THERMOMETRICS
A COMMITMENT TO EXCELLENCE



Thermometrics temperature sensor solutions

Amphenol
Advanced Sensors

Global Excellence in Temperature Sensors

The Thermometrics temperature product line contributes more than 70 years of technology experience in the design and manufacture of high quality sensors to the Amphenol Advanced Sensors portfolio of sensor-based solutions.

Thermometrics pioneered lead frame technology, unifying the probe terminal and thermistor lead into a single constructed metal substrate. This innovation was the building block to today's fully automated volume production process, which ensures the highest degree of quality and performance.

Thermometrics continues to invest in leading edge temperature sensor and sensor packaging technology for the Thermometrics product line, particularly in developing custom solutions for industry and for specific customer application needs. From chips to value-added assemblies and for temperature ranges from -196ºC to 1150ºC, Thermometrics products play a vital role in measurement, control and protection of industrial- and consumer-based applications worldwide.



High-Performance, Competitively Priced Products for a Wide Range of Applications



Aerospace
- Anti-icing
- Environmental control systems
- Temperature scanning systems



Commercial
- High voltage and short circuit protection
- HVAC
- Energy management
- Liquid level detection
- Telecommunications equipment
- Computers
- Office machines



Transportation
- Engine management
- Dashboard display sensors
- Cabin comfort sensors—non-contact infrared, solar and light
- Circuit protection
- Safety systems
- Coolant/transmission fluid pressure/temperature
- Exhaust gas temperature
- Air quality
- Active/passive incar



Industrial
- Circuit protection
- Temperature measurement and control
- Liquid level detection
- High voltage protection
- Short circuit and other hazard protection
- Process control
- Boilers and water heaters



Healthcare
- Tympanic temperature
- Heart/lung machines
- Thermal dilution catheters (heart)
- Urinary catheters
- Oral and skin temperature
- Sleep apnea
- Esophageal catheters
- Glucose monitoring
- Body mapping
- Oxygen tents
- Clinical mattresses
- Humidifiers
- Anesthesia
- Fluid heaters
- Sterilizers
- Culture ovens
- Cryogenics



Consumer
- Electronics
- Level control
- Appliances
- Overload protection
- Boilers and water heaters
- Food and beverage



Calibration Services
- Primary temperature standard
- NIST calibration services

Critical Information for Real Time Decisions



For Flight

From cabin comfort to test cell systems monitoring, our sensors play a role in temperature measurement for commercial, civil and military aerospace applications—fixed-wing and rotary, and both engine and airframe.

Sensors monitor engine thrust, reliability and emissions in test cells, while also monitoring test cell throughput. In the cabin, our HVAC sensors provide climate control for a comfortable environment while a variety of other sensors monitor temperature in appliances like coffee makers, microwaves and refrigerators.

On the Road

Today's increasingly complex engine management systems rely upon sensors to monitor, measure and control vehicle performance including fuel economy, safety, and control of exhaust emissions.

Our comprehensive product range includes temperature sensors for use in coolant or transmission fluid; high temperature sensors to measure exhaust gas temperature; IR, gas and humidity sensors for cabin comfort; and solar and light sensors.

Our single-piece leadframe construction reduces the number of interconnections and ensures more reliable performance.

At the Office

Electronic circuitry and sensitive system components demand thermistor protection and control. Our custom-design capability and problem solving expertise mean that we can offer innovative solutions in circuit protection; and temperature measurement and control.

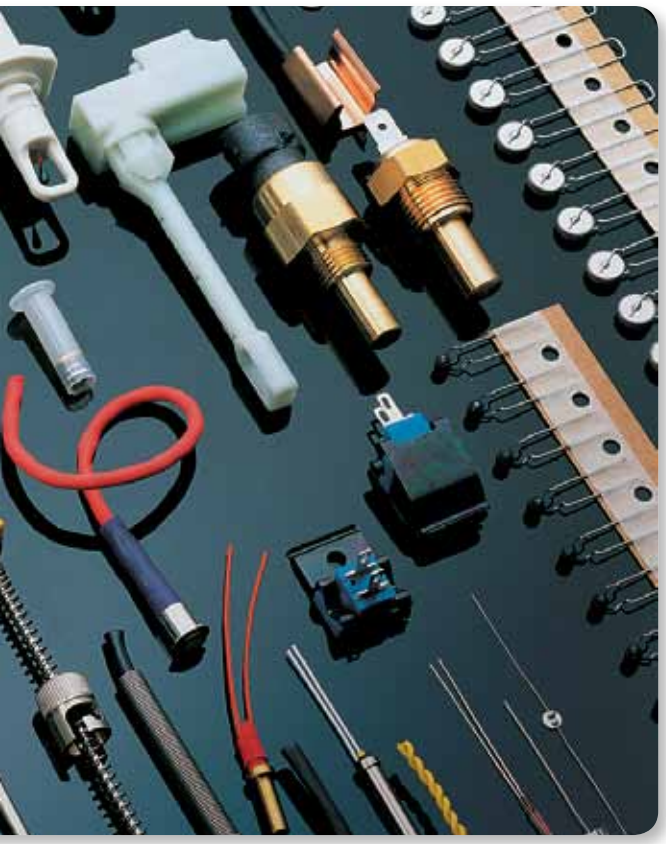
Our sensors excel at applications such as process control energy management, HVAC systems, power supplies, transformers, motor soft start and general time delay units. They are used to control critical process temperature.

Our simple-to-integrate sensors are designed to meet the rapidly changing demands of deregulated and global markets for high-technology sensors.









Around the Home

Today's consumers expect their everyday appliances to deliver reliable and efficient performance. Electronic sensors offer improved accuracy over electromechanical solutions and are designed to perform over a very wide range of temperatures and specifications. Our sensors play a vital part in measuring and controlling the temperature of water, steam, air and food. They are also used for flow measurement, level control, and overload protection and in combination with other sensors for multiple functions.

Temperature sensors can be found all around the home in boilers and water heaters, washing machines, dishwashers, stoves, microwave ovens, irons, toasters, refrigerators and deep freezers.

For Healthcare

We have developed state-of-the-art, high-performance sensors known for their accuracy, reliability and small size. Used extensively for heart catheters, esophageal stethoscopes, fever thermometers, skin sensors, blood analyzers, incubators, respiration monitors and hypodermic needle sensors, they help meet many temperature-related requirements.

Innovative work on small precision sensors continues for cancer research. Thermistors measure the temperature of cells and with precise monitoring, doctors can use heat to destroy diseased cells in tumors.

In the Plant

Our custom-design capability and problem solving expertise mean that we can provide innovative solutions in circuit protection, temperature measurement and control, liquid level detection and gas flow measurement. We have one of the most extensive product ranges of industrial temperature sensors in the world.

With new markets emerging worldwide, our global sensor manufacturing centers meet local content demands and allow us to exceed specific customer requirements. Along with the best manufacturing and test equipment, our strict manufacturing processes and quality procedures ensure the highest standards for your applications.







NTC or PTC?

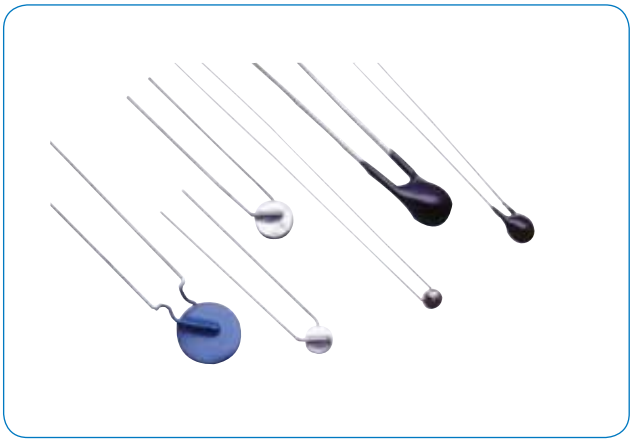
Thermistors are thermally sensitive resistors with either a negative resistance/temperature coefficient (NTC) or positive resistance/temperature (PTC) coefficient. Thermometrics offers a wide range of both types of thermistors from component level through complete assemblies. Both types of thermistors are solid state ceramic components, known for their exceptional quality and long life.

NTC Thermistors

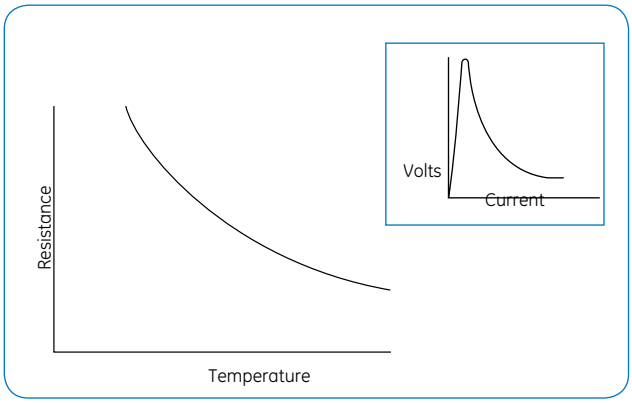
NTC thermistors are manufactured from the oxides of transition metals and can operate over the range of -196°C to 1000°C. Choose an NTC thermistor when a continuous change of resistance with temperature is required.

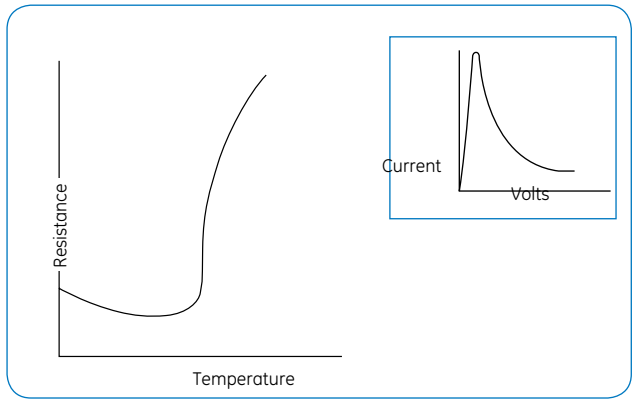
PTC Thermistors

PTC thermistors are temperature-dependent resistors manufactured from doped barium titanate and are available with transition temperatures from 60°C to 200°C. Choose a PTC thermistor for self reset-capable fuse and heater applications.









What are the key characteristics of NTCs?

- Defined sensitivity to temperature
- Sensitivity to electrical power input
- Sensitivity to changes in thermal conductivity

What are the main applications for NTC thermistors?

- Temperature measurement and control
- Temperature compensation
- Surge suppression
- Power measurement
- Fluid level-flow detection
- Customized solutions

What are the key characteristics of PTCs?

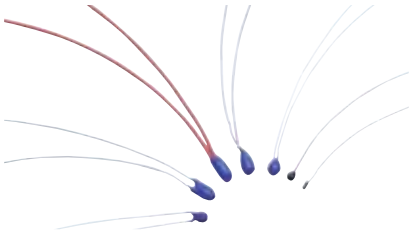
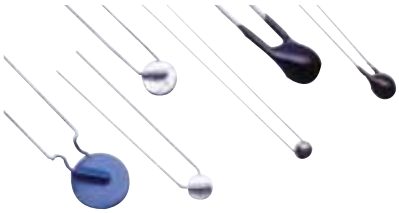
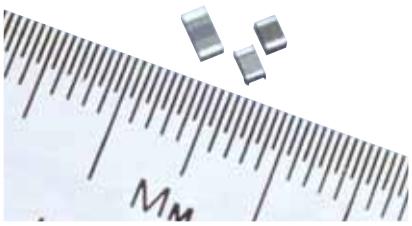
- Large change in resistance at a preset temperature
- Ability to self-regulate temperature
- Current-limiting capability
- Sensitivity to changes in thermal conductivityw
- Standard and custom design geometries

What are the main applications for PTC thermistors?

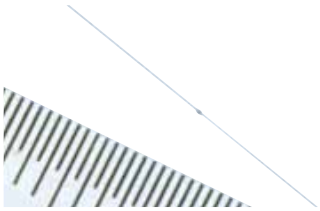
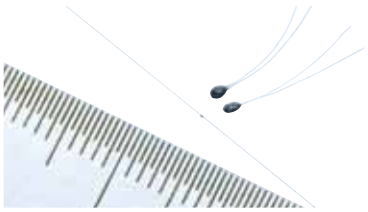
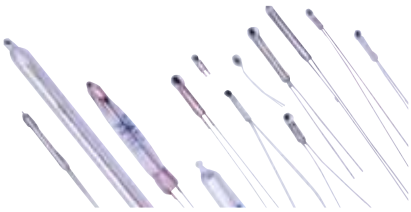
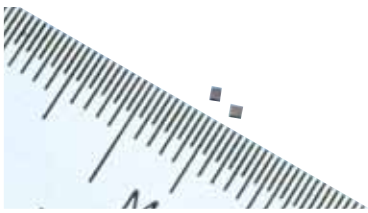
- Over-temperature protection
- Over-current protection
- Surge generation
- Current stabilization
- Fluid level-flow detection
- Self regulating heaters

Thermometrics is a world leader in beta curve selections and high voltage circuit applications.

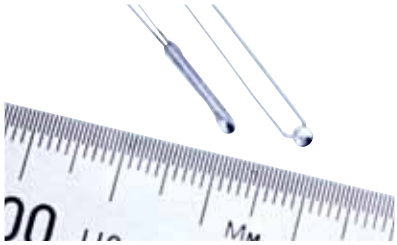
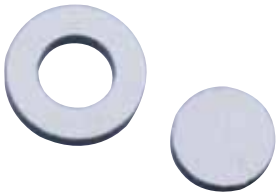
NTC Thermistors

Description	Codes	Temperature Measurement Control	Temperature Compensation	Surge Suppression	Power Measurement	Fluid Level/Flow Detection	Key Features	Typical Uses
Epoxy and silicone-coated chip thermistors 	TK95 DC95 EC95 MC65 MF65 SC30 SC50 ND NK MS C100 NDK NDP NDM NDL TC	✓	✓			✓	• Interchangebility options down to ±0.1°C accuracy 0 to 100°C range • Head size 0.8 to 2.4 mm • Automated assembly	Automotive engine management, air conditioning, medical, clinical thermometers, blood analysis
Glass encapsulated DO-35 package 	DK GE TH	✓	✓				• Tmax 300°C • Hermatic seal • High voltage insulation • Bandoliered for auto PCB insertion	Battery packs, toasters, hair dryers, automotive transmissions, smoke detectors, environmental control
Discs with radial leads 	RL10 RL14 RL20 RL30 RL35/40/45	✓	✓	✓			• Operation at high currents • Wide range of resistance vs temperature curves • Custom design	Automotive engine temperature, temperature compensation
Discs for inrush current limiting 	CL TP T5D			✓			• Continuous current ratings 1.1 to 16 A • Cold resistances 0.7 to 120 W • Some UL-approved versions	Soft start for switch mode power supplies, filament lamp circuits
Suface mount chips 	NHQ NHQM NHQMM TM	✓	✓				• 0402,0603, 0805, 1206 sizes • Ni barrier terminations • Resistance tolerances down to ±1%	Rechargeable battery packs, LCD temperature compensation

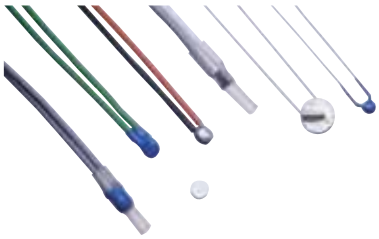
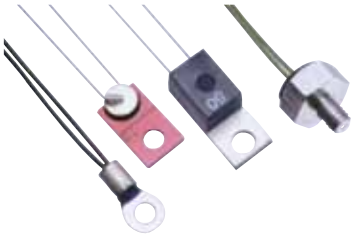
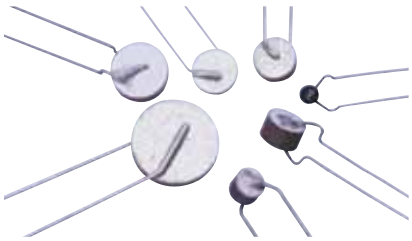
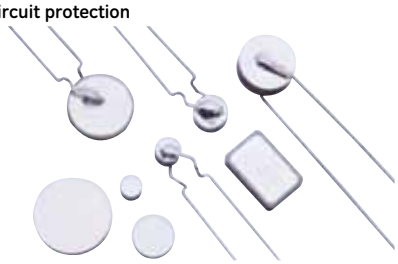
NTC Thermistors

Description	Codes	Temperature Measurement Control	Temperature Compensation	Surge Suppression	Power Measurement	Fluid Level/Flow Detection	Key Features	Typical Uses
Glass-encapsulated suface mount chips 	DKM MELF	✓	✓				• Tmax 250°C • Suitable for harsh environments and soldering profiles	SMD circuitry
Bare bead thermistor 	BB05/07/11	✓	✓		✓	✓	• Fast time constant, 0.11 secs • Extremely small size 0.13 to 0.25 mm • High stability	RF & microwave power measurements
Glass-coated beads 	B05/07/10/14 B35/43	✓	✓		✓	✓	• Hermetically sealed • Small size, 0.13 mm to 1.1 mm • Tmax 300°C	Gas chromatography, thermal conductivity analysis, gas flow measurement, liquid level sensing
Glass-encapsulated beads, rods, probes 	BR11/14/16/23 BR32/42/55 P20/25/30 P60/65/85/100 R60/65/85/100 SP60/65/85/100 FP07/10/14	✓	✓	✓		✓	• Robust • Hermetically sealed • Tmax 300°C • Interchangeable matched pairs available • Some models with intermittent operation to 600°C	Liquid level sensing, gas flow measurement, fluid temperature, pulse suppression
Glass encapsulated chips with leads 	GC32 GC14/16 GC11	✓	✓	✓		✓	• Long-term stability • Chip technology • Size • Response • Accuracy	Medical catheters military/aerospace, airflow, blood analysis
Leadless chip thermistors 	NDU HM	✓	✓				• Silver or gold electrodes suitable for wire bonding • Small size	Hybrid circuits, glucose monitors, digital thermometers

NTC Thermistors

Description	Codes	Temperature Measurement Control	Temperature Compensation	Surge Suppression	Power Measurement	Fluid Level/Flow Detection	Key Features	Typical Uses
Cryogenic thermistors 	RL1004 RL060628 CTP60 CTP65 CTP85 CTP100	✓	✓			✓	• Suitable for use at very low temperatures—down to -196°C	Cryogenic temperature measurement
Unleaded discs 	KU UD20 0706 1403 1703 1803 2006 3006	✓	✓				• Wide range of resistance vs temperature curves • Custom design	Automotive engine temperature sensing

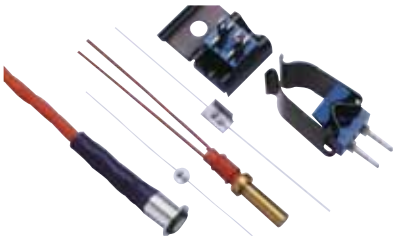
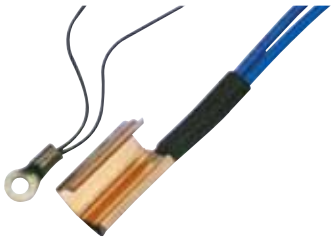
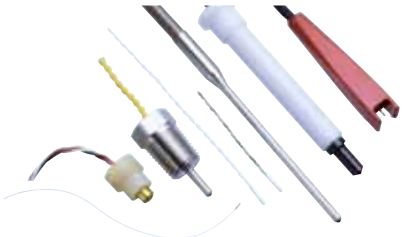
PTC Thermistors

Description	Codes	Over Temperature	Over Current	Surge Generation	Current Stabilization	Fluid Level/Flow Detection	Self Regulating Heaters	Key Features	Typical Uses
Motor protection 	YA YB YC YD YF YG PTD	✓						• Small insulated head • Long insulated flexible wire • Switch temperatures 30 to 180°C • DIN compliance • MOD approval	Protection of industrial motors and transformers, submarine motors
Surface sensors 	YK YR PTA PTE	✓						• Screw-in or bolt-on configurations • Flexible or solid wire • Switch temperature 30 to 140°C	Semi-conductor heat sinks, enclosure panels, power supplies
Wired devices - general purpose 	YM120 YP YS4019 YS4020 PTF PTO		✓	✓	✓			• Ratings up to 1000 Vrms • Switch currents up to 2A	Transformer protection, electronic lighting, instrument/DMM protection
Surface mount devices 	YSM YSM 4021 PTSM		✓	✓	✓			• High power SMD PTCs • Compatible with SMD assembly • Ratings up to 1000 Vrms • Switch currents up to 2A • Conformance to ITU-T K20/21	Telecom line protection, DMM instrument protection, electronic lighting control
Circuit protection 	YS	✓	✓		✓			• Custom designed for electronic circuit applications • Excellent thermal shock and power handling performance • Conformance to ITU-T K20/21	Telecom primary and secondary protection

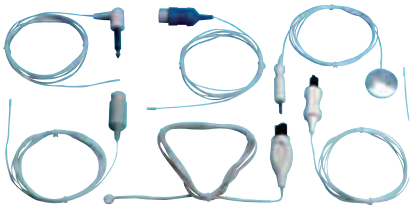
PTC Thermistors

Description	Codes	Over Temperature	Over Current	Surge Generation	Current Stabilization	Fluid Level/Flow Detection	Self Regulating Heaters	Key Features	Typical Uses
Self-regulating heaters 	YH PTH						✓	• Temperature regulation on range of supply voltage • Voltage ratings 12 to 240 V • Reference temperatures 40 to 180°C • Custom shapes	Medical equipment, in-line diesel fuel heaters, LCD heaters, stabilization of electronic components, wax motors, saw devices, air fresheners outside camera lenses
Liquid level sensing 	YL JYA					✓		• Water resistant housing • High sensitivity • Axial and radial formats	Tea urns, fuel storage systems, industrial plants, laboratory water stills, vending machines

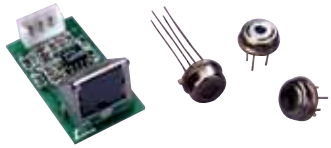
Probes and Assemblies

Description	Codes	Temperature Measurement Control	Temperature Compensation	Surge Suppression	Power Measurement	Fluid Level/Flow Detection	Key Features	Typical Uses
General purpose sensors 	GT JA JB JE JF JP M series T series	✓	✓			✓	• Tmax 225°C • Range of fittings	Domestic ovens, combination microwave ovens, industrial process control
Fast response surface sensors 	JC JW JD JS2945 Substrate	✓					• Response time down to 250 ms • Voltage insulation 1500 V • Environmental protection • Pipe ranges 13 mm to 22 mm	Gas boiler control, domestic water systems, air conditioners, showers, vending machines, radiator inlet-outlet, automotive temperature sensing, aerospace de-icing
Refrigeration, low temperature 	JL JM JI EVAP A1424 EVAP for HVAC A1447-A1450	✓					• Low temperature • Resistant to moisture ingress	Low temperature appliances, air conditioning evaporators, industrial and domestic refrigeration, automotive
Eyelet 	JR M2000	✓					• Ease of installation • M3, M4, M5 eyelet sizes	Semiconductor heatsinks, enclosure panels, surface temperature measurement, PC fan control, power supplies, air conditioning ducts
Medical products 	Custom assemblies	✓				✓	• Clinically approved materials	Thermometer probes, catheters, skin sensors, fluid flow

Probes and Assemblies

Description	Codes	Temperature Measurement Control	Temperature Compensation	Surge Suppression	Power Measurement	Fluid Level/Flow Detection	Key Features	Typical Uses
Medical products 	AB6 MA100 MA400	✓					• Clinically approved materials • Custom designs • Size • Accuracy	Medical catheters (thermodilution, esophageal, foley, ablation), vital sign monitors
Automotive subassemblies 	Lead frame	✓	✓				• Designed for automated assembly • Reduced overall sensor cost • Enhanced reliability	Automotive engine temperature
Automotive assemblies 	Brass assemblies, etc.	✓	✓				• Custom designed • In-house overmolding capability • Large variety of connector options	Automotive coolant temperature indication
Composite NTC/PTC 	KY	✓					• Constant resistance over normal operating temperature range (accomplished by using NTC/PTC paired thermistors)	Automotive coolant dashboard sensor

Additional Technologies and Accessories

Description	Codes	Temperature Measurement Control	Temperature Compensation	Surge Suppression	Power Measurement	Fluid Level/Flow Detection	Key Features	Typical Uses
IR thermopile sensors 	ZTP	✓	✓				• Non-contact temperature sensing • Fast response • Temperature compensated • Sensing elements/modules • Single and dual zone available	Microwave ovens, automotive air conditioning, ear thermometers Cooktop surface control
High temperature sensors 	JTC JTR PT100 PT200 PT1000	✓	✓			✓	• Operation up to 1150°C • Flexible sensor • Industry standard connection • Customized OEM solutions • RTD, thermocouples and NTC technologies	Industrial and process control, food and beverage processing, automotive

About us

Amphenol has united the technological innovation and experience of industry leaders in the design and manufacture of advanced sensing solutions into one world-class business.

Amphenol Advanced Sensors sensing products measure temperature, pressure, liquid level, moisture and humidity, gas concentration, and flow rate for applications ranging from environmental, medical, and pharmaceutical to automotive, and aerospace.

Amphenol Advanced Sensors offers industry leading domain expertise, rapid customization, world-class manufacturing capability and lasting customer relationships to deliver the greatest value in cost of ownership to their customers.

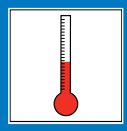
Temperature, humidity, pressure, CO_2, light



Pressure



Temperature



Gas



Humidity



Amphenol

Advanced Sensors

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