BACnet Protocol Implementation Conformance Statement

Date:	15.04.2025
Vendor Name:	METZ CONNECT GmbH
Product Name:	BACnet Server for EWIO2, following variants
Product Model Number:	110904, EWIO2-BM 110909, EWIO2-W-BM (with WLAN) 110935, EWIO2-M-BM (with M-Bus) 110934, EWIO2-MW-BM (with both)
Application Software Version:	2.1.6
Firmware Revision:	1.0.0-MC
BACnet Protocol Revision:	20

Product Description:

BACnet/IP server for device EWIO2:
Application specific controller providing
- 8 digital inputs,
- 6 relay outputs, 2 triac outputs (EWIO2-W-BM, EWIO2-BM),
  4 relay outputs, 1 M-Bus master interface (EWIO2-MW-BM, EWIO2-M-BM)
- 4 transistor outputs (pnp),
- 3 analog outputs (0-10 V),
- 3 analog inputs (0-10 V, Ohm, 0-20 mA),
- 2 Modbus interfaces.

These extension module types are available:
- digital: MR-DI4, MR-SI4, MR-DI10, MR-DO4, MR-TO4, MR-DIO4/2,
- analog: MR-AI8, MR-CI4, MR-AO4 and MR-AOP4.

BACnet Standardized Device Profile (Annex L):

BACnet Application Specific Controller (B-ASC)

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

Data Sharing-ReadProperty-B	(DS-RP-B)
Data Sharing-WriteProperty-B	(DS-WP-B)
Data Sharing-ReadPropertyMultiple-B	(DS-RPM-B)
Data Sharing-WritePropertyMultiple-B	(DS-WPM-B)
Data Sharing-COV-B	(DS-COV-B)
Device Management-Dynamic Device Binding-B	(DM-DDB-B)
Device Management-Dynamic Object Binding-B	(DM-DOB-B)
Device Management-DeviceCommunicationControl-B	(DM-DCC-B, no Password)
Device Management-ReinitializeDevice-B	(DM-RD-B, no Password)
Device Management-Backup and Restore-B	(DM-BR-B, no Password)
Device Management-TimeSynchronization-B	(DM-TS-B)
Device Management-UTCTimeSynchronization-B	(DM-UTC-B)
Device Management-Object Creation and Deletion-B	(DM-OCD-B)
Network Management-BBMD Configuration-B	(NM-BBMDC-B)
Network Management-Foreign Device Registration-A	(NM-FDR-A)
Gateway-Embedded Objects-B	(GW-EO-B, extension modules)
Trending-Viewing and Modifying Trends Internal-B	(T-VMT-I-B)

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

Segmentation Capability:

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

Data Link Layer Options:

☒ BACnet IP, (Annex J)
☒ BACnet IP, (Annex J), Foreign Device
☒ BACnet IP, (Annex J), BACnet Broadcast Management Device (BBMD)
☐ BACnet IP, (Annex J), Network Address Translation (NAT Traversal)

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

Character Sets Supported:

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

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

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

Gateway Options:

If this product is a communication gateway, describe the types of non-BACnet equipment/networks(s) that the gateway supports: Input/output extension modules, see page 1

1.1 Device Object

Property	Remark / Value	Conf.
Object_Type	DEVICE (8)	R
Object_Identifier	device, default instance: 421000	RW-N
Object_Name	max. 64 Bytes, default “EWIO2_BACnet”	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
Location	max. 64 Bytes, default “”	OW-N
Vendor_Name	“METZ CONNECT GmbH”	R
Vendor_Identifier	421	R
Model_Name	max. 64 Bytes, default “EWIO2 with BACnet Server”	RW-N
Firmware_Revision	“1.0.0-MC”	R
Application_Software_Version	“2.1.6”	R
Protocol_Version	1	R
Protocol_Revision	20	R
System_Status	OPERATIONAL (0, default), OPERATIONAL_READ_ONLY (1), NON_OPERATIONAL (4)	RW-V
Protocol_Services_Supported	read-property, read-property-multiple, write-property, write-property-multiple, subscribe-cov, who-has, who-is, device-communication-control, reinitialize-device, time-synchronisation, utc-time-synchronisation, atomic-read-file, atomic-write-file, read-range, create-object, delete-object	R
Protocol_Object_Types_Supported	DEVICE, NETWORK-PORT, ANALOG_INPUT, ANALOG_OUTPUT, ANALOG_VALUE, BINARY_INPUT, BINARY_OUTPUT, BINARY_VALUE, MULTI_STATE_VALUE, FILE, TREND_LOG, POSITIVE_INTEGER_VALUE, STRUCTURED_VIEW	R
Object_List	device, network-port 1, analog-input 0…159, analog-output 0…159, analog-value 0…600, binary-input 0…159, binary-output 0…159, binary-value 0…1, multistate-value 0…159, file 0…6, trend-log 1…400, positive-integer-value 0…23, structured-view 0…49. Existence of objects depends on device type, usage of extension modules, trend logging …	R
Structured_Object_List		O
Max_APDU_Length_Accepted	1476	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	default 3000 ms	RW-N
Number_Of_APDU_Retries	default 3	RW-N
Device_Address_Binding	-	R
Database_Revision	Revision of Configuration File	R-N
Active_COV_Subscriptions	max. 100 Subscriptions, Confirmed / Unconfirmed, for binary-input, binary-output, analog-input, analog-output	O
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

1.2 Device Object (continued)

Property	Remark / Value	Conf.
Local_Time		O
Local_Date		O
UTC_Offset		O
Daylight_Savings_Status		O
Configuration_Files	file 0…6	O
Last_Restore_Time		O-N
Backup_Failure_Timeout	default 10 sec	OW-N
Backup_And_Restore_State		O
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

1.3 Network Port Object 1

Property	Remark / Value	Conf.
Object_Type	NETWORK_PORT (56)	R
Object_Identifier	network-port, instance 1	R
Object_Name	max. 64 Bytes, default “BACnet/IP Port”	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
-	not creatable / not deletable	-
Network_Number	0 (unknown)	O
Network_Number_Quality	UNKNOWN (0)	O
Changes_Pending	FALSE (0) / TRUE (1) see footnote *1	R
Command	IDLE (0) / DISCARD_CHANGES (1)	OW-V
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0	R
Reliability	NO_FAULT_DETECTED (0)	R
Out_Of_Service	FALSE (0)	R
Protocol_Level	BACNET_APPLICATION (2)	R
Network_Type	IPV4 (5)	R
MAC_Address		O
APDU_Length	1476	O
Link_Speed	0 (unknown)	O
BACnet_IP_Mode	NORMAL (0, default) / FOREIGN (1) / BBMD (2) *1 *2	OW-N
IP_Address	*2	O
BACnet_IP_UDP_Port	default 0xBAC0 *1 *2	OW-N
IP_Subnet_Mask	*2	O
IP_Default_Gateway	*2	O
IP_DNS_Server	*2	O
IP_DHCP_Enable	*2	O
BBMD_Broadcast_Distribution_Table	*1	OW-N
BBMD_Accept_FD_Registrations	*1	OW-N
BBMD_Foreign_Device_Table		O
FD_BBMD_Address	*1 *2	OW-N
FD_Subscription_Lifetime	*1 *2	OW-N
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

*1 Writing stores values temporarily and sets property Changes_Pending to true.
Changes are activated together by service Reinitialize-Device / Warmstart or Activate_Changes.
Changes are discarded by writing Property Command / DISCARD_CHANGES.

*2 These values can be set using the web interface.

2 Digital Outputs

2.1 Binary Output Object 0…13

Property	Remark / Value	Conf.
Object_Type	BINARY_OUTPUT (4)	R
Object_Identifier	binary-output, instance 0 … 13	R
Object_Name	max. 64 Bytes, default “Relay K1”, “Triac T1”, “Transistor Output D1” …	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
Device_Type	max. 64 Bytes, default “”	OW-N
Inactive_Text	max. 32 Bytes, default “off”	OW-N
Active_Text	max. 32 Bytes, default “on”	OW-N
-	creatable / deletable	-
Present_Value	NULL (write only) / INACTIVE (0) / ACTIVE (1)	RP-V
Reliability	NO_FAULT_DETECTED (0) SHORTED_LOOP (5) = short circuit at transistor output UNRELIABLE_OTHER (7) = hardware driver fault COMMUNICATION_FAILURE (12) = no extension module	O
Status_Flags	IN_ALARM: 0 FAULT: 0 / 1 OVERRIDDEN: 0 / 1 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1) if TRUE, Present_Value and Reliability are writable, not processed and decoupled from IO	RW-N
Polarity	NORMAL (0) / REVERSE (1)	RW-N
Feedback_Value	INACTIVE (0) / ACTIVE (1)	O
Interface_Value	INACTIVE (0) / ACTIVE (1)	O
Priority_Array [16]	NULL / INACTIVE (0) / ACTIVE (1)	R
Relinquish_Default	INACTIVE (0) / ACTIVE (1)	RW-N
Current_Command_Priority		R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

Device type with 4 relays and M-Bus:
Instance 0: Relay K1, Terminals 11, 12 (NC), 14 (NO)
Instance 1: Relay K2, Terminals 21, 22 (NC), 24 (NO)
Instance 2: Relay K3, Terminals 31, 32 (NC), 34 (NO)
Instance 3: Relay K4, Terminals 41, 42 (NC), 44 (NO)

Device type with 6 relays and 2 triacs:
Instance 0: Relay K1, Terminals 11, 12 (NC), 14 (NO)
Instance 1: Relay K2, Terminals 21, 22 (NC), 24 (NO)
Instance 2: Relay K3, Terminals 31, 32 (NC), 34 (NO)
Instance 3: Triac T1, Terminals T13, T14
Instance 4: Triac T2, Terminals T23, T24
Instance 5: Relay K4, Terminals 41, 42 (NC), 44 (NO)
Instance 6: Relay K5, Terminals 51, 52 (NC), 54 (NO)
Instance 7: Relay K6, Terminals 61, 62 (NC), 64 (NO)

Both device types:
Instance 10: Transistor Output D1, Terminal D1
Instance 11: Transistor Output D2, Terminal D2
Instance 12: Transistor Output D3, Terminal D3
Instance 13: Transistor Output D4, Terminal D4
PNP transistors switching to 24V, 20 mA max, short circuit protected

If an output is controlled by another application, the bacnet-server must not control it too.
For this purpose, the object may be deleted or switched out-of-service.
If switched out-of-service, the properties Feedback_Value and Interface_Value but not Present_Value show the actual output value.

Function Table for Binary Output							
Out_Of_ Service	Polarity	Switch	Priority_ Array	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	x	0	1
1	1	Auto	0 / 1	0 / 1	x	0	1
Using hand off/on switches							
0	0	Hand 0 Hand 1	0 / 1 0 / 1	0 / 1 0 / 1	0 1	1	0
0	1	Hand 0 Hand 1	0 / 1 0 / 1	0 / 1 0 / 1	0 1	1	0
1	0	Hand 0 Hand 1	0 / 1 0 / 1	0 / 1 0 / 1	0 1	1	1
1	1	Hand 0 Hand 1	0 / 1 0 / 1	0 / 1 0 / 1	0 1	1	1

Auto / Hand keys:
Long actuation toggles between auto and hand mode, shown with the green LED.
Short actuation toggles between output on and off, shown with the yellow LED.
In hand mode, the properties Feedback_Value and Interface_Value but not Present_Value show the actual output value and Status_Flag OVERRIDDEN is set.

3 Digital Inputs

3.1 Binary Input Object 0…7

Instance 0…3: Terminals 1+ / 1- … 4+ / 4-, inputs for connection of switches
Instance 4…7: Terminals 5+ / 5- … 8+ / 8-, optocoupler inputs for voltage 24 V

Property	Remark / Value	Conf.
Object_Type	BINARY_INPUT (3)	R
Object_Identifier	binary-input, instance 0 … 7	R
Object_Name	max. 64 Bytes, default “Binary Input DI1” …	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
Device_Type	max. 64 Bytes, default “”	OW-N
Inactive_Text	max. 32 Bytes, default “off”	OW-N
Active_Text	max. 32 Bytes, default “on”	OW-N
-	creatable / deletable	-
Present_Value	INACTIVE (0) / ACTIVE (1)	R
Reliability	NO_FAULT_DETECTED (0) UNRELIABLE_OTHER (7) = hardware driver fault COMMUNICATION_FAILURE (12) = no extension module	O
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) if TRUE, Present_Value and Reliability are writable, not processed and decoupled from IO	RW-N
Polarity	NORMAL (0) / REVERSE (1)	RW-N
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

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				

3.2 Positive Integer Value Object 0…7

Property	Remark / Value	Conf.
Object_Type	POSITIVE_INTEGER_VALUE (48)	R
Object_Identifier	positive-integer-value, instance 0 … 7	R
Object_Name	max. 64 Bytes, default “Debounce Time DI1” …	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
-	creatable / deletable	-
Present_Value	Debounce Time of Binary Input 0…7, default 8	RW-N
Units	milliseconds (159)	R
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Out_Of_Service	FALSE (0) / TRUE (1) if TRUE, Present_Value is writable and not processed	RW-N
Min_Pres_Value	0	R
Max_Pres_Value	255	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

The debounce time is needed if a digital input is steered by a contact, e.g. relay or switch.
A time of 20…50 ms is often recommended.
This time delays the input signal and limits its frequency range.

If an input is controlled by another application, the bacnet-server must not control it too.
For this purpose, the object may be deleted or switched out-of-service.

4 Analog Outputs

4.1 Analog Output Object 0…2

Instance 0…2: Terminals O1 … O3, 0-10 V

Property	Remark / Value	Conf.
Object_Type	ANALOG_OUTPUT (1)	R
Object_Identifier	analog-output, instance 0 … 2	R
Object_Name	max. 64 Bytes, default “Voltage Output O1” …	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
Device_Type	max. 64 Bytes, default “”	OW-N
-	creatable / deletable	-
Present_Value	0.0 … 102.4 (0 V … 10.24 V) NULL (write only)	RP-V
Reliability	NO_FAULT_DETECTED (0) SHORTED_LOOP (5) = short circuit at EWIO output UNRELIABLE_OTHER (7) = hardware driver fault COMMUNICATION_FAILURE (12) = no extension module	O
Status_Flags	IN_ALARM: 0 FAULT: 0 / 1 OVERRIDDEN: 0 / 1 OUT_OF_SERVICE: 0 / 1	R
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0) / TRUE (1) if TRUE, Present_Value and Reliability are writable, not processed and decoupled from IO	RW-N
Units	percent (98)	R
Interface_Value	0.0 … 102.4 (0 V … 10.24 V)	O
Priority_Array [16]	NULL / 0.0 … 102.4	R
Relinquish_Default	0.0 … 102.4, default 0.0	RW-N
Current_Command_Priority		R
COV_Increment	Minimum change of Present_Value for COV notification, default 1.0	OW-N
Min_Pres_Value	0.0	O
Max_Pres_Value	102.4	O
Resolution	EWIO: 0.003125 % (0.3125 mV) MR-AO(P)4: 0.00625 % (0.625 mV)	-
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

If an output is controlled by another application, the bacnet-server must not control it too.
For this purpose, the object may be deleted or switched out-of-service.
If switched out-of-service, the actual output value is shown in property Interface_Value but not in Present_Value.

Function Table for Analog Output						
Out_Of_ Service	Switches	Priority_ Array	Present_ Value	Analog Output	OVER RIDDEN	OUT_OF_ SERVICE
0	Auto	NULL	Relinquish_Default	Relinquish_Default	0	0
		Value	Value	Value		
0	Hand	NULL	Relinquish_Default	Hand	1	0
		Value	Value			
1	Auto	NULL	Relinquish_Default	unchanged	0	1
		Value	Value			
1	Hand	NULL	Relinquish_Default	Hand	1	1
		Value	Value			

Auto / Hand keys AO1 … AO3:
Long actuation toggles between auto and hand mode, shown with the green LED.
Short actuation selects the changeable output, shown with the green LED blinking.
The keys ↑ and ↓ change the selected output value, shown with the yellow LED.
The change accelerates with time, shown with the green LED blinking frequency.
In hand mode, the properties Feedback_Value and Interface_Value but not Present_Value show the actual output value and Status_Flag OVERRIDDEN is set.

5 Analog Inputs, Counters and Diagnostics

5.1 Analog Input Object 0…37

Instance 0…2:	Analog Input E1 … E3,	measurement result value
Instance 10…12:	Analog Input E1 Raw …,	for diagnostic purpose, raw measurement
Instance 19:	ADC Noise,	for diagnostic purpose, 0 - 255
Instance 20…27:	Frequency DI1 … DI8,	binary inputs, 0.1 - 2000 Hz
Instance 28:	Supply Voltage,	for diagnostic purpose, 20 - 24 V
Instance 29:	Device Temperature,	for diagnostic purpose, 0 - 75 °C
Instance 30…37:	Counter DI1 … DI8,	binary inputs, 64-bit counter

Property	Remark / Value	Conf.
Object_Type	ANALOG_INPUT (0)	R
Object_Identifier	analog-input, instance 0 … 37	R
Object_Name	max. 64 Bytes, default “Analog Input E1” …, “Analog Input E1 Raw” …, “ADC Noise”, “Frequency DI1” …, “Supply Voltage”, “Device Temperature”, “Counter DI1” …	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
Device_Type	max. 64 Bytes, instance 0-2 default: selected State_Text of Multistate Value instance 19-37 default: “”	OW-N
-	creatable / deletable	-
Present_Value	Measured value, Measurement Range see above and in Multistate Value	R
Reliability	NO_FAULT_DETECTED (0) OVER_RANGE (2) / UNDER_RANGE (3) UNRELIABLE_OTHER (7) = hardware driver fault PROCESS_ERROR (8) = not calibrated, ADC fault COMMUNICATION_FAILURE (12) = no extension module	O
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) if TRUE, Present_Value and Reliability are writable, not processed and decoupled from IO	RW-N
Units	see above and in Multistate Value	R
COV_Increment	Minimum change of Present_Value for COV notification, default 1.0	OW-N
Min_Pres_Value	see above and in Multistate Value	O
Max_Pres_Value	see above and in Multistate Value	O
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

Analog Input E1 … E3:
The measurement range is defined in Multistate-Values with the same instance.
Min_Pres_Value, Max_Pres_Value and Units are set according to the range.

Analog Input E1 Raw …:
Measurement ranges are 0 - 10 V / 40 Ω - 4 MΩ / 0 - 20 mA.
Min_Pres_Value, Max_Pres_Value and Units are set according to the range.

Frequency DI1 … DI8:
The debounce time limits the frequency range of input signals.
If it is set to 0, the maximum frequency is about 2000 Hz.

Counter DI1 … DI8:
The system counters have 64 bits, but precision of analog input objects is limited to 24 bits.

5.2 Multistate Value Object 0…2

Property	Remark / Value	Conf.
Object_Type	MULTISTATE_VALUE (19)	R
Object_Identifier	multistate-value, instance 0 … 2	R
Object_Name	max. 64 Bytes, default “Measurement Range E1” …	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
State_Text	max. 32 Bytes, default see next Table	OW-N
-	creatable / deletable	-
Present_Value	Measurement Range of Analog Input 0…2, default State 3	RW-N
Reliability	NO_FAULT_DETECTED (0) UNRELIABLE_OTHER (7) = hardware driver fault COMMUNICATION_FAILURE (12) = no extension module	O
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) if TRUE, Present_Value and Reliability are writable, not processed and decoupled from IO	RW-N
Number_Of_States	see next Table	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

If an input is controlled by another application, the bacnet-server must not control it too.
For this purpose, the object may be deleted or switched out-of-service.

Multistate Value		Measurement Range of Analog Input		
State	State_Text	Units	Min_Pres_Value	Max_Pres_Value
1	"0-10V %"	percent (98)	0	100
2	"0-5V % Pullup"	percent (98)	0	50
3	"0-10 Volt"	volts (5)	0	10
4	"0-5 Volt Pullup"	volts (5)	0	5
5	"Ohm"	ohms (4)	40	4000000
6	"User Defined"	no-units (95)	0	0
7	"PT100"	degrees-celsius (62)	-50	150
8	"PT500"	degrees-celsius (62)	-50	150
9	"PT1000"	degrees-celsius (62)	-50	150
10	"NI1000-TC5000"	degrees-celsius (62)	-50	150
11	"NI1000-TC6180"	degrees-celsius (62)	-50	150
12	"BALCO500"	degrees-celsius (62)	-50	150
13	"KTY81_110"	degrees-celsius (62)	-50	150
14	"KTY81_210"	degrees-celsius (62)	-50	150
15	"NTC1k8 Thermokon"	degrees-celsius (62)	-50	150
16	"NTC5k Thermokon"	degrees-celsius (62)	-50	150
17	"NTC10k Thermokon"	degrees-celsius (62)	-50	150
18	"NTC20k Thermokon"	degrees-celsius (62)	-50	150
19	"LM235Z"	degrees-celsius (62)	-50	150
20	"NTC10k Carel"	degrees-celsius (62)	-50	110
21	"NTC5k Schneider"	degrees-celsius (62)	-50	150
22	"NTC30k Schneider"	degrees-celsius (62)	-50	150
23	"KP250"	degrees-celsius (62)	-50	150
24	"Poti 10k %"	percent (98)	0	100
25	"Inactive"	no-units (95)	0	0
26	"0-20mA %"	percent (98)	0	100
27	"0-20mA"	milliamperes (2)	0	20
28	"4-20mA %"	percent (98)	0	100
29	"4-20mA"	milliamperes (2)	4	20
30	"3-wire sensing"	ohms (4)	0	14000
31	"4-wire sensing"	ohms (4)	0	14000
32	"40 Ohm - 14 kOhm"	ohms (4)	40	14000
33	"12 kOhm - 4 MOhm"	ohms (4)	12000	4000000
34	"40 Ohm - 650 Ohm"	ohms (4)	40	650
35	"500 Ohm - 14 kOhm"	ohms (4)	500	14000
36	"12 kOhm - 180 kOhm"	ohms (4)	12000	180000
37	"140 kOhm - 4 MOhm"	ohms (4)	140000	4000000

The characteristics of temperature sensors are listed at the end of this document.

Extension module MR-AI8, States 26…37:
Measurement is not supported. Instead, the corresponding analog input is inactive.
Extension module MR-CI4: See usage of extension modules below.

6 User Defined Sensor

6.1 Analog Value Object 20…39

Property	Remark / Value	Conf.
Object_Type	ANALOG_VALUE (2)	R
Object_Identifier	analog-value, instance 20 … 39	R
Object_Name	max. 64 bytes, default “X 1”, “Y 1” … “X 10”, “Y 10”	RW-N
Property_List		R
Description	max. 255 bytes, default “”	OW-N
-	creatable / deletable	-
Present_Value	Interpolation table values in User Defined measurement range	RW-N
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) if TRUE, Present_Value is writable and not processed	RW-N
Units	X1…X10: Units to use in Analog Input Object (default °C)	RW-N
	Y1…Y10: Defined in Multistate Value 18	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

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 must be filled from its beginning.
By default it ends where both values are 0.
If X = Y = 0 is a valid pair, a different length may be chosen with Positive Integer Value 18.

The measurement range at the input must be selected in Multistate Value 18.

6.2 Multistate Value Object 18

Property	Remark / Value	Conf.
Object_Type	MULTISTATE_VALUE (19)	R
Object_Identifier	multistate-value, instance 18	R
Object_Name	max. 64 bytes, default “User Defined Range”	RW-N
Property_List		R
Description	max. 255 bytes, default “”	OW-N
State_Text	max. 20 bytes, default see next Table	OW-N
-	creatable / deletable	-
Present_Value	Selection of measurement range at input - Voltage (Volt) - Voltage, pullup resistor 2kOhm to 5V (Volt Pullup) - Resistance (Ohm) - Current (mA) and usage of interpolation table - approximately linear sensor (e.g. PT1000) - approximately exponential sensor (e.g. NTC) default 3, for PT1000 example	RW-N
Reliability	NO_FAULT_DETECTED (0)	O
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) if TRUE, Present_Value and Reliability are writable, not processed and decoupled from IO	RW-N
Number_Of_States	8	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

User Defined Range		
State	State_Text	Units of Analog Values Y
1	"Volt linear"	volts (5)
2	"Volt Pullup linear"	volts (5)
3	"Ohm linear”	ohms (4)
4	"mA linear"	milliamperes (2)
5	"Volt exp"	volts (5)
6	"Volt P exp"	volts (5)
7	"Ohm NTC exp"	ohms (4)
8	"mA exp"	milliamperes (2)

6.3 Positive Integer Value Object 18

Property	Remark / Value	Conf.
Object_Type	POSITIVE_INTEGER_VALUE (48)	R
Object_Identifier	positive-integer-value, instance 18	R
Object_Name	max. 64 Bytes, default “Interpolation Table Length”	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
-	creatable / deletable	-
Present_Value	Interpolation table length of user defined sensor	RW-N
Units	no-units (95)	R
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Out_Of_Service	FALSE (0) / TRUE (1) if TRUE, Present_Value is writable and not processed	RW-N
Min_Pres_Value	0	R
Max_Pres_Value	10	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

By default the interpolation table of the user defined sensor ends where both X and Y values are 0. The currently counted length is shown in Present_Value of this object.

If X = Y = 0 is a valid pair, a different length 1…10 may be selected in Present_Value.
The length may be counted again, after 0 is written to Present_Value.

7 Watchdog Timer

7.1 Analog Value Object 9

Property	Remark / Value	Conf.
Object_Type	ANALOG_VALUE (2)	R
Object_Identifier	analog-value, instance 9	R
Object_Name	max. 64 Bytes, default “Watchdog Time”	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
-	creatable / deletable	-
Present_Value	Time Constant of Watchdog Timer, default 0, 0: Watchdog is inactive, Maximum: 655.35 seconds	RW-N
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) if TRUE, Present_Value is writable and not processed	RW-N
Units	seconds (73)	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

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.

Each extension module with outputs also has a watchdog timer, which resets its outputs to their defaults, if communication between EWIO and extension module fails permanently.

8 Usage of Extension Modules

A unique address 1…6 must be selected for every extension module.

The following BACnet objects are used for the extension modules (BI = Binary-Input, BO = Binary-Output, AI = Analog-Input, AO = Analog-Output, MV = Multistate-Value). The BACnet objects only exist if extension modules are used.

Module Type	Adr 1	Adr 2 / 3 / 4 / 5	Adr 6
MR-DI10	BI 40…49	reserved instances 60 / 80 / 100 / 120 … 79 / 99 / 119 / 139	BI 140…149
MR-DI4, MR-SI4	BI 40…43		BI 140…143
MR-DIO4/2	BI 40…43 BO 40…41		BI 140…143 BO 140…141
MR-DO4, MR-TO4	BO 40…43		BO 140…143
MR-AI8	AI 40…47 AI 50…57 MV 40…47		AI 140…147 AI 150…157 MV 140…147
MR-CI4	AI 40…43 AI 50…53 MV 40…43		AI 140…143 AI 150…153 MV 140…143
MR-AO4, MR-AOP4	AO 40…43		AO 140…143

Objects for extension modules have the following default names.

Objects	default Object_Name
BI	“Modbus Adr 1 Digital Input 1” …
BO	“Modbus Adr 2 Digital Output 1” …
AO	“Modbus Adr 3 Analog Output 1” …
AI AI MV	“Modbus Adr 4 Analog Input 1” … “Modbus Adr 4 Analog Input 1Raw ” … “Modbus Adr 4 Measurement Range 1” …

Other properties of Binary-Inputs, Binary-Outputs, Multistate-Values, Analog-Inputs and Analog-Outputs are the same as those of the EWIO. Exceptions:

- The Binary-Outputs of MR-Modules can always be manually overridden.

- Module MR-AI8 does not support measurement in States 26 … 37, instead the corresponding analog input is inactive. Module MR-CI4, see following table.

Multistate Value		Measurement Range of Analog Input MR-CI4		
State	State_Text	Units	Min_Pres_Value	Max_Pres_Value
1	"0-10V %"	percent (98)	0	100
2	"0-10 Volt"	volts (5)	0	10
3	"0-20mA %"	percent (98)	0	100
4	"0-20mA"	milliamperes (2)	0	20
5	"4-20mA %"	percent (98)	0	100
6	"4-20mA"	milliamperes (2)	4	20

8.1 Multistate Value Object 20…25

These Multistate-Values show which extension module types are used with address 1…6.

Property	Remark / Value	Conf.
Object_Type	MULTISTATE_VALUE (19)	R
Object_Identifier	multistate-value, instance 20 … 25	R
Object_Name	max. 64 Bytes, default “MR Device Type Adr 0” …	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
State_Text	max. 32 Bytes, default see next Table	OW-N
-	creatable / deletable	-
Present_Value	code for MR module type, default state 1	RW-N
Reliability	NO_FAULT_DETECTED (0) UNRELIABLE_OTHER (7) = hardware driver fault PROCESS_ERROR (8) = device driver not running COMMUNICATION_FAILURE (12) = no extension module	O
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) if TRUE, Present_Value and Reliability are writable, not processed and decoupled from IO	RW-N
Number_Of_States	11	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

Multistate Value 20…25	
State	State_Text
1	"none"
2	"MR-DO4"
3	"MR-TO4"
4	"MR-DI4"
5	"MR-DI10"
6	"MR-SI4"
7	"MR-DIO4/2"
8	"MR-AO4"
9	"MR-AOP4"
10	"MR-AI8"
11	"MR-CI4"

When MR devices are added or exchanged, these changes are not shown until a search for extension modules has been done by the device driver. This search may be started using Binary Value 1. BACnet objects used for the MR devices are added or removed then.

When a MR device is removed permanently, state 1 (none) must be selected manually in Multistate-Value 20…25, to remove the MR device from the configuration file. All BACnet objects used for the removed MR device are removed then. To prevent accidental removal of a configuration, it can only be removed if the MR device is electrically disconnected.

Changes to the configuration files are stored automatically for changed MR device types.

8.2 Binary Value Object 0

This object shows the combined status of all extension modules in Present_Value.

- normal (0): Reliability of Multistate Value 20…25 is NO_FAULT_DETECTED.
- fault (1): Any of these Reliability values is other than NO_FAULT_DETECTED.

A broken connection to an extension module might be an error indicated in MV 20…25. This error is also shown in property Reliability of individual Input / Output objects.

Property	Remark / Value	Conf.
Object_Type	BINARY_VALUE (5)	R
Object_Identifier	binary-value, instance 0	R
Object_Name	max. 64 Bytes, default “MR Device Driver Status”	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
Inactive_Text	max. 32 Bytes, default “normal”	OW-N
Active_Text	max. 32 Bytes, default “fault”	OW-N
-	creatable / deletable	-
Present_Value	INACTIVE (0) / ACTIVE (1)	RW-V
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) if TRUE, Present_Value is writable and not processed	RW-N
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

8.3 Binary Value Object 1

With this object a search for extension modules by the device driver may be started.

Property	Remark / Value	Conf.
Object_Type	BINARY_VALUE (5)	R
Object_Identifier	binary-value, instance 1	R
Object_Name	max. 64 Bytes, default “MR Device Search”	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
Inactive_Text	max. 32 Bytes, default “normal”	OW-N
Active_Text	max. 32 Bytes, default “search”	OW-N
-	creatable / deletable	-
Present_Value	INACTIVE (0) / ACTIVE (1)	RW-V
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) if TRUE, Present_Value is writable and not processed	RW-N
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

When Present_Value is set to ACTIVE, the device driver searches for new or exchanged extension modules. When the search is finished, Present_Value is reset to INACTIVE. The installed extension modules are shown then in Multistate Value 20…25.

To remove an extension module permanently, state 1 (none) must be selected manually in Multistate-Value 20…25 before the search. To prevent accidental removal of a configuration, it can only be removed if the MR device is electrically disconnected.

9 Modbus Settings

9.1 Multistate Value Object 10…13

Property	Remark / Value	Conf.
Object_Type	MULTISTATE_VALUE (19)	R
Object_Identifier	multistate-value, instance 10 … 13	R
Object_Name	max. 64 bytes, default “Modbus 1 Baud Rate”, “Modbus 1 Parity Mode”, “Modbus 2 Baud Rate”, “Modbus 2 Parity Mode”	RW-N
Property_List		R
Description	max. 255 bytes, default “”	OW-N
State_Text	max. 20 bytes, baud rate default “1200”, “2400”, “4800”, “9600”, “19200”, “38400”, “57600”, 115200” parity mode default “8e1”, “8o1”, “8n2”, “8n1”	OW-N
-	creatable / deletable	-
Present_Value	Settings of the Modbus interfaces baud rate: default 8 (115200 baud) parity mode: default 1 (8 data bits, even parity, 1 stop bit)	RW-N
Reliability	NO_FAULT_DETECTED (0)	O
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) if TRUE, Present_Value and Reliability are writable, not processed and decoupled from IO	RW-N
Number_Of_States	baud rate: 8 parity mode: 4	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

9.2 Positive Integer Value Object 20…23

Property	Remark / Value	Conf.
Object_Type	POSITIVE_INTEGER_VALUE (48)	R
Object_Identifier	positive-integer-value, instance 20 … 23	R
Object_Name	max. 64 bytes, default “Modbus 1 Retries Count”, “Modbus 1 Response Timeout”, “Modbus 2 Retries Count”, “Modbus 2 Response Timeout”	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
-	creatable / deletable	-
Present_Value	Settings of the Modbus interfaces retries count: default 2 response timeout: default 100	RW-N
Units	retries count: no-units (95) response timeout: milliseconds (159)	R
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0 / 1	R
Out_Of_Service	FALSE (0) / TRUE (1) if TRUE, Present_Value is writable and not processed	RW-N
Min_Pres_Value	0	R
Max_Pres_Value	retries count: 10 response timeout: 5000	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

10 Trend Logging

A Trend Log object logs measured values or status together with timestamps in an internal buffer for subsequent retrieval. There are two kinds of Trend Logs:

BACnet Trend Logs:
Values are retrieved from other EWIO BACnet objects and stored in the Trend Log buffers.

SQLite Trend Logs:
Values periodically retrieved from M-Bus or Modbus devices or EWIO inputs are stored in an internal SQLite data base and subsequently in Trend Log buffers. Configuration of M-Bus or Modbus properties is done via the EWIO web interface, see below.

10.1 Trend Log Object 1…400 (BACnet)

Property	Remark / Value	Conf.
Object_Type	TREND_LOG (20)	R
Object_Identifier	trend-log, instance 1…400	R-N
Object_Name	max. 64 Bytes, default “Trend Log 1” …	RW-N
Property_List		R
Description	max. 255 Bytes	OW-N
-	creatable / deletable	-
Enable	FALSE (0) / TRUE (1)	RW-N
Stop_When_Full	FALSE (0) / TRUE (1)	RW-N
Start_Time	default: unspecified	OW-N
Stop_Time	default: unspecified	OW-N
Log_DeviceObjectProperty	Device: none (this EWIO device), Object: default analog-value, inst. 200 higher than trend-log, Property: default Present_Value	OW-N
Log_Interval	hundredths of seconds	OW-N
Logging_Type	POLLED (0), COV (1), TRIGGERED (2)	RW-N
Trigger	FALSE (0) / TRUE (1)	OW
Buffer_Size	default 1000, maximum 1000000, writable only if Enable is FALSE, the Log_Buffer is cleared when written	RW-N
Record_Count	number of records currently in Log_Buffer, a write of 0 clears the Log_Buffer	RW-N
Total_Record_Count	number of records collected since creation	R-N
Log_Buffer	readable only with service Read-Range	R-N
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0	R
Event_State	NORMAL (0)	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Files)		

10.2 Trend Log Object 1…400 (SQLite)

Property	Remark / Value	Conf.
Object_Type	TREND_LOG (20)	R
Object_Identifier	trend-log, instance 1…400	R-N
Object_Name	max. 64 Bytes, defined by Web-Interface, see below, default “Trend Log 1” …	R-N
Property_List		R
Description	max. 255 Bytes, defined by Web-Interface, see below	O-N
-	not creatable / not deletable	-
Enable	FALSE (0) / TRUE (1)	RW-N
Stop_When_Full	FALSE (0) / TRUE (1)	RW-N
Start_Time	default: defined by Web-Interface, see below	OW-N
Stop_Time	default: unspecified	OW-N
Log_DeviceObjectProperty	Device: none (this EWIO device), Object: analog-value, inst. 200 higher than trend-log, Property: Present_Value	O-N
Log_Interval	hundredths of seconds, defined by Web-Interface, see below	O-N
Logging_Type	POLLED (0), TRIGGERED (2)	R-N
Trigger	FALSE (0)	O
Buffer_Size	default 1000, maximum 1000000, writable only if Enable is FALSE, the Log_Buffer is cleared when written	RW-N
Record_Count	number of records currently in Log_Buffer, a write of 0 clears the Log_Buffer	RW-N
Total_Record_Count	number of records collected since creation	R-N
Log_Buffer	readable only with service Read-Range	R-N
Status_Flags	IN_ALARM: 0 FAULT: 0 OVERRIDDEN: 0 OUT_OF_SERVICE: 0	R
Event_State	NORMAL (0)	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Files)		

10.3 Analog Value Object 201…600 (SQLite)

These Analog Values may store additional information usable only with SQLite Trendlogs.

Property	Remark / Value	Conf.
Object_Type	ANALOG_VALUE (2)	R
Object_Identifier	analog-value, instance 201…600, instance is 200 higher than corresponding trend-log	R
Object_Name	max. 64 Bytes, default is prefix "AV_" followed by name of trend-log, default "ANALOG VALUE 1" …	RW-N
Property_List		R
Description	max. 255 Bytes, default is same description as in trend-log	OW-N
-	not creatable / not deletable	-
Present_Value	previously measured value stored in trend-log from EWIO / M-Bus device / Modbus device	R-N
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) if TRUE, Present_Value is writable and not processed	RW-N
Units	physical unit of measured values in the trend log, default is defined by Web-Interface, see below	RW-N
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Files)		

Some properties only of SQLite Trend-Log (TL) and Analog-Value (AV) are defined by the web interface:

Object	**Property**	**Web Interface parameter**
TL / AV	Object_Name	Name of data point (Datenpunkt / Beschreibung)
TL / AV	Description	Name of counter device (Zähler / Messstelle)
TL	Log_Interval	Interval (Datenpunkt / Intervall)
TL	Start_Time	Start time (Datenpunkt / Auslesen ab)
AV	Units	Unit (Datenpunkt / Einheit)

These web interface defined values are used as defaults, if special BACnet values are defined (empty String, unspecified Start_Time, no-units).

All writable Analog-Value properties and Trend-Log property Start_Time may be replaced using BACnet. These are BACnet server local values. The value defined by the web interface remains unchanged.

The default Object_Name is used if both BACnet and web interface defined names are empty.

In the Web-Interface a unit symbol like °C is entered. To translate this to BACnet units the configuration file /var/opt/etc/units.conf is used, which may be customized.

11 Configuration Files

11.1 File Object 0…6

The configuration files of the BACnet server and I/O drivers may be read and written while Backup and Restore operations using the services Atomic-Read-File and Atomic-Write-File. Outside Backup and Restore any access to the file data is prevented.

Property	Remark / Value	Conf.
Object_Type	FILE (10)	R
Object_Identifier	file, instance 0…6	R
Object_Name	max. 64 Bytes, default “Network_Configuration”, “Object_Configuration”, “BBMD_Configuration”, “IoDriver_Configuration”, “ExtModDriver1_Configuration”, “ExtModDriver2_Configuration”, “Trendlog_Configuration”	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
File_Type	max. 32 Bytes, default “Configuration”	RW-N
-	not creatable / not deletable	-
File_Size	File-Size of file system, may be written with 0 while Restore procedure	RW-N
Modification_Date	Modification-Date of file system	R-N
Archive	Archive bit of file system, FALSE (0) / TRUE (1)	RW-N
Read_Only	Read-Only bit of file system, FALSE (0)	R-N
File_Access_Method	FILE_ACCESS_STREAM (1)	R
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

12 Structured View

12.1 Structured View Object 0…49

This object type allows the grouping of objects according to certain criteria. All objects of this device (except Device and Structured View objects) are grouped in 18 predefined Structured View objects. The other Structured View objects allow the creation of further groupings.

Property	Remark / Value	Conf.
Object_Type	STRUCTURED VIEW (29)	R
Object_Identifier	Structured view, instance 0…49	R
Object_Name	max. 64 Bytes, default “Device”, “Digital-In”, “Digital-Out”, “Analog-In”, “Analog-Out”, “Counter”, “Modbus”, “User-Sensor”, “Extension-1” … “Extension-6”, “Trendlog-1” … “Trendlog-4”	RW-N
Property_List		R
Description	max. 255 Bytes, default “”	OW-N
-	Instance 0…17 not creatable / not deletable Instance 18…49 creatable / deletable	-
Node_Type	Instance 0…17 default COLLECTION (8) Instance 18…49 default UNKNOWN (0)	RW-N
Subordinate_List	Instance 0…17 not writable Instance 18…49 writable	R RW-N
Conf.: R: Required, O: Optional, C: Conditional, W: Writable, P: Writable with Priority, Write: -V: Volatile, -N: Nonvolatile (Storage in Configuration File)		

13 Appendix: Temperature Sensor Characteristics

13.1 Table for PT- and NI-Sensors

Temp	PT100 TC3850	PT500 TC3850	PT1000 TC3850	NI1000 TC5000	NI1000 TC6180	BALCO500	KP250
°C	Ohm	Ohm	Ohm	Ohm	Ohm	Ohm	Ohm
-50	80.306	401.53	803.06	790.88	742.55	361.65	196.5
-30	88.222	441.11	882.22	871.69	841.46	397.05	217.9
-10	96.086	480.43	960.86	956.24	945.82	433.96	239.3
10	103.903	519.51	1039.03	1044.79	1055.52	472.91	260.7
30	111.673	558.36	1116.73	1137.62	1170.56	513.89	282.1
50	119.397	596.99	1193.97	1234.98	1291.05	556.90	303.5
70	127.075	635.38	1270.75	1337.15	1417.21	601.94	324.9
90	134.707	673.53	1347.07	1444.39	1549.34	649.02	346.3
110	142.293	711.46	1422.93	1556.98	1687.89	698.13	367.7
130	149.832	749.16	1498.32	1675.19	1833.35	749.27	389.1
150	157.325	786.63	1573.25	1799.27	1986.35	802.44	410.5

13.2 Table for KTY81- and NTC-Sensors

Temp	KTY81 -110	KTY81 -210	NTC1k8 Thermokon	NTC5k Thermokon	NTC10k Thermokon	NTC20k Thermokon	NTC10k Carel	NTC5k Schneider	NTC30k Schneider
°C	Ohm	Ohm	Ohm	kOhm	kOhm	kOhm	kOhm	Ohm	kOhm
-50	515	1030		333.9	667.8	1668.0	329.5	9850	2497.83
-40	567	1135		167.8	335.7	813.4	188.5	9711	1219.17
-30	624	1247	24500	88.34	176.7	415.5	111.3	9465	622.94
-20	684	1367	14000	48.49	96.97	221.3	67.77	9066	331.02
-10	747	1495	8400	27.65	55.30	122.5	42.47	8471	183.56
0	815	1630	5200	16.33	32.65	70.20	27.28	7660	105.31
10	886	1772	3330	9.952	19.90	41.56	17.96	6666	62.355
20	961	1922	2200	6.247	12.49	25.35	12.09	5573	38.022
30	1040	2080	1480	4.028	8.06	15.89	8.31	4492	23.827
40	1122	2245	1040	2.662	5.32	10.21	5.83	3517	15.314
50	1209	2417	740	1.801	3.60	6.72	4.16	2702	10.077
60	1299	2597	540	1.244	2.49	4.52	3.02	2055	6.777
70	1392	2785	402	0.8758	1.75	3.10	2.23	1562	4.650
80	1490	2980	306	0.6281	1.26	2.12	1.67	1193	3.251
90	1591	3182	240	0.4581	0.92	1.54	1.27	921	2.312
100	1696	3392	187	0.3393	0.68	1.12	0.97	721	1.670
110	1805	3607	149	0.2550	0.51	0.82	0.76	574	1.224
120	1915	3817	118	0.1943	0.39	0.61		466	0.909
130	2023	4008	95	0.1499	0.30	0.46		380	0.690
140	2124	4166	77	0.1170	0.23	0.35		320	0.530
150	2211	4280	64	0.0924	0.18	0.27		270	0.410

13.3 Table for LM235Z Sensors

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