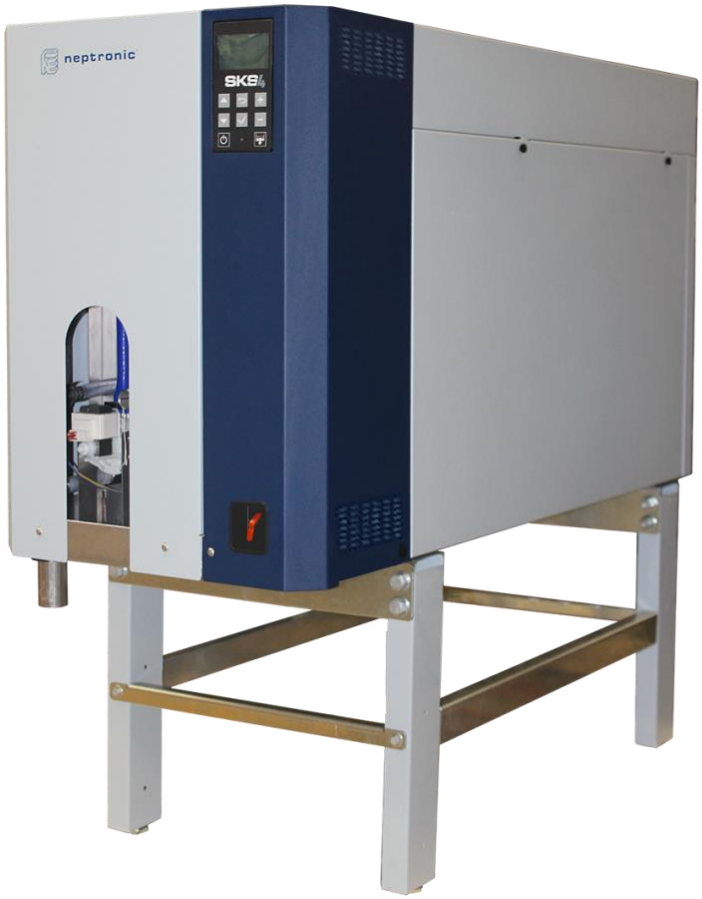
SKS4 Steam to Steam Humidifier

Modbus Communication Module User Guide



Introduction

The SKS4 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 SKS4 devices.
The SKS4 Modbus Guide assumes that you are familiar with Modbus terminology.

The following are the requirements for Modbus:

- *Data Model*. The SKS4 Steam to 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 400001).

    Note: Ensure that the Modbus communication software used does not have a limit on the range of the register addresses that can be viewed and supports 6-digit holding registers.
- *Function Codes*. The SKS4 Steam to 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 SKS4 Steam to Steam Humidifier Modbus server supports the following exception codes:
    - Illegal data address
    - Illegal data value
    - Slave device busy
- *Serial Line*. The SKS4 Steam to 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 SKS4 Steam to 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	400001	Modbus Address and Product Type	Unsigned	MSB = Product type, not writable LSB = Modbus Address (1 to 247), writable	W	
1	400002	Device Baud Rate	Unsigned *Scale 100*	0, 9600, 19200, 38400, and 57600, 0 = Auto Baud *Rate Detection Value/100 (e.g. 38400 baud = 384)*	W	19200
2	400003	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	400004	Product Name (characters 8 & 7)	ASCII	MSB = char 6, LSB = char 7	W	
4	400005	Product Name (characters 6 & 5)	ASCII	MSB = char 4, LSB = char 5	W	
5	400006	Product Name (characters 4 & 3)	ASCII	MSB = char 2, LSB = char 3	W	
6	400007	Product Name (characters 2 & 1)	ASCII	MSB = char 0, LSB = char 1	W	
7	400008	Product Actual Firmware Version (in Integer x100)	Unsigned *Scale 100*	1 to 65535 (e.g. 100)	RO	

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
8	400009	Product Actual EEPROM Version (in Integer x100)	Unsigned *Scale 100*	1 to 65535 (e.g. 100)	RO	
2000	402001	Control Signal	Unsigned *Scale 1000*	Units: Volt (V), Range: 0V to 15V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
2001	402002	Room RH Signal	Unsigned *Scale 1000*	Units: Volt (V), Range: 0V to 15V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
2002	402003	Supply RH Signal	Unsigned *Scale 1000*	Units: Volt (V), Range: 0V to 15V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
2003	402004	Water Level Signal	Unsigned *Scale 1*	Units: Hz, Range: 0 to 30000Hz *Value x 1 (e.g. 10Hz = 10)*	RO	0Hz
2004	402005	Water Level Low Signal	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
2005	402006	Water Level High Signal	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
2006	402007	Water Temperature Signal	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
2007	402008	Foam Signal	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
2008	402009	Cabinet Temperature Signal	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
2009	402010	Board Temperature Signal	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
2010	402011	Main Power Supply	Unsigned *Scale 10*	Unit: Volt (V), Range: 0V to 40V *Value x 10 (e.g. 1V = 10)*	RO	0V
2011	402012	Steam Valve Feedback Signal	Unsigned *Scale 1000*	Units: Volt (V), Range: 0V to 10.5V *Value x 1000 (e.g. 1V = 1000)*	RO	0V

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
4000	404001	Steam Output Feedback Signal	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
4001	404002	Steam Valve Signal	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
6000	406001	Control Input	Unsigned *Scale 100*	Unit: %, Range: 0% to 100% *Value x 100 (e.g. 10% = 1000)*	W	0%
6001	406002	Control Min	Unsigned *Scale 100*	Unit: %, Range: 0% to 100% *Value x 100 (e.g. 10% = 1000)*	W	0%
6002	406003	Control Max	Unsigned *Scale 100*	Unit: %, Range: 0% to 100% *Value x 100 (e.g. 10% = 1000)*	W	0%
6003	406004	Control Bias	Signed *Scale 100*	Unit: %, Range: -10% to 10% *Value x 100 (e.g. 10% = 1000)*	W	0%
6004	406005	Room RH	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	RO	0% RH
6005	406006	Room RH Min	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	RO	0% RH
6006	406007	Room RH Max	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	RO	0% RH
6007	406008	Room RH Bias	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	RO	0% RH
6008	406009	Supply High Limit RH	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	RO	0% RH
6009	406010	Supply High Limit RH Min	Unsigned *Scale 100*	Unit: %, Range: 0% to 100% *Value x 100 (e.g. 10% = 1000)*	W	0%
6010	406011	Supply High Limit RH Max	Unsigned *Scale 100*	Unit: %, Range: 0% to 100% *Value x 100 (e.g. 10% = 1000)*	W	0%

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6011	40**6012**	Supply High Limit RH Bias	Signed *Scale 100*	Unit: %, Range: -10% to 10% *Value x 100 (e.g. 10% = 1000)*	W	0%
6012	40**6013**	Water Temperature Signal Min	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
6013	40**6014**	Water Temperature Signal Max	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	RO	0V
6014	40**6015**	Water Temperature	Unsigned *Scale 100*	Unit: ºC/ºF, Range: 0°C to 125°C or 32°F to 257°F *Value x 100 (e.g. 5°C = 500 or 40ºF = 4000)*	RO	50°C or 122°F
6015	40**6016**	Water Temperature Min	Unsigned *Scale 100*	Unit: ºC/ºF, Range: 0°C to 250°C or 32°F to 482°F *Value x 100 (e.g. 5°C = 500 or 40ºF = 4000)*	RO	0°C or 32°F
6016	40**6017**	Water Temperature Max	Unsigned *Scale 100*	Unit: ºC/ºF, Range: 0°C to 250°C or 32°F to 482°F *Value x 100 (e.g. 5°C = 500 or 40ºF = 4000)*	RO	125°C or 257°F
6017	40**6018**	Water Temperature Bias	Unsigned *Scale 100*	Unit: ºC/ºF, Range: -10°C to 10°C or -18°F to 18°F *Value x 100 (e.g. 5°C = 500 or 14ºF = 1400)*	RO	0°C or 32°F
6018	40**6019**	Cabinet Temperature	Unsigned *Scale 100*	Unit: ºC/ºF, Range: -20°C to 100°C or -4°F to 212°F *Value x 100 (e.g. 5°C = 500 or 10ºF = 1000)*	RO	0°C or 32°F
6019	40**6020**	Modbus TCP IP Keep Alive Time Out (0)	Unsigned *Scale 1*	Unit: Minutes (min), Range: 1 to 1440 mins *Value x 1 (e.g. 5 mins = 5)*	W	5 min
6020	40**6021**	Modbus TCP IP Keep Alive Time Out (1)		Unit: Minutes (min), Range: 1 to 1440 mins		
6021	40**6022**	HRL Temperature	Signed *Scale 100*	Unit: ºC/ºF, Range: -40°C to 260°C or -40°F to 500°F *Value x 100 (e.g. 5°C = 500 or 40ºF = 4000)*	RO	0°C or 32°F
6022	40**6023**	HRL Humidity	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 1% RH = 100)*	RO	0% RH
6023	40**6024**	Board Temperature	Unsigned *Scale 100*	Unit: ºC/ºF, Range: 0°C to 100°C or 32°F to 212°F *Value x 100 (e.g. 5°C = 500 or 32ºF = 3200)*	RO	0°C or 32°F
6024	40**6025**	Power Output Feedback Bias	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	W	0V

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6025	40**6026**	Power Output Feedback Min	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	W	0V
6026	40**6027**	Power Output Feedback Max	Unsigned *Scale 1000*	Unit: Volt (V), Range: 0V to 10V *Value x 1000 (e.g. 1V = 1000)*	W	0V
6027	40**6028**	Power Output Feedback	Unsigned *Scale 100*	Unit: %, Range: 0% to 100% *Value x 100 (e.g. 10% = 1000)*	RO	0%
6028	40**6029**	Steam Valve Control	Unsigned *Scale 100*	Unit: %, Range: 0% to 100% *Value x 100 (e.g. 10% = 1000)*	RO	0%
6029	40**6030**	Water Level	Unsigned *Scale 10*	Unit: %, Range: 0% to 120% *Value x 10 (e.g. 10% = 100)*	RO	78%
6030	40**6031**	Water Probe Low Pos Reading	Unsigned *Scale 1*	Unit: Hz, Range: 0 to 30000 Hz *Value x 1 (e.g. 1 Hz = 1)*	RO	30000Hz
6031	40**6032**	Water Probe High Pos Reading	Unsigned *Scale 1*	Unit: Hz, Range: 0 to 30000 Hz *Value x 1 (e.g. 1 Hz = 1)*	RO	30000Hz
6032	40**6033**	Water Probe Abs Low Pos Reading	Unsigned *Scale 1*	Unit: Hz, Range: 0 to 30000 Hz *Value x 1 (e.g. 1 Hz = 1)*	RO	30000Hz
6033	40**6034**	Water Probe Abs High Pos Reading	Unsigned *Scale 1*	Unit: Hz, Range: 0 to 30000 Hz *Value x 1 (e.g. 1 Hz = 1)*	RO	30000Hz
6034	40**6035**	Room RH Network Reading	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	W	0% RH
6035	40**6036**	Room RH Setpoint	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	W	40% RH
6036	40**6037**	Room RH Unoccupied Setpoint	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	W	30% RH
6037	40**6038**	Room RH Vacant Setpoint	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	W	20% RH
6038	40**6039**	Room Demand Proportional Gain	Unsigned *Scale 10*	No Unit, Range: 1 to 200 *Value x 10 (e.g. 10 = 100)*	W	20

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6039	40**6040**	Room Demand Integral Time	Unsigned *Scale 10*	Unit: sec, Range: 0 to 900 sec *Value x 10 (e.g. 10sec = 100)*	W	0 sec
6040	40**6041**	Room Demand Derivative Time	Unsigned *Scale 10*	Unit: sec, Range: 0 to 60 sec *Value x 10 (e.g. 10sec = 100)*	W	0 sec
6041	40**6042**	Room Demand	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10%* RH = *1000)*	RO	0% RH
6042	40**6043**	Room Demand Proportional Band (0)	Unsigned *Scale 10*	Unit: %, Range: 1% to 100% *Value x 10 (e.g. 10%* RH = *100)*	W	5%
6043	40**6044**	Room Demand Proportional Band (1)		Unit: %, Range: 1% to 100%		
6044	40**6045**	Supply High Limit Network Reading	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	W	0% RH
6045	40**6046**	Supply High Limit Setpoint	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	W	80% RH
6046	40**6047**	Supply High Limit Proportional Gain	Unsigned *Scale 10*	No Unit, Range: 1 to 200 *Value x 10 (e.g. 10 = 100)*	W	10
6047	40**6048**	Supply High Limit Integral Time	Unsigned *Scale 10*	Unit: sec, Range: 0 to 900 sec *Value x 10 (e.g. 10sec = 100)*	W	0 sec
6048	40**6049**	Supply High Limit Derivative Time	Unsigned *Scale 10*	Unit: sec, Range: 0 to 60 sec *Value x 10 (e.g. 10sec = 100)*	W	0 sec
6049	40**6050**	Supply High Limit Demand	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	RO	0% RH
6050	40**6051**	Supply High Limit Proportional Band (0)	Unsigned *Scale 10*	Unit: %, Range: 1% to 100% *Value x 10 (e.g. 10%* RH = *100)*	W	10%
6051	40**6052**	Supply High Limit Proportional Band (1)		Unit: %, Range: 1% to 100%		
6052	40**6053**	Humidity Control Network Demand	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	W	0% RH

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6053	40**6054**	Humidity Control Network High Limit	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	W	100% RH
6054	40**6055**	Humidity Demand	Unsigned *Scale 100*	Unit: % RH, Range: 0% RH to 100% RH *Value x 100 (e.g. 10% RH = 1000)*	RO	0% RH
6055	40**6056**	Humidity Demand Low Dead Band (0)	Unsigned *Scale 100*	Unit: %, Range: 0% to 100% *Value x 100 (e.g. 10% = 1000)*	W	1%
6056	40**6057**	Humidity Demand Low Dead Band (1)		Unit: %, Range: 0% to 100%		
6057	40**6058**	Network Timeout (0)	Unsigned *Scale 1*	Unit: Seconds (sec), Range: 1 to 900 sec *Value x 1 (e.g. 10sec = 10)*	W	900 sec
6058	40**6059**	Network Timeout (1)		Unit: Seconds (sec), Range: 1 to 900 sec		
6059	40**6060**	System Power Output	Unsigned *Scale 100*	Unit: %, Range: 0% to 100% *Value x 100 (e.g. 10% = 1000)*	RO	0%
6060	40**6061**	System Steam Capacity	Unsigned *Scale 10*	Unit: kg/hr or lb/hr, Range: 0 to 300 kg/hr or 0 to 66 1lb/hr *Value x 10 (e.g. 10 kg/hr = 100 or 10 lb/hr = 100)*	RO	0 kg/hr or 0 lb/hr
6061	40**6062**	Water Level Replace Interval (0)	Unsigned *Scale 1*	Unit: Days, Range: 0 day to 7 days *Value x 1 (e.g. 1 day = 1)*	W	7day
6062	40**6063**	Water Level Replace Interval (1)		Unit: Days, Range: 0 day to 7 days *Value x 1 (e.g. 1 day = 1)*		
6063	40**6064**	Boiler Anti-freeze Keep Warm Setpoint (0)	Signed *Scale 100*	Unit: ºC/ºF, Range: -40ºC to 100ºC or -40ºF to 212ºF *Value x 100 (e.g. 10ºC = 1000 or 40ºF = 4000)*	RO	30°C or 86°F
6064	40**6065**	Boiler Anti-freeze Keep Warm Setpoint (1)		Unit: ºC/ºF, Range: -40ºC to 100ºC or -40ºF to 212ºF		
6065	40**6066**	Boiler Anti-freeze Keep Warm (0)	Signed *Scale 100*	Unit: ºC/ºF, Range: -40ºC to 100ºC or -40ºF to 212ºF *Value x 100 (e.g. 10ºC = 1000 or 40ºF = 4000)*	RO	10°C or 50°F
6066	40**6067**	Boiler Anti-freeze Keep Warm (1)		Unit: ºC/ºF, Range: -40ºC to 100ºC or -40ºF to 212ºF		
6067	40**6068**	Boiler Anti-freeze Drain (0)	Signed *Scale 100*	Unit: ºC/ºF, Range: -40ºC to 100ºC or -40ºF to 212ºF *Value x 100 (e.g. 10ºC = 1000 or 40ºF = 4000)*	RO	1°C or 34°F

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6068	406069	Boiler Anti-freeze Drain (1)		Unit: ºC/ºF, Range: -40ºC to 100ºC or -40ºF to 212ºF		
6069	406070	Boiler Demand	Unsigned *Scale 100*	Unit: %, Range: 0% to 100% *Value x 100 (e.g. 10% = 1000)*	W	0%
6070	406071	Boiler Capacity	Unsigned *Scale 10*	Unit: kg/hr or lb/hr, Range: 0 to 3000kg/hr or 0 to 6613.8lb/hr *Value x 10 (e.g. 10 kg/hr = 100 or 10 lb/hr = 100)*	RO	15 kg/hr or 33.06 lb/hr
6071	406072	Boiler Power Output	Unsigned *Scale 100*	Unit: %, Range: 0% to 100% *Value x 100 (e.g. 10% = 1000)*	RO	0%
6072	406073	Boiler Run Time (0)	Unsigned *Scale 100*	Units: Hours (h), Range: 0 to 21474836.47 h *Value x 100 (e.g. 10h = 1000)*	RO	0h
6073	406074	Boiler Run Time (1)		Units: Hours (h), Range: 0 to 21474836.47 h		
6074	406075	Boiler Run Time (2)		Units: Hours (h), Range: 0 to 21474836.47 h		
6075	406076	Boiler Run Time (3)		Units: Hours (h), Range: 0 to 21474836.47 h		
6076	406077	Boiler On Time (0)	Unsigned *Scale 100*	Units: Hours (h), Range: 0 to 21474836.47 h *Value x 100 (e.g. 10h = 1000)*	RO	0h
6077	406078	Boiler On Time (1)		Units: Hours (h), Range: 0 to 21474836.47 h		
6078	406079	Boiler On Time (2)		Units: Hours (h), Range: 0 to 21474836.47 h		
6079	406080	Boiler On Time (3)		Units: Hours (h), Range: 0 to 21474836.47 h		
6080	406081	Boiler Service Run Time (0)	Unsigned *Scale 100*	Units: Hours (h), Range: 0 to 21474836.47 h *Value x 100 (e.g. 10h = 1000)*	RO	0h
6081	406082	Boiler Service Run Time (1)		Units: Hours (h), Range: 0 to 21474836.47 h		
6082	406083	Boiler Service Run Time (2)		Units: Hours (h), Range: 0 to 21474836.47 h		
6083	406084	Boiler Service Run Time (3)		Units: Hours (h), Range: 0 to 21474836.47 h		
6084	406085	Boiler Service On Time (0)	Unsigned *Scale 100*	Units: Hours (h), Range: 0 to 21474836.47 h *Value x 100 (e.g. 10h = 1000)*	RO	0h

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6085	406086	Boiler Service On Time (1)		Units: Hours (h), Range: 0 to 21474836.47 h		
6086	406087	Boiler Service On Time (2)		Units: Hours (h), Range: 0 to 21474836.47 h		
6087	406088	Boiler Service On Time (3)		Units: Hours (h), Range: 0 to 21474836.47 h		
6088	406089	Boiler Minimum Steam Output	Unsigned *Scale 1*	Unit: %, Range: 1% to 25% *Value x 1 (e.g. 1% = 1)*	W	5%
6089	406090	Boiler Drain Interval	Unsigned *Scale 1*	Units: Hours (h), Range: 0 to 24 h *Value x 1 (e.g. 1 h = 1)*	W	6h
6090	406091	Boiler Drain Volume	Unsigned *Scale 1*	Unit: %, Range: 25% to 100% *Value x 1 (e.g. 30% = 300)*	W	100%
6091	406092	Boiler Max Steam Output	Unsigned *Scale 1*	Unit: %, Range: 0% to 100% *Value x 1 (e.g. 30% = 300)*	W	100%
6092	406093	Boiler Idle Time Drain	Unsigned *Scale 1*	Unit: Hours (h), Range: 0 to 72 h *Value x 1 (e.g. 1 h = 1)*	W	24h
6093	406094	Boiler Idle Temperature Setpoint	Unsigned *Scale 1*	Unit: ºC/ºF, Range: 0°C to 60°C or 32°F or 140°F *Value x 1 (e.g. 5°C = 500 or 32ºF = 3200)*	W	0°C or 32°F
6094	406095	Boiler Blowdown Rate	Unsigned *Scale 1*	Unit: %, Range: 0% to 100% *Value x 1 (e.g.1% = 1)*	W	0%
6095	406096	Boiler Service Interval	Unsigned *Scale 1*	Unit: Hours (h), Range: 1000 to 3000 h *Value x 1 (e.g. 1500 h = 1500)*	W	1000h
6096	406097	Boiler Idle Tank Rinse Interval	Unsigned *Scale 1*	Unit: Days, Range: 1 to 7 days *Value x 1 (e.g. 1 day = 1)*	W	3 day
6097	406098	Actuator Deadband	Unsigned *Scale 1*	Unit: %, Range: 0% to 25% *Value x 1 (e.g. 5% = 5)*	W	5%
6098	406099	Boiler Manual Calibration Time (0)	Unsigned *Scale 100*	Units: Hours (h), Range: 0 to 21474836.47 h *Value x 100 (e.g. 10h = 1000)*	RO	0h
6099	406100	Boiler Manual Calibration Time (1)		Units: Hours (h), Range: 0 to 21474836.47 h		

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6100	40**6101**	Boiler Manual Calibration Time (2)		Units: Hours (h), Range: 0 to 21474836.47 h		
6101	40**6102**	Boiler Manual Calibration Time (4)		Units: Hours (h), Range: 0 to 21474836.47 h		
6102	40**6103**	Steam Valve Feedback	Unsigned *Scale 100*	Unit: %, Range: 0% to 100% *Value x 100 (e.g. 1% = 100)*	RO	0%
10000	4**10001**	Air Flow	Unsigned *Scale 1*	0 = Closed 1 = Open	RO	Closed
10001	4**10002**	Supply High Limit	Unsigned *Scale 1*	0 = Closed 1 = Open	RO	Closed
10002	4**10003**	Interlock	Unsigned *Scale 1*	0 = Closed 1 = Open	RO	Closed
10003	4**10004**	Binary External Demand	Unsigned *Scale 1*	0 = 0% 1 = 100%	RO	0%
10004	4**10005**	Water Leak Detection	Unsigned *Scale 1*	0 = Ok 1 = Leak	RO	Ok
10005	4**10006**	Thermal Cutout	Unsigned *Scale 1*	0 = Closed 1 = Open	RO	Closed
10006	4**10007**	RS485 Interface	Unsigned *Scale 1*	0 = No 1 = Yes	RO	No
10007	4**10008**	Ethernet Interface	Unsigned *Scale 1*	0 = No 1 = Yes	RO	No
10008	4**10009**	Contactors PCB Fuse	Unsigned *Scale 1*	0 = Normal 1 = Blown Fuse	RO	Normal
10009	4**10010**	Control PCB Fuse	Unsigned *Scale 1*	0 = Normal 1 = Open Fuse	RO	Normal
11000	4**11001**	Drain Valve	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
11001	4**11002**	Alarm Warning Relay	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off
11002	4**11003**	Service Warning Relay	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off
11003	4**11004**	Water Level Valve	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off
11004	4**11005**	Tank Water Valve	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off
11005	4**11006**	Drain Cooler Valve	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off
11006	4**11007**	Drain Pump	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off
11007	4**11008**	Drain Pump 2	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off
11008	4**11009**	Drain Pump 3	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off
11009	4**11010**	Alarm LED	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off
11010	4**11011**	Power LED	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off
11011	4**11012**	Buzzer	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off
12000	4**12001**	Network Control State	Unsigned *Scale 1*	0 = Normal 1 = Fault	W	Normal
12001	4**12002**	Water Level Low	Unsigned *Scale 1*	0 = Inactive 1 = Active	RO	Inactive

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
12002	4**12003**	Water Level High	Unsigned *Scale 1*	0 = Inactive 1 = Active	RO	Inactive
12003	4**12004**	Foam Sensor	Unsigned *Scale 1*	0 = NoFoam 1 = Foam	RO	NoFoam
12004	4**12005**	HRL Lock Setpoint	Unsigned *Scale 1*	0 = Unlock 1 = Lock	W	Unlock
12005	4**12006**	Notify Alarm	Unsigned *Scale 1*	0 = Off 1 = On	W	Off
12006	4**12007**	Notify Warning	Unsigned *Scale 1*	0 = Off 1 = On	W	Off
12007	4**12008**	Notify App Msg	Unsigned *Scale 1*	0 = Off 1 = On	W	Off
12008	4**12009**	Inhibit Resistive Probe	Unsigned *Scale 1*	0 = No 1 = Yes	W	No
12009	4**12010**	Boiler Service Operation	Unsigned *Scale 1*	0 = Not Allowed 1 = Allowed	W	Allowed
12010	4**12011**	Boiler Service Due	Unsigned *Scale 1*	0 = Off 1 = On	RO	Off
12011	4**12012**	Foam	Unsigned *Scale 1*	0 = Ok 1 = Detected	RO	Ok
12012	4**12013**	Boiler Line Rinse	Unsigned *Scale 1*	0 = Off 1 = On	W	On
12013	4**12014**	Power Up Drain	*Unsigned* *Scale 1*	0 = Off 1 = On	W	Off
12014	4**12015**	Manual Water Calibration State	*Unsigned* *Scale 1*	0 = Ok 1 = Required	RO	Ok

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
15000	4**15001**	System Power State	Unsigned *Scale 1*	0 = Off 1 = On	W	Off
15001	4**15002**	System Log Verbose Level	Unsigned *Scale 1*	0 = None 1 = Emergency 2 = Alert 3 = Critical 4 = Error 5 = Warning 6 = Notice 7 = Info 8 = Debug	W	Debug
15002	4**15003**	Modbus Server Units	Unsigned *Scale 1*	0 = Metric 1 = Imperial	W	Metric
15003	4**15004**	Control Signal Type	Unsigned *Scale 1*	0 = 0-10Vdc 1 = 2-10Vdc 2 = 4-20mA 3 = 0-20mA	W	0-10Vdc
15004	4**15005**	Room RH Signal Type	Unsigned *Scale 1*	0 = 0-10Vdc 1 = 2-10Vdc 2 = 4-20mA 3 = 0-20mA	W	0-10Vdc
15005	4**15006**	Supply RH Signal Type	Unsigned *Scale 1*	0 = 0-10Vdc 1 = 2-10Vdc 2 = 4-20mA 3 = 0-20mA	W	0-10Vdc
15006	4**15007**	Control Profile	Unsigned *Scale 1*	0 = ExternAnalog 1 = ExternNetwork 2 = InternAnalog 3 = InternNetwork 4 = HRL 5 = Custom	W	ExternAnalog
15007	4**15008**	Modulating High Limit Profile	Unsigned *Scale 1*	0 = Disabled 1 = ExternAnalog 2 = ExternNetwork 3 = InternAnalog 4 = InternNetwork 5 = Custom	W	Disabled
15008	4**15009**	Occupancy State	Unsigned *Scale 1*	0 = Occupied 1 = Unoccupied 2 = Vacant 3 = Off	RO	Occupied
15009	4**15010**	Room RH Source	Unsigned *Scale 1*	0 = None 1 = RoomRH 2 = Network	W	None
15010	4**15011**	Room RH Setpoint Source	Unsigned Scale 1	0 = None 1 = Internal 2 = ControlInput	W	None
15011	4**15012**	Supply High Limit Reading Source	Unsigned Scale 1	0 = None 1 = SuppyHLRH 2 = Network	W	None

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
15012	4**15013**	Supply High Limit Setpoint Source	Unsigned *Scale 1*	0 = None 1 = Internal 2 = ControlInput	W	None
15013	4**15014**	Humidity Control Demand Source	Unsigned *Scale 1*	0 = None 1 = ControlInput 2 = RoomDemand 3 = Network	W	ControlInput
15014	4**15015**	Humidity Control High Limit Source	Unsigned *Scale 1*	0 = None 1 = ControlInput 2 = SupplyHLDemand 3 = Network	W	None
15015	4**15016**	Humidity Control Cutout State	Unsigned *Scale 1*	0 = Off 1 = Normal 2 = LowLimit 3 = HighLimit 4 = NoAirFlow 5 = Interlock	RO	Off
15016	4**15017**	Boiler Request	Unsigned *Scale 1*	0 = None 1 = Reset Alarms 2 = Drain 3 = Reset Counters 4 = Filling 5 = WaterCalib	W	None
15017	4**15018**	Boiler State	Unsigned *Scale 1*	0 = Off 1 = Idle 2 = LineRinse 3 = TankRinse 4 = Filling 5 = Draining 6 = Heating 7 = Boiling 8 = Alarm	RO	Off
15018	4**15019**	Boiler Fill Mode	Unsigned *Scale 1*	0 = OneShot 1 = Pulsed	W	Pulsed
15019	4**15020**	Boiler Alarm	Unsigned *Scale 1*	0 = Normal 1 = FailedPump 2 = FillTimeout 3 = BlockedPiping 4 = HeatTimeout 5 = Overheat 6 = WaterLeak 7 = Service *8 is Reserved* 9 = TankBlocked 10 = RefillDelay	RO	Normal
15020	4**15021**	Boiler Idle Tank Rinse On	Unsigned *Scale 1*	0 = Off 1 = On	W	Off
15021	4**15022**	Boiler Idle Tank Rinse Off	Unsigned *Scale 1*	0 = Off 1 = On	W	Off
15022	4**15023**	Water Probe Auto Calib	Unsigned *Scale 1*	0 = None 1 = Once 2 = Always	W	Always

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
15023	4**15024**	Boiler Startup Tank Rinse	Unsigned *Scale 1*	0 = Off 1 = On	W	Off
15024	4**15025**	Water Level Probe Warning	Unsigned *Scale 1*	0 = Ok 1 = Replace	RO	OK
15025	4**15026**	Water Level Probe Failure	Unsigned *Scale 1*	0 = None 1 = Capacitive 2 = Resistive 3 = Both	RO	None
15026	4**15027**	Water Level Probe Alarm	Unsigned *Scale 1*	0 = OK 1 = Defect 2 = NoCalib	RO	Ok

Notes

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