



**neptronic®**

# **SKS4 Steam to Steam Humidifier**

## **Modbus Communication Module User Guide**



## Introduction

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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 <i>Scale 100</i>	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 <i>Scale 100</i>	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	406012	Supply High Limit RH Bias	Signed Scale 100	Unit: %, Range: -10% to 10% Value x 100 (e.g. 10% = 1000)	W	0%
6012	406013	Water Temperature Signal Min	Unsigned Scale 1000	Unit: Volt (V), Range: 0V to 10V Value x 1000 (e.g. 1V = 1000)	RO	0V
6013	406014	Water Temperature Signal Max	Unsigned Scale 1000	Unit: Volt (V), Range: 0V to 10V Value x 1000 (e.g. 1V = 1000)	RO	0V
6014	406015	Water Temperature	Unsigned Scale 100	Unit: °C/°F, Range: 0°C to 125°C or 32°F to 257°F Value x 100 (e.g. 5°C = 500 or 40°F = 4000)	RO	50°C or 122°F
6015	406016	Water Temperature Min	Unsigned Scale 100	Unit: °C/°F, Range: 0°C to 250°C or 32°F to 482°F Value x 100 (e.g. 5°C = 500 or 40°F = 4000)	RO	0°C or 32°F
6016	406017	Water Temperature Max	Unsigned Scale 100	Unit: °C/°F, Range: 0°C to 250°C or 32°F to 482°F Value x 100 (e.g. 5°C = 500 or 40°F = 4000)	RO	125°C or 257°F
6017	406018	Water Temperature Bias	Unsigned Scale 100	Unit: °C/°F, Range: -10°C to 10°C or -18°F to 18°F Value x 100 (e.g. 5°C = 500 or 14°F = 1400)	RO	0°C or 32°F
6018	406019	Cabinet Temperature	Unsigned Scale 100	Unit: °C/°F, Range: -20°C to 100°C or -4°F to 212°F Value x 100 (e.g. 5°C = 500 or 10°F = 1000)	RO	0°C or 32°F
6019	406020	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	406021	Modbus TCP IP Keep Alive Time Out (1)		Unit: Minutes (min), Range: 1 to 1440 mins		
6021	406022	HRL Temperature	Signed Scale 100	Unit: °C/°F, Range: -40°C to 260°C or -40°F to 500°F Value x 100 (e.g. 5°C = 500 or 40°F = 4000)	RO	0°C or 32°F
6022	406023	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	406024	Board Temperature	Unsigned Scale 100	Unit: °C/°F, Range: 0°C to 100°C or 32°F to 212°F Value x 100 (e.g. 5°C = 500 or 32°F = 3200)	RO	0°C or 32°F
6024	406025	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	406026	Power Output Feedback Min	Unsigned Scale 1000	Unit: Volt (V), Range: 0V to 10V Value x 1000 (e.g. 1V = 1000)	W	0V
6026	406027	Power Output Feedback Max	Unsigned Scale 1000	Unit: Volt (V), Range: 0V to 10V Value x 1000 (e.g. 1V = 1000)	W	0V
6027	406028	Power Output Feedback	Unsigned Scale 100	Unit: %, Range: 0% to 100% Value x 100 (e.g. 10% = 1000)	RO	0%
6028	406029	Steam Valve Control	Unsigned Scale 100	Unit: %, Range: 0% to 100% Value x 100 (e.g. 10% = 1000)	RO	0%
6029	406030	Water Level	Unsigned Scale 10	Unit: %, Range: 0% to 120% Value x 10 (e.g. 10% = 100)	RO	78%
6030	406031	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	406032	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	406033	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	406034	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	406035	Room RH Network Reading	Unsigned Scale 100	Unit: % RH, Range: 0% RH to 100% RH Value x 100 (e.g. 10% RH = 1000)	RO	0% RH
6035	406036	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	406037	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	406038	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	406039	Room Demand Proportional Gain	Unsigned Scale 10	No Unit, Range: 1 to 200 Value x 10 (e.g. 10 = 100)	W	28.5



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6039	406040	Room Demand Integral Time	Unsigned Scale 10	Unit: sec, Range: 0 to 900 sec Value x 10 (e.g. 10sec = 100)	W	15 sec
6040	406041	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	406042	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	406043	Room Demand Proportional Band (0)	Unsigned Scale 10	Unit: %, Range: 1% to 100% Value x 10 (e.g. 10% RH = 100)	W	5%
6043	406044	Room Demand Proportional Band (1)		Unit: %, Range: 1% to 100%		
6044	406045	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	406046	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	406047	Supply High Limit Proportional Gain	Unsigned Scale 10	No Unit, Range: 1 to 200 Value x 10 (e.g. 10 = 100)	W	28.5
6047	406048	Supply High Limit Integral Time	Unsigned Scale 10	Unit: sec, Range: 0 to 900 sec Value x 10 (e.g. 10sec = 100)	W	15 sec
6048	406049	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	406050	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	406051	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	406052	Supply High Limit Proportional Band (1)		Unit: %, Range: 1% to 100%		
6052	406053	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	406054	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	406055	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	406056	Humidity Demand Low Dead Band (0)	Unsigned Scale 100	Unit: %, Range: 0% to 100% Value x 100 (e.g. 10% = 1000)	W	1%
6056	406057	Humidity Demand Low Dead Band (1)		Unit: %, Range: 0% to 100%		
6057	406058	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	406059	Network Timeout (1)		Unit: Seconds (sec), Range: 1 to 900 sec		
6059	406060	System Power Output	Unsigned Scale 100	Unit: %, Range: 0% to 100% Value x 100 (e.g. 10% = 1000)	RO	0%
6060	406061	System Steam Capacity	Unsigned Scale 10	Unit: kg/hr or lb/hr, Range: 0 to 300 kg/hr or 0 to 66 lb/hr Value x 10 (e.g. 10 kg/hr = 100 or 10 lb/hr = 100)	RO	0 kg/hr or 0 lb/hr
6061	406062	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	406063	Water Level Replace Interval (1)		Unit: Days, Range: 0 day to 7 days Value x 1 (e.g. 1 day = 1)		
6063	406064	Boiler Anti-freeze Keep Warm Setpoint (0)	Signed Scale 100	Unit: °C/°F, Range: -40°C to 100°C or -40°F to 212°F Value x 100 (e.g. 10°C = 1000 or 40°F = 4000)	RO	30°C or 86°F
6064	406065	Boiler Anti-freeze Keep Warm Setpoint (1)		Unit: °C/°F, Range: -40°C to 100°C or -40°F to 212°F		
6065	406066	Boiler Anti-freeze Keep Warm (0)	Signed Scale 100	Unit: °C/°F, Range: -40°C to 100°C or -40°F to 212°F Value x 100 (e.g. 10°C = 1000 or 40°F = 4000)	RO	10°C or 50°F
6066	406067	Boiler Anti-freeze Keep Warm (1)		Unit: °C/°F, Range: -40°C to 100°C or -40°F to 212°F		
6067	406068	Boiler Anti-freeze Drain (0)	Signed Scale 100	Unit: °C/°F, Range: -40°C to 100°C or -40°F to 212°F Value x 100 (e.g. 10°C = 1000 or 40°F = 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: °C/°F, Range: -40°C to 100°C or -40°F to 212°F		
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: °C/°F, Range: 0°C to 60°C or 32°F or 140°F Value x 1 (e.g. 5°C = 500 or 32°F = 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	406101	Boiler Manual Calibration Time (2)		Units: Hours (h), Range: 0 to 21474836.47 h		
6101	406102	Boiler Manual Calibration Time (4)		Units: Hours (h), Range: 0 to 21474836.47 h		
6102	406103	Steam Valve Feedback	Unsigned Scale 100	Unit: %, Range: 0% to 100% Value x 100 (e.g. 1% = 100)	RO	0%
10000	410001	Air Flow	Unsigned Scale 1	0 = Closed 1 = Open	RO	Closed
10001	410002	Supply High Limit	Unsigned Scale 1	0 = Closed 1 = Open	RO	Closed
10002	410003	Interlock	Unsigned Scale 1	0 = Closed 1 = Open	RO	Closed
10003	410004	Binary External Demand	Unsigned Scale 1	0 = 0% 1 = 100%	RO	0%
10004	410005	Water Leak Detection	Unsigned Scale 1	0 = Ok 1 = Leak	RO	Ok
10005	410006	Thermal Cutout	Unsigned Scale 1	0 = Closed 1 = Open	RO	Closed
10006	410007	RS485 Interface	Unsigned Scale 1	0 = No 1 = Yes	RO	No
10007	410008	Ethernet Interface	Unsigned Scale 1	0 = No 1 = Yes	RO	No
10008	410009	Contactors PCB Fuse	Unsigned Scale 1	0 = Normal 1 = Blown Fuse	RO	Normal
10009	410010	Control PCB Fuse	Unsigned Scale 1	0 = Normal 1 = Open Fuse	RO	Normal
11000	411001	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	411002	Alarm Warning Relay	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11002	411003	Service Warning Relay	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11003	411004	Water Level Valve	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11004	411005	Tank Water Valve	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11005	411006	Drain Cooler Valve	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11006	411007	Drain Pump	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11007	411008	Drain Pump 2	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11008	411009	Drain Pump 3	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11009	411010	Alarm LED	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11010	411011	Power LED	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11011	411012	Buzzer	Unsigned Scale 1	0 = Off 1 = On	RO	Off
12000	412001	Network Control State	Unsigned Scale 1	0 = Normal 1 = Fault	W	Normal
12001	412002	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	412003	Water Level High	Unsigned Scale 1	0 = Inactive 1 = Active	RO	Inactive
12003	412004	Foam Sensor	Unsigned Scale 1	0 = NoFoam 1 = Foam	RO	NoFoam
12004	412005	HRL Lock Setpoint	Unsigned Scale 1	0 = Unlock 1 = Lock	W	Unlock
12005	412006	Notify Alarm	Unsigned Scale 1	0 = Off 1 = On	W	Off
12006	412007	Notify Warning	Unsigned Scale 1	0 = Off 1 = On	W	Off
12007	412008	Notify App Msg	Unsigned Scale 1	0 = Off 1 = On	W	Off
12008	412009	Inhibit Resistive Probe	Unsigned Scale 1	0 = No 1 = Yes	W	No
12009	412010	Boiler Service Operation	Unsigned Scale 1	0 = Not Allowed 1 = Allowed	W	Allowed
12010	412011	Boiler Service Due	Unsigned Scale 1	0 = Off 1 = On	RO	Off
12011	412012	Foam	Unsigned Scale 1	0 = Ok 1 = Detected	RO	Ok
12012	412013	Power Up Drain	Unsigned Scale 1	0 = Off 1 = On	W	Off
12013	412014	Manual Water Calibration State	Unsigned Scale 1	0 = Ok 1 = Required	RO	Ok
15000	415001	System Power State	Unsigned Scale 1	0 = Off 1 = On	W	Off

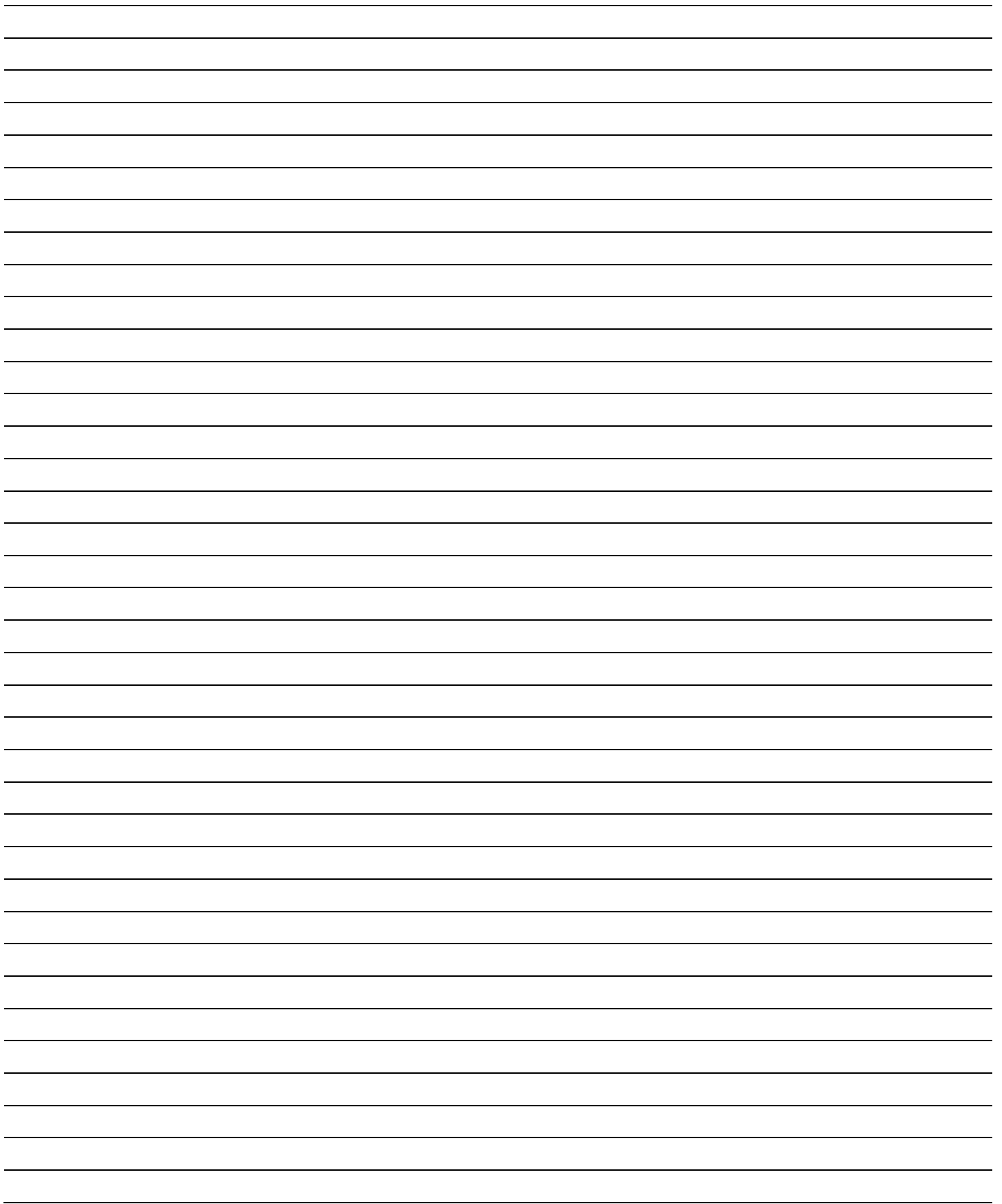
Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
15001	415002	System Log Verbose Level	Unsigned Scale 1	0 = None 1 = Emergency 2 = Alert 3 = Critical 4 = Error 5 = Warning 6 = Notice 7 = Info 8 = Debug	W	Debug
15002	415003	Modbus Server Units	Unsigned Scale 1	0 = Metric 1 = Imperial	W	Metric
15003	415004	Control Signal Type	Unsigned Scale 1	0 = 0-10Vdc 1 = 2-10Vdc 2 = 4-20mA 3 = 0-20mA	W	0-10Vdc
15004	415005	Room RH Signal Type	Unsigned Scale 1	0 = 0-10Vdc 1 = 2-10Vdc 2 = 4-20mA 3 = 0-20mA	W	0-10Vdc
15005	415006	Supply RH Signal Type	Unsigned Scale 1	0 = 0-10Vdc 1 = 2-10Vdc 2 = 4-20mA 3 = 0-20mA	W	0-10Vdc
15006	415007	Control Profile	Unsigned Scale 1	0 = ExternAnalog 1 = ExternNetwork 2 = InternAnalog 3 = InternNetwork 4 = HRL 5 = Custom	W	ExternAnalog
15007	415008	Modulating High Limit Profile	Unsigned Scale 1	0 = Disabled 1 = ExternAnalog 2 = ExternNetwork 3 = InternAnalog 4 = InternNetwork 5 = Custom	W	Disabled
15008	415009	Occupancy State	Unsigned Scale 1	0 = Occupied 1 = Unoccupied 2 = Vacant 3 = Off	RO	Occupied
15009	415010	Room RH Source	Unsigned Scale 1	0 = None 1 = RoomRH 2 = Network	W	None
15010	415011	Room RH Setpoint Source	Unsigned Scale 1	0 = None 1 = Internal 2 = ControllInput	W	None
15011	415012	Supply High Limit Reading Source	Unsigned Scale 1	0 = None 1 = SuppyHLRH 2 = Network	W	None
15012	415013	Supply High Limit Setpoint Source	Unsigned Scale 1	0 = None 1 = Internal 2 = ControllInput	W	None



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
15013	415014	Humidity Control Demand Source	Unsigned Scale 1	0 = None 1 = ControllInput 2 = RoomDemand 3 = Network	W	ControllInput
15014	415015	Humidity Control High Limit Source	Unsigned Scale 1	0 = None 1 = ControllInput 2 = SupplyHLDemand 3 = Network	W	None
15015	415016	Humidity Control Cutout State	Unsigned Scale 1	0 = Off 1 = Normal 2 = LowLimit 3 = HighLimit 4 = NoAirFlow 5 = Interlock	RO	Off
15016	415017	Boiler Request	Unsigned Scale 1	0 = None 1 = Reset Alarms 2 = Drain 3 = Reset Counters 4 = Filling 5 = WaterCalib	W	None
15017	415018	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	415019	Boiler Fill Mode	Unsigned Scale 1	0 = OneShot 1 = Pulsed	W	Pulsed
15019	415020	Boiler Alarm	Unsigned Scale 1	0 = Normal 1 = FailedPump 2 = FillTimeout 3 = BlockedPiping 4 = HeatTimeout 5 = Overheat 6 = WaterLeak 7 = Service 8 = Foaming 9 = TankBlocked 10 = RefillDelay	RO	Normal
15020	415021	Boiler Idle Tank Rinse On	Unsigned Scale 1	0 = Off 1 = On	W	Off
15021	415022	Boiler Idle Tank Rinse Off	Unsigned Scale 1	0 = Off 1 = On	W	Off
15022	415023	Water Probe Auto Calib	Unsigned Scale 1	0 = None 1 = Once 2 = Always	W	Always
15023	415024	Boiler Startup Tank Rinse	Unsigned Scale 1	0 = Off 1 = On	W	Off

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
15024	415025	Water Level Probe Warning	Unsigned <i>Scale 1</i>	0 = Ok 1 = Calib 2 = Replace	RO	OK
15025	415026	Water Level Probe Failure	Unsigned <i>Scale 1</i>	0 = None 1 = Capacitive 2 = Resistive 3 = Both	RO	None
15026	415027	Water Level Probe Alarm	Unsigned <i>Scale 1</i>	0 = OK 1 = Defect 2 = NoCalib	RO	Ok







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