High Pressure Atomiser

SKH Series

BACnet User Guide

Contents

Introduction

The SKH High Pressure Atomiser Humidifier BACnet® Communication Module User Guide provides information about using the humidifier with BACnet communications feature. The BACnet communication protocol for building automation and control networks enables communication between client devices within a network. The humidifier provides a BACnet network interface between BACnet client devices and Neptronic Humidifier series devices. It uses the BACnet Master Slave/Token Passing (MS/TP) protocol at the BACnet MAC layer.

Pre-requisites

The BACnet communication user guide assumes that you are familiar with the concepts of BACnet and its terminology.

Advantages of BACnet

BACnet enabled humidifiers have the following advantages:

- *Quick Message Transmission.* The humidifier uses a synchronous implementation for BACnet messages making it quick and efficient. Each BACnet confirmed service request is answered as quickly as possible without using the **Reply Postponed** frame. The MS/TP implementation is performed within **Tusage_delay** of 15 minutes to ensure a **Tusage_timeout** value within 20 minutes.

- *MS/TP Support.* The humidifier supports a Full Master Node state machine for MS/TP. Max_Master and the instances are configured to the device object through **BACnet WriteProperty** service. The MAC address is set via the DIP switches. Programming mode determines the MS/TP baud rate setting of 9600, 19200, 38400, and 76800. In the configuration mode, the device is configured through the device's keypad. For more information about the WriteProperty, refer to *Table 3 - Object Types Supported*.

- *BIBB Support.* The humidifier functions the same way as the B-ASC type profile server and supports the specific BIBB as per their relevant definitions.
  - DS-RP-B
  - DS-RPM-B
  - DS-WP-B
  - DS-WPM-B
  - DM-DCC-B
  - DM-DDB-B
  - DM-DOB-B
  - DM-RD-B
  - DM-TS-B
  - DM-UTC-B
  - DS-COV-B
  - DS-COVP-B
  - SCHED-WS-I-B

- *Object Support.* The humidifier supports a fixed list of BACnet visible values, which appear as Present_Values of various BACnet standard object types in addition to a device object. For more information, refer to *Table 3 - Object Types Supported*.

- *Alarms.* The humidifier supports indication of various alarm conditions through value changes in properties of several objects. However, it does not generate BACnet event notifications.

BACnet Properties Configuration

To establish communication on the network, and guarantee a unique ID of devices in a BACnet system, the following properties may have to be configured.

Table 1 - BACnet Properties Configuration

Property	Default Value	Configuration
MAC Address	000	Set to a value between 000 and 127 via DIP switches. Can also be set to a value between 000 and 254 via menu. The values from 128-254 represent MS/TP non-token passing slave devices.
Device Instance	Auto	• The humidifier automatically configures its device instance to 153,000 + MAC address. • The value can be set manually via the menu. • The value can be set manually through the **WriteProperty** service to **Device Object.Object_Identifier**. • The device's **Object_Identifier** is a combination of the **Device Object_Type** (8) and the **Device_Instance** (0-4194302), therefore its decimal or hexadecimal representation tends to be incomprehensible. • For example, the **Device_Instance**=1000 has an equivalent **Object_Identifier** of 0x020003E8 hexadecimal or 33555432 decimal.
Baud Rate	0 = Auto	• The humidifier configures its baud rate automatically by detecting the network upon connection. • The value can be set manually from the available values of Auto, 9600, 19200, 38400, 76800.
Max_Master	127	• Configure **Max_Master** value to increase network efficiency when there are less than 127 devices on the network. • The **Max_Master** value can be changed through the TRL to configure WriteProperty service to the Device **Object.Max_Master**. For more information, refer to the MAC Address and Max_Master section.
Device Object.Object_Name	Name of the device	• Configure the name of the device through WriteProperty service to the **Device Object.Object_Name**. For example, SKH.

Configuration Options

The following options enable you to configure and run the BACnet features of the humidifiers quickly.

Quick Setup

Configure the humidifier's baud rate and device instance without programming.

1. Connect the humidifier to the network and power it up.

2. The humidifier automatically configures the baud rate and device instance.

3. Repeat the steps for each humidifier.

Manual Setup

1. To use a **Device_Instance** other than 153,000, and/or if your site has more than one humidifier network, go to the menu.

2. Disconnect the power to the humidifier, connect the humidifier to the network, and connect the power again.

3. Configure the **Max_Master** value through **WriteProperty** service to the **Device Object.Max_Master** to increase network efficiency or if there are less than 127 devices on the network.

MAC Address and Max_Master

The MAC address must be unique on the entire MS/TP network. However, having a unique MAC address and a high baud rate does not guarantee efficient operation of the humidifier and other MS/TP units on the MS/TP network. Some MAC address and Max_Master combinations are more efficient than others. BACnet requires token-passing units to occasionally "poll" for other masters based on the MAC address and Max_Master.

A poor combination of MAC addresses and Max_Master can lead to a slower network due to lost time polling for masters that are not present. Unless there are 126 other units on the MS/TP network, the default Max_Master value of 127 is not the most efficient choice for the humidifier. The Max_Master default value of 127 was selected to ensure that any master, specifically a BACnet client can be found when the humidifier is initially started.

Examples of Mac Address and Max_Master Configurations

The following are some of the examples to indicate the optimum combination of Mac address and Max_Master configurations to ensure a quick and efficient output.

Example 1

- MAC=0. Max_Master=127

- MAC=1, Max_Master=127

This configuration is slow and inefficient because every time either unit is required to find another master unit, it has to poll 126 units until it finds the right one to pass the token.

Example 2

- MAC=0. Max_Master=5

- MAC=1 to MAC=4 are not used

- MAC=5, Max_Master=5

This configuration is better than Example 1 but it is still slower. The Max_Master is set to the most efficient value but the gap between the two MAC addresses is high. Therefore, each unit must poll four units until it finds the right one to pass the token.

Example 3

- MAC=0. Max_Master=1

- MAC=2, Max_Master=2

This is an incorrect configuration. The MAC=0 will never find MAC=2 because it will never poll for the master MAC address=2.

Example 4

- MAC=0. Max_Master=3

- MAC=1, Max_Master=3

- MAC=2, Max_Master=3

- MAC=3, Max_Master=3

This is an efficient configuration as the units are numbered consecutively and the MAX_Master is set to the most efficient value. As a general guideline, the most efficient setup for an MS/TP network is one in which the units are consecutively numbered starting at MAC address 0 and having Max_Master=the maximum MAC address in the system. If consecutive numbering is not possible, then the next most efficient setup is one in which all units have Max_Master=the maximum MAC address in the system.

Network Reset

Reset the humidifier via BACnet using the **Reinitialize Device** service. The Reinitialize Device service can be accessed using the following password: **nep.**

The Reinitialize Device service has two types of reset:

- *Warm Reset.* The Warm Reset restarts the humidifier with actual configuration.

- *Cold Reset.* The Cold Reset restarts the humidifier with *Factory configuration*.

> ⚠️ **Warning:** *The Cold Reset erases the actual configuration when setting the MSTP address. Therefore, exercise caution while performing a Cold Reset.*

Device Object Properties

The following table lists all the BACnet properties supported for the device object. The W indicates that the property is writable using the BACnet **WriteProperty** service.

Table 2 - Device Object Properties

Property	Value	Writable
Object_Identifier	• Programmable where the instance part of the Object_Identifier is in the range of 0-4194302 • The device instance must be unique system-wide • The default value for the device instance=153000 (Vendor_Identifier*1000)	W
Object_Name	SKH	W
Description	Programmable up to 32 characters (default: SKH).	W
Object_Type	Device	
System_Status	Operational	
Vendor_Identifier	Always 153	
Vendor_Name	Always Neptronic	
Model_Name	Example, SKH	Read Only
Firmware_Revision	currently, 2.05	Read Only
Application_Software_Version	currently, 2.03	Read Only
Protocol_Version	Always 1	Read Only
Protocol_Revision	14	Read Only
DataBase_Revision	2	Read Only
Max_APDU_Length_Accepted	Always 480	Read Only
Segmentation_Supported	(3) = No Segmentation	Read Only
APDU_Timeout	6000	W
Number_of_APDU_Retries	Always 3	Read Only
Local_Time	00:00:00	W
Local_Date	01-Jan-2015 (Thu)	W
Uts_Offset	-3:00	W
Daylight_Savings_Status	False	W
Backup_Failure_Timeout	300	W
Configuration_Files	File-1	
Last_Restore_Time	2015-01-01 (Thu), 00:01:50:00	
Backup_And_Restore_State	IDLE	
Backup_Preparation_Time	0	
Restore_Completion_Time	0	
Restore_Preparation_Time	0	
Protocol_Services_Supported	• 07470BC83AE200 • confirmedCOVNotification • subscribeCOV • atomicReadFile • atomicWriteFile • readProperty • readPropertyMultiple • WriteProperty • writePropertyMultiple • deviceCommunicationControl • reinitializeDevice • i-Am • i-Have • unconfirmedCOVNotification • unconfirmedPrivateTransfer • timeSynchronization • who-Has • who-Is • subscribeCOVProperty	
Protocol_Object_Types_Supported	• analog-input • analog-output • analog-value • binary-input • binary-output • binary-value • device • file • program • schedule • multi-state-value	
Object_List	196	Read Only
Device_Address_Binding	Always empty	
Max_Master	Programmable in the range of 0-127 (default: 127)	W
Max_Info_Frames	Always 1	

Property	Value	Writable
Proprietary property #1000	• Represents the MS/TP MAC address in the range of 0 to 254 (default: 0) • Writable if all MAC address DIP switches are OFF • Values 128 to 254 represent MS/TP non-token passing slave devices	W
Proprietary property #1001	• Programmable (default: Auto) • Represents the MS/TP Baud rate (unsigned type) • Values are 0 (auto), 9600, 19200, 38400, 76800 • Reading this property always returns the actual Baud rate	W
Proprietary property #1002	• Programmable (default: 15 minutes) • Represents the period of time that an object in/out of service will automatically return to normal. Range = 0-120 minutes (unsigned type) • Writing 0 means no automatic return to normal	W

Object Types Supported

The following table lists all the BACnet properties supported for each object type. Most of the properties are locked. The exception is **Present_Value**, which represents the dynamic operating values of the device, and the Status_Flag, Event_State, and Reliability properties, which reflect the availability of the **Present_Value**. Unless otherwise specified, properties are not changeable.

Table 3 - Object Types Supported

Object Type	Enabled	Optional Properties Supported	Writable Properties	Notes
Analog Input	☑	• Reliability • Description • Min_Present_Value • Max_Present_Value • Resolution • COV-Increment	• Out_of_Service • COV-Increment	• If "Out of Service" is true, Present_Value and Status_Flag become writable properties. • Out_of_Service property is writable for objects to which Present_Value is not writable. Refer to Out of Service Property section on page 7 for more information. • Object will automatically return to Normal after a programmable period of time. Refer to Proprietary property #1002 of Device Object in Table 2 - Device Object Properties.
Analog Value	☑	• Reliability • Description • COV-Increment • Priority_Array • Relinquish_Default	• Present_Value • Out_of_Service • COV-Increment	• Present_Value property is writable for every AV object except AV.20, AV.23, AV.40, AV.45, AV.55 • Out_of_Service property is writable for objects indicated in Table 6 - Object Table Information: Analog Value (AV) on page 9. • Refer to Out of Service Property section on page 7 for more information. • Object will automatically return to Normal after a programmable period of time. Refer to Proprietary property #1002 of Device Object in Table 2 - Device Object Properties. Some objects are commandable. In such case, the priority-array and relinquish-default properties are available. • Writable properties are different for some objects. Refer to the respective Object Table information to know the writable property for each AV object.
Analog Output	☑	• Description • Reliability • Min-Pres-Value • Max-Pres-Value • Resolution • COV-Increment	• Present_Value • COV-Increment	• Present_Value property is writable as per Analog Output (AO) table on page 8.
Binary Input	☑	• Reliability • Active_Text • Inactive_Text • Description	Out_of_Service	• If "Out of Service" is true, Present_Value and Status_Flag become writable properties. • Out_of_Service property is writable for objects to which Present_Value is not writable. Refer to Out of Service Property section on page 7 for more information. • Object will automatically return to Normal after a programmable period of time. Refer to Proprietary property #1002 of Device Object in Table 2 - Device Object Properties.
Binary Value	☑	• Reliability • Active_Text • Inactive_Text • Description	Present_Value	• Present_Value property is writable for every Binary Value object. • Writable properties are different for some objects. Refer to the respective Object Table information to

Object Type	Enabled	Optional Properties Supported	Writable Properties	Notes
		• Priority_Array • Relinquish_Default		know the writable property for each BV object. • Out_of_Service property is writable for every Binary Value object. • Some objects are commandable. In such case, the priority-array and relinquish-default properties are available. • Object automatically returns to Normal after a programmable time. Refer to Proprietary property #1002 of Device Object in Table 2 - Device Object Properties.
Binary Output	☑	• description • reliability • inactive-text • active-text	Present_Value	• Present_Value property is writable.
Device	☑	• Max_Master • Max_Info_Frame • Description • active-cov-subscriptions • #1000 (MSTP addr) • #1001 (Baud rate) • #1002 (Time out) • Local_Time • Local_Date • Uts_Offset • Daylight_Savings_Status • Apdu_Timeout • Backup_Failure_Timeout	• Object_Identifier • Object_Name • Max_Master • Description • Local_Time • Local_Date • Uts_Offset • Daylight_Savings_Status • Apdu_Timeout • Backup_Failure_Timeout • #1000 • #1001 • #1002 • Configuration_Files • Last_Restore_Time • Backup_And_Restore_State • Backup_Preparation_Time • Restore_Completion_time • Restore_Preparation_Time	• Refer to Table 2 - Device Object Properties on page 5.
Multi-State Value	☑	• Description • Reliability • States_Text	Present_Value	• Present_Value property is writable for every Multi State Value object except MSV.12, MSV.13, MSV.15 • Writable properties are different for some objects. Refer to the respective Object Table information to know the writable property for each MSV object. • Out_of_Service property is not writable for MSV.

Out of Service Property

Neptronic humidifiers offer the use of the Out of Service writable property. When the value of this property is set to True, it disconnects the object from the physical input, enabling you to input other values. This is useful for special applications or while troubleshooting. For example, you can ignore the temperature read from a sensor and input the desired temperature value in order to perform specific tests.

For security reasons, a timeout will set the Out of Service property back to False after 15 minutes. This value can be modified to between 0 and 120 minutes (For more information, see proprietary property #1002 in *Table 2 - Device Object Properties*).

Object Table Information

The SKH series uses the following BACnet object tables, categorized on the basis of their ID. The type is the BACnet Object type, the instance is the BACnet Object. Together, the type and instance form the **BACnet Object_Identifier** for an object according to the following C-language algorithm:

- object_identifier=(unsigned long)((unsigned long)type<<22)+instance

Analog Input (AI)

Table 4 - Object Table Information: Analog Input (AI)

ID	Name	Description	W?	Notes
Integrator				
AI.1	SKHBoardTemp	Displays the temperature reading measured on the SKH PC board.	Out of Service	0°C to 100°C, Resolution: 0.1°C

SKH EZC

ID	Name	Description	W?	Notes
Integrator				
AI.3	RoomRHSetpoint or RoomTempSetpoint	Displays the setpoint for the room relative humidity sensor. OR Displays the setpoint for the room temperature sensor.	Out of Service	0.0 to 100.0%RH or 10°C to 40°C, Resolution 0.1%RH or 0.01°C
AI.4	RoomRH	Displays the reading of the relative humidity in the room.	Out of Service	0.0 to 100.0%RH, Resolution 0.1%RH
AI.5	RoomTemp	Displays the temperature reading of the room.	Out of Service	-100°C to 100°C, Resolution 0.01°C
AI.6	DuctRH	Displays the relative humidity reading of the duct.	Out of Service	0.0 to 100.0%RH, Resolution 0.1%RH
AI.7	TrlhRH	Displays the value of the relative humidity measured on the TRL.	Out of Service	0.0 to 100.0%RH, Resolution 0.1%RH
AI.8	TrlhTemp	Displays the value of the temperature measured on the TRL.	Out of Service	0°C to 50°C, Resolution 0.01°C
AI.9	BoardTemp	Displays the temperature reading measured on the PC board.	Read Only	0°C to 100°C, Resolution 0.01°C
Advanced				
AI.200	DI4_TpmDuty		Out of Service	0 milliseconds to 1000 milliseconds, Resolution 1millisecond

Analog Output (AO)

Table 5 - Object Table Information: Analog Output (AO)

ID	Name	Description	W?	Notes
AO.1	FeedbackVoltage	Configuration value of the output feedback voltage.	Present Value	0 millivolts to 10440 millivolts, Resolution 1 millivolt

SKH EZC

ID	Name	Description	W?	Notes
AO.1	FeedbackVoltage	Configuration value of the output feedback voltage.	Present Value	0 millivolts to 10440 millivolts, Resolution 1 millivolt

Analog Value (AV)

Table 6 - Object Table Information: Analog Value (AV)

ID	Name	Description	W?	Notes
Integrator				
AV.1	PumpDemand	Displays the pump demand of the system.	Read Only	0% to 100%, Resolution 0.01%
AV.2	SystemZoneDemand	Displays the zone demand of the system.	Read Only	0% to 100%, Resolution 0.01%
AV.3	SimulationDuration	Duration of Simulation mode.	Present Value	5 to 60 minutes, Resolution 1 minute
AV.4	SimulationZoneSelection	Configuration value for the selection of the number of zones in simulation mode.	Present Value	1 to 3, Resolution 1
AV.5	SimulationZoneDemand	Configuration value of the number of stages for the zones in simulation mode.	Present Value	0 to 4, Resolution 1
AV.7	SimulationPumpDemand	Configuration value for the selection of pump demand for simulation mode.	Present Value	0 to 100%, Resolution 1%
AV.8	SimulationDowncounter	Configuration vale for the simulation mode downcounter.	Out of Service	0 to 3600 seconds, Resolution 1 second
AV.9	SystemPumpCapacity	Displays the pump capacity of the system.	Read Only	0 to 42949672.95 kg/hr, Resolution 0.01 kg/hr
AV.11	SystemZoneCapacity	Displays the zone capacity of the system.	Read Only	3.2 to 1451488 kg/hr, Resolution 0.01 kg/hr
AV.12	SystemNumOfZones	Displays the number of zones for the system.	Read Only	0 to 3, Resolution 1
Integrator- Configuration				
AV.100	Cfg_SystemInactivityDelay	Configuration value of the system inactivity delay.	Present Value	4 to 72 hours, Resolution 1 hour
AV.101	Cfg_SystemInactivityDrainTime	Configuration value of the system inactivity drain time.	Present Value	1 to 255 minutes, Resolution 1 minute
Advanced				
AV.204	PumpFeedback	Displays the feedback value of pump.	Read Only	0 to 100, Resolution 0.01
AV.208	PumpInletTemp	Displays the inlet temperature of pump.	Read Only	-10°C to 10°C, Resolution 0.01°C

ID	Name	Description	W?	Notes
AV.212	PumpInletPressure	Displays the Inlet pressure of pump.	Read Only	0 to 60000KPa, Resolution 0.1KPa
AV.216	PumpOutputPressure	Displays the output pressure of pump.	Read Only	0 to 60000KPa, Resolution 0.1KPa
AV.220	PumpDutyTime	Displays the duty time of pump.	Read Only	0 to 42949672.95, Resolution 1
AV.224	PumpWeightedDutyTime	Displays the weighted duty time of pump.	Read Only	0 to 42949672.95, Resolution 1
Advanced - Configuration				
AV.300	Cfg_PumpInactivityDelay	Configuration value of the pump inactivity delay.	Present Value	4 to 72 hours, Resolution 1 hour
AV.304	Cfg_PumpInactivityDrainTime	Configuration value of the pump inactivity drain time.	Present Value	1 to 255 seconds, Resolution 1 second

SKH EZC

ID	Name	Description	W?	Notes
Integrator				
AV.1	ZoneDemand	Configuration value of the zone demand.	Present Value	0% to 100%, Resolution 0.01%
AV.2	SimulatedDemand	Configuration value of the simulated demand.	Present Value	0% to 4%, Resolution 1%
AV.3	ZoneOutput	Displays the value of the zone output.	Out of Service	0% to 100%, Resolution 0.01%
AV.4	ZoneOuputLimit	Configuration value of the maximum zone output limit.	Present Value	0% to 100%, Resolution 0.01%
AV.5	UnoccupiedRHSetpoint	Configuration value of the relative humidity setpoint in the unoccupied mode.	Present Value	5% RH to 95% RH, Resolution 0.1% RH
AV.6	UnoccupiedTempSetpoint	Configuration value of the temperature setpoint in the unoccupied mode.	Present Value	10°C to 40°C, Resolution 0.01°C
AV.7	VacantRHSetpoint	Configuration value of the relative humidity setpoint in the vacancy mode.	Present Value	5% RH to 95% RH, Resolution 0.1% RH
AV.8	VacantTempSetpoint	Configuration value of the temperature setpoint in the vacancy mode.	Present Value	10°C to 40°C, Resolution 0.01°C
AV.9	InternalRHSetpoint	Configuration value of the internal relative humidity setpoint.	Present Value	5% RH to 95% RH, Resolution 0.1% RH
AV.10	InternalTempSetpoint	Configuration value of the internal temperature setpoint.	Present Value	10°C to 40°C, Resolution 0.01°C
AV.11	NetworkRHSetpoint	Configuration value of the network relative humidity setpoint.	Present Value	5% RH to 40% RH, Resolution 0.1% RH
AV.12	NetworkTempSetpoint	Configuration value of the network temperature setpoint.	Present Value	10°C to 40°C, Resolution 0.01°C
AV.13	NetworkRH	Configuration value of the network relative humidity.	Present Value	0% to 100%, Resolution 0.1%
AV.14	NetworkTemp	Configuration value of the network temperature.	Present Value	0°C to 50°C, Resolution 0.01°C
AV.15	NetworkDowncounter	Displays the value of the network downcounter.	Out of Service	1 to 900 seconds, Resolution 1 second
AV.100	Cfg_InactivityDelay	Configuration value of the system inactivity delay.	Present Value	4 to 72 hours, Resolution 1 hour
AV.101	Cfg_InactivityDrainTime	Configuration value of the inactivity delay of drain.	Present Value	1 to 255 seconds, Resolution 1 second
AV.102	Cfg_NetworkTimeout	Configuration value of the network timeout.	Present Value	1 to 15 minutes, Resolution 1 minute

ID	Name	Description	W?	Notes
AV.103	Cfg_FanOnDelay	Configuration value of the delay in seconds before the fan is turned on.	Present Value	1 to 255 seconds, Resolution 1 second
AV.104	Cfg_FanOffDelay	Configuration value of the delay in seconds before the fan is turned off.	Present Value	1 to 255 seconds, Resolution 1 second
Advanced				
AV.200	Stage1Runtime	Displays the value of the stage 1 runtime.	Read Only	0 to 42949672.95, Resolution 1
AV.201	Stage2Runtime	Displays the value of the stage 2 runtime.	Read Only	0 to 42949672.95, Resolution 1
AV.202	Stage3Runtime	Displays the value of the stage 3 runtime.	Read Only	0 to 42949672.95, Resolution 1
AV.203	Stage4Runtime	Displays the value of the stage 4 runtime.	Read Only	0 to 42949672.95, Resolution 1
Advanced – Configuration				
AV.300	Cfg_DuctRHSetpoint	Configuration value of the duct relative humidity setpoint.	Present Value	10% RH to 90% RH, Resolution 0.1% RH
AV.301	Cfg_DuctRHCutout	Configuration value of the duct relative humidity cutout.	Present Value	50% RH to 95% RH, Resolution 0.1% RH
AV.302	Cfg_DuctRHPropBand	Configuration value of the duct relative humidity proportional band.	Present Value	5% RH to 50% RH, Resolution 0.1% RH
AV.303	Cfg_DuctRHIntegralTime	Configuration value of the duct relative humidity integral time.	Present Value	0 to 600 seconds, Resolution 1 second
AV.304	Cfg_DuctRHDerivateTime	Configuration value of the duct relative humidity derivate time.	Present Value	0 to 60 seconds, Resolution 0.1 seconds
AV.305	Cfg_RHProportionalBand	Configuration value of the relative humidity proportional band.	Present Value	1% RH to 20% RH, Resolution 0.1%RH
AV.306	Cfg_TempProportionalBand	Configuration value of the temperature proportional band.	Present Value	0.5°C to 50°C, Resolution 0.01°C
AV.307	Cfg_IntegralTime	Configuration value of the integral time.	Present Value	0 to 600 seconds, Resolution 1 second.
AV.308	Cfg_DifferentialTime	Configuration value of the differential time.	Present Value	0 to 60 seconds, Resolution 0.1 second
AV.309	Cfg_TrlhRHSetpointMin	Configuration value of the minimum relative humidity setpoint measured by the TRL.	Present Value	5% RH to AV.310, Resolution 0.1% RH
AV.310	Cfg_TrlhRHSetpointMax	Configuration value of the maximum relative humidity setpoint measured by the TRL.	Present Value	AV.309 to 95% RH, Resolution 0.1% RH
AV.311	Cfg_TrlhTempSetpointMin	Configuration value of the minimum temperature setpoint measured by the TRL.	Present Value	10°C to AV.312, Resolution 0.01°C
AV.312	Cfg_TrlhTempSetpointMax	Configuration value of the maximum temperature setpoint measured by the TRL.	Present Value	AV.311 to 40°C, Resolution 0.01°C
AV.313	Cfg_RoomRHSetpointMin	Configuration value of the minimum relative humidity setpoint of the room.	Present Value	0% RH to AV.314, Resolution 0.1% RH
AV.314	Cfg_RoomRHSetpointMax	Configuration value of the maximum relative humidity setpoint of the room.	Present Value	AV.313 to 100% RH, Resolution 0.1% RH
AV.315	Cfg_RoomTempSetpointMin	Configuration value of the minimum temperature setpoint of the room.	Present Value	10°C to AV.316, Resolution 0.01°C
AV.316	Cfg_RoomTempSetpointMax	Configuration value of the maximum temperature setpoint of the room.	Present Value	AV.315 to 40°C, Resolution 0.01°C
AV.317	Cfg_RoomRHMin	Configuration value of the minimum relative humidity of the room.	Present Value	0%RH to AV.317, Resolution 0.1%RH
AV.318	Cfg_RoomRHMax	Configuration value of the maximum relative humidity of the room.	Present Value	AV.316 to 100%RH, Resolution 0.1%RH
AV.319	Cfg_RoomTempMin	Configuration value of the minimum temperature of the room.	Present Value	10°C to AV.320, Resolution 0.01°C

ID	Name	Description	W?	Notes
AV.320	Cfg_RoomTempMax	Configuration value of the maximum temperature of the room.	Present Value	AV.319 to 40°C, Resolution 0.01°C
AV.321	Cfg_StageOnDelay	Configuration value of the delay before each stage is on.	Present Value	1 to 255 seconds, Resolution 1 second
AV.323	Cfg_TPMStagePeriod	Configuration value of the TPM stage period.	Present Value	30 to 60 seconds, Resolution 0.001 second
AV.324	Cfg_RoomRHSetpointOffset	Configuration value of the relative humidity setpoint offset value of the room.	Present Value	-10% RH to 10% RH, Resolution 0.1% RH
AV.325	Cfg_RoomTempSetpointOffset	Configuration value of the temperature setpoint offset value of the room.	Present Value	-10°C to 10°C, Resolution 0.01°C
AV.326	Cfg_RoomRHSOffset	Configuration value of the relative humidity offset value of the room.	Present Value	-10% RH to 10% RH, Resolution 0.1% RH
AV.327	Cfg_RoomTempOffset	Configuration value of the temperature offset value of the room.	Present Value	-10°C to 10°C, Resolution 0.01°C
AV.328	Cfg_DuctRHOffset	Configuration value of the relative humidity offset value of the room.	Present Value	-10% RH to 10% RH, Resolution 0.1% RH
AV.329	Cfg_BoardTempOffset	Configuration value of the temperature offset value of the board.	Present Value	-10°C to 10°C, Resolution 0.01°C
AV.330	Cfg_TrlhRoomRHOffset	Configuration value of the relative humidity offset value of the room measured by the TRL.	Present Value	-10% RH to 10% RH, Resolution 0.1% RH
AV.331	Cfg_TRLRoomTempOffset	Configuration value of the temperature offset value of the room measured by the TRL.	Present Value	-10°C to 10°C, Resolution 0.01°C

Binary Input (BI)

Table 7 - Object Table Information: Binary Input (BI) (SKH EZC)

ID	Name	Description	W?	Notes
BI.1	DI1_AirflowCutout	Select whether to open or close the airflow cutout.	Out of Service Present Value	0 = Open, 1 = Close
BI.2	DI2_DuctRHCutout	Select whether to open or close the duct RH cutout.	Out of Service Present Value	0 = Open, 1 = Close
BI.3	DI3_InterlockCutout	Select whether to open or close the interlock cutout.	Out of Service Present Value	0 = Open, 1 = Close
BI.4	DI4_BinaryDemand	Select whether to open or close the binary demand.	Out of Service Present Value	0 = Open, 1 = Close

Binary Output (BO)

Table 8 - Object Table Information: Binary Output (BO)

ID	Name	Description	W?	Notes
BO.1	AlarmRelay	Select whether to open or close the alarm relay. Closed when any alarm is on but AirFlowCutout and ServiceWarning.	Present Value Relinquish Default	0 = Open, 1 = Close
BO.2	MaintenanceRelay	Select whether to open or close the maintenance relay. Closed when ServiceAlarm or ServiceWarning is on.	Present Value Relinquish Default	0 = Open, 1 = Close
BO.3	Buzzer	Select whether to activate or not the buzzer. ON when a key push event is acknowledged and KeyBeep is on or when AlarmRelay is closed and AlarmBeep is on.	Present Value	0 = Inactive, 1 = Active

SKH EZC

ID	Name	Description	W?	Notes
Integrator				
BO.1	FanControl	Displays the status of Fan control.	Read Only	0 =Off, 1 = On
Advanced				
BO.200	ZoneDrain	Displays the status of zone drain.	Read Only	0 = Off, 1 = On
BO.201	ZoneInlet	Displays the status of zone inlet.	Read Only	0 = Off, 1 = On

Binary Value (BV)

Table 9 - Object Table Information: Binary Value (BV)

ID	Name	Description	W?	Notes
Integrator				
BV.1	SystemMode	Select to whether to enable or disable the system mode.	Present Value	0 = Off, 1 = On
BV.2	SimulationState	Displays the status of the simulation state.	Read Only	0 = Off, 1 = On
BV.3	SimulationPumpOverride	Displays the status of the simulation pump override.	Read Only	0 = Off, 1 = On
BV.4	SystemDrainPending	Displays the status of the system drain pending.	Read Only	0 = Off, 1 = On
BV.5	SystemDrain	Displays the status of the system drain.	Read Only	0 = Off, 1 = On
BV.6	SystemZoneDemand	Displays the status of system zone demand.	Read Only	0 = Off, 1 = On
BV.7	WaterPressureState	Displays the status of the water pressure state.	Read Only	0 = Not Ready, 1 = Ready

ID	Name	Description	W?	Notes
BV.8	UVLampChangeDue	Displays the status of the UV lamp change due.	Read Only	0 = Off, 1 = On
Integrator - Alarms				
BV.50	AL_ServiceWarning	Displays the status of the service warning. It indicates the upcoming cleaning for the humidifier. The warning is displayed when cleaning is due in 100 hours or less.	Read Only	0 = Off, 1 = On
BV.51	AL_ServiceAlarm	Displays the status of the service alarm. The alarm is triggered when cleaning, UV lamp change or Silver Ion cartridge change is due.	Read Only	0 = Off, 1 = On
BV.52	AL_PumpGlobalAlarmMask	Displays the status of the pump global alarm mask.	Read Only	0 = Off, 1 = On
BV.56	AL_GlobalPumpComTimeout	Displays the status of the global pump communication timeout.	Read Only	0 = Off, 1 = On
BV.57	AL_GlobalZoneComTimeout	Displays the status of the global zone communication timeout.	Read Only	0 = Off, 1 = On
Advanced				
BV.200	PumpDrainValve	Displays the status of pump drain valve.	Read Only	0 = Off, 1 = On
BV.204	PumpEnableVFD	Displays the status of the pump enable VFD.	Read Only	0 = Off, 1 = On
BV.210	AL_PumpInletTempSensorFailure	Displays the status of the pump inlet temperature sensor failure.	Read Only	0 = Off, 1 = On
BV.214	AL_PumpInletPressureSensorFailure	Displays the status of the pump inlet pressure sensor failure.	Read Only	0 = Off, 1 = On
BV.218	AL_PumpOutputPressureSensorFailure	Displays the status of the pump output pressure sensor failure.	Read Only	0 = Off, 1 = On
BV.222	AL_PumpVFDFailure	Displays the status of the pump VFD failure.	Read Only	0 = Off, 1 = On
BV.226	AL_PumpInletTempTooHigh	Displays the status of the pump if the inlet water temperature of pump is above the maximum temperature.	Read Only	0 = Off, 1 = On
BV.230	AL_PumpInletTempTooLow	Displays the status of the pump if the inlet water temperature of pump is below the minimum temperature.	Read Only	0 = Off, 1 = On
BV.234	AL_PumpInletPressureToLow	Displays the status of the pump if the inlet pressure of pump is below the minimum pressure.	Read Only	0 = Off, 1 = On
BV.238	AL_PumpInletPressureToHigh	Displays the status of the pump if the inlet pressure of pump is above the maximum pressure.	Read Only	0 = Off, 1 = On
BV.242	AL_PumpOutputPressureTooLow	Displays the status of the pump if the output pressure of pump is below the minimum pressure.	Read Only	0 = Off, 1 = On
BV.246	AL_PumpOutputPressureTooHigh	Displays the status of the pump if the output pressure of pump is above the maximum pressure.	Read Only	0 = Off, 1 = On
BV.250	AL_PumpTemperatureTooHigh	Displays the status of the pump if the temperature of pump is above the maximum temperature.	Read Only	0 = Off, 1 = On
BV.254	AL_PumpServiceAlarm	Displays whether the service alarm for the pump if currently enabled signifying the service due for the pump.	Read Only	0 = Off, 1 = On
BV.258	AL_PumpPressurizingTimeout	Displays the status of the communication timeout for pressurizing of pump.	Read Only	0 = Off, 1 = On

ID	Name	Description	W?	Notes
BV.262	AL_PumpCoolingTimeout	Displays the status of the communication timeout for the cooling of pump.	Read Only	0 = Off, 1 = On
BV.266	AL_PumpInvalidConfig	Displays the status of configuration of the pump.	Read Only	0 = Off, 1 = On
BV.270	AL_PumpComTimeout	Displays the status of the communication timeout of pump. It indicates that the communication delay is too long.	Read Only	0 = Off, 1 = On
BV.274	AL_Zone1ComTimeout	Displays the status of communication timeout for the zone 1. It indicates that the communication delay is too long.	Read Only	0 = Off, 1 = On
BV.275	AL_Zone2ComTimeout	Displays the status of communication timeout for the zone 2. It indicates that the communication delay is too long.	Read Only	0 = Off, 1 = On
BV.276	AL_Zone3ComTimeout	Displays the status of communication timeout for the zone 3. It indicates that the communication delay is too long.	Read Only	0 = Off, 1 = On

SKH EZC

ID	Name	Description	W?	Notes
Integrator				
BV.1	SystemMode	Displays the status of the system mode.	Read Only	0 = Off 1 = On
BV.2	ZoneMode	Select whether to enable or disable the zone mode.	Present Value	0 = Off, 1 = On
BV.3	WaterPressure	Displays the status of the water pressure.	Read Only	0 = Not Ready, 1 = Ready
BV.4	LimitedByDuctRH	Displays the status of the duct relative humidity.	Read Only	0 = Off, 1 = On
BV.30	AL_GlobalAlarmMask	Displays the status of the global alarm mask.	Read Only	0 = Off, 1 = On
BV.31	AL_DuctRHCutout	Displays the status of the duct relative humidity cutout.	Read Only	0 = Off, 1 = On
BV.32	AL_AirflowCutout	Displays the status of the airflow cutout.	Read Only	0 = Off, 1 = On
BV.33	AL_InterlockCutout	Displays the status of the interlock cutout.	Read Only	0 = Off, 1 = On
BV.34	AL_NoCoordinator	Displays the status of the communication between the master PCB and EZC. It indicates that the communication has been lost between EZC and SKH Master PCB alarm.	Read Only	0 = Off, 1 = On
BV.35	AL_TrlhTimeout	Displays the status of the communication timeout between the EZC and controller. It indicates that the communication delay is too long between EZC and TRL alarm.	Read Only	0 = Off, 1 = On
BV.36	AL_NetworkTimeout	Displays the status of the communication timeout for the network.	Read Only	0 = Off, 1 = On
BV.37	AL_InvalidConfiguration	Displays the status of the configuration.	Read Only	0 = Off, 1 = On
Integrator - Configuration				
BV.100	Cfg_EnableFanControl	Select whether to enable or disable the fan control.	Present Value	0 = Off, 1 = On
BV.101	Cfg_InhibitAirFlowCutout	Select whether to enable or disable the inhibit airflow cutout.	Present Value	0 = Off, 1 = On
BV.102	Cfg_NetworkControlOverride	Select whether to enable or disable the network control override.	Present Value	0 = Off, 1 = On
BV.103	Cfg_NetworkTempUnits	Select the temperature unit.	Present Value	0 = Celsius, 1 = Fahrenheit
BV.104	Cfg_NetworkMassFlowUnits	Select the mass flow unit.	Present Value	0 = kg/h, 1 = lb/h

ID	Name	Description	W?	Notes
BV.105	Cfg_TRLHTempUnits	Select the temperature unit on the TRL.	Present Value	0 = Celsius, 1 = Fahrenheit
BV.106	Cfg_TRLHSetpointLock	Select whether to lock the setpoint on the TRL.	Present Value	0 = Off, 1 = On
BV.107	Cfg_TRLHZoneModeLock	Select whether to lock the zone mode on the TRL.	Present Value	0 = Off, 1 = On
BV.108	Cfg_TRLHDisplayTime	Select whether to display the time on the TRL.	Present Value	0 = Off, 1 = On
BV.109	Cfg_TRLHTimeFormat	Select the time format on the TRL.	Present Value	0 = 24H, 1= 12H
Advanced				
BV.200	SimulationState	Displays the state of simulation mode.	Read Only	0 = Off, 1 = On
BV.201	Stage1Output	Select whether to enable or disable the output value of stage 1.	Present Value	0 = Off, 1 = On
BV.203	Stage2Output	Select whether to enable or disable the output value of stage 2.	Present Value	0 = Off, 1 = On
BV.204	Stage3Output	Select whether to enable or disable the output value of stage 3.	Present Value	0 = Off, 1 = On
BV.205	Stage4Output	Select whether to enable or disable the output value of stage 4.	Present Value	0 = Off, 1 = On
BV.230	AL_BoardSensorFailure	Displays the status of the alarm for the failure of the broad sensor. It indicates that the PCB temperature is above the maximum temperature.	Read Only	0 = Off, 1= On
BV.231	AL_RoomRHSensorFailure	Displays the status of the alarm for the failure of the room relative humidity sensor.	Read Only	0 = Off, 1 = On
BV.232	AL_RoomTempSensorFailure	Displays the status of the alarm for the failure of the room temperature sensor.	Read Only	0 = Off, 1 = On
BV.233	AL_DuctRHSensorFailure	Displays the status of the alarm for the failure of the duct relative humidity sensor.	Read Only	0 = Off, 1 = On
BV.234	AL_TrlhRHSensorFailure	Displays the status of the alarm for the failure of the controller relative humidity sensor.	Read Only	0 = Off, 1 = On
BV.235	AL_TrlhTempSensorFailure	Displays the status of the alarm for the failure of the controller temperature sensor.	Read Only	0 = Off, 1 = On

Multi State Value (MSV)

Table 10 - Object Table Information: Multi State Value (MSV)

ID	Name	Description	W?	Notes
Integrator				
MSV.1	PumpState	Displays the status of pump.	Read Only	1 = Stand-by 2 = Start Pump 3 = Pressurizing 4 = Ready 5 = Cooling 6 = Manual Prime 7 = System Drain 8 = Inactivity Drain 9 = Alarm 10 = Closing
Integrator – Configuration				
MSV.100	Cfg_PressureUnits	Configuration value to select the pressure units.	Present Value	1 = kPa 2 = PSI 3 = Bar
MSV.101	Cfg_Language	Select the language of the BACnet server.	Present Value	1 = English
MSV.102	Cfg_ObjectListMode	Configuration value to select the category of BACnet objects to display.	Present Value	1 = Integrator 2 = Advanced 3 = Factory

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| ID	Name	Description	W?	Notes
Integrator				
MSV.1	ZoneState	Displays the status of zone.	Read Only	1 = POR 2 = Alarm 3 = Stand-By 4 = Drain Stages 5 = Drain Lines 6 = Ready
MSV.2	Occupancy	Configuration value of the current occupancy state.	Present Value	1 = Occupied 2 = Unoccupied 3 = Vacant 4 = Off

ID	Name	Description	W?	Notes
Integrator – Configuration				
MSV.100	Cfg_ControlMode	Configuration value to select the control mode.	Present Value	1 = External AI3 2 = Internal RH 3 = Internal Temp 4 = Internal Alternating 5 = Network
MSV.101	Cfg_ControlRHSource	Configuration value to select the control humidity source.	Present Value	1 = None 2 = AI4 3 = TRLH 4 = Network
MSV.102	Cfg_ControlTempSource	Configuration value to select the control temperature source.	Present Value	1 = None 2 = AI5 3 = TRLH 4 = Network
MSV.103	Cfg_ControlSetpointSource	Configuration value to select the control setpoint source.	Present Value	1 = AI3 2 = Internal 3 = Network
MSV.104	Cfg_HighLimitSource	Configuration value to select high limit source for analog input 1.	Present Value	1 = None 2 = AI6 3 = Network
MSV.105	Cfg_ObjectListMode	Configuration value to select the category of BACnet objects to display.	Present Value	1 = Integrator 2 = Advanced 3 = Factory
Advanced				
MSV.300	Cfg_AI3Signal	Select the signal type for the analog input 3.	Present Value	1 = 0-10Vdc 2 = 2-10Vdc
MSV.301	Cfg_AI4Signal	Select the signal type for the analog input 4.	Present Value	1 = 0-10Vdc 2 = 2-10Vdc
MSV.302	Cfg_AI5Signal	Select the signal type for the analog input 5.	Present Value	1 = 0-10Vdc 2 = 2-10Vdc
MSV.303	Cfg_AI6Signal	Select the signal type for the analog input 6.	Present Value	1 = 0-10Vdc 2 = 2-10Vdc

ID	Name	Description	W?	Notes
MSV.304	Cfg_FeedbackSignal	Select the signal type for the feedback signal.	Present Value	1 = 0-20mA 2 = 4-20mA

Other

Table 11 - Object Table Information: Other

ID	Name	Description	W?	Notes
FIL.1	FirmwareUpdateFile	File object of the firmware upgrade.	File_Size Archive	Stream access method via atomicWriteFile and atomicReadFile.
FIL.2	BootloaderUpdateFile	File object of the bootloader firmware upgrade.	File_Size Archive	Stream access method via atomicWriteFile and atomicReadFile.
FIL.3	PumpFirmwareUpdateFile	File object for pump firmware upgrade.	File_Size Archive	Stream access method via atomicWriteFile and atomicReadFile
FIL.4	PumpBootloaderUpdateFile	File object for pump bootloader upgrade.	File_Size Archive	Stream access method via atomicWriteFile and atomicReadFile
PGM.1	FirmwareUpdateTask	Firmware upgrade task.	Program_Change	
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FIL.1	FirmwareUpdateFile	File object of the firmware upgrade.	File_Size Archive	Stream access method via atomicWriteFile and atomicReadFile.
FIL.2	BootloaderUpdateFile	File object of the bootloader firmware upgrade.	File_Size Archive	Stream access method via atomicWriteFile and atomicReadFile.
PGM.1	FirmwareUpdateTask	Firmware upgrade task.	Program_Change	
SCH.1	OccupancySchedule	Weekly occupancy schedule to specify which occupancy state is active during specific periods of day.	Out_Of_Service Weekly_Schedule Schedule_Default Priority_for_Writing Effective_Period	Result is written into OccupancyState's present value (MSV.2). See OccupancyState for the list of valid event values.

Notes
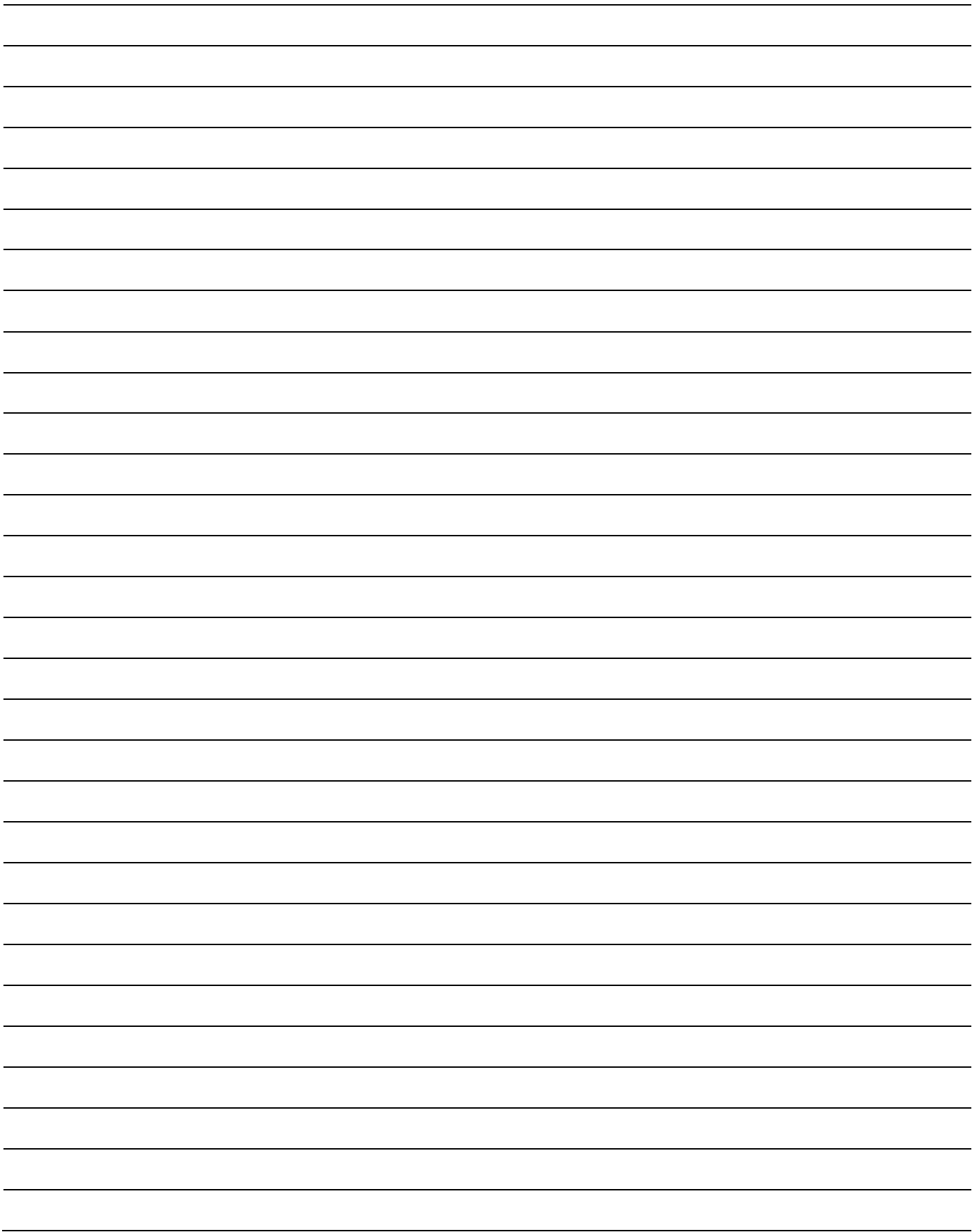
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