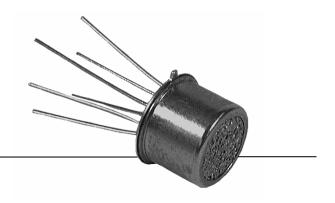
## Honeywell



# HIH-4602-A/C Series Humidity Sensors

#### DESCRIPTION

HIH-4602-A/C Series Relative Humidity (RH) sensors combine both relative humidity and temperature sensing in a TO-5 housing with a hydrophobic sintered stainless steel filter.

The laser-trimmed, thermoset polymer capacitive sensing elements have on-chip integrated signal conditioning.

The temperature sensor is thermally connected with the RH sensor making the HIH-4602-A/C often ideal for measuring dew point and other absolute moisture terms.

#### FEATURES

- Near linear voltage output vs %RH
- Laser-trimmed interchangeability
- Enhanced accuracy, fast response
- Chemically resistant
- Stable, low drift performance
- Built-in static protection
- Often ideal for dew point and absolute moisture measurements
- TO-5 housing

The HIH-4602-A contains an integral thermistor, while the HIH-4602-C contains an integral precision RTD.

Factory calibration data supplied with each sensor allows individually matched downstream electronics and  $\pm 3.5$  %RH total accuracy.

#### POTENTIAL APPLICATIONS

- Refrigeration
- Drying
- Meteorology
- · Battery-powered systems
- OEM (Original Equipment Manufacturer) assemblies

### HIH-4602-A/C Series

#### TABLE 1. PERFORMANCE SPECIFICATIONS (At 5 Vdc supply and 25 °C [77 °F] unless otherwise noted.)

Parameter	Minimum	Typical	Maximum	Unit	Specific Note
Interchangeability (first order curve)	_	_	_	_	_
0% RH to 59% RH	-5	_	5	% RH	_
60% RH to 100% RH	-8	_	8	% RH	_
Accuracy (best fit straight line)	-3.5	_	+3.5	% RH	1
Hysterisis	_	3	_	% RH	_
Repeatability	_	±0.5	_	% RH	_
Settling time	_	_	70	ms	_
Response time (1/e in slow moving air)	_	50	_	S	_
Stability (at 50% RH in one year)	_	±1.2	_	% RH	_
Voltage supply	4	_	5.8	Vdc	_
Current supply	_	200	500	μA	_
Output voltage temp. coefficient at 50% RH, 5 V	-	-4	_	mV/ºC	_
Voltage output (1st order curve fit)	Vou		2(sensor RH) + 0	.16), typical at 2	5 °C
Temperature compensation	True RH = (se	nsor RH)/(1.0546	-0.00216T), T in	°C	
Operating temperature	-40[-40]	See Figure 1.	85[185]	°C[°F]	_
Operating humidity	0	See Figure 1.	100	% RH	2
Storage temperature	-50[-58]	_	125[257]	°C[°F]	_
Storage humidity		See Figure 2.		% RH	2

#### Specific Notes:

1. Device is calibrated at 5 Vdc and 25 °C.

2. Non-condensing environment.

#### **General Notes:**

Sensor is ratiometric to supply voltage. •

Extended exposure to >90% RH causes a reversible shift of ٠ 3% RH.

Sensor is light sensitive. For best performance, shield sensor • from bright light.

#### **FACTORY CALIBRATION DATA**

HIH-4602 Sensors are supplied with a calibration and data printout. See Table 2.

TABLE 2. EXAMPLE DATA PRINTOUT		
Model	HIH-4602-C	
Channel	92	
Wafer	030996M	
MRP	337313	
Calculated values at 5 V V <sub>out</sub> at 0% RH V <sub>out</sub> at 75.3% RH	0.826 V 3.198 V	
Linear output for 3.5% RH accuracy at 25 °C Zero offset Slope RH	0.826 V 31.483 mV/%RH (V <sub>ουτ</sub> - zero offset)/slope (V <sub>ουτ</sub> - 0.826)/0.0315	
Ratiometric response for		

V <sub>out</sub> at 0% RH	0.826 V	High
$V_{out}$ at 75.3% RH	3.198 V	a = 0.00082808
Linear output for 3.5% RH		b = 0.00020869
accuracy at 25 °C		c = 8.0812E-08
Zero offset	0.826 V	
Slope	31.483 mV/%RH	TABLE 4. HIH-4
RH	(V <sub>out</sub> - zero offset)/slope (V <sub>out</sub> - 0.826)/0.0315	SPECIFICATION
Ratiometric response for		Thin film platinu
0% RH to 100% RH		DIN EN 60571
V <sub>out</sub>	V <sub>SUPPLY</sub> (0.1652 to 0.7952)	TCR = 3750 pp



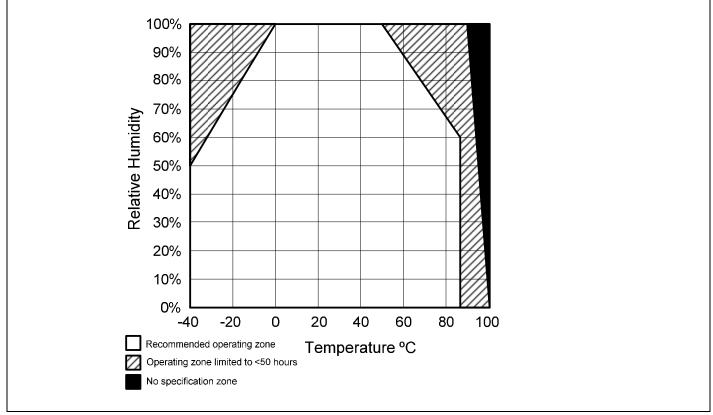
#### TABLE 3. HIH-4602-A NTC THERMISTOR TEMPERATURE SPECIFICTIONS

Rb = 100 kOhm ±5% at 25 °C		
Beta = 4250, 25 °C to 85 °C		
$1/T = a + b(Ln R) + c(Ln R) ^ 3, T in degrees K$		
	Temp. °C	Resistance
Low	0	351000
Mid	50	33590
High	100	5569
a = 0.000828083		
b = 0.000208691		
c = 8.0812E-08		

#### 4602-C RTD TEMPERATURE SENSOR NS

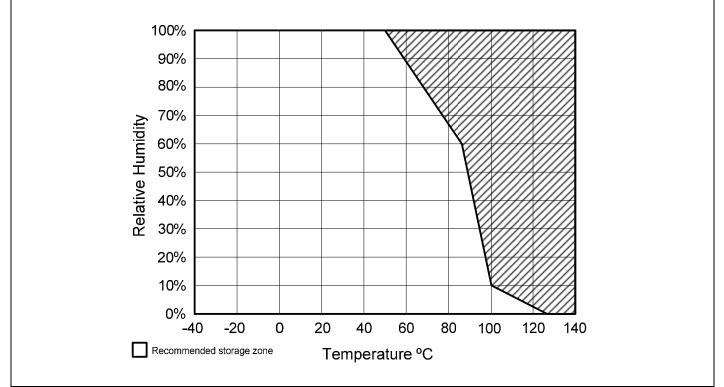
Thin film platinum RTD – Class 2B (Ro: ±0.25%)
DIN EN 60571 (PER IEC 751)
TCR = 3750 ppm/°C
1000 Ohm at 0 °C [32 °F]

### **Humidity Sensors**

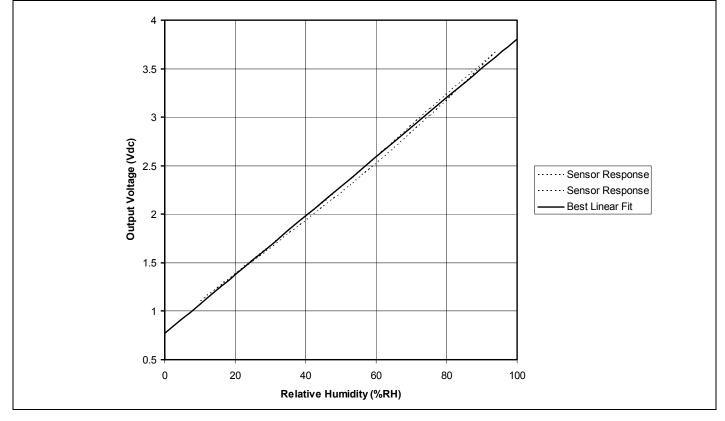


#### FIGURE 1. OPERATING ENVIRONMENT (Non-condensing environment.)



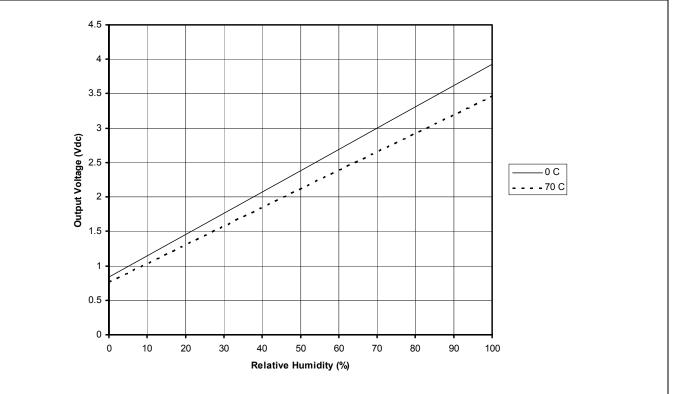


### HIH-4602-A/C Series

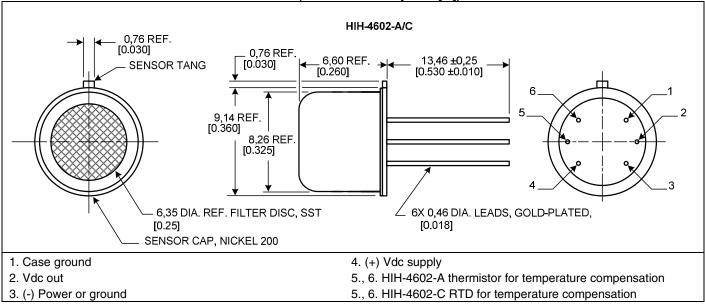


#### FIGURE 3. TYPICAL OUTPUT VOLTAGE VS RELATIVE HUMIDITY (At 25 °C and 5 V.)





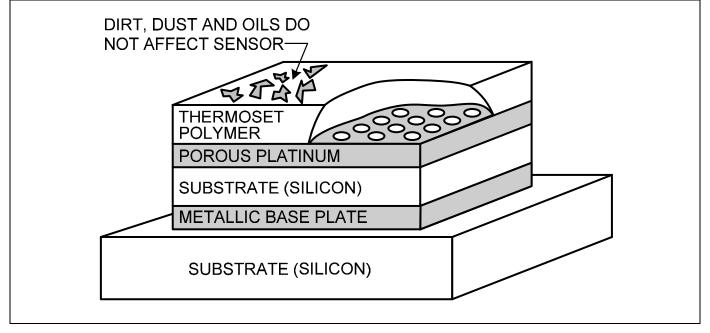
### **Humidity Sensors**



#### FIGURE 5. HIH-4602-A/C 1MOUNTING DIMENSIONS (For reference only. mm/[in])

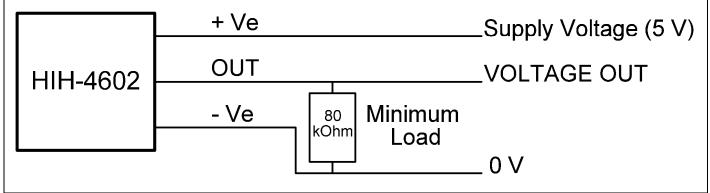
#### FIGURE 6. RH SENSOR CONSTRUCTION

Sensor construction consists of a planar capacitor with a second polymer layer to protect against dirt, dust, oils and other hazards.



### HIH-4602-A/C Series

#### FIGURE 7. TYPICAL APPLICATION CIRCUIT



#### **ORDER GUIDE**

Catalog Listing	Description
HIH-4602-A	Monolithic IC humidity sensor with integral thermistor in TO-5 can
HIH-4602-C	Monolithic IC humidity sensor with integral precision RTD in TO-5 can

#### FURTHER HUMIDITY SENSOR INFORMATION

See the following associated literature at www.honeywell.com/sensing:

- Product installation instructions
- Application sheets:
  - Humidity Sensor Performance Characteristics
  - Humidity Sensor Theory and Behavior
  - Humidity Sensor Moisture and Psychrometrics
  - Thermoset Polymer-based Capacitive Sensors

### Humidity Sensors

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### 🛦 WARNING

#### **MISUSE OF DOCUMENTATION**

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

#### WARRANTY/REMEDY

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Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

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