



## BACnet Protocol Implementation Conformance Statement

**Date:** June 11, 2007  
**Vendor Name:** Carel SpA  
**Product Name:** BACnet pCOWeb/pCOnet  
**Product Model Number:** pCOWeb@/pCOnet@  
**Applications Software Version:** 1.22  
**Firmware Revision:** A133-B121  
**BACnet Protocol Revision:** 4 (ANSI/ASHRAE 135-2004)  
**Product Description:** Provides BACnet 8802.3 Ethernet, BACnet/IP (pCOWeb) and MS/TP (pCOnet BACnet MSTP) connectivity for Carel pCOx series controllers

**BACnet Standardized Device Profile (Annex L):**  
 BACnet Application Specific Controller (B-ASC)

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

*DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DS-COV-B, DS-COVP-B, DM-DDB-A, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-RD-B, DM-TS-B, DM-UTC-B, AE-N-I-B, AE-ACK-B, AE-INFO-B*

**Segmentation Capability:**  
 Segmentation not supported

**Standard Object Types Supported:**  
 No dynamic Creation or Deletion supported  
 No proprietary object types supported

**Device Object:**

**Optional Properties Supported:**

Active\_COV\_Subscriptions  
 Daylight\_Savings\_Time  
 Description  
 Location  
 Local\_Date  
 Local\_Time  
 Max\_Info\_Frames (MS/TP only)  
 Max\_Master (MS/TP only)  
 Profile\_Name  
 UTC\_Offset

**Proprietary Properties Supported:**

Proprietary Property 1000 (Enable\_Alarming BOOLEAN DataType)  
 Proprietary Property 1001 (MSTP\_TS Unsigned DataType, pCOnet only)  
 Proprietary Property 1002 (MSTP\_BAUD Unsigned DataType, pCOnet only)  
 Proprietary Property 1003 (LAN Type Unsigned DataType, 0=8802-3 Ethernet, 1=BACnet/IP, pCOWeb only)  
 Proprietary Property 1004 (BACnet/IP UDP Unsigned DataType, pCOWeb only)  
 Proprietary Property 1005 (Password Character String DataType, for ReinitializeDevice and Device Communication Control)



- Proprietary Property 1006 (WhoslamInterval Unsigned DataType, in minutes for sending periodic lam and Whols request)
- Proprietary Property 1007 (PCO\_BAUD Unsigned DataType, the Baud Rate for the pCO network)
- Proprietary Property 1009 (PCO\_MAPPEDA Unsigned DataType, the actual number of pCO Analog points mapped)
- Proprietary Property 1010 (PCO\_MAPPEDI Unsigned DataType, the actual number of pCO Integer points mapped)
- Proprietary Property 1011 (PCO\_MAPPEDD Unsigned DataType, the actual number of pCO Digital points mapped)
- Proprietary Property 1012 (BBMD\_Address Unsigned DataType, the IP address of the BBMD to which a Foreign Device registration is made, pCOWeb only)
- Proprietary Property 1013 (BBMD\_TimeToLive Unsigned DataType, the TimeToLive value when a Foreign Device registration is made, pCOWeb only)

#### **Writable Properties:**

- APDU\_Timeout
- Daylight\_Savings\_Time
- Description
- Location
- Max\_Info\_Frames (pCOnet only)
- Max\_Master (pCOnet only)
- Number\_Of\_APDU\_Retries
- Object\_Identifier
- UTC\_Offset
- Proprietary Property 1000
- Proprietary Property 1001
- Proprietary Property 1002
- Proprietary Property 1003
- Proprietary Property 1004
- Proprietary Property 1005
- Proprietary Property 1006
- Proprietary Property 1007
- Proprietary Property 1009
- Proprietary Property 1010
- Proprietary Property 1011
- Proprietary Property 1012
- Proprietary Property 1013

#### **Restrictions:**

- Description, Location (limited to 64 characters), Proprietary Properties 1009, 1010 and 1011 (limited to 0-207)

#### **Analog Value Objects:**

##### **Optional Properties Supported:**

- Acked\_Transitions
- COV\_Increment
- Deadband
- Description
- Event\_Enable



Event\_Time\_Stamps  
High\_Limit  
Limit\_Enable  
Low\_Limit  
Notify\_Type  
Reliability  
Time\_Delay

**Writable Properties:**

Object\_Identifier \*  
Deadband  
Description  
Event\_Enable  
High\_Limit  
Limit\_Enable  
Low\_Limit  
Notification\_Class  
Object\_Name  
Present\_Value  
Units

\* Note: The Analog Values 1001 through 1207 may be programmed as either Analog Value or Multi-State Value types by writing to the Object\_Identifier property

**Property Range Restrictions:**

Description (limited to 64 characters)  
Object\_Name (limited to 32 characters)

**Binary Value Objects:**

**Optional Properties Supported:**

Acked\_Transitions  
Active\_Text  
Alarm\_Value  
Description  
Event\_Enable  
Event\_Time\_Stamps  
Inactive\_Text  
Notify\_Type  
Reliability  
Time\_Delay

**Writable Properties:**

Active\_Text  
Alarm\_Value  
Description  
Event\_Enable  
Inactive\_Text  
Notification\_Class  
Object\_Name  
Present\_Value

**Property Range Restrictions:**

Description (limited to 64 characters)



Object\_Name, Active\_Text, Inactive\_Text (limited to 32 characters)

## Multi-state Value Objects:

### Optional Properties Supported:

Acked\_Transitions  
Alarm\_Values  
Description  
Event\_Enable  
Event\_Time\_Stamps  
Fault\_Values  
Notify\_Type  
Reliability  
State\_Text  
Time\_Delay

### Writable Properties:

Object\_Identifier \*  
Alarm\_Values  
Description  
Event\_Enable  
Fault\_Values  
Notification\_Class  
Number\_of\_States  
Object\_Name  
Present\_Value  
State\_Text

\* Note: The Analog Values 1001 through 1207 may be programmed as either Analog Value or Multi-State Value types by writing to the Object\_Identifier property

### Property Range Restrictions:

Description (limited to 64 characters)  
Object\_Name, State\_Text (limited to 32 characters)  
Number\_of\_States (limited to 32)

## Notification Class Objects:

### Optional Properties Supported:

Description

### Writable Properties:

Ack\_Required  
Priority  
Recipient\_List

### Property Range Restrictions:

Object Instance (1-16, i.e. there are always sixteen (16) Notification Class Objects)  
Description (limited to 64 characters)  
Recipient\_List (limited to 1)

## Data Link Layer Options:

8802.3 Ethernet (clause 7), BACnet/IP (Annex J), MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 78600



### Device Address Binding:

Static device binding is not supported. (No client functionality is included).

### Networking Options:

When configured for BACnet/IP as the Data Link, a pCOWeb allows registration as a Foreign Device to a single specified BACnet BBMD. The Time-to-Live is programmable.

### Character Sets Supported:

ANSI X3.4

### BACnet/pCO Mapping

For each pCOWeb/pCOnet there can be a maximum of 637 BACnet objects, in addition to the Device Object. Of the 637 objects, there are always 16 Notification Class objects and there can be up to 207 Analog Values, 207 Analog Values or Multi-state Values and 207 Binary Values. The number of each type can be configured prior to use. From the factory all 621 objects are mapped. Object\_Identifier are assigned according to the following table:

Object Type	Instance Range	pCO Mapping
Analog Value	1-207	A001-A207
Analog Value or Multi-state Value	1001-1207	I001-I207
Binary Value	1-207	D001-D207

From the factory, I001-I2007 are mapped as Analog Value 1001-Analog Value 1207. Each of these may be reprogrammed as Multi-state Values on an individual basis, by writing to the Object\_Identifier property. BACnet objects which are mapped but for which there are no corresponding physical pCO points return an *unreliable-other* (7) value for the Reliability property of the corresponding object and an undetermined value for the Present\_Value property (usually=0 or 0.0).

The Object\_Name properties for all the objects are writable and can be up to 32 characters in length. By default objects are named **A001-A207**, **I001-I207** and **D001-D207** corresponding to their pCO mapping.

### Alarming

BACnet Intrinsic Alarming is supported for the Analog Values (Out\_of\_Range event types), Binary Values (Change\_of\_State event types) and Multi-state Values (Change\_of\_State event types). All optional properties related to Intrinsic Alarming are included and writable where appropriate. Use of Notification Class Objects may be optionally bypassed. In this scheme, if an object's Notification\_Class property is set to 0, three standard BACnet properties that are normally included in Notification Class objects, specifically Ack\_Required, Issue\_Confirmed\_Notifications and Priority, are included for each Analog Value, Binary Value and Multi-state Value object and take the place of the Notification Class. Although these properties are not standard or optional for Analog Value, Binary Value and Multi-state Value objects, they are treated in a standard BACnet way. Also in this scheme, two properties, Process\_Identifier and Recipient, are included for the Device Object and take the place of the Notification Class Object. Although these properties are not standard or optional for Device objects, they are treated in a standard BACnet way. The Recipient property is limited to the Object\_Identifier of a Device object. If the Notification\_Class for an object is 0, it will be reported as 1 in alarm events.

For all alarms, the default Message Text that is always included by default is of the form:

"nnnnnn (Binary Value xxx) ChangeOfState v"

"nnnnnn (Analog Value xxx) OutOfRange v"



where:

nnnnn is the Object\_Name  
 xxx is the object instance  
 ChangeOfState or OutOfRange is the Event\_Type  
 v is the to-state (i.e. Normal, Offnormal, Fault, High Limit or Low Limit)

The Message Text can be customized by replacing any of the Event\_Type text and/or to-state text with customized text up to 32 characters long each. In addition, the Object\_Name property can be replaced with the Description property. Alarm Message Text can be customized on an object by object basis by writing to the following proprietary properties for the object:

Property name	Enumerated Property value	Datatype	Value
PROP_ALARMCUSTOM	3000	Boolean	True=Alarms are customized for this object False=Use the default Message Text format
PROP_ALARMPROPERTY	3001	Character string	Object_Name or Description
PROP_ALARMCOS	3002	Character string	String (up to 32 characters) to replace Event_Type ChangeofState text
PROP_ALARMLOOR	3003	Character string	String (up to 32 characters) to replace Event_Type OutofRange text
PROP_ALARMNORMAL	3004	Character string	String (up to 32 characters) to replace to-state Normal text
PROP_ALARMFAULT	3005	Character string	String (up to 32 characters) to replace to-state Fault text
PROP_ALARMOFFNORMAL	3006	Character string	String (up to 32 characters) to replace to-state Offnormal text
PROP_ALARMHILIM	3007	Character string	String (up to 32 characters) to replace to-state High Limit text
PROP_ALARMLOWLIM	3008	Character string	String (up to 32 characters) to replace to-state Low Limit text

### COV Subscriptions

The DS-COV-B and/or DS-COVP-B BIBB support a maximum 250 simultaneous subscriptions. The following properties are eligible for COV reporting using the SubscribeCOVProperty Service:

- Present\_Value
- Status\_Flags
- Reliability
- Event\_State
- Out\_of\_Service



## Default Factory Settings

Default values for the pCOWeb/pCOnet are as follows:

pCOWeb	pCOnet	Property	Default Value
Yes	Yes	Device Instance	77000
Yes	No	LAN type	1=BACnet/IP
Yes	No	BACnet/IP UDP	BAC0 (hexadecimal) or 47808 (decimal)
No	Yes	MS/TP Station Address	0
No	Yes	Max_Master	127
No	Yes	Max_Info_Frames	20
No	Yes	MS/TP Baud rate	38400
Yes	Yes	Alarming Enabled	False
Yes	Yes	Number of pCO Analogs Mapped	207
Yes	Yes	Number of pCO Integers Mapped	207
Yes	Yes	Number of pCO Digitals Mapped	207
Yes	No	IP Address for BBMD	None
Yes	No	Foreign Device Time-To-Live	0 (seconds)