HL-69158NP Multi-Function Humidity Device with Temperature Sensor Product Bulletin

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Introduction

The Johnson Controls® HL-69158NP is a multi-function device that can function as a high limit or proportional override humidity controller, as stand-alone proportional controller, or a stand-alone two-position controller.

As a high limit or proportional override controller, it limits duct humidity by comparing a controller's request for humidification with the humidity present in a duct. The HL-69158NP proportionately reduces its output signal to the humidification equipment as duct Relative Humidity (RH) approaches a user-defined setpoint. As a result, the HL-69158NP provides more accurate control of duct humidity and reduces condensation. As a stand-alone controller, it can provide a proportional 0 VDC to 10 VDC or 0 mA to 20 mA output based on its own setpoint, or two-position Single-Pole, Single-Throw (SPST) Normally Open (N.O.) output. The HL-69158NP also includes an integral temperature sensor, which adds to the product's versatility.

Figure 1: HL-69158NP Multi-Function Humidity Device

Features and benefits

Multi-functional device: provides several humidity control applications: high limit or proportional override, stand-alone proportional, or stand-alone two-position

All-plastic material for Duct Probe: improves thermal performance and complies with Underwriters Laboratories® Inc (UL) flammability ratings for plenum use; complies with Blue Angel (Germany) and TCO'95 (Sweden) environmental regulations

Humidity and temperature sensors in one unit: eliminates the need for separate sensors and reduces installation time and cost

Adjustable RH setpoint and proportional band: enables the user to define the maximum humidity level allowed in the duct and reduces excessive humidification equipment cycling

Product overview

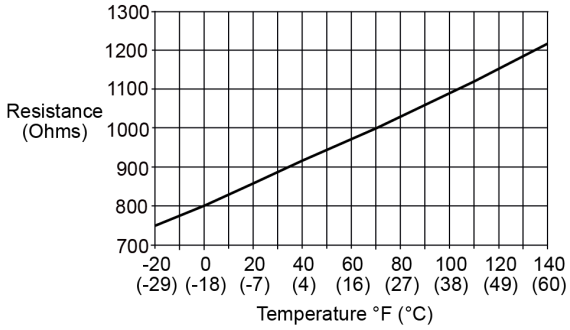
Important: The HL-69158NP Multi-function Humidity Device is intended to provide input to equipment under normal operating conditions. Where failure or malfunction of an HL-69158NP could lead to an abnormal operating condition that could cause personal injury or damage to the equipment or other property, other devices (limit or safety controls) or systems (alarm or supervisory) intended to warn of, or protect against, failure or malfunction of the HL-69158NP must be incorporated into and maintained as part of the control system.

When it functions as an override device, the HL-69158NP generates a 0 VDC to 10 VDC or 0 mA to 20 mA output signal based on both setpoint and sensed humidity. The HL-69158NP regulates duct humidity by overriding a system controller's demand for humidification when humidity exceeds a user-defined setpoint. When used as a stand-alone device, the HL-69158NP delivers a proportional or On/Off relay output to a humidifier as humidity approaches the preset setpoint. Power the HL-69158NP from either a separate 24 VAC transformer or directly from the controller.

The Johnson Controls sensor offers an all-plastic enclosure, which reduces thermal biasing. This feature lowers energy consumption, reduces condensation, and eliminates the need for thermal compensation.

The temperature sensor's thin-film nickel material provides 1,000 ohms of resistance at 70°F (21°C). The temperature sensor operates independently of the humidity control function. See Figure 2 for the resistance versus temperature relationship for a nickel sensor.

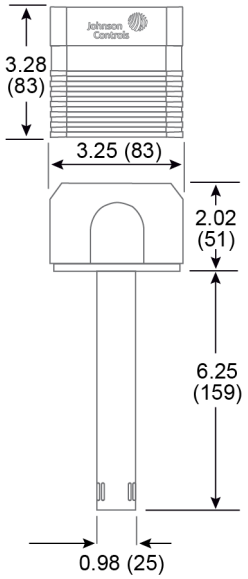
Figure 2: Resistance versus temperature



Dimensions

See the following figure for Humidity Device dimensions.

Figure 3: HL-69158NP dimensions, in. (mm)



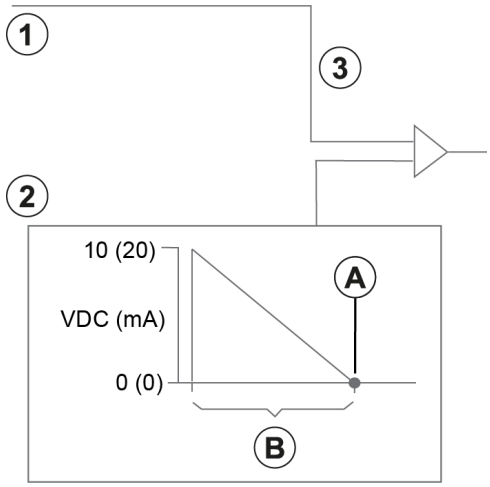
Applications

Proportional override device

About this task: When you use the HL-69158NP device as a proportional override device with a system controller, the HL-69158NP operates as follows:

1. The HL-69158NP accepts a 0 to 10 VDC or 0 to 20 mA input from a system controller. See Figure 4.
2. The HL-69158NP calculates an internal 0 to 10 VDC (0 to 20 mA) signal, which is a function of the following:
    a. The setpoint or maximum humidity allowed in the supply air duct; user adjustable from 60% RH to 95% RH
    b. The proportional band or the range of humidity below the setpoint over which the control signal is modified; user adjustable from 5% RH to 30% RH
    c. The sensed humidity in the duct
3. The HL-69158NP compares the two signals from Step 1 and Step 2, and outputs the lower of the two signals to the humidification equipment.

Figure 4: HL-69158NP internal calculation and output selection



Callout	Description
1	0 VDC to 10 VDC or 0 mA to 20 mA input from the System Controller
2	HL-69158NP's internal signal
3	Output to the humidification equipment
A	Setpoint
B	Proportional band

Example: If the setpoint is 90% RH, the proportional band is 20% RH, the duct humidity is 80% RH, and the controller input is 7 VDC, the HL-69158NP outputs 5 VDC to the humidification equipment since 5 VDC is lower than the system controller's signal.

Important: You cannot use the relay output when you use an analog input signal.

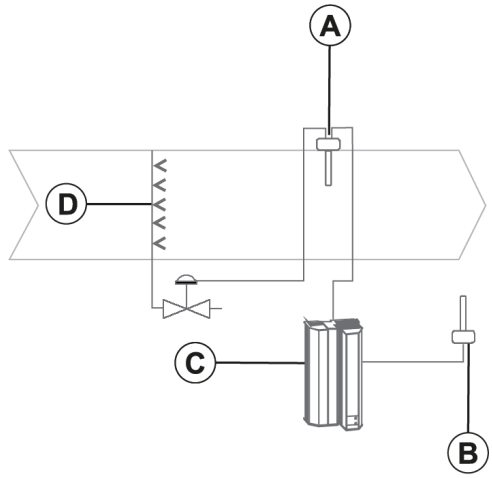
Sample configurations

The HL-69158NP provides proportional override control when linked with a system controller or another HL-69158NP. See Figure 5 and Figure 6.

Note: When you use the HL-69158NP device as a proportional override device, you can configure the HL-69158NP for the following Johnson Controls controllers:

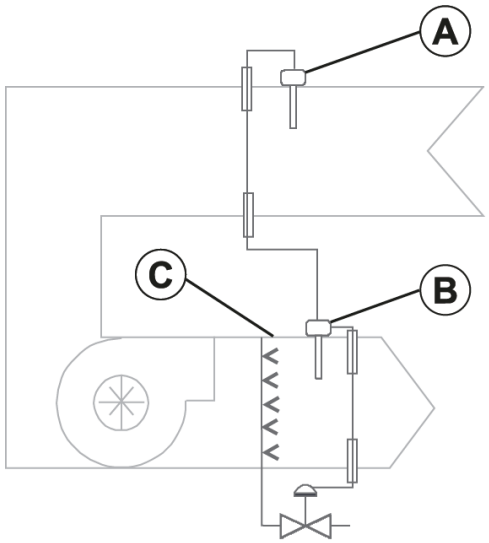
- Air Handling Unit (AHU)
- Unitary (UNT) Controller
- Variable Air Volume (VAV) Controller
- VAV Modular Assembly (VMA)
- Digital Control Module (DCM) with a Function Module-Output Analog Electrical (FM-OAE)
- DX-9xxx or AS-LCPx00-0
- System 350™ control such as a W351P Humidity Control

Figure 5: HL-69158NP linked with a System Controller



Callout	Description
A	HL-69158NP device
B	HL-69158NP device, mounted at least 8 ft (2.4 m) downstream from the humidification equipment
C	System Controller
D	Humidifier

Figure 6: HL-69158NP linked with another HL-69158NP device

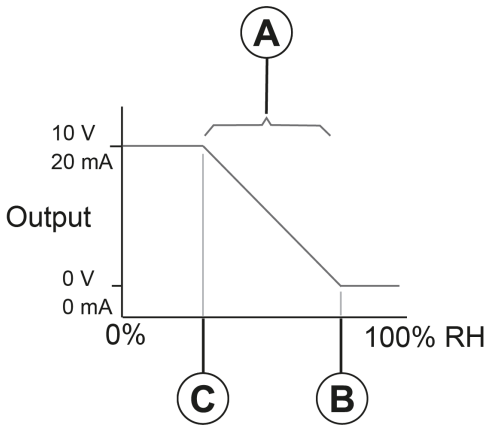


Callout	Description
A	HL-69158NP device
B	HL-69158NP device, mounted at least 8 ft (2.4 m) downstream from the humidification equipment
C	Humidifier

Stand-alone proportional device

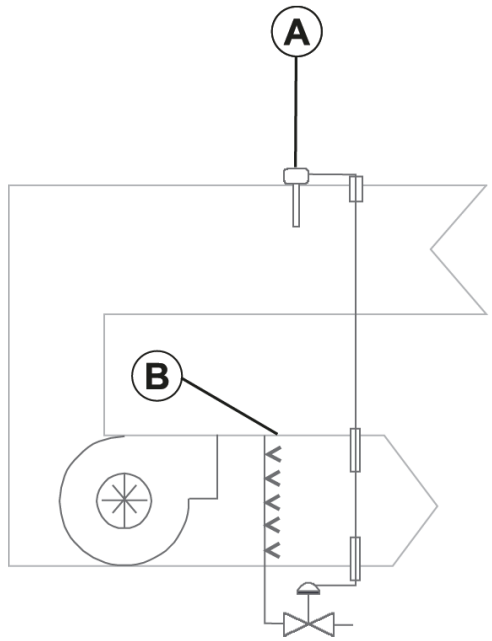
When stand-alone proportional duct humidity control is required, the HL-69158NP input jumper is set to no input. When duct humidity approaches the user-defined setpoint, the HL-69158NP proportionately reduces its output to the humidification equipment. See Figure 7 . A sample configuration is shown in Figure 8.

Figure 7: Stand-alone proportional control operation



Callout	Description
A	Proportional band (PB)
B	Setpoint (SP)
C	SP - PB

Figure 8: HL-69158NP operating as a stand-alone proportional or two-position device

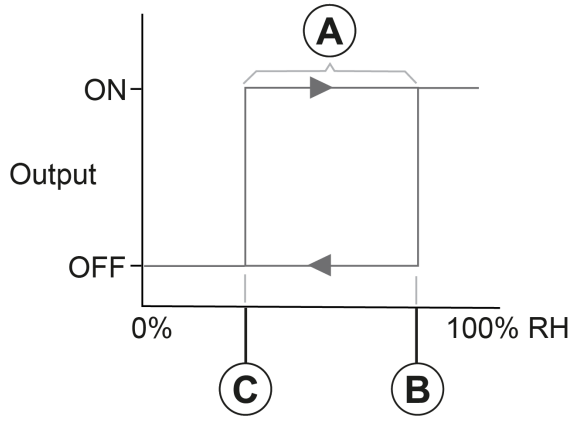


Callout	Description
A	HL-69158NP mounted in return air or space
B	Humidifier

Stand-alone two-position device

The HL-69158NP also provides an SPST relay output that you can use with On/Off equipment. You must set the input jumper to no input. The relay contacts open when RH reaches setpoint, and close when RH reaches setpoint minus the proportional band as shown in the following figure.

Figure 9: Stand-alone relay operation



Callout	Description
A	Proportional band (PB)
B	Setpoint (SP)
C	SP - PB

Repair information

The multi-function humidity device is not field repairable. See the Ordering information section to order a replacement.

Ordering information

Contact the nearest Johnson Controls representative to order a humidity device, and specify product code number HL-69158NP.

Technical specifications

Table 1: HL-69158NP Multi-function Humidity Device with Temperature Sensor technical specifications

Specification	Description
Power requirements	Proportional output: 20 VAC to 30 VAC, 1.1 VA at 50/60 Hz or 14 VDC to 30 VDC at 22 mA Relay output: 20 VAC to 30 VAC, 1.1 VA at 50/60 Hz or 20 VDC to 30 VDC at 22 mA
Wire gauge	16 AWG to 24 AWG; 18 AWG optimal
Humidity	Element: Capacitive Setpoint: Adjustable from 60% RH to 95% RH Proportional band: Adjustable from 5% RH to 30% RH
Temperature sensor	Type: Thin-film nickel Resistance: 1K ohm at 70°F (21°C) Accuracy: ±0.34°F (0.18°C) at 70°F (21°C) Coefficient: Approximately +3 ohm/°F; 5 ohm/°C
Controller signal	Input and output: 0 VDC to 10 VDC or 0 mA to 20 mA
Input impedance	Voltage: 20K ohm Current: 500 ohm
Output load	Voltage: ≥1K ohm Current: ≤500 ohm
Relay contact	Single-Pole, Single-Throw (SPST), normally open — open at setpoint and closed at setpoint minus proportional band, stand-alone operation only
Relay contact rating	Maximum: 4A, 24 VAC, Class 2; Pilot Duty, 42.4 VA at 24 VAC Minimum: 100 mA at 5 VDC
Ambient operating conditions	32°F to 150°F (0°C to 66°C); 0% RH to 100% RH noncondensing; 90°F (32°C) maximum dew point
Ambient storage conditions	-40°F to 150°F (-40°C to 66°C); 0% RH to 100% RH; 90°F (32°C) maximum dew point
Materials	Blue plastic cover with blue housing and probe
Dimensions (H x W x D)	3.28 in. x 3.25 in. x 8.27 in. (83 mm x 83 mm x 210 mm) Probe (L x D): 6.25 in. x 0.98 in. (159 mm x 25 mm)
Shipping weight	0.7 lb (0.03 kg)
Duct probe material	94-5V flammability rated per UL 94
Compliance	United States: UL Listed, CCN XAPX, File E27734; to UL 60730-1; and IEC 60730-2-13. Plenum Rated (UL 2043)
	Canada: cUL Listed, CCN XAPX7, File E27734; to CAN/CSA E60730-1; and CAN/CSAE60730-2-13
CE	Europe: CE Mark - Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive.
	Australia and New Zealand: RCM Mark, Australia/NZ Emissions Compliant

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Software terms

Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source software information, and other terms set forth at www.johnsoncontrols.com/techterms. Your use of this product constitutes an agreement to such terms.

Patents

Patents: https://jcipat.com

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