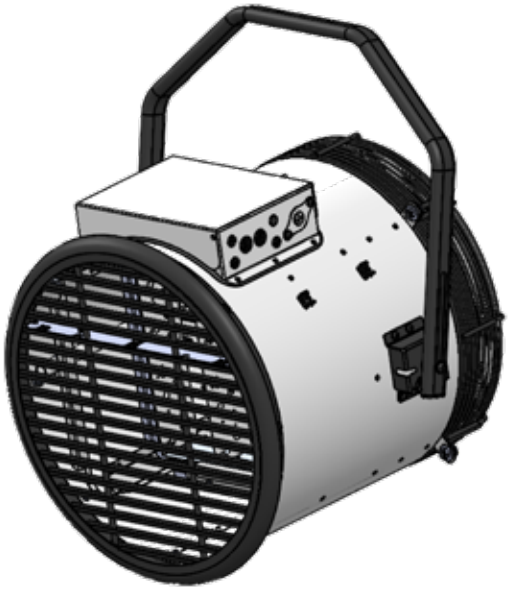
REZNOR®

ELECTRIC UNIT HEATER



MODBUS MANUAL

These appliances meet the following directives:
The Eco design for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2020
Electromagnetic Compatibility Regulations 2016
Electrical Equipment (Safety) Regulations 2016
Supply of Machinery (Safety) Regulations 2008
Supply of Machinery (Safety) Regulations (A) 2011

Please read this document carefully before commencing installation, commissioning and/or servicing.
Leave it with the end user/site agent to be placed in their premises technical file after installation.

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death.
All work must be carried out by appropriately qualified persons.
The manufacturer does not take any responsibility in the event of non-observance of the regulations concerning the connection of the apparatus causing a dangerous operation possibly resulting in damage to the apparatus and/or environment in which the unit is installed.

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NGH NORTEK GLOBAL HVAC

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Data protocol.

There are two data protocols implemented to suit the functionality of the system. The e+ control will respond to either format at any time but a system will only have one master, either a panel or a BMS. The native format is where the e+ control is in a network with a Signal Pro panel providing overall control.

The secondary format is via Modbus format where the e+ control is in a network with a building management system providing overall control.

Native Data format.

In native data format the e+ control will check for matching identity and unit address before it actions the command and then will respond with a status message.

Modbus data format.

For more information on Modbus see https://www.modbus.org/specs.php

Modbus communication uses the RTU mode. The message frame for command and response consists of:

<start><slaveaddress><functioncode><data><CRC><end>

Where:

<start> and <end> is a silent interval between frames of minimum 3½ character times which is 4.0mS @ 9600 baud

<slave address> is Modbus address of the slave receiving or responding

<functioncode> is Modbus function code

<data> appropriate amount of data bytes

<CRC> 16 bit CRC of the entire message, i.e. <slaveaddress><functioncode><data>, sent low byte first then high byte. CRC settings: 16 bit, initial value 0xFFFF, polynomial 0x8005 (0xA001 reversed).

When receiving Modbus messages the e+ control will check for a matching unit address and valid checksum before it actions the command and sends a response message.

Notes:

- When a slave heater responds to a master message it must wait a minimum of 4.0mS before responding due to <start>/<end> requirement.
- The gap between characters in a message must be less than 1½ character times which is 1.71mS @ 9600 baud. This applies to sending or receiving messages. Therefore if a gap of longer than 1.71mS is detected in an incoming frame the frame is discarded.

Modbus function codes

Table 1 following gives a list of the Modbus function codes supported by the unit heater. All other Modbus function codes are unimplemented and will elicit a return of exception code 01, not recognised.

Modbus function code 01 & 02 plus 03 & 04 are treated as equivalents and return the same information. Modbus function arguments which are not in lists of registers or coils below will elicit a return of exception code 02, error address out of range.

Modbus function arguments

Table 2 following gives a list of function arguments and the holding / input registers. Note that these are the register addresses as sent in the Modbus message, not “Modbus protocol register numbers” which would be 121 to 127.

Function code	Description	Range of arguments
01	Read coils	Coils 1 to 23
02	Read discrete input	Inputs 1 to 23
03	Read holding registers	Registers 121 to 127
04	Read input register	Registers 121 to 127
05	Write single coil	Coils 12 to 16, 18 to 24
06	Write single register	Registers 124 to 125

Table 1 - Modbus function codes

Register address	Description	Read / write	Comments
120	PCB temperature	Read only	1°C resolution, range 0 to 99
121	Control temperature	Read only	1°C resolution, range 0 to 99
122	Room temperature	Read only	0.1°C resolution, range -10.0 to 50.0 Sent as signed word eg -5°C =0xFFCE, +5°C=0x0032
123	Power duty cycle	Read only	Range 0 to 255
124	Set point temperature	Read / write	1°C resolution, range 30 to 50
125	Not used	-	
126	Hours run	Read only	

Table 2 - Modbus function arguments

Modbus addresses

Modbus addresses map to the unit addresses as follows:

Modbus address	Switch setting
0	All, broadcast message
16	0
17	1
18	2
19	3
20	4
21	5
22	6
23	7
24	8
25	9
26	A
27	B
28	C
29	D
30	E
31	F

Modbus function arguments, coils / inputs

Table 3 below gives a list of function arguments for coils and inputs. Note: These are the coil addresses as sent in the Modbus message, not "Modbus protocol coil numbers" which would be 1 to 24.

Coil address	Description	Read / write	Comments
0	Fan 1	Read only	Set if fan 1 normal is active
1	Fan 2	Read only	Set if fan 2 boost is active
2	Not used	-	-
3	Timer input	Read only	Set if timer link open circuit
4	Not used	-	-
5	Stat input	Read only	Set if stat link open circuit
6	Door input	Read only	Set if door input open circuit
7	Heating status	Read only	Set if heat duty cycle > 0
8	Temperature status	Read only	Set if temperature out of range
9	PCB temp status	Read only	Set if PCB temperature out of range
10	Room temp status	Read only	Set if room temperature out of range
11	Room temp not fitted	Read only	Set if room temp sensor not fitted
12	Set fan 1	Read / write	Set fan 1 on
13	Set fan 2	Read / write	Set fan 2 on
14	Not used	-	-
15	Set heating on	Read / write	Set heating on
16	Not used	-	-
17	Not used	-	-
18	Not used	-	-
19	Not used	-	-
20	Not used	-	-
21	Not used	-	-
22	Not used	-	-
23	Reset	Write	Set to initiate reset

Testing of Modbus Settings

Various programs are available to test Modbus settings. We would recommend the use of OpenModScan which is open source and freely available.

Notes

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Previous part no. Reznor, e+, Modbus Manual, EN 2024-06, D301625 Iss 0
Current full Part No. D301625 Reznor, e+, Modbus Manual, EN 2025-10, Iss 1

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