



neptronic®

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 40001).
- *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 <i>Detection Value/100 (e.g. 38400 baud = 384)</i>	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	0 to 10500 Value x 1000 (e.g. 1V = 1000)	RO	0
2001	402002	Room RH Signal	Unsigned Scale 1000	0 to 10500 Value x 1000 (e.g. 1V = 1000)	RO	0
2002	402003	Supply RH Signal	Unsigned Scale 1000	0 to 10500 Value x 1000 (e.g. 1V = 1000)	RO	0
2003	402004	Water Level Signal	Unsigned Scale 1	0 to 30000 Value x 1 (e.g. 10Hz = 10)	RO	0
2004	402005	Water Level Low Signal	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	RO	0
2005	402006	Water Level High Signal	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	RO	0
2006	402007	Water Temperature Signal	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	RO	0
2007	402008	Foam Signal	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	RO	0
2008	402009	Cabinet Temperature Signal	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	RO	0
2009	402010	Board Temperature Signal	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	RO	0
2010	402011	Main Power Supply	Unsigned Scale 10	0 to 400 Value x 10 (e.g. 1V = 10)	RO	0
2011	402012	Steam Valve Feedback Signal	Unsigned Scale 1000	0 to 10500 Value x 1000 (e.g. 1V=1000)	RO	0
4000	404001	Steam Output Feedback Signal	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	RO	0



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6000	406001	Control Input	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6001	406002	Room RH	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	RO	0
6002	406003	Supply High Limit RH	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	RO	0
6003	406004	Water Temperature Signal Min	Unsigned Scale 1000	0 to 10000 Value x 100 (e.g. 1V = 1000)	RO	0
6004	406005	Water Temperature Signal Max	Unsigned Scale 1000	0 to 10000 Value x 100 (e.g. 1V = 1000)	RO	0
6005	406006	Water Temperature	Unsigned Scale 100	0 to 12500 Value x 100 (e.g. 10C = 1000)	RO	5000
6006	406007	Water Temperature Min	Unsigned Scale 100	0 to 25000 Value x 100 (e.g. 10C = 1000)	RO	0
6007	406008	Water Temperature Max	Unsigned Scale 100	0 to 25000 Value x 100 (e.g. 10C = 1000)	RO	12500
6008	406009	Water Temperature Bias	Unsigned Scale 100	-1000 to 1000 Value x 100 (e.g. 10C = 1000)	RO	0
6009	406010	Cabinet Temperature	Unsigned Scale 100	-2000 to 10000 Value x 100 (e.g. 10C = 1000)	RO	0
6010	406011	HRL Temperature	Signed Scale 100	-4000 to 26000 Value x 100 (e.g. 10C = 1000)	RO	0
6011	406012	HRL Humidity	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 1%RH = 100)	RO	0
6012	406013	Board Temperature	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10C = 1000)	RO	0
6013	406014	Power Output Feedback	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6014	406015	Water Level	Unsigned Scale 10	0 to 2000 Value x 10 (e.g. 10% = 100)	RO	780



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6015	406016	Water Probe Low Pos Reading	Unsigned Scale 1	0 to 30000 Value x 1 (e.g. 1Hz = 1)	RO	30000
6016	406017	Water Probe High Pos Reading	Unsigned Scale 1	0 to 30000 Value x 1 (e.g. 1Hz = 1)	RO	30000
6017	406018	Water Probe Abs Low Pos Reading	Unsigned Scale 1	0 to 30000 Value x 1 (e.g. 1Hz = 1)	RO	30000
6018	406019	Water Probe Abs High Pos Reading	Unsigned Scale 1	0 to 30000 Value x 1 (e.g. 1Hz = 1)	RO	30000
6019	406020	Room RH Network Reading	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	RO	0
6020	406021	Room RH Setpoint	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	4000
6021	406022	Room RH Unoccupied Setpoint	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	3000
6022	406023	Room RH Vacant Setpoint	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	2000
6023	406024	Room Demand	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6024	406025	Supply High Limit Network Reading	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	0
6025	406026	Supply High Limit Setpoint	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	8000
6026	406027	Supply High Limit Demand	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6027	406028	Humidity Control Network Demand	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
6028	406029	Humidity Control Network High Limit	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	10000
6029	406030	Humidity Demand	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6030	406031	Humidity Demand Low Dead Band (0)	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% =1000)	W	100
6031	406032	Humidity Demand Low Dead Band (1)		0 to 10000 Value x 100 (e.g. 10% =1000)		
6032	406033	Network Timeout (0)	Unsigned Scale 1	1 to 15 Value x 1 (e.g. 1 min = 1)	W	15
6033	406034	Network Timeout (1)				
6034	406035	System Power Output	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6035	406036	System Steam Capacity.	Unsigned Scale 10	0 to 30000 Value x 10 (e.g 10 kg/h = 100)	RO	0
6036	406037	AFKW Stp (0)	Signed Scale 100	-4000 to 10000 Value x 100 (e.g. 10C = 1000)	RO	3000
6037	406038	AFKW Stp (1)		-4000 to 10000		
6038	406039	AF Keep Warm (0)	Signed Scale 100	-4000 to 10000 Value x 100 (e.g. 10C = 1000)	RO	1000
6039	406040	AF Keep Warm (1)		-4000 to 10000		
6040	406041	AF Drain (0)	Signed Scale 100	-4000 to 10000 Value x 100 (e.g. 10C = 1000)	RO	100
6041	406042	AF Drain (1)		-4000 to 10000		
6042	406043	Boiler Demand	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
6043	406044	Boiler Capacity	Unsigned Scale 10	0 to 30000 Value x 10 (e.g. 1kg/h = 10)	RO	150
6044	406045	Boiler Power Output	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6045	406046	Boiler Run Time (0)	Unsigned Scale 100	0 to 2147483647 Value x 100 (e.g. 10h = 1000)	RO	0



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6046	406047	Boiler Run Time (1)		0 to 2147483647		
6047	406048	Boiler Run Time (2)		0 to 2147483647		
6048	406049	Boiler Run Time (3)		0 to 2147483647		
6049	406050	Boiler On Time (0)	Unsigned Scale 100	0 to 2147483647 Value x 100 (e.g. 10h = 1000)	RO	0
6050	406051	Boiler On Time (1)		0 to 2147483647		
6051	406052	Boiler On Time (2)		0 to 2147483647		
6052	406053	Boiler On Time (3)		0 to 2147483647		
6053	406054	Boiler Service Run Time (0)	Unsigned Scale 100	0 to 2147483647 Value x 100 (e.g. 10h = 1000)	RO	0
6054	406055	Boiler Service Run Time (1)		0 to 2147483647		
6055	406056	Boiler Service Run Time (2)		0 to 2147483647		
6056	406057	Boiler Service Run Time (3)		0 to 2147483647		
6057	406058	Boiler Service On Time (0)	Unsigned Scale 100	0 to 2147483647 Value x 100 (e.g. 10h = 1000)	RO	0
6058	406059	Boiler Service On Time (1)		0 to 2147483647		
6059	406060	Boiler Service On Time (2)		0 to 2147483647		
6060	406061	Boiler Service On Time (3)		0 to 2147483647		
6061	406062	Boiler Minimum Steam Output	Unsigned Scale 1	1 to 25 Value x 1 (e.g. 1% = 1)	W	5
6062	406063	Boiler Drain Interval	Unsigned Scale 1	0 to 24 Value x 1 (e.g. 1h = 1)	W	6
6063	406064	Boiler Drain Volume	Unsigned Scale 1	25 to 100 Value x 1 (e.g. 1% = 1)	W	100



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6064	406065	Boiler Max Steam Output	Unsigned Scale 1	0 to 100 Value x 1 (e.g. 1% = 1)	W	100
6065	406066	Boiler Idle Time Drain	Unsigned Scale 1	0 to 72 Value x 1 (e.g. 1h = 1)	W	24
6066	406067	Boiler Idle Temperature Setpoint	Unsigned Scale 1	0 to 60 Value x 1 (e.g. 1°C = 1)	W	0
6067	406068	Boiler Blowdown Rate	Unsigned Scale 1	0 to 100 Value x 1 (e.g. 1% = 1)	W	0
6068	406069	Boiler Service Interval	Unsigned Scale 1	1000 to 3000 Value x 1 (e.g. 1h = 1)	W	1000
6069	406070	Boiler Idle Tank Rinse Interval	Unsigned Scale 1	1 to 7 Value x 1 (e.g. 1 day = 1)	W	3
6070	406071	Actuator Deadband	Unsigned Scale 1	0 to 25 Value x 1 (e.g. 5 = 5)	W	5
6071	406072	Steam Valve Feedback	Unsigned Scale 100	0 to 10000 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



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
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
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



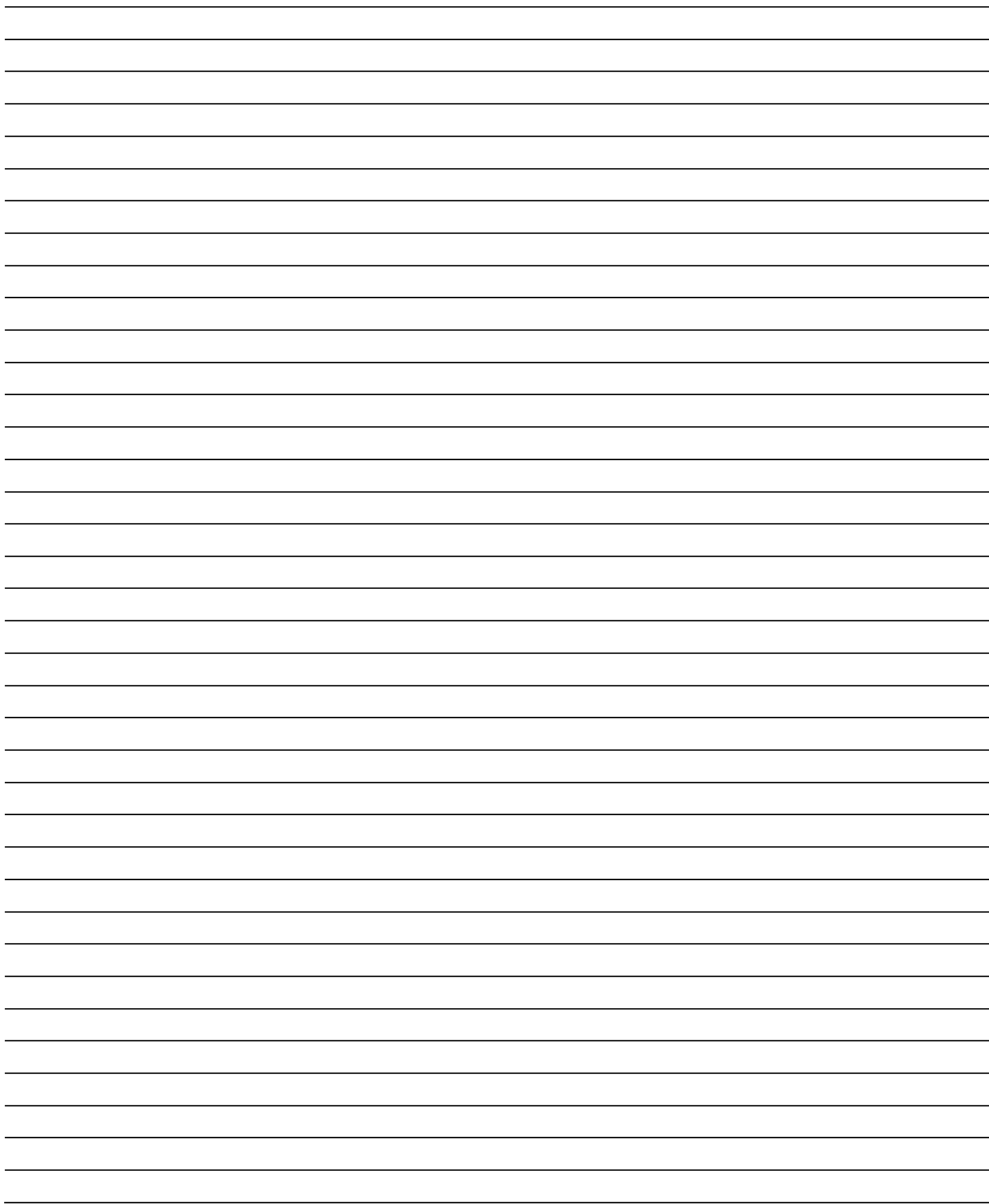
Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
11010	411011	Power LED	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11011	411012	Buzzer	Unsigned Scale 1	0 = Off 1 = On	RO	Off
12000	412001	System Production Test Done	Unsigned Scale 1	0 = Inactive 1 = Active	RO	Inactive
12001	412002	Network Control State	Unsigned Scale 1	0 = Normal 1 = Fault	W	Normal
12002	412003	Water Level Low	Unsigned Scale 1	0 = Inactive 1 = Active	RO	Inactive
12003	412004	Water Level High	Unsigned Scale 1	0 = Inactive 1 = Active	RO	Inactive
12004	412005	Foam Sensor	Unsigned Scale 1	0 = NoFoam 1 = Foam	RO	NoFoam
12005	412006	HRL Lock Setpoint	Unsigned Scale 1	0 = Unlock 1 = Lock	W	Unlock
12006	412007	Boiler Service Operation	Unsigned Scale 1	0 = Not Allowed 1 = Allowed	W	Allowed
12007	412008	Boiler Service Due	Unsigned Scale 1	0 = Off 1 = On	RO	Off
12008	412009	Boiler Foam State	Unsigned Scale 1	0 = NotFoaming 1 = Foaming	RO	NotFoaming
15000	415001	System Power State	Unsigned Scale 1	0 = Off 1 = On	W	Off
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

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
15002	415003	Modbus Server Units	Unsigned Scale 1	0 = Metric 1 = Imperial	W	Metric
15003	415004	Control Profile	Unsigned Scale 1	0 = ExternAnalog 1 = ExternNetwork 2 = InternAnalog 3 = InternNetwork 4 = HRL 5 = Custom	W	ExternAnalog
15004	415005	Modulating High Limit Profile	Unsigned Scale 1	0 = Disabled 1 = ExternAnalog 2 = ExternNetwork 3 = InternAnalog 4 = InternNetwork 5 = Custom	W	Disabled
15005	415006	Occupancy State	Unsigned Scale 1	0 = Occupied 1 = Unoccupied 2 = Vacant 3 = Off	RO	Occupied
15006	415007	Room RH Source	Unsigned Scale 1	0 = None 1 = RoomRH 2 = Network	W	None
15007	415008	Room RH Setpoint Source	Unsigned Scale 1	0 = None 1 = Internal 2 = ControllInput	W	None
15008	415009	Supply High Limit Reading Source	Unsigned Scale 1	0 = None 1 = SupplyHLRH 2 = Network	W	None
15009	415010	Supply High Limit Setpoint Source	Unsigned Scale 1	0 = None 1 = Internal 2 = ControllInput	W	None
15010	415011	Humidity Control Demand Source	Unsigned Scale 1	0 = None 1 = ControllInput 2 = RoomDemand 3 = Network	W	ControllInput
15011	415012	Humidity Control High Limit Source	Unsigned Scale 1	0 = None 1 = ControllInput 2 = SupplyHLDemand 3 = Network	W	None
15012	415013	Humidity Control Cutout State	Unsigned Scale 1	0 = Off 1 = Normal 2 = LowLimit 3 = HighLimit 4 = NoAirFlow 5 = Interlock	RO	Off
15013	415014	Boiler Request	Unsigned Scale 1	0 = None 1 = Reset Alarms 2 = Drain 3 = Reset Counters 4 = Filling 5 = WaterCalib	W	None



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
15014	415015	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
15015	415016	Boiler Fill Mode	Unsigned Scale 1	0 = OneShot 1 = Pulsed	W	Pulsed
15016	415017	Boiler Alarm	Unsigned Scale 1	0 = Normal 1 = FailedPump 2 = FillTimeout 3 = BlockedPiping 4 = HeatTimeout 5 = Overheat 6 = WaterLeak 7 = Service 8 = Foaming	RO	Normal
15017	415018	Boiler Idle Tank Rinse On	Unsigned Scale 1	0 = Off 1 = On	W	Off
15018	415019	Boiler Idle Tank Rinse Off	Unsigned Scale 1	0 = Off 1 = On	W	Off
15019	415020	Water Probe Auto Calib	Unsigned Scale 1	0 = None 1 = Once 2 = Always	W	Always
15020	415021	Boiler Startup Tank Rinse	Unsigned Scale 1	0 = Off 1 = On	W	Off

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