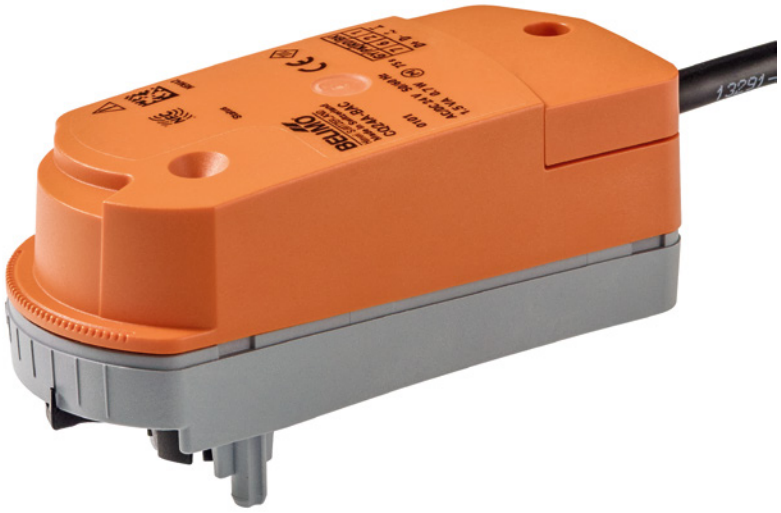

Modbus Interface Description

Zone Valve Actuator C..24A-BAC / V1.07

Edition 2026-07

Table of contents

General notes

General information	
Modbus RTU	
Configuration	
Register implementation	3
Supported commands	
Command “Read Discrete Inputs”	
Interpret values in the registers	
32-bit values in two registers	4
Deactivated registers	

Register overview

Operation	5
Configuration	

Register descriptions

Control and general settings	6
Health state	8

General notes

General information

Date	01.07.2026
Product Name	Zone rotary actuator
Actuator Type	Short stroke valve actuator CQ24A-BAC CV24A-BAC
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)
Terminating Resistor	External 120 Ω

Configuration

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.

Supported commands

Standard commands:	Optional commands:
Read Holding Registers [3]	Read Discrete Inputs [2]
Write Single Register [6]	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 data types.
Exceptions are marked with **). Signed integers are represented as two's complement.

Example unsigned integer:	Example signed integer:
Read (Function 03, 1 Register) Value Register No. x = 0001 1010 1100 1000_2 = $6{,}856_{10}$	Read (Function 03, 1 Register) Value Register No. x = 1111 1101 1111 0010_2 = -526_{10}
Actual value = value * scaling factor * unit = 6,856 * 0.01 * unit = **68.56 unit**	Actual value = value * scaling factor * unit = -526_{10} * 0.01 * unit = **−5.26 unit**

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 byte swap" / LSW (Least Significant Word) first. Note: While the regular "little endian" interpretation refers to the each byte (8 bit Word) per register, the additional "byte swap" interpretation leads to where "little endian" refers to the 16 bit Word of one register.

Example:

Register No. x (Value LowWord)	Register No. x + 1 (Value HighWord)
= $14{,}551_{10}$	= 19_{10}
= $0011\ 1000\ 1101\ 0111_2$	= $0000\ 0000\ 0001\ 0011_2$

Value LowWord	**Value HighWord**
= 14,551	= 19
= $0011\ 1000\ 1101\ 0111_2$	= $0000\ 0000\ 0001\ 0011_2$

32-bit value
= 0000 0000 0001 0011 0011 1000 1101 01112
= 1,259,73510
= 1,259.735 unit

Math formula:

32-bit value = (Value HighWord * 65,536) + Value LowWord
32-bit value = (19 * 65,536) + 14,551
= 1,259,735
= 1,259.735 unit

Deactivated registers

If a register is not supported by a device or by a device setting, this is indicated by 65,535 ($1111\ 1111\ 1111\ 1111_2$).

Register overview

Operation

No.	Address	Register	Access
1	0	Setpoint Relative [%]	R / W
2	1	Override Control	R / W
3	2	Command	R / W
4	3	Device Type	R
5	4	Relative Position [%]	R
6	5	Absolute Position [°]	R

**) signed integer

Description Access: R = Read, W = Write

Configuration

No.	Address	Register	Access
101	100	Series Number 1st part	R
102	101	Series Number 2nd part	R
103	102	Series Number 4th part	R
104	103	Firmware Version	R
105	104	Malfunction and service information	–
106	105	–	–
107	106	Maximum Limit [%]	R / W
109	108	Bus Fail Action	R / W
110	109	Timeout for Bus Watchdog [s]	R / W

Description Access: R = Read, W = Write



All writeable registers >100 are persistent and are **not** supposed to be written on a regular basis. Designated data points are highlighted in colour in the document.

Register descriptions

Control and general settings

These registers can be used to control and configure the fundamental functionalities and read the corresponding feedback values of the device.

No.	Address	Description Comment	Range, enumeration	Unit	Scaling	Access
1	0	**Setpoint relative** Setpoint for actuator between 0 and Max No. 107	0...10'000 Default: 0	%	0.01	R / W
5	4	**Relative position**	0...10'000	%	0.01	R
6	5	**Absolute position**	0...max angle	°	0.01	R
2	1	**Override control** Overrides setpoint with defined values	0: None 1: Open 2: Close 3: – 4: – 5: Max Default: 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: 0	–	–	R / W
4	3	**Device type**	0: Device not connected **1: Air / Water** 2: VAV / EPIV 3: Fire 4: Energy Valve 5: 6-way EPIV	–	–	R
107	106	**Maximum limit** 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** 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
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

No.	Address	Description Comment	Range, enumeration	Unit	Scaling	Access
102	101	**Series number 2nd part**	–	–	–	R
103	102	**Series number 4th part**	–	–	1	R
104	103	**Firmware version** Firmware version of communication module Example: 302, Version 3.02	–	–	–	R

Description Access: R = Read, W = Write

Health state

This register allows to determine malfunctions, service information and error states of the device.

No.	Address	Description Comment	Range, enumeration	Unit	Scaling	Access
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

Description Access: R = Read, W = Write

All inclusive.

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