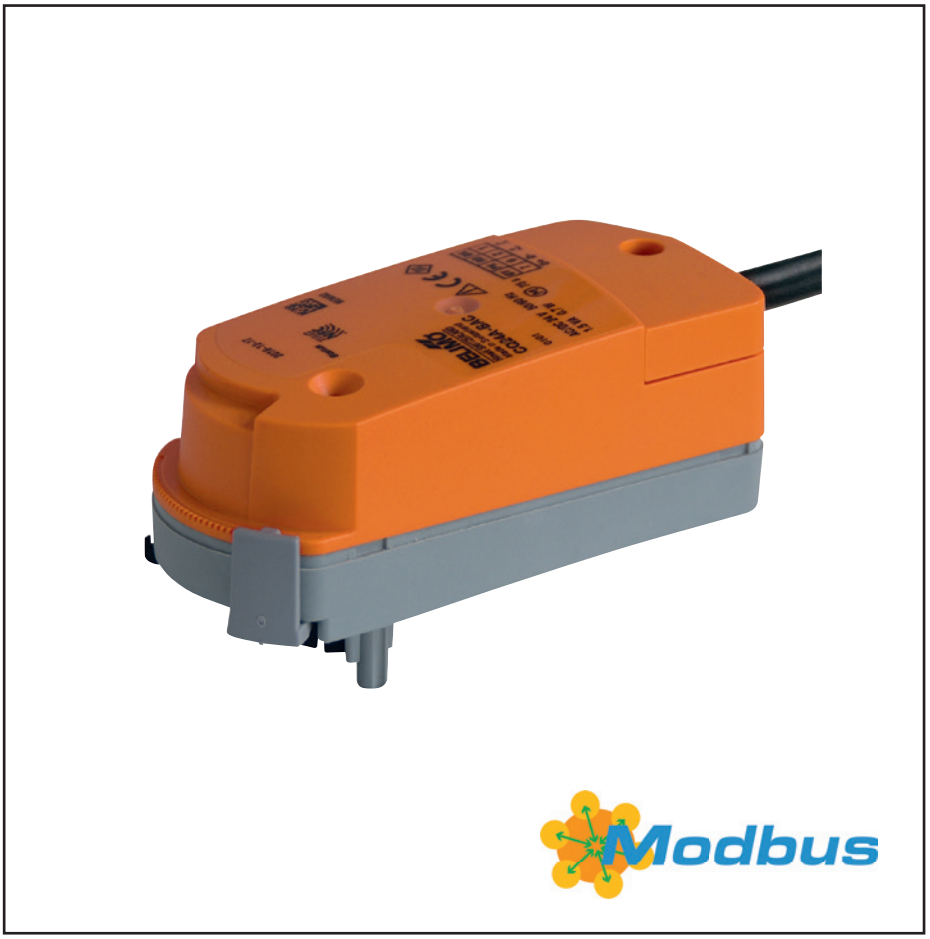

CQ24A-BAC

Contents

Modbus General Notes

General information	Date	28.11.2018
	Product Name	CQ Zone Rotary Actuator
	Actuator type	CQ24A-MOD
	Protocol	Modbus RTU over RS-485
Modbus RTU	Transmission formats	1-8-N-2, 1-8-N-1, 1-8-E-1, 1-8-O-1 (Default: 1-8-N-2)
	Baud rates	9‘600, 19‘200, 38‘400, 76‘800, 115’200 Bd (Default: 38‘400 Bd)
	Address	1...247 (Default: 1)
	Number of nodes	Max. 32 (without repeater)
Parameterisation	Tool	Belimo Assistant 2

Register implementation

All data is arranged in a table and addressed by 1..n (Register No.) or 0..n-1 (Address). No distinction is made between data types (Discrete Inputs, Coils, Input Registers and Holding Registers). As a consequence, all data can be accessed with the two commands for Holding Register. The commands for Discrete Inputs and Input Registers can be used as an alternative.

Commands

Standard commands:
Read Holding Registers [3]
Write Single Register [6]

Optional commands:
Read Discrete Inputs [2]
Read Input Registers [4]
Write Multiple Registers [16]

Command „Read Discrete Inputs“

The command reads one or more bits and can alternatively be used for Register No. 105 (Malfunction and Service information).

Example: The start address to be used is 1664 → **104** (Register Address) * **16** (Bit) = **1664**

Interpret values in the registers

All values in the register are unsigned integer datatypes.

Example: Read (Function 03, 1 Register) Value Register No. 12 = 0001‘1010‘1100‘10002 = 6‘85610
Actual Value = Value * Scaling factor * Unit = 6‘856 * 0.01 * m3/h = **68.56 m³/h**

32-Bit values in two registers

Values that exceed 65,535 are stored in two consecutive Registers and have to be interpreted as „little endian“ / LSW (Least Significant Word) first

Example: Register No. 10 (AbsFlow LowWord) = 14,55110 = 0011‘1000‘1101‘0111_2
Register No. 11 (AbsFlow HighWord) = 1910 = 0000‘0000‘0001‘0011_2

AbsFlow HighWord	AbsFlow LowWord
19	14,551
$0000‘0000‘0001‘0011_2$	$0011‘1000‘1101‘0111_2$

AbsFlow = $0000‘0000‘0001‘0011‘0011‘1000‘1101‘0111_2$ = 1,259,73510 = **1259.735 l/h**

Math formula:
AbsFlow = (AbsFlow HighWord * 65,536) + AbsFlow LowWord
AbsFlow = (19 * 65,536) + 14,551 = 1,259,735 = **1259.735 l/h**

Deactivated registers

If a register is not supported by a device or by a device setting it is indicated with 65‘535 ($1111‘1111‘1111‘1111_2$).

All writeable registers on registers >100 are persistent and are **not** supposed to be written on a regular base.

Modbus Register Overview

Operation

No.	Address	Register	Access
1	0	Setpoint [%]	R / W
2	1	Override control	R / W
3	2	Command	R / W
4	3	Actuator type	R
5	4	Relative position [%]	R
6	5	Absolute position [°]	R

Service

No.	Address	Register	Access
101	100	Series number 1st part	R
102	101	Series number 2nd part	
103	102	Series number 4th part	
104	103	Firmware version	R
105	104	Malfunction and service information	R
106	105	-	-
107	106	Max [%]	R / W
108	107	-	-
109	108	Bus fail position	R / W
110	109	Communication Watchdog	R / W

Modbus Register Description

No.	Address	Description Comment	Range Enumeration	Unit	Scaling	Access
1	0	Setpoint Setpoint for actuator between 0 and Max (No. 107)	0…10'000 *Default: 0*	%	0.01	R / W
2	1	Override Control Override setpoint with defined values	0: None 1: Open 2: Close 3: - 4: - 5: Max *Default: None(0)*	–	–	R / W
3	2	Command Initiation of actuator functions for service and test After command is sent, register returns to None(0)	0: None 1: Adaption 2: - 3: Sync *Default: None(0)*	–	–	R / W
4	3	Actuator Type	0: Actuator not connected **1: Air / Water** 2: VAV / EPIV 3: Fire 4: Energy Valve 5: 6way EPIV	–	–	R
5	4	Relative Position	0...10'000	%	0.01	R
6	5	Absolute Position	0...max angle	°	0.01	R

Modbus Register Description

No.	Address	Description Comment	Range Enumeration	Unit	Scaling	Access
101	100	Series Number 1st part Each device has an unambiguous series number, which is either impressed on or glued to the housing The series number consists of 4 segments, although only parts 1, 2 and 4 are displayed on Modus Example: 00839-31324-064-008 1st part: 00839 2nd part: 31324 4th part: 008	–	–	–	R
102	101	Series Number 2nd part	–	–	–	R
103	102	Series Number 4th part	–	–	–	R
104	103	Firmware Version Firmware version of communication module Example: 302, Version 3.02	–	–	–	R
105	104	Malfunction and Service Information Value is bit-coded. More than one bit can be set to 1 All bits not montioned in the enumeration are not used for this actuator range Internal activity: Actuator performs a test run, adaption, etc. Bus Watchdog triggered: Timeout for the Bus Watchdog expired	Bit8: Internal activity Bit10: Bus Watchdog triggered	–	–	R
106	105	-	-	-	-	-
107	106	Max Max has to be ≥ 30%	3'000 ...10'000 *Default: 10`000*	%	0.01	R / W
109	108	Bus Fail Position Modbus communication is not monitored as standard. In the event of a breakdown in communication, the actuator retains the current setpoint The bus implementation tracks the Modbus communication. If neither the Setpoint (Register No. 1) nor the Override Control (Register No. 2) is renewed before the Timeout for Bus Watchdog (Register No. 110) expires, the actuator controls to the Bus Fail Position Triggered bus watchdog is indicated in the Malfunction and Service Information (Register No. 105)	0...10'000 *Default: 0*	%	0.01	R / W
110	109	Timeout for Bus Watchdog in s Time until Bus Fail will be detected. If Bus Watchdog = 0 then deactivated If Bus Fail Position (Register No. 109) different from 0, the Bus Fail Position becomes active after the Timeout for Bus Watchdog is expired Recomended timeout value with activated watchdog is 120 s.	0...3'600 *Default: 0*	s	1	R / W