



**Sensata**  
Technologies

# TEMPERATURE SELECTION GUIDE





# Temperature Switches & Thermostats

Temperature Switches/Thermostats mechanically react to a system's media based on a predetermined temperature value. Depending on the product line, switches may be used as indicators or cut-offs monitoring the temperature of liquids, gases, or surfaces in a system.

## 1NT Series

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The 1NT is a single throw snap -action, fixed temperature thermostat.

### Application Opportunities

The 1NT can fit a variety of different applications and can be used as a regulating thermal switch, over-temperature control, or pilot duty control switch.

### Features

- Ambient temperature range from -40°C to 240°C
- ISO9001-2000 certification
- Lower Cost
- Automatic reset, manual reset, trip free manual reset, one shot configurations available

### Application Examples

- HVAC
- Power Supplies
- Automation
- Medical equipment

### Agency Approval

- UL/CSA recognized
- ENEC/ENEC recognized



## 3NT Series

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The 3NT is an automatic reset thermostat built in an easy-to-mount package that allows for operation in moist environments.

### Application Opportunities

The 3NT's easy-mount clip makes it ideal for remote locations within applications. Its innovative dry seal makes it a candidate for food & beverage systems that need to operate in moist environments.

### Features

- Temperature switching range from -40°C to 135°C
- Easy to mount clip
- Innovative dry seal
- 100k cycle life
- Automatic reset

### Application Examples

- HVAC
- White products
- Refrigerators
- Heat pumps

### Agency Approval

- UL/CSA recognized
- ENEC/ENEC recognized



## 5100 Series

The 5100 Series is a single pole, single throw, snap-action, hermetically-sealed thermostat built in a probe package.

### Application Opportunities

The 5100 Series' probe design makes it an ideal temperature switch for applications that need switching in an immersion environment. Its construction makes it rugged enough for either high-vibration applications or ones under high pressures.

### Features

- Stainless steel construction
- Operating temperature of 1.67°C to 249°C
- Hermetic glass seal (isolated-case only)
- Ideal for immersion switching
- Pressure exposure limit of 1500 PSI
- 100k cycle life

### Application Examples

- Hydraulic systems
- Degreasers
- Chemical baths
- Oil and transmission protection

### Agency Approval

- UL E36687 and E66685
- CSA LR25561-6 and LR25561-8
- Thermal shock specifications per MIL-STD-202, method 107, test condition B



## 5011 Series

The 5011 Series is a positive snap action, single pole, single throw hermetically sealed thermostat that is built into a case grounded or case isolated package.

### Application Opportunities

The 5011 Series is designed as a surface mount thermostat for applications with heavy environmental concerns or applications that require the thermostat to be an isolated device.

### Features

- Hermetic glass seal
- Case isolated and case grounded options available
- 100k cycle life
- Operating temperature range from 60°C to 249°C

### Application Examples

- Printed circuit board protection
- Air or water-cooled engines and transmissions

### Agency Approval

- RoHS compliant
- Thermal shock specifications per MIL-STD-202, Method 107 Test Condition B



## 5003 Series

The 5003 Series is a positive snap action, single pole, single throw thermostat built in a low profile package.

### Application Opportunities

The 5003 Series is ideal for applications where space is at a premium due to its compact size. The construction of the switch assembly offers excellent shock and vibration resistance and is ideal for high humidity and contaminating atmospheres.

### Features

- Low profile design
- 100k cycle life
- Operating temperature range of 1.67°C to 162.78°C

### Application Examples

- Power supplies
- Laser systems
- HVAC
- Generators
- Air compressors
- Printing press machines
- Packaging equipment
- Warming plates
- Industrial refrigeration units
- Lighting system amplifiers
- Battery systems

### Agency Approval

- RoHS compliant per EU directive 2002/95/EC



# Thermal Sensing & Switching Thermostats



Thermal sensing and switching thermostats are small temperature switches designed specifically around placement on PC boards or power supplies. They are built in industry standard packages for easy installation.

## 6600 Series

The 6600 Series is a positive snap action, single pole, single throw sub-miniature thermostat in a package that dimensionally conforms to standard 8-pin DIP.

### Application Opportunities

The 6600 Series is ideal for use on PC boards. Typical uses include turning on an indicator light, sounding an alarm, switching on a control circuit, or even switching a circuit to shut down a system.



### Features

- 8-pin DIP international electronic package standard
- Operating temperature of 40°C to 130°C
- 25,000 cycles @ 46 VDC, 1.0A
- 30,000 cycles @ 120 VAC, 1.0A
- 100,000 cycles @ 5 VDC, 0.001A (gold plated contacts)

### Application Examples

- Power supplies
- Battery chargers
- Servo systems
- Machine tools
- Datacom equipment
- Emergency lighting
- RF and microwave amplifiers
- Test equipment

### Agency Approval

- Vibration specifications per MIL-STD-202, method 204D, test condition D
- Shock specifications per Mil-STD-202, method 213, test condition C
- cRUus recognized E36687
- VDE approval 0631/12.83
- RoHS compliant per EU Directive 2002/95/EC



## 6700 Series

The 6700 Series is a positive snap action, single pole, single throw sub-miniature thermostat in a package that conforms to standard Y220/TO222, which allows for the sensor to be automatically soldered onto PC boards.

### Application Opportunities

The 6700 Series is ideal for PC board and power supply applications that require low space usage. It is suited well for turning on an indicator light, sounding an alarm, switching on a control circuit, or even switching a circuit to shut down a system.

### Features

- Y-220/TO-2220 international electronic package standard
- Operating temperature of 40°C to 130°C
- 25,000 cycles @ 46 VDC, 1.0A
- 30,000 cycles @ 120 VAC, 1.0A
- 100,000 cycles @ 5 VDC, 0.001A (gold plated contacts)

### Application Examples

- Power supplies
- Battery chargers
- Servo systems
- Machine tools
- Datacom equipment
- tEmergency lighting
- RF and microwave amplifiers
- Test equipment

### Agency Approval

- Vibration specifications per MIL-STD-202, method 204D, test condition D
- Shock specifications per Mil-STD-202, method 213, test condition C
- cRUus recognized E36687
- VDE approval 0631/12.83
- RoHS compliant per EU Directive 2002/95/EC

# Temperature Sensors



Temperature sensors convey temperature into a readable electrical parameter, which helps the user monitor their application. They work with measuring the temperature of different media including air, water, oil, refrigerants and many more.

	3000	4000	5024	DARTS
<b>Sensing Technology</b>	10K $\Omega$ NTC Thermistor or 100 $\Omega$ RTD	1000 $\Omega$ RTD	10K $\Omega$ NTC Thermistor	200 $\Omega$ or 500 $\Omega$ RTD
<b>Sense Element Accuracy</b>	$\pm 0.6^{\circ}\text{C}$ at 25 $^{\circ}\text{C}$ (Thermistor) $\pm 0.15^{\circ}\text{C}$ at 0 $^{\circ}\text{C}$ (RTD)	$\pm 0.1^{\circ}\text{C}$ at 0 $^{\circ}\text{C}$	$\pm 0.3^{\circ}\text{C}$ at 25 $^{\circ}\text{C}$	$\pm 0.3^{\circ}\text{C}$ at 0 $^{\circ}\text{C}$
<b>Operating Temperature</b>	-40 $^{\circ}\text{C}$ to 125 $^{\circ}\text{C}$	-40 $^{\circ}\text{C}$ to 85 $^{\circ}\text{C}$	-40 $^{\circ}\text{C}$ to 250 $^{\circ}\text{C}$	-40 $^{\circ}\text{C}$ to 850 $^{\circ}\text{C}$
<b>Environmental Sealing</b>	IP67	IP69K	IP67	IP69K
<b>Termination</b>	Wire Leads	Wire Leads	Integrated Connector	Wire Leads
<b>Mounting</b>	Probe, 3/8-18 PTF Thread, 1/2-14 PTF Thread	Probe	M14 x 1.5 Thread and FKM O-Ring	M14 x 1.5 Thread

## 3000 Series

The 3000 Series is a low-cost temperature sensor in a probe package. There are options with either NTC or RTD sensing technology.

### Application Opportunities

The 3000 Series is a universal, low-cost temperature sensor for diverse applications including surface, liquid, and air temperature sensing.

### Features

- Temperature sensing range of -40 $^{\circ}\text{C}$  to 125 $^{\circ}\text{C}$
- Stainless steel probe assemblies
- Flying lead connector

### Application Examples

- HVAC
- Material handling
- Commercial food & beverage equipment



## 4000 Series

The 4000 Series is a universal cable temperature sensor probe utilizing a highly accurate Class AA PT1000 RTD.

### Application Opportunities

The 4000 series delivers high accuracy, and fast response time in an IP69K housing with silicon jacketed wire, making it applicable for a wide range of temperature sensing applications. Offering increased ingress protection and added wire strain relief, this is a robust package built for tough applications like in HVAC equipment, heat pumps, water heaters, and industrial heating and cooling equipment.

### Features

- Highly accurate PT1000 RTD (Class AA)
- IP69K
- -40 - 85 $^{\circ}\text{C}$  operating temperature range
- 100nF Capacitor for electrical noise reduction

### Application Examples

- HVAC Equipment
- Heat pumps
- Water heaters
- Industrial heating and cooling equipment

## 5024 Series

The 5024 EGR Series is a mid-range temperature sensor built for harsh environments and pollutant regulating applications.

### Application Opportunities

Systems which require engine gas recirculation are the ideal application for the 5024 Series. Outside of EGR applications, the 5024 would be a great temperature sensor for harsh environment applications that need reliable temperature sensing up to 300°C.

### Features

- O-Ring sealed hex port
- Temperature sensing range of -55°C to 300°C
- USCAR connector
- Stainless steel construction

### Application Examples

- Automotive
- Generators
- Marine engines
- Motor blocks
- Heat pumps



## DARTS Series

The DARTS Series is a platinum RTD temperature sensor designed for high temperature sensing.

### Application Opportunities

The DARTS Series is an ideal sensor for extreme temperature sensing. Originally designed to sense temperature in exhaust gas systems, the DARTS Series fits HVOR and automotive applications well. It is a robust temperature sensor solution for industrial applications that have harsh temperature and environmental requirements.

### Features

- Temperature sensing range of -40°C to 850°C
- Flexibility in insertion depth
- Straight and bended configurations available
- Flying lead connector

### Application Examples

- Industrial exhaust gas
- HVAC
- HVOR
- Automotive





# Hybrid Temperature/Pressure Sensors



Hybrid Temperature/Pressure Sensors fulfill two roles. They sense the pressure of a media, while also sensing its temperature.

## 112CP Series

The 112CP Series is a pressure and temperature sensor built into one package.

### Application Opportunities

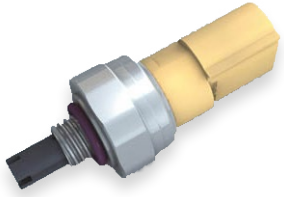
The 112CP allows for the ability to provide pressure and temperature measurements in a unique package. Unlike other integrated packages, the 112CP places the thermistor directly in the measurement medium, which provides faster response time and greater accuracy over encased or pipe-mounted thermistors.

### Features

- Pressure sensing range 0 to 650 PSI
- Temperature operating range - 40°C to 135°C
- 1 M cycle life
- Pressure and temperature sensing in one package

### Application Examples

- HVAC
- Alternative energy
- Engine controls & monitors
- Compressors & pumps



# Custom Temperature Solutions



Sensata is an established leader in designing industrial thermostats and temperature sensors for a wide variety of global industrial applications.

In addition to our standard temperature sensing products, Sensata can design and build a wide variety of custom temperature sensing solutions for HVAC and industrial applications, leveraging our decades of expertise dealing with all sorts of harsh environments.

These designs can provide equipment OEMs with the technology they need to build differentiated products which deliver more efficient, safer equipment.

Contact our team today to discuss your temperature sensing application and see how Sensata can make a difference in your designs.



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### About us

Sensata Technologies is one of the world's leading suppliers of sensing, electrical protection, control and power management solutions with operations and business centers in twelve countries. Sensata's products improve safety, efficiency and comfort for millions of people every day in automotive, appliance, aircraft, industrial, military, heavy vehicle, heating, air-conditioning and ventilation, data, - telecommunications, recreational vehicles and marine applications. For more information please visit Sensata's website at [www.sensata.com](http://www.sensata.com)

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