PICS EE850D / EE820D

BACnet Protocol Implementation Conformance Statement

YOUR PARTNER IN SENSOR TECHNOLOGY

E+E ELEKTRONIK® Ges.m.b.H.

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1. GENERAL INFORMATION

Date:	03.07.2018
Vendor Name:	E+E Elektronik
Product Name:	EE850D or EE820D
Product Model Number:	EE850D or EE820D

These are the generic denominations for EE850 or EE820 devices with digital output (RS485) and BACnet MS/TP protocol. For type number of specific EE850D or EE820D devices see the respective data sheets at:
www.epluse.com/fileadmin/data/product/EE850/datasheet_EE850.pdf
www.epluse.com/fileadmin/data/product/EE820/datasheet_EE820.pdf

Application Software Version:	1.0
Firmware Revision:	1.0
BACnet Protocol Version:	1
BACnet Protocol Revision:	10

Product Description:
Carbon dioxide (CO2) BACNet MS/TP Smart Sensor Master device.
With temperature and humidity measurement: EE850D.
Without temperature and humidity measurement: EE820D.

2. BACNET STANDARDIZED DEVICE PROFILE (ANNEX L)

- ☐ BACnet Operator Workstation (B-OWS)
- ☐ BACnet Advanced Operator Workstation (B-AWS)
- ☐ BACnet Operator Display (B-OD)
- ☐ BACnet Building Controller (B-BC)
- ☐ BACnet Advanced Application Controller (B-AAC)
- ☐ BACnet Application Specific Controller (B-ASC)
- ☒ BACnet Smart Sensor (B-SS)
- ☐ BACnet Smart Actuator (B-SA)

3. LIST OF ALL SUPPORTED BACNET INTEROPERABILITY BUILDING BLOCKS (ANNEX K):

DS-RP-B..... Data Sharing – Read Property – B
DS-RPM-B..... Data Sharing – Read Property Multiple – B
DS-WP-B..... Data Sharing – Write Property – B
DM-DDB-B ..... Data Management – Dynamic Device Binding – B
DM-DOB-B ..... Data Management – Dynamic Object Binding – B
DM-DCC-B ..... Data Management – Device Communication Control – B
DM-RD-B..... Data Management – Reinitialize Device – B

4. SEGMENTATION CAPABILITY

- ☐ Able to transmit segmented messages
- ☐ Able to receive segmented messages

5. BACNET STANDARD OBJECT TYPES SUPPORTED

- ☐ Accumulator
- ☒ Analog Input
- ☐ Analog Output
- ☐ Analog Value
- ☐ Averaging
- ☐ Binary Input
- ☐ Binary Output
- ☐ Binary Value
- ☐ Calendar
- ☐ Command
- ☒ Device
- ☐ Event Enrollment
- ☐ File
- ☐ Group
- ☐ Life Safety Point
- ☐ Life Safety Zone
- ☐ Loop
- ☐ Multistate Input
- ☐ Multistate Output
- ☐ Multistate Value
- ☐ Notification Class
- ☐ Program
- ☐ Pulse Converter
- ☐ Schedule
- ☐ Trend Log

6. DATA LINK LAYER OPTIONS

- ☐ BACnet IP, (Annex J):
- ☐ BACnet IP, (Annex J), Foreign Device:
- ☐ ISO 8802-3, Ethernet (Clause 7):
- ☐ ATA 878.1, 2.5 Mb. ARCNET (Clause 8):
- ☐ ATA 878.1, EIA-485 ARCNET (Clause 8), baud rate(s):
- ☒ MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 57600, 76800, 115200
- ☐ MS/TP slave (Clause 9), baud rate(s):
- ☐ Point-To-Point, EIA 232 (Clause 10), baud rate(s):
- ☐ Point-To-Point, modem, (Clause 10), baud rate(s):
- ☐ LonTalk, (Clause 11), medium:
- ☐ BACnet/Zigbee (Annex O):
- ☐ Other:

7. 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

8. 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

9. 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)

10. 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)	☐ SO 10646 (UCS-4)	☐ JIS X 0208

11. TRANSMITTER DIFFERENCES

BACnet Objects	EE850D	EE850D
Device Object	☒	☒
Analog Input Object: CO2	☒	☒
Analog Input Object: CO2 raw	☒	☒
Analog Input Object: Temperature	☒	
Analog Input Object: Relative Humidity	☒	
Analog Input Object: Water Vapor Partial Pressure	☒	
Analog Input Object: Dew Point temperature	☒	
Analog Input Object: Absolute humidity	☒	
Analog Input Object: Mixing Ratio	☒	
Analog Input Object: Enthalpy	☒	
Analog Input Object: Frost Point Temperature	☒	

12. BACNET OBJECTS

This part describes the various BACnet objects in detail. In the following sections the main properties of the individual objects are explained.

12.1 Device Object

Property	Data Type	Initial Value	R/O/P	Persistence
Object Identifier	BACnetObjectIdentifier	6	R (W)	Non Volatile
Object Name	CharacterString[15]	“EE850D_0000006” or “EE820D_0000006”	R (W)	Non Volatile
Object Type	BACnetObjectType (Enum.)	OBJECT_DEVICE	R (R)	Fixed
Description	CharacterString[15]	“EE850D” or “EE820D”	O (W)	Non Volatile
System Status	BACnetDeviceStatus (Enum.)	STATUS_OPERATIONAL	R (R)	Volatile
Vendor Name	CharacterString	“E+E Elektronik”	R (R)	Fixed
Vendor Identifier	Unsigned16	623	R (R)	Fixed
Model Name	CharacterString	“EE850D” or “EE820D”	R (R)	Fixed
Firmware Revision	CharacterString	“1.0”	R (R)	Fixed
Application Software Version	CharacterString	“1.0”	R (R)	Fixed
Location	CharacterString[15]	“AUT”	O (W)	Non Volatile
Protocol Version	Unsigned	1	R (R)	Fixed
Protocol Revision	Unsigned	10	R (R)	Fixed
Protocol Services Supported	BACnetProtocolServices Supported (Bit-String)	Read Property Read Property Multiple Write Property Device Comm. Control Reinitialize Device Who-Is Who-Has	R (R)	Fixed
Protocol Object Types Supported	BACnetObjectTypes Supported (Bit-String)	Device Analog Input	R (R)	Fixed
Object List	BACnetARRAY[N] of BACnetObjectIdentifier	EE850D: Device Object AI0 (CO2) AI1 (CO2 raw) AI2 (Temperature) AI3 (Relative humidity) AI4 (Water Vap. Press.) AI5 (Dew Point Temp.) AI6 (Absolute Humidity) AI7 (Mixing Ratio) AI8 (Enthalpy) AI9 (Frost Point Temp.) EE820D: Device Object AI0 (CO2) AI1 (CO2 raw)	R (R)	Fixed
Max APDU Length Accepted	Unsigned16	480	R (R)	Fixed
Segmentation Supported	BACnetSegmentation (Enum.)	NO_SEGMENTATION	R (R)	Fixed
APDU Timeout	Unsigned	3000	R (R)	Fixed
Number of APDU Retries	Unsigned	3	R (R)	Fixed
Device Address Binding	List of BACnetAddressBinding	NULL	R (R)	Fixed
Database Revision	Unsigned	0	R (W)	Non Volatile
Max Info Frames	Unsigned	1	O (R)	Fixed
Max Master	Unsigned	127	O (W)	Non Volatile
Communication Parameter	CharacterString	“9600-8n1”	P (W)	Non Volatile

R (R)..... Required Property (Readable)
R (W)..... Required Property (Read-/Writable)
O (R)..... Optional Property (Readable)
O (W)..... Optional Property (Read-/Writeable)
P (R)..... Proprietary Property (Readable)
P (W)..... Proprietary Property (Read-/Writeable)

Max Master:
The maximum “Max Master” Property is 127. This value is writable via BACnet write property.

Communication Parameter:
For changing the RS485 communication parameters it is relevant to observe the character string format. The character string consists of following parts:

1. Baud rate (9600, 19200, 38400, 57600, 76800, 115200)
2. "-"
3. Number of data bits (fixed: 8)
4. Parity (fixed: no)
5. Number of stop bits (fixed: 1)

Example:
- Change parameters to: Baud = 38400, 8 data bits, no parity, 1 stop bit:
  String: "38400-8n1"

ATTENTION: The character string shall end with the terminating 0.

12.2 Analog Input Objects

Each analog input object has the same structure.

Property	Data Type	Initial Value	R/O/P	Persistence
Object Identifier	BACnetObjectIdentifier	0…CO2 1…CO2 raw 2…Temperature 3…Relative humidity 4…Water Vap. Press. 5…Dew Point Temp. 6…Absolute Humidity 7…Mixing Ratio 8…Enthalpy 9…Frost Point Temp.	R	Fixed
Object Name	CharacterString	"CO2".....CO2 "CO2raw"..CO2 Raw "T".....Temperature "RH".....Rel. Humidity "e".....Wat. Vap. Press. "Td".....Dew Pnt. Temp. "dv".....Abs. Humidity "r".....Mixing Ratio "h".....Enthalpy "Tf".....Frost Point Temp.	R	Fixed
Description	CharacterString	(see below)	O	Fixed
Object Type	BACnetObjectType (Enum.)	OBJECT_ANALOG_INPUT	R	Fixed
Present Value	Real	0.0	R (W)[a.]	Volatile
Status Flags	BACnetStatusFlags (Bit-String)	false, false, false, false	R	Volatile
Event State	BACnetEventState	NORMAL	R	Volatile
Out of Service	Boolean	false	R (W)	Volatile
Units	BACnetEngineeringUnits (Enum.)	(see below)	R (W)	Non Volatile
Reliability	BACnetReliability (Enum.)	NO_FAULT_DETECTED	R (W)[a.]	Volatile

a.) When "Out of Service" flag is true, value is writable.

Description Property:
The following table shows the possible object descriptions depending on the set units:

Obj.	Initial Value	Alternative 1	Alternative 2
CO2	"CO2 [ppm]"	-	-
CO2raw	"CO2 raw [ppm]"	-	-
T	"Temperature [deg. C]"	"Temperature [deg. F]"	"Temperature [K]"
RH	"Relative humidity [%rH]"	-	-
e	"Water vapor partial pressure [mbar]"	"Water vapor partial pressure [psi]"	-
Td	"Dew point temperature [deg. C]"	"Dew point temperature [deg. F]"	"Dew point temperature [K]"
dv	"Absolute humidity [g/m^3]"	"Absolute humidity [gr/ft^3]"	-
r	"Mixing ratio [g/kg]"	"Mixing ratio [gr/lb]"	-
h	"Enthalpy [kJ/kg]"	"Enthalpy [ft lbf/lb]"	"Enthalpy [BTU/lb]"
Tf	"Frost point temperature [deg. C]"	"Frost point temperature [deg. F]"	"Frost point temperature [K]"

Present Value Property:
This property represents the actual sensor or actual calculation value. When the "Out of Service" flag is true, this value is writable. The default values when "Out of Service" is set are 50.0.

Status Flags Property:
The following table describes the possible states of the “Status Flags” property:

Flag	State	Reason
IN_ALARM	false	Value of “Event State” property is NORMAL (0)
	true	Value of “Event State” property is not NORMAL (0)
FAULT	false	Value of “Reliability” property is NO_FAULT_DETECTED
	true	Value of “Reliability” property is not NO_FAULT_DETECTED
OVERRIDDEN	false	Always false
OUT_OF_SERVICE	false	“Present Value” and “Reliability” properties are not writeable via BACnet
	true	“Present Value” and “Reliability” properties are writeable via BACnet

Event State:
The following table describes the possible states of the “Event State” property:

State	Reason
NORMAL (0)	Value of “Reliability” property is NO_FAULT_DETECTED
FAULT (1)	Value of “Reliability” property is not NO_FAULT_DETECTED

Units:
The following table lists the possible units for each analog input object:

Obj.	Unit Initial Value	Unit Alternative 1	Unit Alternative 2
CO2	Parts per Million (96)	-	-
CO2raw	Parts per Million (96)	-	-
T	Degrees Celsius (62)	Degrees Fahrenheit (64)	Degrees Kelvin (63)
RH	Relative Humidity (29)	-	-
e	Millibars (134)	Pounds Force per Square Inch (56)	-
Td	Degrees Celsius (62)	Degrees Fahrenheit (64)	Degrees Kelvin (63)
dv	Grams per Cubic Meter (217)	Grains per Cubic Foot (256)[a.)]	-
r	Grams per Kilogram (210)	Grains per Pound (257)[a.)]	-
h	Kilojoules per Kilogram Dry Air (149)	Footpound per Pound Dry Air (258)[a.)]	BTU per Pound Dry Air (24)
Tf	Degrees Celsius (62)	Degrees Fahrenheit (64)	Degrees Kelvin (63)

a.) Not an ASHRAE defined Unit

Reliability:
The following table describes the possible states of the “Reliability” property:

State	Reason
NO_FAULT_DETECTED (0)	No fault detected
NO SENSOR (1)	Sensor is damaged or not connected

13. MISCELLANEOUS INFORMATION

Reinitialize Device (RD):
The RD function is used to restart/reboot the entire transmitter via BACnet. To use reinitialize device functionality a password is needed. The password is: “BACnet123”.

Device Communication Control (DCC):
The DCC functionality is used to stop initiating messages on the BACnet network. After receiving a DCC stop initiate message, the device does not response to a request any more, except to RD or DCC requests. The use of the device communication control functionality is password protected. The password is: “BACnet123”.

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