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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





# Sensors and Switches



SENSING AND CONTROL

## Product Catalog

**Honeywell**

## SENSORS AND SWITCHES

Honeywell offers a wide selection of products and technology capability for applications in medical devices and equipment; heating, ventilation, air-conditioning and refrigeration; information technology; home appliances; motor control and automotive passenger cars. This catalogue contains a selection of our most popular, established product listings. To view our complete range of products, visit our web site at [www.honeywell.com/sensing](http://www.honeywell.com/sensing).

### *How to use this catalogue*

For each referenced listing, key specification parameters, descriptions and mounting drawing information are presented. These listings illustrate our capabilities while the specifications included allow easy differentiation between similar products. For products with no specific reference numbers, please contact your local Honeywell sales office.

There are, of course, many more product options available. Full product specification information may be accessed on our web site ([www.honeywell.com/sensing](http://www.honeywell.com/sensing)). At the Home page enter the catalogue listing reference in the SEARCH box and click GO! This will take you directly to the interactive catalogue/specification search tables for this listing. Alternatively, select and click the interactive catalogue icon on the Home page and then choose a product category against which to do a specification search.

Also on the web site you can access installation instructions, application notes, Frequently Asked Questions (FAQs), selection guides and additional technical information.

### *Mounting dimensions*

Mounting dimensions shown in each product section are for reference only. For exacting layout work, request an engineering drawing from your nearest Honeywell sales office. Where dual dimensions are shown on mounting drawings, the first or upper one is millimetres (mm) and the second or lower is inches (in). Where single dimensions are shown, they are millimetres (mm), unless otherwise stated.

### *To order these products*

Simply contact your local Honeywell Distributor or your local Honeywell office. More information on Honeywell products and how to contact us can be found at <http://locator.micro.honeywell.com/>



**Interactive Catalog**  
[www.honeywell.com/sensing](http://www.honeywell.com/sensing)

### *Honeywell – delivering excellence*

To assist in delivering the right products for our customers' applications, we listen to them to understand their needs. Using techniques such as "Voice of the Customer" and "Concept Engineering," we aim to deliver the products and solutions. As part of Honeywell we can use local knowledge and understanding combined with global expertise and resources to achieve this. We can deploy many key technologies to bring innovative solutions to customers' problems.

Our products are manufactured to work well and to last. We use Six Sigma Plus productivity to ensure this is the case. We have award winning manufacturing facilities around the world and recognised world class business excellence in manufacturing and supply chain management to deliver on time, anywhere in the world.

Our e-business approach offers instant access to product information, technical support and application knowledge through our Internet site. Check out our powerful new interactive catalogue that can search and find the right products for customers' needs and deliver a drawing ready for incorporation in a CAD system direct to your desk.

And of course, we manage our whole business for the benefit of our customers, using an acknowledged world-class business excellence approach that incorporates Six Sigma principles.

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**Pressure Sensors** Page 4

Absolute, differential, gage and vacuum gage pressure sensors for media that are compatible with a silicon diaphragm. These sensors are often ideal for low-cost, commercial-grade applications such as printed circuit boards. Small and reliable, they aim to offer excellent repeatability and high accuracy under varying environmental conditions.

**Mass Airflow Sensors** Page 13

Amplified and unamplified microbridge mass airflow sensors aim at providing a sensitive, fast response and high accuracy over a broad range of gas and air flows.

**Force Sensors** Page 16

Compact, extremely sensitive devices for precise, reliable performance in many applications that requires precision force measurement.

**Humidity Sensors** Page 18

Relative humidity sensors with on-chip signal conditioning. Chemically resistant packaging to accommodate many harsh environments. Sensor construction consists of a planar capacitor with a second polymer layer to protect against dirt, dust, oils and other hazards.

**Temperature Sensors - RTDs** Page 19

Platinum and silicon-based thin film resistance temperature devices (RTDs) for appropriate applications requiring small package size, accuracy and linear outputs.

**Temperature Sensors - Thermistors** Page 21

Precision Hi-Rel negative temperature coefficient (NTC) thermistors and positive temperature coefficient (PTC) thermistors for use in a broad variety of temperature measurement and control applications.

**Temperature Sensors - Probes** Page 27

A variety of customized probes for use in the automotive and other industries.

**Thermal Cutoffs** Page 30

Dependable organic thermal cutoffs in temperatures ranging from 72 °C to 240 °C [162 °F to 464 °F]. They are available in various lead lengths and configurations.

**Thermostats Redi-Temp®** Page 32

Redi-Temp® is a line of standard thermostats offered in a range of pre-set temperatures. These standard products are available for immediate delivery. They are often useful for low-volume applications where standard configurations are acceptable.

**Thermostats - Commercial** Page 34

Dependable bi-metal thermostats include a choice of automatic or manual reset, phenolic or ceramic housings and a variety of mounting brackets and terminal options.

**Thermostats - Precision** Page 42

Hermetic and non-hermetic thermostats in standard and custom packages for use in a wide variety of precision applications.

**Thermostats - High Reliability** Page 63

Meet the stringent requirements of military and aerospace industries for dielectric strength, moisture resistance, vibration, shock and hermetic seal. These products meet all domestic and international approvals, as well as appropriate military specifications.

**Combi-sensor** Page 65

Liquid pressure/temperature sensor that uses piezoresistive and thermistor sensing technology to measure water pressure and temperature.

**Heaters** Page 66

Wire-wound, chemically-etched, high temperature and transparent heaters in a variety of sizes and geometries.

**Magnetic Position Sensors** Page 68

Hall effect and magnetoresistive sensors for many applications that require accurate, reliable outputs.

**Infrared Products** Page 74

Optoelectronic standard infrared emitting diodes (IREDs), sensors and assemblies for object presence, limit and motion sensing, position encoding and movement encoding.

**Current Sensors** Page 81

Adjustable linear null balance, digital and linear output current sensors for monitoring ac or dc current.

**Liquid Level Sensors** Page 87

Sensitive sensors in a variety of housing types for detecting the presence or absence of a wide range of liquids.

**Basic Switches** Page 89

Standard, miniature and subminiature switches available in a range of enclosures and with a variety of actuators. They are often ideal for use alone or built into assemblies.

**Turbidity Sensors** Page 99

Turbidity sensing aims to provide a quick, practical indication of the relative amount of solids suspended in water or liquids.

**⚠ WARNING**

**MISUSE OF DOCUMENTATION**

- The information presented in this catalogue is for reference only. DO NOT USE this document as product installation information.
- 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.**

**⚠ WARNING**

**PERSONAL INJURY**

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.**



# Pressure Sensors



## 24PC/26PC Series

**Signal conditioning:** Unamplified noncompensated (24PC Series)  
Compensated (26PC Series)

**Supply voltage:** 10 Vdc typ.  
12 Vdc max. (24PC Series)  
16 Vdc max. (26PC Series)

**Operating temperature:** -40 °C to 85 °C [-40 °F to 185 °F]

**Port style:** Straight or flow through

**Termination:** PCB; 1 x 4; 0.600 in (Type 6)  
PCB; 2 x 2; (Type 2)  
1 x 4 with connector (Type 5)

## OPTIONS

### Differential



### Gage

MOUNTING DIMENSIONS (for reference only) mm/in  
GAUGE SENSOR  
1 x 4 Termination (Style 6) Port Style A, Straight  
Pin 1 is notched, Pin 2 is next to Pin 1, etc.



Honeywell pressure sensors are small, low cost and reliable. They promote excellent repeatability, high accuracy and reliability under varying environmental conditions. In addition, they feature highly consistent operating characteristics from one sensor to the next and interchangeability without recalibration.

We offer three pressure sensor measurement types—absolute, differential and gage—including vacuum gage and bidirectional types. A wide variety of pressure ranges, along with both amplified and unamplified versions, are available.

Honeywell pressure sensors are best used in applications which require precision pressure measurement.

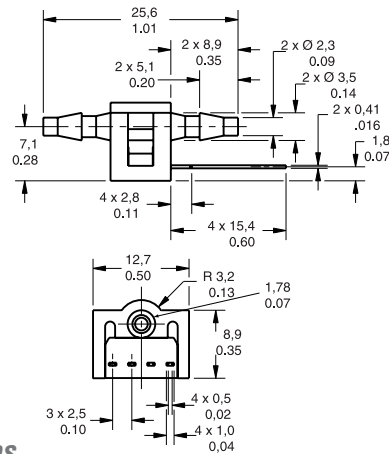
## 24PC Series

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gage/vacuum gage	1.0 psi	24PCFA6G
Differential/vacuum gage	5.0 psi	24PCBFA6D
Gage/vacuum gage	5.0 psi	24PCBFA6G
Differential/vacuum gage	15.0 psi	24PCCFA6D
Gage/vacuum gage	15.0 psi	24PCCFA6G
Differential/vacuum gage	30.0 psi	24PCDFA6D
Gage/vacuum gage	30.0 psi	24PCDFA6G
Differential	0.5 psi	24PCEFA6D
Gage	0.5 psi	24PCEFA6G
Differential	100 psi	24PCFFA6D
Gage	100 psi	24PCFFA6G

## 26PC Series

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Differential/vacuum gage	1.0 psi	26PCFA6D
Gage/vacuum gage	1.0 psi	26PCFA6G
Differential	5.0 psi	26PCBFA6D
Gage	5.0 psi	26PCBFA6G
Differential/vacuum gage	15.0 psi	26PCCFA6D
Gage/vacuum gage	15.0 psi	26PCCFA6G
Differential	30.0 psi	26PCDFA6D
Gage	30.0 psi	26PCDFA6G
Gage	100 psi	26PCFFA6G
Differential	250 psi	26PCGFA6D

## Flow through Type 6



## 24PC Series

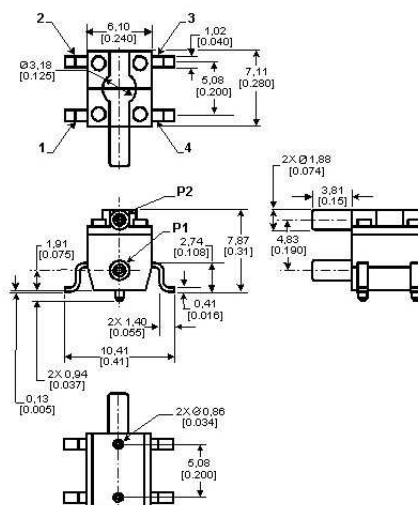
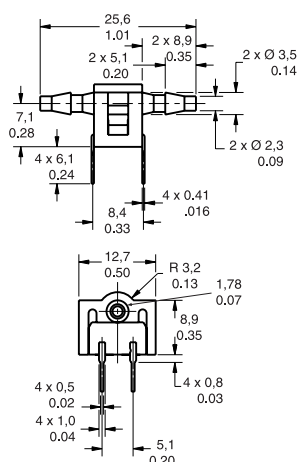
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Flow through/vacuum gage	15.0 psi	24PCFG6G
Flow through/vacuum gage	30.0 psi	24PCDFG6G

## 26PC Series

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Flow through/vacuum gage	1.0 psi	26PCAF6G
Flow through	15.0 psi	26PCCF6G
Gage/vacuum gage	100 psi	26PCFF6G

## 24PC/26PC Series (continued)

### Type 2



### 26PC Series

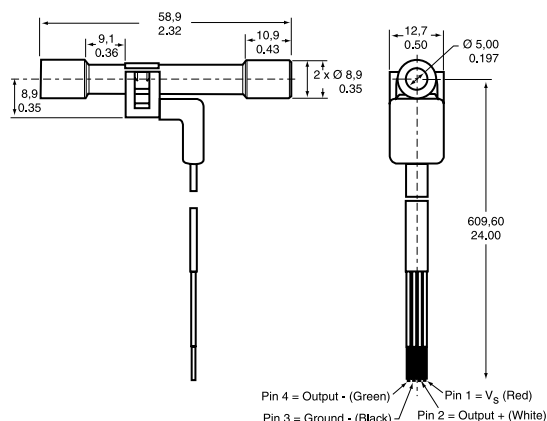
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Flow through	30.0 psi	26PCDFG2G

### OPTIONS

#### 24PC SMT Series

PRESSURE RANGE	REFERENCE
0 psi to 1.0 psi	24PC01SMT
0 psi to 5.0 psi	24PC05SMT
0 psi to 15.0 psi	24PC15SMT

### Type 5



#### 26PC SMT Series

PRESSURE RANGE	REFERENCE
0 psi to 1.0 psi	26PC01SMT
0 psi to 5.0 psi	26PC05SMT
0 psi to 15.0 psi	26PC15SMT

### 26PC Series

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Flow through/vacuum gage	100 psi	26PCFFU5G

## CPC/CPX Series, Low Pressure

<b>Signal conditioning:</b>	Unamplified Compensated (CPC Series) Noncompensated (CPX Series)
<b>Supply voltage:</b>	12 Vdc typ., 16 Vdc max.
<b>Operating temperature:</b>	-25 °C to 85 °C [-13 °F to 185 °F]
<b>Port style:</b>	Barbed PCB
<b>Termination:</b>	
<b>Accuracy grade:</b>	Commercial (1.0 %)

## 24PC/26PC SMT (Surface-Mount Technology)

**Signal conditioning:** Unamplified noncompensated (24PC SMT Series)  
Compensated (26PC SMT Series)

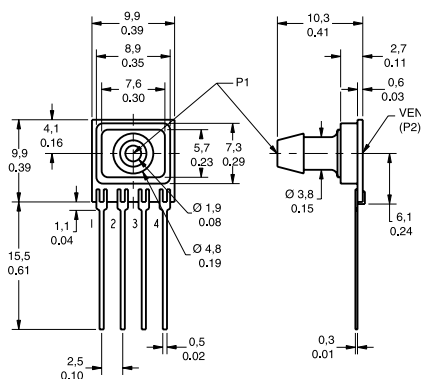
**Supply voltage:** 10 Vdc typ.  
12 Vdc max. (24PC SMT Series)  
16 Vdc max. (26PC SMT Series)

**Operating temperature:** -40 °C to 85 °C [-40 °F to 185 °F]

**Port style:** Straight, Ø 1,88 mm [0.74 in]

**Termination:** SMT solder

**Measurement type:** Gage, vacuum gage, differential, wet/wet differential



**CPC/CPX Series, Low Pressure (continued)**

**OPTIONS**

**CPC Series**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Differential	1.0 psi [4.0 in H <sub>2</sub> O]	CPCL04DFC
Gage	1.0 psi [4.0 in H <sub>2</sub> O]	CPCL04GFC
Differential	1.0 psi [10.0 in H <sub>2</sub> O]	CPCL10DFC

**CPX Series**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Differential	4.0 in H <sub>2</sub> O	CPXL04DF
Differential	10.0 in H <sub>2</sub> O	CPCL10DF

**DC Series, Low Pressure**

**Signal conditioning:** Amplified compensated  
Unregulated (DC001NDC4)  
Regulated (DC005NDR4)

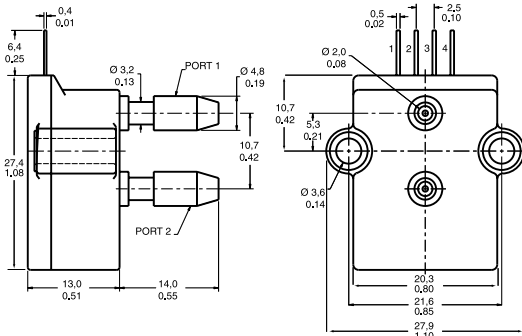
**Supply voltage:** 5 Vdc typ., 5.1 Vdc max. (DC001NDC4)  
7 Vdc to 35 Vdc (DC005NDR4)

**Operating temperature:** -25 °C to 85 °C [-13 °F to 185 °F]

**Port style:** Barbed

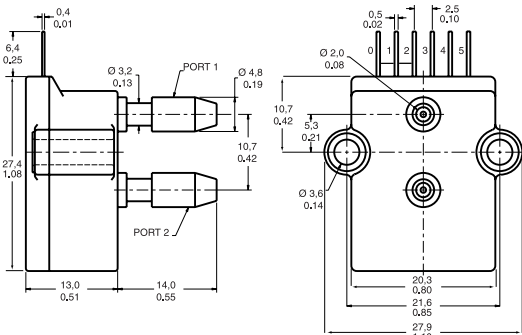
**Termination:** PCB

**OPTIONS**



**DC001NDC4**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Differential	1.0 in H <sub>2</sub> O	DC001NDC4



**DC005NDR4**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Differential	5.0 in H <sub>2</sub> O	DC005NDR4

**DCXL/DUXL Series, Low Pressure**

**Signal conditioning:** Unamplified  
Compensated (DCXL)  
Noncompensated (DUXL)

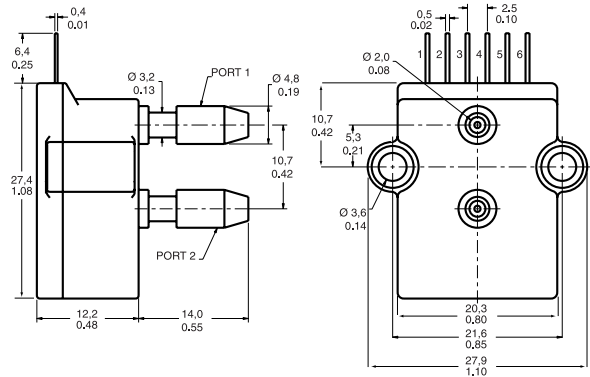
**Supply voltage:** 12 Vdc typ., 16 Vdc max. (DCXL)  
4.5 Vdc min., 8 Vdc max. (DUXL)

**Operating temperature:** -25 °C to 85 °C [-13 °F to 185 °F]

**Port style:** Barbed

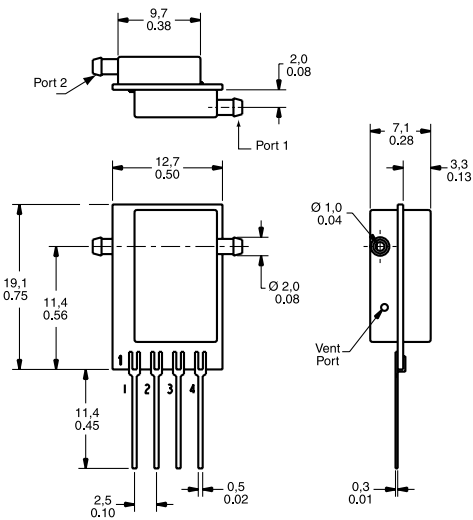
**Termination:** PCB

**OPTIONS**



**DCXL Series**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Differential	1.0 in H <sub>2</sub> O	DCXL01DN
Differential	10.0 in H <sub>2</sub> O	DCXL10DN

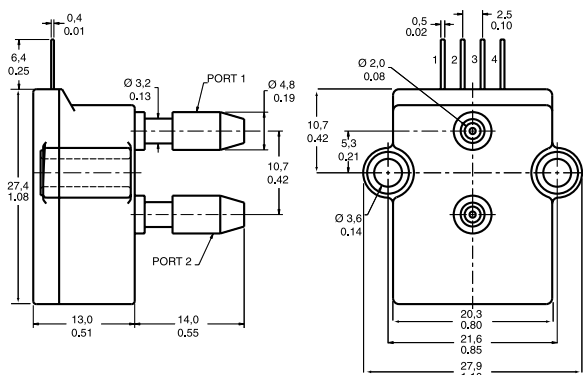


**DUXL Series**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Differential	1.0 in H <sub>2</sub> O	DUXL01D
Differential	10.0 in H <sub>2</sub> O	DUXL10D

## XCA Series

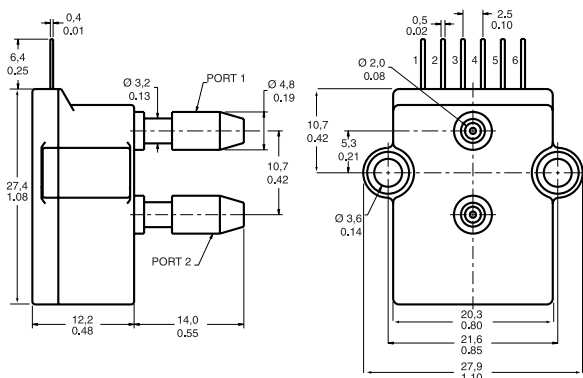
**Signal conditioning:** Amplified compensated  
**Supply voltage:** 5 Vdc typ., 16 Vdc max.  
**Operating temperature:** -25 °C to 85 °C [-13 °F to 185 °F]  
**Port style:** Barbed  
**Termination:** PCB



MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Absolute	15.0 psia	XCA415AN

## XCX Series

**Signal conditioning:** Unamplified compensated  
**Supply voltage:** 12 Vdc typ., 16 Vdc max.  
**Operating temperature:** -25 °C to 85 °C [-13 °F to 185 °F]  
**Port style:** Barbed  
**Termination:** PCB  
**Accuracy grade:** Commercial (1.0 %)

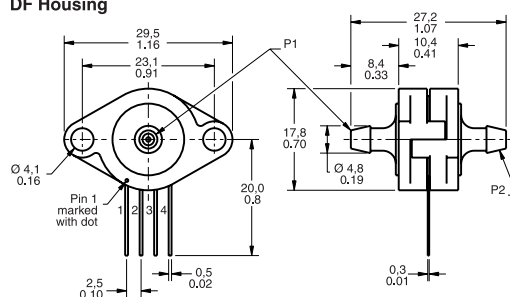


MEASUREMENT TYPE	PRESSURE RANGE	ACCURACY GRADE	REFERENCE
Differential	1.0 psi		XCX01DNC
Differential	1.0 psi	High (0.50 %)	XCX01DNH
Differential	15.0 psi		XCX15DNC

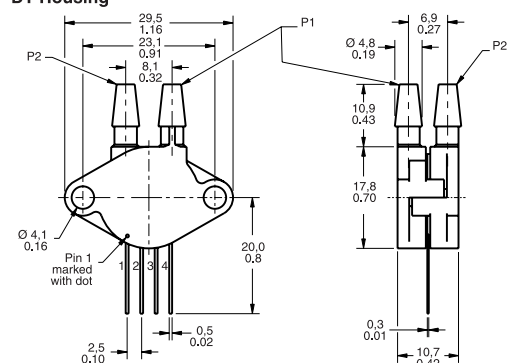
## XPC Series

**Signal conditioning:** Unamplified compensated  
**Supply voltage:** 12 Vdc typ., 16 Vdc max.  
**Operating temperature:** -25 °C to 85 °C [-13 °F to 185 °F]  
**Port style:** Barbed  
**Termination:** PCB  
**Accuracy grade:** Commercial (1.0 %)

### DF Housing



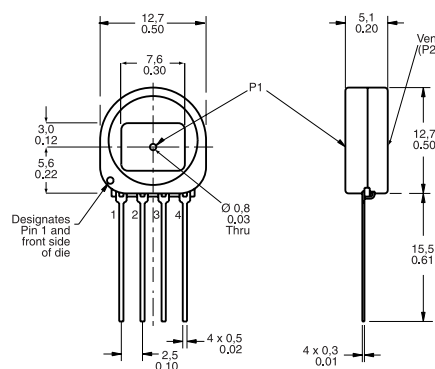
### DT Housing



MEASUREMENT TYPE	PRESSURE RANGE	PORT STYLE	REFERENCE
Differential	1.0 psi	Axial	XPC01DFC
Differential	15.0 psi	Radial	XPC15DTC

## XSX Series, Low Pressure

**Signal conditioning:** Unamplified uncompensated  
**Supply voltage:** 12 Vdc typ., 16 Vdc max.  
**Operating temperature:** -25 °C to 85 °C [-13 °F to 185 °F]  
**Port style:** Button  
**Termination:** PCB  
**Accuracy grade:** Commercial (1.0 %)

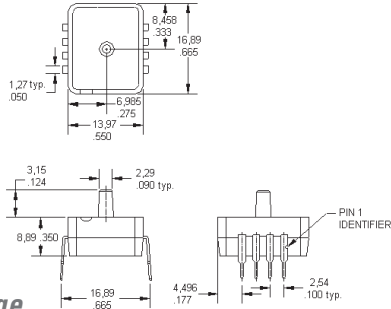


MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gage	4.0 in H <sub>2</sub> O	XSXL04GF



## ASDX Series

**Signal conditioning:** Amplified compensated  
**Supply voltage:** 4.75 Vdc to 5.25 Vdc  
**Operating temperature:** -20 °C to 105 °C [-4 °F to 221 °F]  
**Port style:** Taper 2,29 mm [0.090 in]  
**Termination:** PCB  
**Accuracy grade:** ±2.0 %

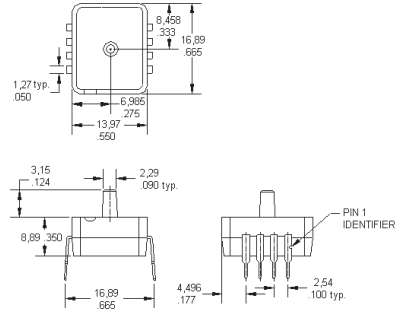


**A2 package**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Absolute	0 psi to 15 psi	ASDX015A24R
Absolute	0 psi to 30 psi	ASDX030A24R
Absolute	0 psi to 100 psi	ASDX100A24R

## ASDX DO (Digital Output) Series

**Signal conditioning:** Amplified  
**Supply voltage:** 4.75 Vdc to 5.25 Vdc  
**Operating temperature:** -20 °C to 105 °C [-4 °F to 221 °F]  
**Port style:** Taper 2,29 mm [0.090 in]  
**Termination:** PCB  
**Accuracy grade:** ±2.0 %



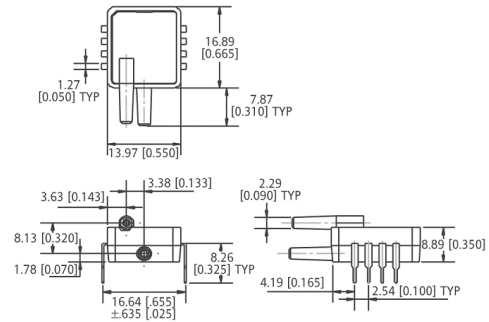
**A2 package**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Absolute	0 psi to 15 psi	ASDX015A24R-DO
Absolute	0 psi to 30 psi	ASDX030A24R-DO
Absolute	0 psi to 100 psi	ASDX100A24R-DO



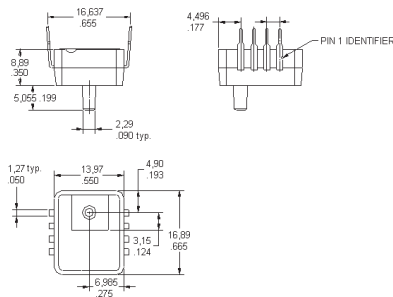
**D4 package**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Differential/gage	0 psi to 1 psi	ASDX001D44R
Differential/gage	0 psi to 5 psi	ASDX005D44R
Differential/gage	0 psi to 15 psi	ASDX015D44R
Differential/gage	0 psi to 30 psi	ASDX030D44R
Differential/gage	0 psi to 100 psi	ASDX100D44R



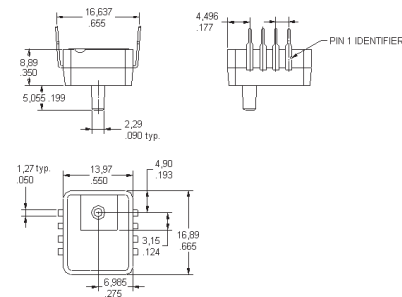
**D4 package**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Differential/gage	0 psi to 1 psi	ASDX001D44R-DO
Differential/gage	0 psi to 1 psi	ASDX001D44D-DO
Differential/gage	0 psi to 5 psi	ASDX005D44R-DO
Differential/gage	0 psi to 5 psi	ASDX005D44D-DO
Differential/gage	0 psi to 15 psi	ASDX015D44R-DO
Differential/gage	0 psi to 15 psi	ASDX015D44D-DO
Differential/gage	0 psi to 30 psi	ASDX030D44R-DO
Differential/gage	0 psi to 30 psi	ASDX030D44D-DO
Differential/gage	0 psi to 100 psi	ASDX100D44R-DO



**G2 package**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gage	0 psi to 1 psi	ASDX001G24R
Gage	0 psi to 5 psi	ASDX005G24R
Gage	0 psi to 15 psi	ASDX015G24R
Gage	0 psi to 30 psi	ASDX030G24R
Gage	0 psi to 100 psi	ASDX100G24R

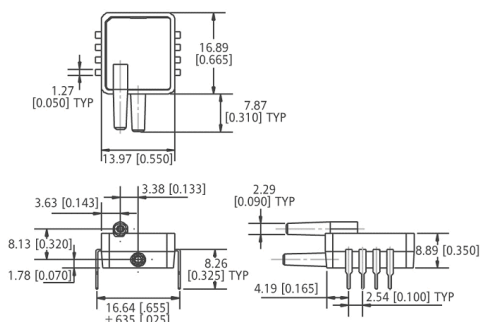


**G2 package**

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gage	0 psi to 1 psi	ASDX001G24R-DO
Gage	0 psi to 5 psi	ASDX005G24R-DO
Gage	0 psi to 15 psi	ASDX015G24R-DO
Gage	0 psi to 30 psi	ASDX030G24R-DO
Gage	0 psi to 100 psi	ASDX100G24R-DO

## ASDXL Series

**Signal conditioning:** Amplified  
**Output signal:** 0.5 Vdc to 4.5 Vdc  
**Operating temperature:** Compensated 0 °C to 85 °C [32 °F to 185 °F]  
**Port style:** Taper 2,29 mm [0.090 in]  
**Termination:** PCB  
**Accuracy grade:** 2.0 %

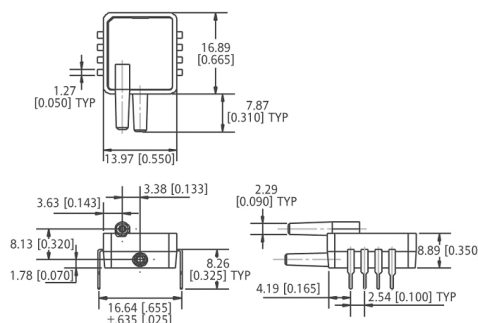


### D4 package

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Bidirectional	±5 in H <sub>2</sub> O	ASDXL005D44D
Bidirectional	0 in to 10 in H <sub>2</sub> O	ASDXL010D44D
Differential	0 in to 10 in H <sub>2</sub> O	ASDXL010D44R

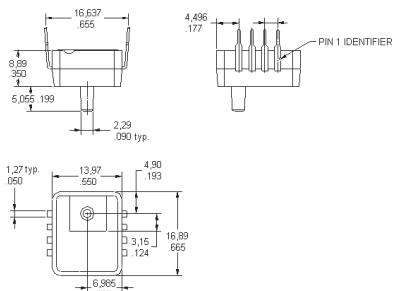
## ASDXL DO (Digital Output) Series

**Signal conditioning:** Amplified  
**Output signal:** HEX E25 to EA8  
**Operating temperature:** Compensated 0 °C to 85 °C [32 °F to 185 °F]  
**Port style:** Taper 2,29 mm [0.090 in]  
**Termination:** PCB  
**Accuracy grade:** 2.0 %



### D4 package

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Bidirectional	±5 in H <sub>2</sub> O	ASDXL005D44D-DO
Bidirectional	±10 in H <sub>2</sub> O	ASDXL010D44D-DO
Differential	0 in to 10 in H <sub>2</sub> O	ASDXL010D44R-DO



### G2 package

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gage	0 in to 10 in H <sub>2</sub> O	ASDXL010G24R

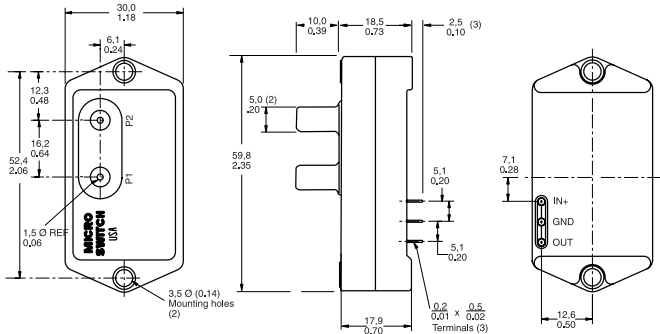


### G2 package

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gage	0 in to 10 in H <sub>2</sub> O	ASDXL010G25R-DO

## 140PC Series

**Signal conditioning:** Amplified  
**Supply voltage:** 8 Vdc typ., 16 Vdc max.  
**Operating temperature:** -40 °C to 85 °C [-40 °F to 185 °F]  
**Port style:** Straight  
**Termination:** PCB

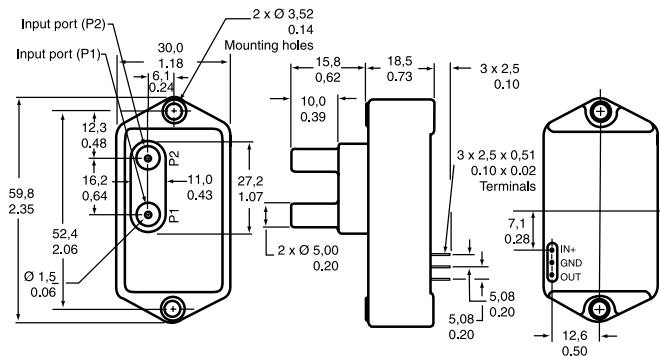


**Note:** Dimensions shown apply to Differential and Absolute versions. Gage units are identical, except the P1 port is absent.

MEASUREMENT TYPE	PRESSURE RANGE	TERMINATION	REFERENCE
Gage/vacuum gage	15 psi		141PC15G
Differential/vacuum gage	1.0 psi		142PC01D
Gage	1.0 psi		142PC01G
Gage	2.0 psi		142PC02G
Differential/vacuum gage	5.0 psi		142PC05D
Differential/vacuum gage	-39 in H <sub>2</sub> O to 55 in H <sub>2</sub> O		142PC05D97
Gage	5.0 psi		142PC05G
Absolute	15 psia		142PC15A
Absolute	15 psia	Leadwire	142PC15AW95
Gage	15 psi		142PC15G
Differential/vacuum gage	±2.5 psi		143PC03D
Differential/vacuum gage	±5.0 psi	Leadwire	143PC05DW

## 160PC Series, Low Pressure

**Signal conditioning:** Amplified  
**Supply voltage:** 8 Vdc typ., 16 Vdc max.  
**Operating temperature:** -40 °C to 85 °C [-40 °F to 185 °F]  
**Port style:** Straight  
**Termination:** PCB

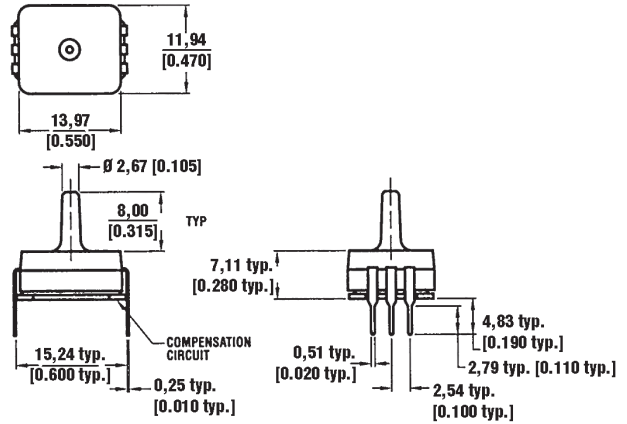


**Note:** Dimensions shown apply to Differential and Absolute versions. Gage units are identical, except the P1 port is absent.

MEASUREMENT TYPE	PRESSURE RANGE	SUPPLY VOLTAGE	REFERENCE
Differential/vacuum gage	0 in to 27.68 in H <sub>2</sub> O		162PC01D
Differential/vacuum gage	±5.0 in H <sub>2</sub> O		163PC01D36
Differential/vacuum gage	-20 cm to 120 cm H <sub>2</sub> O		163PC01D48
Differential/vacuum gage	-20 cm to 120 cm H <sub>2</sub> O	5 Vdc	163PC01D61
Differential/vacuum gage	±2.5 in H <sub>2</sub> O		163PC01D75
Differential/vacuum gage	10.0 in H <sub>2</sub> O		164PC01D37
Differential/vacuum gage	5.0 in H <sub>2</sub> O		164PC01D76

## SDX Series

**Signal conditioning:** Calibrated zero and span  
**Supply voltage:** 20 Vdc  
**Operating temperature:** Calibrated 0 °C to 50 °C [32 °F to 122 °F]  
**Port style:** Straight  
**Termination:** PCB



### A2/G2 package

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gage	0 psi to 5 psi	SDX05G2
Absolute	0 psi to 15 psi	SDX15A2



### D4 package

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Differential	0 psi to 1 psi	SDX01D4
Differential	0 psi to 5 psi	SDX05D4
Differential	0 psi to 15 psi	SDX15D4-A



## SDX IND Series

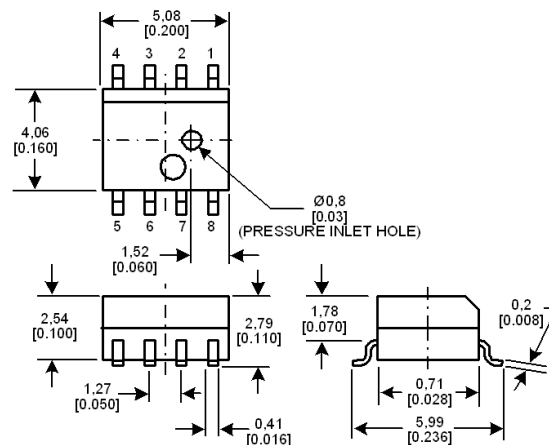
**Signal conditioning:** Calibrated zero and span  
**Supply voltage:** 20 Vdc  
**Operating temperature:** Calibrated 0 °C to 50 °C [32 °F to 122 °F]  
**Port style:** Straight  
**Termination:** PCB



MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Differential	0 in H <sub>2</sub> O to 5 in H <sub>2</sub> O	SDX005IND4
Differential	0 in H <sub>2</sub> O to 10 in H <sub>2</sub> O	SDX010IND4

## HPX Series

**Signal conditioning:** None  
**Supply voltage:** 3 Vdc typ., 10 Vdc max.  
**Operating temperature:** -20 °C to 100 °C [-4 °F to 212 °F]  
**Termination:** PCB

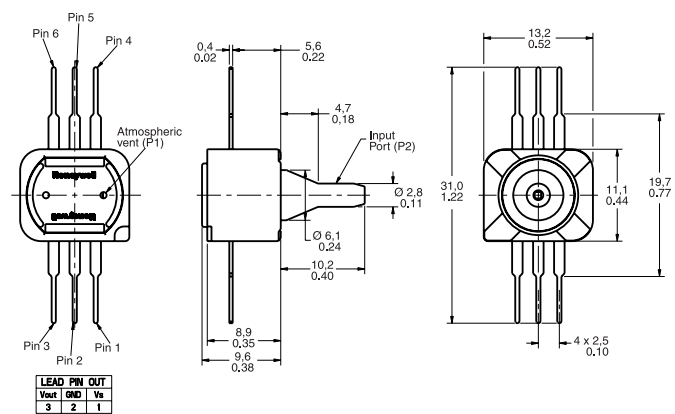


### SOIC package

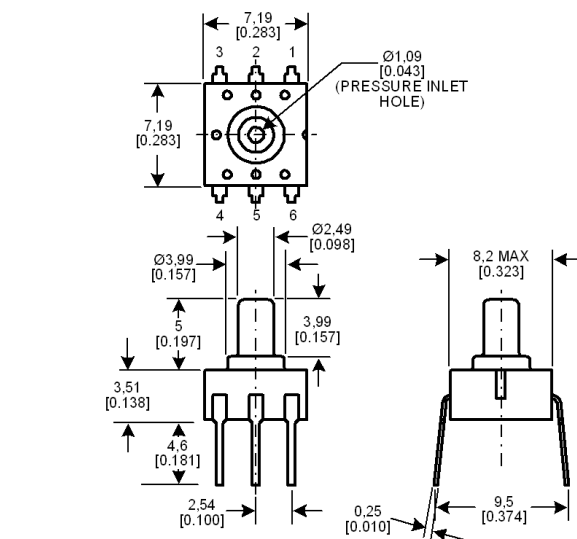
MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Absolute	0 psi to 15 psi	HPX015AS
Absolute	0 psi to 30 psi	HPX030AS
Absolute	0 psi to 50 psi	HPX050AS
Absolute	0 psi to 100 psi	HPX100AS

## 40PC Series, Miniature Signal Conditioned

**Signal conditioning:** Amplified  
**Supply voltage:** 5 Vdc ±0.25 Vdc  
**Operating temperature:** -45 °C to 125 °C [-49 °F to 257 °F]  
**Port style:** Straight for O-ring interface  
**Termination:** PCB, unformed



MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Bi-directional gage/vacuum gage	±50 mm Hg	40PC001B1A
Gage	0 to 300 mm HG	40PC006G1A
Vacuum	0 to -15.0 psi	40PC015V1A
Gage	15.0 psi	40PC015G1A
Gage	30.0 psi	40PC030G1A
Gage	100 psi	40PC100G1A
Gage	150 psi	40PC150G1A
Gage	250 psi	40PC250G1A
Gage	500 psi	40PC500G1A



### DIP package

MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Gage	0 psi to 5.8 psi	HPX005GD
Gage	0 psi to 15 psi	HPX015GD
Gage	0 psi to 30 psi	HPX030GD
Gage	0 psi to 50 psi	HPX050GD
Gage	0 psi to 100 psi	HPX100GD

# HSD Series

**Signal conditioning:** Amplified  
**Supply voltage:** 3.0 Vdc ±0.01 Vdc  
**Operating temperature:** -20 °C to 105 °C [-4 °F to 221 °F]  
**Output signal:** HEX E25 to EA8  
**Termination:** OCLPP (Open Cavity Leadless Plastic Package)



MEASUREMENT TYPE	PRESSURE RANGE	REFERENCE
Absolute	0 psi to 15 psi	HSD015A

# Mass Airflow Sensors



Mass Airflow sensors contain a thin-film, thermally isolated bridge structure that consists of a heater and temperature sensing elements. The bridge structure promotes sensitivity and fast response to the flow of air or other gas over the chip.

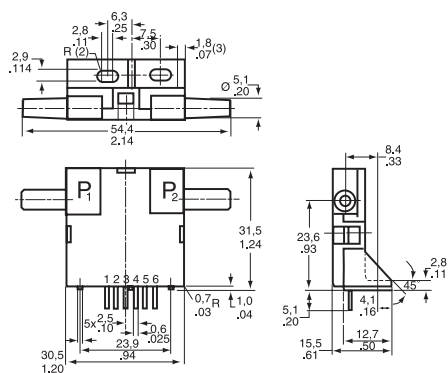
State-of-the-art chip design and manufacturing techniques allow the microbridge to be sensitive, fast and small. Used in appropriate applications where airflow needs to be measured.

**Supply voltage:** 8 Vdc to 15 Vdc  
**Operating temperature:** -25 °C to 85 °C [-13 °F to 185 °F]  
**Media compatibility:** Dry gas only

## AWM2000 Series

The AWM2000 Series microbridge mass airflow sensor is a passive device comprised of two Wheatstone bridges and has bidirectional sensing capability. The heater control circuit is required for operation per specifications. The sensing bridge supply circuit is also required for operation per specifications. These two circuits are not on board the package and must be supplied in the application. The differential amplifier is often a useful interface for the sensing bridge. It can be used to introduce gain and to voltage offsets to the sensor output.

**Signal conditioning:** Unamplified (-44.5 mVdc to 44.5 mVdc)  
**Port style:** Straight  
**Sensor resistance:** 5 kOhm

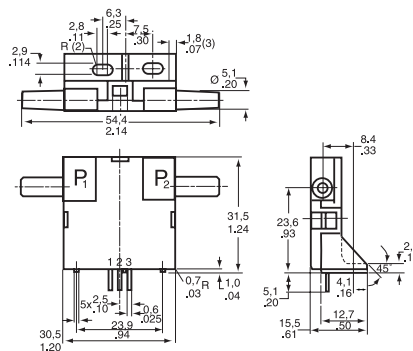


FLOW/PRESSURE RANGE	REFERENCE
±200 sccm	AWM2100V
±4.0 in H <sub>2</sub> O (10 mBar)	AWM2200V
±1000 sccm (1 SLPM)	AWM2300V

## AWM3000 Series

Like the AWM2000 Series, the dual Wheatstone bridges control airflow measurement. The AWM3000 Series is amplified; therefore, it can be used to increase the gain and to introduce voltage offsets to the sensor output. The heater control circuit and the sensing bridge supply circuit are on board the package.

**Signal conditioning:** Amplified (1 Vdc to 5 Vdc)  
**Port style:** Straight



FLOW/PRESSURE RANGE	REFERENCE
±200 cm	AWM3100V
+2.0 in H <sub>2</sub> O (5 mBar)	AWM3200V
±1000 sccm (1 SLPM)	AWM3300V



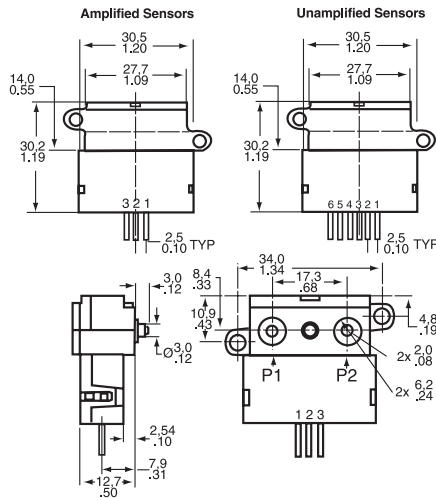
## AWM4000 Series

The microbridge mass airflow sensor operates on the theory of heat transfer. Mass airflow is directed across the surface of the sensing elements. Output voltage varies in proportion to the mass air or other gas flow through the inlet and outlet ports of the package. The specially designed housing precisely directs and controls the airflow across the microstructure sensing element. Mechanical design of the package typically allows it to be easily mounted to printed circuit boards.

The microbridge mass airflow sensor has a unique silicon chip based on advanced microstructure technology. It consists of a thin-film, thermally isolated bridge structure containing heater and temperature sensing elements. The bridge structure provides a sensitive and fast response to the flow of air or other gas over the chip. Dual sensing elements positioned on both sides of a central heating element indicate flow direction as well as flow rate. Laser trimmed thick film and thin film resistors provide consistent interchangeability from one device to the next.

**Port style:**

Manifold



## AWM5000 Series - High Flow

AWM5000 Series microbridge mass airflow sensors feature a venturi type flow housing. They measure flow as high as 20 standard liters per minute (SLPM) while inducing a maximum pressure drop of 2.25 in H<sub>2</sub>O. The microbridge chip is in direct contact with the flow stream, greatly reducing error possibilities due to orifice or bypass channel clogging.

The rugged plastic package has been designed to withstand common mode pressures up to 50 psi, and the small sensing element allows 100 g of shock without compromising performance. The included "AMP" compatible connector provides reliable connection in many demanding applications.

Each AWM5000 sensor contains circuitry which performs amplification, linearization, temperature compensation and gas calibration. A 1 Vdc to 5 Vdc linear output is possible for all listings regardless of flow range (5, 10, 15, or 20 SLPM) or calibration gas (nitrogen, carbon dioxide, nitrous oxide or argon). All calibration is performed by active laser.

**Signal conditioning:**

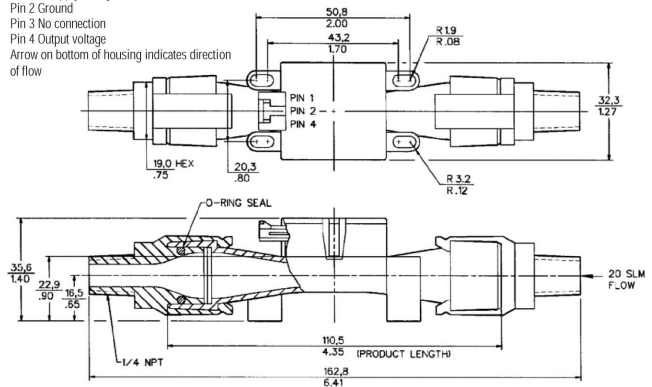
Amplified (1 Vdc to 5 Vdc)

**Port style:**

Threaded, 1/4 in NPT

**OUTPUT CONNECTIONS**

- Pin 1 - Supply voltage
  - Pin 2 Ground
  - Pin 3 No connection
  - Pin 4 Output voltage
- Arrow on bottom of housing indicates direction of flow



**SIGNAL CONDITIONING**

Unamplified (8.5 mV)  
 Unamplified (54.7 mV)  
 Amplified (1 Vdc to 5 Vdc)  
 Amplified (1 Vdc to 5 Vdc)

**FLOW/PRESSURE RANGE**

±25 sccm  
 ±1000 sccm (1 SLPM)  
 ±1000 sccm (1 SLPM)  
 + 6 SLPM

**REFERENCE**

AWM42150VH  
 AWM42300V  
 AWM43300V  
 AWM43600V

**FLOW/PRESSURE RANGE**

0 SLPM to 5 SLPM (N<sub>2</sub> calibration)  
 0 SLPM to 10 SLPM (N<sub>2</sub> calibration)  
 0 SLPM to 20 SLPM (CO<sub>2</sub> calibration)  
 0 SLPM to 20 SLPM (N<sub>2</sub> calibration)

**REFERENCE**

AWM5101VN  
 AWM5102VN  
 AWM5104VC  
 AWM5104VN

**CAUTION**

**PRODUCT DAMAGE**

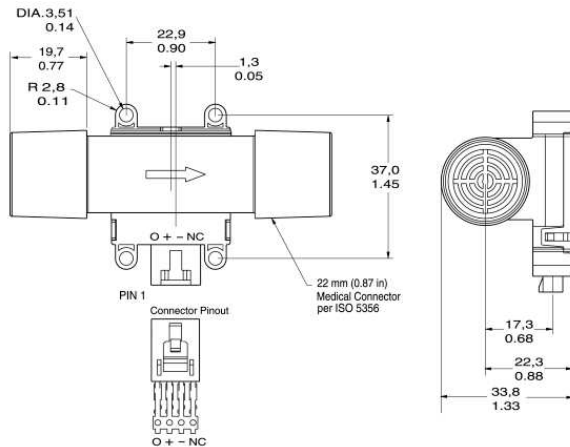
AWM Series Microbridge Mass Airflow Sensors are not designed to sense liquid flow and will be damaged by liquid flow through the sensor.

**Failure to comply with these instructions could result in product damage.**

## AWM700 Series

AWM700 Series microbridge mass airflow sensors provide in-line flow measurement with a specially designed bypass flow housing. The sensors measure flow as high as 200 standard litres per minute (SLPM) while inducing a pressure drop of 1 inch H<sub>2</sub>O, typically. The AWM700 has a high flow range capability in a small package.

**Signal conditioning:** Amplified (1 Vdc to 5 Vdc)  
**Port style:** Tapered, 22 mm



**FLOW/PRESSURE RANGE**  
 ±200 SLPM

**REFERENCE**  
 AWM720P1

### NOTICE

#### LAMINAR FLOW

Due to the fast response time of the sensor, these specifications were generated using laminar flow. Airflow instability or “turbulence” present in the airstream will result in an increase in measurement uncertainty.

The turbulent flow problem can be corrected by either straightening the airflow using flow laminarizing or by slowing the response of the sensor using a simple RC time constant on the output of the sensor. This, of course, slows down the sensor response time. The values needed depend on the amount of turbulence present in the application.

Several techniques for laminarizing the flow include adding hex shaped honeycombs, foam, screen materials or adding constrictors (frits) to the flow stream. There are various commercial laminar flow elements that can be purchased. Unfortunately the greater the efficiency of the laminarizer, the greater the increase in pressure drop in order to establish a given flow rate. Plastic honeycomb material probably gives the most improvement for the least pressure drop. In any test fixture, the avoidance of sharp radii is an absolute requirement.

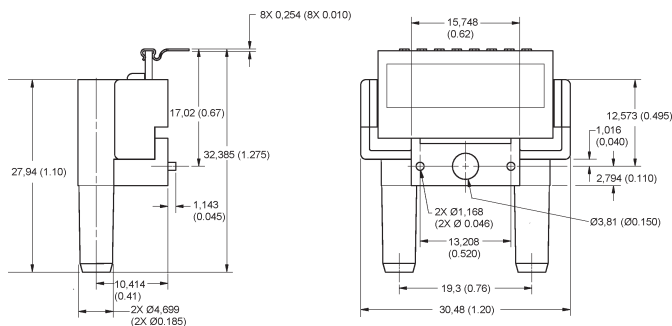
## AWM90000 Series

The AWM90000 Series microbridge mass airflow sensors are available in two versions, mass flow and differential pressure. The AWM92100V has a flow range of ±200 sccm with a pressure drop of only 0.49 mBar, typically. The AWM92200V is a differential pressure version that has a range of ±2 in H<sub>2</sub>O.

The AWM90000 Series has a 1 ms response time, operates with a supply voltage from 8.0 Vdc to 15.0 Vdc, while consuming only 50 mW of power. The compact plastic package will withstand a maximum overpressure of 25 psi without compromising performance.

**Signal Conditioning:**  
**Port Style:**

Unamplified  
 Straight



**FLOW RANGE (FULL SCALE)**  
 ±200 SCCM

**PRESSURE RANGE**  
 ±2.0 H<sub>2</sub>O (5 mBar)

**REFERENCE**  
 AWM92100V  
 AWM92200V

### CAUTION

#### PRODUCT DAMAGE

AWM Series Microbridge Mass Airflow Sensors are not designed to sense liquid flow and will be damaged by liquid flow through the sensor.

**Failure to comply with these instructions could result in product**

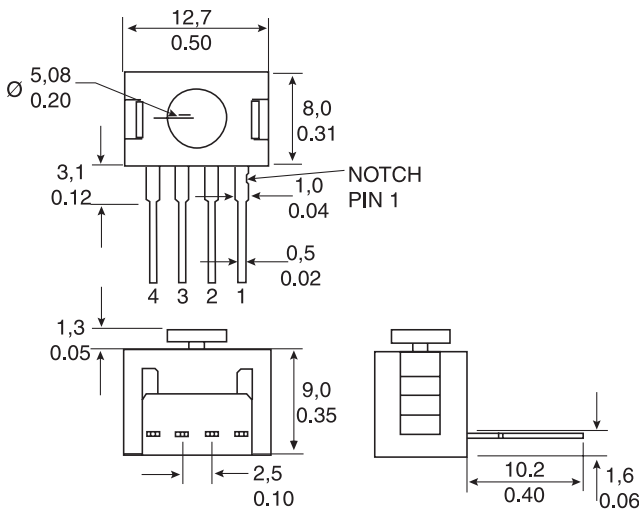
# Force Sensors



Force sensors operate on the principle that the resistance of silicon-implanted piezoresistors will increase when the resistors flex under any applied force. The sensor concentrates force from the application, through the stainless steel plunger, directly to the silicon sensing element. The amount of resistance changes in proportion to the amount of force being applied. This change in circuit resistance results in a corresponding mV output level.

## FSG Series

**Supply voltage:** 360 mV span @ 10 Vdc  
**Operating temperature:** -40 °C to 85 °C [-40 °F to 185 °F]  
**Sensitivity:** 0.20 mV/g min., 0.24 mV/g typ., 0.28 mV/g max.  
**Overforce:** 5500 g

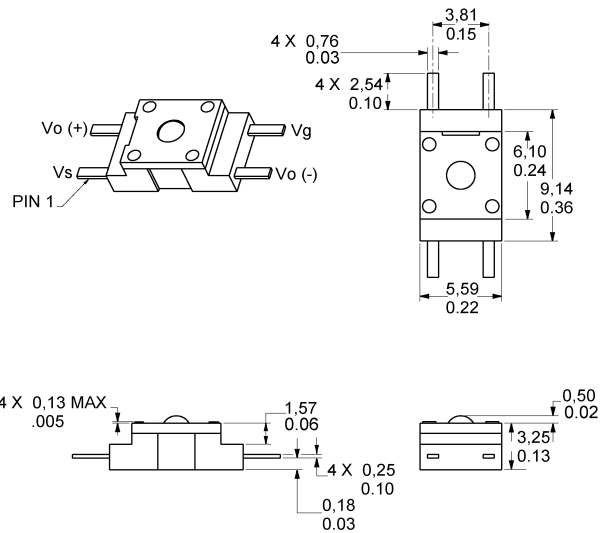


**Plunger actuator - force range 1500 g**

Non-compensated REFERENCE  
FSG15N1A

## FSL Series

**Supply voltage:** 60 mV span @ 5 Vdc  
**Operating temperature:** -40 °C to 85 °C [-40 °F to 185 °F]  
**Sensitivity:** 0.10 mV/g min., 0.12 mV/g typ., 0.14 mV/g max.  
**Overforce:** 4500 g



**Ball bearing actuator - force range 500 g**

Non-compensated REFERENCE  
FSG15N1A



## Model 1865 Force/Pressure Transducer

Model 1865 is a high-performance transducer specifically designed to address the needs of certain medical and specialized OEM applications. Offering laser-trimmed compensation, Model 1865 may be specified to operate with either a constant current or voltage supply.

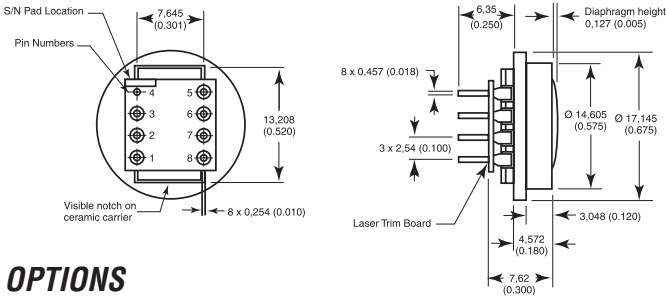
Model 1865 employs a solid state piezoresistive pressure transducer mounted in a plastic package. For applications where force is applied by a flexible membrane to the sensor, such as found in infusion pumps, Model 1865's precision height silicone diaphragm provides long life and is often a reliable replacement for older force or load cell transducers. Utilizing a silicon rubber diaphragm, Model 1865 is compatible with some liquid media applications. Model 1865 may be operated in either current or voltage excitation, and its output may be amplified or signal conditioned, as required. The semiconductor-based sensor offers high resolution using its Wheatstone bridge strain gage design. The height of the unit's patented, poured-in-place silicon rubber diaphragm is controlled to promote sensitivity to low pressure. This diaphragm is bonded to a plastic header and transmits force applied through a special silicone gel to the diaphragm of a silicon piezoresistive die. The back of the die is exposed to atmospheric pressure, which results in a gage pressure output.

**Pressure over-range protection:** 3X span or 60 psi, whichever is least  
**Media/materials compatibility**

**Top side:** Room atmosphere, directly applied force, and liquids compatible with dimethyl silicon, polyetherimide (Ultem®)

**Bottom side:** Non-corrosive dry gasses and fluids compatible with silicon, pyrex, RTV silicone and ceramic

**Sensor:** Gage pressure  
**Diaphragm:** Dimethyl silicone  
**Compensation:** Laser-trimmed normalized output



### OPTIONS

#### Excitation 1.5 mA

PRESSURE	REFERENCE
0 psi to 5 psi	1865-01G-L-N
0 psi to 10 psi	1865-02G-L-N
0 psi to 15 psi	1865-03G-L-N
0 psi to 25 psi	1865-04G-L-N
0 psi to 30 psi	1865-05G-L-N

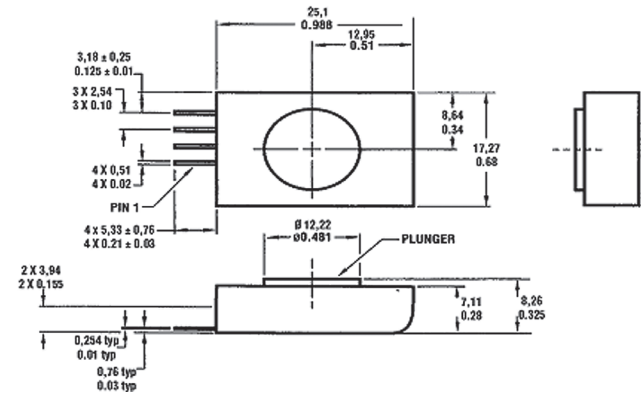
#### Excitation 10 Vdc

PRESSURE	REFERENCE
0 psi to 5 psi	1865-01G-K-N
0 psi to 10 psi	1865-02G-K-N
0 psi to 15 psi	1865-03G-K-N
0 psi to 25 psi	1865-04G-K-N
0 psi to 30 psi	1865-05G-K-N

## FS Series Force/Pressure Sensor

The FS01/FS03 Sensors are special low-cost, piezoresistive-based force sensors. These high-level voltage output, calibrated and temperature-compensated sensors give an accurate and stable output over a 5 °C to 50 °C [41 °F to 122 °F] temperature range. They offer simple operation from a single 5.0 Vdc supply. The FS01/FS03 sensors feature an integrated circuit sensor element and laser-trimmed, thick-film ceramic in a small plastic housing. Their extremely small size often enables the use of multiple sensors in limited available space. This package also provides excellent corrosion resistance and isolation to external package stress.

**Supply voltage:** 12.0 Vdc  
**Operating temperature:** 0 °C to 70 °C [32 °F to 158 °F]  
**Maximum force:** 7 lb



PRESSURE	REFERENCE
0 lb to 1.5 lb	FS01
0 lb to 3.0 lb	FS03

# Humidity Sensors

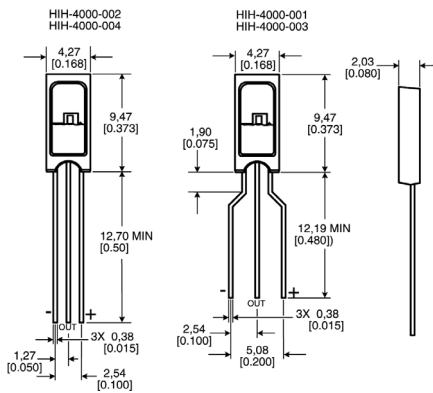


## HIH-4000 Series

The HIH-4000 Series humidity sensors are designed specifically for high volume OEM users. Direct input to a controller or other device is made possible by this sensor's linear voltage output. With a typical current draw of only 200  $\mu$ A, the HIH-4000 Series is often ideally suited for low drain, battery operated systems. Tight sensor interchangeability reduces or eliminates OEM production calibration costs. Individual sensor calibration data is available.

These sensors deliver instrumentation-quality RH sensing performance in a competitively priced, solderable SIP. Available in two lead spacing configurations, the RH sensor is a laser trimmed, thermoset polymer capacitive sensing element with on-chip integrated signal conditioning.

**Package style:** Solderable SIP



TERMINATION	CALIBRATION	REFERENCE
2,54 mm [0.100 in] lead pitch	None	HIH-4000-001
1,27 mm [0.050 in] lead pitch	None	HIH-4000-002
2,54 mm [0.100 in] lead pitch	with calibration and data printout	HIH-4000-003
1,27 mm [0.050 in] lead pitch	with calibration and data printout	HIH-4000-004

### CAUTION PRODUCT DAMAGE

The inherent design of this component causes it to be sensitive to the electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take normal ESD precautions when handling this product.

**Failure to comply with these instructions could result in product damage**

Relative Humidity/Temperature and Relative Humidity sensors are configured with integrated circuitry to provide on-chip signal conditioning. These sensors contain a capacitive sensing die set in thermoset polymers that interacts with platinum electrodes. The laser trimmed sensors have an interchangeability of  $\pm 5$  % from 0 %RH to 60 %RH, with stable, low drift performance.

Absorption based humidity sensors provide both temperature and %RH (Relative Humidity) outputs. On-chip signal processing ensures linear voltage output versus %RH. Sensor laser trimming offers accuracy of  $\pm 2.5$  %, and achieves 2 %RH accuracy with calibration.

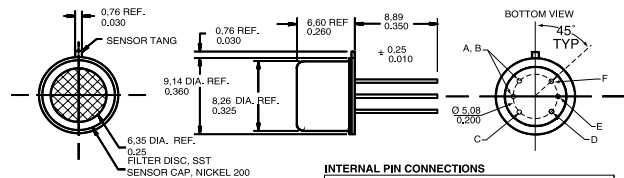
**Supply voltage:** 4.0 Vdc to 5.8 Vdc  
**Operating humidity range:** 0 %RH to 100 %RH, non-condensing  
**Operating temperature range:** -40 °C to 85 °C [-40 °F to 185 °F]

## HIH Series

### HIH-3602 Monolithic integrated circuit

HIH-3602-A and HIH-3602-C RH sensors combine both relative humidity and temperature sensing in a TO-5 housing with a hydrophobic sintered stainless steel filter. The temperature sensor is thermally connected with the RH sensor making the HIH-3602-A/C often ideal for measuring dew point and other absolute moisture terms.

**Package style:** TO-5 can  
**Termination:** 0,46 mm [0.18 in]  
**NIST certification:** NIST calibration sensor-specific printout



**INTERNAL PIN CONNECTIONS**  
**0,46 mm [0.018 in] dia. lead gold plated (6 places)**

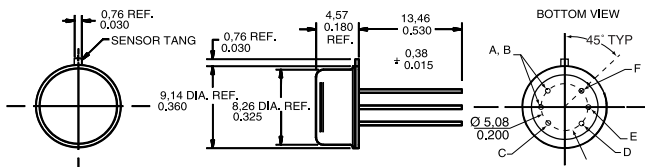
A, B	(HIH-3602-A) Thermistor for temperature compensation
A, B	(HIH-3602-C) RTD for temperature compensation
C	+VDC supply
D	(-) Power or ground
E	VDC out
F	Case ground

TEMPERATURE SENSOR	REFERENCE
100 kOhm $\pm 5$ % @ 25 °C, NTC 0-50 C	HIH-3602-A
1000 Ohm $\pm 0.2$ % @ 0 °C, platinum RTD	HIH-3602-C

### HIH-3602-L Integrated circuit

The HIH-3602-L Relative Humidity (RH) sensor delivers instrumentation-quality RH sensing performance in a rugged, low cost, slotted TO-39 housing. On-board signal conditioning reduces product development times while a typical current draw of only 200  $\mu$ A makes the HIH-3602-L perfect for battery powered systems. This sensor should be shielded from bright light.

**Package style:** TO-39 can  
**Termination:** 0,46 mm [0.18 in]  
**NIST certification:** None



**INTERNAL PIN CONNECTIONS**  
**0,46mm [0.018 in] dia. lead gold plated (6 places)**

A, B	No connection
C	+VDC supply
D	(-) Power or ground
E	VDC out
F	Case ground

**REFERENCE**  
 HIH-3602-L

# Temperature Sensors - RTDs



Honeywell's thin-film RTD (Resistance Temperature Detector) temperature sensors feature two distinct series. These sensors are laser-trimmed for accuracy and interchangeability. Linear outputs are stable and fast.

The TD Series Temperature Sensors are silicon-based RTDs. They offer 2000 Ohm nominal resistance at 20 °C. Temperature range of -40 °C to 150 °C [-40 °F to 302 °F].

The HEL Series Temperature Sensors are platinum RTDs, offering 100 Ohm or 1000 Ohm versions and temperature ranges of -200 °C to 540 °C [-300 °F to 1000 °F].

## HEL-700 Series 100/1000 Ohm Platinum RTD

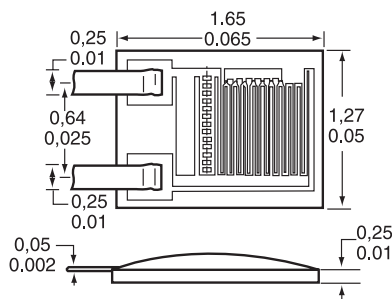
Supply voltage: 4 Vdc to 9 Vdc  
 Base resistance: 1000 ±2 Ohm (±0.2 %) @ 0 °C (standard)  
 and interchangeability: 1000 ±1 Ohm (±0.1 %) @ 0 °C (optional)

### OPTIONS

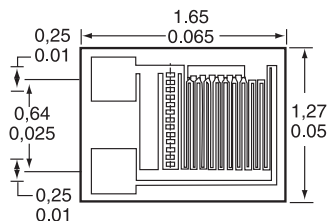
#### HEL-700

Temperature range: -200 °C to 540 °C [-300 °F to 1000 °F]  
 Packaging style/termination: Radial chip/ribbon leads (type A)  
 Radial chip/no leads (type B)  
 SMT (axial) flip chip/no leads (type C)

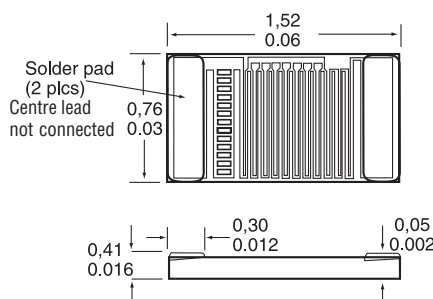
#### Type A



#### Type B



#### Type C



### 100 Ohm (0.00385 Ohm/Ohm/°C DIN standard)

PACKAGING STYLE	BASE RESISTANCE AND INTERCHANGEABILITY	REFERENCE
Type A	Standard	HEL-700-T-0-A
Type A	Optional	HEL-700-T-1-A
Type B	Standard	HEL-700-T-0-B
Type B	Optional	HEL-700-T-1-B

### 1000 Ohm (0.00375 Ohm/Ohm/°C)

PACKAGING STYLE	BASE RESISTANCE AND INTERCHANGEABILITY	REFERENCE
Type A	Standard	HEL-700-U-0-A
Type A	Optional	HEL-700-U-1-A
Type B	Standard	HEL-700-U-0-B
Type B	Optional	HEL-700-U-1-B
Type C	Standard	HEL-700-U-0-C
Type C	Optional	HEL-700-U-1-C

### CAUTION

#### PRODUCT DAMAGE

The inherent design of this component causes it to be sensitive to the electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take normal ESD precautions when handling this product.

**Failure to comply with these instructions could result in product damage**

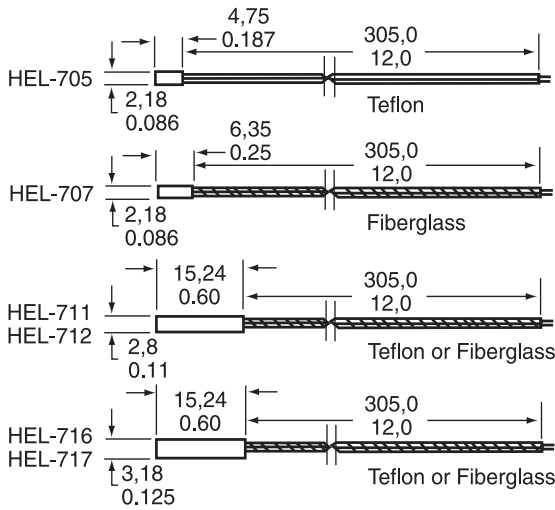


## HEL-700 Series 100/1000 Ohm Platinum RTD (continued)

### HEL-705/707/711/712/716/717

Temperature range: -200 °C to 260 °C [-320 °F to 500 °F] (HEL-705/711/716)  
 -75 °C to 540 °C [-100 °F to 1000 °F] (HEL-707/712/717)

Packaging style: Ceramic case  
 Termination: 12 in leadwires  
 NIST calibration: None



### 100 Ohm (0.00385 Ohm/Ohm/°C DIN standard)

BASE RESISTANCE AND INTERCHANGEABILITY	REFERENCE
Standard	HEL-705-T-0-12-00
Optional	HEL-705-T-1-12-00
Standard	HEL-707-T-0-12-00
Optional	HEL-707-T-1-12-00
Standard	HEL-711-T-0-12-00
Optional	HEL-711-T-1-12-00
Standard	HEL-712-T-0-12-00
Optional	HEL-712-T-1-12-00
Standard	HEL-716-T-0-12-00
Optional	HEL-716-T-1-12-00
Standard	HEL-717-T-0-12-00
Optional	HEL-717-T-1-12-00

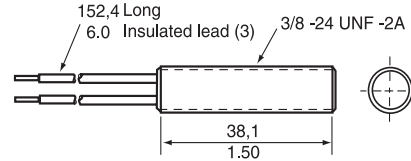
### 1000 Ohm (0.00375 Ohm/Ohm/°C)

BASE RESISTANCE AND INTERCHANGEABILITY	NIST CALIBRATION	REFERENCE
Standard		HEL-705-U-0-12-00
Optional		HEL-705-U-1-12-00
Standard		HEL-707-U-0-12-00
Optional		HEL-707-U-1-12-00
Standard		HEL-711-U-0-12-00
Optional		HEL-711-U-1-12-00
Standard		HEL-712-U-0-12-00
Optional		HEL-712-U-1-12-00
Standard		HEL-716-U-0-12-00
Optional		HEL-716-U-1-12-00
Optional	NIST @ 0 °C and 100 °C	HEL-716-U-1-12-C2
Standard		HEL-717-U-0-12-00
Optional		HEL-717-U-1-12-00

## TD Series 2000 Ohm Silicon RTD

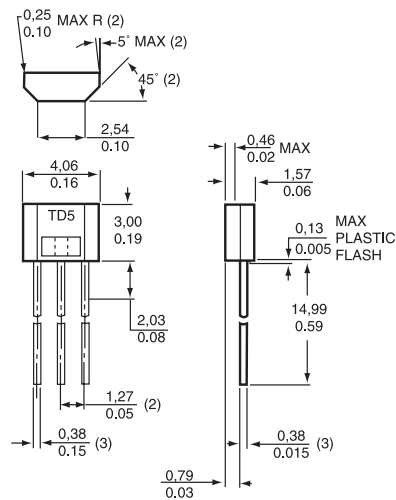
Supply voltage: 10 Vdc  
 Temperature range: -40 °C to 150 °C [-40 °F to 302 °F]

### OPTIONS



### TD4A Liquid temperature sensor

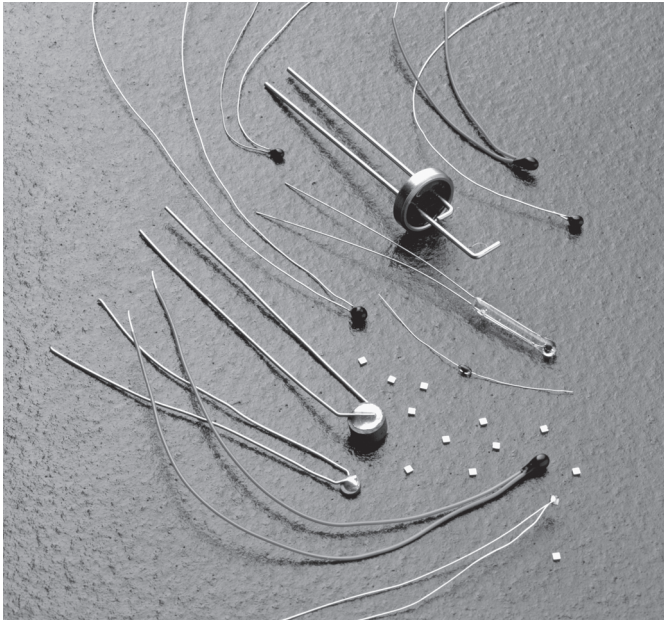
PACKAGING STYLE	TERMINATION	REFERENCE
Threaded aluminium case	Leadwires	TD4A



### TD5A Subminiature temperature sensor

PACKAGING STYLE	TERMINATION	REFERENCE
Plastic case	SIP	TD5A

# Temperature Sensors - Thermistors



Thermistors change resistance with a change in temperature. They do not amplify, rectify, polarize or generate a signal. The thermistor temperature may be changed by the surrounding temperature or by self-heating the thermistor by passing a current through it.

Most applications such as temperature measurement and control or copper coil compensation require that the power dispersed in a thermistor be kept to a minimum so as not to perceptibly self-heat the thermistor. Other applications depend entirely on the self-heating effect. When the surrounding temperature is fixed, the resistance of a thermistor is largely a function of power being dispersed within it, raising its temperature above its environment. Under these operating conditions, the temperature may rise 100 °C to 200 °C [121 °F to 392 °F] and the resistance may be lowered to 1/1000<sup>th</sup> of its original value at low current.

This self-heating characteristic provides a whole field of uses for the thermistor. In the self-heat state it is thermally sensitive (its resistance will be changed) to any condition, changing the rate at which heat is conducted away from it. If the rate of heat removal is ideally fixed, then the thermistor is sensitive to power input and suited for use in voltage or power level control applications.

## Glass Encapsulated Chip (GEC) Thermistors

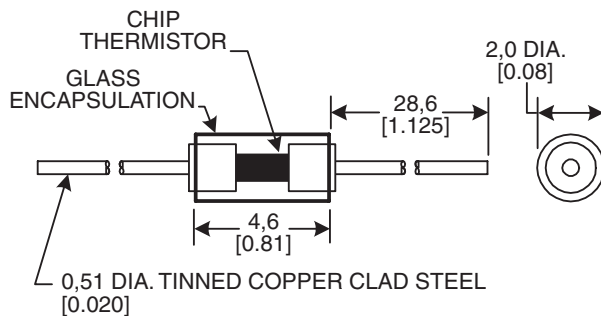
The GEC thermistors are high-quality, hermetically-sealed, glass-encapsulated chip thermistors in an axial lead package. They cover the full temperature range of -60 °C to 300 °C [-76 °F to 572 °F]. These rugged sensors are designed for many applications which demand reliability at low cost. The uniform dimensions often are ideally suited for automated assembly.

- Operating temperature:** -60 °C to 300 °C [-76 °F to 572 °F]
- Encapsulation:** DO-35 glass
- Lead material:** Tinned copper-clad steel
- Dissipation constant (DC):** 2.5 mW/°C in still air min.
- Time constant (TC):** 4 s in still air max.
- Resistance range at 25 °C [77 °F]:** 1 kOhm to 1 MOhm

## OPTIONS

At 25 °C [77 °F]

OHM	% TOLERANCE	R/T CURVE	REFERENCE
1,000	10	10A	135-102DAG-J01
2,000	10	10	135-202FAG-J01
3,000	10	10	135-302FAG-J01
5,000	5	10	135-502FAF-J01
5,000	10	10	135-502FAG-J01
10,000	5	10	135-103FAF-J01
10,000	10	16	135-103FAG-J01
10,000	5	16	135-103LAF-J01
20,000	10	16	135-203LAG-J01
30,000	10	16	135-303KAG-J01
50,000	5	16	135-503LAF-J01
50,000	10	16	135-503LAG-J01
100,000	5	16	135-104LAF-J01
100,000	10	16	135-104LAG-J01
200,000	10	1	135-204QAG-J01
500,000	10	1	135-504QAG-J01
1 M	10	1	135-105QAG-J01



Interchangeable R/T curve matched  
±1 °C from 0 °C to 100 °C [32 °F to 212 °F]

OHM	R/T CURVE	REFERENCE
10,000	16	135-103LFW-J01
20,000	16	135-203LFW-J01
30,000	16	135-303LFW-J01
50,000	16	135-503LFW-J01
100,000	16	135-104LFW-J01

## Epoxy-coated or Uncoated Chip Thermistors

Epoxy-coated or uncoated chip thermistors are available in a broad range of custom resistance values and R/T curves. They are also available in two lead types:

- Uninsulated: 0,2032 mm [0.008 in] diameter, tinned copper for 1 kOhm or less, and tinned copper alloy for greater than 1 kOhm.
- Insulated: 0,254 mm [0.010 in] diameter, nickel wire, Teflon<sup>®</sup>-insulated, 38,1 mm [1.5 in] long and furnished with 6,35 mm [0.25 in] stripped ends of 0,4064 mm [0.016 in] and 0,508 mm [0.020 in] tin-plated copper leads.

**Operating temperature range:** -40 °C to 125 °C [-40 °F to 257 °F]\*

**Encapsulation:** Epoxy-coated or uncoated

- Lead material:**
- Uninsulated: tinned copper/copper alloy
  - Insulated: tinned copper/copper alloy with nickel wire Teflon

**Dissipation constant (DC):** 0.75 mW/°C in still air min.

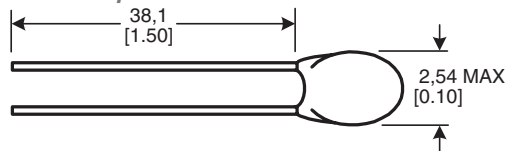
**Time constant (TC):** 15 s in still air max.

**Resistance range at 25 °C [77 °F]:** 100 Ohm to 100 kOhm

\*Very accurate (±0.2 °C) when used between 0 °C to 70 °C [32 °F to 158 °F]. Other ranges and tolerances are available.

### OPTIONS

#### Epoxy-coated chip



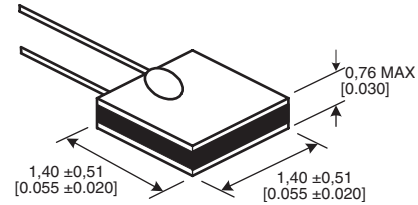
#### 10 % tolerance at 25 °C [77 °F], uninsulated leads

OHM	R/T CURVE	REFERENCE
100	17	197-101CAG-A01
300	17	197-301CAG-A01
500	10A	197-501DAG-A01
1,000	10A	197-102DAG-A01
2,000	16	197-202LAG-A01
3,000	16	197-302LAG-A01
5,000	16	197-502LAG-A01
10,000	16	197-103LAG-A01
20,000	16	197-203LAG-A01
30,000	18	197-303KAG-A01
50,000	1	197-503QAG-A01
100,000	1	197-104QAG-A01

#### 10 % tolerance at 25 °C [77 °F], insulated leads

OHM	R/T CURVE	REFERENCE
100	17	199-101CAG-A01
300	17	199-301CAG-A01
500	10A	199-501DAG-A01
1,000	10A	199-102DAG-A01
2,000	16	199-202LAG-A01
3,000	16	199-302LAG-A01
5,000	16	199-502LAG-A01
10,000	16	199-103LAG-A01
20,000	16	199-203LAG-A01
30,000	18	199-303KAG-A01
50,000	1	199-503QAG-A01
100,000	1	199-104QAG-A01

#### Uncoated chip



#### 10 % tolerance at 25 °C [77 °F], unisulated leads

OHM	R/T CURVE	REFERENCE
100	17	195-101CAG-A01
300	17	195-301CAG-A01
500	10A	195-501DAG-A01
1,000	10A	195-102DAG-A01
2,000	16	195-202LAG-A01
3,000	16	195-302LAG-A01
5,000	16	195-502LAG-A01
10,000	16	195-103LAG-A01
20,000	16	195-203LAG-A01
30,000	18	195-303KAG-A01
50,000	1	195-503QAG-A01
100,000	1	195-104QAG-A01

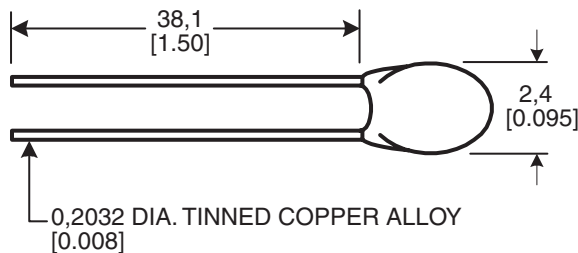
#### 10 % tolerance at 25 °C [77 °F], insulated leads

OHM	R/T CURVE	REFERENCE
100	17	198-101CAG-A01
300	17	198-301CAG-A01
500	10A	198-501DAG-A01
1,000	10A	198-102DAG-A01
2,000	16	198-202LAG-A01
3,000	16	198-302LAG-A01
5,000	16	198-502LAG-A01
10,000	16	198-103LAG-A01
20,000	16	198-203LAG-A01
30,000	18	198-303KAG-A01
50,000	1	198-503QAG-A01
100,000	1	198-104QAG-A01

## UNI-CURVE® Interchangeable Thermistors

The UNI-CURVE® Interchangeable thermistors are temperature-matched. They offer additional cost savings by eliminating the need for individual resistance temperature calibration, as well as standardization of circuit components and simplification of design and replacement problems.

**Operating temperature range:** -40 °C to 150 °C [-40 °F to 302 °F]\*  
**Encapsulation:** Epoxy-coated  
**Lead material:** Tinned copper alloy  
**Dissipation constant (DC):** 0.75 mW/°C in still air min.  
**Time constant (TC):** 15 s in still air max.  
**Resistance range at 25 °C [77 °F]:** 1 kOhm to 100 kOhm  
 \*Very accurate ( $\pm 0.2$  °C) when used between 0 °C to 70 °C [32 °F to 158 °F]. Other ranges and tolerances are available.



### OPTIONS

**$\pm 0,2$  °C tolerance at 25 °C [77 °F]**  
**0 °C to 70 °C [32 °F to 158 °F]**

OHM	R/T CURVE	REFERENCE
1,000	10A	192-102DET-A01
2,252	16	192-222LET-A01
3,000	16	192-302LET-A01
5,000	16	192-502LET-A01
10,000	16	192-103LET-A01
30,000	18	192-303KET-A01
30,000	1	192-303QET-A01
50,000	1	192-503QET-A01
100,000	1	192-104QET-A01

**$\pm 0,5$  °C tolerance at 25 °C [77 °F]**  
**0 °C to 70 °C [32 °F to 158 °F]**

OHM	R/T CURVE	REFERENCE
1,000	10A	192-102DEV-A01
2,252	16	192-222LEV-A01
3,000	16	192-302LEV-A01
5,000	16	192-502LEV-A01
10,000	16	192-103LEV-A01
30,000	18	192-303KEV-A01
30,000	1	192-303QEV-A01
50,000	1	192-503QEV-A01
100,000	1	192-104QEV-A01

**$\pm 1,0$  °C tolerance at 25 °C [77 °F]**  
**0 °C to 70 °C [32 °F to 158 °F]**

OHM	R/T CURVE	REFERENCE
1,000	10A	192-102DEW-A01
2,252	16	192-222LEW-A01
3,000	16	192-302LEW-A01
5,000	16	192-502LEW-A01
10,000	16	192-103LEW-A01
30,000	18	192-303KEW-A01
30,000	1	192-303QEW-A01
50,000	1	192-503QEW-A01
100,000	1	192-104QEW-A01

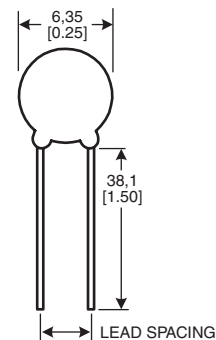
## Disc Thermistors

Uncoated or epoxy-coated Disc thermistors are available in a broad range of custom resistance values and R/T curves. They are only available with uninsulated leads. Diameters range from 2,54 mm [0.1 in] to 10,16 mm [0.4 in]. They are often ideally suited for low-cost applications with a maximum temperature of 150 °C [302 °F]. They are also typically well suited for PC board mount and are available on tape and reel.

**Operating temperature range:** -60 °C to 150 °C [-76 °F to 302 °F]  
**Encapsulation:** Epoxy-coated or uncoated  
**Lead material:** Uninsulated: tinned copper/copper alloy  
**Dissipation constant (DC):** Varies with size, ranges from 3 mW/°C to 8 mW/°C  
**Time constant (TC):** Varies with size ranges from 10 s to 32 s  
**Resistance range at 25 °C [77 °F]:** 100 Ohm to 100 kOhm

### OPTIONS

*Epoxy-coated chip*



**10 % tolerance at 25 °C [77 °F]**  
**Lead diameter 0,4064 mm [0.016 in]**  
**Lead spacing 2,54 mm [0.1 in]**

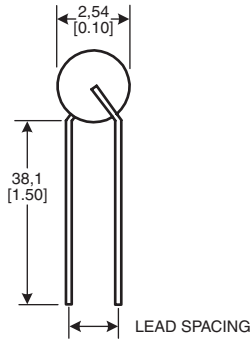
OHM	R/T CURVE	DC MIN.	TC MAX.	REFERENCE
500	10	3	10	140-501FAG-RB1
1,000	10	4	10	140-102FAG-RB1
3,000	16	3	10	140-302LAG-RB1
5,000	16	4	10	140-502LAG-RB1
10,000	16	4	10	140-103LAG-RB1
50,000	1	3	10	140-503QAG-RB1
100,000	1	3	10	140-104QAG-RB1

**10 % tolerance at 25 °C [77 °F]**  
**Lead diameter 0,508 mm [0.020 in]**  
**Lead spacing 5,08 mm [0.2 in]**

OHM	R/T CURVE	DC MIN.	TC MAX.	REFERENCE
100	10	4	16	143-101FAG-RC1
200	10	5	18	143-201FAG-RC1
300	10	6	20	143-501FAG-RC1
1,000	16	6	20	143-102LAG-RC1
3,000	16	6	22	143-302LAG-RC1
5,000	16	7	35	143-502LAG-RC1
10,000	1	4	20	143-103QAG-RC1
30,000	1	6	25	143-303QAG-RC1
50,000	1	7	30	143-503QAG-RC1



Uncoated chip



10 % tolerance at 25 °C [77 °F]

Lead diameter 0,4064 mm [0.016 in]

Lead spacing 2,54 mm [0.1 in]

OHM	R/T CURVE	DC MIN.	TC MAX.	REFERENCE
500	10	3	10	142-501FAG-RB1
1,000	10	4	10	142-102FAG-RB1
3,000	16	3	10	142-302LAG-RB1
5,000	16	4	10	142-502LAG-RB1
10,000	16	4	10	142-103LAG-RB1
50,000	1	3	10	142-503QAG-RB1
100,000	1	3	10	142-104QAG-RB1

10 % tolerance at 25 °C [77 °F]

Lead diameter 0,508 mm [0.020 in]

Lead spacing 5,08 mm [0.2 in]

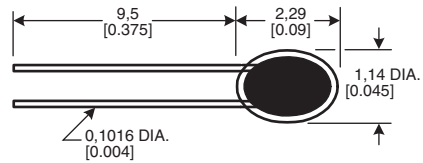
OHM	R/T CURVE	DC MIN.	TC MAX.	REFERENCE
100	10	4	16	145-101FAG-RC1
200	10	5	18	145-201FAG-RC1
300	10	6	20	145-301FAG-RC1
500	10	6	25	145-501FAG-RC1
1,000	16	6	20	145-102LAG-RC1
3,000	16	6	22	145-302LAG-RC1
5,000	16	7	35	145-502LAG-RC1
10,000	1	4	20	145-103QAG-RC1
30,000	1	7	28	145-303QAG-RC1
50,000	1	8	32	145-503QAG-RC1

Standard Bead Thermistors

Standard Bead thermistors are hermetically-sealed in glass. These small units provide maximum stability when used to 300 °C [572 °F] for high temperature design requirements. They are often ideally suited for many stringent military, aerospace and oceanographic applications.

**Operating temperature range:** -60 °C to 300 °C [-76 °F to 572 °F]  
**Encapsulation:** Glass hermetic seal  
**Lead material:** Platinum iridium  
**Dissipation constant (DC):** 0.4 mW/°C in still air min.  
**Time constant (TC):** 4 s in still air max.  
**Resistance range at 25 °C [77 °F]:** 200 Ohm to 1 MOhm

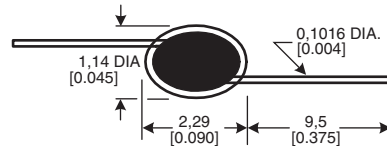
OPTIONS



Adjacent leads

20 % Tolerance at 25 °C [77 °F]

OHM	R/T CURVE	RATIO 0 °C/50 °C	REFERENCE
200	8	4.80	112-201BAJ-B01
1,000	11	7.04	112-102EAJ-B01
2,000	11	7.04	112-202EAJ-B01
5,000	11	7.04	112-502EAJ-B01
10,000	12	7.59	112-103FAJ-B01
20,000	13	9.11	112-203HAJ-B01
50,000	14	9.53	112-503IAJ-B01
100,000	15	10.45	112-104KAJ-B01
200,000	15	10.45	112-204KAJ-B01
500,000	4	11.78	112-504NAJ-B01
1 M	5	13.12	112-105PAJ-B01



Axial leads

20 % Tolerance at 25 °C [77 °F]

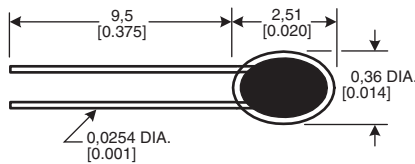
OHM	R/T CURVE	RATIO 0 °C/50 °C	REFERENCE
2,000	11	7.04	112-202EAJ-H01
5,000	11	7.04	112-502EAJ-H01
10,000	12	7.59	112-103FAJ-H01
100,000	15	10.45	112-104KAJ-H01
600,000	4	11.78	112-604NAJ-H01

## Small Bead Thermistors

Small Bead Thermistors feature relatively uniform size, offer ultra-fast time response and are highly sensitive to electric power. They are often ideally suited for use in low heat capacity applications and their micro size many times makes them perfect for use in extremely small assemblies such as catheters and hypodermic needles. They are also often used in self-heat applications such as gas analysis, gas flow measurement and thermal conductivity analysis.

**Operating temperature range:** -60 °C to 300 °C [-76 °F to 572 °F]  
**Encapsulation:** Glass hermetic seal  
**Lead material:** Platinum iridium  
**Dissipation constant (DC):** 0.1 mW/°C in still air min.  
**Time constant (TC):** 1 s in still air max.  
**Resistance range at 25 °C [77 °F]:** 2 kOhm to 100 kOhm

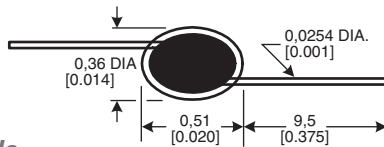
### OPTIONS



#### Adjacent leads

at 25 °C [77 °F]

OHM	% TOLERANCE	R/T CURVE	RATIO 0 °C/50 °C [32 °F/122 °F]	REFERENCE
2,000	25	9	5.50	111-202CAK-B01
8,000	20	11	7.04	111-802EAJ-B01
30,000	25	11	7.04	111-303EAK-B01



#### Axial leads

at 25 °C [77 °F]

OHM	% TOLERANCE	R/T CURVE	RATIO 0 °C/50 °C [32 °F/122 °F]	REFERENCE
2,000	25	9	5.50	111-202CAK-H01
8,000	20	11	7.04	111-802EAJ-H01
10,000	20	11	7.04	111-103EAJ-H01
100,000	25	13	9.11	111-104HAK-H01

## Glass Probe Thermistors

Glass Probe thermistors are shock resistant, rugged, glass-encapsulated units that are ideally suited for immersion in fluid and convenient for mounting in air sensor assemblies. They are available in two configurations: standard and mini.

**Operating temperature range:** -60 °C to 300 °C [-76 °F to 572 °F]  
**Encapsulation:** Glass  
**Lead material:** Dumet (copper-clad Ni-Fe wire)  
**Dissipation constant (DC):**

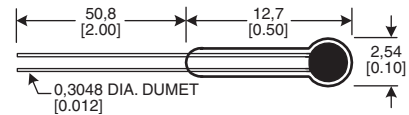
- Standard: 1.0 mW/°C in still air min.
- Mini: 0.7 mW/°C in still air min.

**Time constant (TC):**

- Standard: 22 s in still air max.
- Mini: 10 s in still air max.

**Resistance range at 25 °C [77 °F]:** 1 kOhm to 10 MOhm

### OPTIONS

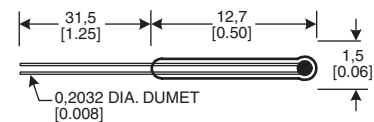


#### Standard

20 % Tolerance at 25 °C [77 °F]

dc 1.0 mW/°C min., TC 22 s max.

OHM	R/T CURVE	RATIO	REFERENCE
1,000	11	7.04	121-102EAJ-Q01
2,000	11	7.04	121-202EAJ-Q01
5,000	11	7.04	121-502EAJ-Q01
10,000	12	7.59	121-103FAJ-Q01
50,000	14	9.53	121-502JAJ-Q01
100,000	15	10.45	121-104KAJ-Q01
200,000	15	10.45	121-202KAJ-Q01
500,000	4	11.89	121-504NAJ-Q01
1 M	5	13.12	121-105PAJ-Q01
10 M	6	15.65	121-106QAJ-Q01



#### Mini

20 % Tolerance at 25 °C [77 °F]

dc 0.7 mW/°C min., TC 10 s max.

OHM	R/T CURVE	RATIO	REFERENCE
1,000	11	7.04	120-102EAJ-Q01
2,000	11	7.04	120-202EAJ-Q01
10,000	12	7.59	120-103FAJ-Q01
50,000	14	9.53	120-502JAJ-Q01
100,000	15	10.45	120-104KAJ-Q01