DAIKIN APPLIED EUROPE S.p.A.

BAS integration guide

Modbus protocol

Doc. Name:
D-EIGOC00206-24_01EN-WCZ

Product Name:
EWWT-Q/EWLT-Q/EWHT-Q

Control software name:
PROXIMA

Table of contents

1. Introduction

This document contains information to incorporate EWWT-Q/EWLT-Q/EWHT-Q Unit Controller into a building automation system (BAS) via Modbus communication protocols.

EWWT-Q/EWLT-Q/EWHT-Q data points are always accessible to a BAS via Modbus network by mean of on board RS485 connection or when option for Ethernet connection is activated.

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

2. About this document

2.1 Notice

2.2 Before starting

Application range

This document refers to the following components:

POL486.65	Controller

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

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 extra low 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.

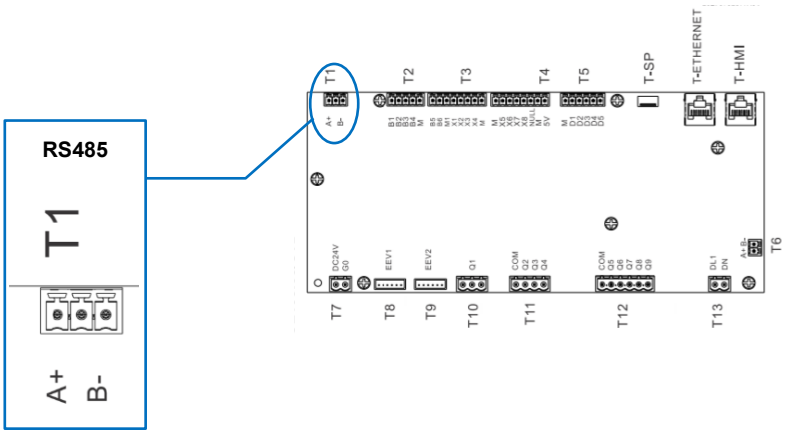
Disposal

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 Modbus network

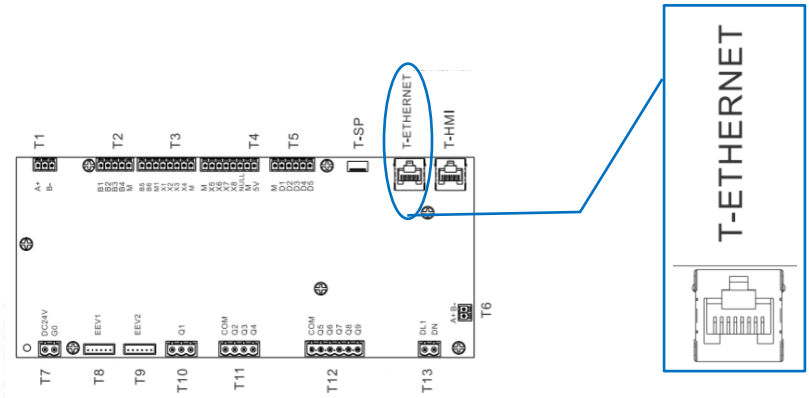
Unit controller

EWWT-Q/EWLT-Q/EWHT-Q 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

Modbus TCP/IP communication is also ready onborad the controller via Ethernet port as a software option available with connectivity kit SAP code EKRSCBMS.



5. Modbus integration list

Note **All the variables can be accessed through Holding Registers. The address is 4xxxx.**

Always verify "Clear Alarms – Network" writing configuration before starting normal operations: a continuous clear command can lead to potential hazard and unit damaging

Description	Type	Address	Offset	R/W	Range
Hour	UNSIGNED WORD	313	0	R	0…12
Minute	UNSIGNED WORD	314	0	R	0…60
Second	UNSIGNED WORD	315	0	R	0…60
Year	UNSIGNED WORD	309	0	R	
Month	UNSIGNED WORD	310	0	R	0…12
Day	UNSIGNED WORD	311	0	R	0…31
DayOfWeek	UNSIGNED WORD	312	0	R	
Local/Network Source	UNSIGNED WORD	1	1	R	0 Remote 1 Local
Enabled State	UNSIGNED WORD	2	1	R	0 Disabled 1 Enabled
Capacity Limited	UNSIGNED WORD	4	1	R	0 No 1 Yes
Unit general alarm	UNSIGNED WORD	5	1	R	0 No 1 Yes
Thermoregulation State	UNSIGNED WORD	8	1	R	0 Off 1 On

Unit Enable Setpoint - Network	UNSIGNED WORD	9	1	W	0 Disable 1 Enable 2 Scheduler
Clear Alarms – Network	UNSIGNED WORD	10	1	W	0 Normal 1 Clear
Operation Mode	UNSIGNED WORD	11	1	R	1 Ice 2 Cool 3 Heat 4 Test
Active Setpoint	SIGNED WORD	12	0,1	R	-15…60°C
Actual Capacity	SIGNED WORD	13	0,1	R	0…100%
Active Capacity Limit Output	SIGNED WORD	14	0,1	R	0…100%
Status	UNSIGNED WORD	15	1	R	1 Off 2 Start 3 Run 4 Preshutdown 5 Service
Evaporator Entering Water Temp	SIGNED WORD	16	0,1	R	°C
Evaporator Leaving Water Temp	SIGNED WORD	17	0,1	R	°C
Warning CODE	SIGNED WORD	31	1	R	0…65535
Problem CODE	SIGNED WORD	32	1	R	0…65535
Fault CODE	UNSIGNED WORD	33	1	R	0…65535
Fault INDEX	SIGNED WORD	30	1	R	0…9999999
Problem INDEX	SIGNED WORD	29	1	R	0…9999999
Operation Mode Setpoint – Network	UNSIGNED WORD	34	1	W	0 Cool 1 Heat
Cool Setpoint – Network	SIGNED WORD	35	0,1	W	-15/4°C…30°C

Heat Setpoint – Network	SIGNED WORD	37	0,1	W	25…60˚C
Evaporator Pump #1 Status	UNSIGNED WORD	305	1	R	0 Pump Off Request 1 Pump On Request
Evaporator Pump #1 Run Hours	UNSIGNED DOUBLE WORD	303	1	R	hours
Circuit #1 State	UNSIGNED WORD	300	1	R	0 Off 1 Preopen 2 Start 3 Run 4 Pumpdown
Circuit #1 Comp #1 – Status	UNSIGNED WORD	1852	1	R	0 Off 1 On
Circuit #1 Comp #1 - Run Hours	UNSIGNED DOUBLE WORD	74	1	W	0…9999999
Circuit #1 Comp #1 - OffAuto	SIGNED WORD	1841	1	W	0 Off 1 On
Circuit #1 Comp #2 - Status	UNSIGNED WORD	1838	1	R	0 Off 1 On
Circuit #1 Comp #2 - Run Hours	UNSIGNED WORD	87	1	R	0…9999999
Circuit #1 Comp #2 - OffAuto	UNSIGNED WORD	1827	1	W	0 Off 1 On
Circuit #1 – Suction Temperature	SIGNED WORD	65	0,1	R	˚C
Circuit #1 - CondRefrigPress	SIGNED WORD	39	0,1	R	kPa
Circuit #1 - CondSatRefrigTemp	SIGNED WORD	40	0,1	R	˚C
Circuit #1 - OFFEvapPressSen	UNSIGNED WORD	552	1	R	0 No Alarm 1 In Alarm
Circuit #1 - EvapRefrigPress	SIGNED WORD	41	0,1	R	kPa
Circuit #1 - EvapSatRefrigTemp	SIGNED WORD	42	0,1	R	˚C
Circuit #1 - OutdoorFanSpeed	SIGNED WORD	1986	1	R	V
Circuit #1 - EvapEXVPosition	SIGNED WORD	1982	0,1	R	0….100%
CondFlowSwitchStatus	SIGNED WORD	7	1	R	0 Off 1 On
Cond EWT	SIGNED WORD	19	0,1	R	˚C
Cond LWT	SIGNED WORD	20	0,1	R	˚C
EvapFlowSwitchStatus	SIGNED WORD	6	1	R	0 Off 1 On
Evap Pump Run Hours	SIGNED WORD	102	2	R/W	h
Evap Pump Status	UNSIGNED WORD	101	1	R	0 Off 1 On

CondPump1RunHours	SIGNED WORD	122	2	R	h
CondPump1Status	UNSIGNED WORD	121	1	R	0 Off 1 On
Active Warn Index	SIGNED WORD	28	1	R	
Units	UNSIGNED WORD	316	1	R/W	0 English 1 Metric
CmnEvap LWT	SIGNED WORD	1103	0,1	R	°C
CmnEvap LWT Senf	UNSIGNED WORD	880	1	R	0 No Alarm 1 In Alarm
CmnCond LWT	SIGNED WORD	1104	0,1	R	°C
CmnCond LWT Senf	UNSIGNED WORD	881	1	R	0 No Alarm 1 In Alarm
MUStandalone	UNSIGNED WORD	1135	1	W	0 No 1 Yes
Master Comm Error	UNSIGNED WORD	890	1	R	0 No Alarm 1 In Alarm
MU2 Comm Error	UNSIGNED WORD	892	1	R	0 No Alarm 1 In Alarm
MU3 Comm Error	UNSIGNED WORD	893	1	R	0 No Alarm 1 In Alarm
MU4 Comm Error	UNSIGNED WORD	1437	1	R	0 No Alarm 1 In Alarm
MU4 Load	SIGNED WORD	1204	0,1	R	0….100%
MU4 State	UNSIGNED WORD	1190	1	R	0 Stop 1 Run 2 Alarm 3 ComErr
MU2 Load	SIGNED WORD	1168	0,1	R	0….100%
MU2 State	UNSIGNED WORD	1172	1	R	as MU4 State
MU3 Load	SIGNED WORD	1186	0,1	R	0….100%
MU3 State	UNSIGNED WORD	1187	1	R	as MU4 State
MUSEOpState	UNSIGNED WORD	1100	1	R	0 Stop 1 Run
MUSE Actual Mode	UNSIGNED WORD	1119	1	R	0 Cool 1 Ice 2 Heat 3 Pursuit

MUSECtrlTemp	SIGNED WORD	1112	0,1	R	˚C
MUSE Load	SIGNED WORD	1132	1	R	0….100%
MU1 Enabling	UNSIGNED WORD	1324	1	R/W	0 Disable 1 Enable
Clear Timers	UNSIGNED WORD	1526	1	W	0 Off 1 Reset
Pump Skid Communication Error	UNSIGNED WORD	1390	1	R	0 No Alarm 1 In Alarm
MU2 Actual Mode	UNSIGNED WORD	1155	1	R	0 Cool 1 Ice 2 Heat 3 Pursuit
MU2 ELWT	SIGNED WORD	1167	0,1	R	˚C
MU2 EEWT	SIGNED WORD	1166	0,1	R	˚C
MU2 CEWT	SIGNED WORD	1164	0,1	R	˚C
MU2 CLWT	SIGNED WORD	1165	0,1	R	˚C
MU3 Actual Mode	UNSIGNED WORD	1173	1	R	as MU2 Actual Mode
MU3 ELWT	SIGNED WORD	1185	0,1	R	˚C
MU3 EEWT	SIGNED WORD	1184	0,1	R	˚C
MU3 CEWT	SIGNED WORD	1182	0,1	R	˚C
MU3 CLWT	SIGNED WORD	1183	0,1	R	˚C
MU4 Actual Mode	UNSIGNED WORD	1191	1	R	as MU2 Actual Mode
MU4 ELWT	SIGNED WORD	1203	0,1	R	˚C
MU4 EEWT	SIGNED WORD	1202	0,1	R	˚C
MU4 CEWT	SIGNED WORD	1200	0,1	R	˚C
MU4 CLWT	SIGNED WORD	1201	0,1	R	˚C
UnitShutdownAlm	UNSIGNED WORD	54	1	R	0 Off 1 On
Comp1ShutdownAlm	UNSIGNED WORD	51	1	R	0 Off 1 On
Comp2ShutdownAlm	UNSIGNED WORD	52	1	R	0 Off 1 On

6. Annex A – Alarming

Unit and circuits alarms are coded inside “Alarm Words”. Each bit represents an alarm that is active when the correspondent bit has 1 value. It follows examples:

Unit Alarm Word #1		**Encoding**		
Value (dec)	Value (bin)	bit	value	Meaning
17.408	0**1**00 0**1**00 0000 0000	0	0	*Not Used*
		1	0	*Not Used*
		2	0	*Not Used*
		3	0	*Not Used*
		4	0	*Not Used*
		5	0	*Not Used*
		6	0	*Not Used*
		7	0	Demand Limit Fault
		8	0	*Not Used*
		9	0	*Not Used*
		10	**1**	**ACTIVE: Evaporator Entering water temperature sensor fault**
		11	0	Evaporator flow loss
		12	0	Evaporator freeze unit
		13	0	*Not Used*
		14	**1**	**ACTIVE: Evaporator leaving water temperature sensor fault**
		15	0	Evaporator pump 1 fault

6.1 Annex A – Unit Alarm Words

Unit	bit #	Alarm	WCZ
Alarm Word #1	0	*Not Used*	
	1	Condenser Entering water temperature sensor fault	*X*
	2	*Condenser Flow loss*	*X*
	3	Condenser Freeze Unit	*X*
	4	*Condenser* leaving water temperature sensor fault	*X*
	5	*Condenser Pump 1 Fault*	*X*
	6	*Not Used*	
	7	Demand Limit Fault	X
	8	*Not Used*	
	9	*Not Used*	
	10	Evaporator Entering water temperature sensor fault	X
	11	Evaporator flow loss	X
	12	Evaporator freeze unit	X
	13	*Not Used*	
	14	Evaporator leaving water temperature sensor fault	X
	15	Evaporator pump 1 fault	X
Alarm Word #2	0	*Not Used*	
	1	External alarm	X
	2	*External Event*	X
	3	*Not Used*	
	4	*Not Used*	
	5	*Not Used*	
	6	*Not Used*	
	7	*Not Used*	
	8	*Not Used*	
	9	*Not Used*	
	10	*Not Used*	
	11	*Not Used*	
	12	*Not Used*	
	13	*Not Used*	
	14	*Not Used*	
	15	Leaving water temperature reset fault	X

Unit	bit #	Alarm	WCZ
Alarm Word #3	0	*Not Used*	
	1	Option extension fault	X
	2	*Not Used*	
	3	*Not Used*	
	4	*Not Used*	
	5	*Not Used*	
	6	*Not Used*	
	7	*Not Used*	
	8	*Not Used*	
	9	*Not Used*	
	10	*Not Used*	
	11	*Not Used*	
	12	*Not Used*	
	13	*Not Used*	
	14	*Not Used*	
	15	*Not Used*	
Alarm Word #4	0	*Not Used*	
	1	*Not Used*	
	2	*Not Used*	
	3	Controller Time Not Valid	X
	4	*Not Used*	
	5	*Not Used*	
	6	*Not Used*	
	7	*Gas Leakage Alarm*	*X*
	8	*Gas Sensor Fault*	*X*
	9	*Not Used*	
	10	*Not Used*	
	11	*Not Used*	
	12	*Not Used*	
	13	*Not Used*	
	14	*Not Used*	
	15	*Not Used*	

6.2 Annex A – Circuit Alarm Words

Circuit 1	bit#	Alarm	bit#	WCZ
Alarm Word#1	0	Condensing pressure sensor fault	0	X
	1	Discharge temperature sensor fault	1	X
	2	*Not Used*	2	
	3	*Not Used*	3	
	4	*Not Used*	4	
	5	*Not Used*	5	
	6	Evaporating pressure sensor fault	6	X
	7	*EXV Alarm*	7	X
	8	*Not Used*	8	
	9	*Not Used*	9	
	10	*Not Used*	10	
	11	Gas leakage	11	X
	12	*Not Used*	12	
	13	High condensing pressure	13	X
	14	High discharge temperature	14	X
	15	*Not Used*	15	
Alarm Word #2	0	*Not Used*	0	
	1	*Not Used*	1	
	2	*Not Used*	2	
	3	*Not Used*	3	
	4	*Not Used*	4	
	5	*Not Used*	5	
	6	Low discharge superheat	6	X
	7	Low evaporating pressure	7	X
	8	Low pressure ratio	8	X
	9	*Not Used*	9	
	10	Mechanical high pressure switch	10	X
	11	*Not Used*	11	
	12	No pressure change at start	12	X
	13	*Not Used*	13	
	14	*Not Used*	14	
	15	Pumpdown fail	15	X

Circuit 1	bit #	Alarm	bit #	SIC
Alarm Word #3	0	*Not Used*	0	
	1	*Not Used*	1	
	2	*Not Used*	2	
	3	*Not Used*	3	
	4	*Not Used*	4	
	5	Suction temperature sensor fault	5	X
	6	*Not Used*	6	
	7	*Not Used*	7	
	8	*Not Used*	8	
	9	*Not Used*	9	
	10	*Not Used*	10	
	11	*Not Used*	11	
	12	*Not Used*	12	
	13	*Not Used*	13	
	14	*Not Used*	14	
	15	*Not Used*	15	
Alarm Word #4	0	*Not Used*	0	
	1	*Not Used*	1	
	2	*Not Used*	2	
	3	*Not Used*	3	
	4	*Not Used*	4	
	5	*Not Used*	5	
	6	*Not Used*	6	
	7	*Not Used*	7	
	8	*Not Used*	8	
	9	*Not Used*	9	
	10	*Not Used*	10	
	11	*Not Used*	11	
	12	*Not Used*	12	
	13	*Not Used*	13	
	14	*Not Used*	14	
	15	*Not Used*	15	

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