Modbus communication parameters

Register

No.	Adr	Register
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) [m³/h] [l/min] [Pa] (only for VAV/EPIV)
9	8	Sensor value [mv] [Ω] [–]
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**

Rows 1–9 are grouped under **In operation**; rows 101–109 are grouped under **Service**.

- 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.

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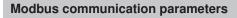Write Single Register [6]

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

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.

Modbus communication parameters

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 Vnom, 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:
[m^3/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 impr essed 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

Modbus communication parameters

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.

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)

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.

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