



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	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 <i>Baud Rate 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	



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
7	400008	Product Actual Firmware Version (in Integer x100).	Unsigned Scale 100	1 to 65535 (e.g. 100)	RO	
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	157
2007	402008	Foam Signal.	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	RO	0
2008	402009	SSR Temperature Signal.	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	RO	0
2009	402010	Current Sensor 1 Signal.	Unsigned Scale 1000	0 to 3300 Value x 1000 (e.g. 1V = 1000)	RO	0
2010	402011	Current Sensor 2 Signal.	Unsigned Scale 1000	0 to 3300 Value x 1000 (e.g. 1V = 1000)	RO	0



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
2011	40 2012	Cabinet Temperature Signal.	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	RO	0
2012	40 2013	Main Power Supply.	Unsigned Scale 10	0 to 400 Value x 10 (e.g. 1V = 10)	RO	0
4000	40 4001	Power Output Feedback Signal.	Unsigned Scale 1000	0 to 10000 Value x 1000 (e.g. 1V = 1000)	RO	0
4001	40 4002	Heater SSR Stage.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
4002	40 4003	Local Display Backlight Output.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6000	40 6001	Control Input.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6001	40 6002	Room RH.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	RO	0
6002	40 6003	Supply High Limit RH.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	RO	0
6003	40 6004	Water Temperature.	Unsigned Scale 100	0 to 12500 Value x 100 (e.g. 10C = 1000)	RO	5000
6004	40 6005	SSR Temperature.	Signed Scale 100	-2000 to 10000 Value x 100 (e.g. 10C = 1000)	RO	0
6005	40 6006	Current Sensor 1 (0).	Unsigned Scale 100	0 to 15000 Value x 100 (e.g. 10A = 1000)	RO	0
6006	40 6007	Current Sensor 1 (1).		0 to 15000		
6007	40 6008	Current Sensor 2 (0).	Unsigned Scale 100	0 to 15000 Value x 100 (e.g. 10A = 1000)	RO	0
6008	40 6009	Current Sensor 2 (1).		0 to 15000		



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6009	406010	Board Temperature.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10C = 1000)	RO	0
6010	406011	Power Output Feedback.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6011	406012	Water Level.	Unsigned Scale 10	0 to 2000 Value x 10 (e.g. 10% = 100)	RO	780
6012	406013	Room RH Network Reading.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	RO	0
6013	406014	Room RH Setpoint.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	4000
6014	406015	Room RH Unoccupied Setpoint.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	3000
6015	406016	Room RH Vacant Setpoint.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	2000
6016	406017	Room Demand.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6017	406018	Supply High Limit Network Reading.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	0
6018	406019	Supply High Limit Setpoint.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% hum = 1000)	W	8000
6019	406020	Supply High Limit Demand.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6020	406021	Humidity Control Network Demand.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
6021	406022	Humidity Control Network High Limit.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	10000
6022	406023	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
6023	406024	SDU Fan Off Delay.	Unsigned Scale 1	5 to 20 Value x 1 (e.g. 5min = 5)	W	5
6024	406025	System Power Output.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6025	406026	System Steam Capacity.	Unsigned Scale 10	0 to 30000 Value x 10 (e.g. 10 kg/h = 100)	RO	0
6026	406027	Boiler Demand.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	W	0
6027	406028	Boiler Power Output.	Unsigned Scale 100	0 to 10000 Value x 100 (e.g. 10% = 1000)	RO	0
6028	406029	Boiler Run Time (0).	Unsigned Scale 100	0 to 2147483647 Value x 100 (e.g. 10h = 1000)	RO	0
6029	406030	Boiler Run Time (1)		0 to 2147483647		
6030	406031	Boiler Run Time (2).		0 to 2147483647		
6031	406032	Boiler Run Time (3).		0 to 2147483647		
6032	406033	Boiler On Time (0).	Unsigned Scale 100	0 to 2147483647 Value x 100 (e.g. 10h = 1000)	RO	0
6033	406034	Boiler On Time (1).		0 to 2147483647		
6034	406035	Boiler On Time (2).		0 to 2147483647		
6035	406036	Boiler On Time (3).		0 to 2147483647		
6036	406037	Boiler Service Run Time (0).	Unsigned Scale 100	0 to 2147483647 Value x 100 (e.g. 10h = 1000)	RO	0
6037	406038	Boiler Service Run Time (1).		0 to 2147483647		
6038	406039	Boiler Service Run Time (2).		0 to 2147483647		
6039	406040	Boiler Service Run Time (3).		0 to 2147483647		



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6040	406041	Boiler Service On Time (0).	Unsigned Scale 100	0 to 2147483647 Value x 100 (e.g. 10h = 1000)	RO	0
6041	406042	Boiler Service On Time (1).		0 to 2147483647		
6042	406043	Boiler Service On Time (2).		0 to 2147483647		
6043	406044	Boiler Service On Time (3).		0 to 2147483647		
6044	406045	Boiler Minimum Steam Output.	Unsigned Scale 1	1 to 25 Value x 1 (e.g. 1% = 1)	W	5
6045	406046	Boiler Drain Interval.	Unsigned Scale 1	0 to 24 Value x 1 (e.g. 1h = 1)	W	6
6046	406047	Boiler Drain Volume.	Unsigned Scale 1	25 to 100 Value x 1 (e.g. 1% = 1)	W	100
6047	406048	Boiler Max Steam Output.	Unsigned Scale 1	0 to 100 Value x 1 (e.g. 1% = 1)	W	100
6048	406049	Boiler Idle Time Drain.	Unsigned Scale 1	0 to 72 Value x 1 (e.g. 1h = 1)	W	24
6049	406050	Boiler Idle Temperature Setpoint.	Unsigned Scale 1	0 to 60 Value x 1 (e.g. 1°C = 1)	W	0
6050	406051	Boiler Idle Temperature Delta.	Unsigned Scale 1	1 to 100 Value x 1 (e.g. 1°C = 1)	RO	10
6051	406052	Boiler Blowdown Rate.	Unsigned Scale 1	0 to 100 Value x 1 (e.g. 1% = 1)	W	0
6052	406053	Boiler Service Interval.	Unsigned Scale 1	1000 to 3000 Value x 1 (e.g. 1h = 1)	W	1000
6053	406054	Boiler Tank Rinse Interval.	Unsigned Scale 1	1 to 7 Value x 1 (e.g. 1 day = 1)	W	3

Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
10000	410001	Air Flow.	Unsigned <i>Scale 1</i>	0 = Closed 1 = Open	RO	Closed
10001	410002	Supply High Limit.	Unsigned <i>Scale 1</i>	0 = Closed 1 = Open	RO	Closed
10002	410003	Interlock.	Unsigned <i>Scale 1</i>	0 = Closed 1 = Open	RO	Closed
10003	410004	Binary External Demand.	Unsigned <i>Scale 1</i>	0 = 0% 1 = 100%	RO	0%
10004	410005	Water Leak Detection.	Unsigned <i>Scale 1</i>	0 = Ok 1 = Leak	RO	Ok
10005	410006	Thermal Cutout.	Unsigned <i>Scale 1</i>	0 = Closed 1 = Open	RO	Closed
10006	410007	RS485 Interface.	Unsigned <i>Scale 1</i>	0 = No 1 = Yes	RO	No
10007	410008	Ethernet Interface.	Unsigned <i>Scale 1</i>	0 = No 1 = Yes	RO	No
10008	410009	Contactors PCB Fuse.	Unsigned <i>Scale 1</i>	0 = Normal 1 = Blown Fuse	RO	Normal
10009	410010	Control PCB Fuse.	Unsigned <i>Scale 1</i>	0 = Normal 1 = Open Fuse	RO	Normal
11000	411001	Alarm Warning Relay.	Unsigned <i>Scale 1</i>	0 = Off 1 = On	RO	Off
11001	411002	Service Warning Relay.	Unsigned <i>Scale 1</i>	0 = Off 1 = On	RO	Off
11002	411003	Water Level Valve.	Unsigned <i>Scale 1</i>	0 = Off 1 = On	RO	Off



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
11003	411004	Tank Water Valve.	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11004	411005	Drain Cooler Valve.	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11005	411006	Drain Pump.	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11006	411007	Main Contactor.	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11007	411008	Heater Stage 1.	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11008	411009	Heater Stage2.	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11009	411010	Heater Stage 3.	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11010	411011	SDU Fan.	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11011	411012	Alarm LED.	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11012	411013	Power LED.	Unsigned Scale 1	0 = Off 1 = On	RO	Off
11013	411014	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
12002	412003	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
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	SDU Fan Fault.	Unsigned Scale 1	0 = Off 1 = On	RO	Off
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
15000	415001	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
15001	415002	Modbus Server Units	Unsigned Scale 1	0 = Metric 1 = Imperial	W	Metric
15002	415003	Control Profile.	Unsigned Scale 1	0 = ExternAnalog 1 = ExternNetwork 2 = InternAnalog 3 = InternNetwork 4 = HRL 5 = Custom	W	ExternAnalog
15003	415004	Modulating High Limit Profile.	Unsigned Scale 1	0 = Disabled 1 = ExternAnalog 2 = ExternNetwork 3 = InternAnalog 4 = InternNetwork 5 = Custom	W	Disabled
15004	415005	Occupancy State.	Unsigned Scale 1	0 = Occupied 1 = Unoccupied 2 = Vacant 3 = Off	RO	Occupied
15005	415006	Room RH Source.	Unsigned Scale 1	0 = None 1 = RoomRH 2 = Network	W	None

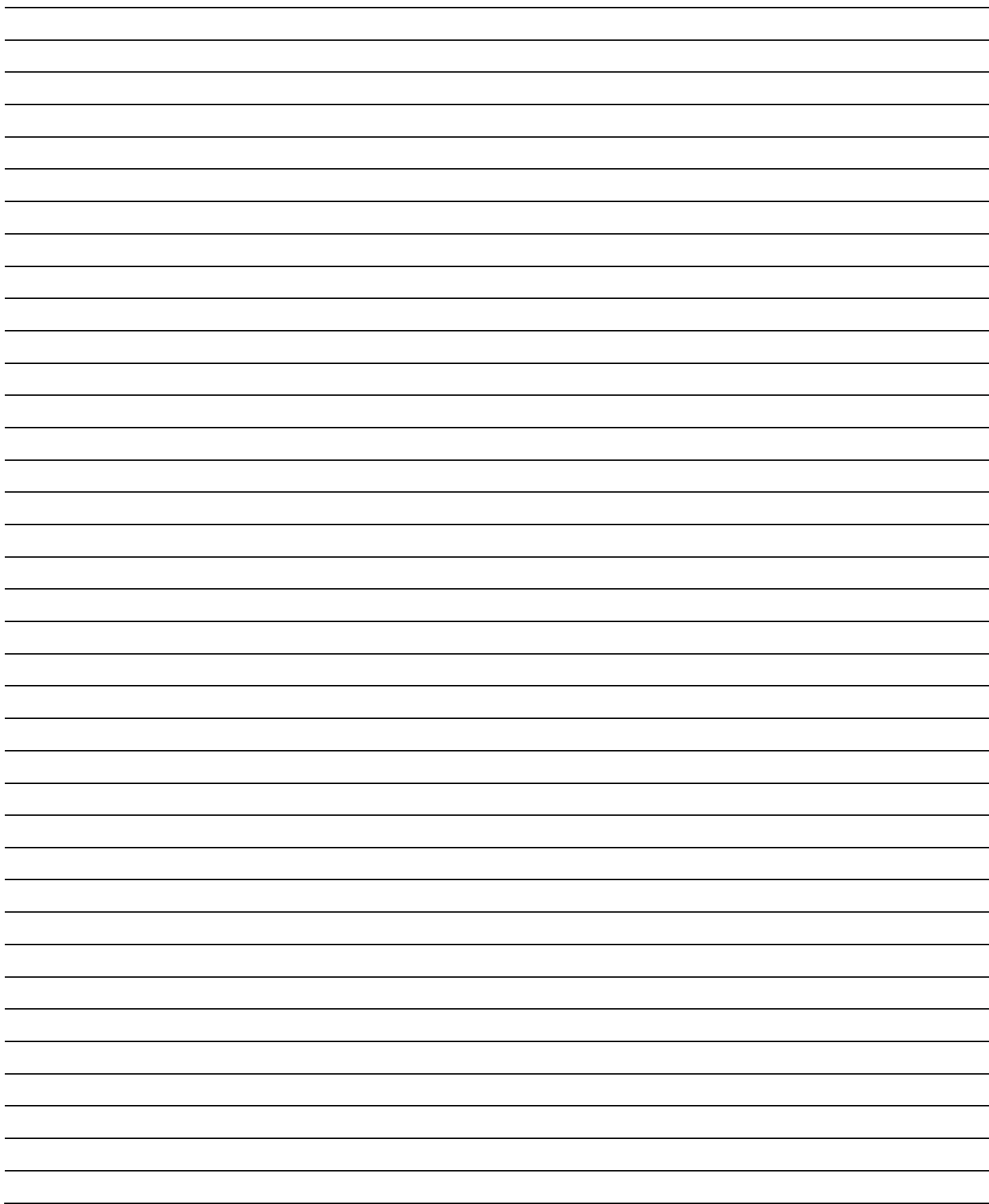


Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
15006	415007	Room RH Setpoint Source.	Unsigned Scale 1	0 = None 1 = Internal 2 = ControllInput	W	None
15007	415008	Supply High Limit Reading Source.	Unsigned Scale 1	0 = None 1 = SupplyHLRH 2 = Network	W	None
15008	415009	Supply High Limit Setpoint Source.	Unsigned Scale 1	0 = None 1 = Internal 2 = ControllInput	W	None
15009	415010	Humidity Control Demand Source.	Unsigned Scale 1	0 = None 1 = ControllInput 2 = RoomDemand 3 = Network	W	ControllInput
15010	415011	Humidity Control High Limit Source.	Unsigned Scale 1	0 = None 1 = ControllInput 2 = SupplyHLDemand 3 = Network	W	None
15011	415012	Humidity Control Cutout State.	Unsigned Scale 1	0 = Off 1 = Normal 2 = LowLimit 3 = HighLimit 4 = NoAirFlow 5 = Interlock	RO	Off
15012	415013	SDU Fan Target.	Unsigned Scale 1	0 = None 1 = SDUFan	W	None
15013	415014	Boiler Power State.	Unsigned Scale 1	0 = Off 1 = On	RO	Off
15014	415015	Boiler Request.	Unsigned Scale 1	0 = None 1 = Reset Alarms 2 = Drain 3 = Reset Counters 4 = Filling 5 = WaterCalib	W	None
15015	415016	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
15016	415017	Boiler Fill Mode.	Unsigned Scale 1	0 = OneShot 1 = Pulsed	W	Pulsed



Protocol Base	Holding Register	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
15017	415018	Boiler Alarm.	Unsigned <i>Scale 1</i>	0 = Normal 1 = FailedPump 2 = FillTimeout 3 = BlockedPiping 4 = HeatTimeout 5 = Overheat 6 = WaterLeak 7 = Service 8 = Foaming	RO	Normal
15018	415019	Boiler Tank Rinse Idle.	Unsigned <i>Scale 1</i>	0 = Off 1 = On	W	On
15019	415020	Boiler Tank Rinse Off.	Unsigned <i>Scale 1</i>	0 = Off 1 = On	W	Off
15020	415021	Water Probe Auto Calib.	Unsigned <i>Scale 1</i>	0 = None 1 = Once 2 = Always	W	Always

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