alnor Modbus Connect Communication Protocol for HRU-PremAIR User Manual

Contents

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Product Information

Product: HRU-PremAIR
Version: 0723
Connection Type: Modbus RTU Slave
Standard Address: 2
Pairing Address: 207
Transmission Speed: 19200
Transmission Line: EVEN
Data Bits: 8
Stop Bit: 1

Product Usage Instructions

Introduction

This manual provides instructions for using the Modbus communication feature of the HRU-PremAIR.

Features

The following information is provided regarding the central unit connection:

- Connection Type: Modbus RTU Slave
- Standard Address: 2
- Pairing Address: 207
- Transmission Speed: 19200
- Transmission Line: EVEN
- Data Bits: 8
- Stop Bit: 1

Pairing Description

1. Start the HRU-PremAIR unit.

2. Complete the binding process.
3. Devices are connected.
4. Start the binding process (duration: 10 minutes).
5. Value: 0xC84F0001
6. Overwrite register 43004.
7. Value: 0x0203
8. Read register 43900
9. Value: 2
10. Read register 43901
11. Value: 1

Physical Connection
Refer to the provided images for connecting the HRU-PremAIR unit.

Modbus Function

- The control board supports two standard Modbus functions: register read (function code 03) and register write (function code 16).
- The following tables provide examples of data transfer packets for each function:

Table 1: Example Data Transfer Packet for Function 03
Information Address: 0x02
Function Code: 0x03

Table 2: Example Data Transfer Packet for Function 16
Information Address: 0x02
Function Code: 0x16

Register Details

Register No.	Read Function / Name	Write Value	Unit	Data Type	Cached
40002	R-	Product Type + Sub ID + Manufacturer ID	–	UINT32	Yes
40003	0001C84Fh	OEM number	–	UINT8	Yes
40005	R-	String to identify the product	–	STRING	Yes
40020	VMD-02RPS54	–	–	–	–
40101	R-	RF Communication status	–	UINT16	Yes
40102	R-	Battery Status	FFFFh (no battery)	–	UINT16
40103	R-	Fault status	–	UINT16	Yes
41000	R-	Actual Ventilation speed	UINT8	Yes	
41001	R-	Actual Exhaust Fan speed	%	UINT8	Yes

Note: The product name “HRU-PremAIR” is a legally protected trademark and technical patent. All rights reserved.
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Introduction

This document contains the Modbus communication protocol which is used for all HRU-PremAIR series devices.

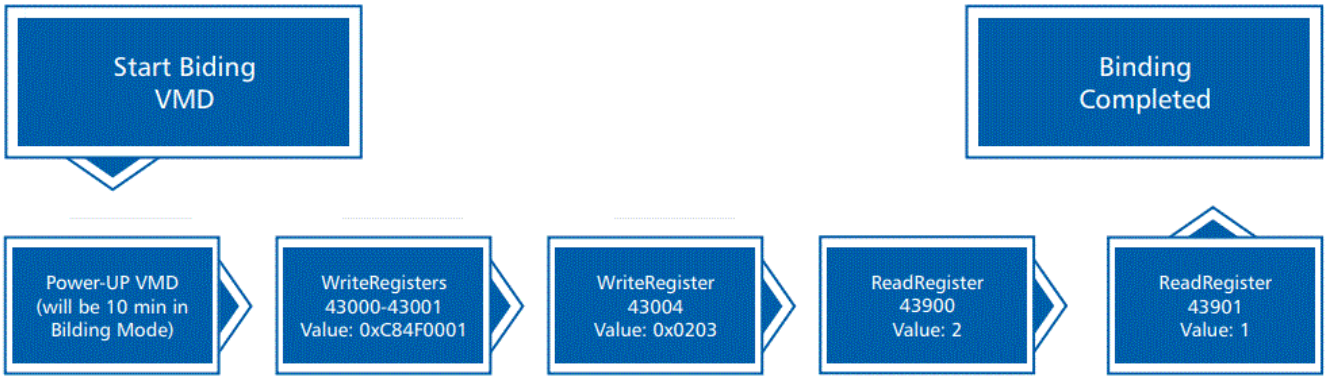
Properties

The control system uses the RTU Modbus protocol using the RS485 data transmission standard. The communication module operates as a slave, and information can be collected from the main module (master). Information concerning the control panel connection is given below:

- Connection type: Modbus RTU Slave
- Standard address: 2
- Address for pairing: 207
- Transfer rate: 19200
- Transfer line: EVEN
- Data bits: 8
- Stop bit: 1

Pairing description

All register changes and readouts are made using address 207. In order to pair the BRDG-02R13 communication module, the recuperator should be switched to the binding mode. To do that, the recuperator should be powered off and on again, and it will be in the binding mode for 10 minutes. The following steps should be taken during that period:



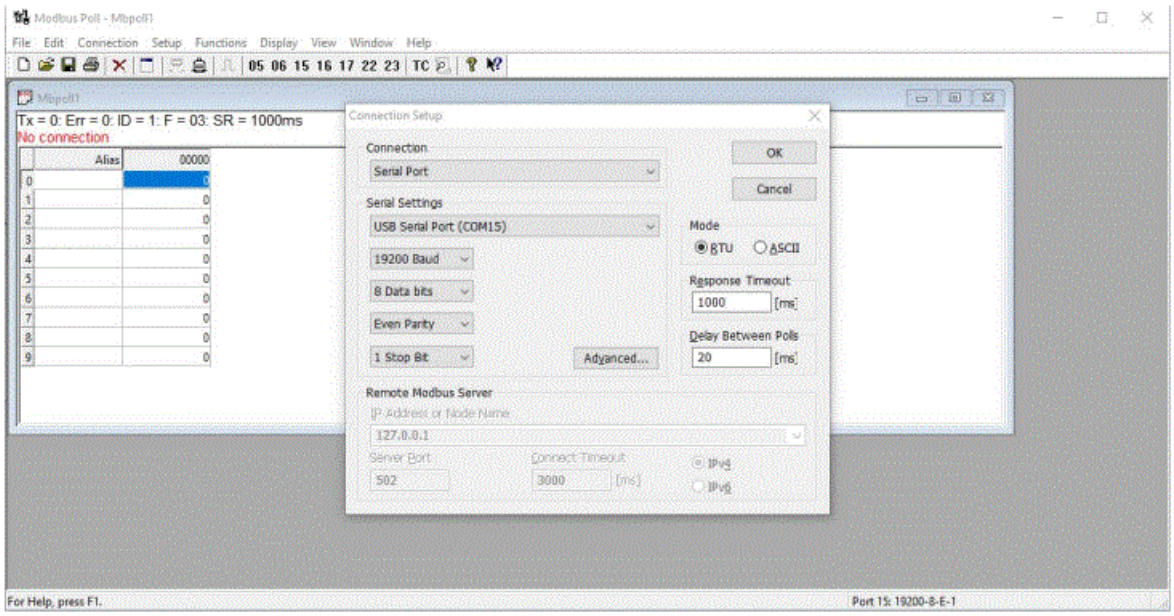


Photo 1. Connection with the unit

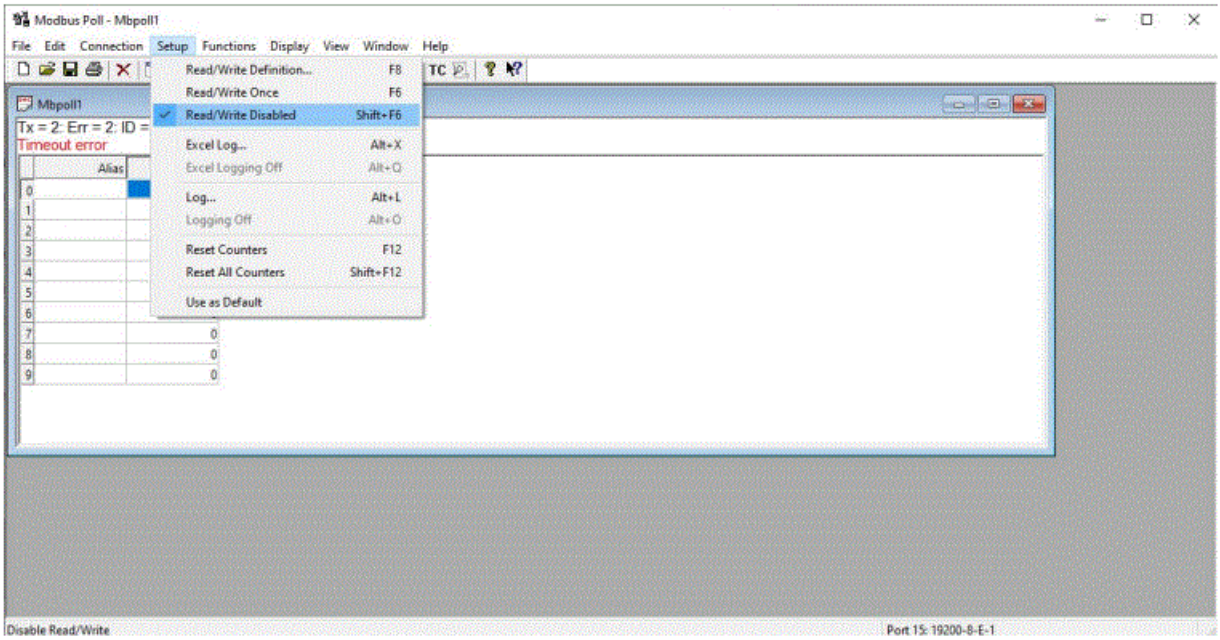


Photo 2. Disabling the read-out register

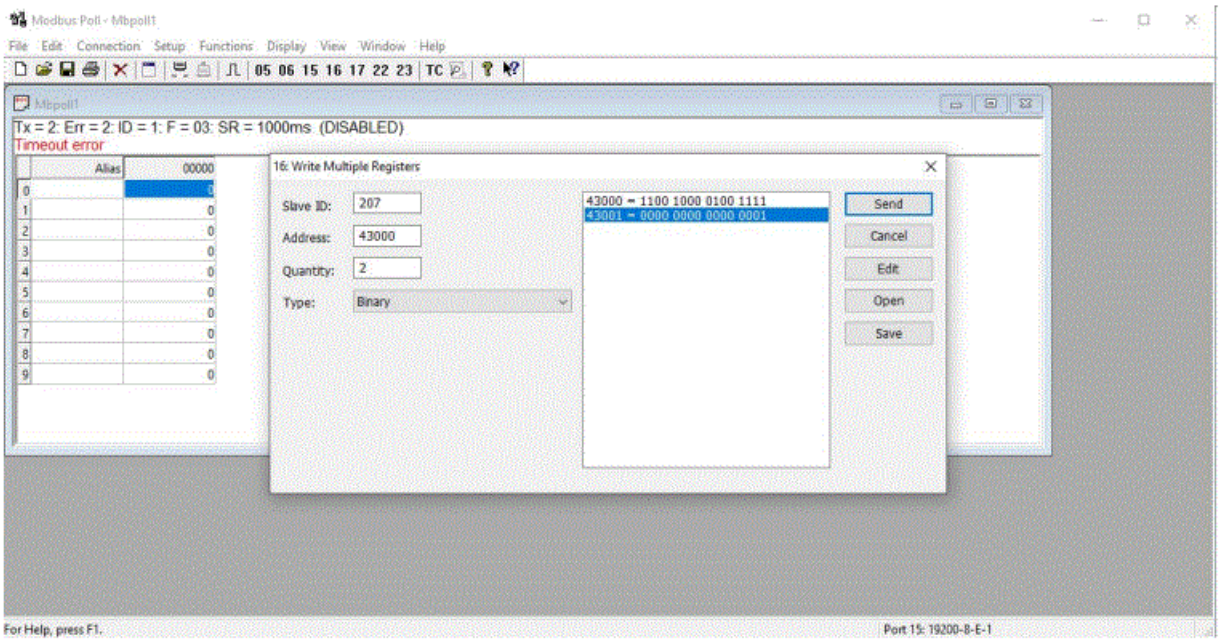


Photo 3. Entering value 0XC84F0001 into registers 43000 and 43001

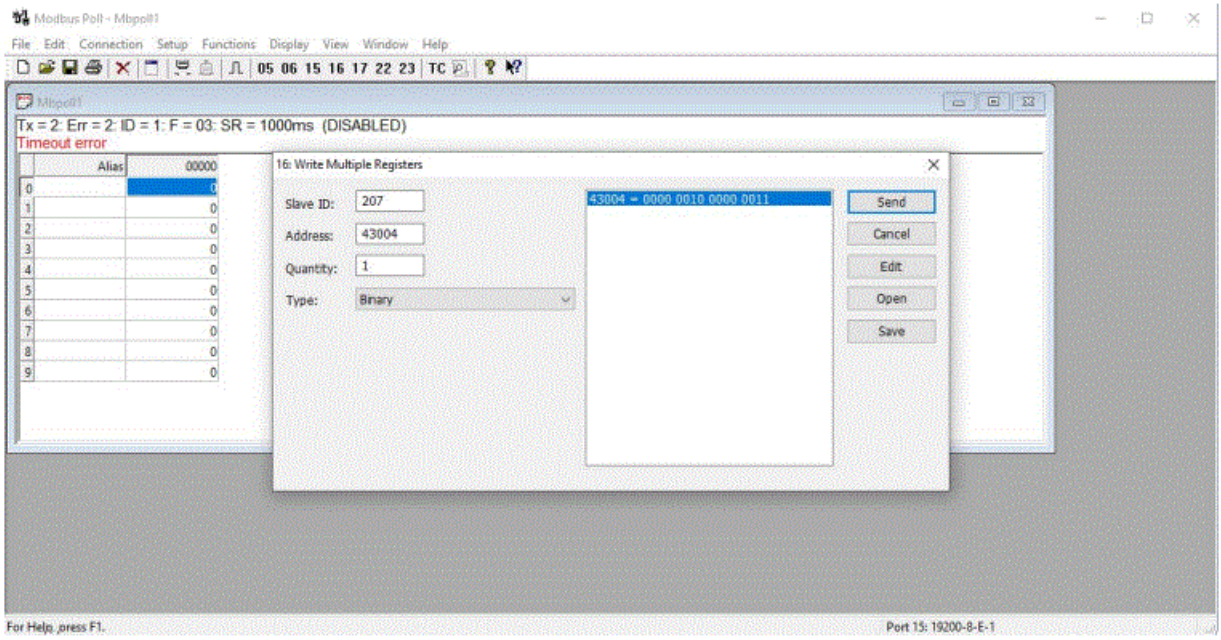


Photo 4. Entering value 0X0203 into register 430044

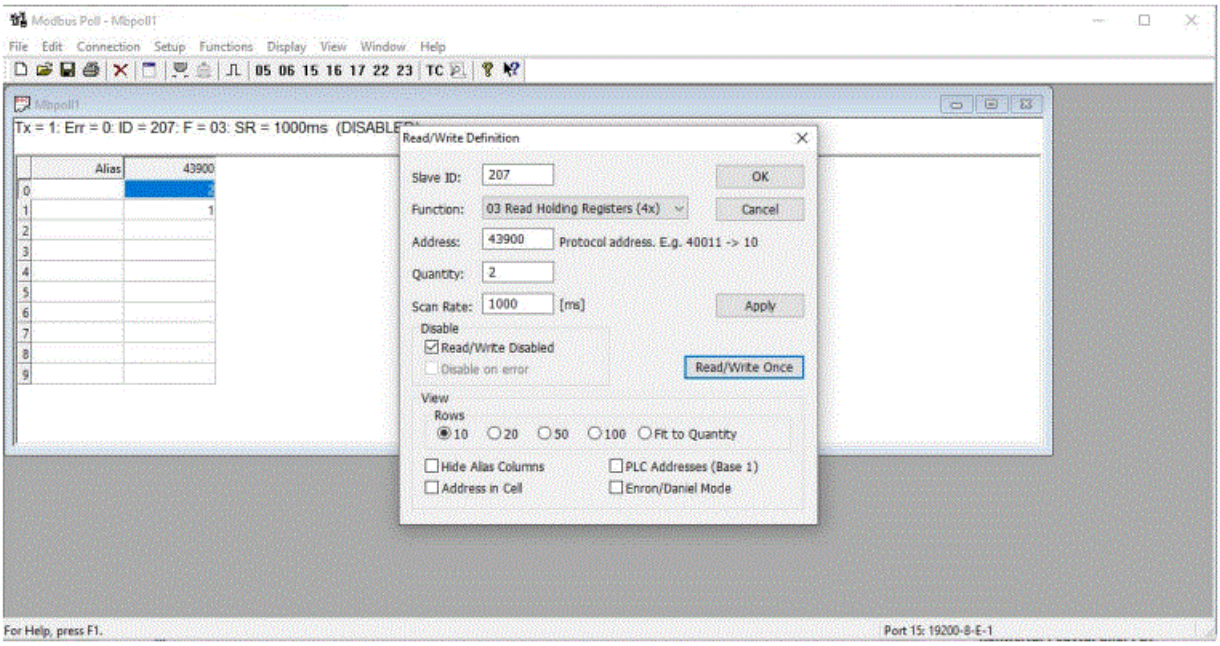


Photo 5. Register readout

For the given registers, the values should be:

- 43900 – 2
- 43901 – 1

Important!
After the first pairing made correctly, power off the recuperator, restart it and wait for the data readout. The data should be read out when the fans start up.
Each time the recuperator resets, the data will be read automatically.

Physical connection

The communication network is shown below. The control board may be connected to RS485 to which more than one device is connected. Address conflicts on this line should be eliminated and necessary software settings should be made in order to ensure data communication.
If the line is too long or if there is any communication problem, install a 120 Ω resistor on both ends of the line, as shown in the diagram.

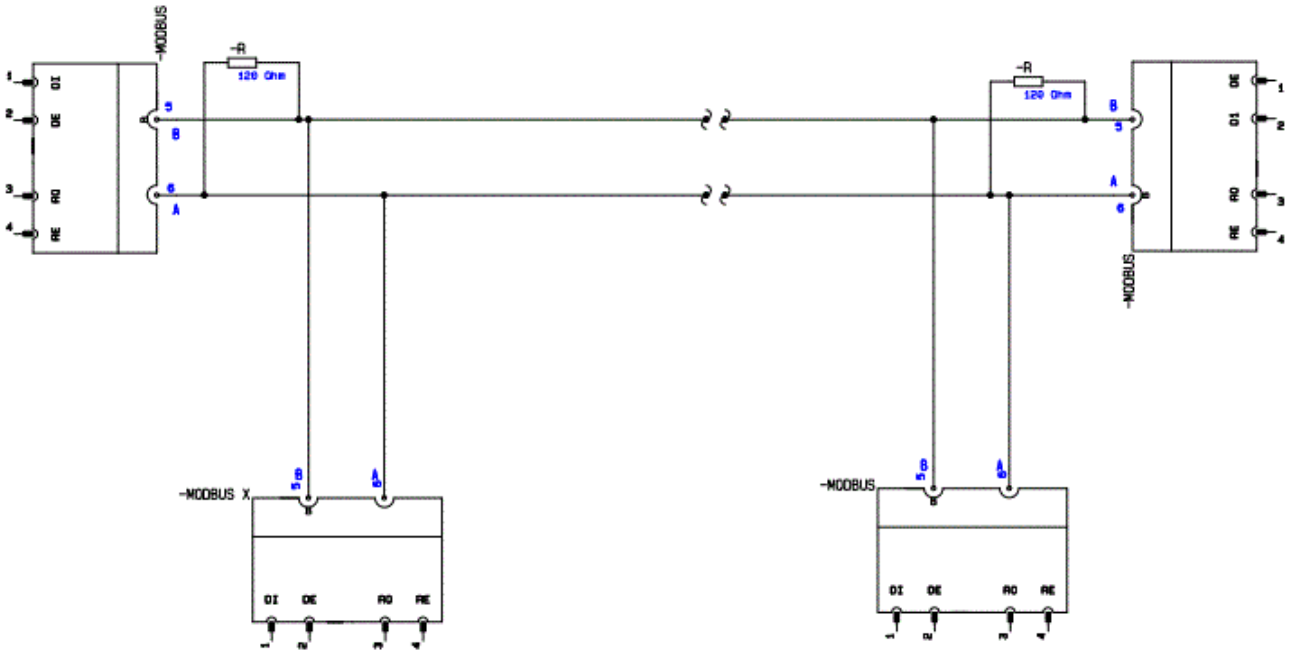


Photo 6. Resistor installation diagram

Modbus function

- The communication package is the same for each function. First, information concerning the address of the relevant module is sent in the package. After adding the information type, the CRC code is sent, being a failure code evaluating the package accuracy.
- The control board handles two of the standard Modbus functions.
- Those codes are: 03 register readout and 16 register write.

Main device data transfer	
Address information	Function code
0x02	0x03

Control board response	
Address information	Function code
0x02	0x03

Table 1. Sample 03 function data transfer package.

Main device data transfer	
Address information	Function code
0x02	0x16

Control board response	
Address information	Function code
0x02	0x03

Table 2. Sample 16 function data transfer package.

Modbus register list

Reg No.	**Read Write**	**Function / Name** value	**Unit**	**Data Type**	**Cached**
40002	R-	**Product Type + Sub ID + Manufacturer ID**	–	UINT32	Yes
40003		0001C84Fh			

40005	R-	**OEM number** 6Ah	–	UINT8	Yes
40011-	R-	**String to identify the product**	–	STRING	Yes
40020		VMD-02RPS54			
40101	R-	RF Communication status	–	UINT16	Yes
		0 = No Error			
		1 = Error (no communication for at least 30 minutes)	–	UINT16	Yes
40102	R-	**Battery Status**			
		FFFFh (no battery)			
40103	R-	**Fault status**	–	UINT16	Yes
		0 = Fan ok			
		1 = Fan failure			
41000	R-	Actual Ventilation speed		UINT8	Yes
		0 = OFF			
		1 = Speed 1, low			
		2 = Speed 2, medium			
		3 = Speed 3, high			
		11 = Speed 1 temporary override, timer			
		12 = Speed 2 temporary override, timer			
		13 = Speed 3 temporary override, timer			
		22 = Absolute minimum speed, away			
		23 = Absolute maximum speed, boost			
		24 = Auto mode			
41001	R-	**Actual Exhaust Fan speed**	%	UINT8	Yes
		0 = Off			
		200 = Highest speed			
		FFh = Not available			

Reg No.	Read Write	Function / Name value	Unit	Data Type	Cached
41002	R-	**Actual Inlet Fan speed** 0 = Off200 = Highest speed FFh = Not available	%	UINT8	Yes
41003	R-	**Error Code** 0 No fault **1 Nonspecific fault** 2 Emergency stop **3 Fan 1 supply error** 4 X22 sensor error 5 X23 sensor error 6 X21 sensor error 7 X20 sensor error 8 Fan 2 error 254 Binding mode active 255 Device identification active *Note: Not implemented in VMD yet*	-	UINT8	Yes
41004	R-	**Remaining Time Temporary override** Note: this value is only valid when the actual Ventilation speed equals 11, 12, or 13	Min	UINT16	Yes
41005- 41006	R- R-	**Indoor Temperature** Value equals NAN when there is no known outdoor temperature available A value below -273°C indicates there is problem with the sensor	°C	FLOAT	Yes
41007- 41008	R-	**Outdoor Temperature** Value equals NAN when there is no known outdoor temperature available A value below -273°C indicates there is problem with the sensor	°C	FLOAT	Yes
41009- 41010	R-	**Exhaust Temperature** Value equals NAN when there is no known outdoor temperature available A value below -273°C indicates there is problem with the sensor	°C	FLOAT	Yes
41011- 41012	R-	**Supply Temperature** Value equals NAN when there is no known outdoor temperature available A value below -273°C indicates there is problem with the sensor	°C	FLOAT	Yes
41013	R-	**Preheater** 0% = Preheater off 100% = Pre heater maximum	%	UINT8	Yes
41014	R-	Filter Dirty 0 = Filter OK 1 = Filter dirty	-	UINT8	Yes
41015	R-	Defrost 0 = Defrost inactive 1 = Defrost active	-	UINT8	Yes
41016	R-	Bypass position 0% = closed 100% = Open *Note: Values above 120% indicates an error*			

Reg No.	Read Write	Function / Name value	Unit	Data Type	Cached
41500	RW	**Requested system ventilation speed** 0 = OFF 1 = Absolute minimum speed, away 2 = Speed 1, low 3 = Speed 2, nominal 4 = Speed 3, high 5 = Auto mode 7 = Absolute maximum speed, boost *Note: the value returned by reading is the BRDG internal value and not the value from the fan.*	-	UINT8	Yes
41501	-W	**Override Time speed 1** When this value is written the fan automatically switches over to Speed 1 Temporary override mode. *Note: maximum allowed amount of hours is 18*	%	UINT8	Yes
41502	-W	**Override Time speed 2** When this value is written the fan automatically switches over to Speed 2 Temporary override mode. *Note: maximum allowed amount of hours is 18*	Min	UINT16	No
41503	-W	**Override Time speed 3** When this value is written the fan automatically switches over to Speed 3 Temporary override mode *Note: maximum allowed amount of hours is 18*	Min	UINT16	No
42000	-W	**Reset Air Filter Timer** Value 0 resets filter timer	-	UINT8	No
42001	R-	**Indoor Humidity** EFh = not available F0h = shorted sensor F1h = open sensor F2h = not available error F3h = out of range high F4h = out of range low F5h = not reliable F6h-FEh = reserved error FFh = non-specified error	%	UINT8	No
42002	RW	**Standby speed supply** Min : 0 % Max : 40 % Note: Setting Tag 61	%	UINT8	Yes
42003	RW	**Low speed supply** Min : 0 % Max : 80 % Note: Setting Tag 63	%	UINT8	Yes
42004	RW	**Low speed exhaust** Min : 0 % Max : 80 % Note: Setting Tag 64	%	UINT8	Yes
42005	RW	**Medium speed supply** Min : 0 % Max : 100 % Note: Setting Tag 65	%	UINT8	Yes

Reg No.	Read Write	Function / Name value	Unit	Data Type	Cached
42006	RW	**Medium speed exhaust** Min : 10 % Max : 100 % Note: Setting Tag 66	%	UINT8	Yes
42007	RW	**High speed supply** Min : 0 % Max : 100 % Note: Setting Tag 67	%	UINT8	Yes
42008	RW	**High speed exhaust** Min : 10% Max : 100 % Note: Setting Tag 68	%	UINT8	Yes
42009 42010	RW	**Frost protection pre-heater setpoint** Min : -20 °C Max : 50 °C Note: Setting Tag 39	°C	FLOAT	Yes
42011 42012	RW	**Room temperature heating setpoint** Min : 0 °C Max : 30 °C Note: Setting Tag 117	°C	FLOAT	Yes
42013 42014	RW	**Room temperature heating setpoint** Min : 0 °C Max : 30 °C Note: Setting Tag 117	°C	FLOAT	Yes
42015 42016	RW	**Room temperature cooling offset** Min : 1 K Max : 10 K Note: Setting Tag 132	K	FLOAT	Yes
42017	RW	**Post heater/cooler Supply heating setpoint only VMD-02RPS66 and VMD-02RPS78** Min : -20 °C Max : 50 °C Note: Setting Tag 171	°C	SINT8	Yes
42018	RW	**Post heater/cooler Supply cooling offset only VMD-02RPS66 and VMD-02RPS78** Min : 0 K Max: 10 K Note: Setting Tag 174	K	UINT8	Yes
42019	RW	**Maximum Constant Pressure only VMD-02RPS66 and VMD-02RPS78** Min : 0 Pa Max : 500 Pa Note: Setting tag 218	Pa	UINT16	Yes
42020	RW	**Fireplace Demand Duration** Min: 0 Sec Max: 60000 Sec Note: Setting tag 238	Sec	UINT16	Yes

RF Node Registers (Time schedule) only VMD-02RPS66 and VMD-02RPS78					
Reg No.	Read Write	Function / Name value	Unit	Data Type	Cached
49000	RW*	**Operation** 0 = Read a time schedule switch point 1 = Change a time schedule switch point	-	UINT8	
49001	R-	**Time schedule Operation Status** Current status of the time schedule action 0 = No action has been performed yet 1 = Configuration of time schedule is modified (A write on register "Operation (49000)" is needed to update the target) 2 = Configuring the time schedule on the target is ongoing 3 = Configuring the time schedule on the target is finished *Note: (check register 49002 to see if the change in the time schedule was accepted by the product)* 4 = RF communication problem	-	UINT8	
49002	R-	**Status** 0 = Okay 1 = Not okay This indicates that product accept the new command. *Note: In case of a read not okay could indicate you read beyond the actual used number of switch points.*	-	UINT8	
49010	R-	**Number Of Switch Points**	-	UINT16	
49011	RW	**Index Switch Point**	-	UINT16	
49012	RW	**Day Of Week** 0 = Monday 1 = Tuesday 2 = Wednesday 3 = Thursday 4 = Friday 5 = Saturday 6 = Sunday 9Fh = Monday, Tuesday, Wednesday, Thursday, Friday E0h = Saterday, Sunday FFh = All days	-	UINT8	
49013	RW	**Hour**	h	UINT8	
49014	RW	**Minutes**	min	UINT8	
49015	RW	**Switch Point Control Mode** 1 = Off 2 = Auto 3 = Holiday, low, middle, high, boost	-	UINT8	
49016	RW	**Switch Point Auto RH** 0 = RH control enabled 1 = No RH control *Note: (this register is only considered when register 49015 is set to "Auto")*	-	UINT8	
49017	RW	**Switch Point Auto CO_2** 0 = CO2 control enabled 1 = No CO2 control *Note: (this register is only considered when register 49015 is set to "Auto")*	-	UINT8	
49018	RW	**Switch Point Auto VOC** 0 = VOC control enabled 1 = No VOC control *Note: (this register is only considered when register 49015 is set to "Auto")*	-	UINT8	
49019	RW	**Switch Point Auto Temperature** 0 = Temperature control enabled 1 = No temperature control *Note: (this register is only considered when register 49015 is set to "Auto")*	-	UINT8	

RF Node Registers (Time schedule) only VMD-02RPS66 and VMD-02RPS78					
Reg No.	Read Write	Function / Name value	Unit	Data Type	Cached
49020	RW	**Switch Point Continuous** 221 = Holiday 227 = Boost 228 = Low 229 = Middle 230 = High *Note: (this register is only considered when register 49015 is set to "Holi-day, low, middle, high, boost")*	-	UINT8	
49050	R-	**Time schedule active** 0 – Time schedule is not active 1 – Time schedule is active 2 – Time schedule is active, but is changing the time schedule *Note: A read on this register starts a RF query to the device. Read again to read the last received value.*	-	UINT8	Yes
49051	R-	**Time schedule available** 0 – Time schedule not available 1 – Time schedule is available *Note: A read on this register starts a RF query to the device. Read again to read the last received value.*	-	UINT8	Yes
49052	R-	**UI schedule type** 1= 24h (Every day the same) 2 = 5-2 (Mo-Fr, Sa-Su) 3 = 7 day	-	UINT8	Yes
49053	R-	**Switch Points Per Day** 0 = No Fixed number of switched points per day 1 until 15	-	UINT8	Yes
49054	R-	**Available UI schedule type** bit 1: 24h (Every day the same) bit 2: 5-2 (Mo-Fr, Sa-Su) bit 3: 7 day	-	UINT8	Yes
49055	R-	**Max Switch Points Per Day** A number between 1 - 15	-	UINT8	Yes
49056	R-	**UI** 0 = not available to display 1 = Time schedule read only 2 = Time schedule read and write possible	-	UINT8	Yes
49057	R-	**Max Number Of Switch Points** Total available switch points	-	UINT8	Yes
49060	RW*	**Activate time schedule** Write this register to (re-)activate or deactivate the time schedule 0 = Deactivates the time schedule 1 = Activate the time schedule (this also ends temporary override) 2 = Set time schedule in edit mode	-	UINT8	Yes
49061	RW*	**UI schedule type** 1 = 24h (Every day the same) 2 = 5-2 (Mo-Fr, Sa-Su) 3 = 7 day	-	UINT8	
49062	RW*	**Switch Points Per Day** Value between 1 (default) till 6	-	UINT8	

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Documents / Resources

	alnor Modbus Connect Communication Protocol for HRU-PremAIR [pdf] User Manual Modbus Connect, Communication Protocol for HRU-PremAIR, Modbus Connect Communicatio n Protocol, Communication Protocol, Modbus Connect Communication Protocol for HRU-Prem AIR

References

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