

# **Setra Relative Humidity BACnet Protocol**

Implementation conformance statement

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# 1.0 General information

**Date:** 28.10.2014  
**Vendor name:** Setra Systems  
**Product name:** SRH300D or SRH200D  
**Product model number:** SRH300D or SRH200D

These are the generic denominators for SRH300 or SRH200 devices with digital output (RS485) and BACnet MS/TP protocol. For type number of specific SRH300D or SRH200D devices see the respective data sheets at:

[https://www.setra.com/hubfs/Setra Product Data Sheets/Model SRH200 Data Sheet.pdf](https://www.setra.com/hubfs/Setra%20Product%20Data%20Sheets/Model%20SRH200%20Data%20Sheet.pdf)  
[https://www.setra.com/hubfs/Setra Product Data Sheets/Model SRH300 Data Sheet.pdf](https://www.setra.com/hubfs/Setra%20Product%20Data%20Sheets/Model%20SRH300%20Data%20Sheet.pdf)

**Application software version:** 1.8  
**Firmware revision:** 1.8  
**BACnet protocol version:** 1  
**BACnet protocol revision:** 10

## Product description:

Humidity and temperature BACnet MS/TP smart sensor master devices SRH300D or SRH200 (derived from SRH300D).

# 2.0 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)

### 3.0 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  
DS-COVU-B ... data sharing – COV-unsolicited – 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

### 4.0 Segmentation capability

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

### 5.0 BACnet standard object types supported

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Accumulator             | <input type="checkbox"/> Command           | <input type="checkbox"/> Multistate output  |
| <input checked="" type="checkbox"/> Analog input | <input checked="" type="checkbox"/> Device | <input type="checkbox"/> Multistate value   |
| <input type="checkbox"/> Analog output           | <input type="checkbox"/> Event enrollment  | <input type="checkbox"/> Notification class |
| <input type="checkbox"/> Analog value            | <input type="checkbox"/> File              | <input type="checkbox"/> Program            |
| <input type="checkbox"/> Averaging               | <input type="checkbox"/> Group             | <input type="checkbox"/> Pulse converter    |
| <input type="checkbox"/> Binary input            | <input type="checkbox"/> Life safety point | <input type="checkbox"/> Schedule           |
| <input type="checkbox"/> Binary output           | <input type="checkbox"/> Life safety zone  | <input type="checkbox"/> Trend log          |
| <input type="checkbox"/> Binary output           | <input type="checkbox"/> Loop              |   |
| <input type="checkbox"/> Calendar                | <input type="checkbox"/> Multistate input  |   |

## 6.0 Data link layer option

- 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):
- MS/TP master (clause 9), baud rate(s): 9600, 19200, 38400, 57600, 76800, 115200
- ATA 878.1, EIA-485 ARCNET (clause 8), band rate(s)
- MS/TP slave (clause 9), baud rate(s):
- Point-to-point, EIA 232 (clause 10), baud rate(s):
- Point-to-point, modem, (clause 10), baud rate(s):
- LonTalk, (clause 11), medium:
- BACnet/zigbee (annex O):
- Other:

## 7.0 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

## 8.0 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

## 9.0 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)

## 10.0 Character sets supported

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

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

## 11.0 Transmitter differences

BACnet objects	SRH300D	SRH200
Device object	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Analog input object: temperature	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Analog input object: relative humidity	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Analog input object: water vapor partial pressure	<input checked="" type="checkbox"/>	
Analog input object: dew point temperature	<input checked="" type="checkbox"/>	
Analog input object: absolute humidity	<input checked="" type="checkbox"/>	
Analog input object: mixing ratio	<input checked="" type="checkbox"/>	
Analog input object: enthalpy	<input checked="" type="checkbox"/>	
Analog input object: frost point temperature	<input checked="" type="checkbox"/>	
	<input checked="" type="checkbox"/>	

## 12.0 BACnet objects

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

### 12.1 Device object

Property	Data type	Initial value	R/O/P	Persistence
Object identifier	BACnetObjectIdentifier	1 (SRH300D) 2 (SRH200D)	R (W)	Non Volatile
Object name	CharacterString[15]	"SRH300D_0000001" "SRH200D_0000002"	R (W)	Non Volatile
Object type	BACnetObjecType	OBJECT_DEVICE	R (R)	Fixed
Description	CharacterString[15]	"SRH300D" "SRH200D"	O (W)	Non Volatile
System status	BACnetDeviceStatus	STATUS_OPERATIONAL	R (R)	Volatile
Vendor name	CharacterString	"SETRA SYSTEMS"	R (R)	Fixed
Vendor identifier	Unsigned16	351	R (R)	Fixed
Model name	CharacterString	"SRH300D" "SRH200D"	R (R)	Fixed
Firmware revision	CharacterString	"1.8"	R (R)	Fixed
Application software versions	CharacterString	"1.8"	R (R)	Fixed
Location	CharacterString[15]	"USA"	O (W)	Non Volatile
Protocol version	Unsigned	1	R (R)	Fixed
Protocol revision	Unsigned	10	R (R)	Fixed
Protocol services supported	BACnetProtocolServices Supported (BitString)	Read Property Read Property Multiple Write Property Device Comm. Control Reinitialize Device Unconfirmed COV Who-Is	R (R)	Fixed
Protocol object types supported	BACnetTypes Supported (BitString)	Device A INPUTnalog	R (R)	Fixed

Property	Data type	Initial value	R/O/P	Persistence
Object list	BACnetARRAY[N] of BACnetObjectIdentifier	<b>SRH 300D:</b> Device Object A10 (Temperature) A11(Relative Humidity) A12 (Water Vap. Press.) A13 (Dew Point Temp.) A14 (Absolute Humidity) A15 (Mixing Ratio) A16 (Enthalpy) A17 (Frost Point Temp.)	R (R)	Fixed
		<b>SRH200D:</b> Device object A10 (temperature) A11 (relative humidity)		
Max APDU length accepted	Unsigned16	480	R (R)	Fixed
Segmentation supported	BACnetSegmentation	NO_SEGMENTATION	R (R)	Fixed
APDU timeout	Unsigned	3000	R (R)	Fixed
Number of SPDU retires	Unsigned	3	R (R)	Fixed
Device address binding	List of	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	"38400-8n1"	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/writable)

P (R) .....proprietary property (readable)

P (W) .....Proprietary property (read/writable)

### Max master property:

The maximum "Max Master" property is 127. This property is writable via BACnet.



### Communication parameter property:

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 (7, 8)
4. Parity (no, even, odd)
5. Number of stop bits (1, 2)

### Example:

Change parameters to: Baud = 76800, 8 data bits, no parity, 1 stop bit:

String: "76800-8n1"

### Attention:

The character string shall end with the terminating 0.

## 12.2 Analog input objects

All analog input objects have the same structure. The only difference between the SRH300D and the SRH200D transmitter is the count of the analog input objects (see 11.0).

Property	Data type	Initial value	R/O/P	Persistence
Object identifier	BACnetObjectIdentifier	0 ... Temperature	R	Fixed
		1 ... Relative Humidity		
		2 ... Water Vap. Press.		
		3 ... Dew Point Temp.		
		4 ... Absolute Humidity		
		5 ... Mixing Ratio		
		6 ... Enthalpy		
Object name	CharacterString	"T" ... Temperature	R	Fixed
		"RH" ... Rel. Humidity		
		"e" ... Wat. Vap. Press.		
		"Td" ... Dew Pnt. Temp.		
		"dv" ... Abs. Humidity		
		"r" ... Mixing Ratio		
		"h" ... Enthalpy		
"Tf" ... Frost Pnt. Temp.				
Description	CharacterString	(see below)	O	Fixed
Object type	BACnetObjectType (Enum.)	OBJECT_ANALOG_INPUT	R	Fixed
Present value	Real	0.0	R	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	(see below)	R (W)	Non volatile
Reliability	BACnetReliability (Enum.)	NO_FAULT_DETECTED	R	Volatile
COV increment	Real	Not a Number (NaN)	O (W)	Non volatile

a.) When "out of service" flag is true, value is writable.

**Description property:**

The following table lists the possible object descriptions depending on the selected measurement units:

Initial value	Alternative 1	Alternative 2
"Temperature [deg. C]"	"Temperature [deg. F]"	"Temperature [deg. K]"
"Relative humidity [%rH]"		
"Water vapor partial pressure"	"Water vapor partial pressure"	
Dew point temperature [deg.]	"Temperature [deg. F]"	"Temperature [deg. K]"
Absolute humidity [g/m <sup>3</sup> ]"	"Absolute humidity [g/ft <sup>3</sup> ]"	
"Mixing ratio [g/kg]"	"Mixing ratio [g/lb]"	
"Enthalpy [kJ/kg]"	"Enthalpy [ft lbf/lb]"	"Enthalpy [BTU/lb]"
"Frost point temperature [deg.]"	"Temperature [deg.F]"	"Temperature [deg. K]"

**Present value property:**

This property represents the actual measured value or actual calculated value. When the "Out of Service" flag is true, the present value property is writable. The default present value property is 50.0 when "Out of service" is true.

**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
OVERRIDDEN	False	Always false
OUT_OF_SERVICE	False	"Present Value" and "Reliability" properties are not writable
	True	"Present Value" and "Reliability" properties are writable via

**Event state property:**

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 property:**

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

Initial value	Alternative 1	Alternative 2
Degrees Celsius (62)	Degrees Fahrenheit (64)	Degrees Kelvin (63)
Relative humidity (29)		
Millibars (134)	Pounds force per square inch	
Degrees Celsius (62)	Degrees Fahrenheit (64)	Degrees Kelvin (63)
Grams per cubic meter (217)	Grams per cubic foot (256) <sup>a)</sup>	
Grams per Kilogram (210)	Grams per pound (257) <sup>a)</sup>	
Kilojoules per Kilogram dry air	Footpound per pound dry air	BTU per pound dry air (24)
Degrees Celsius (62)	Degrees Fahrenheit (64)	Degrees Kelvin (63)

a.) Not an ASHRAE defined unit.

**Reliability property:**

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

**COV increment property:**

Default value is NaN (not a number). When the "COV increment property" is NaN or greater than 1000,000,000.0 then COV reporting is disabled.

## 13.0 Miscellaneous information

**Reinitialize device (RD):**

The RD function is used to restart/ reboot the entire transmitter via BACnet. A password is required for using the RD function. The password is: "BACnet123".

**Device communication control (DCC):**

The DCC function is used to stop initiating messages on the BACnet network. After receiving a DCC stop initiate message, the device does not respond to any request any longer, except to RD or DCC requests. The use of the DCC function is password portected. The password is: "BACnet123".

**Unsolicited COV reporting:**

When COV reporting is activated, a BACnet message is broadcasted every time when the difference between actual and the previous "Present Value" since last COV message exceeds the "COV Increment" value. Since no subscription list is supported, the COV message is always broadcasted. This function is necessary when several BACnet clients need same information from one certain B.



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