

# THERMAL PRODUCTS

Product Range Guide



Honeywell

# To improve your world, you need to know what is going on.

Honeywell Sensing and Internet of Things (SIOT) has more than 50,000 products, ranging from snap-action, limit, toggle, and pressure switches to position, speed, pressure, temperature, air flow, force, and acceleration sensors. Each allows you to take control of your world by providing information to make better decisions. Honeywell SIOT provides one of the broadest sensing and switching portfolios so you can take control of your world.

Honeywell sensor, switch, and control components are tailored to exact specifications for stronger performance, longer productivity, and increased safety. Enhanced accuracy and durability are built into every part, improving output and endurance. For our customers, this can reduce expenditures and operational costs. Our global footprint and channels help to competitively price such components for your chosen application and provide immediate technical support.

While Honeywell's switch and sensor solutions are suitable for a wide array of basic and complex applications, our custom-engineered solutions offer enhanced precision, repeatability, and ruggedness. We offer domain knowledge and technology resources, along with a close working relationship, to develop and deliver cost-effective, individually tailored solutions. Whether clean-slate development or simple modifications to an existing design are needed, our expertly engineered solutions help to meet the most stringent requirements with world-class product designs, technology integration, and customer-specific manufacturing.

Global service, sourcing, and manufacturing. Industry-leading engineers. Value-added assemblies and solutions. A one-stop, full-service, globally competitive supplier.



## Table of Contents

Temperature Probes .....	3
RTD Sensors .....	4-5
Thermistors .....	6-7
Precision Thermostats .....	8-9
High Reliability Thermostats .....	10-11
Commercial Thermostats .....	12-13
Flexible Heaters .....	14-15
Humidity Sensors .....	16-19

# Temperature Sensors | Temperature Probes

Compact and easy to install. Operate with enhanced sensitivity, reliability, and stability under diverse conditions of shock, vibration, humidity, and corrosion. Wide variety of custom packages available for air, liquid, and solid temperature sensing. Potential applications include transportation, compressors, HVAC/R, automation control, and aviation.



Series	LTP	R300	ES110
Temp. sensing type	immersion/air-gas	immersion	air-gas
Thermistor type	NTC	RTD	NTC
Nominal resistance at 25°C [77°F]	1000 Ohm, 2252 Ohm, 2057 Ohm, 2795 Ohm	100 Ohm	2000 Ohm
Operating temperature range	-40°C to 150°C [-40°F to 302°F]	-40°C to 275°C [-40°F to 572°F] continuous, excursion to 300°C [572°F] for 10 minutes max.	-40°C to 150°C [-40°F to 302°F]
Housing material	brass hex, stainless steel probe tip	stainless steel	brass
Electrical and mechanical interface	Bosch Kompakt, Delphi Metri-Pack 150 Series, AMP Seal 16, AMP Minitimer, AMP Superseal, Deutsch DT04-2P; M10 to M18, 3/4 UNF, or G 1/4 threads, two hex options	overmolded connector with M14 x 1.50 thread	overmolded connector with M10 x 1.25 or M12 x 1.50 thread
Features	low temperature passive probes have durable, closed-tip design	enhanced response, reliability, and accuracy; stainless steel construction	exposed thermistor, rugged design, brass encapsulation



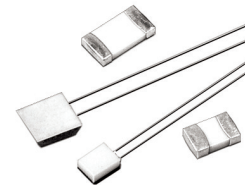
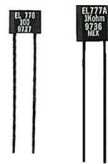
Series	ES120	500	6655
Temp. sensing type	immersion	air-gas/immersion-liquid level/surface	air/surface
Thermistor type	NTC or KTY	NTC	NTC
Nominal resistance at 25°C [77°F]	2000 Ohm	200 Ohm to 1,000,000 Ohm (inclusive)	10,000 Ohm, 12,000 Ohm
Operating temperature range	-40°C to 150°C [-40°F to 302°F]	-40°C to 300°C [-40°F to 572°F] (inclusive)	-20°C to 110°C [-4°F to 230°F]
Housing material	brass	plastic, aluminum, stainless steel, epoxy filled, tin- or nickel-plated copper, ceramic or kynar-filled tubing	phenolic
Electrical and mechanical interface	overmolded connector with M10 x 1.25, M10 x 1.0, M12 x 1.5, M14 x 1.50 thread, or 1/8 PTF	wide variety of connectors, lead types, materials, and insulation	quick connect terminal: (90°, 0.25 in), (0°, 0.25 in), (45°, 0.25 in), (90°, 0.1875 in)
Features	enclosed thermistor, rugged design, brass encapsulation	wide selection of housing, resistance, and termination options	low, compact profile, tight interchangeability, enhanced accuracy and response time

# Temperature Sensors | RTD Sensors

Silicon-based, thin film RTDs (Resistance Temperature Detectors) are laser trimmed for accuracy and interchangeability. Offer stable, fast linear outputs with a wide temperature range. Accurate and interchangeable without recalibration. Available in discrete or packaged versions in plastic and ceramic, miniaturized and surface mount housings.



Series	HEL-700	HEL-775
Sensor type	100 Ohm, 1000 Ohm platinum RTD	100 Ohm, 1000 Ohm platinum RTD
Temperature coefficient	0.00385 Ohm/Ohm/°C 0.00375 Ohm/Ohm/°C	0.00385 Ohm/Ohm/°C 0.00375 Ohm/Ohm/°C
Temperature sensing range	TFE teflon: -70°C to 260°C [-94°F to 500°F] fiberglass: -75°C to 500°C [-100°F to 932°F]	-55°C to 150°C [-67°F to 302°F]
Packaging type	alumina tube	ceramic case
Termination	28 AWG or 24 AWG lead wire	SIP
Base resistance and interchangeability	100 Ohm: ±0.1 % at 0°C 100 Ohm: ±0.2 % at 0°C 1000 Ohm: ±0.1 % at 0°C 1000 Ohm: ±0.2 % at 0°C	100 Ohm: ±0.1 % at 0°C 100 Ohm: ±0.2 % at 0°C 1000 Ohm: ±0.1 % at 0°C 1000 Ohm: ±0.2 % at 0°C
Self-heating	<15 mW/°C for 0.85 O.D. typ.	<6.8 mW/°C typ.; 9.7 mW/°C typ.
Termination material	24 AWG nickel-coated, stranded copper 28 AWG nickel-coated, stranded copper	phosphor bronze with tin silver plating
Features	teflon or fiberglass lead wires, wide temperature range, ceramic case material, multiple sizes	enhanced stability, thin film platinum, ceramic SIP, solderable leads



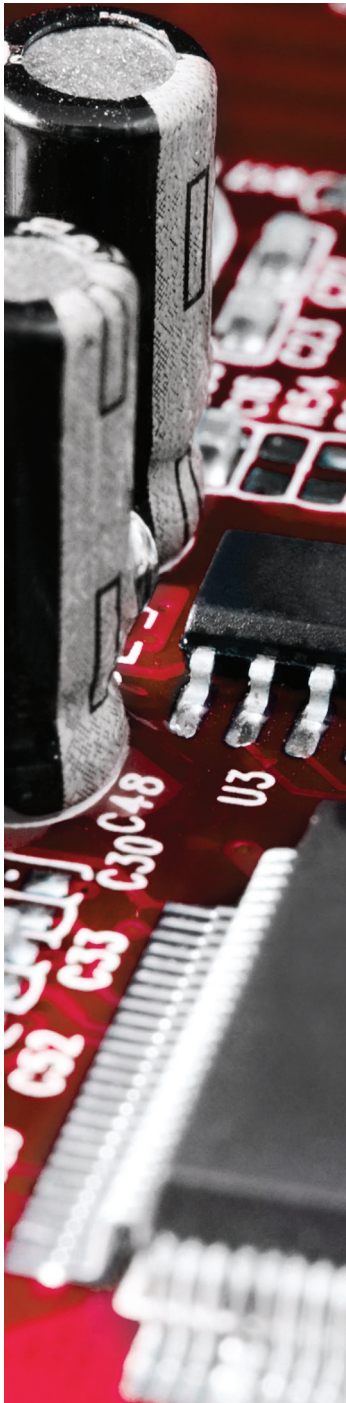
Series	HEL-776/777	700
Sensor type	100 Ohm, 1000 Ohm platinum RTD	100 Ohm, 1000 Ohm platinum RTD
Temperature coefficient	0.00385 Ohm/Ohm/°C 0.00375 Ohm/Ohm/°C	0.00385 Ohm/Ohm/°C 0.00375 Ohm/Ohm/°C
Temperature sensing range	-55°C to 150°C [-67°F to 302°F]	-70°C to 500°C [-94°F to 932°F] leaded: -50°C to 130°C [-58°F to 266°F]
Packaging type	molded plastic	radial chip or surface mount axial flip chip
Termination	SIP	lead wires or solderpads
Base resistance & interchangeability	100 Ohm: ±0.1 % at 0°C 100 Ohm: ±0.2 % at 0°C 1000 Ohm: ±0.1 % at 0°C 1000 Ohm: ±0.2 % at 0°C	100 Ohm: Class A; 100 Ohm: Class B 1000 Ohm: Class A; 1000 Ohm: Class B 1000 Ohm: Class 2B
Self-heating	<15 mW/°C typ.	0,4 K/mW, 0,6 K/mW, or 0,8 K/mW at 0°C [32°F]
Termination material	Cu alloy 194 solder dipped with Sn/Ag	Pt-clad Ni wire and end termination galvanic Sn-plated with Ni barrier layer
Features	enhanced stability, thin film platinum, molded plastic SIP package, solderable leads	interchangeability, SMD and chip package versions, enhanced stability and time response

# Temperature Sensors | RTD Sensors

Potential applications include HVAC, electronics assemblies, semiconductors, and process control. motor overload and semiconductor protection, electronic assembly thermal management and temperature compensation, as well as HVAC/R equipment.



Series	HRTS	TD
<b>Sensor type</b>	100 Ohm, 1000 Ohm platinum RTD	2000 Ohm silicon resistive element
<b>Temperature coefficient</b>	0.00385 Ohm/Ohm/°C 0.00375 Ohm/Ohm/°C	-
<b>Temperature sensing range</b>	-70°C to 260°C [-94°F to 500°F]	-40°C to 150°C [-40°F to 302°F]
<b>Packaging type</b>	ceramic case	plastic or threaded aluminum case
<b>Termination</b>	lead wires	SIP or lead wires
<b>Base resistance and interchangeability</b>	100 Ohm: ±0.1 % at 0°C 100 Ohm: ±0.2 % at 0°C 1000 Ohm: ±0.1 % at 0°C 1000 Ohm: ±0.2 % at 0°C	R2000 Ohm ±5 Ohm at 20°C
<b>Self-heating</b>	<0.3 mW/°C typ.	-
<b>Termination material</b>	28 AWG nickel-coated, stranded copper, teflon insulated	TD4A: solderable leads available TD5A: insulated
<b>Features</b>	resistance interchangeable, accurate, fast, laser-trimmed, wide temperature range	interchangeable without recalibration, thin film, laser trimmed, air or liquid temperature sensing



# Temperature Sensors | Thermistors

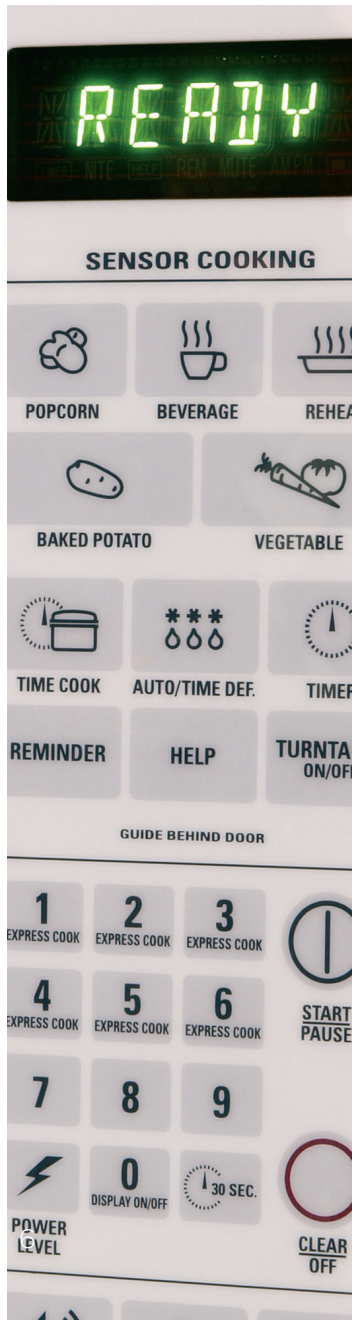
Change resistance with change in temperature. Available in wide range of resistance values and temperature ranges. Variety of packages and sizes from leaded devices to surface mount versions. Potential applications include military, aerospace, appliances, medical, and instrumentation such as chromatography, thermal conductivity and gas analysis.



Series	111	112	115	120
Description	small, hermetically sealed glass bead	large, hermetically sealed glass bead	E-I tested and matched beads on header assembly	mini glass probe
Operating temperature range	-60°C to 300°C [-76°F to 572°F]	-60°C to 300°C [-76°F to 572°F]	-60°C to 300°C [-76°F to 572°F]	-60°C to 300°C [-76°F to 572°F]
Dissipation constant in still air	0.1 mW/°C	0.4 mW/°C	varies with assembly type	0.7 mW/°C, 1.0 mW/°C
Time constant in air	0.5 s	4.0 s	0.5 s	10.0 s
Nominal resistance at 25°C [77°F]	1 kOhm, 2 kOhm, 8 kOhm, 10 kOhm, 100 kOhm	200 Ohm, 500 Ohm, 1 kOhm, 2 kOhm, 5 kOhm, 10 kOhm, 50 kOhm, 100 kOhm, 500 kOhm, 2 MOhm	2 kOhm, 8 kOhm	1 kOhm, 2 kOhm, 10 kOhm
Maximum diameter	0,36 mm [0.014 in]	1,14 mm [0.045 in]	0,36 mm [0.014 in]	1,5 mm [0.060 in]
Termination material	platinum iridium	platinum iridium	glass to metal header	dumet
Lead length	9,6 mm [0.375 in]	9,6 mm [0.375 in]	31,75 mm [1.25 in]	31,8 mm [1.25 in]
Features	enhanced response time and long-term stability, hermetically sealed in glass, micro size, welded platinum iridium leads	enhanced response time, hermetically sealed in glass, small size, enhanced long-term stability		E-I matched in air or helium, interchangeable pairs, extended life, compression-type glass hermetic seal, high pressure solder seal



Series	140	142	143	173
Description	small disc	large disc	large disc	EIA 0805 surface mount, end-banded
Operating temperature range	-60°C to 150°C [-76°F to 302°F]	-60°C to 150°C [-76°F to 302°F]	-60°C to 150°C [-76°F to 302°F]	-60°C to 125°C [-76°F to 257°F]
Dissipation constant in still air	3.0 mW/°C, 4.0 mW/°C	3.0 mW/°C, 4.0 mW/°C	5 mW/°C to 7 mW/°C	3.5 mW/°C
Time constant in air	10.0 s	10.0 s	16.0 s to 20.0 s	10.0 s
Nominal resistance at 25°C [77°F]	500 Ohm, 1 kOhm, 3 kOhm, 5 kOhm, 10 kOhm, 50 kOhm, 100 k Ohm	500 Ohm, 1 kOhm, 3 kOhm, 5 kOhm, 10 kOhm, 50 kOhm, 100 k Ohm	100 Ohm, 200 Ohm, 1 kOhm, 3 kOhm, 5 kOhm, 30 kOhm	500 Ohm, 5 kOhm, 10 kOhm, 22 kOhm, 33 kOhm, 47 kOhm, 50 kOhm, 100 kOhm
Maximum diameter	2,54 mm [0.1 in]	3,81 mm [0.15 in]	6,35 mm [0.25 in]	EIA 0805 SMD
Termination material	tinned copper	tinned copper	tinned copper	solder-plated nickel barrier
Lead length	38,1 mm [1.50 in]	38,1 mm [1.50 in]	38,1 mm [1.50 in]	-
Features	pc-board mountable, rugged design, solderable leads	pc-board mountable, rugged design, solderable leads	rugged design, pc-board mountable, solderable leads	surface mount, tape and reel, glass-coated ceramic, 0805 EIA package





121	126	128	129	135
standard glass probe	matched large glass bead	matched mini glass probe	matched large glass probe	glass encapsulated chip, DO-35 type
-60°C to 300°C [-76°F to 572°F]	-60°C to 300°C [-76°F to 572°F]	-60°C to 300°C [-76°F to 572°F]	-60°C to 300°C [-76°F to 572°F]	-60°C to 300°C [-76°F to 572°F]
1.0 mW/°C	0.8 mW/°C	2.1 mW/°C	3.0 mW/°C	2.5 mW/°C
22.0 s	4.0 s	10.0 s	22.0 s	4.0 s
2 kOhm, 5 kOhm, 10 kOhm, 50 kOhm, 100 kOhm, 1 MOhm	2 kOhm, 100 kOhm	2 kOhm, 15 kOhm	2 kOhm, 4 kOhm	1 kOhm, 2 kOhm, 5 kOhm, 10 Ohm, 20 kOhm, 25 kOhm, 30 kOhm, 47 kOhm, 50 kOhm, 100 kOhm, 200 kOhm, 230 kOhm, 500 kOhm, 1 MOhm, 5 MOhm
2,54 mm [0.10 in]	2,54 mm [0.10 in]	3,05 mm [0.120 in]	5,08 mm [0.20 in]	2,0 mm [0.080 in]
dumet	platinum iridium	dumet	dumet	tinned copper-clad steel
50,8 mm [2.00 in]	9,6 mm [0.375 in]	31,8 mm [1.25 in]	50,8 mm [2.00 in]	28,6 mm [1.125 in]
hermetically sealed in glass, enhanced reliability and stability, weldable/solderable dumet leads	hermetically sealed in glass, interchangeability, enhanced sensitivity and reliability, small size	hermetically sealed in glass, interchangeability, enhanced sensitivity and reliability, minia- ture size	interchangeability; enhanced sensitivity, reliability, and stability; miniature size	enhanced temperature capability, uniform dimensions, tape and reel



175	192	194	197	ICL
EIA 1206 surface mount, end-banded	uni-curve with bare leads and epoxy	uni-curve with insulated leads and epoxy	chip with bare leads and epoxy	in-rush current limiter
-60°C to 125°C [-76°F to 257°F]	-60°C to 150°C [-76°F to 302°F]	-60°C to 150°C [-76°F to 302°F]	-60°C to 125°C [-76°F to 257°F]	-40°C to 185°C [-40°F to 365°F]
3.5 mW/°C	0.75 mW/°C	0.75 mW/°C	0.75 mW/°C	12.7 mW/°C to 23 mW/°C
10.0 s	15.0 s	15.0 s	15.0 s	32 s to 93 s
5 kOhm, 10 kOhm, 5 kOhm, 100 k Ohm, 440 kOhm	500 Ohm, 1 kOhm, 2,252 Ohm, 3 kOhm, 5 kOhm, 10 kOhm, 30 kOhm, 50 k Ohm, 100 kOhm	2,252 Ohm, 3 kOhm, 5 kOhm, 10 kOhm, 30 kOhm, 100 kOhm, 50 kOhm	300 Ohm, 1 kOhm, 3 kOhm, 5 kOhm, 10 kOhm, 50 kOhm, 100 kOhm	0.5 Ohm to 220 Ohm ±20 %
EIA 1206 SMD	2,413 mm [0.095 in] <sup>1</sup>	2,413 mm [0.095 in] <sup>1</sup>	2,413 mm [0.095 in] <sup>1</sup>	9.5 mm [0.374 in] to 32 mm [1.26 in]
solder-plated nickel barrier	tinned copper, alloy 180	solid nickel, Teflon® insulated	tinned copper, alloy 180	tinned copper
-	38,1 mm [1.50 in]	38,1 mm [1.50 in]	38,1 mm [1.50 in]	[25,4 mm] 1 in min.
surface mount tape and reel, glass-coated ceramic, 1206 EIA package	resistance temperature curve interchangeability, enhanced stability and life, epoxy coated	resistance temperature curve interchangeability, enhanced stability and life, epoxy coated, teflon-coated leads	rapid response times, epoxy coated	enhanced reliability, special high- temp protective coating, rugged design, pc-board mountable

<sup>1</sup>On a 2252 and 3000 Ohm part, diameter can be up to 3,05 mm [0.120 in] max.

# Thermostats | Precision Thermostats

Provide either temperature control or over-temperature protection. Hermetic/non-hermetic devices available. Custom packaged for application flexibility and designed to operate in extreme environmental conditions. Potential applications include computers, medical electronics, power supplies, industrial controls, test equipment, and aerospace.



Series	3000 Custom Packaged	3100 Hermetic	3100U REDI TEMP
Description	custom packaged	hermetic	UL-approved hermetic
Amperage	dependent on the internal device	2.0 A/1.0 A/5.0 A	3.0 A resistive max.
Housing material	stainless steel or brass	steel housing hermetically sealed with glass-to-metal seal at terminal junction	steel housing hermetically sealed with glass-to-metal seal at terminal junction
Operating temperature range	-29°C to 260°C [-20°F to 500°F]	-29°C to 260°C [-20°F to 500°F]	-29°C to 260°C [-20°F to 500°F]
Environmental exposure range	-62°C to 288°C [-80°F to 550°F]	-62°C to 288°C [-80°F to 550°F]	-62°C to 288°C [-80°F to 550°F]
Dielectric strength	MIL-STD-202, Method 301; 1250 Vac 60 Hz - terminal to case	MIL-STD-202, Method 301; 1250 Vac 60 Hz - terminal to case	MIL-STD-202, Method 301; 1250 Vac 60 Hz - terminal to case
Insulation resistance	MIL-STD-202, Method 302; 50 MOhm min. terminal to case	MIL-STD-202, Method 302; Cond. B - 50 MOhm - 500 Vdc applied	MIL-STD-202, Method 302; Cond. B - 50 MOhm - 500 Vdc applied
Contact resistance	MIL-STD-202, Method 307; 0.050 Ohm	MIL-STD-202, Method 307; 0.050 Ohm	MIL-STD-202, Method 307; 0.050 Ohm max.
Hermetic seal	MIL-STD-202, Method 112; Cond. A, 1 x 10 <sup>-5</sup> atm cc/s	MIL-STD-202, Method 112; Cond. 1 x 10 <sup>-5</sup> atm cc/s	MIL-STD-202, Method 112; Cond. 1 x 10 <sup>-5</sup> atm cc/s
Moisture resistance	MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106
Approvals	-	-	UL/CSA
Features	custom packaging, hermetically sealed, tight tolerances and differentials, hermetic connector or potted construction	hermetically sealed, tight tolerances and differentials, pre-set and tamper proof, SPST contacts	hermetically sealed, tight tolerances and differentials, pre-set and tamper proof, SPST contacts







### 3106 Low-level Hermetic

### 3150 Low Silhouette Hermetic

### 3156 Low-level Silhouette Hermetic

### 3001/3004 Series Non-Hermetic

low-level hermetic

low silhouette hermetic

low level, silhouette hermetic

low profile silhouette

100 mA/500 mA

2.0 A/1.0 A

100 mA/500 mA

1 A to 3 A (3001, 3001U Series)\*  
2 A to 4 A (3004 Series)\*

steel housing hermetically sealed with glass-to-metal seal at terminal junction

steel housing hermetically sealed with glass-to-metal seal at terminal junction

steel housing hermetically sealed with glass-to-metal seal at terminal junction

phenolic base with metal closure

-29°C to 204°C  
[-20°F to 400°F]

-29°C to 177°C  
[-20°F to 350°F]

-29°C to 204°C  
[-20°F to 400°F]

-18°C to 168 °C  
[0°F to 335°F]

-62°C to 260°C  
[-80°F to 500°F]

-54°C to 260°C  
[-65°F to 500°F]

-62°C to 260°C  
[-80°F to 500°F]

-18°C to 177 °C  
[0°F to 350°F]

MIL-STD-202, Method 301;  
1250 Vac 60 Hz - terminal to case

MIL-STD-202, Method 301;  
750 Vac 60 Hz - terminal to case

MIL-STD-202, Method 301;  
1250 Vac 60 Hz - terminal to case

MIL-STD-202, Method 301; 1500 Vac 60 Hz terminal to case (2000 Vac 3004)

MIL-STD-202, Method 302;  
Cond. B - 50 MOhm - 500 Vdc applied

MIL-STD-202, Method 302;  
Cond. B - 50 MOhm - 500 Vdc applied

MIL-STD-202, Method 302;  
Cond. B - 500 MOhm - 500 Vdc applied

MIL-STD-202, Method 302; Cond. B  
500 MW, 500 Vdc applied

MIL-STD-202, Method 307; 0.025 Ohm

MIL-STD-202, Method 307; 0.050 Ohm

MIL-STD-202, Method 307; 0.050 Ohm

MIL-STD-202, Method 307; 50 mW

MIL-STD-202, Method 112;  
Cond. 1 x 10<sup>-5</sup> atm cc/s

MIL-STD-202, Method 112;  
Cond. 1 x 10<sup>-5</sup> atm cc/s

MIL-STD-202, Method 112;  
Cond. 1 x 10<sup>-5</sup>

-

MIL-STD-202, Method 106

MIL-STD-202, Method 106

MIL-STD-202, Method 106

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UL/CSA

gold-alloy contacts, hermetically sealed, tight tolerances and differentials, pre-set and tamper proof, SPST contacts

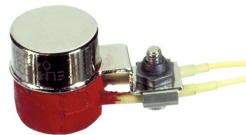
hermetically sealed, tight tolerances and differentials, pre-set and tamper proof, SPST contacts

gold-alloy contacts, hermetically sealed, tight tolerances and differentials, pre-set and tamper proof, SPST contacts

tight tolerances and differentials, low profile, available to open or close on temperature rise, dust-proof phenolic base, SPST contacts

# Thermostats | High Reliability Thermostats

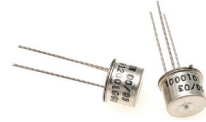
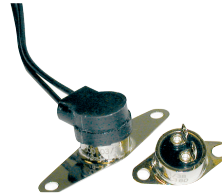
Provide either temperature control or over-temperature protection. Hermetic/non-hermetic devices available. Manufactured to meet stringent requirements of military and aerospace industries for dielectric strength, moisture, resistance, vibration, and shock. Many potential applications in aerospace and defense applications.



Series	3200 Aerospace	3153 Low Silhouette Hermetic
Description	aerospace	low silhouette hermetic
Amperage	5.0 A resistive	2.0 A resistive
Housing material	steel housing hermetically sealed with glass-to-metal seal at terminal junction	steel housing hermetically sealed with glass-to-metal seal at terminal junction
Operating temperature range	-51°C to 163°C [-60°F to 325°F]	-29°C to 177°C [-20°F to 350°F]
Environmental exposure range	-65°C to 177°C [-85°F to 350°F]	-65°C to 260°C [-85°F to 500°F]
Dielectric strength	MIL-STD-202, Method 301; 1250 Vac	MIL-STD-202, Method 301; 1250 Vac 60 Hz - terminal to case
Insulation resistance	MIL-STD-202, Method 302; 500 MOhm	MIL-STD-202, Method 302; 500 MOhm
Contact resistance	MIL-STD-202, Method 307; 0.025 Ohm max.	MIL-STD-202, Method 307; 0.050 Ohm max.
Hermetic seal	MIL-STD-202, Method 112; Cond. C	MIL-STD-202, Method 112; Cond. C
Moisture resistance	MIL-STD-202, Method 106	MIL-STD-202, Method 106
Shock	MIL-STD-202, Method 213; 750 G	MIL-STD-202, Method 213; 100 G
Vibration	MIL-STD-202, Method 204; 30 G; MIL-STD-202, Method 214; 50 G	MIL-STD-202, Method 204; 20 G
Thermal shock	MIL-STD-202, Method 107; Cond. B	MIL-STD-202, Method 107; Cond. B
Salt spray	MIL-STD-202, Method 101; Cond. B	MIL-STD-202, Method 101; Cond. B
Acceleration	MIL-STD-202, Method 212; 20 G	-
Approvals	MIL-S-24236/NASA S-311-641/01	MIL-S-24236
Features	NASA certified, space qualified, hermetically sealed, tight tolerances and differentials, pre-set and tamper proof, SPST contacts	hermetically sealed, tight tolerances and differentials, pre-set and tamper proof, SPST contacts

\* Based on 240 Vac and life-cycle dependent. Call for further details.





### 3MS1 QPL

### 3500

### 3800 Industrial-Grade

### 3600/3601 Custom-Packaged

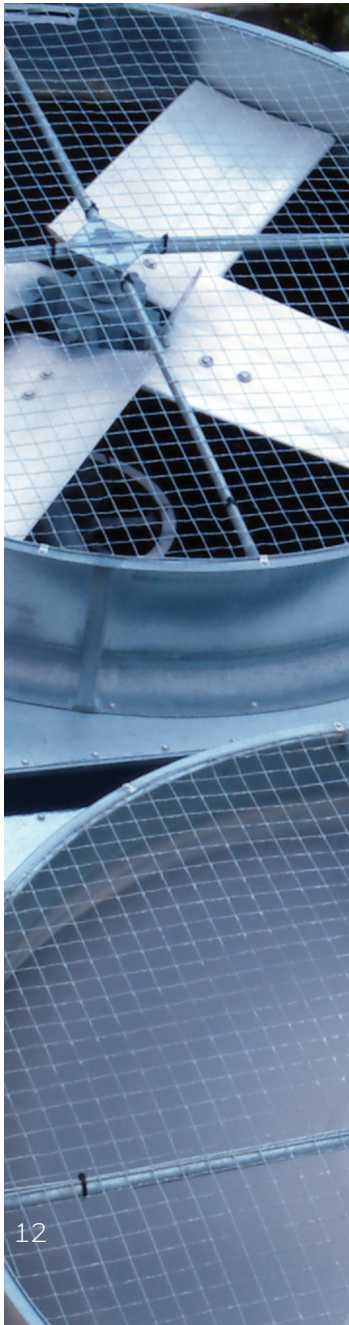
military	military	severe-duty applications	PCB mountable TO-5
5 A resistive	5 A resistive	7 A resistive	1 A resistive
steel housing with glass-to-metal seal at terminal junction	steel housing with glass-to-metal seal at terminal junction	steel housing with glass-to-metal seal at terminal junction	nickel
-46°C to 190°C [-50°F to 375°F]	-51°C to 204°C [-60°F to 400°F]	-29°C to 260°C [-20°F to 500°F]	40° C to 120°C [104°F to 248°F]
-65°C to 260°C [-85°F to 500°F]	-65°C to 260°C [-85°F to 500°F]	-62°C to 260°C [-80°F to 500°F]	-50°C to 150°C [-58°F to 302°F]
MIL-STD-202, Method 301; 1250 Vac	MIL-STD-202, Method 301; 1250 Vac	MIL-STD-202, Method 301; 1250 Vac 60 Hz terminal to case	500 Vac 60 Hz for one second, terminal to case
MIL-STD-202, Method 302; 500 MW	MIL-STD-202, Method 302; 500 MW	MIL-STD-202, Method 302, Cond. B; 50 MW min. terminal to case	20 mW at 500 Vdc
MIL-STD-202, Method 307; 0.050 W max.	MIL-STD-202, Method 307; 0.050 W max.	MIL-STD-202, Method 307; 50 mW max.	60 mW
MIL-STD-202, Method 112; Cond. C	MIL-STD-202, Method 112; Cond. C	MIL-STD-202, Method 112; Cond. A 1x10 <sup>-5</sup> atm cc/s	1x10 <sup>-3</sup> atm cc/s
MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106	-
MIL-STD-202, Method 213; 100 G	MIL-STD-202, Method 213; 400 G	MIL-STD-202, Method 213; 400 G	-
MIL-STD-202, Method 204; 20 G	MIL-STD-202, Method 204; 20 G	MIL-STD-202, Method 204; 20 G	-
MIL-STD-202, Method 107; Cond. B	MIL-STD-202, Method 107; Cond. B	-	-
MIL-STD-202, Method 101; Cond. B	MIL-STD-202, Method 101; Cond. B	-	-
MIL-STD-202, Method 212; 20 G	MIL-STD-202, Method 212; 20 G	-	-
qualified to MIL-S-24236; QPL listed	meets or exceeds the requirements of MIL-S-24236	-	-
each unit is 100% thermally and mechanically inspected, available to open or close on temperature rise, calibrations preset at factory, SPST contacts	tight tolerances and differentials, hermetically sealed, designed specifically for military and commercial aircraft, each unit is 100% thermally and mechanically inspected	easily customized, used where high levels of vibration and mechanical shock are common	gold contacts, available to open or close on temperature rise, specifically designed for PCBs, flexible circuitry, sophisticated time-based circuits, wave solderable

# Thermostats | Commercial Thermostats

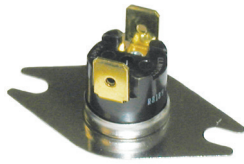
Provide either temperature control or over-temperature protection. Automatic or manual reset options. Phenolic or ceramic housings. Potential applications include HVAC, computers, medical equipment, appliances, automotive, office automation, fireplaces, and water heaters.



Series	2450A	2450CM	2450CMG
Use	heat detection	high current	low voltage
Reset type	automatic	manual	manual
Housing material	phenolic, epoxy seal cap and terminals	ceramic	ceramic
Functional property	open or close on rise	open on rise	open on rise
Amperage	3 A	15 A/10 A	0.5 A
Operating temperature range	47°C to 107°C [117°F to 225°F]	52°C to 232°C [125°F to 450°F]	52°C to 232°C [125°F to 450°F]
Environmental exposure range	0°C to 150°C [32°F to 302°F]	10°C to 260°C [50°F to 500°F]	10°C to 260°C [50°F to 500°F]
Contacts	WE-1 gold alloy cross point	silver/nickel alloy	WE-1 gold alloy cross point
Approvals	UL	UL, CSA, VDE	UL, CSA, VDE
Features	gold-alloy contacts; epoxy-sealed cap and terminals	rivet sleeve construction	gold-alloy contacts; rivet sleeve construction



Series	2450RG	2455R	2455RA
Use	low voltage	high current	heat detection
Reset type	automatic	automatic	automatic
Housing material	phenolic	phenolic	phenolic, epoxy seal cap and terminals
Functional property	open or close on rise	open or close on rise	close on rise
Amperage	0.5 A	15 A/10 A	3 A
Operating temperature range	0°C to 150°C [32°F to 302°F]	0°C to 150°C [32°F to 302°F]	47°C to 107°C [117°F to 225°F]
Environmental exposure range	-18°C to 177°C [0°F to 350°F]	-18°C to 177°C [0°F to 350°F]	0°C to 150°C [32°F to 302°F]
Contacts	WE-1 gold alloy cross point	silver/nickel alloy	WE-1 gold alloy cross point
Approvals	UL, CSA	UL, CSA, VDE	UL
Features	gold-alloy contacts; rivet sleeve construction	rivet sleeve construction; high profile and current	gold-alloy contacts; epoxy-sealed cap



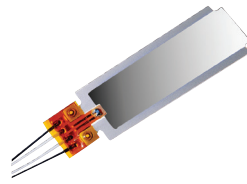
<b>2450HR</b>	<b>2450HRG</b>	<b>2450R</b>	<b>2450RC</b>	<b>2450RCG</b>
high current	low current	high current	high current	low voltage
automatic	automatic	automatic	automatic	automatic
phenolic	phenolic	phenolic	ceramic	ceramic
open or close on rise	open on rise	open or close on rise	open or close on rise	open or close on rise
15 A/10 A	0.5 A	15 A/10 A	15 A/10 A	0.5 A
0°C to 150°C [32°F to 302°F]	0°C to 150°C [32°F to 302°F]	0°C to 150°C [32°F to 302°F]	0°C to 260°C [32°F to 500°F]	0°C to 260°C [32°F to 500°F]
-18°C to 177°C [0°F to 350°F]	-18°C to 177°C [0°F to 350°F]	-18°C to 177°C [0°F to 350°F]	-20°C to 287°C [0°F to 550°F]	-20°C to 287°C [0°F to 550°F]
silver/nickel alloy	WE-1 gold alloy cross point	silver/nickel alloy	silver/nickel alloy	WE-1 gold alloy cross point
UL, CSA	UL, CSA	UL, CSA	UL, CSA, VDE	UL, CSA, VDE
rivet sleeve construction; factory calibrated	gold-alloy contacts; rivet sleeve construction; factory calibrated	rivet sleeve construction; low profile	rivet sleeve construction; low profile	gold-alloy contacts; rivet sleeve construction; low profile



<b>2455RVB</b>	<b>2455RC</b>	<b>2455RG</b>	<b>2455RM</b>
high current	high current	low voltage	high current
automatic	automatic	automatic	manual
ceramic, epoxy overmold	ceramic	phenolic	phenolic
open or close on rise	open on rise	open or close on rise	open on rise
15 A/10 A	15 A/10 A	0.5 A	15 A/10 A
-12°C to 105°C [10°F to 250°F]	0°C to 260°C [32°F to 500°F]	0°C to 150°C [32°F to 302°F]	0°C to 150°C [32°F to 302°F] (inclusive)
-18°C to 121°C [0°F to 250°F]	-20°C to 287°C [0°F to 550°F]	-18°C to 177°C [0°F to 350°F]	-18°C to 260°C [0°F to 500°F]
silver/nickel alloy	silver/nickel alloy	WE-1 gold alloy cross point	silver/nickel alloy
UL, CSA, VDE	UL, CSA, VDE	UL, CSA, VDE	UL, CSA, VDE
epoxy overmolded; rivet-sleeve construction; dust-free housing; factory calibrated	rivet sleeve construction; high profile	gold-alloy contacts; rivet sleeve construction; high profile; factory calibrated	rivet sleeve construction; factory calibrated

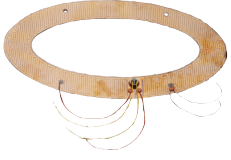
# Heaters | Flexible Heaters

Flat or custom geometry configurations with single, multiple or variable Watt densities provide stable, uniform, and customized heat output for unique application needs. May be bonded to other system components or combined with other thermal products to form custom-engineered heating systems. Potential applications include medical, HVAC/R, and LCD displays,



<b>Series</b>	<b>78000</b>
<b>Description</b>	transparent
<b>Maximum power</b>	0.8 W/cm <sup>2</sup> [5 W/in <sup>2</sup> ]
<b>Operating/storage temperature range</b>	-40°C to 85°C [-40°F to 185°F]
<b>Size constraints</b>	0,60 m x 0,43 m [22 in x 17 in]
<b>Geometry</b>	specific to customer requirements within size constraints
<b>Heater trace pattern</b>	continuous layer of ITO (Indium Tin Oxide) across entire surface
<b>Construction</b>	very thin layer of ITO electrically sputtered on PET polyester film; electrical connection made via silver ink or carbon bus bars laid on top of the ITO; wire connections are made via ring terminals eyeleted to the silver or carbon bus bars or flexible tail/connector
<b>Standard wire</b>	<ul style="list-style-type: none"> <li>• UL 1180 Teflon*</li> <li>• gauge per customer request</li> <li>• otherwise selected for max. heater current draw</li> </ul>
<b>PSA</b>	yes
<b>Approvals</b>	-
<b>Features</b>	no wires in clear view area, optical grade, thin film polyester, low power consumption





### 3400

### 3100

### 3200

Kapton® insulated or Kapton® insulated high temperature

silicon wire-wound

silicon chemically etched

6.2 W/cm<sup>2</sup> [40 W/in<sup>2</sup>]

6.2 W/cm<sup>2</sup> [40 W/in<sup>2</sup>]

6.2 W/cm<sup>2</sup> [40 W/in<sup>2</sup>]

Kapton® insulated: 177°C [350°F] max.

250°C [482°F] max.  
200°C [392°F] max. (UL)

250°C [482°F] max.  
200°C [392°F] max. (UL)

0,61 m x 0,61 m [24 in x 24 in]

none, virtually any size and shape

0,61 m x 0,61 m [24 in x 24 in]

specific to customer requirements within size constraints

specific to customer requirements

specific to customer requirements within size constraints

specific to customer requirements

specific to customer requirements

specific to customer requirements

contain etched, resistive foil encased between two layers of Kapton®; Kapton® insulated uses acrylic, thermoset bonding adhesive

contains resistive wire encased between two layers of fiberglass-supported silicone rubber; all bonding adhesives are uncured silicone rubber; cured under pressure and temperature during manufacturing

contains resistive foil traces encased between two layers of fiberglass-supported silicone rubber bonded together using temperature and pressure; heater trace patterns generated similar to processes used in pc-board design and manufacture

- UL 1180 Teflon®
- gauge per customer request
- otherwise selected for max. heater current draw

- UL 1180 Teflon®
- gauge per customer request
- otherwise selected for max. heater current draw

- UL 1180 Teflon®
- gauge per customer request
- otherwise selected for max. heater current draw

yes

yes

yes

UL, CSA

UL, CSA, TUV

UL, CSA, TUV

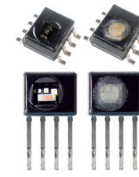
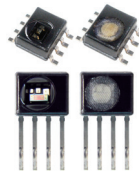
low out gassing, variety of geometries, high dielectric strength with minimal thickness

virtually any size or shape, multi-strand resistance wires

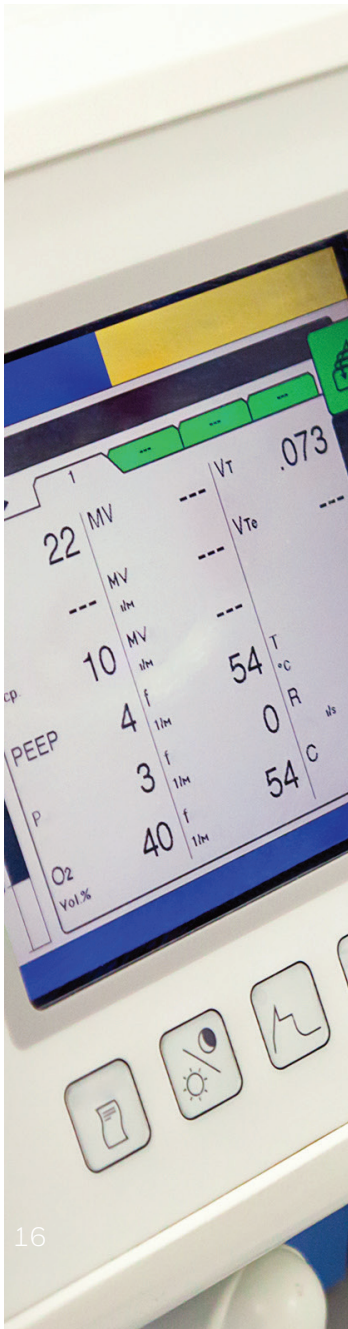
multiple watt densities or varying trace geometries; flat, molded-to-shape, spiral wrap

# Humidity Sensors | Honeywell Humidicon™

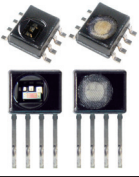
Digital output-type relative humidity and temperature sensor combined in same package. Offer a range of humidity accuracies from  $\pm 2.0\%$  RH typ. to  $\pm 4.5\%$  RH typ., wide operating temperature ranges, and low hysteresis. Potential applications include HVAC/R, air compressors, weather stations, telecom cabinets, respiratory therapy, and incubators/microenvironments.



Series	Honeywell Humidicon™ HIH6000	Honeywell Humidicon™ HIH6100
<b>Description</b>	digital output-type relative humidity (RH) and temperature sensor combined in same package	digital output-type relative humidity (RH) and temperature sensor combined in same package
<b>Humidity accuracy</b>	$\pm 4.5\%$ RH typ.	$\pm 4.0\%$ RH typ.
<b>Temperature accuracy</b>	$\pm 1.0^\circ\text{C}$ typ.	$\pm 1.0^\circ\text{C}$ max.
<b>Operating temperature range</b>	$-40^\circ\text{C}$ to $100^\circ\text{C}$ [ $-40^\circ\text{F}$ to $212^\circ\text{F}$ ]	$-25^\circ\text{C}$ to $85^\circ\text{C}$ [ $-13^\circ\text{F}$ to $185^\circ\text{F}$ ]
<b>Hysteresis</b>	-	-
<b>Output</b>	I <sup>2</sup> C or SPI	I <sup>2</sup> C or SPI
<b>Package type</b>	SIP 4 Pin or SOIC-8 SMD	SIP 4 Pin or SOIC-8 SMD
<b>Response time</b>	6 s typ. in 20 l/min minimum airflow	6 s typ. in 20 l/min minimum airflow
<b>Long-term stability</b>	$\pm 1.2\%$ RH for five years	$\pm 1.2\%$ RH for five years
<b>Operating humidity range</b>	0 %RH to 100 %RH	0 %RH to 100 %RH
<b>Compensated humidity range</b>	20 %RH to 80 %RH	10 %RH to 90 %RH
<b>Moisture/dust filter</b>	yes (some listings)	yes (some listings)
<b>Voltage supply</b>	3.3 Vdc typ.	3.3 Vdc typ.
<b>Features</b>	industry-leading long term stability, reliability, and relative humidity accuracy; lowest total cost solution; energy efficient; available with or without hydrophobic filter and condensation-resistance; optional one or two %RH level alarm outputs	industry-leading long term stability, reliability, and relative humidity accuracy; lowest total cost solution; energy efficient; available with or without hydrophobic filter and condensation-resistance; optional one or two %RH level alarm outputs







## Honeywell HumidIcon™ HIH7000

digital output-type relative humidity (RH) and temperature sensor combined in same package

±3.0 %RH typ.

±1.0°C typ.

-40°C to 100°C [-40°F to 212°F]

-

I<sup>2</sup>C or SPI

SIP 4 Pin or SOIC-8 SMD

6 s typ. in 20 l/min minimum airflow

±1.2 %RH for five years

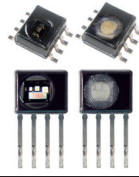
0 %RH to 100 %RH

20 %RH to 80 %RH

yes (some listings)

3.3 Vdc typ.

industry-leading long term stability, reliability, and relative humidity accuracy; lowest total cost solution; energy efficient; available with or without hydrophobic filter and condensation-resistance; optional one or two %RH level alarm outputs



## Honeywell HumidIcon™ HIH8000

digital output-type relative humidity (RH) and temperature sensor combined in same package

±2.0 %RH typ.

±0.8°C typ.

-40°C to 125°C [-40°F to 257°F]

-

I<sup>2</sup>C or SPI

SIP 4 Pin or SOIC-8 SMD

6 s typ. in 20 l/min minimum airflow

±1.2 %RH for five years

0 %RH to 100 %RH

10 %RH to 90 %RH

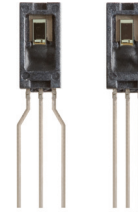
yes (some listings)

3.3 Vdc typ.

industry-leading long term stability, reliability, and relative humidity accuracy; lowest total cost solution; energy efficient; available with or without hydrophobic filter and condensation-resistance; optional one or two %RH level alarm outputs

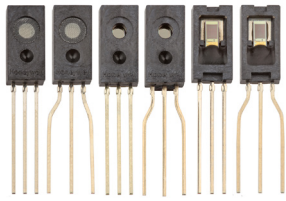
# Humidity Sensors | Humidity

Configured with integrated circuitry to provide on-chip signal conditioning. Covered, filtered or unfiltered integrated circuit available. Potential applications include refrigeration, drying, meteorology, battery-powered systems, OEM assemblies, HVAC/R, office automation, and medical.



Series	HIH-5030/5031	HIH-4000
Description	covered, filtered or unfiltered integrated circuit	integrated circuit
Output	analog voltage	analog voltage
Package type	surface mount	SIP (2,54 mm [0.100 in] or 1,27 mm [0.050 in] lead pitch)
Response time	5 s typ. 1/e in slow moving air	5 s typ. 1/e in slow moving air
Long-term stability	±1.2 %RH for five years; ±0.25 %RH each year	±1.2 %RH for five years; ±0.25 %RH each year
Operating temperature range	-40°C to 85°C [-40°F to 185°F]	-40°C to 85°C [-40°F to 185°F]
Operating humidity range	0 %RH to 100 %RH	0 %RH to 100 %RH
Moisture/dust filter	yes (some listings)	no
Cover/case	yes	no
Calibration and data print out	no	yes (some listings)
Accuracy	±3 %RH	±3.5 %RH
Voltage supply	2.7 Vdc to 5.5 Vdc	4 Vdc to 5.8 Vdc
Features	near linear voltage output vs. %RH, laser trimmed, molded thermoset plastic housing, chemically resistant, tape and reel	near linear voltage output vs. %RH; laser trimmed, molded thermoset plastic housing, chemically resistant





### HIH-4010/4020/4021

### HIH-4030/4031

### HIH-4602-A, C

### HIH-4602-L

covered or uncovered, filtered or unfiltered integrated circuit

covered, filtered or unfiltered integrated circuit

monolithic IC with integral thermistor or precision RTD

integrated circuit

analog voltage

analog voltage

analog voltage (for humidity), resistance (for temperature)

analog voltage

SIP (2,54 mm [0.100 in] or 1,27 mm [0.050 in] lead pitch)

surface mount

TO-5 can

slotted TO-5 can

5 s typ. 1/e in slow moving air

5 s typ. 1/e in slow moving air

50 s typ. 1/e in slow moving air

30 s typ. 1/e in slow moving air

±1.2 %RH for five years; ±0.25 %RH each year

±1.2 %RH for five years

±1.2 %RH for five years

±1.2 %RH for five years

-40°C to 85°C  
[-40°F to 185°F]

-40°C to 85°C  
[-40°F to 185°F]

-40°C to 85°C  
[-40°F to 185°F]

-40°C to 85°C  
[-40°F to 185°F]

0 %RH to 100 %RH

0 %RH to 100 %RH

0 %RH to 100 %RH

0 %RH to 100 %RH

yes (some listings)

yes (some listings)

yes

no

yes (some listings)

yes

yes

yes

yes (some listings)

yes (some listings)

yes (some listings)

yes (some listings)

±3.5 %RH

±3.5 %RH

±3.5 %RH

±3.5 %RH

4 Vdc to 5.8 Vdc

4 Vdc to 5.8 Vdc

4 Vdc to 5.8 Vdc

4 Vdc to 5.8 Vdc

near linear voltage output vs. %RH, laser trimmed, molded thermoset plastic housing, chemically resistant

near linear voltage output vs. %RH, laser trimmed, molded thermoset plastic housing, chemically resistant, tape and reel

humidity and temperature sensing in one package, near linear voltage output vs. %RH, laser trimmed, chemically resistant, built-in static protection

near linear voltage output vs %RH, laser-trimmed, chemically resistant, enhanced accuracy, fast response



## Humidity Sensors Used in Wall Mount Transducers (Asia-Pacific Region Only)

### SCT Series

#### Description

humidity and temperature wall mount transducer using Honeywell HumidCon™ humidity/temperature sensor

#### Humidity measurement range

0 % RH to 100 %RH non-condensation

#### Humidity accuracy

±4 %RH (25°C [77°F], 10 %RH to 90 %RH)  
±5 %RH (5°C to 50°C [41°F to 122°F], 10 %RH to 90 %RH)

#### Temperature measurement range

-5°C to 55°C [13°F to 131°F], 0°C to 70°C [32°F to 158°F], -25°C to 60°C [-13°F to 140°F]

#### Temperature accuracy

±0.5°C, ±0.3°C, ±0.2°C, or ±1°C (depending on type of internal sensor used)

#### Long term drift

±0.05 %RH typ. and ±1.2 %RH max. at 50 %RH for 5 years stability

#### Operating temperature range

**-20°C to 70°C [-4°F to 158°F]:** units with LDC display  
**-25°C to 85°C [-13°F to 185°F]:** units without LDC display

#### Voltage supply

24 Vdc ±10%, 50 mA max. (units with 4 mA to 20 mA output)  
18 Vdc to 40 Vdc, 15 mA max. or 24 Vac ±15%, 50/60 Hz, 50 mA max (units with 0 V to 10 V output)

## **Warranty/Remedy**

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

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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