



GREYSTONE
ENERGY SYSTEMS INC

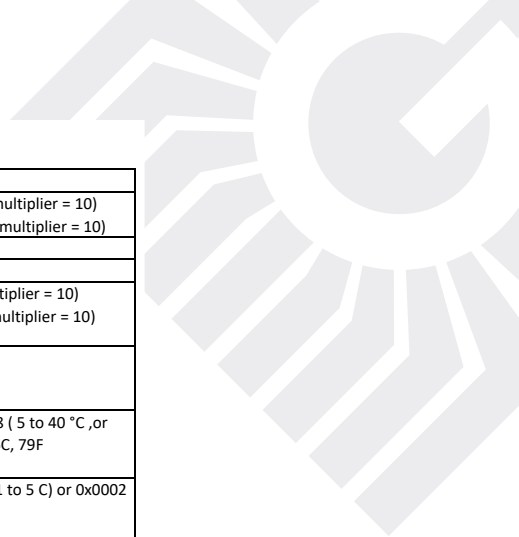


HN SERIES

Humidity/Temperature Transmitter

Setup Guide for Modbus Communication





Modbus Address	Typical Offset	Units	Data Type	Access	Description	Notes (All 16 bit Integers)	Register Value
40001	+0	%RH	Word	Read	RH sensor value	0-100%RH, resolution 0.1%RH	0x0000 to 0x3E8 (0.0 to 100.0%RH multiplier = 10)
40002	+1	C/F	Word	Read	Temperature sensor value	-40 to 50C, -40 to 122F, resolution 0.1 C/F	0xFFD8 to 0x01F4, corresponding to -40.0 to 50.0 °C (multiplier = 10) 0xFFD8 to 0x04C4, corresponding to -40.0 to 122.0 °F (multiplier = 10)
40003	+2		Word	Read	Relay Status	0 = Normal, 1 = Alarm	0x0000 (Normal) or 0x0001 (Alarm)
40004	+3	%RH	Word	Read/Write	RH offset	+/- 10%RH, 1%RH resolution	0xFFF6 to 0X000A (-10 to 10 %RH)
40005	+4	C/F	Word	Read/Write	Temperature offset	-5 to 5 Δ°C, Resolution = 0.1 Δ°C -10 to 10 Δ°F, Resolution = 0.1 Δ°F	0xFFCE to 0x0032, corresponding to -5.0 to 5.0 °C (multiplier = 10) 0xFF9C to 0x0064, corresponding to -10.0 to 10.0 °F (multiplier = 10)
40006	+5		Word	Read/Write	Relay Assignment	0 = RH , 1 = Temperature, configures which sensor relay setpoint uses	0x0000 (RH) or 0x0001(T)
40007	+6	%RH (C/F)	Word	Read/Write	Relay setpoint	Setpoint to activate Relay, resolution 1%RH, range 20 to 90%RH, or 5 to 40 °C, Resolution = 1 °C/°F	0x00C8 to 0X0384 (20 to 90 %RH) or 0x0005 to 0x0028 (5 to 40 °C ,or 0x0028 to 0x0064 (40 to100 °F). Defaults 70%RH or 26C, 79F
40008	+7	%RH (C/F)	Word	Read/Write	Relay Hysteresis	Hysteresis for relay activation, resolution 1%RH, range 5 to 20%RH,or 1C/F, range 1 to 5 C or 2-10 F)	0x0005 to 0x0014 (5 to 20%RH) or 0x0001 to 0x0005 (1 to 5 C) or 0x0002 to 0x000A (2 to 10F). Default 10%RH or 2C, 4F
40009	+8	Seconds	Word	Read/Write	Relay On Time	Minimum on time when relay activated, default 0 seconds, resolution 1 second, range 255 seconds	0x0000 to 0x00FF (0 to 255 seconds), default 0
40010	+9	C/F	Word	Read/Write	Temperature Units	0 = °C, 1 = °F, default 0	0x0000 (C) or 0x0001 (F)
40011	+10		Word	Read/Write	Relay Test	0 = Disable, 1 = Enable, default 0	0x0000 (Disable) or 0x0001 (Enable)

RTU Message Format

Modbus Framing	8 bit binary
Data Bits	start bits --- 1, data bits --- 8, parity bits --- none, stop bits -- 1
Baud Rate	9600, 19200, 38400, 57600, 76800 or 115200
Duplex	Half duplex
Error Checking	Cyclical Redundancy Check (CRC) CRC-16 — polynomial x16+x15+x2+x0 reversed version 0xA001
Latency	More than 3.5 characters --- minimum

RTU Framing Support and Bit Sequences

Start	1	2	3	4	5	6	7	8 Stop
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RTU Function Codes

0x03 --- Read holding registers

Query							
Slave address (0x01 to 0xFF)	Function code (0x03)	Starting address MSB	Starting address LSB	Quantity of registers MSB	Quantity of registers LSB	CRC LSB	CRC MSB

* Starting address = 0x0000 to 0xFFFF, Quantity of registers = 0x0000 to 0x007D

Response							
Slave address (0x01 to 0xFF)	Function code (0x03)	Byte count 2N	Register value MSB	Register value LSB	...	CRC LSB	CRC MSB

* N= Quantity of registers

0x06 --- Write single register

Query

Slave address (0x01 to 0xFF)	Function code 0x06	Register address MSB	Register address LSB	Register value MSB	Register value LSB	CRC LSB	CRC MSB
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Response

Slave address (0x01 to 0xFF)	Function code 0x06	Register address MSB	Register address LSB	Register value MSB	Register value LSB	CRC LSB	CRC MSB
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* Register address = 0x0000 to 0xFFFF, Registers value = 0x0000 to 0xFFFF

Exception response

Slave address (0x01 to 0xFF)	Function code + 0x80	Exception code 0x01, 0x02 or 0x03	CRC LSB	CRC MSB
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* An exception response is only returned if the CRC is correct
Exception code 01 --- illegal function, 02 --- illegal address, 03 --- illegal data value

Note that the registers may be read individually or multiple registers may be read at the same time by changing the query as shown below.

To read several registers with one query...

0x03 --- Read ALL REGISTERS

Query

Slave address (0x01 to 0xFF)	0x03	0x00	0x00 (Note 1)	0x00	0x05 (Note2)	CRC LSB	CRC MSB
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Response

Slave address (0x01 to 0xFF)	0x03	0x0A (Note 3)	Register value MSB	Register value LSB	...	CRC LSB	CRC MSB
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Note 1 The starting address (A) may be 0x0000 to 0x00A. The read multiple feature will read all registers from the starting address forward. If the starting address is 0x0000 then registers 40001 to 40011 can be read. If the starting address is 0x0008 then registers 40009 to 40011 can be read.

Note 2 The quantity of registers (N) may be 0x0001 to 0x000B, but must be limited to 11 - A. If the starting address (A) is set to 0x0000 then N may be 0x0001 to 0x000B. If the starting address is set to 0x0008 then N may be 0x0001 to 0x0003.

Note 3 The byte count (B) will always be 2N. If the quantity of registers (N) is 0x0001 then B will be 0x02. If N is 0x0005 then B will be 0x0A.