



neptronic®

SKE4 Steam Humidifier

Modbus Communication Module User Guide





Introduction

The SKE4 Modbus Communication Module User Guide provides information for using Neptronic® communication feature. The controller uses Modbus communication protocol over serial line in the RTU mode and provides a Modbus network interface between client devices and Neptronic SKE4 devices.

The SKE4 Modbus Guide assumes that you are familiar with Modbus terminology.

The following are the requirements for Modbus:

- **Data Model.** The SKE4 Steam Humidifier Modbus server data model uses only the Modbus Registers table.
- **Register Address:**
 - As per protocol base (base 0); for PLC add 1 to protocol base.
 - As per holding register (base 40001).
- **Function Codes.** The SKE4 Steam Humidifier Modbus server supports a limited function codes subset comprising:
 - Read Holding Registers (0x03)
 - Write Single Register (0x06)
 - Write Multiple Registers (0x10)
- **Exception Responses.** The SKE4 Steam Humidifier Modbus server supports the following exception codes:
 - Illegal data address
 - Illegal data value
 - Slave device busy
- **Serial Line.** The SKE4 Steam Humidifier Modbus over serial line uses RTU transmission mode over a two-wire configuration RS485 (EIA/TIA-485 standard) physical layer.
 - The physical layer can use fixed baud rate selection or automatic baud rate detection (default) as per the **Modbus Auto Baud Rate** device menu item or holding register index 1.
 - The supported baud rates are 9600, 19200, 38400, and 57600.
 - The physical layer also supports variable parity control and stop bit configuration as per the **Modbus Comport Config** device menu item or holding register index 2.
 - In auto baud rate configuration, if the device detects only consecutive bad frames (2 or more) for one second with any given baud rate, it will reinitialize itself to the next baud rate.
- **Addressing.** The SKE4 Steam Humidifier device only answers at the following address:
 - The device's unique address (1 to 246) that can be set through the device menu or through holding register index 0.

Modbus Registers

Table Glossary

Name	Description	Name	Description
W	Writable Register	ASCII	For registers containing ASCII (8-bit) characters
RO	Read Only Register	MSB	Most Significant Byte
Unsigned	For range of values from 0 to 65,535, unless otherwise specified	LSB	Least Significant Byte
Signed	For range of values from -32,768 to 32,767, unless otherwise specified	MSW	Most Significant Word
Bit String	For registers with multiple values using bit mask (example, flags)	LSW	Least Significant Word

Modbus Registers Table

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
0	40001	Modbus Address and Product Type.	Unsigned	MSB = Product type LSB = Modbus Address	W	
1	40002	Device Baud Rate.	Unsigned	0 = Auto Baud Rate Detection 3 = 38400 1 = 9600 4 = 57600 2 = 19200	W	19200
2	40003	Modbus Slave Communication Port Configuration.	Unsigned	0 = No parity, 2 Stop bits 1 = Even parity, 1 Stop bit 2 = Odd parity, 1 Stop bit	W	No parity, 2 Stops bits
3	40004	Product Name (characters 8 & 7).	ASCII	1 to 65535	RO	
4	40005	Product Name (characters 6 & 5).	ASCII	1 to 65535	RO	
5	40006	Product Name (characters 4 & 3).	ASCII	1 to 65535	RO	
6	40007	Product Name (characters 2 & 1).	ASCII	1 to 65535	RO	
7	40008	Product Actual Firmware Version (in Integer x100).	Unsigned	1 to 65535	RO	
8	40009	Product Actual EEPROM Version (in Integer x100).	Unsigned	1 to 65535	RO	



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
9	40010	System Production Test Done.	Bit String	0 = Inactive 1 = Active	W	Inactive
10	40011	System Log Verbose Level.	Bit String	0 = None 1 = Emergency 2 = Alert 3 = Critical 4 = Error 5 = Warning 6 = Notice 7 = Info 8 = Debug	W	Debug
11	40012	Air Flow.	Bit String	0 = Closed 1 = Open	W	Closed
12	40013	Supply High Limit.	Bit String	0 = Closed 1 = Open	W	Closed
13	40014	Interlock.	Bit String	0 = Closed 1 = Open	W	Closed
14	40015	Binary External Demand.	Bit String	0 = 0% 1 = 100%	W	0%
15	40016	Control Signal (LSB).	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	W	0
16	40017	Control Signal (MSB).		0 to 10000		
17	40018	Control Input (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
18	40019	Control Input (MSB).		0 to 10000		
19	40020	Room RH Signal (LSB).	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	W	0
20	40021	Room RH Signal (MSB).		0 to 10000		
21	40022	Room RH (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	0
22	40023	Room RH (MSB).		0 to 10000		



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
23	40024	Supply RH Signal (LSB).	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	W	0
24	40025	Supply RH Signal (MSB).		0 to 10000		
25	40026	Supply High Limit RH (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	0
26	40027	Supply High Limit RH (MSB).		0 to 10000		
27	40028	Water Leak Detection.	Bit String	0 = Ok 1 = Leak	W	Ok
28	40029	Water Level Signal (LSB).	Unsigned Scale 1	0 to 30000 Value x 1 (e.g. 10Hz = 10)	W	0
29	40030	Water Level Signal (MSB).		0 to 30000		
30	40031	Water Level Low Signal (LSB).	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	W	0
31	40032	Water Level Low Signal (MSB).		0 to 10000		
32	40033	Water Level Low.	Bit String	0 = Inactive 1 = Active	W	Inactive
33	40034	Water Level High Signal (LSB).	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	W	0
34	40035	Water Level High Signal (MSB).		0 to 10000		
35	40036	Water Level High.	Bit String	0 = Inactive 1 = Active	W	Inactive
36	40037	Water Temperature Signal (LSB).	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	W	0
37	40038	Water Temperature Signal (MSB).		0 to 10000		
38	40039	Water Temperature (LSB).	Unsigned Scale 100	0 to 12500 Value x 100 (e.g. 10C = 1000)	W	5000
39	40040	Water Temperature (MSB).		0 to 12500		



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
40	40041	Foam Signal (LSB).	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	W	0
41	40042	Foam Signal (MSB).		0 to 10000		
42	40043	Foam Sensor.	Bit String	0 = NoFoam 1 = Foam	W	NoFoam
43	40044	Thermal Cutout.	Bit String	0 = Closed 1 = Open	W	Closed
44	40045	SSR Temperature Signal (LSB).	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	W	0
45	40046	SSR Temperature Signal (MSB).		0 to 10000		
46	40047	SSR Temperature (LSB).	Signed Scale 100	-2000 to 10000 Value x 100 (e.g. 10C = 1000)	W	0
47	40048	SSR Temperature (MSB).		-2000 to 10000		
48	40049	Current Sensor 1 Signal (LSB).	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	W	0
49	40050	Current Sensor 1 Signal (MSB).		0 to 10000		
50	40051	Current Sensor 1 (LSB).	Unsigned Scale 100	0 to 100000 Value x 100 (e.g. 10A = 1000)	W	0
51	40052	Current Sensor 1 (MSB).		0 to 100000		
52	40053	Current Sensor 2 Signal (LSB).	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	W	0
53	40054	Current Sensor 2 Signal (MSB).		0 to 10000		
54	40055	Current Sensor 2 (LSB).	Unsigned Scale 100	0 to 100000 Value x 100 (e.g. 10A = 1000)	W	0
55	40056	Current Sensor 2 (MSB).		0 to 100000		
56	40057	RS485 Interface.	Bit String	0 = No 1 = Yes	W	No



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
57	40058	Ethernet Interface.	Bit String	0 = No 1 = Yes	W	No
58	40059	Contactors PCB Fuse.	Bit String	0 = Normal 1 = Blown Fuse	W	Normal
59	40060	Control PCB Fuse.	Bit String	0 = Normal 1 = Open Fuse	W	Normal
60	40061	Cabinet Temperature Signal (LSB).	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	W	0
61	40062	Cabinet Temperature Signal (MSB).		0 to 10000		
62	40063	Board Temperature (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10C = 1000)	W	0
63	40064	Board Temperature (MSB).		0 to 10000		
64	40065	Main Power Supply (LSB).	Unsigned Scale 10	0 to 400 Value x 10 (e.g. 1V = 10)	W	0
65	40066	Main Power Supply (MSB).		0 to 400		
66	40067	Power Output Feedback Signal (LSB).	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	W	0
67	40068	Power Output Feedback Signal (MSB).		0 to 10000		
68	40069	Power Output Feedback (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
69	40070	Power Output Feedback (MSB).		0 to 10000		
70	40071	Alarm Warning Relay.	Bit String	0 = Off 1 = On	W	Off
71	40072	Service Warning Relay.	Bit String	0 = Off 1 = On	W	Off
72	40073	Water Level Valve.	Bit String	0 = Off 1 = On	W	Off



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
73	40074	Tank Water Valve.	Bit String	0 = Off 1 = On	W	Off
74	40075	Drain Cooler Valve.	Bit String	0 = Off 1 = On	W	Off
75	40076	Drain Pump.	Bit String	0 = Off 1 = On	W	Off
76	40077	Main Contactor.	Bit String	0 = Off 1 = On	W	Off
77	40078	Heater Stage 1.	Bit String	0 = Off 1 = On	W	Off
78	40079	Heater Stage2.	Bit String	0 = Off 1 = On	W	Off
79	40080	Heater Stage 3.	Bit String	0 = Off 1 = On	W	Off
80	40081	SDU Fan.	Bit String	0 = Off 1 = On	W	Off
81	40082	Heater SSR Stage (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
82	40083	Heater SSR Stage (MSB).		0 to 10000		
83	40084	Local Display Backlight Output (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
84	40085	Local Display Backlight Output (MSB).		0 to 10000		
85	40086	Alarm LED.	Bit String	0 = Off 1 = On	W	Off
86	40087	Power LED.	Bit String	0 = Off 1 = On	W	Off
87	40088	Buzzer.	Bit String	0 = Off 1 = On	W	Off



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
88	40089	Water Level (LSB).	Unsigned Scale 100	0 to 1200 Value x 100 (e.g. 10% = 1000)	W	0
89	40090	Water Level (MSB).		0 to 1200		
90	40091	Control Profile.	Bit String	0 = ExternAnalog 1 = ExternNetwork 2 = InternAnalog 3 = InternNetwork 4 = InternTBD 5 = Custom	W	0
91	40092	Modulating High Limit Profile.	Bit String	0 = Disabled 1 = ExternAnalog 2 = ExternNetwork 3 = InternAnalog 4 = InternNetwork 5 = Custom	W	0
92	40093	Occupancy State.	Bit String	0 = Occupied 1 = Unoccupied 2 = Vacant 3 = Off	W	0
93	40094	Room RH Network Reading (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	0
94	40095	Room RH Network Reading (MSB).		0 to 10000		
95	40096	Room RH Setpoint (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	4000
96	40097	Room RH Setpoint (MSB).		0 to 10000		
97	40098	Room RH Unoccupied Setpoint (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	3000
98	40099	Room RH Unoccupied Setpoint (MSB).		0 to 10000		
99	40100	Room RH Vacant Setpoint (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	2000
100	40101	Room RH Vacant Setpoint (MSB).		0 to 10000		
101	40102	Room Demand (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
102	40103	Room Demand (MSB).		0 to 10000		
103	40104	Room RH Source.	Bit String	0 = None 1 = RoomRH 2 = Network	W	None



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
104	40105	Room RH Setpoint Source.	Bit String	0 = None 1 = Internal 2 = ControllInput	W	None
105	40106	Supply High Limit Network Reading (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	0
106	40107	Supply High Limit Network Reading (MSB).		0 to 10000		
107	40108	Supply High Limit Setpoint (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	8000
108	40109	Supply High Limit Setpoint (MSB).		0 to 10000		
109	40110	Supply High Limit Demand (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
110	40111	Supply High Limit Demand (MSB).		0 to 10000		
111	40112	Supply High Limit Reading Source.	Bit String	0 = None 1 = SupplyHLRH 2 = Network	W	None
112	40113	Supply High Limit Setpoint Source.	Bit String	0 = None 1 = Internal 2 = ControllInput	W	None
113	40114	Humidity Control Network Demand (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
114	40115	Humidity Control Network Demand (MSB).		0 to 10000		
115	40116	Humidity Control Network High Limit (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	10000
116	40117	Humidity Control Network High Limit (MSB).		0 to 10000		
117	40118	Humidity Demand (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
118	40119	Humidity Demand (MSB).		0 to 10000		
119	40120	SDU Fan Off Delay (LSB).	Unsigned Scale 1	5 to 20 Value x 1 (e.g. 5min = 5)	W	5
120	40121	SDU Fan Off Delay (MSB).		5 to 20		



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
121	40122	SDU Fan Fault.	Bit String	0 = Off 1 = On	W	0
122	40123	Humidity Control Demand Source.	Bit String	0 = None 1 = ControllInput 2 = RoomDemand 3 = Network	W	ControllInput
123	40124	Humidity Control High Limit Source.	Bit String	0 = None 1 = ControllInput 2 = SupplyHLDemand 3 = Network	W	None
124	40125	Humidity Control Cutout State.	Bit String	0 = Off 1 = Normal 2 = LowLimit 3 = HighLimit 4 = NoAirFlow 5 = Interlock	W	Normal
125	40126	SDU Fan Target.	Bit String	0 = None 1 = SDUFan	W	None
126	40127	System Power Output (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
127	40128	System Power Output (MSB).		0 to 10000		
128	40129	System Power Capacity (LSB).	Unsigned Scale 10	0 to 2147483647 Value x 10 (e.g. 10kg/hr = 100)	W	0
129	40130	System Power Capacity (MSB).		0 to 2147483647		
130	40131	Boiler Demand (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
131	40132	Boiler Demand (MSB).		0 to 10000		
132	40133	Boiler Power Output (LSB).	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
133	40134	Boiler Power Output (MSB).		0 to 10000		
134	40135	Boiler Run Time (LSB).	Unsigned Scale 100	0 to 2147483647 Value x 100 (e.g. 10hr = 1000)	W	0
135	40136	Boiler Run Time (MSB).		0 to 2147483647		
136	40137	Boiler On Time (LSB).	Unsigned Scale 100	0 to 2147483647 Value x 100 (e.g. 10hr = 1000)	W	0
137	40138	Boiler On Time (MSB).		0 to 2147483647		



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
138	40139	Boiler Service Run Time (LSB).	Unsigned Scale 100	0 to 2147483647 Value x 100 (e.g. 10hr = 1000)	W	0
139	40140	Boiler Service Run Time (MSB).		0 to 2147483647		
140	40141	Boiler Service On Time (LSB).	Unsigned Scale 100	0 to 2147483647 Value x 100 (e.g. 10hr = 1000)	W	0
141	40142	Boiler Service On Time (MSB).		0 to 2147483647		
142	40143	Boiler Minimum Steam Output (LSB).	Unsigned Scale 1	1 to 25 Value x 1 (e.g. 10% = 10)	W	5
143	40144	Boiler Minimum Steam Output (MSB).		1 to 25		
144	40145	Boiler Drain Interval (LSB).	Unsigned Scale 1	0 to 24 Value x 1 (e.g. 10hr = 10)	W	6
145	40146	Boiler Drain Interval (MSB).		0 to 24		
146	40147	Boiler Drain Volume (LSB).	Unsigned Scale 1	25 to 100 Value x 1 (e.g. 50% = 50)	W	100
147	40148	Boiler Drain Volume (MSB).		25 to 100		
148	40149	Boiler Max Steam Output (LSB).	Unsigned Scale 1	0 to 100 Value x 1 (e.g. 10% = 10)	W	100
149	40150	Boiler Max Steam Output (MSB).		0 to 100		
150	40151	Boiler Idle Time Drain (LSB).	Unsigned Scale 1	24 to 72 Value x 1 (e.g. 30hr = 30)	W	72
151	40152	Boiler Idle Time Drain (MSB).		24 to 72		
152	40153	Boiler Idle Temperature Setpoint (LSB).	Unsigned Scale 1	0 to 40 Value x 1 (e.g. 10C = 10)	W	0
153	40154	Boiler Idle Temperature Setpoint (MSB).		0 to 40		
154	40155	Boiler Anti Freeze Setpoint (LSB).	Unsigned Scale 1	5 to 15 Value x 1 (e.g. 10C = 10)	W	10
155	40156	Boiler Anti Freeze Setpoint (MSB).		5 to 15		



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
156	40157	Boiler Blowdown Rate (LSB).	Unsigned Scale 1	0 to 100 Value x 1 (e.g. 10% = 10)	W	0
157	40158	Boiler Blowdown Rate (MSB).		0 to 100		
158	40159	Boiler Service Interval (LSB).	Unsigned Scale 1	1000 to 3000 Value x 1 (e.g. 1000hr = 1000)	W	1000
159	40160	Boiler Service Interval (MSB).		1000 to 3000		
160	40161	Boiler Tank Rinse Interval (LSB).	Unsigned Scale 1	1 to 7 Value x 1 (e.g. 1 day = 1)	W	3
161	40162	Boiler Tank Rinse Interval (MSB).		1 to 7		
162	40163	Boiler Service Operation.	Bit String	0 = Not Allowed 1 = Allowed	W	Allowed
163	40164	Boiler Service Due.	Bit String	0 = Off 1 = On	W	Off
164	40165	Boiler Power State.	Bit String	0 = Off 1 = On	W	Off
165	40166	Boiler Request.	Bit String	0 = None 1 = Reset Alarms 2 = Drain 3 = Reset Counters	W	None
166	40167	Boiler State.	Bit String	0 = Off 1 = Idle 2 = LineRinse 3 = TankRinse 4 = Filling 5 = Draining 6 = Heating 7 = Boiling 8 = Alarm	W	Off
167	40168	Boiler Fill Mode.	Bit String	0 = OneShot 1 = Pulsed	W	Pulsed
168	40169	Boiler Alarm.	Bit String	0 = Normal 1 = FailedPump 2 = FillTimeout 3 = BlockedPiping 4 = HeatTimeout 5 = Overheat 6 = WaterLeak 7 = Service 8 = Foaming	W	Normal

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
169	40170	Boiler Tank Rinse Idle.	Bit String	0 = Off 1 = On	W	On
170	40171	Boiler Tank Rinse Off.	Bit String	0 = Off 1 = On	W	Off
171	40172	Water Probe Auto Calibration.	Bit String	0 = None 1 = Once 2 = Always	W	Always
172	40173	Modbus Server Units.	Bit String	0 = Metric 1 = Imperial	W	Metric
173	40174	ModbusRTU1MAC (LSB).	Unsigned Scale 1	0 to 247 <i>Value x 1 (e.g. 1 = 1)</i>	W	1
174	40175	ModbusRTU1MAC (MSB).		0 to 247	W	1

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