (Clause 10), bit 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.

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

Default strings implemented in the objects use UTF-8.
Default strings 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:

Configuration Switches

Hexadecimal Switches x10, x1 define the Network-Address (00 – F9) and bit rate (FA – FF).

Switches	FA	FB	FC	FD	FE	FF
Bit rate	9600	19200	38400	57600	76800	115200

- Turn Switch x10 to E (Device is temporarily configured as Slave)
- Turn Switch x1 to A – F to select bit rate
- Turn Switch x10 to F, wait 1 second
- Red and green LEDs are blinking when bit rate is stored in EEPROM
- Turn Switch x10 to select Network-Address
- Turn Switch x1 to select Network-Address

MS/TP Master if using Network Address 0x00 … Max_Master,
MS/TP Slave if using Network Address Max_Master + 1 … 0xF9.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Name	max. 63 Bytes, default "BMT-DO4_" + Network-Address (Hexadecimal)	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	"METZ CONNECT GmbH"	R
Vendor_Identifier	421	R
Model_Name	"BMT-DO4"	R
Description	max. 127 Bytes, default ""	RW-E
Location	max. 63 Bytes, default ""	RW-E
Firmware_Revision	"1.3"	R
Application_Software_Version	"1.0"	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, BINARY_OUTPUT, ANALOG_VALUE	R
Object_List [6]	device, binary-output 1…4, analog-value 1	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	10000	R
Number_Of_APDU_Retries	3	R
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	max. 6 Subscriptions, for binary-output 1…4, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Binary Output Object 1…4

Property	Remark / Value	RW
Object_Identifier	binary-output, instance 1 … 4	R
Object_Type	BINARY_OUTPUT (4)	R
Object_Name	max. 42 Bytes, default “Relay 1” … “Relay 4”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	NULL (write only) / INACTIVE (0) / ACTIVE (1)	RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 = Switch A (Auto) 1 = Switch 0 (Off) or 1 (On) OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Priority_Array [16]	NULL / INACTIVE (0) / ACTIVE (1)	R
Relinquish_Default	INACTIVE (0)	R
Inactive_Text	max. 20 Bytes, default “Off”	RW-E
Active_Text	max. 20 Bytes, default “On”	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Output

Out_Of_ Service	Polarity	Switch	Priority_ Array	Present_ Value	Binary Output	OVER RIDDEN	OUT_OF_ SERVICE
0	0	A	NULL / 0 / 1	0 / 0 / 1	0 / 0 / 1	0	0
0	0	0	NULL / 0 / 1	0	0	1	0
		1	NULL / 0 / 1	1	1		
0	1	A	NULL / 0 / 1	0 / 0 / 1	1 / 1 / 0	0	0
0	1	0	NULL / 0 / 1	1	0	1	0
		1	NULL / 0 / 1	0	1		
1	0	A	NULL / 0 / 1	0 / 0 / 1	0	0	1
1	0	0	NULL / 0 / 1	0 / 0 / 1	0	0	1
		1	NULL / 0 / 1	0 / 0 / 1	1		
1	1	A	NULL / 0 / 1	0 / 0 / 1	1	0	1
1	1	0	NULL / 0 / 1	0 / 0 / 1	0	0	1
		1	NULL / 0 / 1	0 / 0 / 1	1		

Analog Value Object 1

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 1	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 Bytes, default “Watchdog Time“	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Time Constant of Watchdog Timer, 0: Watchdog is inactive, Maximum: 655.34 seconds	RW-E
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
Units	seconds (73)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

The Watchdog Timer resets Present_Value of all output objects to Relinquish_Default, if BACnet communication fails permanently. The timer is restarted, when a BACnet message with an APDU is received.
When the timer times out, the priority arrays of all output objects are completely cleared to NULL.

BMT-TO4

BACnet Protocol Implementation Conformance Statement

Date: 10.01.2014
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-TO4
Product Model Number: 110 880 13
Application Software Version: 1.0
Firmware Revision: 1.3
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing 4 Triac Outputs.

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)**

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-COV-B (DS-COV-B)
Data Sharing-COV-Unsolicited-B (DS-COVU-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)
Device Management-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

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

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: No
2) Whether objects of this type are dynamically deletable using the DeleteObject service: No
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
6) List of proprietary properties and for each its property identifier, data type, and meaning
7) List of any property range restrictions

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), bit rate(s) _____
☒ MS/TP master (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☒ MS/TP slave (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐ Point-To-Point, EIA 232 (Clause 10), bit rate(s):_____
☐ Point-To-Point, modem, (Clause 10), bit 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.

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

Default strings implemented in the objects use UTF-8.
Default strings 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:

Configuration Switches

Hexadecimal Switches x10, x1 define the Network-Address (00 – F9) and bit rate (FA – FF).

Switches	FA	FB	FC	FD	FE	FF
Bit rate	9600	19200	38400	57600	76800	115200

- Turn Switch x10 to E (Device is temporarily configured as Slave)
- Turn Switch x1 to A – F to select bit rate
- Turn Switch x10 to F, wait 1 second
- Red and green LEDs are blinking when bit rate is stored in EEPROM
- Turn Switch x10 to select Network-Address
- Turn Switch x1 to select Network-Address

MS/TP Master if using Network Address 0x00 … Max_Master,
MS/TP Slave if using Network Address Max_Master + 1 … 0xF9.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Name	max. 63 Bytes, default "BMT-TO4_" + Network-Address (Hexadecimal)	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	"METZ CONNECT GmbH"	R
Vendor_Identifier	421	R
Model_Name	"BMT-TO4"	R
Description	max. 127 Bytes, default ""	RW-E
Location	max. 63 Bytes, default ""	RW-E
Firmware_Revision	"1.3"	R
Application_Software_Version	"1.0"	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, BINARY_OUTPUT, ANALOG_VALUE	R
Object_List [6]	device, binary-output 1…4, analog-value 1	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	10000	R
Number_Of_APDU_Retries	3	R
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	max. 6 Subscriptions, for binary-output 1…4, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Binary Output Object 1…4

Property	Remark / Value	RW
Object_Identifier	binary-output, instance 1 … 4	R
Object_Type	BINARY_OUTPUT (4)	R
Object_Name	max. 42 Bytes, default “Triac 1” … “Triac 4”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	NULL (write only) / INACTIVE (0) / ACTIVE (1)	RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 = Switch A (Auto) 1 = Switch 0 (Off) or 1 (On) OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Priority_Array [16]	NULL / INACTIVE (0) / ACTIVE (1)	R
Relinquish_Default	INACTIVE (0)	R
Inactive_Text	max. 20 Bytes, default “Off”	RW-E
Active_Text	max. 20 Bytes, default “On”	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Output

Out_Of_ Service	Polarity	Switch	Priority_ Array	Present_ Value	Binary Output	OVER RIDDEN	OUT_OF_ SERVICE
0	0	A	NULL / 0 / 1	0 / 0 / 1	0 / 0 / 1	0	0
0	0	0	NULL / 0 / 1	0	0	1	0
		1	NULL / 0 / 1	1	1		
0	1	A	NULL / 0 / 1	0 / 0 / 1	1 / 1 / 0	0	0
0	1	0	NULL / 0 / 1	1	0	1	0
		1	NULL / 0 / 1	0	1		
1	0	A	NULL / 0 / 1	0 / 0 / 1	0	0	1
1	0	0	NULL / 0 / 1	0 / 0 / 1	0	0	1
		1	NULL / 0 / 1	0 / 0 / 1	1		
1	1	A	NULL / 0 / 1	0 / 0 / 1	1	0	1
1	1	0	NULL / 0 / 1	0 / 0 / 1	0	0	1
		1	NULL / 0 / 1	0 / 0 / 1	1		

Analog Value Object 1

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 1	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 Bytes, default “Watchdog Time“	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Time Constant of Watchdog Timer, 0: Watchdog is inactive, Maximum: 655.34 seconds	RW-E
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
Units	seconds (73)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

The Watchdog Timer resets Present_Value of all output objects to Relinquish_Default, if BACnet communication fails permanently. The timer is restarted, when a BACnet message with an APDU is received.
When the timer times out, the priority arrays of all output objects are completely cleared to NULL.

BMT-DI4

BACnet Protocol Implementation Conformance Statement

Date: 10.01.2014
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-DI4
Product Model Number: 110 884 13 19
Application Software Version: 1.0
Firmware Revision: 1.4
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing 4 Digital Inputs.

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)**
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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-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

☐ Able to transmit segmented messages Window Size _____
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☐ ATA 878.1, EIA-485 ARCNET (Clause 8), bit rate(s) _____
☒ MS/TP master (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☒ MS/TP slave (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐ Point-To-Point, EIA 232 (Clause 10), bit rate(s):_____
☐ Point-To-Point, modem, (Clause 10), bit rate(s): _____
☐ LonTalk, (Clause 11), medium: _____
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☐ 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

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☐ Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
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☒ ISO 10646 (UCS-2)	☒ ISO 10646 (UCS-4)	☒ JIS X 0208

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Bit rate	9600	19200	38400	57600	76800	115200

- Turn Switch x10 to E (Device is temporarily configured as Slave)
- Turn Switch x1 to A – F to select bit rate
- Turn Switch x10 to F, wait 1 second
- Red and green LEDs are blinking when bit rate is stored in EEPROM
- Turn Switch x10 to select Network-Address
- Turn Switch x1 to select Network-Address

MS/TP Master if using Network Address 0x00 … Max_Master,
MS/TP Slave if using Network Address Max_Master + 1 … 0xF9.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Name	max. 63 Bytes, default “BMT-DI4_” + Network-Address (Hexadecimal)	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	“METZ CONNECT GmbH”	R
Vendor_Identifier	421	R
Model_Name	“BMT-DI4”	R
Description	max. 127 Bytes, default “”	RW-E
Location	max. 63 Bytes, default “”	RW-E
Firmware_Revision	“1.4”	R
Application_Software_Version	“1.0”	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, BINARY_INPUT, GROUP	R
Object_List [8]	device, binary-input 1…4, group 1…3	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	10000	R
Number_Of_APDU_Retries	3	R
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	max. 6 Subscriptions, for binary-input 1…4, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Binary Input Object 1…4

Property	Remark / Value	RW
Object_Identifier	binary-input, instance 1 … 4	R
Object_Type	BINARY_INPUT (3)	R
Object_Name	max. 42 Bytes, default “Input 1” … “Input 4”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	INACTIVE (0) / ACTIVE (1), writable if Out_Of_Service	R RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Inactive_Text	max. 20 Bytes, default “Off”	RW-E
Active_Text	max. 20 Bytes, default “On”	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Input

Out_Of_ Service	Polarity	Binary Input	Present_ Value	OUT_OF_ SERVICE
0	0	0 1	0 1	0
0	1	0 1	1 0	0
1	0	0 1	x	1
1	1	0 1	x	1

x: Present_Value is writable and not affected by inputs

Group Object 1…3

Property	Remark / Value	RW
Object_Identifier	group, instance 1 … 3	R
Object_Type	GROUP (11)	R
Object_Name	max. 42 Bytes, default “Group 1” … “Group 3”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Present_Value of Binary Inputs, see next Table	R
List_Of_Group_Members	see next Table	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Members of Groups

Group	Binary Input			
	1	2	3	4
1	x	x	x	x
2	x	x		
3			x	x

BMT-DI10

BACnet Protocol Implementation Conformance Statement

Date: 10.01.2014
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-DI10
Product Model Number: 110 881 13 19
Application Software Version: 1.0
Firmware Revision: 1.3
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing 10 Digital Inputs.

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)**

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-COV-B (DS-COV-B)
Data Sharing-COV-Unsolicited-B (DS-COVU-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)
Device Management-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

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

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: No
2) Whether objects of this type are dynamically deletable using the DeleteObject service: No
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
6) List of proprietary properties and for each its property identifier, data type, and meaning
7) List of any property range restrictions

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), bit rate(s) _____
☒ MS/TP master (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☒ MS/TP slave (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐ Point-To-Point, EIA 232 (Clause 10), bit rate(s):_____
☐ Point-To-Point, modem, (Clause 10), bit 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.

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

Default strings implemented in the objects use UTF-8.
Default strings 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:

Configuration Switches

Hexadecimal Switches x10, x1 define the Network-Address (00 – F9) and bit rate (FA – FF).

Switches	FA	FB	FC	FD	FE	FF
Bit rate	9600	19200	38400	57600	76800	115200

- Turn Switch x10 to E (Device is temporarily configured as Slave)
- Turn Switch x1 to A – F to select bit rate
- Turn Switch x10 to F, wait 1 second
- Red and green LEDs are blinking when bit rate is stored in EEPROM
- Turn Switch x10 to select Network-Address
- Turn Switch x1 to select Network-Address

MS/TP Master if using Network Address 0x00 … Max_Master,
MS/TP Slave if using Network Address Max_Master + 1 … 0xF9.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Name	max. 63 Bytes, default "BMT-DI10_" + Network-Address (Hexadecimal)	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	"METZ CONNECT GmbH"	R
Vendor_Identifier	421	R
Model_Name	"BMT-DI10"	R
Description	max. 127 Bytes, default ""	RW-E
Location	max. 63 Bytes, default ""	RW-E
Firmware_Revision	"1.3"	R
Application_Software_Version	"1.0"	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, BINARY_INPUT, GROUP	R
Object_List [22]	device, binary-input 1…10, group 1…11	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	10000	R
Number_Of_APDU_Retries	3	R
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	max. 12 Subscriptions, for binary-input 1…10, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Binary Input Object 1…10

Property	Remark / Value	RW
Object_Identifier	binary-input, instance 1 … 10	R
Object_Type	BINARY_INPUT (3)	R
Object_Name	max. 42 Bytes, default “Input 1” … “Input 10”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	INACTIVE (0) / ACTIVE (1), writable if Out_Of_Service	R RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Inactive_Text	max. 20 Bytes, default “Off”	RW-E
Active_Text	max. 20 Bytes, default “On”	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Input

Out_Of_ Service	Polarity	Binary Input	Present_ Value	OUT_OF_ SERVICE
0	0	0 1	0 1	0
0	1	0 1	1 0	0
1	0	0 1	x	1
1	1	0 1	x	1

x: Present_Value is writable and not affected by inputs

Group Object 1…11

Property	Remark / Value	RW
Object_Identifier	group, instance 1 … 11	R
Object_Type	GROUP (11)	R
Object_Name	max. 42 Bytes, default “Group 1” … “Group 11”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Present_Value of Binary Inputs, see next Table	R
List_Of_Group_Members	see next Table	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Members of Groups

Group	Binary Input									
	1	2	3	4	5	6	7	8	9	10
1	x	x	x	x	x	x	x	x	x	x
2	x	x	x	x	x	x	x			
3				x	x	x	x	x	x	x
4			x	x	x	x	x	x		
5	x	x	x	x	x					
6						x	x	x	x	x
7				x	x	x	x			
8	x	x	x							
9								x	x	x
10				x	x					
11						x	x			

BMT-SI4

BACnet Protocol Implementation Conformance Statement

Date: 16.03.2015
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-SI4
Product Model Number: 110 889 13
Application Software Version: 1.0
Firmware Revision: 1.5
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing 4 Digital Inputs.
Input pulses with minimum High and Low times of 10ms may be counted using Accumulator Objects.

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)**

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-COV-B (DS-COV-B)
Data Sharing-COV-Unsolicited-B (DS-COVU-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)
Device Management-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

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

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: No
2) Whether objects of this type are dynamically deletable using the DeleteObject service: No
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
6) List of proprietary properties and for each its property identifier, datatype, and meaning
7) List of any property range restrictions

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), bit rate(s) _____
☒ MS/TP master (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☒ MS/TP slave (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐ Point-To-Point, EIA 232 (Clause 10), bit rate(s):_____
☐ Point-To-Point, modem, (Clause 10), bit 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.

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

Default strings implemented in the objects use UTF-8.
Default strings 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:

Configuration Switches

Hexadecimal Switches x10, x1 define the Network-Address (00 – F9) and bit rate (FA – FF).

Switches	FA	FB	FC	FD	FE	FF
Bit rate	9600	19200	38400	57600	76800	115200

- Turn Switch x10 to E (Device is temporarily configured as Slave)
- Turn Switch x1 to A – F to select bit rate
- Turn Switch x10 to F, wait 1 Second
- Red and green LEDs are blinking when bit rate is stored in EEPROM
- Turn Switch x10 to select Network-Address
- Turn Switch x1 to select Network-Address

MS/TP Master if using Network Address 0x00 … Max_Master,
MS/TP Slave if using Network Address Max_Master + 1 … 0xF9.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Name	max. 63 Bytes, default “BMT-SI4_” + Network-Address (Hexadecimal)	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	“METZ CONNECT GmbH”	R
Vendor_Identifier	421	R
Model_Name	“BMT-SI4”	R
Description	max. 127 Bytes, default “”	RW-E
Location	max. 63 Bytes, default “”	RW-E
Firmware_Revision	“1.5”	R
Application_Software_Version	“1.0”	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, BINARY_INPUT, GROUP, ACCUMULATOR	R
Object_List [12]	device, binary-input 1…4, group 1…3, accumulator 1…4	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	1…65535, default 6000	RW-E
Number_Of_APDU_Retries	1…10, default 3	RW-E
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	max. 6 Subscriptions, for binary-input 1…4, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Binary Input Object 1…4

Property	Remark / Value	RW
Object_Identifier	binary-input, instance 1 … 4	R
Object_Type	BINARY_INPUT (3)	R
Object_Name	max. 42 Bytes, default “Input 1” … “Input 4”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	INACTIVE (0) / ACTIVE (1), writable if Out_Of_Service	R RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Inactive_Text	max. 20 Bytes, default “Off”	RW-E
Active_Text	max. 20 Bytes, default “On”	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Input				
Out_Of_ Service	Polarity	Binary Input	Present_ Value	OUT_OF_ SERVICE
0	0	0 1	0 1	0
0	1	0 1	1 0	0
1	0	0 1	x	1
1	1	0 1	x	1
x: Present_Value is writable and not affected by inputs				

Input pulses must have minimum High and Low times of 10ms.

Accumulator Object 1…4

Property	Remark / Value	RW
Object_Identifier	accumulator, instance 1 … 4	R
Object_Type	ACCUMULATOR (23)	R
Object_Name	max. 42 Bytes, default “Accumulator 1” … “Accumulator 4”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	pulse counter of corresponding input, writable if Out_Of_Service (pulse counter remains unchanged)	R-E RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Max_Pres_Value	4294967295	R
Units	default no-units (95)	RW-E
Prescale	Multiplier 0 … 65535, default 1 Modulo-Divide 1 … 65535, default 1	RW-E
Scale	Float-Scale or Integer-Scale, default 1.0 (Float)	RW-E
Value_Set	pulse counter is stored to Value_Set, when corresponding key is pressed, default 0	R-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Group Object 1…3

Property	Remark / Value	RW
Object_Identifier	group, instance 1 … 3	R
Object_Type	GROUP (11)	R
Object_Name	max. 42 Bytes, default “Group 1” … “Group 3”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Present_Value of Binary Inputs, see next Table	R
List_Of_Group_Members	see next Table	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Members of Groups				
Group	Binary Input			
	1	2	3	4
1	x	x	x	x
2	x	x		
3			x	x

BMT-DIO4/2

BACnet Protocol Implementation Conformance Statement

Date: 10.01.2014
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-DIO4/2
Product Model Number: 110 883 13 26
Application Software Version: 1.0
Firmware Revision: 1.3
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing 4 Digital Inputs and 2 Relay Outputs.

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)**

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-COV-B (DS-COV-B)
Data Sharing-COV-Unsolicited-B (DS-COVU-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)
Device Management-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

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

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: No
2) Whether objects of this type are dynamically deletable using the DeleteObject service: No
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
6) List of proprietary properties and for each its property identifier, data type, and meaning
7) List of any property range restrictions

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), bit rate(s) _____
☒ MS/TP master (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☒ MS/TP slave (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐ Point-To-Point, EIA 232 (Clause 10), bit rate(s):_____
☐ Point-To-Point, modem, (Clause 10), bit 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.

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

Default strings implemented in the objects use UTF-8.
Default strings 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:

Configuration Switches

Hexadecimal Switches x10, x1 define the Network-Address (00 – F9) and bit rate (FA – FF).

Switches	FA	FB	FC	FD	FE	FF
Bit rate	9600	19200	38400	57600	76800	115200

- Turn Switch x10 to E (Device is temporarily configured as Slave)
- Turn Switch x1 to A – F to select bit rate
- Turn Switch x10 to F, wait 1 Second
- Red and green LEDs are blinking when bit rate is stored in EEPROM
- Turn Switch x10 to select Network-Address
- Turn Switch x1 to select Network-Address

MS/TP Master if using Network Address 0x00 … Max_Master,
MS/TP Slave if using Network Address Max_Master + 1 … 0xF9.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Name	max. 63 Bytes, default "BMT-DIO4/2_" + Network-Address (Hexadecimal)	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	"METZ CONNECT GmbH"	R
Vendor_Identifier	421	R
Model_Name	"BMT-DIO4/2"	R
Description	max. 127 Bytes, default ""	RW-E
Location	max. 63 Bytes, default ""	RW-E
Firmware_Revision	"1.3"	R
Application_Software_Version	"1.0"	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, BINARY_OUTPUT, BINARY_INPUT, GROUP, ANALOG_VALUE	R
Object_List [11]	device, binary-output 1…2, binary-input 1…4, group 1…3, analog-value 1	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	10000	R
Number_Of_APDU_Retries	3	R
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	max. 8 Subscriptions, for binary-input / binary-output, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Binary Output Object 1…2

Property	Remark / Value	RW
Object_Identifier	binary-output, instance 1 … 2	R
Object_Type	BINARY_OUTPUT (4)	R
Object_Name	max. 42 Bytes, default “Relay 1” … “Relay 2”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	NULL (write only) / INACTIVE (0) / ACTIVE (1)	RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 = Switch A (Auto) 1 = Switch 0 (Off) or 1 (On) OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Priority_Array [16]	NULL / INACTIVE (0) / ACTIVE (1)	R
Relinquish_Default	INACTIVE (0)	R
Inactive_Text	max. 20 Bytes, default “Off”	RW-E
Active_Text	max. 20 Bytes, default “On”	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Output

Out_Of_ Service	Polarity	Switch	Priority_ Array	Present_ Value	Binary Output	OVER RIDDEN	OUT_OF_ SERVICE
0	0	A	NULL / 0 / 1	0 / 0 / 1	0 / 0 / 1	0	0
0	0	0 1	NULL / 0 / 1 NULL / 0 / 1	0 1	0 1	1	0
0	1	A	NULL / 0 / 1	0 / 0 / 1	1 / 1 / 0	0	0
0	1	0 1	NULL / 0 / 1 NULL / 0 / 1	1 0	0 1	1	0
1	0	A	NULL / 0 / 1	0 / 0 / 1	0	0	1
1	0	0 1	NULL / 0 / 1 NULL / 0 / 1	0 / 0 / 1 0 / 0 / 1	0 1	0	1
1	1	A	NULL / 0 / 1	0 / 0 / 1	1	0	1
1	1	0 1	NULL / 0 / 1 NULL / 0 / 1	0 / 0 / 1 0 / 0 / 1	0 1	0	1

Binary Input Object 1…4

Property	Remark / Value	RW
Object_Identifier	binary-input, instance 1 … 4	R
Object_Type	BINARY_INPUT (3)	R
Object_Name	max. 42 Bytes, default “Input 1” … “Input 4”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	INACTIVE (0) / ACTIVE (1), writable if Out_Of_Service	R RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Inactive_Text	max. 20 Bytes, default “Off”	RW-E
Active_Text	max. 20 Bytes, default “On”	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Input

Out_Of_ Service	Polarity	Binary Input	Present_ Value	OUT_OF_ SERVICE
0	0	0 1	0 1	0
0	1	0 1	1 0	0
1	0	0 1	x	1
1	1	0 1	x	1

x: Present_Value is writable and not affected by inputs

Group Object 1…3

Property	Remark / Value	RW
Object_Identifier	group, instance 1 … 3	R
Object_Type	GROUP (11)	R
Object_Name	max. 42 Bytes, default “Group 1” … “Group 3”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Present_Value of Binary Inputs, see next Table	R
List_Of_Group_Members	see next Table	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Members of Groups

Group	Binary Input			
	1	2	3	4
1	x	x	x	x
2	x	x		
3			x	x

Analog Value Object 1

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 1	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 Bytes, default “Watchdog Time”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Time Constant of Watchdog Timer, 0: Watchdog is inactive, Maximum: 655.34 seconds	RW-E
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
Units	seconds (73)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

The Watchdog Timer resets Present_Value of all output objects to Relinquish_Default, if BACnet communication fails permanently. The timer is restarted, when a BACnet message with an APDU is received.
When the timer times out, the priority arrays of all output objects are completely cleared to NULL.

BMT-DIO4/2-IP

BACnet Protocol Implementation Conformance Statement

Date: 10.01.2014
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-DIO4/2-IP
Product Model Number: 110 883 13 26 IP
Application Software Version: 1.0
Firmware Revision: 1.3
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing 4 Digital Inputs and 2 Relay Outputs.

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)**

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-COV-B (DS-COV-B)
Data Sharing-COV-Unsolicited-B (DS-COVU-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)
Device Management-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

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

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: No
2) Whether objects of this type are dynamically deletable using the DeleteObject service: No
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
6) List of proprietary properties and for each its property identifier, data type, and meaning
7) List of any property range restrictions

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), bit rate(s) _____
☒ MS/TP master (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☒ MS/TP slave (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐ Point-To-Point, EIA 232 (Clause 10), bit rate(s):_____
☐ Point-To-Point, modem, (Clause 10), bit 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.

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

Default strings implemented in the objects use UTF-8.
Default strings 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:

Configuration Switches

Hexadecimal Switches x10, x1 define the Network-Address (00 – F9) and bit rate (FA – FF).

Switches	FA	FB	FC	FD	FE	FF
Bit rate	9600	19200	38400	57600	76800	115200

- Turn Switch x10 to E (Device is temporarily configured as Slave)
- Turn Switch x1 to A – F to select bit rate
- Turn Switch x10 to F, wait 1 second
- Red and green LEDs are blinking when bit rate is stored in EEPROM
- Turn Switch x10 to select Network-Address
- Turn Switch x1 to select Network-Address

MS/TP Master if using Network Address 0x00 … Max_Master,
MS/TP Slave if using Network Address Max_Master + 1 … 0xF9.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Name	max. 63 Bytes, default "BMT-DIO4/2-IP_" + Network-Address (Hexadecimal)	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	"METZ CONNECT GmbH"	R
Vendor_Identifier	421	R
Model_Name	"BMT-DIO4/2-IP"	R
Description	max. 127 Bytes, default ""	RW-E
Location	max. 63 Bytes, default ""	RW-E
Firmware_Revision	"1.3"	R
Application_Software_Version	"1.0"	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, BINARY_OUTPUT, BINARY_INPUT, GROUP, ANALOG_VALUE	R
Object_List [11]	device, binary-output 1…2, binary-input 1…4, group 1…3, analog-value 1	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	10000	R
Number_Of_APDU_Retries	3	R
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	max. 8 Subscriptions, for binary-input / binary-output, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Binary Output Object 1…2

Property	Remark / Value	RW
Object_Identifier	binary-output, instance 1 … 2	R
Object_Type	BINARY_OUTPUT (4)	R
Object_Name	max. 42 Bytes, default “Relay 1” … “Relay 2”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	NULL (write only) / INACTIVE (0) / ACTIVE (1)	RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 = Switch A (Auto) 1 = Switch 0 (Off) or 1 (On) OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Priority_Array [16]	NULL / INACTIVE (0) / ACTIVE (1)	R
Relinquish_Default	INACTIVE (0)	R
Inactive_Text	max. 20 Bytes, default “Off”	RW-E
Active_Text	max. 20 Bytes, default “On”	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Output

Out_Of_ Service	Polarity	Switch	Priority_ Array	Present_ Value	Binary Output	OVER RIDDEN	OUT_OF_ SERVICE
0	0	A	NULL / 0 / 1	0 / 0 / 1	0 / 0 / 1	0	0
0	0	0 1	NULL / 0 / 1 NULL / 0 / 1	0 1	0 1	1	0
0	1	A	NULL / 0 / 1	0 / 0 / 1	1 / 1 / 0	0	0
0	1	0 1	NULL / 0 / 1 NULL / 0 / 1	1 0	0 1	1	0
1	0	A	NULL / 0 / 1	0 / 0 / 1	0	0	1
1	0	0 1	NULL / 0 / 1 NULL / 0 / 1	0 / 0 / 1 0 / 0 / 1	0 1	0	1
1	1	A	NULL / 0 / 1	0 / 0 / 1	1	0	1
1	1	0 1	NULL / 0 / 1 NULL / 0 / 1	0 / 0 / 1 0 / 0 / 1	0 1	0	1

Binary Input Object 1…4

Property	Remark / Value	RW
Object_Identifier	binary-input, instance 1 … 4	R
Object_Type	BINARY_INPUT (3)	R
Object_Name	max. 42 Bytes, default “Input 1” … “Input 4”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	INACTIVE (0) / ACTIVE (1), writable if Out_Of_Service	R RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Inactive_Text	max. 20 Bytes, default “Off”	RW-E
Active_Text	max. 20 Bytes, default “On”	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Input

Out_Of_ Service	Polarity	Binary Input	Present_ Value	OUT_OF_ SERVICE
0	0	0 1	0 1	0
0	1	0 1	1 0	0
1	0	0 1	x	1
1	1	0 1	x	1

x: Present_Value is writable and not affected by inputs

Group Object 1…3

Property	Remark / Value	RW
Object_Identifier	group, instance 1 … 3	R
Object_Type	GROUP (11)	R
Object_Name	max. 42 Bytes, default “Group 1” … “Group 3”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Present_Value of Binary Inputs, see next Table	R
List_Of_Group_Members	see next Table	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Members of Groups

Group	Binary Input			
	1	2	3	4
1	x	x	x	x
2	x	x		
3			x	x

Analog Value Object 1

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 1	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 Bytes, default “Watchdog Time”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Time Constant of Watchdog Timer, 0: Watchdog is inactive, Maximum: 655.34 seconds	RW-E
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
Units	seconds (73)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

The Watchdog Timer resets Present_Value of all output objects to Relinquish_Default, if BACnet communication fails permanently. The timer is restarted, when a BACnet message with an APDU is received.
When the timer times out, the priority arrays of all output objects are completely cleared to NULL.

BMT-TP

BACnet Protocol Implementation Conformance Statement

Date: 10.01.2014
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-TP
Product Model Number: 110 888 13
Application Software Version: 1.0
Firmware Revision: 1.3
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing 6 Digital Inputs and 2 two-stage Relay Outputs and 2 Transistor Outputs (PhotoMOS).

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)**

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-COV-B (DS-COV-B)
Data Sharing-COV-Unsolicited-B (DS-COVU-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)
Device Management-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

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

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: No
2) Whether objects of this type are dynamically deletable using the DeleteObject service: No
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
6) List of proprietary properties and for each its property identifier, data type, and meaning
7) List of any property range restrictions

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), bit rate(s) _____
☒ MS/TP master (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☒ MS/TP slave (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐ Point-To-Point, EIA 232 (Clause 10), bit rate(s):_____
☐ Point-To-Point, modem, (Clause 10), bit 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.

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

Default strings implemented in the objects use UTF-8.
Default strings 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:

Configuration Switches

Hexadecimal Switches x10, x1 define the Network-Address (00 – F9) and bit rate (FA – FF).

Switches	FA	FB	FC	FD	FE	FF
Bit rate	9600	19200	38400	57600	76800	115200

- Turn Switch x10 to E (Device is temporarily configured as Slave)
- Turn Switch x1 to A – F to select bit rate
- Turn Switch x10 to F, wait 1 second
- Red and green LEDs are blinking when bit rate is stored in EEPROM
- Turn Switch x10 to select Network-Address
- Turn Switch x1 to select Network-Address

MS/TP Master if using Network Address 0x00 … Max_Master,
MS/TP Slave if using Network Address Max_Master + 1 … 0xF9.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Name	max. 63 Bytes, default "BMT-TP_" + Network-Address (Hexadecimal)	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	"METZ CONNECT GmbH"	R
Vendor_Identifier	421	R
Model_Name	"BMT-TP"	R
Description	max. 127 Bytes, default ""	RW-E
Location	max. 63 Bytes, default ""	RW-E
Firmware_Revision	"1.3"	R
Application_Software_Version	"1.0"	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, BINARY_OUTPUT, BINARY_INPUT, GROUP, MULTISTATE_OUTPUT, MULTISTATE_VALUE, ANALOG_VALUE	R
Object_List [25]	device, binary-output 1…2, binary-input 1…6, group 1…3, multistate-output 1…2, multistate-value 1…6, analog-value 1…5	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	10000	R
Number_Of_APDU_Retries	3	R
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	max. 12 Subscriptions, for binary-input / binary-output / multistate-output, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Multistate Value Object 1…2

Property	Remark / Value	RW
Object_Identifier	multistate-value, instance 1 … 2	R
Object_Type	MULTISTATE_VALUE (19)	R
Object_Name	max. 42 Bytes, default “Operating Mode 1” … “Operating Mode 2”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Operating Mode of Multistate Output Object 1…2, default 1	RW-E
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	4	R
State_Text	max. 20 Bytes, default 1: “Switch 0-1-2” 2: “Switch 1-0-2” 3: “Sunblind” 4: “Sunblind 2”	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Operating Mode 1 “Switch 0-1-2”

The Present_Value of Multistate Output Objects may be overridden by Switches.
Position of Switch 1 / 2 ST: Top = Off, Middle = Stage 1, Bottom = Stage 2.

Operating Mode 2 “Switch 1-0-2”

The Present_Value of Multistate Output Objects may be overridden by Switches.
Position of Switch 1 / 2 ST: Top = Stage 1, Middle = Off, Bottom = Stage 2.

Operating Mode 3 “Sunblind”

Binary Inputs 1 / 2 or 4 / 5 are used for Open / Close pushbutton switches.
Short actuation will yield a short pulse of constant duration for the appropriate Multistate Output.
Long actuation will yield a long pulse of constant duration for the appropriate Multistate Output.
Analog Value 2 defines the duration of short pulses (default 0.5s),
Analog Value 3 defines the duration of long pulses (default 60s).
Analog Value 5 defines the minimum long key press time (default 2s).

Commands written to Multistate Value 6 may be used for security functions.

The Present_Value of Multistate Output Objects will not be be overridden by Switches.
Instead Commands, Switches and pulses generated of Binary Inputs may be mapped to Priority_Array levels
of Multistate Output Objects. Multistate Value 3 defines the Input Priority, Multistate Value 4 defines the Switch Priority, Multistate Value 5 defines the Command Priority.
If mapped to the same priority level, the relative priority is: network < command < switch < input.

Position of Switch 1 / 2 ST: Top = Stage 1 / Open, Middle = Off, Bottom = Stage 2 / Close.
Input 1 / 2 off: NULL, Input 1 on: Relay 1 Stage 1 / Open, only Input 2 on: Relay 1 Stage 2 / Close.
Input 4 / 5 off: NULL, Input 4 on: Relay 2 Stage 1 / Open, only Input 5 on: Relay 2 Stage 2 / Close.

Operating Mode 4 “Sunblind 2”

Multistate Value 1 and 2 are forced to the same Operating Mode.
Multistate Output 1 is used for both Relay Outputs.
Multistate Output 2 is disabled.

Binary Inputs 1 / 2 are used for Open / Close pushbutton switches.
Short actuation will yield a short pulse of constant duration for Multistate Output 1.
Long actuation will yield a long pulse of constant duration for Multistate Output 1.
Analog Value 2 defines the duration of short pulses (default 0.5s),
Analog Value 3 defines the duration of long pulses (default 60s).
Analog Value 5 defines the minimum long key press time (default 2s).

Commands written to Multistate Value 6 may be used for security functions.

The Present_Value of Multistate Output Object 1 will not be overridden by Switches.
Instead Commands, Switches and pulses generated of Binary Inputs may be mapped to Priority_Array levels
of Multistate Output Object 1. Multistate Value 3 defines the Input Priority, Multistate Value 4 defines the Switch Priority, Multistate Value 5 defines the Command Priority.
If mapped to the same priority level, the relative priority is: network < command < switch < input.

Position of Switch 1 ST: Top = Stage 1 / Open, Middle = Off, Bottom = Stage 2 / Close.
Input 1 / 2 off: NULL, Input 1 on: Relays Stage 1 / Open, only Input 2 on: Relays Stage 2 / Close.

	Wiring	Terminals	Wiring
Motor (Open – / Close +)	31	11	Motor (Open + / Close –)
	GND	34 24	GND
	+24V	44 14	+24V

Multistate Value Object 3…5

Property	Remark / Value	RW
Object_Identifier	multistate-value, instance 3, 4, 5	R
Object_Type	MULTISTATE_VALUE (19)	R
Object_Name	max. 42 Bytes, default “Input Priority”, “Switch Priority”, “Command Priority”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Priority_Array level of Multistate Output objects values: 1 … 16 default: Input 9, Switch 7, Command 4	RW-E
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	16	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Analog Value Object 2…5

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 2, 3, 4, 5	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 Bytes, default “Short Pulse”, “Long Pulse”, “Rotation Pulse”, “Key Press Time”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Time constant of Multistate Output pulses values: 0 … 655.34 seconds default: Short 0.5 sec, Long 60 sec, Rotation 1 sec, Key Press Time 2 sec	RW-E
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
Units	seconds (73)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Multistate Value Object 6

Property	Remark / Value	RW
Object_Identifier	multistate-value, instance 6	R
Object_Type	MULTISTATE_VALUE (19)	R
Object_Name	max. 42 Bytes, default “Command”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Command to Multistate Output objects values: 1 … 5, default: 5 1: Long pulse to open, lock inputs and switches 2: Long pulse to close, lock inputs and switches 3: Long pulse to close, then rotate pulse to open, lock inputs and switches 4: Lock inputs and switches 5: Normal operation of inputs and switches	RW
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	5	R
State_Text	max. 20 Bytes, default 1: “Open” 2: “Close” 3: “Close/Rotate” 4: “Locked” 5: “Normal”	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Multistate Output Object 1…2

Property	Remark / Value	RW
Object_Identifier	multistate-output, instance 1 … 2	R
Object_Type	MULTISTATE_OUTPUT (14)	R
Object_Name	max. 42 Bytes, default “Relay 1” … “Relay 2”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	NULL (write only) / 1 / 2 / 3	RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 = Switch A (Auto) 1 = Switch H (Hand) OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1), Output is switched Off when TRUE	RW
Number_Of_States	3	R
State_Text	max. 20 Bytes, default State 1: “Off”, State 2: “Stage-1/Open”, State 3: “Stage-2/Close”	RW-E
Priority_Array [16]	NULL / 1 / 2 / 3	R
Relinquish_Default	1	R
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

When switching between States 2 and 3 a minimum Off Time of 500ms is inserted.

The Present_Value may be overridden by Switches.
Commands, Switches and Binary Inputs may be mapped to Priority_Array levels.
For details concerning Operating Mode see Multistate Values 1…2.

BACnet Standard Priority_Array Levels

Level	Application	Level	Application
1	Manual Life Safety	9	Available
2	Automatic Life Safety	10	Available
3	Available	11	Available
4	Available	12	Available
5	Critical Equipment Control	13	Available
6	Minimum On / Off	14	Available
7	Available	15	Available
8	Manual Operator	16	Available

Binary Output Object 1…2

Property	Remark / Value	RW
Object_Identifier	binary-output, instance 1 … 2	R
Object_Type	BINARY_OUTPUT (4)	R
Object_Name	max. 42 Bytes, default “Transistor 1” … “Transistor 2”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	NULL (write only) / INACTIVE (0) / ACTIVE (1)	RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Priority_Array [16]	NULL / INACTIVE (0) / ACTIVE (1)	R
Relinquish_Default	INACTIVE (0)	R
Inactive_Text	max. 20 Bytes, default “Off”	RW-E
Active_Text	max. 20 Bytes, default “On”	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Output

Out_Of_ Service	Polarity	Priority_Array and Relinquish_Default	Present_ Value	Binary Output	OUT_OF_ SERVICE
0	0	0 / 1	0 / 1	0 / 1	0
0	1	0 / 1	0 / 1	1 / 0	0
1	0	0 / 1	0 / 1	0	1
1	1	0 / 1	0 / 1	1	1

Binary Input Object 1…6

Property	Remark / Value	RW
Object_Identifier	binary-input, instance 1 … 6	R
Object_Type	BINARY_INPUT (3)	R
Object_Name	max. 42 Bytes, default “Input 1” … “Input 6”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	INACTIVE (0) / ACTIVE (1), writable if Out_Of_Service	R RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Inactive_Text	max. 20 Bytes, default “Off”	RW-E
Active_Text	max. 20 Bytes, default “On”	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Input

Out_Of_ Service	Polarity	Binary Input	Present_ Value	OUT_OF_ SERVICE
0	0	0 1	0 1	0
0	1	0 1	1 0	0
1	0	0 1	x	1
1	1	0 1	x	1

x: Present_Value is writable and not affected by inputs

Group Object 1…3

Property	Remark / Value	RW
Object_Identifier	group, instance 1 … 3	R
Object_Type	GROUP (11)	R
Object_Name	max. 42 Bytes, default “Group 1” … “Group 3”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Present_Value of Binary Inputs, see next Table	R
List_Of_Group_Members	see next Table	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Members of Groups

Group	Binary Input					
	1	2	3	4	5	6
1	x	x	x	x	x	x
2	x	x	x			
3				x	x	x

Analog Value Object 1

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 1	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 Bytes, default “Watchdog Time”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Time Constant of Watchdog Timer, 0: Watchdog is inactive, Maximum: 655.34 seconds	RW-E
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
Units	seconds (73)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

The Watchdog Timer resets Present_Value of all output objects to Relinquish_Default, if BACnet communication fails permanently. The timer is restarted, when a BACnet message with an APDU is received.
When the timer times out, the priority arrays of all output objects are completely cleared to NULL.

BMT-AO4

BACnet Protocol Implementation Conformance Statement

Date: 10.01.2014
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-AO4
Product Model Number: 110 885 13 02
Application Software Version: 1.0
Firmware Revision: 1.3
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing 4 Analog Outputs 0 – 10 V.

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)**

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-COV-B (DS-COV-B)
Data Sharing-COV-Unsolicited-B (DS-COVU-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)
Device Management-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

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

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: No
2) Whether objects of this type are dynamically deletable using the DeleteObject service: No
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
6) List of proprietary properties and for each its property identifier, data type, and meaning
7) List of any property range restrictions

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), bit rate(s) _____
☒ MS/TP master (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☒ MS/TP slave (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐ Point-To-Point, EIA 232 (Clause 10), bit rate(s):_____
☐ Point-To-Point, modem, (Clause 10), bit 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.

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

Default strings implemented in the objects use UTF-8.
Default strings 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:

Configuration Switches

Hexadecimal Switches x10, x1 define the Network-Address (00 – F9) and bit rate (FA – FF).

Switches	FA	FB	FC	FD	FE	FF
Bit rate	9600	19200	38400	57600	76800	115200

- Turn Switch x10 to E (Device is temporarily configured as Slave)
- Turn Switch x1 to A – F to select bit rate
- Turn Switch x10 to F, wait 1 second
- Red and green LEDs are blinking when bit rate is stored in EEPROM
- Turn Switch x10 to select Network-Address
- Turn Switch x1 to select Network-Address

MS/TP Master if using Network Address 0x00 … Max_Master,
MS/TP Slave if using Network Address Max_Master + 1 … 0xF9.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Name	max. 63 Bytes, default "BMT-AO4_" + Network-Address (Hexadecimal)	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	"METZ CONNECT GmbH"	R
Vendor_Identifier	421	R
Model_Name	"BMT-AO4"	R
Description	max. 127 Bytes, default ""	RW-E
Location	max. 63 Bytes, default ""	RW-E
Firmware_Revision	"1.3"	R
Application_Software_Version	"1.0"	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, ANALOG_OUTPUT, ANALOG_VALUE	R
Object_List [6]	device, analog-output 1…4, analog-value 1	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	10000	R
Number_Of_APDU_Retries	3	R
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	max. 6 Subscriptions, for analog-output 1…4, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Analog Output Object 1…4

Property	Remark / Value	RW
Object_Identifier	analog-output, instance 1 … 4	R
Object_Type	ANALOG_OUTPUT (1)	R
Object_Name	max. 42 Bytes, default “Output 1” … “Output 4”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	0.0 … 102.4 (0V … 10.24V)	RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Units	Percent (98)	R
Priority_Array [16]	NULL / 0.0 … 102.4 (0V … 10.24V)	R
Relinquish_Default	0.0 … 102.4 (0V … 10.24V)	RW-E
COV_Increment	Minimum change of Present_Value for COV notification, default 1.0	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
Resolution	0.00625 (0.625 mV)	-
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Analog Output				
Out_Of_Service	Priority_Array	Present_Value	Analog Output	OUT_OF_SERVICE
0	NULL	Relinquish_Default	Relinquish_Default	0
	Value	Value	Value	
1	NULL	Relinquish_Default	unchanged	1
	Value	Value		

Analog Value Object 1

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 1	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 Bytes, default “Watchdog Time“	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Time Constant of Watchdog Timer, 0: Watchdog is inactive, Maximum: 655.34 seconds	RW-E
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
Units	seconds (73)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

The Watchdog Timer resets Present_Value of all output objects to Relinquish_Default, if BACnet communication fails permanently. The timer is restarted, when a BACnet message with an APDU is received.
When the timer times out, the priority arrays of all output objects are completely cleared to NULL.

BMT-AOP4

BACnet Protocol Implementation Conformance Statement

Date: 10.01.2014
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-AOP4
Product Model Number: 110 887 13 02
Application Software Version: 1.0
Firmware Revision: 1.3
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing 4 Analog Outputs 0 – 10 V.

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)**

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-COV-B (DS-COV-B)
Data Sharing-COV-Unsolicited-B (DS-COVU-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)
Device Management-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

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

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: No
2) Whether objects of this type are dynamically deletable using the DeleteObject service: No
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
6) List of proprietary properties and for each its property identifier, data type, and meaning
7) List of any property range restrictions

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), bit rate(s) _____
☒ MS/TP master (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☒ MS/TP slave (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐ Point-To-Point, EIA 232 (Clause 10), bit rate(s):_____
☐ Point-To-Point, modem, (Clause 10), bit 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.

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

Default strings implemented in the objects use UTF-8.
Default strings 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:

Configuration Switches

Hexadecimal Switches x10, x1 define the Network-Address (00 – F9) and bit rate (FA – FF).

Switches	FA	FB	FC	FD	FE	FF
Bit rate	9600	19200	38400	57600	76800	115200

- Turn Switch x10 to E (Device is temporarily configured as Slave)
- Turn Switch x1 to A – F to select bit rate
- Turn Switch x10 to F, wait 1 second
- Red and green LEDs are blinking when bit rate is stored in EEPROM
- Turn Switch x10 to select Network-Address
- Turn Switch x1 to select Network-Address

MS/TP Master if using Network Address 0x00 … Max_Master,
MS/TP Slave if using Network Address Max_Master + 1 … 0xF9.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Name	max. 63 Bytes, default "BMT-AOP4_" + Network-Address (Hexadecimal)	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	"METZ CONNECT GmbH"	R
Vendor_Identifier	421	R
Model_Name	"BMT-AOP4"	R
Description	max. 127 Bytes, default ""	RW-E
Location	max. 63 Bytes, default ""	RW-E
Firmware_Revision	"1.3"	R
Application_Software_Version	"1.0"	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, ANALOG_OUTPUT, ANALOG_VALUE	R
Object_List [6]	device, analog-output 1…4, analog-value 1	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	10000	R
Number_Of_APDU_Retries	3	R
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	max. 6 Subscriptions, for analog-output 1…4, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Analog Output Object 1…4

Property	Remark / Value	RW
Object_Identifier	analog-output, instance 1 … 4	R
Object_Type	ANALOG_OUTPUT (1)	R
Object_Name	max. 42 Bytes, default “Output 1” … “Output 4”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	0.0 … 102.4 (0V … 10.24V)	RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 / 1 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Units	Percent (98)	R
Priority_Array [16]	NULL / 0.0 … 102.4 (0V … 10.24V)	R
Relinquish_Default	0.0 … 102.4 (0V … 10.24V)	RW-E
COV_Increment	Minimum change of Present_Value for COV notification, default 1.0	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
Resolution	0.00625 (0.625 mV)	-
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Analog Output						
Out_Of_Service	Potentiometer	Priority_Array	Present_Value	Analog Output	OVERRIDDEN	OUT_OF_SERVICE
0	Automatic (Left Stop)	NULL	Relinquish_Default	Relinquish_Default	0	0
		Value	Value	Value		
0	Manual (Not Left Stop)	NULL	Manual	Manual	1	0
		Value				
1	Automatic (Left Stop)	NULL	Relinquish_Default	unchanged	0	1
		Value	Value			
1	Manual (Not Left Stop)	NULL	Relinquish_Default	Manual	0	1
		Value	Value			

Analog Value Object 1

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 1	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 Bytes, default “Watchdog Time“	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Time Constant of Watchdog Timer, 0: Watchdog is inactive, Maximum: 655.34 seconds	RW-E
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
Units	seconds (73)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

The Watchdog Timer resets Present_Value of all output objects to Relinquish_Default, if BACnet communication fails permanently. The timer is restarted, when a BACnet message with an APDU is received.
When the timer times out, the priority arrays of all output objects are completely cleared to NULL.

BMT-AI8

BACnet Protocol Implementation Conformance Statement

Date: 10.01.2014
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-AI8
Product Model Number: 110 882 13
Application Software Version: 1.0
Firmware Revision: 1.3
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing 8 Analog Inputs.

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)**

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-COV-B (DS-COV-B)
Data Sharing-COV-Unsolicited-B (DS-COVU-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)
Device Management-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

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

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: No
2) Whether objects of this type are dynamically deletable using the DeleteObject service: No
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
6) List of proprietary properties and for each its property identifier, data type, and meaning
7) List of any property range restrictions

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), bit rate(s) _____
☒ MS/TP master (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☒ MS/TP slave (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐ Point-To-Point, EIA 232 (Clause 10), bit rate(s):_____
☐ Point-To-Point, modem, (Clause 10), bit 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.

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

Default strings implemented in the objects use UTF-8.
Default strings 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:

Configuration Switches

Hexadecimal Switches x10, x1 define the Network-Address (00 – F9) and bit rate (FA – FF).

Switches	FA	FB	FC	FD	FE	FF
Bit rate	9600	19200	38400	57600	76800	115200

- Turn Switch x10 to E (Device is temporarily configured as Slave)
- Turn Switch x1 to A – F to select bit rate
- Turn Switch x10 to F, wait 1 second
- Red and green LEDs are blinking when bit rate is stored in EEPROM
- Turn Switch x10 to select Network-Address
- Turn Switch x1 to select Network-Address

MS/TP Master if using Network Address 0x00 … Max_Master,
MS/TP Slave if using Network Address Max_Master + 1 … 0xF9.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Name	max. 63 Bytes, default "BMT-AI8_" + Network-Address (Hexadecimal)	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	"METZ CONNECT GmbH"	R
Vendor_Identifier	421	R
Model_Name	"BMT-AI8"	R
Description	max. 127 Bytes, default ""	RW-E
Location	max. 63 Bytes, default ""	RW-E
Firmware_Revision	"1.3"	R
Application_Software_Version	"1"	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, ANALOG_INPUT, ANALOG_VALUE, MULTISTATE_VALUE, GROUP	R
Object_List [49]	device, analog-input 1…8, analog-value 1…28, multistate-value 1…9, group 1…3	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	10000	R
Number_Of_APDU_Retries	3	R
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	max. 10 Subscriptions, for analog-input 1…8, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Analog Input Object 1…8

Property	Remark / Value	RW
Object_Identifier	analog-input, instance 1 … 8	R
Object_Type	ANALOG_INPUT (0)	R
Object_Name	max. 42 Bytes, default “Input 1” … “Input 8”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Measured value, writable if Out_Of_Service, Measurement Range defined in Multistate Value 1…8	R RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Units	Defined in Multistate Value 1…8	R
COV_Increment	Minimum change of Present_Value for COV notification, default 1.0	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Analog Value Object 21…28

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 21 … 28	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 Bytes, default “Offset 1” … “Offset 8”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Offset is added to measured value (Analog Input 1 … 8), default 0.0	RW-E
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
Units	same as Analog Input 1 … 8	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Multistate Value Object 1…8

Property	Remark / Value	RW
Object_Identifier	multistate-value, instance 1 … 8	R
Object_Type	MULTISTATE_VALUE (19)	R
Object_Name	max. 42 Bytes, default “Measurement Range 1” … “Measurement Range 8”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Measurement Range of Analog Input 1…8 - Voltage (%, Volt) - Voltage, Pullup Resistor 2kOhm to 5V (% P, Volt P) - Resistance (Ohm) - User defined Sensor - Standard Temperature Sensors	RW-E
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	19	R
State_Text	max. 20 Bytes, default see next Table	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Measurement Ranges		
State	State_Text	Units of Analog Input
1 default	"0-10V %"	percent (98)
2	"0-10V % P"	percent (98)
3	"0-10 Volt"	volts (5)
4	"0-10 Volt P"	volts (5)
5	"Ohm"	ohms (4)
6	"User Defined"	set in Analog Value Object X1…X10
7	"PT100"	degrees-Celsius (62)
8	"PT500"	degrees-Celsius (62)
9	"PT1000"	degrees-Celsius (62)
10	"NI1000-TC5000"	degrees-Celsius (62)
11	"NI1000-TC6180"	degrees-Celsius (62)
12	"BALCO500"	degrees-Celsius (62)
13	"KTY81_110"	degrees-Celsius (62)
14	"KTY81_210"	degrees-Celsius (62)

15	"NTC1k8-T"	degrees-Celsius (62)
16	"NTC5k-T"	degrees-Celsius (62)
17	"NTC10k-T"	degrees-Celsius (62)
18	"NTC20k-T"	degrees-Celsius (62)
19	"LM235Z"	degrees-Celsius (62)

Analog Value Object 1…20

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 1 … 20	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 Bytes, default “X 1”, “Y 1” … “X 10”, “Y 10”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Interpolation Table in User Defined Measurement Range	RW-E
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
Units	X1…X10: Units of Analog Input Object (default °C)	RW-E
	Y1…Y10: Defined in Multistate Value 9	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Interpolation Table					
Instance	Name	Default Value	Instance	Name	Default Value
1	“X 1”	-10.0	2	“Y 1”	960.86
3	“X 2”	10.0	4	“Y 2”	1039.03
5	“X 3”	30.0	6	“Y 3”	1116.73
7	“X 4”	50.0	8	“Y 4”	1193.97
9	“X 5”	70.0	10	“Y 5”	1270.75
11	“X 6”	0.0	12	“Y 6”	0.0
13	“X 7”	0.0	14	“Y 7”	0.0
15	“X 8”	0.0	16	“Y 8”	0.0
17	“X 9”	0.0	18	“Y 9”	0.0
19	“X 10”	0.0	20	“Y 10”	0.0

The Interpolation Table by default provides an example for PT1000 Temperature Sensors. In the example X values are Temperature in °C, Y values are Resistance in Ohms. X and Y values must be sorted in ascending or descending order. The table ends where both values are 0.0. Measurement Range at Input must be selected in Multistate Value 9.

Multistate Value Object 9

Property	Remark / Value	RW
Object_Identifier	multistate-value, instance 9	R
Object_Type	MULTISTATE_VALUE (19)	R
Object_Name	max. 42 Bytes, default “User Defined Range”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Selection of Measurement Range at Input - Voltage (Volt) - Voltage, Pullup Resistor 2kOhm to 5V (Volt P) - Resistance (Ohm) and Usage of Interpolation Table - approximately linear sensor (e.g. PT1000) - approximately exponential sensor (e.g. NTC) default 3, for PT1000 example	RW-E
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
State_Text	max. 20 Bytes, default see next Table	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

User Defined Range		
State	State_Text	Units of Analog Values Y
1	"Volt lin"	volts (5)
2	"Volt P lin"	volts (5)
3	"Ohm lin"	ohms (4)
4	"Volt exp"	volts (5)
5	"Volt P exp"	volts (5)
6	"Ohm NTC exp"	ohms (4)

Group Object 1…3

Property	Remark / Value	RW
Object_Identifier	group, instance 1 … 3	R
Object_Type	GROUP (11)	R
Object_Name	max. 42 Bytes, default “Group 1” … “Group 3”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Present_Value of Analog Inputs, see next Table	R
List_Of_Group_Members	see next Table	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Members of Groups								
Group	Analog Input							
	1	2	3	4	5	6	7	8
1	x	x	x	x	x	x	x	x
2	x	x	x	x				
3					x	x	x	x

Table for PT- and NI-Sensors

Temp	PT100 TC3850	PT500 TC3850	PT1000 TC3850	NI1000 TC5000	NI1000 TC6180	BALCO 500
°C	Ohm	Ohm	Ohm	Ohm	Ohm	Ohm
-50	80.306	401.53	803.06	790.88	742.55	361.65
-30	88.222	441.11	882.22	871.69	841.46	397.05
-10	96.086	480.43	960.86	956.24	945.82	433.96
10	103.903	519.51	1039.03	1044.79	1055.52	472.91
30	111.673	558.36	1116.73	1137.62	1170.56	513.89
50	119.397	596.99	1193.97	1234.98	1291.05	556.90
70	127.075	635.38	1270.75	1337.15	1417.21	601.94
90	134.707	673.53	1347.07	1444.39	1549.34	649.02
110	142.293	711.46	1422.93	1556.98	1687.89	698.13
130	149.832	749.16	1498.32	1675.19	1833.35	749.27
150	157.325	786.63	1573.25	1799.27	1986.35	802.44

Table for KTY81- and NTC-Sensors

Temp	KTY81-110	KTY81-210	NTC1k8-T	NTC5k-T	NTC10k-T	NTC20k-T
°C	Ohm	Ohm	Ohm	kOhm	kOhm	kOhm
-50	515	1030		333.9	667.8	1668.0
-40	567	1135		167.8	335.7	813.4
-30	624	1247	24500	88.34	176.7	415.5
-20	684	1367	14000	48.49	96.97	221.3
-10	747	1495	8400	27.65	55.30	122.5
0	815	1630	5200	16.33	32.65	70.20
10	886	1772	3330	9.952	19.90	41.56
20	961	1922	2200	6.247	12.49	25.35
30	1040	2080	1480	4.028	8.06	15.89
40	1122	2245	1040	2.662	5.32	10.21
50	1209	2417	740	1.801	3.60	6.72
60	1299	2597	540	1.244	2.49	4.52
70	1392	2785	402	0.8758	1.75	3.10
80	1490	2980	306	0.6281	1.26	2.12
90	1591	3182	240	0.4581	0.92	1.54
100	1696	3392	187	0.3393	0.68	1.12
110	1805	3607	149	0.2550	0.51	0.82
120	1915	3817	118	0.1943	0.39	0.61
130	2023	4008	95	0.1499	0.30	0.46
140	2124	4166	77	0.1170	0.23	0.35
150	2211	4280	64	0.0924	0.18	0.27

Table for LM235Z

Temp	°C	-40	0	40	80	120
LM235Z	Volt	2.332	2.732	3.132	3.532	3.932

BMT-CI4

BACnet Protocol Implementation Conformance Statement

Date: 10.10.2014
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-CI4
Product Model Number: 110 890 13 32
Application Software Version: 1.0
Firmware Revision: 1.0
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing 4 Analog Inputs 0-10V or 0-20mA or 4-20mA.

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)**

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-COV-B (DS-COV-B)
Data Sharing-COV-Unsolicited-B (DS-COVU-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)
Device Management-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

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

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: No
2) Whether objects of this type are dynamically deletable using the DeleteObject service: No
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
6) List of proprietary properties and for each its property identifier, datatype, and meaning
7) List of any property range restrictions

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), bit rate(s) _____
☒ MS/TP master (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☒ MS/TP slave (Clause 9), bit rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐ Point-To-Point, EIA 232 (Clause 10), bit rate(s):_____
☐ Point-To-Point, modem, (Clause 10), bit 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.

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

Default strings implemented in the objects use UTF-8.
Default strings 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:

Configuration Switches

Hexadecimal Switches x10, x1 define the Network-Address (00 – F9) and bit rate (FA – FF).

Switches	FA	FB	FC	FD	FE	FF
Bit rate	9600	19200	38400	57600	76800	115200

- Turn Switch x10 to E (Device is temporarily configured as Slave)
- Turn Switch x1 to A – F to select bit rate
- Turn Switch x10 to F, wait 1 Second
- Red and green LEDs are blinking when bit rate is stored in EEPROM
- Turn Switch x10 to select Network-Address
- Turn Switch x1 to select Network-Address

MS/TP Master if using Network Address 0x00 … Max_Master,
MS/TP Slave if using Network Address Max_Master + 1 … 0xF9.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Name	max. 63 Bytes, default "BMT-CI4_" + Network-Address (Hexadecimal)	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	"METZ CONNECT GmbH"	R
Vendor_Identifier	421	R
Model_Name	"BMT-CI4"	R
Description	max. 127 Bytes, default ""	RW-E
Location	max. 63 Bytes, default ""	RW-E
Firmware_Revision	"1.0"	R
Application_Software_Version	"1.0"	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, ANALOG_INPUT, ANALOG_VALUE, GROUP, MULTISTATE_VALUE (only for calibration)	R
Object_List [12]	device, analog-input 1…4, analog-value 1…4, group 1…3, (multistate-value 1…2, visible only when calibrating)	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	1…65535, default 6000	RW-E
Number_Of_APDU_Retries	1…10, default 3	RW-E
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	max. 6 Subscriptions, for analog -input 1…4, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Analog Input Object 1…4

Property	Remark / Value	RW
Object_Identifier	analog-input, instance 1 … 4	R
Object_Type	ANALOG_INPUT (0)	R
Object_Name	max. 42 Bytes, default “Input 1” … “Input 4”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Device_Type	max. 31 Bytes, default “”	RW-E
Present_Value	Measured value, writable if Out_Of_Service	R RW
Status_Flags	IN_ALARM: 0 FAULT: 0 / 1 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Units	Percent (98)	R
Reliability	NO_FAULT_DETECTED (0), OVER_RANGE (2) when > Max_Pres_Value, UNDER_RANGE (3) when < Min_Pres_Value	R
Update_Interval	50 (= 500 ms)	R
Min_Pres_Value	0.0 %	R
Max_Pres_Value	110.0 %	R
Resolution	0.003 %	R
COV_Increment	Minimum change of Present_Value for COV notification, default 1.0	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Terminal U1 … U4: Voltage, Input Resistance 200 kOhm
Terminal I1 … I4: Current, Input Resistance 100 Ohm
Terminal 1- … 4-: Ground

Measurement Range				
Input 1 / 2 / 3 / 4	0-10 V	0-20 mA	0-20 mA	4-20 mA
DIP Switch 1 / 3 / 5 / 7	OFF	ON	OFF	ON
DIP Switch 2 / 4 / 6 / 8	OFF	OFF	ON	ON
Value 0 %	0 V	0 mA	0 mA	4 mA
Value 100 %	10 V	20 mA	20 mA	20 mA
Value 110 %	11 V	22 mA	22 mA	21.6 mA

Analog Value Object 1…4

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 1 … 4	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 Bytes, default “Offset 1” … “Offset 4”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Offset is added to measured value (Analog Input 1 … 4), default 0.0	RW-E
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
Units	Percent (98)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Group Object 1…3

Property	Remark / Value	RW
Object_Identifier	group, instance 1 … 3	R
Object_Type	GROUP (11)	R
Object_Name	max. 42 Bytes, default “Group 1” … “Group 3”	RW-E
Description	max. 84 Bytes, default “”	RW-E
Present_Value	Present_Value of Analog Inputs, see next Table	R
List_Of_Group_Members	see next Table	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Members of Groups				
Group	Analog Input			
	1	2	3	4
1	x	x	x	x
2	x	x		
3			x	x

BMT-Multi-IO

BACnet Protocol Implementation Conformance Statement

Date: 06.02.2017
Vendor Name: METZ CONNECT GmbH
Product Name: BMT-Multi-IO
Product Model Number: 110 893 13
Application Software Version: 7
Firmware Revision: 1.0
BACnet Protocol Revision: 12

Product Description:

BACnet MS/TP Application Specific Controller providing
- 11 optocoupler inputs (24 V AC/DC, 4.3 mA),
- 1 current input (sources 12 V, 15 mA to a switch),
- 4 relay outputs (250 V AC, 5 A),
- 4 transistor outputs (Photo-MOS, 40 V AC/DC, 100 mA),
- 6 analog inputs (voltage 0-10 V, resistance 40-4M Ohm, temperature sensors),
- 1 analog input (current 0-20 mA, shunt 200 Ohm),
- 2 isolated analog outputs (0-10 V, max. load 2 kOhm).

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-COV-B (DS-COV-B)
Data Sharing-COV-Unsolicited-B (DS-COVU-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)
Device Management-ReinitializeDevice-B (DM-RD-B)

Segmentation Capability:

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

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: No
2) Whether objects of this type are dynamically deletable using the DeleteObject service: No
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
6) List of proprietary properties and for each its property identifier, datatype, and meaning
7) List of any property range restrictions

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
☐ 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

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 strings implemented in the objects use UTF-8.
Default strings 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

Configuration Switches

Hexadecimal switches x10, x1 define the network address (00 – F9) and baud rate (FA – FF).

Switches	FA	FB	FC	FD	FE	FF
Baud Rate	9600	19200	38400	57600	76800	115200

- Turn switch x10 to E (device is temporarily configured as slave)
- Turn switch x1 to A – F to select baud rate
- Turn switch x10 to F, wait 1 second
- Red and green LEDs are blinking when baud rate is stored in EEPROM
- Turn switch x10 to select network address
- Turn switch x1 to select network address

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 … 0xF9 is used.

Device Object

Property	Remark / Value	RW
Object_Identifier	device, default instance: 421000 + Network-Address	RW-E
Object_Type	DEVICE (8)	R
Object_Name	max. 63 bytes, default “BMT-Multi-IO_” + Network-Address (Hexadecimal)	RW-E
Property_List		R
Description	max. 127 bytes, default “”	RW-E
Location	max. 63 bytes, default “”	RW-E
Vendor_Name	“METZ CONNECT GmbH”	R
Vendor_Identifier	421	R
Model_Name	“BMT-Multi-IO”	R
Firmware_Revision	“1.0”	R
Application_Software_Version	“7”	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, subscribe-cov, who-has, who-is, read-range, device-communication-control, reinitialize-device	R
Protocol_Object_Types_Supported	DEVICE, BINARY_INPUT, BINARY_OUTPUT, ANALOG_INPUT, ANALOG_OUTPUT, ANALOG_VALUE, MULTISTATE_VALUE, ACCUMULATOR, STRUCTURED_VIEW	R
Object_List	device, binary-input 1…12, binary-output 1…8, analog-input 1…7, analog-output 1…2, analog-value 1…28, multistate-value 1…8, accumulator 1, structured-view 1…4	R

Structured_Object_List	structured-view 1	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
System_Status	OPERATIONAL (0)	R
APDU_Timeout	1…65535, default 6000	RW-E
Number_Of_APDU_Retries	1…10, default 3	RW-E
Device_Address_Binding	-	R
Database_Revision	0	R
Max_Master	0…127, default 127	RW-E
Max_Info_Frames	1…255, default 1	RW-E
Active_COV_Subscriptions	service Read-Property max. 12 subscriptions, service Read-Range max. 30 subscriptions, COV may be used with all input and output objects, Confirmed / Unconfirmed, Lifetime = 0…65535 sec.	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Structured View Object 1…4

Property	Remark / Value	RW
Object_Identifier	structured-view, instance 1 … 4	R
Object_Type	STRUCTURED_VIEW (29)	R
Object_Name	max. 42 bytes, default see table below	RW-E
Property_List		R
Description	max. 84 bytes, default “”	RW-E
Node_Type	see table below	R
Subordinate_List	see table below	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Subordinate Lists			
Instance	Object_Name	Node_Type	Object References
1	“Device”	DEVICE (3)	structured-view 2…4 device accumulator 1
2	“Digital-In”	COLLECTION (8)	binary-input 1…12
3	“Analog-In”	COLLECTION (8)	analog-input 1…7 analog-value 1…27 multistate-value 1…8
4	“Outputs”	COLLECTION (8)	binary-output 1…8 analog-output 1…2 analog-value 28

Binary Output Object 1…8

Relays: Terminals 11, 12 (NC), 14 (NO) … 41, 42 (NC), 44 (NO), with hand mode.
Transistors: Terminals D1 … D4, C2 (Common), no hand mode.
Auto / Hand keys: Long actuation toggles between auto and hand mode, shown with green LED.
Short actuation toggles between relay on and off, shown with yellow LED.

Property	Remark / Value	RW
Object_Identifier	binary-output, instance 1 … 8	R
Object_Type	BINARY_OUTPUT (4)	R
Object_Name	max. 42 bytes, default “Relay 1” … “Relay 4”, “Transistor D1” … “Transistor D4”	RW-E
Property_List		R
Description	max. 84 bytes, default “”	RW-E
Inactive_Text	max. 20 bytes, default “Off”	RW-E
Active_Text	max. 20 bytes, default “On”	RW-E
Present_Value	NULL (write only) / INACTIVE (0) / ACTIVE (1)	RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 / 1 = Auto / Hand mode OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Priority_Array [16]	NULL / INACTIVE (0) / ACTIVE (1)	R
Relinquish_Default	INACTIVE (0)	R
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Output							
Out_Of_ Service	Polarity	mode key	Priority_Array and Relinquish_Default	Present_ Value	Binary Output	OVER RIDDEN	OUT_OF_ SERVICE
0	0	Auto	0 / 1	0 / 1	0 / 1	0	0
0	1	Auto	0 / 1	0 / 1	1 / 0	0	0
1	0	Auto	0 / 1	0 / 1	0	0	1
1	1	Auto	0 / 1	0 / 1	1	0	1

0	0	Hand 0 Hand 1	0 / 1 0 / 1	0 1	0 1	1	0
0	1	Hand 0 Hand 1	0 / 1 0 / 1	1 0	0 1	1	0
1	0	Hand 0 Hand 1	0 / 1 0 / 1	0 / 1 0 / 1	0 1	0	1
1	1	Hand 0 Hand 1	0 / 1 0 / 1	0 / 1 0 / 1	0 1	0	1

Binary Input Object 1…12

Optocoupler inputs: Terminals 1+, 1– … 11+, 11–.
Current input: Terminals S0+, S0–, this is the pulse input of the Accumulator object.
Input states are shown with yellow LEDs.

Property	Remark / Value	RW
Object_Identifier	binary-input, instance 1 … 12	R
Object_Type	BINARY_INPUT (3)	R
Object_Name	max. 42 bytes, default “Binary Input 1” … “Binary Input 11”, “Binary Input S0”	RW-E
Property_List		R
Description	max. 84 bytes, default “”	RW-E
Inactive_Text	max. 20 bytes, default “Off”	RW-E
Active_Text	max. 20 bytes, default “On”	RW-E
Present_Value	INACTIVE (0) / ACTIVE (1), writable if Out_Of_Service	R RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Polarity	NORMAL (0) / REVERSE (1)	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Binary Input				
Out_Of_ Service	Polarity	Binary Input	Present_ Value	OUT_OF_ SERVICE
0	0	0 1	0 1	0
0	1	0 1	1 0	0
1	0	0 1	x	1
1	1	0 1	x	1
x: Present_Value is writable and not affected by inputs				

Accumulator Object 1

This object counts pulses at the current input, terminals S0+, S0–.
Input pulses must have minimum High and Low times of 10ms, the maximum frequency is 50 Hz.

Property	Remark / Value	RW
Object_Identifier	accumulator, instance 1	R
Object_Type	ACCUMULATOR (23)	R
Object_Name	max. 42 bytes, default “Accumulator 1”	RW-E
Property_List		R
Description	max. 84 bytes, default “”	RW-E
Present_Value	pulse counter of corresponding input, writable if Out_Of_Service (pulse counter remains unchanged)	R-E RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Max_Pres_Value	4294967295	R
Units	default no-units (95)	RW-E
Prescale	Multiplier 0 … 65535, default 1 Modulo-Divide 1 … 65535, default 1	RW-E
Scale	Float-Scale or Integer-Scale, default 1.0 (Float)	RW-E
Value_Set	pulse counter is stored to Value_Set, when corresponding key is pressed, default 0	R-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Analog Value Object 28

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 28	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 bytes, default “Watchdog Time”	RW-E
Property_List		R
Description	max. 84 bytes, default “”	RW-E
Present_Value	Time constant of Watchdog Timer, Special value 0: Watchdog is inactive	RW-E
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
Units	seconds (73)	R
Min_Pres_Value	0.00	-
Max_Pres_Value	655.35	-
Resolution	0.01	-
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

The Watchdog Timer resets Present_Value of all output objects to Relinquish_Default, if BACnet communication fails permanently.
The timer is restarted, when a BACnet message with an APDU is received.
When the timer times out, the priority arrays of all output objects are completely cleared to NULL.

Analog Output Object 1…2

Analog outputs: Terminals O1+, O1– … O2+, O2–.
The outputs are isolated from other circuits.
Terminals O1– … O2– are connected.
Output voltages are shown with yellow LEDs.

Property	Remark / Value	RW
Object_Identifier	analog-output, instance 1 … 2	R
Object_Type	ANALOG_OUTPUT (1)	R
Object_Name	max. 42 bytes, default “Analog Output O1” … “Analog Output O2”	RW-E
Property_List		R
Description	max. 84 bytes, default “”	RW-E
Present_Value	0.0 … 102.4 (0V … 10.24V)	RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Units	Percent (98)	R
Priority_Array [16]	NULL / 0.0 … 102.4 (0V … 10.24V)	R
Relinquish_Default	0.0 … 102.4 (0V … 10.24V)	RW-E
COV_Increment	Minimum change of Present_Value for COV notification, default 1.0	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
Min_Pres_Value	0.0	-
Max_Pres_Value	102.4	-
Resolution	0.025 (2.5 mV)	-
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Function Table for Analog Output				
Out_Of_Service	Priority_Array	Present_Value	Analog Output	OUT_OF_SERVICE
0	NULL	Relinquish_Default	Relinquish_Default	0
	Value	Value	Value	
1	NULL	Relinquish_Default	unchanged	1
	Value	Value		

Analog Input Object 1…7

Voltage / resistance inputs: Terminals E1 … E6,
Current input: Terminal I,
Common ground: Terminals –.
Resolution of A/D converter: 15 bits.
Accuracy: 0.1 % for voltage, current, resistance < 12 kOhm,
1.0 % for resistance > 12 kOhm,
0.2 °C for temperature.

Property	Remark / Value	RW
Object_Identifier	analog-input, instance 1 … 7	R
Object_Type	ANALOG_INPUT (0)	R
Object_Name	max. 42 bytes, default “Analog Input E1” … “Analog Input E6”, “Analog Input I”	RW-E
Property_List		R
Description	max. 84 bytes, default “”	RW-E
Present_Value	Measured value, writable if Out_Of_Service, measurement range is defined in Multistate Value 1…7, added offset is defined in Analog Value 21…27	R RW
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1)	RW
Units	Defined in Multistate Value 1…7	R
COV_Increment	Minimum change of Present_Value for COV notification, default 1.0	RW-E
Notification_Class	Unsubscribed UnconfirmedCOVNotification 0: no COV notification, default, 1: local broadcast, 2: global broadcast	RW-E
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Analog Value Object 21…27

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 21 … 27	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	max. 42 bytes, default “Offset E1” … “Offset E6”, “Offset I”	RW-E
Property_List		R
Description	max. 84 bytes, default “”	RW-E
Present_Value	Offset is added to measured value (Analog Input 1 … 7), default 0.0	RW-E
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
Units	same as Analog Input 1 … 7	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Multistate Value Object 1…7

Property	Remark / Value	RW
Object_Identifier	multistate-value, instance 1 … 7	R
Object_Type	MULTISTATE_VALUE (19)	R
Object_Name	max. 42 bytes, default “Measurement Range E1” … “Measurement Range E6”, “Measurement Range I”	RW-E
Property_List		R
Description	max. 84 bytes, default “”	RW-E
State_Text	max. 20 bytes, default see next Table	RW-E
Present_Value	Measurement range of Analog Input 1…7, see below - Voltage (%, Volt) - Voltage, pullup resistor 2kOhm to 5V (% P, Volt P) - Resistance (Ohm) - User defined sensor - Standard temperature sensors - Current (%, mA)	RW-E
Status_Flags	IN_ALARM: 0 FAULT: 0	R

	OVERRIDDEN: 0 OUT_OF_SERVICE: 0	
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Number_Of_States	19 (Input E1…E6), 3 (Input I)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Measurement Ranges E1…E6		
State	State_Text	Units of Analog Input
1 default	"0-10V %"	percent (98)
2	"0-10V % P"	percent (98)
3	"0-10 Volt"	volts (5)
4	"0-10 Volt P"	volts (5)
5	"Ohm"	ohms (4)
6	"User Defined"	set in Analog Value Object X1…X10
7	"PT100"	degrees-Celsius (62)
8	"PT500"	degrees-Celsius (62)
9	"PT1000"	degrees-Celsius (62)
10	"NI1000-TC5000"	degrees-Celsius (62)
11	"NI1000-TC6180"	degrees-Celsius (62)
12	"BALCO500"	degrees-Celsius (62)
13	"KTY81_110"	degrees-Celsius (62)
14	"KTY81_210"	degrees-Celsius (62)
15	"NTC1k8-T"	degrees-Celsius (62)
16	"NTC5k-T"	degrees-Celsius (62)
17	"NTC10k-T"	degrees-Celsius (62)
18	"NTC20k-T"	degrees-Celsius (62)
19	"LM235Z"	degrees-Celsius (62)

Measurement Ranges I		
State	State_Text	Units of Analog Input
1 default	"0-20mA %"	percent (98)
2	"4-20mA %"	percent (98)
3	"0-20 mA"	milliamperes (2)

Analog Value Object 1…20

Property	Remark / Value	RW
Object_Identifier	analog-value, instance 1 … 20	R
Object_Type	ANALOG_VALUE (2)	R
Object_Name	“X 1”, “Y 1” … “X 10”, “Y 10”	R
Property_List		R
Description	“”	R
Present_Value	Interpolation table in User Defined measurement range	RW-E
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
Units	X1…X10: Units of Analog Input Object (default °C)	RW-E
	Y1…Y10: Defined in Multistate Value 9	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Interpolation Table					
Instance	Name	Default Value	Instance	Name	Default Value
1	“X 1”	-10.0	2	“Y 1”	960.86
3	“X 2”	10.0	4	“Y 2”	1039.03
5	“X 3”	30.0	6	“Y 3”	1116.73
7	“X 4”	50.0	8	“Y 4”	1193.97
9	“X 5”	70.0	10	“Y 5”	1270.75
11	“X 6”	0.0	12	“Y 6”	0.0
13	“X 7”	0.0	14	“Y 7”	0.0
15	“X 8”	0.0	16	“Y 8”	0.0
17	“X 9”	0.0	18	“Y 9”	0.0
19	“X 10”	0.0	20	“Y 10”	0.0

The interpolation table by default provides an example for PT1000 temperature sensors.
In the example X values are temperature in °C, Y values are resistance in Ohms.
X and Y values must be sorted in ascending or descending order.
The table ends where both values are 0.0.
Measurement range at input must be selected in Multistate Value 9.

Multistate Value Object 9

Property	Remark / Value	RW
Object_Identifier	multistate-value, instance 9	R
Object_Type	MULTISTATE_VALUE (19)	R
Object_Name	max. 42 bytes, default “User Defined Range”	RW-E
Property_List		R
Description	max. 84 bytes, default “”	RW-E
State_Text	max. 20 bytes, default see next Table	RW-E
Present_Value	Selection of measurement range at input - Voltage (Volt) - Voltage, pullup resistor 2kOhm to 5V (Volt P) - Resistance (Ohm) and usage of interpolation table - approximately linear sensor (e.g. PT1000) - approximately exponential sensor (e.g. NTC) default 3, for PT1000 example	RW-E
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
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

User Defined Range		
State	State_Text	Units of Analog Values Y
1	"Volt lin"	volts (5)
2	"Volt P lin"	volts (5)
3	"Ohm lin"	ohms (4)
4	"Volt exp"	volts (5)
5	"Volt P exp"	volts (5)
6	"Ohm NTC exp"	ohms (4)

Table for PT- and NI-Sensors

Temp	PT100 TC3850	PT500 TC3850	PT1000 TC3850	NI1000 TC5000	NI1000 TC6180	BALCO 500
°C	Ohm	Ohm	Ohm	Ohm	Ohm	Ohm
-50	80.306	401.53	803.06	790.88	742.55	361.65
-30	88.222	441.11	882.22	871.69	841.46	397.05
-10	96.086	480.43	960.86	956.24	945.82	433.96
10	103.903	519.51	1039.03	1044.79	1055.52	472.91
30	111.673	558.36	1116.73	1137.62	1170.56	513.89
50	119.397	596.99	1193.97	1234.98	1291.05	556.90
70	127.075	635.38	1270.75	1337.15	1417.21	601.94
90	134.707	673.53	1347.07	1444.39	1549.34	649.02
110	142.293	711.46	1422.93	1556.98	1687.89	698.13
130	149.832	749.16	1498.32	1675.19	1833.35	749.27
150	157.325	786.63	1573.25	1799.27	1986.35	802.44

Table for KTY81- and NTC-Sensors

Temp	KTY81-110	KTY81-210	NTC1k8-T	NTC5k-T	NTC10k-T	NTC20k-T
°C	Ohm	Ohm	Ohm	kOhm	kOhm	kOhm
-50	515	1030		333.9	667.8	1668.0
-40	567	1135		167.8	335.7	813.4
-30	624	1247	24500	88.34	176.7	415.5
-20	684	1367	14000	48.49	96.97	221.3
-10	747	1495	8400	27.65	55.30	122.5
0	815	1630	5200	16.33	32.65	70.20
10	886	1772	3330	9.952	19.90	41.56
20	961	1922	2200	6.247	12.49	25.35
30	1040	2080	1480	4.028	8.06	15.89
40	1122	2245	1040	2.662	5.32	10.21
50	1209	2417	740	1.801	3.60	6.72
60	1299	2597	540	1.244	2.49	4.52
70	1392	2785	402	0.8758	1.75	3.10
80	1490	2980	306	0.6281	1.26	2.12
90	1591	3182	240	0.4581	0.92	1.54
100	1696	3392	187	0.3393	0.68	1.12
110	1805	3607	149	0.2550	0.51	0.82
120	1915	3817	118	0.1943	0.39	0.61
130	2023	4008	95	0.1499	0.30	0.46
140	2124	4166	77	0.1170	0.23	0.35
150	2211	4280	64	0.0924	0.18	0.27

Table for LM235Z

Temp	°C	-40	0	40	80	120
LM235Z	Volt	2.332	2.732	3.132	3.532	3.932