

# THERMAL PRODUCTS

Product Range Guide



**Honeywell**

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

Honeywell Advanced Sensing Technologies 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.



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## 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
<b>Temp. sensing type</b>	immersion/air-gas	immersion	air-gas
<b>Thermistor type</b>	NTC	RTD	NTC
<b>Nominal resistance at 25°C [77°F]</b>	1000 Ohm, 2252 Ohm, 2057 Ohm, 2795 Ohm	100 Ohm	2000 Ohm
<b>Operating temperature range</b>	-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]
<b>Housing material</b>	brass hex, stainless steel probe tip	stainless steel	brass
<b>Electrical and mechanical interface</b>	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
<b>Features</b>	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
<b>Temp. sensing type</b>	immersion	air-gas/immersion-liquid level/surface	air/surface
<b>Thermistor type</b>	NTC or KTY	NTC	NTC
<b>Nominal resistance at 25°C [77°F]</b>	2000 Ohm	200 Ohm to 1,000,000 Ohm (inclusive)	10,000 Ohm, 12,000 Ohm
<b>Operating temperature range</b>	-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]
<b>Housing material</b>	brass	plastic, aluminum, stainless steel, epoxy filled, tin- or nickel-plated copper, ceramic or kynar-filled tubing	phenolic
<b>Electrical and mechanical interface</b>	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)
<b>Features</b>	enclosed thermistor, rugged design, brass encapsulation	wide selection of housing, resistance, and termination options	low, compact profile, tight interchangeability, enhanced accuracy and response time

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
<b>Sensor type</b>	100 Ohm, 1000 Ohm platinum RTD	100 Ohm, 1000 Ohm platinum RTD
<b>Temperature coefficient</b>	0.00385 Ohm/Ohm/°C 0.00375 Ohm/Ohm/°C	0.00385 Ohm/Ohm/°C 0.00375 Ohm/Ohm/°C
<b>Temperature sensing range</b>	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]
<b>Packaging type</b>	alumina tube	ceramic case
<b>Termination</b>	28 AWG or 24 AWG lead wire	SIP
<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	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
<b>Self-heating</b>	<15 mW/°C for 0.85 O.D. typ.	<6.8 mW/°C typ.; 9.7 mW/°C typ.
<b>Termination material</b>	24 AWG nickel-coated, stranded copper 28 AWG nickel-coated, stranded copper	phosphor bronze with tin silver plating
<b>Features</b>	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
<b>Sensor type</b>	100 Ohm, 1000 Ohm platinum RTD	100 Ohm, 1000 Ohm platinum RTD
<b>Temperature coefficient</b>	0.00385 Ohm/Ohm/°C 0.00375 Ohm/Ohm/°C	0.00385 Ohm/Ohm/°C 0.00375 Ohm/Ohm/°C
<b>Temperature sensing range</b>	-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]
<b>Packaging type</b>	molded plastic	radial chip or surface mount axial flip chip
<b>Termination</b>	SIP	lead wires or solderpads
<b>Base resistance &amp; 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	100 Ohm: Class A; 100 Ohm: Class B 1000 Ohm: Class A; 1000 Ohm: Class B 1000 Ohm: Class 2B
<b>Self-heating</b>	<15 mW/°C typ.	0,4 K/mW, 0,6 K/mW, or 0,8 K/mW at 0°C [32°F]
<b>Termination material</b>	Cu alloy 194 solder dipped with Sn/Ag	Pt-clad Ni wire and end termination galvanic Sn-plated with Ni barrier layer
<b>Features</b>	enhanced stability, thin film platinum, molded plastic SIP package, solderable leads	interchangeability, SMD and chip package versions, enhanced stability and time response

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	121	126	128	129	135
<b>Description</b>	small, hermetically sealed glass bead	large, hermetically sealed glass bead	E-I tested and matched beads on header assembly	mini glass probe	standard glass probe	matched large glass bead	matched mini glass probe	matched large glass probe	glass encapsulated chip, DO-35 type
<b>Operating temperature range</b>	-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]	-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]
<b>Dissipation constant in still air</b>	0.1 mW/°C	0.4 mW/°C	varies with assembly type	0.7 mW/°C, 1.0 mW/°C	1.0 mW/°C	0.8 mW/°C	2.1 mW/°C	3.0 mW/°C	2.5 mW/°C
<b>Time constant in air</b>	0.5 s	4.0 s	0.5 s	10.0 s	22.0 s	4.0 s	10.0 s	22.0 s	4.0 s
<b>Nominal resistance at 25°C [77°F]</b>	1 kOhm, 2 kOhm, 8 kOhm, 10 kOhm, 100 kOhm	200 Ohm, 500 Ohm, 1 kOhm, 2 kOhm, 5 kOhm, 10 kOhm, 50 k Ohm, 100 kOhm, 500 kOhm, 2 MOhm	2 kOhm, 8 kOhm	1 kOhm, 2 kOhm, 10 kOhm	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
<b>Maximum diameter</b>	0,36 mm [0.014 in]	1,14 mm [0.045 in]	0,36 mm [0.014 in]	1,5 mm [0.060 in]	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]
<b>Termination material</b>	platinum iridium	platinum iridium	glass to metal header	dumet	dumet	platinum iridium	dumet	dumet	tinned copper-clad steel
<b>Lead length</b>	9,6 mm [0.375 in]	9,6 mm [0.375 in]	31,75 mm [1.25 in]	31,8 mm [1.25 in]	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]
<b>Features</b>	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	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, miniature size	interchangeability; enhanced sensitivity, reliability, and stability; miniature size	enhanced temperature capability, uniform dimensions, tape and reel



Series	140	142	143	173	175	192	194	197	ICL
<b>Description</b>	small disc	large disc	large disc	EIA 0805 surface mount, end-banded	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
<b>Operating temperature range</b>	-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]	-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]
<b>Dissipation constant in still air</b>	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	3.5 mW/°C	0.75 mW/°C	0.75 mW/°C	0.75 mW/°C	12.7 mW/°C to 23 mW/°C
<b>Time constant in air</b>	10.0 s	10.0 s	16.0 s to 20.0 s	10.0 s	10.0 s	15.0 s	15.0 s	15.0 s	32 s to 93 s
<b>Nominal resistance at 25°C [77°F]</b>	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	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 %
<b>Maximum diameter</b>	2,54 mm [0.1 in]	3,81 mm [0.15 in]	6,35 mm [0.25 in]	EIA 0805 SMD	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]
<b>Termination material</b>	tinned copper	tinned copper	tinned copper	solder-plated nickel barrier	solder-plated nickel barrier	tinned copper, alloy 180	solid nickel, Teflon® insulated	tinned copper, alloy 180	tinned copper
<b>Lead length</b>	38,1 mm [1.50 in]	38,1 mm [1.50 in]	38,1 mm [1.50 in]	-	-	38,1 mm [1.50 in]	38,1 mm [1.50 in]	38,1 mm [1.50 in]	[25,4 mm] 1 in min.
<b>Features</b>	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	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	3106 Low-level Hermetic	3150 Low Silhouette Hermetic	3156 Low-level Silhouette Hermetic	3001/3004 Series Non-Hermetic
<b>Description</b>	custom packaged	hermetic	UL-approved hermetic	low-level hermetic	low silhouette hermetic	low level, silhouette hermetic	low profile silhouette
<b>Amperage</b>	dependent on the internal device	2.0 A/1.0 A/5.0 A	3.0 A resistive max.	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)*
<b>Housing material</b>	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	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
<b>Operating temperature range</b>	-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]	-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]
<b>Environmental exposure range</b>	-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]	-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]
<b>Dielectric strength</b>	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	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)
<b>Insulation resistance</b>	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	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
<b>Contact resistance</b>	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.	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
<b>Hermetic seal</b>	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	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>	-
<b>Moisture resistance</b>	MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106	-
<b>Approvals</b>	-	-	UL/CSA	-	-	-	UL/CSA
<b>Features</b>	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	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	3MS1 QPL	3500	3800 Industrial-Grade	3600/3601 Custom-Packaged
<b>Description</b>	aerospace	low silhouette hermetic	military	military	severe-duty applications	PCB mountable TO-5
<b>Amperage</b>	5.0 A resistive	2.0 A resistive	5 A resistive	5 A resistive	7 A resistive	1 A resistive
<b>Housing material</b>	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 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
<b>Operating temperature range</b>	-51°C to 163°C [-60°F to 325°F]	-29°C to 177°C [-20°F to 350°F]	-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]
<b>Environmental exposure range</b>	-65°C to 177°C [-85°F to 350°F]	-65°C to 260°C [-85°F to 500°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]
<b>Dielectric strength</b>	MIL-STD-202, Method 301; 1250 Vac	MIL-STD-202, Method 301; 1250 Vac 60 Hz - terminal to case	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
<b>Insulation resistance</b>	MIL-STD-202, Method 302; 500 MOhm	MIL-STD-202, Method 302; 500 MOhm	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
<b>Contact resistance</b>	MIL-STD-202, Method 307; 0.025 Ohm max.	MIL-STD-202, Method 307; 0.050 Ohm max.	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
<b>Hermetic seal</b>	MIL-STD-202, Method 112; Cond. C	MIL-STD-202, Method 112; Cond. C	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
<b>Moisture resistance</b>	MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106	-
<b>Shock</b>	MIL-STD-202, Method 213; 750 G	MIL-STD-202, Method 213; 100 G	MIL-STD-202, Method 213; 100 G	MIL-STD-202, Method 213; 400 G	MIL-STD-202, Method 213; 400 G	-
<b>Vibration</b>	MIL-STD-202, Method 204; 30 G; MIL-STD-202, Method 214; 50 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 204; 20 G	-
<b>Thermal shock</b>	MIL-STD-202, Method 107; Cond. B	MIL-STD-202, Method 107; Cond. B	MIL-STD-202, Method 107; Cond. B	MIL-STD-202, Method 107; Cond. B	-	-
<b>Salt spray</b>	MIL-STD-202, Method 101; Cond. B	MIL-STD-202, Method 101; Cond. B	MIL-STD-202, Method 101; Cond. B	MIL-STD-202, Method 101; Cond. B	-	-
<b>Acceleration</b>	MIL-STD-202, Method 212; 20 G	-	MIL-STD-202, Method 212; 20 G	MIL-STD-202, Method 212; 20 G	-	-
<b>Approvals</b>	MIL-S-24236/NASA S-311-641/01	MIL-S-24236	qualified to MIL-S-24236; QPL listed	meets or exceeds the requirements of MIL-S-24236	-	-
<b>Features</b>	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	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

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

# 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.



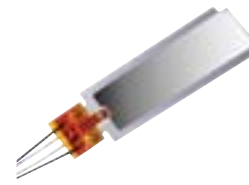
Series	2450A	2450CM	2450CMG	2450HR	2450HRG	2450R	2450RC	2450RCG
<b>Use</b>	heat detection	high current	low voltage	high current	low current	high current	high current	low voltage
<b>Reset type</b>	automatic	manual	manual	automatic	automatic	automatic	automatic	automatic
<b>Housing material</b>	phenolic, epoxy seal cap and terminals	ceramic	ceramic	phenolic	phenolic	phenolic	ceramic	ceramic
<b>Functional property</b>	open or close on rise	open on rise	open on rise	open or close on rise	open on rise	open or close on rise	open or close on rise	open or close on rise
<b>Amperage</b>	3 A	15 A/10 A	0.5 A	15 A/10 A	0.5 A	15 A/10 A	15 A/10 A	0.5 A
<b>Operating temperature range</b>	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]	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]
<b>Environmental exposure range</b>	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]	-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]
<b>Contacts</b>	WE-1 gold alloy cross point	silver/nickel alloy	WE-1 gold alloy cross point	silver/nickel alloy	WE-1 gold alloy cross point	silver/nickel alloy	silver/nickel alloy	WE-1 gold alloy cross point
<b>Approvals</b>	UL	UL, CSA, VDE	UL, CSA, VDE	UL, CSA	UL, CSA	UL, CSA	UL, CSA, VDE	UL, CSA, VDE
<b>Features</b>	gold-alloy contacts; epoxy-sealed cap and terminals	rivet sleeve construction	gold-alloy contacts; rivet sleeve construction	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



Series	2450RG	2455R	2455RA	2455RVB	2455RC	2455RG	2455RM
<b>Use</b>	low voltage	high current	heat detection	high current	high current	low voltage	high current
<b>Reset type</b>	automatic	automatic	automatic	automatic	automatic	automatic	manual
<b>Housing material</b>	phenolic	phenolic	phenolic, epoxy seal cap and terminals	ceramic, epoxy overmold	ceramic	phenolic	phenolic
<b>Functional property</b>	open or close on rise	open or close on rise	close on rise	open or close on rise	open on rise	open or close on rise	open on rise
<b>Amperage</b>	0.5 A	15 A/10 A	3 A	15 A/10 A	15 A/10 A	0.5 A	15 A/10 A
<b>Operating temperature range</b>	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]	-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)
<b>Environmental exposure range</b>	-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]	-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]
<b>Contacts</b>	WE-1 gold alloy cross point	silver/nickel alloy	WE-1 gold alloy cross point	silver/nickel alloy	silver/nickel alloy	WE-1 gold alloy cross point	silver/nickel alloy
<b>Approvals</b>	UL, CSA	UL, CSA, VDE	UL	UL, CSA, VDE	UL, CSA, VDE	UL, CSA, VDE	UL, CSA, VDE
<b>Features</b>	gold-alloy contacts; rivet sleeve construction	rivet sleeve construction; high profile and current	gold-alloy contacts; epoxy-sealed cap	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



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,



Series	78000	3400	3100	3200
<b>Description</b>	transparent	Kapton <sup>®</sup> insulated or Kapton <sup>®</sup> insulated high temperature	silicon wire-wound	silicon chemically etched
<b>Maximum power</b>	0.8 W/cm <sup>2</sup> [5 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> ]	6.2 W/cm <sup>2</sup> [40 W/in <sup>2</sup> ]
<b>Operating/storage temperature range</b>	-40°C to 85°C [-40°F to 185°F]	Kapton <sup>®</sup> 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)
<b>Size constraints</b>	0,60 m x 0,43 m [22 in x 17 in]	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]
<b>Geometry</b>	specific to customer requirements within size constraints	specific to customer requirements within size constraints	specific to customer requirements	specific to customer requirements within size constraints
<b>Heater trace pattern</b>	continuous layer of ITO (Indium Tin Oxide) across entire surface	specific to customer requirements	specific to customer requirements	specific to customer requirements
<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	contain etched, resistive foil encased between two layers of Kapton <sup>®</sup> ; Kapton <sup>®</sup> 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
<b>Standard wire</b>	<ul style="list-style-type: none"> <li>• UL 1180 Teflon<sup>®</sup></li> <li>• gauge per customer request</li> <li>• otherwise selected for max. heater current draw</li> </ul>	<ul style="list-style-type: none"> <li>• UL 1180 Teflon<sup>®</sup></li> <li>• gauge per customer request</li> <li>• otherwise selected for max. heater current draw</li> </ul>	<ul style="list-style-type: none"> <li>• UL 1180 Teflon<sup>®</sup></li> <li>• gauge per customer request</li> <li>• otherwise selected for max. heater current draw</li> </ul>	<ul style="list-style-type: none"> <li>• UL 1180 Teflon<sup>®</sup></li> <li>• gauge per customer request</li> <li>• otherwise selected for max. heater current draw</li> </ul>
<b>PSA</b>	yes	yes	yes	yes
<b>Approvals</b>	-	UL, CSA	UL, CSA, TUV	UL, CSA, TUV
<b>Features</b>	no wires in clear view area, optical grade, thin film polyester, low power consumption	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





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	Honeywell HumidIcon™ HIH7000	Honeywell HumidIcon™ HIH8000
Description	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	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
Humidity accuracy	$\pm 4.5$ %RH typ.	$\pm 4.0$ %RH typ.	$\pm 3.0$ %RH typ.	$\pm 2.0$ %RH typ.
Temperature accuracy	$\pm 1.0^\circ\text{C}$ typ.	$\pm 1.0^\circ\text{C}$ max.	$\pm 1.0^\circ\text{C}$ typ.	$\pm 0.8^\circ\text{C}$ typ.
Operating temperature range	$-40^\circ\text{C}$ 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 $185^\circ\text{F}$ ]	$-40^\circ\text{C}$ to $100^\circ\text{C}$ [ $-40^\circ\text{F}$ to $212^\circ\text{F}$ ]	$-40^\circ\text{C}$ to $125^\circ\text{C}$ [ $-40^\circ\text{F}$ to $257^\circ\text{F}$ ]
Hysteresis	-	-	-	-
Output	I <sup>2</sup> C or SPI	I <sup>2</sup> C or SPI	I <sup>2</sup> C or SPI	I <sup>2</sup> C or SPI
Package type	SIP 4 Pin or SOIC-8 SMD	SIP 4 Pin or SOIC-8 SMD	SIP 4 Pin or SOIC-8 SMD	SIP 4 Pin or SOIC-8 SMD
Response time	6 s typ. in 20 l/min minimum airflow	6 s typ. in 20 l/min minimum airflow	6 s typ. in 20 l/min minimum airflow	6 s typ. in 20 l/min minimum airflow
Long-term stability	$\pm 1.2$ %RH for five years	$\pm 1.2$ %RH for five years	$\pm 1.2$ %RH for five years	$\pm 1.2$ %RH for five years
Operating humidity range	0 %RH to 100 %RH	0 %RH to 100 %RH	0 %RH to 100 %RH	0 %RH to 100 %RH
Compensated humidity range	20 %RH to 80 %RH	10 %RH to 90 %RH	20 %RH to 80 %RH	10 %RH to 90 %RH
Moisture/dust filter	yes (some listings)	yes (some listings)	yes (some listings)	yes (some listings)
Voltage supply	3.3 Vdc typ.	3.3 Vdc typ.	3.3 Vdc typ.	3.3 Vdc typ.
Features	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	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



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	HIH-4010/4020/4021	HIH-4030/4031	HIH-4602-A, C	HIH-4602-L
Description	covered, filtered or unfiltered integrated circuit	integrated circuit	covered or uncovered, filtered or unfiltered integrated circuit	covered, filtered or unfiltered integrated circuit	monolithic IC with integral thermistor or precision RTD	integrated circuit
Output	analog voltage	analog voltage	analog voltage	analog voltage	analog voltage (for humidity), resistance (for temperature)	analog voltage
Package type	surface mount	SIP (2,54 mm [0.100 in] or 1,27 mm [0.050 in] lead pitch)	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
Response time	5 s typ. 1/e in slow moving air	5 s typ. 1/e in slow moving air	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
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	±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
Operating temperature range	-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]	-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	0 %RH to 100 %RH	0 %RH to 100 %RH	0 %RH to 100 %RH	0 %RH to 100 %RH
Moisture/dust filter	yes (some listings)	no	yes (some listings)	yes (some listings)	yes	no
Cover/case	yes	no	yes (some listings)	yes	yes	yes
Calibration and data print out	no	yes (some listings)	yes (some listings)	yes (some listings)	yes (some listings)	yes (some listings)
Accuracy	±3 %RH	±3.5 %RH	±3.5 %RH	±3.5 %RH	±3.5 %RH	±3.5 %RH
Voltage supply	2.7 Vdc to 5.5 Vdc	4 Vdc to 5.8 Vdc	4 Vdc to 5.8 Vdc	4 Vdc to 5.8 Vdc	4 Vdc to 5.8 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	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.

## Find out more

To learn more about Honeywell's sensing and switching products, call **+1-815-235-6847**, email inquiries to **info.sc@honeywell.com**, or visit **sps.honeywell.com/ast**

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