

REACT

V, M, P, P-X, ALS, Parasol Zenith

Modbus settings

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Modbus settings for REACT ALS, V, V-SR, M, P, P-X and P-X-SR

Recommendations for communication via Modbus

The parameters are arranged in 2 memory categories. One memory is a temporary memory (RAM) and the other memory is a permanent memory (EEPROM).

RAM

The temporary memory is used for e.g. the actual value of the current measured flow and the damper position is saved. These values change frequently and, in the event of a power failure, there is no information about the most recent value remaining in the RAM memory. This memory cannot become full, rather it is possible to write to the memory an infinite number of times.

EEPROM

The permanent memory retains its information, even following a power failure. Examples of parameters in this memory include the established setpoint for min. flow/ max. flow or the size that is set in the "Vnom" damper. This memory has a max. limit of 1 million (1,000,000) writes, after which the memory is full and it is not possible to write to it any more.

The recommendation is to limit the number of writes to EEPROM as much as possible, but if e.g. the setting for min. flow (Address 105 or 120) is changed 20 times in a day (10 changes of e.g. occupancy mode in the room), this will "only" equate to 7,300 writes over a year. (20 x 365 days = 7,300 writes). It is important to only write to EEPROM in the event of changes.

Transfer protocol

Protocol:	Modbus RTU
Number of nodes max.	128
Communication rate:	1200 / 2400 / 4800 / 9600 / 19200 / 38400
Bit sequence:	MSB / LSB
Bit format:	1 start bit, 8 data bits, 2 stop bits, no parity 1 start bit, 8 data bits, 1 stop bit, even parity 1 start bit, 8 data bits, 1 stop bit, odd parity
Termination resistance:	120 Ohm (external)
Delay:	Some master products need a specific time to switch from transfer mode to receiver mode. The delay time can be set in increments of 3 ms. Max. 765 ms (255 × 3 ms)
Response time:	≤ 10 ms + delay
Standard communication parameters: Communication setting: 14	1 start bit 19200 baud 8 data bits 1 stop bit Even parity Delay 0 ms

Values for communication rate, parity, stop bits and delay can be changed.

Function code

Function code	Name	Description
03h	Read holding address	Unit parameter / actual read value (integer/floating point)
06h	Write individual holding address	Unit parameter / single words written

Error codes

Error code	Name	Description
01h	Illegal function	The received function code is not allowed to be used in communication with the unit
02h	Illegal data address	The requested register is not available. Alternatively, the register is only a read address
03h	Illegal data value	The written value is not permitted
06h	Slave device busy	The unit is busy

Modbus Register

Holding address

- EEPROM memory is permanent (max. 1 million writes)
- RAM memory is non-permanent

Name	Address	Memory	Value	r/w	Description		
Set point	0	RAM	0...10000	r/w	Set point [%] 0 = 0%, 10000 = 100% Only read value if address 122 = '0, 3'		
Forced control	1	RAM	0...4	r/w	'0' Auto mode, test/forced control not active '1' Open '2' Closed '3' Set min. value '4' Set max. value Only read value if address 122 = '0, 3'		
Relative position	4	RAM	0...10000	r	Relative position [%] 0 = 0%, 10000 = 100%		
Absolute position	5	RAM	0...65000	r	Absolute position [°] 0...65000		
Relative value	6	RAM	0...10000	r	Relative value [%] 0 = 0%, 10000 = 100%		
Absolute value	7	RAM	0...65535	r	Absolute value [m³/h][l/s][Pa][inH₂O×10⁻³] See address 201		
Feedback signal	10	RAM	0...10000	r/w	Feedback signal [mV] 0...10000 Only read value if address 122 = '0, 1'		
Software version	103	EEPROM		r	Software version		
Min relative value	105	EEPROM	0...10000	r/w	Min. value in % of nominal value [%] 0 = 0%, 10000 = 100%		
Max relative value	106	EEPROM	0...10000	r/w	Max. value in % of nominal value [%] 0 = 0%, 10000 = 100%		
Position for dropped communication	108	EEPROM	0...2	r/w	Function after 120 s dropped communication '0' Not active '1' Damper closes '2' Damper opens		
Min. absolute value	120	EEPROM	0...65535	r/w	Min. value [l/s][m³/h][Pa][inH₂O×10⁻³] See address 201		
Max. absolute value	121	EEPROM	0...65535	r/w	Max. value [l/s][m³/h][Pa][inH₂O×10⁻³] See address 201		
Set point function	122	EEPROM	0...3	r/w	Value	Control signal	Feedback signal
					0	Analogue in 0(2)...10 V	Absolute value 0(2)...10 V
					1	Set point controlled via Modbus address 0) 0% = Min. value 100% = Max. value	Absolute value 0(2)...10 V
					2	Set point controlled via Modbus (address 0) 0% = Min. value 100% = Max. value	Feedback signal controlled via Modbus (address 10) 0% = Min. value 100% = Max. value
					3	Analogue in 0(2)...10 V	Feedback signal controlled via Modbus (address 10) 0% = Min. value 100% = Max. value
Modbus address	130	EEPROM	1 - 247	r/w	Modbus address 1 – 247		
Unit*	201	EEPROM	0...3	r/w	'0' [l/s] '1' [m³/h] '2' [Pa] '3' [inH₂O×10⁻³]		

* Product dependent

Communication settings

Function	Description
Adr	 Enables you to set the actuator's Modbus address, by turning the "edit wheel". It is possible to set the address from 1 till 247. If you turn the value selector to end stop "+", the display will show a "2". This makes it possible to select the second level. If you select the second level, this is indicated in the display by a small circle.
	The following functions are available at the second level:
	Flow Return to previous level
	V _{min} Not used.
	V _{max} Not used.
	Test Not used.
	Mode Shows the angle of the rotation (0...255 digital 0...100%)
	Adr. Used for selecting communication settings for Modbus. See table below.
	V _{nom} Used for setting response delay for the Modbus communication

Display number	EEPROM value	Communication rate	Parity	Stop bits
1 ²	0	1200	None	2
2 ²	1	1200	Even	1
3 ²	2	1200	Odd	1
4	3	2400	None	2
5	4	2400	Even	1
6	5	2400	Odd	1
7	6	4800	None	2
8	7	4800	Even	1
9	8	4800	Odd	1
10	9	9600	None	2
11	10	9600	Even	1
12	11	9600	Odd	1
13	12	19200	None	2
14 ³	13	19200	Even	1
15	14	19200	Odd	1
16	15	38400	None	2
17	16	38400	Even	1
18	17	38400	Odd	1
19 ²	18	1200	None	1
20	19	2400	None	1
21	20	4800	None	1
22	21	9600	None	1
23	22	19200	None	1
24	23	38400	None	1

² Limited data length per reading of max. 8 addresses

³ Default setting

Modbus settings for REACT Parasol Zenith with Belimo actuator

Transfer protocol

Protocol:	Modbus RTU
Number of nodes max.	32
Communication rate:	9600, 19200, 38400, 76800, 115200
Bit sequence:	LSB
Bit format:	1-8-N-2, 1-8-N-1, 1-8-E-1, 1-8-O-1
Termination resistance:	120 Ohm (external)
Response time:	≤ 10 ms + delay
Standard communication parameter: Communication setting: 14	1 start bit
	19200 baud
	8 data bits
	1 stop bit
	Even parity
	Delay 0 ms
Values for communication rate, parity, stop bits and delay can be changed.	

Modbus Register

Operation

No.	Address	r/w	Register	
1	0	r/w	Setpoint [%]	
2	1	r/w	Forced control	
3	2	r/w	Checks	
4	3	r	Actuator type	
5	4	r	Relative position [%]	
6	5	r	Absolute position [°] [mm]	
7	6	r	Relative volumetric flow [%]	
8	7	r	Absolute volumetric flow [m³/h]	
9	8	r	Sensor value 1 [mV] [–]	
10	9	–	–	
11	10	r	Absolute flow in selected unit	LowWord
12	11			HighWord
13	12	r	Setpoint analogue [%]	

Service

No.	Address	r/w	Register	
100	99	r	Bus termination	
101	100	r	Serial number, 1st part	
102	101		Serial number, 2nd part	
103	102		Serial number, 4th part	
104	103	r	Firmware version	
105	104	r	Fault and service info	
106	105	r/w	Min [%]	
107	106	r/w	Max [%]	
108	107	r/w	Sensor type 1	
109	108	r/w	Bus fail position	
110	109	r/w	Communication monitoring	
111	110	r	Nominal flow [m³/h]	
112	111	–	–	
113	112	r	Nominal flow in selected unit	LowWord
114	113			HighWord
115	114	–	–	
116	115	–	–	
117	116	r/w	Control signal mode	
118	117	r/w	Unit selection flow	
119	118	r/w	Setpoint source	

Modbus register description

No.	Address	Range Enumeration	Unit	Scaling	Access	Description
1	0	0...10'000 Default: 0	%	0.01	r/w	Setpoint Setpoint for the actuator between min and max
2	1	0: None 1: Open 2: Close 3: Min 4: Mid 5: Max Default: None(0)	–	–	r/w	Forced control Force controls the setpoint with predefined values
3	2	0: None 1: Adaption 2: Test 3: Sync 4: Reset Default: None(0)	–	–	r/w	Check Initiation of the actuator's function
4	3	0: Actuator not connected 1: Air / Water 2: VAV / EPIV 3: Fire 4: Energy Valve 5: 6way EPIV	–	–	r	Actuator type
5	4	0...10'000	%	0.01	r	Relative position
6	5	0...max angle / stroke	"° mm	1 1	r	Absolute position
7	6	0...10'000	%	0.01	r	Relative flow
8	7	0...Vnom	m³/h Pa	1	r	Absolute flow
9	8	0...65'535	mV 0 / 1	1	r	Sensor 1 value Current value from sensor 1, dependent on sensor setting
10	9	–	–	–	–	
11	10	–	UnitSel	0.001	r	Absolute flow, low replacement
12	11					Absolute flow, high replacement
13	12	0...10'000	%	0.01	r	Setpoint analogue

Modbus register description

No.	Address	Range Enumeration	Unit	Scaling	Access	Description
100	99	0: Inactive 1: Active Default: Inactive(0)	–	–	r/w	Bus termination
101	100	–	–	–	r	Indicates whether Bus termination is active
102	101	–	–	–	r	Serial number
103	102	–	–	–	r	Serial number
104	103	–	–	–	r	Firmware version
105	104	Bit1: Mech travel increased Bit2: Actuator cannot move Bit8: Internal activity Bit9: Gear disengaged Bit10: Bus Watchdog triggered	–	–	r	Fault and service information, Bit-coded value
106	105	0...Vmax Default: 0	%	0.01	r/w	Vmin
107	106	Vmin...10'000 Default: 10'000	%	0.01	r/w	Vmax
108	107	0: None 1: Active / Hybrid 2: – 3: – 4: Switch Default: None(0)	–	–	r/w	Sensor 1 type
109	108	0: None / Last setpoint 1: Fast close 2: Fast open 3: Mid position (parameterised) Default: None(0)	–	–	r/w	Bus fail position
110	109	0...3'600 Default: 0 If Bus Fail Position (Register No. 110) not None(0), then Default: 120	s	1	r/w	Timeout for Bus monitoring in s
111	110	–	m ³ /h	1	r	Nominal volumetric flow
112	111	–	–	–	–	Nominal volumetric flow LW
113	112	–	UnitSel	0.001	r	Nominal volumetric flow HW
114	113					
115	114	–	–	–	–	
116	115	–	–	–	–	
117	116	0: Position control 1: Flow control	–	–	r/w	Position control
118	117	0: m ³ /s 1: m ³ /h 2: l/s 3: l/min 4: l/h 5: gpm 6: cfm Default: m ³ /h(1)	–	–	r/w	Unit setting flow
119	118	0: Analogue 1: Bus	–	–	r/w	Setpoint source Analogue: Setpoint from analogue signal 0-10V