

Modbus RTU

The controller is equipped with a standard RS-485 communication interface. The protocol is Modbus RTU and the controller is running as a slave unit.

Below is a detailed explanation of the implemented commands and corresponding functions. Please see the Modbus memory map for detailed memory allocation.

Command 1 – read coil

Command 1 reads the status of a single output address on the bus.

Bit 1, 3, 5...239: Output status for a specific address on the bus

Bit 241, 243, 245, 247: Status for relay outputs on controller

Bit 249, 251, 253: Output status on the three bus addresses 124, 125, 126. (Free available addresses that can be controlled by Modbus)

Command 2 – read discrete input

With command 2, three different information's can be read. First the status of an input address on the bus. Second if a module is connected to a specific address of the bus. Finally a group of status information's for the controller

Bit 10001...10256: Input status for a specific address on the bus(if a module is connected)

Bit 10257...10512: Status signal for a specific address on the bus. This is a 'Alive' signal and will show if a module is connected to the specific address or not.

Status information's:

Bit 10513: System ready; Set if system is ready for approval/ok

Bit 10514: Test in progress; Set if damper/system test in progress

Bit 10515: System running; all okay and system running

Bit 10516: Dampers open; Set if dampers activated

Bit 10517: Damper ON fail; Damper failure detected when dampers in open mode

Bit 10518: Damper OFF fail; Damper failure detected when dampers in closed mode

Bit 10519: Smoke alarm; Alarm detected on controller smoke input

Bit 10521: EXT IN alarm: Alarm detected on controller EXT IN input

Bit 10522: SEF alarm: Alarm detected on controller SEF alarm input

Bit 10523: Interlock ON: Set if Interlock on controller has been activated

Bit 10526: Alarm: Set if alarm/fail detected

Command 3 – read holding registers

With command 3, information's can be read on register level. Information's available is a combination of information's available on bit level with commands 1 and 2. Refer to Modbus memory map to see information's available and above descriptions for command 1 and 2 for detailed explanation.

Command 4 – read input registers

With command 4, information's can be read on register level. Information's available is a combination of information's available on bit level with commands 1 and 2. Refer to Modbus memory map to see information's available and above descriptions for command 1 and 2 for detailed explanation.

Command 5 – write coil

With the write command 5, a group of controller functions can be activated.

Bit 257: Reset alarm; The controller can be reset/started with this bit. Before activating there should not be any active alarms from dampers or controller inputs. To reset the alarm switch bit ON and then OFF.

Bit 258: Damper test; A standard damper test cycle can be started by switching the bit ON and then OFF.

Bit 259: Interlock: Setting the bit will activate Interlock mode.

Bit 262, 263, 264: Set output ON, on the three bus addresses 124, 125, 126. (Can be used for controlling Relay output module etc.)

Command 16 – write output registers

With command 16, functions can be written on register level. Functions available are similar to command 5. Refer to Modbus memory map to see information's available and above descriptions for command 5 for detailed explanation.

APPENDIX: Modbus memory map

Modbus communication setup

Type	RS-485
Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	1

I/O names vs module address

DIP-sw	Module #	Input 1	Input 2	Output 1
0000000	0	i1	i2	o1
1000000	1	i3	i4	o3
0100000	2	i5	i6	o5
1100000	3	i7	i8	o7

0100011	98	i197	i198	o197
1100011	99	i199	i200	o199

0110111	118	i237	i238	o237
1110111	119	i239	i240	o239

CMD 1 - read coil

Bit Addr	Type	BUS addr	
1	Output state	o1	
3	Output state	o3	
5	Output state	o5	
---	---	---	
239	Output state	o239	
241	Output state	o241	Alarm relay
243	Output state	o243	Smoke fan relay
245	Output state	o245	Service relay
247	Output state	o247	Ventilation fan relay
249	Output state	o249	Bus adr. 124
251	Output state	o251	Bus adr. 125
253	Output state	o253	Bus adr. 126
255	Output state	o255	Alarm panel

CMD 2 - read discrete input

Bit Addr	Type	BUS addr
10001	Input state	i1
10002	Input state	i2
10003	Input state	i3
---	---	---
10254	Input state	i254
10255	Input state	i255
10256	Input state	i256
---	---	---
10257	Tx present	i1
10258	Tx present	i2
10259	Tx present	i3
---	---	---
10510	Tx present	i254
10511	Tx present	i255
10512	Tx present	i256
---	---	---
10513	System ready	
10514	Test in progress	
10515	System running	
10516	Dampers open	
10517	Damper ON fail	
10518	Damper OFF fail	
10519	Smoke alarm	
10520	---	
10521	EXT IN alarm	
10522	SEF alarm	
10523	Interlock ON	
10524	---	
10525	---	
10526	Alarm	

CMD 3 - read holding registers

Reg Addr	Type	BUS addr
40001:0	Input state	i1
40001:1	Input state	i2
---	---	---
40001:14	Input state	i15
40001:15	Input state	i16
40002:0	Input state	i17
40002:1	Input state	i18
---	---	---
40016:14	Input state	i255
40016:15	Input state	i256
---	---	---
40017:0	Tx present	i1
40017:1	Tx present	i2
---	---	---
40017:14	Tx present	i15
40017:15	Tx present	i16
40018:0	Tx present	i17
40018:1	Tx present	i18
---	---	---
40032:14	Tx present	i255
40032:15	Tx present	i256

CMD 3 - read holding registers, continued

Reg Addr	Type	BUS addr
40033:0	System ready	
40033:1	---	
40033:2	System running	
40033:3	Dampers open	
40033:4	Damper ON fail	
40033:5	Damper OFF fail	
40033:6	Smoke alarm	
40033:7	---	
40033:8	EXT IN alarm	
40033:9	SEF alarm	
40033:10	Interlock ON	
40033:11	---	
40033:12	---	
40033:13	Alarm	
---	---	---
40065:0	Output state	o1
40065:1	Output state	o2
---	---	---
40065:14	Output state	o15
40065:15	Output state	o16
40066:0	Output state	o17
40066:1	Output state	o18
---	---	---
40080:14	Output state	o255
40080:15	Output state	o256

CMD 4 - read input registers

Reg Addr	Type	BUS addr
30001:0	Input state	i1
30001:1	Input state	i2
---	---	---
30001:14	Input state	i15
30001:15	Input state	i16
30002:0	Input state	i17
30002:1	Input state	i18
---	---	---
30016:14	Input state	i255
30016:15	Input state	i256
---	---	---
30017:0	Tx present	i1
30017:1	Tx present	i2
---	---	---
30017:14	Tx present	i15
30017:15	Tx present	i16
30018:0	Tx present	i17
30018:1	Tx present	i18
---	---	---
30032:14	Tx present	i255
30032:15	Tx present	i256
---	---	---
30033:0	System ready	
30033:1	Test in progress	
30033:2	System running	
30033:3	Dampers open	
30033:4	Damper ON fail	
30033:5	Damper OFF fail	
30033:6	Smoke alarm	
30033:7	---	
30033:8	EXT IN alarm	
30033:9	SEF alarm	
30033:10	Interlock ON	
30033:11	---	
30033:12	---	
30033:13	Alarm	

CMD 5 - write coils

Bit Addr	Type	Comment
257	Reset alarm	To reset the alarm switch bit 257 ON and then OFF
258	Damper test	To perform system test switch bit 0 ON and then OFF
259	Interlock	1: Interlock activated
---	---	---
262	Bus adr. 124	Set output address on bus, (Relay output module etc.)
263	Bus adr. 125	Set output address on bus, (Relay output module etc.)
264	Bus adr. 126	Set output address on bus, (Relay output module etc.)

CMD 16 -- write output registers

Reg Addr	Type	Comment
40017:0	Reset alarm	To reset alarm switch bit 0 ON and then OFF
40017:1	Damper test	To perform system test switch bit 0 ON and then OFF
40017:2	Interlock	1: Interlock activated
40017:3	---	Not used
40017:4	---	Not used
40017:5	Bus output adr. 124	Set output address on bus, (Relay output module etc.)
40017:6	Bus output adr. 125	Set output address on bus, (Relay output module etc.)
40017:7	Bus output adr. 126	Set output address on bus, (Relay output module etc.)