



BACnet Protocol Implementation Conformance Statement

Date: March 13, 2017
Vendor Name: Carel Industries S.p.A.
Product Name: BACnet c.pCO (Server & Client)
Product Model Number: c.pCO
Application Software Version: 1.00.039
Firmware Revision: v4.1.005r6183
BACnet Protocol Revision: 14

Product Description:

The c.pCO is a native BACnet controller device with BACnet/IP and MS/TP capabilities. In addition to all B-BC features, the c.pCO provides BACnet client BIBBs for reading and writing BACnet objects in other devices and represent them as proprietary objects in the c.pCO.

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):

DS-RP-A	T-ATR-B
DS-RP-B	DM-DDB-A
DS-WP-A	DM-DDB-B
DS-WP-B	DM-DOB-B
DS-RPM-A	DM-DCC-B
DS-RPM-B	DM-TS-B
DS-WPM-A	DM-UTC-B
DS-WPM-B	DM-RD-B
AE-N-I-B	DM-BR-B
AE-ACK-B	AE-ASUM-B
AE-INFO-B	DS-COV-A
AE-ESUM-B	DS-COVP-A
SCHED-E-B	DS-COV-B
SCHED-I-B	DS-COVP-B
T-VMT-I-B	DS-COVU-B

Segmentation Capability:

- Able to transmit segmented messages Window Size: 16
- Able to receive segmented messages Window Size: 16

Standard Object Types Supported:

Object Type	Creatable using the Carel c.design tool	Optional Properties	Proprietary Properties	Writable Properties
Device	Yes	Active_COV_Subscriptions APDU_Segment_Timeout Backup_And_Restore_State Backup_Failure_Timeout Backup_Preparation_Time Configuration_Files Daylight_Savings_Status Description Last_Restore_Time Last_Restart_Reason Location Local_Date Local_Time Max_Master Max_Info_Frames Max_Segments_Accepted Restart_Notification_Recipients Restore_Completion_Time Restore_Preparation_Time Time_of_Device_Restart UTC_Offset	(* See descriptions below) 77000 77001 77002 77003 77004 77005 77006 77007 77008 77017 77018 77019 77020	APDU_Timeout APDU_Segment_Timeout Backup_Failure_Timeout Description (max 255 chars) Location (max 64 chars) Max_Master Max_Info_Frames Number_Of_APDU_Retrieves Object_Name (max 64 chars) Restart_Notification_Recipients Restore_Completion_Time (* For Proprietary Properties See descriptions below) Proprietary Property 77004 Proprietary Property 77005 Proprietary Property 77008 Proprietary Property 77017 Proprietary Property 77018 Proprietary Property 77019 Proprietary Property 77020
Analog Input	Yes	Acked_Transitions COV_Increment Deadband Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_Time_Stamps High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Notify_Type Reliability Reliability_Evaluation_Inhibit Resolution Time_Delay	(** See descriptions below) 77009	COV_Increment ⁶ Deadband Description (max 64 chars) Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config (64 chars each) High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Notify_Type Object_Name (max 64 chars) Out_Of_Service Present_Value ³ Reliability ³ Reliability_Evaluation_Inhibit

		Time_Delay_Normal		Resolution Time_Delay Time_Delay_Normal ³ Writable if Out_Of_Service is true ⁶ Writable if COV_Increment property is mapped to a c.pCO variable
Analog Output	Yes	Acked_Transitions COV_Increment Deadband Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_Time_Stamps High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Notify_Type Reliability Reliability_Evaluation_Inhibit Resolution Time_Delay Time_Delay_Normal	(** See descriptions below) 77009	COV_Increment ⁶ Deadband Description (max 64 chars) Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config (64 chars each) High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Notify_Type Object_Name (max 64 chars) Out_Of_Service Present_Value Reliability ³ Reliability_Evaluation_Inhibit Relinquish_Default Resolution Time_Delay Time_Delay_Normal ³ Writable if Out_Of_Service is true ⁶ Writable if COV_Increment property is mapped to a c.pCO variable
Analog Value	Yes	Acked_Transitions COV_Increment Deadband Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_Time_Stamps High_Limit Limit_Enable Low_Limit Max_Pres_Value	(** See descriptions below) 77009	COV_Increment ⁶ Deadband Description (max 64 chars) Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config (64 chars each) High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value

		Min_Pres_Value Notification_Class Notify_Type Priority_Array ¹ Reliability Reliability_Evaluation_Inhibit Relinquish_Default ¹ Resolution Time_Delay Time_Delay_Normal ¹ These Properties are present only if Proprietary Property 77009 = 2 or 130		Notification_Class Notify_Type Object_Name (max 64 chars) Out_Of_Service Present_Value ^{2,3} Reliability ³ Reliability_Evaluation_Inhibit Relinquish_Default Resolution Time_Delay Time_Delay_Normal ² Writable only if Proprietary Property 77009=1 or 2 or 129 or 130 ³ Writable if Out_Of_Service is true ⁶ Writable if COV_Increment property is mapped to a c.pCO variable
Binary Input	Yes	Aked_Transitions Active_Text Alarm_Value Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Time_Stamps Event_Message_Texts_Config Inactive_Text Notification_Class Notify_Type Reliability Reliability_Evaluation_Inhibit Time_Delay Time_Delay_Normal	(** See descriptions below) 77009	Active_Text (max 32 chars) Alarm_Value Description (max 64 chars) Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config (64 chars each) Inactive_Text (max 32 chars) Notification_Class Notify_Type Object_Name (max 64 chars) Out_Of_Service Polarity Present_Value ³ Reliability ³ Reliability_Evaluation_Inhibit Time_Delay Time_Delay_Normal ³ Writable if Out_Of_Service is true
Binary Output	Yes	Active_Text Description Inactive_Text Reliability	(** See descriptions below) 77009	Active_Text (max 32 chars) Description (max 64 chars) Inactive_Text (max 32 chars) Object_Name (max 64 chars) Out_Of_Service Present_Value Polarity Reliability ³ Relinquish_Default

				³ Writable if Out_Of_Service is true
Binary Value	Yes	Active_Text Alarm_Value Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Time_Stamps Event_Message_Texts_Config Inactive_Text Priority_Array ¹ Reliability Relinquish_Default ¹ Reliability_Evaluation_Inhibit Time_Delay Time_Delay_Normal ¹ These Properties are present only if Proprietary Property 77009 = 2 or 130	(** See descriptions below) 77009	Active_Text (max 32 chars) Alarm_Value Description (max 64 chars) Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config (64 chars each) Inactive_Text (max 32 chars) Notification_Class Notify_Type Object_Name (max 64 chars) Out_of_Service Present_Value ^{2,3} Reliability ³ Reliability_Evaluation_Inhibit Relinquish_Default Time_Delay Time_Delay_Normal ² Writable only if Proprietary Property 77009=1 or 2 or 129 or 130 ³ Writable if Out_Of_Service is true
Calendar	No	Description	None	Description (max 255 chars) Object_Name (max 64 chars) Date_List (max 16)
File	No	Description	None	Archive File_Size ⁶ File_Type ⁷ ⁶ Value=0 only for Files 0, 2, 3 ⁷ For Files 2, 3
Integer Value	Yes	Acked_Transitions COV_Increment Deadband Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_State Event_Message_Texts_Config Event_Time_Stamps High_Limit Limit_Enable Low_Limit Max_Pres_Value	(** See descriptions below) 77009	COV_Increment ⁶ Deadband Description (max 64 chars) Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config (64 chars each) High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class

		Min_Pres_Value Notification_Class Notify_Type Out_Of_Service Priority_Array ¹ Reliability Relinquish_Default ¹ Reliability_Evaluation_Inhibit Resolution Time_Delay Time_Delay_Normal ¹ These Properties are present only if Proprietary Property 77009=2 or 130		Notify_Type Object_Name (max 64 chars) Out_Of_Service Present_Value ^{2,3} Reliability ³ Relinquish_Default Reliability_Evaluation_Inhibit Resolution Time_Delay Time_Delay_Normal ² Writable only if Proprietary Property 77009=1 or 2 or 129 or 130 ³ Writable if Out_Of_Service is true ⁶ Writable if COV_Increment property is mapped to a c.pCO variable
Multistate Input	Yes	Acked_Transitions Alarm_Values Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_Time_Stamps Fault_Values Notification_Class Notify_Type Reliability State_Text Reliability_Evaluation_Inhibit Time_Delay Time_Delay_Normal	(** See descriptions below) 77009	Alarm_Values Description (max 64 chars) Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config (64 chars each) Fault_Values Notification_Class Notify_Type Number_of_States (1 to 32) Object_Name (max 64 chars) Out_Of_Service State_Text (max 32 chars per state) Present_Value ³ Reliability ³ Reliability_Evaluation_Inhibit Time_Delay Time_Delay_Normal ³ Writable if Out_Of_Service is true
Multistate Output	Yes	Description Reliability State_Text	(** See descriptions below) 77009	Description (max 64 chars) Number_of_States (1 to 32) Object_Name (max 64 chars) Out_Of_Service State_Text (max 32 chars per state) Present_Value Reliability ³ Relinquish_Default ³ Writable if Out_Of_Service is

				true
Multistate Value	Yes	Acked_Transitions Alarm_Values Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_Time_Stamps Fault_Values Notification_Class Notify_Type Priority_Array ¹ Reliability Reliability_Evaluation_Inhibit Relinquish_Default ¹ State_Text Time_Delay Time_Delay Time_Delay_Normal ¹ These Properties are present only if Proprietary Property 77009=2 or 130	(** See descriptions below) 77009	Alarm_Values Description (max 64 chars) Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config (64 chars each) Fault_Values Notification_Class Notify_Type Number_of_States (1 to 32) Object_Name (max 64 chars) Out_Of_Service State_Text (max 32 chars per state) Present_Value ^{2,3} Reliability ³ Reliability_Evaluation_Inhibit Relinquish_Default Time_Delay Time_Delay_Normal ² Writable only if Proprietary Property 77009=1 or 2 or 129 or 130 ³ Writable if Out_Of_Service is true
Notification Class	No	Description	None	Ack_Required Description (max 255 chars) Object_Name (max 64 chars) Priority Recipient_List (max 4 entries)
Positive Integer Value	Yes	Acked_Transitions COV_Increment Deadband Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_State Event_Message_Texts_Config Event_Time_Stamps High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Notify_Type Out_Of_Service	(** See descriptions below) 77009	COV_Increment ⁶ Deadband Description (max 64 chars) Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config (64 chars each) High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Notify_Type Object_Name (max 64 chars) Out_Of_Service Present_Value ^{2,3}

		Priority_Array ¹ Reliability Relinquish_Default ¹ Reliability_Evaluation_Inhibit Resolution Time_Delay Time_Delay_Normal ¹ These Properties are present only if Proprietary Property 77009=2 or 130		Reliability ³ Reliability_Evaluation_Inhibit Relinquish_Default Resolution Time_Delay Time_Delay_Normal ² Writable only if Proprietary Property 77009=1 or 2 or 129 or 130 ³ Writable if Out_Of_Service is true ⁶ Writable if COV_Increment property is mapped to a c.pCO variable
Schedule	No	Description Exception_Schedule Weekly_Schedule	None	Description (max 255 chars) Object_Name (max 64 chars) Out_of_Service Effective_Period Exception_Schedule (max 4 entries) List_Of_Object_Property_References (max 64 entries) Present_Value ³ Priority_For_Writing Schedule_Default Weekly_Schedule ⁵ ³ Writable if Out_Of_Service is true ⁵ max 6 time/value pairs
Trend Log	No	Acked_Transitions Align_Intervals Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_State Event_Time_Stamps Interval_Offset Last_Notify_Records Log_DeviceObjectProperty Log_Interval Notification_Class Notification_Threshold Notify_Type Records_Since_Notification Reliability_Evaluation_Inhibit Reliability Start_Time Stop_Time Trigger	None	Align_Intervals Buffer_Size Description (max 255 chars) Enable Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config (64 chars each) Interval_Offset Log_DeviceObjectProperty Logging_Type Log_Interval Notification_Class Notification_Threshold Object_Name (max 64 chars) Record_Count Reliability_Evaluation_Inhibit Start_Time Stop_Time Stop_When_Full Trigger

--	--	--	--	--

* Description of the Proprietary Properties of the Device Object

Proprietary Property	Datatype	Description	Writable	Value Range
77000	Unsigned	MACType of the server device	No	0=MS/TP 2=BACnet/IP
77001	OctetString	MACAddress of the server device	No	For MS/TP, 1 octet MAC address For BACnet/IP, by 6 octet IP/UDP port MAC address
77002	OctetString	IP Subnet for BACnet/IP MACTypes	No	255.255.255.0 for example
77003	OctetString	BACnet/IP UDP	No	(big endian) 0xBAC0, etc.
77004	OctetString	BBMD_Address	Yes	0.0.0.0 indicates no BBMD registration required
77005	Unsigned	BBMD_TimeToLive	Yes	In seconds
77006	Unsigned	MAC COM Port	No	0-6
77007	Unsigned	MS/TP Baud rate	No	9600, 19200, 38400, 57600, 76800, 115200
77008	Character String	Password (for ReinitializeDevice and Device Communication Control)	Yes	Max 32 chars (default=carel)
77017	Unsigned	The amount of time of non-activity (no client sending DataExpectingReply PDUs) for the BACnet server to be declared offline	Yes	In milliseconds
77018	Unsigned	The amount of time of silence before an external device to be declared offline	Yes	In seconds
77019	Boolean	The dumptrace/start packet tracing indicator	Yes	TRUE = start tracing BACnet packets into a fixed RAM buffer
77020	Boolean	Exclude/Include Proprietary object types 777 from the Object_List	Yes	TRUE=Exclude

** Description of the Proprietary Properties of the Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Binary Value, Multistate Input, Multistate Output, Multistate Value, Integer Value, Positive Integer Value and Proprietary Object Type 777 objects

Proprietary Property	Datatype	Description	Writable	Value Range
77009	Enumerated	The BACnet read/write feature of the Present_Value property (Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Multistate Input, Multistate Output, Multistate Value, Integer Value, Positive Integer Value)	No	0=read-only 1=writeable (not commandable) 2=commandable If hexadecimal 0x80 (decimal 128) is added to the value, the object accepts SubscribeCOV requests (for example 0x82 (130) means the object commandable and accepts SubscribeCOV requests)
77009	Enumerated	The Binding Type for Carel proprietary objects (type 777) that reference an object external to the c.pCO and for which the c.pCo acts as BACnet client (client objects)	No	0=Disabled 1=Read Poll/No Write 2= Read Poll/Write on COV 3= Read Poll/Write on COV and Online 4=Read on COV/No Write 5=Read on COV/Write on COV 6= Read on COV/Write on COV and Online 7=No Read/Write on COV 8=No Read/Write on COV and Online 9=No Read/Write Poll 10=Read Online/No Write 11= Read Online/Write on COV
77011	Enumerated	The BACnet read/write feature of the Present_Value property of Carel proprietary objects (type 777) that reference an object external to the c.pCO and for which the c.pCo acts as BACnet client (client objects)	No	0=read-only 1=writeable (not commandable)
77012	Object Identifier	The Binding Reference Device	Yes	This is the bound Object Identifier of the external device for Carel proprietary objects (type 777)
77013	Object Identifier	The Binding Reference Object Identifier	Yes	This is the bound Object Identifier of the external object for Carel proprietary objects (type 777)

77014	Enumerated	The Binding Reference Property	Yes	This is the bound Property Identifier of the external object for Carel proprietary objects (type 777). This is normally the Present_Value
77015	Unsigned	The Binding Interval	No	This provides the resubscription interval in seconds for Binding Types that ReadCOV.
77016	Unsigned	The Binding Write Priority	Yes	This provides the write priority for Binding Types that Write.

Proprietary Object Types Supported:

The proprietary object type 777 is included for convenience to indicate one object and one property that is read from some BACnet device external into the c.pCO. The Present_Value property of the proprietary object indicates the value of that object and property. Proprietary properties for this object indicate the device, object and property to be read and/or written based on the algorithms indicated the property 77009. The proprietary objects are included in the Object_List of the c.pCO Device object if property 77020 of the Device object is FALSE.

Object Type	Creatable using the Carel c.design tool	Standard Properties	Proprietary Properties	Writable Properties
777	Yes	Description COV_Increment Max_Pres_Value ¹ Min_Pres_Value ¹ Object_Identifier Object_Name Object_Type Present_Value Resolution ¹ Units ¹ ¹ These Properties are present only if the referenced objects are AI, AO, AV, PI or IV types	(* See descriptions above) 77009 77011 77012 77013 77014 77015 77016	Max_Pres_Value ¹ Min_Pres_Value ¹ Resolution ¹

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, 36800, 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:

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

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