HE-69xx Series Duct Probe Humidity and Temperature Sensors Product Bulletin

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Introduction

The HE-69xx Sensor Series contains relative humidity (RH) sensing products with ±2% or ±3% accuracy.

The HE-69xx Series Duct Probe Humidity and Temperature Sensors combine humidity and temperature sensing in an all-plastic enclosure for use inside ducts. These sensor models are available with a nickel or platinum temperature sensor.

The input power options are 14 VDC to 30 VDC or 20 VAC to 30 VAC. The output signal is 0 VDC to 10 VDC for humidity indication.

Features and benefits

- Tested and calibrated with equipment certified as compliant with National Institute of Standards and Technology (NIST) guidelines.
- ±2% RH accurate model includes test and calibration equipment certificate of calibration conformance.
- User-selectable output voltage range allows choice of standard voltage outputs for use with systems in service or new systems.
- 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.

Figure 1: HE-69xx Series Duct Probe Humidity and Temperature Sensor



Product overview

Important: The HE-69xx Series Duct Probe Humidity and Temperature Sensor is intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the sensor could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the sensor.

Important: Le HE-69xx Series Duct Probe Humidity and Temperature Sensor est destiné à transmettre des données entrantes à un équipement dans des conditions normales de fonctionnement. Lorsqu'une défaillance ou un dysfonctionnement du sensor risque de provoquer des blessures ou d'endommager l'équipement contrôlé ou un autre équipement, la conception du système de contrôle doit intégrer des dispositifs de protection supplémentaires. Veiller dans ce cas à intégrer de façon permanente d'autres dispositifs, tels que des systèmes de supervision ou d'alarme, ou des dispositifs de sécurité ou de limitation, ayant une fonction d'avertissement ou de protection en cas de défaillance ou de dysfonctionnement du sensor.

The HE-69xx Series Duct Probe Sensors provide humidity and temperature sensing inside ducts. The humidity element senses over the entire range of 0% RH to 100% RH and is housed in a plastic enclosure that is easy to install.

Use temperature and humidity information from the HE-69xx Series Duct Probe Sensor to precisely calculate enthalpy. This calculation is important to determine an energy-efficient and cost-effective economization strategy.

Duct humidity is an important factor in the overall quality of indoor air. Use the HE-69xx Series Duct Probe Sensor to monitor and compare duct humidity with levels advised in ASHRAE ventilation standards.

Theory of operation

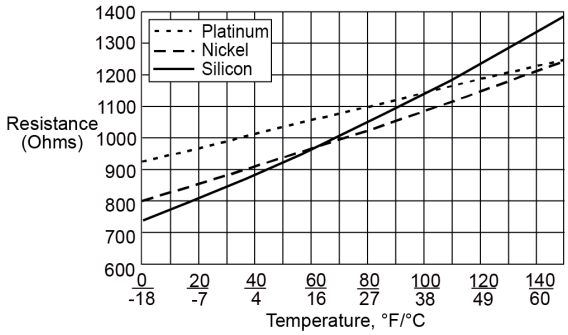
The humidity element is a capacitive sensor. The plates encase a water-permeable polymer that changes its dielectric constant through absorption of moisture in the air. The humidity-induced change in capacitance is used to produce a voltage signal proportional to the relative humidity of the sensed air.

Table 1: Nominal values for nickel and platinum sensors

Temperature		Resistance (ohm)	
°F	**°C**	**Nickel**	**Platinum**
-50	-45.6	673.7	820.7
-40	-40	699.0	842.7
-30	-34.4	724.6	864.7
-20	-28.9	750.5	886.6
-10	-23.3	776.8	908.5
0	-17.8	803.5	930.3
10	-12.2	830.4	952.1
20	-6.7	857.8	973.9
30	-1.1	885.5	995.7
40	4.4	913.5	1017.4
50	10.0	942.0	1039.0
60	15.6	970.8	1060.7
70	21.1	1000.0	1082.3
80	26.7	1029.6	1103.8
90	32.2	1059.6	1125.3
100	37.8	1089.9	1146.8
110	43.3	1120.7	1168.3
120	48.9	1151.9	1189.7
130	54.4	1183.5	1211.1
140	60.0	1215.6	1232.4
150	65.6	1248.0	1253.7
160	71.1	1280.9	1275.0
170	76.7	1314.2	1296.2
180	82.2	1348.0	1317.4
190	87.8	1382.2	1338.6
200	93.3	1416.8	1359.7
210	98.9	1451.9	1380.8
220	104.4	1487.5	1401.9

See Figure 2 for nickel and platinum sensor R/T response characteristics.

Figure 2: Nickel, platinum, and silicon temperature response



Ordering information

To order a HE-69xx Duct Probe Humidity and Temperature Sensor, contact the nearest Johnson Controls representative.

Note: See Table 3 for a list of available models.

Repair information

If the HE-69xx Duct Probe Sensor fails to operate within its specifications, replace the unit. For a replacement sensor, contact the nearest Johnson Controls® representative.

Ordering information

Table 2: HE-69xx Series Duct Probe Humidity and Temperature Sensors

	Ordering code number example	**H**	**E**	**-**	**6**	**9**	**1**	**3**	**0**	**N**	**P**	**-**	**0**
Application	**H** = Humidity sensing												
Device function	**E** = Element												
	-69												
Temperature sensor type	**1** = 1K ohm Nickel **5** = 1K ohm Platinum, Class A **S** = Silicon (A99)												
Humidity sensor accuracy	**3** = ±3% **2** = ±2%												
Output signal	**0** = 0 VDC to 10 VDC												
	N												
Enclosure style	**P** = Duct probe												
Logo	**0** = Johnson Controls												

Table 3: HE-69xx Series Duct Probe Humidity and Temperature Sensors ordering information

Product code number	**Temperature sensor type**	**RH Accuracy**	**Output scale, set point scale, control type**	**Enclosure style**	**Logo**
HE-69120NP-0	Ni1000	±2%	Proportional, 0 V to 10 V	Duct, probe	Yes
HE-69130NP-0	Ni1000	±3%	Proportional, 0 V to 10 V	Duct, probe	Yes
HE-69520NP-0	Pt1000 Class A	±2%	Proportional, 0 V to 10 V	Duct, probe	Yes
HE-69530NP-0	Pt1000 Class A	±3%	Proportional, 0 V to 10 V	Duct, probe	Yes
HE-69S30NP-0	Silicon	±3%	Proportional, 0 V to 10 V	Duct, probe	Yes

Technical specifications

Table 4: HE-69xx Series Duct Probe Humidity and Temperature Sensor

Product	HE-69xx Series Duct Probe Humidity and Temperature Sensor		
Power requirements	12 VDC to 30 VDC or 18 VAC to 30 VAC at 50/60 Hz, Class 2		
Current draw	DC supply		5 mA excluding load
	AC supply		14 mA excluding load
Acceptable wire gauge	16 AWG to 24 AWG wire; 18 AWG wire preferred		
Humidity element at 77°F (25°C)	Signal	0 VDC to 5 VDC or 0 VDC to 10 VDC, 1K ohm maximum load	
	Accuracy	**HE-69x2**	±2% RH for 20% to 80% RH at 77°F (25°C)
			±4% RH for 10% to 20% and 80% to 90% RH at 77°F (25°C)
		HE-69x3	±3% RH for 20% to 80% RH at 77°F (25°C)
			±5% RH for 10% to 20% and 80% to 90% RH at 77°F (25°C)
	Temperature coefficient	-0.03% RH/°C	
Temperature sensors	Thin film nickel	Accuracy	±0.34°F (0.18°C) at 70°F (21°C)
		Reference resistance	1K ohm at 70°F (21°C)
		Resistance change	Approximately 3 ohm/°F (5 ohm/°C)
	Silicon	Accuracy	±1°F (0.6°C) at 70°F (21°C)
		Reference resistance	1,035 ohm at 77°F (25°C)
		Resistance change	Approximately 4 ohm/°F (8 ohm/°C)
	Thin film platinum	Accuracy	±0.65°F at 70°F (±0.36°C at 21°C)
		Reference resistance	1K ohm at 32°F (0°C)
		Resistance change	Approximately 2 ohm/°F (4 ohm/°C)
Electrical connections	3-position and 2-position screw terminal blocks		
Ambient operating conditions	32°F to 140°F (0°C to 60°C)		
	0% to 100% RH, 85°F (29.4°C) maximum dew point		
Survival operating conditions	-40°F to 140°F (-40°C to 60°C)		
	0% to 100% RH, 85°F (29.4°C) maximum dew point		
Materials	Blue plastic cover with blue plastic housing and probe		
Dimensions	Duct probe (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	0.6 lb (0.3 kg)		
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

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 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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