

BAS integration guide

BACnet[®] protocol

Doc. Name:

D-EIGOC00106-24_01EN_WCZ

Product Name:

EWWT-Q/EWLT-Q/EWHT-Q

Control software name:

PROXIMA



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1. Introduction

This document contains information to incorporate Unit Controller into a building automation system (BAS) via BACnet communication protocols.

Unit data points are accessible to a BAS via BACnet network provided that the protocol has been activated by the dedicated option.

BACnet terms are not defined. Refer to the standard BACnet specifications for definitions and details about the protocol.



2. About this document

2.1 Notice

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- **BACnet** from American Society of Heating, Refrigerating and Air-Conditioning Engineers,

2.2 Before starting

Application range

This document refers to the following components:

POL486.65	Controller
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Users

Users of this document are intended to be:

- Modbus systems integrators
- Service Technicians
- Plant Engineers
- Sales staff

Conventions

POL486.65 further in this document and when proper shall be referred to as "Controller"

Abbreviation

BACnet	B uilding A utomation and C ontrol N etwork
BSP	B oard S upport P ackage (operating system)

References

- Siemens Building Technologies - CB1J3960en - **Modbus** communication, slave mode
- The Modbus Organization - www.modbus.org



3. Safety information

Only personnel qualified in accordance with IEC (International Electrotechnical Commission) recommendations may be permitted access to electrical components. It is particularly recommended that all sources of electricity to the unit be shut off before any work is begun. Shut off main power supply at the main circuit breaker or isolator.

IMPORTANT: This equipment uses and emits electromagnetic signals. Tests have shown that the equipment conforms to all applicable codes with respect to electromagnetic compatibility.



RISK OF ELECTROCUTION: Even when the main circuit breaker or isolator is switched off, certain circuits may still be energized, since they may be connected to a separate power source.



RISK OF BURNS: Electrical currents cause components to get hot either temporarily or permanently. Handle power cable, electrical cables and conduits, terminal box covers and motor frames with great care.

Field of application



Use Modbus communication module only for control and monitoring functions in ventilation, air conditioning and refrigeration plants.

Intended use



Trouble-free and safe product operation of the above products presupposes transport, storage, mounting, installation, and commissioning as intended as well as careful operation.

Electrical installation



Fuses, switches, wiring and grounding must comply with local safety regulations for electrical installations.

Wiring



When wiring, strictly separate AC 230 V mains voltage from AC 24 V safety extralow voltage (SELV) to protect against electrical shock!

Commissioning and maintenance



Only qualified staff trained accordingly may prepare for use, commission, and maintain Modbus communication modules.

Maintenance of Modbus communication modules generally only means regular cleaning. We recommend removing dust and dirt from system components installed in the control panels during standard service.

Faults



Only authorized staff may diagnose and correct faults and recommission the plant. This applies to working within the panel as well (e.g. testing or changing fuses).

Storage and transport



Refer to the environmental conditions specified in the respective data sheets for storage and transport. If in doubt, contact your supplier.

Disposal



Devices contain electrical and electronic components; do not dispose of them in household garbage. Observe all local and applicable laws.



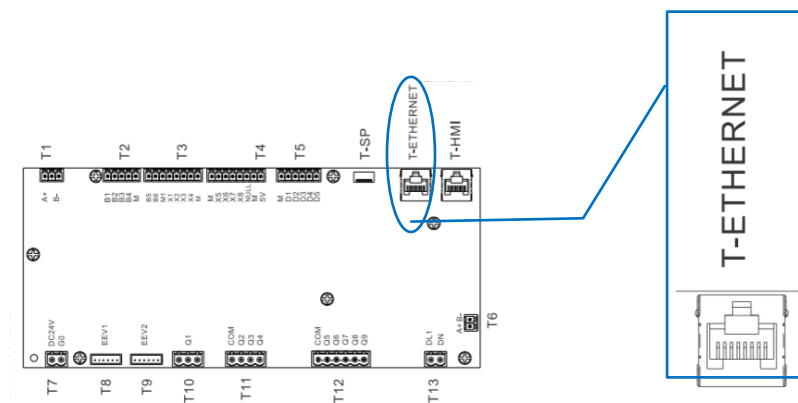
4. Commission this unit in a BACnet network

Unit controller

Unit controller is the POL468.65 and can be always integrated in a Modbus network by mean of the onboard integrated RS485 connection.

Communication software option

BACnet IP communication is available via Ethernet port as a software option available with available with connectivity kit SAP code EKRSCBMS.





5. BACnet integration list

Description	Type	ID	Name	R/W	Range
Unit Local/Remote	BI	3	ChillerLocalRemote	R	0 Network 1 Local
Unit Enable Output	BI	7	ChillerEnableoutput	R	0 Disabled 1 Enabled
Unit general alarm	BI	10	AlarmDigitalOutput	R	0 NoAlarm 1 Alarm
Unit Enable Setpoint	BV	2	ChillerEnableStp	W	0 Disable 1 Enable
Clear Alarms – Network	BV	8	ClearAlarm	W	0 None 1 ClearAlarm
Unit Mode Output	MV	2	Active Mode	R	0 Ice 1 Cool 2 Heat 3 Test
Active Setpoint	AV	5	ActiveLvgWaterTarget	R	°C
Actual Capacity	AV	2	ChillerCapacity	R	%
Active Capacity Limit Output	AV	1	ActiveCapacityLimit	R	%
Evaporator Entering Water Temp	AI	1	EntEvapWaterTemp	R	°C
Evaporator Leaving Water Temp Unit	AI	2	LvgEvapWaterTempUnit	R	°C
Evaporator LWT Senf	BV	748	EvapLvgWTempSen	R	0 NoAlarm 1 Alarm
Evaporator EWT Senf	BV	501	EvapEntwTempSensorFail	R	0 NoAlarm 1 Alarm
Unit Off Evaporator Water Flow	MV	701	UnitOFFEvapWaterFlow	R	0 Off 1 On
Evaporator Flow Switch Input State	BI	11	EvapWaterFlowStatus	R	0 NoFlow 1 Flow
Evaporator Water Freeze Alarm	BV	702	EvapLvgWTempLo	R	0 NoAlarm 1 Alarm
MUSECtrlTemp	AV	151	MUSECtrlTemp	R	°C



Demand Limit Input Fail	BV	513	BadDemandLimitInput	R	0 NoAlarm 1 Alarm
Setpoint Override Input Fail	BV	512	BadSPointOverrideInput	R	0 NoAlarm 1 Alarm
Condenser Flow Switch Input State	MV	12	CondFlowSwitchStatus	R	0 NoFlow 1 Flow
Condenser EWT	AI	3	EntCondWaterTemp	R	°C
Condenser EWT Senf	BV	500	CndEntwTempSensorFail	R	0 NoAlarm 1 Alarm
Condenser LWT	AI	4	LvgCondWaterTempUnit	R	°C
Condenser LWT Senf	BV	503	CndLvgTempSensorFail	R	0 NoAlarm 1 Alarm
Unit Mode Setpoint – Network	MV	3	ChillerOperationMode	W	0 Null 1 Ice 2 Cool 3 Heat
Cool Setpoint – Network	AV	4	NetworkCoolTempSetpoint	W	°C
Heat Setpoint – Network	AV	6	NetworkHeatTempSetpoint	W	°C
Measure Units	MV	47	Units	W	1 Imperial 2 Metric
Evaporator Pump #1 Status	BI	8	EvapPump1State	R	0 OffRequest 1 OnRequest
Evaporator Pump #1 Fault	BV	575	EvPumpFault1	R	0 NoAlarm 1 Alarm
Evaporator Pump #1 Run Hours	AV	112	EvapPump1OperHours	W	h
Condenser Pump #1 Status	BI	121	CondPump1State	R	0 OffRequest 1 OnRequest
Condenser Pump #1 Run Hours	AV	122	CondPump1OperHours	W	h



Condenser Pump #1 Fault	BV	120	CondPump1Fault	R	0 NoAlarm 1 Alarm
Unit External Alarm	BV	923	ExternalAlarm	R	0 NoAlarm 1 Alarm
Unit External Event	BV	924	UnitExternalEvent	R	0 NoAlarm 1 Alarm
Circuit #1 Status	MV	300	C1State	R	1 off 2 Preopen 3 Start 4 Run 5 Pumpdown
Circuit #1 – Actual Capacity	AV	160	ActualCapacityCir1	R	%
Circuit #1 Comp #1 - Run Hours	AV	74	C1Comp1Hours	W	h
Circuit #1 Compressor #1 Auto	MV	430	CompressorOffAutoC1Comp1	W	0 off 1 Auto
Circuit #1 Alarm	BV	760	C1OFFHighPress	R	0 NoAlarm 1 Alarm
Circuit #1 Compressor #1 Status	BV	431	CompressorStatusC1Comp1	R	0 off 1 On
Circuit #1 Suction Temp	AI	105	C1SuctionTemp	R	°C
Circuit #1 Suction Temp Sensor Fault	BV	857	C1OFFSuctTempSen	R	0 NoAlarm 1 Alarm
Circuit #1 Compressor #2 Auto	MV	435	CompressorOffAutoC1Comp2	W	0 off 1 Auto
Circuit #1 Compressor #2 Run hours	AV	75	C1Comp2Hours	R	h
Circuit #1 Compressor #2 Status	BV	436	CompressorStatusC1Comp2	R	0 off 1 On



Circuit #1 Condenser pressure sensor fault	BV	668	C1OFFCondPressSen	R	0 NoAlarm 1 Alarm
Circuit #1 Condenser pressure	AI	99	Cond1RefPressure	R	kPa
Circuit #1 Condenser saturated refrigerant Temp	AV	44	Cond1SatRefTemp	R	°C
Circuit #1 EXV Position	AV	168	Evap1EXVPositionCir1	R	%
Circuit #1 Evaporator pressure sensor fault	BV	711	C1OFFEvapPressSen	R	0 NoAlarm 1 Alarm
Circuit #1 Evaporator pressure	AI	141	C1EvapRefPressure	R	kPa
Circuit #1 Evaporator saturated refrigerant Temp	AV	68	C1EvapSatRefTemp	R	°C
Circuit #1 High Condenser Pressure	BV	676	C1OFFCondPressHi	R	0 NoAlarm 1 Alarm
Circuit #1 Low Evaporator pressure	BV	704	C1OFFEvapPressLow	R	0 NoAlarm 1 Alarm
Circuit #1 No pressure change at start fault	BV	905	C1CompNoPressChStart	R	0 NoAlarm 1 Alarm
Circuit #1 VFD Speed	AV	169	OutdoorFanSpeedCir1	R	V
Circuit #1 Pumpdown failed	BV	516	C1FailedPumpdown	R	0 NoAlarm 1 Alarm
MU Standalone	MV	1135	MUStandalone	W	1 No 2 Yes



CommonLWTSenf	BV	502	CommonLWTSenf	R	0 NoAlarm 1 Alarm
CommonCondLWT - Sensor Fault	BV	503	CommonCondLWTSenf	R	0 NoAlarm 1 Alarm
MUSE Comm Err	BV	20	MasterCommErr	R	0 NoAlarm 1 Alarm
MU2 Comm Err	BV	22	MU2CommErr	R	0 NoAlarm 1 Alarm
MU3 Comm Err	BV	23	MU3CommErr	R	0 NoAlarm 1 Alarm
MU4 Comm Err	BV	1437	MU4CommErr	R	0 NoAlarm 1 Alarm
MU2 Load	AV	1168	MU2Load	R	%
MU2 State	MV	1172	MU2State	R	0 Stop 1 Run
MU3 Load	AV	1186	MU3Load	R	%
MU3 State	MV	1190	MU3State	R	0 Stop 1 Run
MU4 Load	AV	1204	Slave3Load	R	%



MU4 State	MV	1208	MU4State	R	0 Stop 1 Run
MUSE Operating State	MV	1100	MUSEOpSta	R	0 Stop 1 Run
Common Evaporator LWT	AI	1103	CmnLwt	R	°C
Common Evaporator LWT Sensor Fault	BV	502	CmnLwtSenf	R	0 NoAlarm 1 Alarm
Common Condenser LWT	AI	1104	CmnCondLwt	R	°C
Common Condenser LWT Sensor Fault	BV	1433	CmnCondLwtSenf	R	0 NoAlarm 1 Alarm
MUSE Actual Mode	MV	1137	MUSEActMode	R	0 Cool 1 Ice 2 Heat 3 Test 4 Pursuit
MUSE Temperature Setpoint	AV	151	MUSECtrlTemp	W	°C
MUSE Load	AV	1112	MUSELoad	R	%
MU1 Enable	MV	1324	MU1Enabling	W	0 Enable 1 Disable
MUSE Clear Timers	MV	1526	MUSEClrTmr	W	0 off 1 Reset
PumpSkid Communication Error	BV	1390	PumpSkidComEr	R	0 NoAlarm 1 Alarm



MU2 Actual Mode	MV	1155	MU2ActMode	R	As MUSEActMode
MU2 Evaporator LWT	AV	1167	MU2ELWT	R	°C
MU2 Evaporator EWT	AV	1166	MU2EEWT	R	°C
MU2 Condenser EWT	AV	1164	MU2CEWT	R	°C
MU2 Condenser LWT	AV	1165	MU2CLWT	R	°C
MU3 Actual Mode	MV	1173	MU3ActMode	R	As MUSEActMode
MU3 Evaporator LWT	AV	1185	MU3ELWT	R	°C
MU3 Evaporator EWT	AV	1184	MU3EEWT	R	°C
MU3 Condenser EWT	AV	1182	MU3CLWT	R	°C
MU3 Condenser LWT	AV	1183	MU3CEWT	R	°C
MU4 Actual Mode	MV	1191	MU4ActMode	R	As MUSEActMode
MU4 Evaporator LWT	AV	1203	MU4ELWT	R	°C
MU4 Evaporator EWT	AV	1202	MU4EEWT	R	°C
MU4 Condenser EWT	AV	1200	MU4CLWT	R	°C
MU4 Condenser LWT	AV	1201	MU4CEWT	R	°C



Unit - Shutdown Alarm	MV	54	U'ShutdownAlm	R	0 off 1 On
Compressor 1 - Shutdown Alarm	MV	51	C1'ShutdownAlm	R	0 off 1 On
Compressor 2 - Shutdown Alarm	MV	52	C2'ShutdownAlm	R	0 off 1 On
UnitOnOff	BI	4	UnitOnOff	R	0 off 1 On
UnitStatus	MV	1	UnitStatus	R	0 off 1 start 2 Run 3 Pre Shutdown 4 Service



6. Annex B – PICS for BACnet

6.1 BACnet standardized device profile

☐	BACnet Operator Workstation	(B-OWS)
☒	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)

6.2 BACnet interoperability building blocks supported

Data sharing	Data Sharing – ReadProperty-A	DS-RP-A
	Data Sharing – ReadProperty-B	DS-RP-B
	Data Sharing – ReadPropertyMultiple-A	DS-RPM-A
	Data Sharing – ReadPropertyMultiple-B	DS-RPM-B
	Data Sharing – WriteProperty-A	DS-WP-A
	Data Sharing – WriteProperty-B	DS-WP-B
	Data Sharing – WritePropertyMultiple-B	DS-WPM-B
	Data Sharing – COV-B	DS-COV-B
	Data Sharing – COV-A	DS-COV-A
Alarm and event management	Alarm and Event – Notification Internal-B	AE-N-I-B
	Alarm and Event – AcknowledgeAlarm-B	AE-ACK- B
	Alarm and Event – Information-B	AE-INFO-B
	Alarm and Event – Alarm Summary-B	AE-ASUM-B
	Alarm and Event – Event-Enrollment Summary-B	AE-ESUM-B
Scheduling	Scheduling – Internal-B	SCHED-I-B
	Scheduling – External-B	SCHED-E-B
Trending	Trending-Viewing and Modifying Trends Internal-B	T-VMT-I-B
	Trending-Automated Trend Retrieval-B	T-ATR-B
Device management	Device Management – Dynamic Device Binding-A	DM-DDB-A
	Device Management – Dynamic Device Binding-B	DM-DDB-B
	Device Management – Dynamic Object Binding-B	DM-DOB-B
	Device Management – DeviceCommunicationControl-B	DM-DCC-B
	Device Management – TimeSynchronization-B	DM-TS-B
	Device Management – UTCTimeSynchronization-B	DM-UTC-B
	Device Management – ReinitializeDevice-B	DM-RD-B
	Device Management – List Manipulation-B	DM-LM-B
	Device Management – Object Creation and Deletion-B	DM-OCD-B
	Device Management – Backup and Restore-B	DM-BR-B
Network management	Network Management-Connection Establishment-A	NM-CE-A



6.3 BACnet standard object types supported

Object type	Supported	Can be created dynamically	Can be deleted dynamically
Analog Input	☒	☐	☐
Analog Output	☒	☐	☐
Analog Value	☒	☐	☐
Binary Input	☒	☐	☐
Binary Output	☒	☐	☐
Binary Value	☒	☐	☐
Calendar	☒	☐	☐
Command	☐	☐	☐
Device	☒	☐	☐
Event Enrollment	☒	☒	☒
File	☒	☐	☐
Group	☐	☐	☐
Loop	☐	☐	☐
Multi-State Input	☒	☐	☐
Multi-State Output	☒	☐	☐
Multi-State Value	☒	☐	☐
Notification Class	☒	☐	☐
Program	☐	☐	☐
Schedule	☒	☐	☐
Averaging	☐	☐	☐
Trend Log	☒	☐	☐
Life-Safety-Point	☐	☐	☐
Life-Safety-Zone	☐	☐	☐
Accumulator	☐	☐	☐
Pulse-Converter	☐	☐	☐

6.4 BACnet standard object types description

Analog Input	Property supported	Writable	Range restrictions
	Object_Identifier		
	Object_Name		
	Object_Type		
	Present_Value	X	
	Description		
	Status_Flags		
	Event_State		
	Reliability		
	Out_Of_Service	X	
	Units		
	Max_Pres_Value		
	Min_Pres_Value		
	Priority_Array		
	Relinquish_Default	X	
	COV_Increment	X	0 .. maxReal
	Time_Delay		
	Notification_Class		
	High_Limit	X	Min_Pres_Value <= x <=Max_Pres_Value And High_Limit > Low_Limit
	Low_Limit	X	Min_Pres_Value <= x <=Max_Pres_Value And High_Limit > Low_Limit
	Deadband	X	0 .. maxReal
	Limit_Enable	X	
	Event_Enable	X	



Acked_Transitions		
Notify_Type		
Event_Time_Stamps		

Analog Output

Property supported	Writabl e	Range restrictions
Object_Identifier		
Object_Name		
Object_Type		
Present_Value	X	
Description		
Status_Flags		
Event_State		
Reliability		
Out_Of_Service	X	
Units		
Max_Pres_Value		
Min_Pres_Value		
Priority_Array		
Relinquish_Default	X	
COV_Increment	X	0 .. maxReal
Time_Delay		
Notification_Class		
High_Limit	X	Min_Pres_Value <= x <=Max_Pres_Value And High_Limit > Low_Limit
Low_Limit	X	Min_Pres_Value <= x <=Max_Pres_Value And High_Limit > Low_Limit
Deadband	X	0 .. maxReal
Limit_Enable	X	
Event_Enable	X	
Acked_Transitions		
Notify_Type		
Event_Time_Stamps		

Analog Value

Property supported	Writabl e	Range restrictions
Object_Identifier		
Object_Name		
Object_Type		
Present_Value	X	Depends on the Unit
Description		
Status_Flags		
Event_State		
Reliability		
Out_Of_Service	X	
Units		
Max_Pres_Value		
Min_Pres_Value		
Priority_Array		
Relinquish_Default	X	
COV_Increment	X	0 .. maxReal
Time_Delay		
Notification_Class		
High_Limit	X	Min_Pres_Value <= x <=Max_Pres_Value And High_Limit > Low_Limit
Low_Limit	X	Min_Pres_Value <= x <=Max_Pres_Value And High_Limit > Low_Limit



Deadband	X	0 .. maxReal
Limit_Enable	X	
Event_Enable	X	
Acked_Transitions		
Notify_Type		
Event_Time_Stamps		

**Analog Value
(setpoints)**

Property supported	Writabl e	Range restrictions
Object_Identifier		
Object_Name		
Object_Type		
Present_Value	X ⁽¹⁾	Depends on the Unit
Units		
Status_Flags		
COV_Increment	X	0 .. maxReal
Out_Of_Service	X ⁽¹⁾	
Event_State		

⁽¹⁾ Writeable if Out_Of_Service=True**Binary Input**

Property supported	Writabl e	Range restrictions
Object_Identifier		
Object_Name		
Object_Type		
Description		
Present_Value	X ⁽¹⁾	
Status_Flags		
Out_Of_Service	X	
Event_State		
Inactive_Text		
Active_Text		
Polarity	X	
Notification_Class		
Reliability		
Acked_Transitions		
Event_Enable	X	
Alarm_Value	X	
Notify_Type		
Time_Delay		
Event_Time_Stamps		
Elapsed-active-time	X	Only 0
Time-of-active-time-reset		

⁽¹⁾ Writeable if Out_Of_Service=True**Binary
Output**

Property supported	Writabl e	Range restrictions
Object_Identifier		
Object_Name		
Object_Type		
Description		
Present_Value	X	
Status_Flags		
Out_Of_Service	X	
Event_State		
Inactive_Text		
Active_Text		
Notification_Class		
Reliability		
Acked_Transitions		



Event_Enable	X	
Notify_Type		
Time_Delay		
Event_Time_Stamps		
Polarity	X	
Feedback_Value		
Priority_Array		
Relinquish_Default	X	
Elapsed-active-time	X	Only 0
Time-of-active-time-reset		

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