

# BACnet Protocol Implementation Conformance Statement

**Date:** November 16, 2016

**Vendor Name:** ABB, Vendor ID 127

**Product Name:** HVAC Drive

**Product Model Number:** ACH580

**Applications Software Version:** 2.01.x.x      **Firmware Revision:** 2016      **BACnet Protocol Revision:** 12

## Product Description:

The ACH580 is a high-performance variable speed drive (VSD) designed for HVAC and refrigeration applications. Product supports native BACnet, connecting directly to the MS/TP LAN. MS/TP baud rates are supported up to 115.2 kbps, as well as master and slave mode functionalities. Over BACnet, the drive can be fully controlled and monitored as a standard variable speed drive. In addition, the drive's standard I/O is available over BACnet to the user application.

## 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):

<b>DS-RP-B</b>	Data Sharing-ReadProperty
<b>DS-RPM-B</b>	Data Sharing-ReadProperty Multiple
<b>DS-WP-B</b>	Data Sharing-WriteProperty
<b>DS-WPM-B</b>	Data Sharing-WriteProperty Multiple
<b>DS-COV-B</b>	Data Sharing-Change of Value
<b>DM-DDB-B</b>	Device Management-DynamicDeviceBinding
<b>DM-DOB-B</b>	Device Management-DynamicObjectBinding
<b>DM-DCC-B</b>	Device Management-DeviceCommunicationControl
<b>DM-RD-B</b>	Device Management-ReinitializeDevice
<b>DM-TS-B</b>	Device Management-Time Synchronization

## Segmentation Capability:

- Able to transmit segmented messages      Window Size: -
- Able to receive segmented messages      Window Size: -

## Standard Object Types Supported:

Object instantiation is static, i.e. objects cannot be created or deleted.  
Refer to tables at end of this document for object details.

**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): 9.6k, 19.2k, 38.4k, 76.8k, 115.2k
- MS/TP slave (Clause 9), baud rate(s): 9.6k, 19.2k, 38.4k, 76.8k, 115.2k
- 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: \_\_\_\_\_

**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
  - BACnet/IP to MS/TP
  - BACnet/ ISO 8802-3, Ethernet to MS/TP
  - BACnet/IP to BACnet/ ISO 8802-3, Ethernet
  - BACnet/IP to BACnet/ ISO 8802-3, Ethernet to MS/TP
- Annex H, BACnet Tunneling Router over IP
- BACnet/IP Broadcast Management Device (BBMD)
  - Does the BBMD support registrations by Foreign Devices?  Yes  No
  - Max BDT (Broadcast Distribution Table)-Entries: -
  - 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

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

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**Object/Property Support Matrix**

The following table summarizes the Object Types/Properties Supported and default values:

Property	Object type						
	Binary Input	Binary Output	Binary Value	Analog Input	Analog Output	Analog Value	Multistate Value
<b>Object Identifier</b>	R	R	R	R	R	R	R
<b>Object Name</b>	W, P	W, P	R	W, P	W, P	R <sup>(1)</sup>	R
<b>Object Type</b>	R	R	R	R	R	R	R
<b>Present Value</b>	R	C	C	R	C	C	R
<b>Status Flags</b>	R	R	R	R	R	R	R
<b>Event State</b>	R	R	R	R	R	R	R
<b>Out-of-Service</b>	W	W	W	W	W	W	W
<b>Polarity</b>	W, P	W, P					
<b>Active Text</b>	R	R	R				
<b>Inactive Text</b>	R	R	R				
<b>Units</b>				R	R	R	
<b>Min Present Value</b>				R	R	R	
<b>Max Present Value</b>				R	R	R	
<b>Priority Array</b>		R	R		R	R	
<b>Relinquish Default</b>		W, P	W,P		W, P	W, P	
<b>COV Increment</b>				W,P	W,P	W,P	
<b>Number Of States</b>							R
<b>State Text</b>							R
<b>Property List</b>	R	R	R	R	R	R	R
	R=Read Only, W=Writable, C=Commandable, P=Persist  (1) – AV16, AV17, AV21, AV22, AV40, AV41, AV42, AV43, AV44, AV55, AV56, AV59 have W, P						

**Device Object Instance Summary**

The following table summarizes the Device Object supported:

<b>Device Object</b>			
<b>Property</b>	<b>Flag</b>	<b>Type</b>	<b>Default value</b>
<b>Object Identifier</b>	W, P	OID	4194303
<b>Object Name</b>	W, P	CharString	AC Drive 4194303
<b>Object Type</b>	R	Enum	DEV (8)
<b>System Status</b>	R	Enum	
<b>Vendor Name</b>	R	CharString	ABB
<b>Vendor Identifier</b>	R	Unsigned	127
<b>Model Name</b>	R	CharString	ACH580
<b>Firmware Revision</b>	R	CharString	2016
<b>Application Software Revision</b>	R	CharString	
<b>Description</b>	W, P	CharString	“ACH580 is a high-performance variable speed drive designed for HVAC and refrigeration applications.”
<b>Location</b>	W, P	CharString	“(not set)”
<b>Protocol Version</b>	R	Unsigned	1
<b>Protocol Revision</b>	R	Unsigned	12
<b>Protocol Services Supported</b>	R	BitString	
<b>Protocol Object Types Supported</b>	R	BitString	
<b>Object List</b>	R	Array of OID	
<b>Max APDU Length Accepted</b>	R	Unsigned	480
<b>Segmentation Supported</b>	R	Enum	No segmentation (3)
<b>Local Time</b>	R	BACnetTime	
<b>Local Date</b>	R	BACnetDate	
<b>APDU Timeout</b>	W, P	Unsigned	10000 ms
<b>Number of APDU Retries</b>	W, P	Unsigned	3
<b>Max Master</b>	W, P	Unsigned	127
<b>Max Info Frames</b>	W, P	Unsigned	1
<b>Device Address Binding</b>	R	List of Struct	
<b>Database Revision</b>	R, P	Unsigned	
<b>Active COV Subscriptions</b>	R	Array of BACnetCOVSubscription	
<b>Property List</b>	R	Array of Unsigned	
<b>Flags: R=Read Only, W=Writable, C=Commandable, P=Persist</b>			

### **Binary Input Object Instance Summary**

The following table summarizes the Binary Input Objects supported:

<b>Object ID</b>	<b>Object Name</b>	<b>Description</b>	<b>Active/Inactive Text</b>	<b>Present Value Access Type</b>
BI0	RO1-Monitor	Status of Relay Output 1	On / Off	R
BI1	RO2-Monitor	Status of Relay Output 2	On / Off	R
BI2	RO3-Monitor	Status of Relay Output 3	On / Off	R
BI3	RO4-Monitor	Status of Relay Output 4	On / Off	R
BI4	RO5-Monitor	Status of Relay Output 5	On / Off	R
BI5	DO1-Monitor	Status of Digital Output 1	On / Off	R
BI6	DI1-Monitor	Status of Digital Input 1	On / Off	R
BI7	DI2-Monitor	Status of Digital Input 2	On / Off	R
BI8	DI3-Monitor	Status of Digital Input 3	On / Off	R
BI9	DI4-Monitor	Status of Digital Input 4	On / Off	R
BI10	DI5-Monitor	Status of Digital Input 5	On / Off	R
BI11	DI6-Monitor	Status of Digital Input 6	On / Off	R

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays & relinquish defaults.

### **Binary Output Object Instance Summary**

The following table summarizes the Binary Output Objects supported:

<b>Object ID</b>	<b>Object Name</b>	<b>Description</b>	<b>Active/Inactive Text</b>	<b>Present Value Access Type</b>
BO0	RO1-Command	Output state of Relay 1	On / Off	C
BO1	RO2-Command	Output state of Relay 2	On / Off	C
BO2	RO3-Command	Output state of Relay 3	On / Off	C
BO3	RO4-Command	Output state of Relay 4	On / Off	C
BO4	RO5-Command	Output state of Relay 5	On / Off	C
BO5	DO1-Command	Output state of Digital Output 1	On / Off	C

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays & relinquish defaults.

## Binary Value Object Instance Summary

The following table summarizes the Binary Value Objects supported:

Object ID	Object Name	Description	Active/Inactive Text	Present Value Access Type
BV0	RUN-STOP-Monitor	Drive's run status	Run / Stop	R
BV1	Direction-Monitor	Rotational direction of the motor	Reverse / Forward	R
BV2	OK-FAULT-Monitor	Actual fault status of drive	Fault / OK	R
BV3	EXT1-EXT2-Monitor	Actual control source	Ext2 / Ext1	R
BV4	HAND-AUTO-Monitor	Actual operating mode.	Hand / Auto	R
BV5	Warning-Monitor	Actual warning status	Warning / OK	R
BV7	Ready-Monitor	Actual ready status	Ready / Not-Ready	R
BV8	At-Setpoint-Monitor	Actual at setpoint status	Yes / No	R
BV9	Enabled-Monitor	Actual run enabled status	Enable / Disable	R
BV10	RUN-STOP-Command	Command to start drive	Run / Stop	C
BV11	Direction-Command	Command to rotational direction	Reverse / Forward	C
BV12	Run-Permissive-Command	Command to Run Permissive command	Enable / Disable	C
BV13	EXT1-EXT2-Command	Commanded to External 1 or External 2 selection	Ext2 / Ext1	C
BV14	Fault-Reset-Command	Commanded to fault reset	Reset / No	W
BV15-BV16	<Reserved>			
BV18	Control-Override-Command	Command the drive into BACnet Control Override. In this mode, BACnet acquires drive control from its normal source. Note that HAND mode of the panel has priority over BACnet Control Override.	On / Off	C
BV19	Control-Override-Monitor	Indicates if drive has been placed in BACnet Control Override by commanding BV18. In this mode, BACnet acquires drive control from its normal source. Note that HAND mode of the panel has priority over BACnet Control Override.	On / Off	R
BV20	Start-Interlock-1-Command	Command to Start Enable 1	Enable / Disable	C
BV21	Start-Interlock-2-Command	Command to Start Enable 2	Enable / Disable	C
BV24	Started-Monitor	Actual start status	Started / Not-Started	R
BV25	Safe-Torque-Off-Monitor	Actual status of Safe Torque Off	Active / OK	R
BV26	Underload-Monitor	Indicates if ULC signal is lower than the Underload curve	Underload / OK	R

Object ID	Object Name	Description	Active/Inactive Text	Present Value Access Type
BV27	Overload-Monitor	Indicates if ULC signal is higher than the Overload curve	Overload / OK	R
BV28	Motor-Heating-Command	Command to Motor Heating mode	On / Off	W
BV29	Motor-Heating-Monitor	Actual status of Motor Heating mode	On / Off	R
BV30	User0-Monitor	Actual status of "User bit0" in drive status word	On / Off	R
BV31	User1-Monitor	Actual status of "User bit1" in drive status word	On / Off	R
BV32	User2-Monitor	Actual status of "User bit2" in drive status word	On / Off	R
BV33	User3-Monitor	Actual status of "User bit3" in drive status word	On / Off	R
BV34	User0-Command	Commands "User bit0" in drive status word	On / Off	C
BV35	User1-Command	Commands "User bit1" in drive status word	On / Off	C
BV36	User2-Command	Commands "User bit2" in drive status word	On / Off	C
BV37	User3-Command	Commands "User bit3" in drive status word	On / Off	C
BV38	<Reserved>			
BV39	Parameter-Save-Command	Command to save drive parameters and BACnet property data (properties marked as 'P=Persist')	Save / No	W
BV40	PID-Set-Select	Command to Process PID Set1 or Process PID Set2 selection	Set1 / Set2	W

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays & relinquish defaults.

### **Analog Input Object Instance Summary**

The following table summarizes the Analog Input Objects supported:

Object ID	Default Object Name	Description	Min / Max Present Value	Units	Present Value Access Type
AI0	AI1-Monitor	Indicates the input level of Analog Input 1.	0...100	Percent (%)	R
AI1	AI2-Monitor	Indicates the input level of Analog Input 2.	0...100	Percent (%)	R

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays & relinquish defaults.

### **Analog Output Object Instance Summary**

The following table summarizes the Analog Output Objects supported:

Object ID	Default Object Name	Description	Min / Max Present Value	Units	Present Value Access Type
AO0	AO1-Command	Controls Analog Output 1 (drive must be configured for BACnet control).	0...100	Percent	C
AO1	AO2-Command	Controls Analog Output 2 (drive must be configured for BACnet control).	0...100	Percent	C

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays & relinquish defaults.

### Analog Value Object Instance Summary

The following table summarizes the Analog Value Objects supported:

Object ID	Default Object Name	Description	Min / Max Present Value	Units	Present Value Access Type
AV0	Output-RPM	Motor speed	0, nominal speed	rpm	R
AV1	Output-Freq	Output frequency	-500, 500	Hz	R
AV2	DC-Voltage	DC bus voltage	0, 2000	V	R
AV3	Output-Voltage	AC output voltage	0, 2000	V	R
AV4	Output-Current	Output current of drive	0, nominal current	A	R
AV5	Output-Torque	Output torque of motor as a percentage of nominal torque	-1600, 1600	%	R
AV6	Output-Power	Output power in kW	nominal power (+/-)	kW	R
AV7	Operating-Temp-Range	Heatsink temperature	-40, 160	%	R
AV8	<Reserved>				
AV9	Kilowatt-Hour-Meter-NR	Drive's cumulative energy usage. This value is not resettable.	0, 6553599999	kWh	R
AV10-AV13	<Reserved>				
AV14	Running-Hours	Drive's resettable run time (reset by writing 0).	0, 3.40282347e38	hours	R
AV15	Motor-Temp-Degrees-C	Motor temperature	-10, 200	°C	R
AV16	Input-Reference-1	Speed setpoint 1	-150, 150	%	C
AV17	Input-Reference-2	Speed setpoint 2.	-150, 150	%	C
AV18	Active-Fault	Displays most recent fault currently active.			R
AV19	Previous-Fault-1	Displays most recent stored (non-active) fault			R



<b>Object ID</b>	<b>Default Object Name</b>	<b>Description</b>	<b>Min / Max Present Value</b>	<b>Units</b>	<b>Present Value Access Type</b>
AV20	Previous-Fault-2	Displays the second most recent stored (non-active) fault			R
AV21	AO1-Monitor	Output level of Analog Output 1	0, 100	%	R
AV22	AO2-Monitor	Output level of Analog Output 2	0, 100	%	R
AV23	Accel-1-Seconds	Ramp1 acceleration time	0, 1800	s	W
AV24	Decel-1-Seconds	Ramp 1 deceleration time	0, 1800	s	W
AV25	Mbox-Param	Parameter number to be used by mailbox function.		No Units	W
AV26	Mbox-Data	Set (W) or indicate (R) of the data value of mailbox function		No Units	W
AV27-AV28	<Reserved>				
AV29	Min-Speed	Defines the allowed minimum output frequency	-500, 500	Hz	W
AV30	Max-Speed	Defines the allowed maximum output frequency	-500, 500	Hz	W
AV31	Output-Speed	Actual motor speed	-200, 200	%	R
AV32	Output-Current-Range	Actual motor current	0, 200	%	R
AV33	Max-Current	Max motor current	0, nominal current	A	W
AV34-AV39	<Reserved>				
AV40	LOOP-Feedback-Monitor	Loop controller feedback value after source selection, mathematical function and filtering (read-only)	0, 100	%	R
AV41	LOOP-Setpoint-Monitor	Loop controller setpoint value after source selection, mathematical function limitation and ramping (read-only)	0,100	%	R
AV42	LOOP-Setpoint	Command to store loop controller setpoint value used as input for the process	0,100	%	C
AV43	LOOP-Feedback	Stores the feedback value for	0, 100	%	W

Object ID	Default Object Name	Description	Min / Max Present Value	Units	Present Value Access Type
		Loop controller			
AV44	LOOP-Output	Loop controller output	0, 100	%	R
AV45	LOOP- Gain	Loop controller gain	0.1, 100	No Units	W
AV46	LOOP-Integration-Time	Loop controller integration time	0, 3600	s	W
AV47-AV48	<Reserved>				
AV49	LOOP-Deviation-Monitor	Loop controller deviation	0, 100	%	R
AV50-AV52	<Reserved>				
AV53	LOOP-1-Gain	Loop controller gain (Set 2)	0.1, 100	No Units	W
AV54	LOOP-1-Integration-Time	Loop controller integration time (Set 2)	0, 3600	s	W
AV55	LOOP-2-Feedback-Monitor	External loop controller feedback value after source selection, mathematical function and filtering (read-only)	0, 100	%	R
AV56	LOOP-2-Setpoint-Monitor	External loop controller setpoint value after source selection, mathematical function limitation and ramping (read-only)	0,100	%	R
AV57-AV58	<Reserved>				
AV59	LOOP-2-Output	External loop controller output	0, 100	%	R
AV60	LOOP-2-Gain	External loop controller gain	0.1, 100	No Units	W
AV61	LOOP-2-Integration-Time	External loop controller integration time	0, 3600	s	W
AV62-AV63	<Reserved>				
AV64	LOOP-2-Deviation-Monitor	External loop controller deviation	0, 100	%	R
AV65-129	<Reserved>				
AV130	Kilowatt-Hour-This-Hour	Current hour energy consumption	0, 3.40282347e38	kWh	R
AV131	Kilowatt-Hour-Last-Hour	Last hour energy consumption	0, 3.40282347e38	kWh	R
AV132	Kilowatt-Hour-This-Day	Current day energy consumption	0, 3.40282347e38	kWh	R
AV133	Kilowatt-Hour-Last-Day	Last day energy consumption	0, 3.40282347e38	kWh	R

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays & relinquish defaults.

**Multistate Value Object Instance Summary**

The following table summarizes the Multistate Value Objects supported:

<b>Object ID</b>	<b>Object Name</b>	<b>Description</b>	<b>State Text</b>	<b>Present Value Access Type</b>
MSV1	Active-Fault-1	Enumerated type of the most recent fault currently active	None, Comm-Error, Overcurrent, Overtemperature, Overspeed, Overvoltage, Undervoltage, Short-Circuit, Ground-Fault, Motor-Overload, Inverter-Overload, Motor-Underload, External-Fault, Operator-Interface-Error, Config-Error, Feedback-Failure, Output-Phase-Loss Motor-Stall, Power-Unit-Error, Input-Phase-Fault, Internal-Failure, STO-Active, Other	R
MSV4	Active-Warning-1	Enumerated type of the most recent warning currently active	None, Comm-Error, Current-Limit, Overtemperature, Start-Interlock-1, Start-Interlock-2, Start-Interlock-3, Start-Interlock-4, Run-Permissive, Internal-Warning, Start-Delay, Other	R

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays & relinquish defaults.