

Modbus communication parameters

Register

	No.	Adr	Register
In operation	1	0	Setpoint [%]
	2	1	Override control
	3	2	Command
	4	3	Actuator type
	5	4	Relative position [%]
	6	5	Absolute position [°] [mm]
	7	6	Relative volumetric flow [%] (only for VAV/EPIV)
	8	7	Absolute volumetric flow (pressure) [m ³ /h] [l/min] [Pa] (only for VAV/EPIV)
	9	8	Sensor value [mv] [Ω] [-]
Service	101	100	Series number 1st part
	102	101	Series number 2nd part
	103	102	Series number 4th part
	104	103	Firmware version (Modbus module)
	105	104	Malfunction and service information
	106	105	Min [%]
	107	106	Max [%]
	108	107	Sensor type
	109	108	Bus fail position
	110	109	-
	111	110	Nominal volumetric flow (pressure) [m ³ /h] [l/min] [Pa] (only for VAV/EPIV)

- Registers in Bold can be written
- Registers <100 (In operation) which can be written are volatile and should therefore be updated periodically
- Registers >100 which can be written are non-volatile

Commands

All data is arranged in a table and addressed by 1..n (register) or 0..n-1 (address). No distinction is made between data types (Discrete Inputs, Coils, Input Registers, 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.

Note regarding Read Discrete Inputs

The command reads one or more bits and can alternatively be used for register 105 (Malfunction and service information). The start address to be used is 1664.

Standard commands:

Read Holding Registers [3]

Write Single Register [6]

Optional commands:

Read Discrete Inputs [2]

Read Input Registers [4]

Write Multiple Registers [16]

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Register 1: Setpoint Setpoint for actuator setting or volumetric flow in hundredths of one percent, i.e. 0...10 000 corresponds to 0...100%

Register 2: Override control Overriding the setpoint with defined values

Override control	
0	None
1	Open
2	Close
3	Min
5	Max

Register 3: Command Initiation of actuator functions for service and test; the register is reset automatically.

Command	
0	None
1	Adaption
2	Test run
3	Synchronisation
4	Reset actuator malfunctions

Register 4: Actuator type Actuator type; the allocation may deviate from the basic category with some actuators.

Actuator type	
0	Actuator not connected / not known
1	Air/water actuators with/without safety function
2	Volumetric flow controller VAV / EPIV
3	Fire damper actuator

Register 5: Relative position Relative position in hundredths of one percent, i.e. 0...10 000 correspond to 0...100%

Register 6: Absolute position Absolute position
0...10 000 (65535 if not supported by the actuator)
The unit depends on the device:
[°] for actuators with rotary movement
[mm] for actuators with linear movement

Register 7: Relative volumetric flow Relative volumetric flow in hundredths of one percent of V_{nom} , i.e. 0...10 000 correspond to 0...100%.
This value is available only for VAV controllers and EPIV devices (actuator type: 2).
For all other types, 65535 will be entered.

Register 8: Absolute volumetric flow Absolute volumetric flow
This value is available only for VAV controllers and EPIV devices (actuator type: 2).
For all other types, 65535 will be entered.
The unit depends on the device:
[m³/h] for VAV controllers (or [Pa] for pressure applications)
[l/min] for EPIV devices

Register 9: Sensor value Current sensor value; dependent on the setting in Register 108
The unit depends on the sensor type: [mv] [Ω] [-]

Register 101 - 103: Series number 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 Modbus.
Example: 00839-31324-064-008

Register 101	Register 102	Register 103
1st part	2nd part	4th part
00839	31234	008

Register 104: Firmware Version Firmware version of Modbus module (VX.XX)
e.g. 101 V1.01

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Register 105: Malfunction and service information The status information is split into messages about the actuator (malfunctions) and other service information.

	Bit	Description
Malfunctions (low byte)	0	Excessive utilisation
	1	Mechanical travel increased
	2	Mechanical overload
	3	–
	4	Safety-relevant faults (fire protection only)
	5	Damper test error (fire protection only)
	6	Duct temperature too high (fire protection only)
	7	Smoke detector tripped (fire protection only)
Service (high byte)	8	Internal activity (test run, adaption, ...)
	9	Gear disengagement active
	10	Bus watchdog triggered
	11	–
	12	–
	13	–
	14	–
	15	–

The malfunction bits can be reset with Register 3 (command 4) or with the Belimo PC-Tool. Malfunctions 0 and 4 cannot be reset.

Register 106: Min / Vmin setting Minimum limit (position or volumetric flow) in hundredths of one percent, i.e. 0...10 000 correspond to 0...100%
Caution: Changing the setting may result in malfunctions.

Register 107: Max / Vmax setting Maximum limit (position or volumetric flow) in hundredths of one percent, i.e. 2000...10 000 correspond to 20...100%
Caution: Changing the setting may result in malfunctions.

Register 108: Sensor type Sensor type connected to the actuator; in the absence of sensor specification, the switching at the Y input will have the effect of a local compulsion.

Notes
– After changing the sensor type, the actuator must always be restarted in order for correct sensor values to be read out.
– By using actuator variants with RJ12 sockets (J6) sensor values are not available, as connecting a sensor is not possible.

Sensor type	
0	None
1	Active sensor (mV)
2	Passive sensor 1 k (Ω)
3	Passive sensor 1...20 k (Ω)
4	Switching contact (0 / 1)

Register 109: 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 monitoring controls the Modbus communication. If neither the setpoint (Register 1) nor the override control (Register 2) is renewed within 120 seconds, the actuator controls to the bus fail position. Triggered bus monitoring is indicated in Register 105.

Bus fail position	
0	Last setpoint (no bus monitoring)
1	Fast close if time is exceeded
2	Fast open if time is exceeded
3	Parameterized intermediate position Mid if time is exceeded

Register 110: (Reserved) Not used in this device.

Register 111: Nominal volumetric flow This value is available only for VAV controllers and EPIV devices (actuator type: 2). For all other types, 65535 will be entered. The unit depends on the device:
[m3/h] for VAV controllers (or [Pa] for pressure applications)
[l/min] for EPIV devices