# Veox

Точность регулировки



## VAV-Compact

## Contents

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| VAV-Compact | **Volumetric flow compact control device** |
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## Modbus General Notes

| General information | Date | 25.03.2019 |
|---|---|---|
| | Product Name | VAV-Compact |
| | Actuator type | ..MV-D3-MOD, LHV24A-D3-MOD |
| **Modbus RTU** | Protocol | Modbus RTU over RS-485 |
| | 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 | 120 Ω |
| **Parameterisation** | Tool | ZTH EU |

**Quick adressing**

Actuators support quick addressing via the „Address" and „Adaption" buttons.
For detailed, information please see product datasheet (chapter Service).

**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 = $0001'1010'1100'1000_2 = 6'856_{10}$
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) = $14,551_{10} = 0011'1000'1101'0111_2$
Register No. 11 (AbsFlow HighWord) = $19_{10} = 0000'0000'0001'0011_2$

| AbsFlow HighWord | AbsFlow LowWord |
|---|---|
| 19 | 14,551 |
| $0000'0000'0001'0011_2$ | $0011'1000'1101'0111_2$ |

AbsFlow = $0000'0000'0001'0011'0011'1000'1101'0111_2 = 1,259,735_{10}$ = **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.

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## 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 [°] [mm] | | R |
| 7 | 6 | Relative volumetric flow [%] | | R |
| 8 | 7 | Absolute volumetric flow [m³/h] | | R |
| 9 | 8 | Sensor value 1 [mV] [–] | | R |
| 10 | 9 | – | | – |
| 11 | 10 | Absolute volumetric flow in unit selected | LowWord | R |
| 12 | 11 | | HighWord | |
| 13 | 12 | Setpoint analog [%] | | R |

Service

| No. | Address | Register | | Access |
|-----|---------|----------|--|--------|
| 100 | 99 | Bus termination | | R |
| 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 | Min [%] | | R / W |
| 107 | 106 | Max [%] | | R / W |
| 108 | 107 | Sensor type 1 | | R / W |
| 109 | 108 | Bus fail position | | R / W |
| 110 | 109 | Communication Watchdog | | R / W |
| 111 | 110 | Nominal volumetric flow [m³/h] | | R |
| 112 | 111 | – | | – |
| 113 | 112 | Nominal volumetric flow in unit selected | LowWord | R |
| 114 | 113 | | HighWord | |
| 115 | 114 | – | | – |
| 116 | 115 | – | | – |
| 117 | 116 | Control Mode | | R / W |
| 118 | 117 | Unit Selection Flow | | R / W |
| 119 | 118 | Setpoint source | | R / W |

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## Modbus Register Description

| No. | Address | Description / Comment | Range / Enumeration | Unit | Scaling | Access |
|---|---|---|---|---|---|---|
| 1 | 0 | Setpoint<br><br>Setpoint for actuator between Min (Register No. 106) and Max (No. 107) | 0…10'000<br>*Default: 0* | % | 0.01 | R / W |
| 2 | 1 | Override Control<br><br>Override setpoint with defined values | 0: None<br>1: Open<br>2: Close<br>3: Min<br>4: Mid<br>5: Max<br>*Default: None(0)* | – | – | R / W |
| 3 | 2 | Command<br><br>Initiation of actuator functions for service and test<br>After command is sent, register returns to None(0)<br>With Reset(4) all Malfunction and Service Information (Register No. 105)<br>Information can be reset. | 0: None<br>1: Adaption<br>2: Test<br>3: Sync<br>4: Reset<br>*Default: None(0)* | – | – | R / W |
| 4 | 3 | Actuator Type | 0: Actuator not connected<br>1: Air / Water<br>**2: VAV / EPIV**<br>3: Fire<br>4: Energy Valve<br>5: 6way EPIV | – | – | R |
| 5 | 4 | Relative Position | 0...10'000 | % | 0.01 | R |
| 6 | 5 | Absolute Position<br><br>The unit depends on the device:<br>[°] for actuators with rotary movement<br>[mm] for actuators with linear movement | 0...max angle / stroke | °<br>mm | 1<br>1 | R |
| 7 | 6 | Relative volumetric flow<br><br>Relative volumetric flow of Vnom | 0...10'000 | % | 0.01 | R |
| 8 | 7 | Absolut volumetric flow | 0...Vnom | m³/h<br>Pa | 1 | R |
| 9 | 8 | Sensor 1 Value<br><br>Current value of sensor 1, depending on the setting of the Sensor 1 Type<br>(Register No. 108)<br>[mV] if Sensor 1 Type (Register No. 108) is Active(1)<br>[0 / 1] if Sensor 1 Type (Register No. 108) is Switch(4) | 0...65'535 | mV<br>0 / 1 | 1 | R |
| 10 | 9 | – | – | – | – | – |
| 11 | 10 | Absolute volumetric flow<br><br>Absolute flow in unit selected (Register No. 118) LowWord<br>Lower 16 bit of 32 bit value | – | UnitSel | 0.001 | R |
| 12 | 11 | Absolute volumetric flow<br><br>Absolute flow in unit selected (Register No. 118) HighWord<br>Upper 16 bit of 32 bit value | | | | |
| 13 | 12 | Setpoint Analog<br><br>Shows the setoint in % if actuator is control by analog signal | 0...10'000 | % | 0.01 | R |

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## Modbus Register Description

| No. | Address | Description<br>Comment | Range<br>Enumeration | Unit | Scaling | Access |
|-----|---------|------------------------|----------------------|------|---------|--------|
| 100 | 99 | Bus Termination<br><br>Indicates if bus termination (120 Ω) is enabled<br>Bus termination can be set with the configuration tools | 0: inactive<br>1: active<br>*Default: inactive(0)* | – | – | R / W |
| 101 | 100 | Series Number 1st part<br><br>Each device has an unambiguous series number, which is either impressed on or glued to the housing<br>The series number consists of 4 segments, although only parts 1, 2 and 4 are displayed on Modus<br>Example: 00839-31324-064-008<br>        1st part:   00839<br>        2nd part:   31324<br>        4th part:   008 | – | – | – | R |
| 102 | 101 | Series Number 2nd part | – | – | – | R |
| 103 | 102 | Series Number 4th part | – | – | – | R |
| 104 | 103 | Firmware Version<br><br>Firmware version of communication module<br>Example: 302, Version 3.02 | – | – | – | R |
| 105 | 104 | Malfunction and Service Information<br><br>Value is bit-coded. More than one bit can be set to 1<br>All bits not montioned in the enumeration are not used for this actuator range<br>Mechanical travel increased: The actuator has been moved outside the adapted working range<br>Actuator cannot move: Mechanical overload e.g. blocked actuator, etc.<br>Internal activity: Actuator performs a test run, adaption, etc.<br>Gear disengaged: The gear disengaged button is pressed<br>Bus Watchdog triggered: Timeout for the Bus Watchdog expired | Bit1:  Mech travel increased<br>Bit2:  Actuator cannot move<br>Bit8:  Internal activity<br>Bit9:  Gear disengaged<br>Bit10: Bus Watchdog triggered | – | – | R |
| 106 | 105 | Vmin<br><br>Min has to be ≤ Max | 0...Vmax<br>*Default: 0* | % | 0.01 | R / W |
| 107 | 106 | Vmax<br><br>Max has to be ≥ Min and > 20% | Vmin...10'000<br>*Default: 10'000* | % | 0.01 | R / W |
| 108 | 107 | Sensor 1 Type<br><br>If Setpoint Source (Register 119) is analog (Hybrid mode) the sensor type 1 can be set to Active(1) in order to see the Setpoint Analog in mV | 0: None<br>1: Active / Hybrid<br>2: –<br>3: –<br>4: Switch<br>*Default: None(0)* | – | – | R / W |
| 109 | 108 | Bus Fail Position<br><br>Modbus communication is not monitored as standard. In the event of a breakdown in communication, the actuator retains the current setpoint<br>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<br>Triggered bus watchdog is indicated in the Malfunction and Service Information (Register No. 105) | 0: None / Last setpoint<br>1: Fast close<br>2: Fast open<br>3: Mid position (parameterized)<br>*Default: None(0)* | – | – | R / W |
| 110 | 109 | Timeout for Bus Watchdog in s<br><br>Time until Bus Fail will be detected. If Bus Watchdog = 0 then deactivated<br>If Bus Fail Position (Register No. 110) different from 0, the Bus Fail Position becomes active after the Timeout for Bus Watchdog is expired | 0...3'600<br>*Default: 0*<br>*If Bus Fail Position (Register No. 110) not None(0), then Default: 120* | s | 1 | R / W |

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| No. | Address | Description<br>Comment | Range<br>Enumeration | Unit | Scaling | Access |
|-----|---------|------------------------|----------------------|------|---------|--------|
| 111 | 110 | Nominal volumetric flow | – | m³/h | 1 | R |
| 112 | 111 | – | – | – | – | – |
| 113 | 112 | Nominal volumetric flow<br><br>Vnom in unit selected (Register 118) LowWord<br>Lower 16 bit of 32 bit value | – | UnitSel | 0.001 | R |
| 114 | 113 | Nominal volumetric flow<br><br>Vnom in unit selected (Register 118) HighWord<br>Upper 16 bit of 32 bit value | | | | |
| 115 | 114 | – | – | – | – | – |
| 116 | 115 | – | – | – | – | – |
| 117 | 116 | Control Mode | 0: Position control<br>1: Flow control | – | – | R / W |
| 118 | 117 | Unit Selection Flow | 0: m³/s<br>1: m³/h<br>2: l/s<br>3: l/min<br>4: l/h<br>5: gpm<br>6: cfm<br>*Default: m³/h(1)* | – | – | R / W |
| 119 | 118 | Setpoint Source<br><br>Analog: Setpoint from analog signal 0 ... 10 V on wire 3<br>Bus: Setpoint from Modbus (Register 1) | 0: Analog<br>1: Bus<br>*Default: Bus(1)* | – | – | R / W |

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