Amphenol
Connecting People & Technology

Sensors

Autotomotive

Medical

Industrial
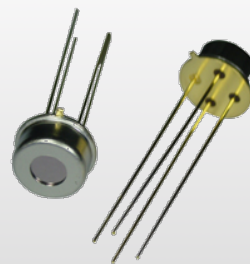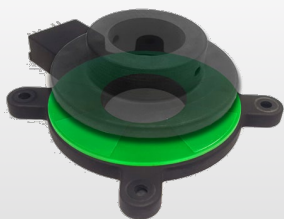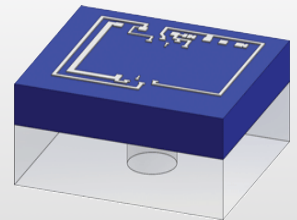
Military

Amphenol
Türkiye&MiddleEast
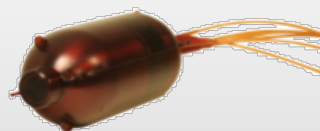
Automotive

Connecting your world through
Sensing Innovations

Amphenol Sensors is a leading innovator in sensing technologies and measurement solutions. Offering the most diverse sensor portfolio of standard and customized products for the world's most demanding regulatory and industry-driven applications, Amphenol creates value by providing critical information for real-time decisions.

Amphenol Sensors is your best source for automotive sensors, offering the technology that brings your systems together— to protect the vehicle, its occupants and the environment.

From engine management to safety systems, consider us your global partner for all of your automotive sensing needs. We deliver innovative solutions and high-performing products with the finest customer support—bringing the best results to you and your customers.

ENGINE MANAGEMENT

◆ **Temperature Sensors**
THERMOMETRICS
• High accuracy • High stability
• Noise immune NTC option
• Fast response time • Combination sensor options

◆ **Pressure Sensors**
NOVA SENSOR   i2s
• High accuracy • High performance
• Long-term stability • Custom options

◆ **Level, Concentration & Conductivity Sensors**
SSI
• Accuracy ±1%
• Detects proper fluid fill and contaminants

POWERTRAIN

◆ **Temperature Sensors**
THERMOMETRICS
• High accuracy • High stability
• Customized to application
• Utilizes metallurgical bond glass-coated NTC

◆ **Pressure Sensors**
NOVA SENSOR   i2s
• Stable and accurate • Durable
• Customizable design • Multiple output options

◆ **Position Sensors**
PIHER sensing systems
• Non-contact inductive and hall-effect technologies
• Accurate output at high speeds
• Reliable in harsh environments

◆ **Combined Pressure & Temperature Sensors**
i2s
• High accuracy • Oil resistant
• Wide temperature range: -40°C to 150°C
• Robust against pressure spikes

SAFETY SYSTEMS

◆ **Temperature Sensors**
THERMOMETRICS
• Fast response time • High accuracy
• High stability • Proven reliability
• Deep domain expertise • Duplicate manufacturing locations

◆ **Pressure Sensors**
NOVA SENSOR   i2s
• Fast response time • High accuracy
• Long-term stability • Custom options
• Diagnostic and protective features (ASIL)

◆ **CO2 Gas Sensors**
TELAIRE
• Self-calibration • Low power consumption
• Compact design • Lin Bus communication
• Custom packaging options

◆ **Position Sensors**
PIHER sensing systems
• Robust and reliable modular design
• Selectable working principle: Potentiometric, hall effect, reed switch

◆ **Level & Concentration Sensors**
SSI
• Accuracy ±2%
• Continuous monitoring for fluid contamination
• Programmable for irregular shape tanks

AFTER-TREATMENT

◆ **Temperature Sensors**
THERMOMETRICS
• High accuracy • High stability
• Integral/pigtail options
• Fast response time • Right angle and straight probe options

CABIN COMFORT

◆ **Temperature Sensors**
THERMOMETRICS
• High accuracy • High stability
• Noise immune NTC option
• Moisture resistant • Fast response time

◆ **Pressure Sensors**
NOVA SENSOR
• High performance • High accuracy
• Customizable design • Multiple output options

◆ **Gas Detection Sensors**
TELAIRE   SGX SENSORTECH
• Detectable gases: CO_2, VOC
• Compact design • Custom packaging options

◆ **Dewpoint Sensors**
SGX SENSORTECH
• PWM and Lin Bus • Custom package options
• Combined temperature measurement

◆ **Dust Particulate Sensors**
TELAIRE   SGX SENSORTECH
• PM2.5 • Laser detection
• Fast response • High accuracy

◆ **Position Sensors**
PIHER sensing systems
• Low profile • Excellent resolution
• Custom form-factor ready
• Linear and rotary position feedback

HVAC

◆ **Temperature Sensors**
THERMOMETRICS
• High accuracy • High stability
• Noise immune NTC option
• Moisture resistant • Fast response time

◆ **Position Sensors**
PIHER sensing systems
• Long life • Low hysteresis
• Excellent resolution and linearity
• Field-proven • Custom connectors and wires

◆ **Pressure Sensors**
i2s
• Leakproof • High accuracy
• Media compatibility

◆ **Gas Detection Sensors**
TELAIRE   SGX SENSORTECH
• Compact design
• Custom packaging options
• Detectable gases: CO_2, Hydrocarbons, NOX, Ammonia

◆ **Dust Particulate Sensors**
TELAIRE   SGX SENSORTECH
• PM2.5 • Laser detection
• Fast response • High accuracy

◆ **Combined Pressure & Temperature Sensors**
i2s
• Leakproof • High accuracy
• Wide pressure range: 10bar to 200bar
• Diagnostic and protective features (ASIL)

FUEL HANDLING SYSTEM

◆ **Temperature Sensors**
THERMOMETRICS
• High accuracy • High stability
• Integral/pigtail options
• Combination sensor options

◆ **Pressure Sensors**
NOVA SENSOR   i2s
• High accuracy • High performance
• Long-term stability
• Custom options

Amphenol
Turkey & Middle East

Amphenol is a leading innovator in advanced sensing technologies and innovative embedded measurement solutions customized for regulatory and industry driven applications, creating value by providing critical information for real time data decisions.
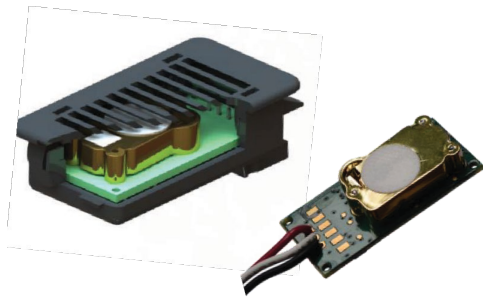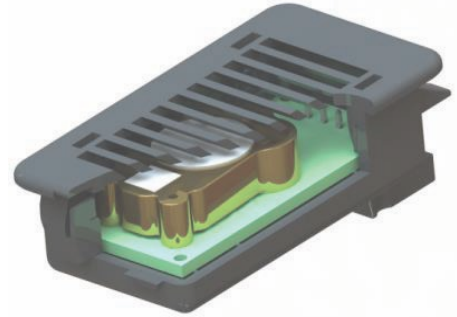
Air Quality CO2 Sensor

Small automotive ready package for simple OEM in-cabin integration. Zero maintenance with automated re calibration for the detection of CO_2 concentrations up to 10000 ppm. Applications include in-cabin air quality control for driver awareness; energy efficiency regulating fresh air ventilation and in-cabin refrigerant leak detection.
Our Telaire CO2 gas sensor product line boasts over 30 patents re- lated to the design and application of low-cost infrared gas sensing.

DPF Sensor

The Accusolve Diesel Particulate Filter (DPF) Soot Sensor utilizes radio frequency technology to enable accurate measurement of accumulated soot in the DPF, providing real-time soot loading data and real time closed loop control of the DPF regeneration process. Accurate measurement of the soot load allows for the optimization and reduction of regeneration cycles of the DPF. This in turn allows for improved fuel economy and improved filter life for active and passive regeneration systems.

Multifunction Air Cleaner Sensor

This sensor utilizes two pressure sensors for measuring both intake air pressure and barometric pressure as well as a humidity sensor and a temperature sensor to alert the operator as to when the air cleaner needs to be changed and ensure optimum engine performance for better fuel economy.

VOC - Volatile Organic Compound Sensor

This sensor module combines state-of-the-art MOS sensor technolo- gy with intelligent detection algorithms to monitor tVOCs and CO2 equivalent variations in confined spaces, such as vehicle cabins. The dual signal output can be used to control ventilation on-demand, saving energy and reducing cost-of-ownership.

Amphenol Turkey&MiddleEast

Position

Piher´s position sensors and controls are widely used in the land vehicle market.

The Automotive market is one of the key drivers of Piher's success. Demanding new and cost effective ideas year on year has shaped the company in to what it is today: proactive and customer driven. Since the seventies Piher has served the key USA and European Automotive OEM's and component suppliers and has developed an expertise in providing custom Control and Sensor solutions unrivalled in today's Automotive sector.

Thanks to sensors, cars are getting "smarter", more efficient, and safer, and here we are to help!

Typical applications for Piher Sensors and Controls are:

• Heating, ventilating + Air aconditioning
• Instrument Panel light dimmers / Headlamp levelling / Head- lamp switches + Interior light control
• Mirror memory
• Infotainment
• Windshield wiper
• Parking radar / Convertable hood control
• Seat position
• Power sunroof
• Transmission control
• Airbag switch
• Powertrain
• Trunk / Boot position
• Swirl actuator
• Seat temperature controls
• Turn counter
• Brake Pedal Position Sensor
• Accelerator Pedal Position Sensor
• Power steering
• Clutch Pedal Position Sensor
• Throttle / EGR Valve and Gear Position Sensor
• Motor-shaft Position Sensor
• Height & suspension Sensor
• Motor-shaft Position Sensor
• Motor/movement control (closed-loop feedback)
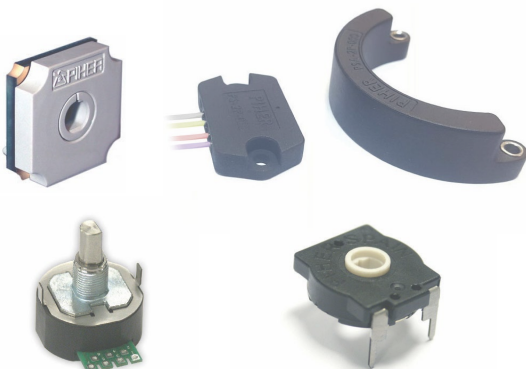
Defog / Rain

Auto Defogging Sensor mounted on the windshield behind the rear view mirror. The Auto Defog Sensor consists of a thermistor for wind shield temperature sensing and Humidity Sensor combined with ambient temperature compensation. These three elements allow the sensor to predict Dew Point or Fogging Condition in vehicles be- fore fogging starts. This information then feeds back to the automatic temperature control (ATC) unit of the vehicle's air conditioning system. The HVAC can then be activated to ensure safe driving con- ditions and increase energy efficiency by minimizing HVAC on time. Casco, a market leader in comfort and climate control sensors, offers a wide range of sensor products and technologies including solar, light, temperature, rain, humidity, CO_2 and dust. State-of-the art technology is integrated into complex systems to ensure optimum comfort and safety for vehicle occupants.

Sun Sensor

Amphenol's dual or single solar sensors use photo diode cells to measure the intensity of the light that enters into the cabin of the vehicle. It takes this information and feeds it back to the automatic temperature control (ATC) unit of the air conditioning system.

Infrared Sensors

The ZT P series of IR thermopile sensors are used for non-contact sur- face temperature measurement. The product consist of thermo-ele- ments, flat IR filter, a thermistor for temperature compensation in a hermeticallysealed TO package. Amphenol (AAS) offers both single zone and dual zone sensors for automotive applications. The sen- sors measure the temperature of the occupants of the vehicle and feeds that information back to the controller where it compares the temperature reading to the set temperature on the HVAC system and then uses the temperature delta to compensate up or down automatically.

Amphenol Turkey&MiddleEast

TULC Sensor

SSI Technologies, LLC introduces our TULC Sensor, an in-tank com- bination sensor for accurate, reliable measurement of temperature, level, and fluid quality/concentration, for SCR Diesel Exhaust Fluid (DEF) tanks to meet legislated mandates for cleaner diesel emissions.

Critical features:
- Detection of water dilution
- Detection of contaminants such as diesel, gasoline, and oil
- Immediate improper fill notification
- Accurate temperature monitoring for DEF tank heat management
- Programmable for regular/irregular shaped tank
- J1939 CAN-bus technology for ready system integration
- Proven and tested ultrasonic technology

Heater Modules

SSI is an industry leader in the design and manufacture of DEF/Urea sensing solutions and DEF/Urea delivery modules for automotive, on-highway truck and off-highway applications.

SSI provides a fully integrated TULC (with and without heater tube assemblies).

Stainless Steel pick up and return lines and engine coolant loops.

Includes graver filter, cap and DEF filter.

Multiple header designs available and engine coolant loops spe- cifically designed and certified to your tank's configuration.

Top mounted with standard and custom header configurations.

Point Level Switch

SSI Technologies, LLC's Point Level Switch/Sensor (PLS) is a durable and economic control module for reliable limit level control OEM applications. The Fluid-Trac™ PLS comes in a compact package that combines a smart point level ultrasonic level sensor, internal temperature compensation, embedded software, and three low side output circuit drivers. The Fluid-Trac™ PLS control module was designed for versatile external control capability. It can be interfaced to Relays, Switches, Pumps, Valves, Audible Alarms/Buzzers and Flashing Alarms.

Acu-Trac™ SMART 485

The Acu-Trac™ Smart 485 family ultrasonic level transducers are designed for continuous liquid level monitoring and liquid level con- trol applications. These non-contact, continuous liquid level transducers can monitor tanks or storage containers that have a depth of up to 1.9 meters (75.69 inches) for gasoline and 2.5 meters (98.4 inches) for other media.

Speed and Position Sensors

SSI Technologies, LLC is a leader in the design, development, and manufacturing of passive (Variable Reluctance) and active (Hall Effect or Magneto-Resistive) magnetic sensors.

SSI Technologies, LLC has over 25 years of experience providing magnetic sensor solutions that meet the specific needs of our OEM customers. By drawing from an extensive design and manufacturing history with major transportation platforms, our engineering staff will provide a custom magnetic sensing solution for your specific application.

Fluid-Trac™

The Fluid-Trac™ cost-competitive liquid level sensor family is ideal for tanks or storage containers that have a depth/height of 32 inches (24 inches for gasoline). These liquid level sensors are chemically compatible with gasoline, diesel fuels, ethanol, oils, fresh water, sewage water, UREA (AdBlue) and engine coolants. A minimum order quantity of 10 units is available through our distribution partner. Orders of 100 units or more are available from the factory direct; test samples are available for larger opportunities.

Amphenol Turkey&MiddleEast

Electrification Solutions for EV/HEV

Battery Pack
Consists of a cluster of individual batteries that serve as the primary fuel source of the vehicle, replacing hydrocarbon fuels used in conventional ICE automobiles.
- Temperature Sensors

Thermal Runaway Detection
Occurs when battery cells exceed allowable operating temperature causing an explosion/fire, which then propagates, or spreads, to other cells within the battery pack.
- Temperature Sensors
- Pressure Sensors
- Gas Detection Sensors

Cell Connection System (CCS)
Used as top cover of the battery cell to provide connectivity with the Battery Management System (BMS).
- Temperature Sensors

Power Inverter / E-Motor
Converts higher voltage DC electricity to lower voltage AC electricity that is required to power the electric motor.
- Temperature Sensors
- Inductive Position Sensors

High Voltage Charger Connector
Connects the high voltage source to charge the battery within the vehicle.
- Temperature Sensors

Battery Coolant
Circulates around the battery cell to assist in maintaining optimum battery temperature.
- Temperature Sensors
- Pressure Sensors
- Combined Pressure & Temperature Sensors
- Ultrasonic Level Sensors

Motor Coil
Wire coils that generate a magnetic field and conduct electric current. The interaction between the two generates rotation of the motor shaft and the actual conversion of electrical to mechanical energy.
- Temperature Sensors

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THERMAL RUNAWAY DETECTION

Temperature Sensors

Measure and monitor battery temperature to detect Thermal Runaway conditions.
- Capable of single or multiple cell detection

THERMOMETRICS

Pressure Sensors

Detect pressure change inside the battery cell that indicates Thermal Runaway conditions.
- Surface mountable
- Simple 3-command I^2C interface
- Very low current consumption: <35µA

NOVA SENSOR

Gas Detection Sensors

Detect the out-gassing of Carbon Dioxide (CO_2) to indicate pre-combustion conditions.
- Single and dual channel configurations
- Self-calibration with patented ABC Logic™ Software

TELAiRE

Gas Detection Sensors

Detect the presence of combustible gases that indicate Thermal Runaway conditions.
- Sensitive to multiple gases: H_2 / CH_4 / CO_2
- Fast response time: <10 seconds
- IP6K7 rating

SGX SENSORTECH

BATTERY PACK

Temperature Sensors

Measure and monitor surface temperature of the many batteries within the battery cell, which is critical to preserving the chemistry of the battery.
- Single point temperature sensors
- Rigid and flexible types
- Custom sensor packaging

THERMOMETRICS

CELL CONNECTION SYSTEM (CCS)

Temperature Sensors

Provide temperature and voltage sensing to monitor the state of charge of the battery cells.
- High current circuit for battery cell connectivity
- Available styles: Wire Harness and Flexible Printed Circuit (FPC)

THERMOMETRICS

HIGH VOLTAGE CHARGER CONNECTOR

Temperature Sensors

Detect over-temperature conditions during charging.
- Installed within the connector

THERMOMETRICS

BATTERY COOLANT

Temperature Sensors

Measure and monitor fluid temperature of inlet/outlet battery coolant to provide indication of battery cell temperature.
- No leak path - Sensor cavity and tube are one piece
- USCAR sealed connection system
- Many part geometries: Inline tube, flying lead and integral sensor

THERMOMETRICS

Pressure Sensors

Measure the pressure in the cooling system to control pump capacity.
- Internal metal sealing for high media compatibility and no leakage
- Customized calibration for high accuracy

NOVA SENSOR

i2s an Amphenol company

Combined Pressure & Temperature Sensors

Measure pressure in the cooling system, while, at the same time, measure temperature of the coolant for optimum thermal management.
- Available versions: R1234yf (up to 35bar) and R744 (up to 200bar)
- Tested LIN 2.1 conformity
- Automatic address assignment within LIN network (Slave Node Position Detection)

i2s an Amphenol company

Ultrasonic Level & Temperature Sensors

Continuously monitor fluid level for early detection of coolant leakage.
- Level accuracy: ±2mm
- Temperature accuracy: ±2.5°C
- Output protocol offerings: Analog, PWM, SENT, CAN, LIN
- Input voltage options: 5V / 12V / 48V

SST

MOTOR COIL

Temperature Sensors

Measure and monitor temperature of the motor coil to provide feedback on the operating conditions of the electric motor.
- Field-proven design
- Variety of lead lengths, terminal and connector options

THERMOMETRICS

POWER INVERTER / E-MOTOR

Temperature Sensors

Measure and monitor operating temperature of the power inverter to provide feedback on unsafe conditions.
- Fast response time
- Pigtail connector

THERMOMETRICS

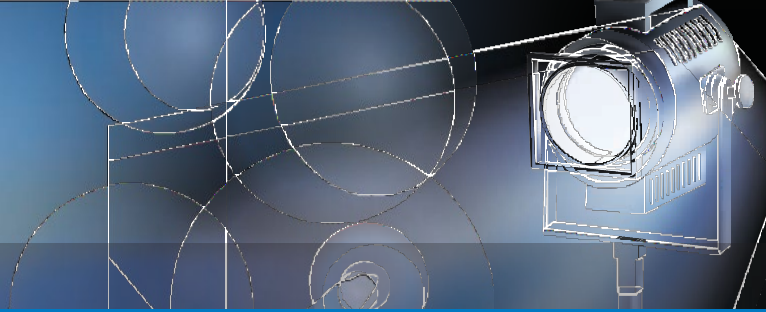**Inductive Position Sensors**

Provide data on the angular position of the rotating motor shaft to optimize control of the motor inverter.
- Inductive eddy-current with weight and size reduction
- Stable output over extended temperature range (-40ºC/+160ºC) and radial/axial misalignment
- Robust against magnetic flux and external stray fields

PIHER sensing systems
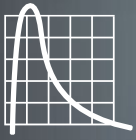
Battery Temperature Sensing

Overview

Amphenol provides an array of sensing products for automotive EV/HEV battery temperature sensing (BTS) and industrial portable power applications. Reliable and accurate temperature sensing measurement is critical to long-term battery performance. Amphenol produces temperature solutions, including NTC thermistors, that are highly accurate with a high degree of stability that set the performance standard.
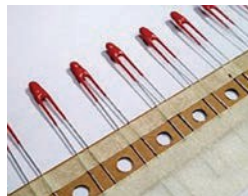
Amphenol Product Applications

Cell Connection System (CCS) Temperature and voltage sensing of the battery cells and high voltage connectivity via busbars. FPC and wired solutions.		**Motor Coil** Interlaced into the stator coil. Provides temperature feed-back on the operating condition of an electric motor.	
Noise Immune NTC Thermistor with capacitive element to prevent self heating due to EMI effects.		**Battery Coolant** Direct immersion into coolant flow. Splash-proof and sealed connector options.	
In-Line Battery Coolant Flow-through temperature sensor for in-line installation. Multiple tube sizes.		**Battery Coolant** Push-in clip-in-place design.	
Inverter Monitors temperature of the electrical inverter on EV/HEV applications.		**Thin-Film Flexible** Surface temperature measurement. Perfect for tight locations. Will conform to contour.	
Battery Pack Temperature Sensor Ring terminal temperature sensor that measures surface temperature.		**Pipe Clip Surface Temperature Sensor** Battery Pack Coolant Line Temperature	

TEMPERATURE SENSORS

One of the most comprehensive ranges of temperature sensor and probe products in the world today are offered in the category of measurement and sensing products driven by temperature technologies. These include high temperature thermistors, gauge drivers, sensors, and elements. Amphenol Advanced Sensors provides solutions to temperature sensing challenges faced by the various industry segments - such as medical, automotive, and telecommunications across the globe.

Exhaust Gas Recirculation (EGR)

This sensor is made in both a 150° C and a 300° C temperature version. It is used to monitor the temperature at several locations in diesel engines as part of the engine control strategy. The high temperature sensor is used in the exhaust gas and the low temperature sensor is used in the intake air stream. Both are designed for fast response, are optimized for thermal dissipation and are suitable for high vibration and corrosive environments.

Fin Sensor

This sensor measures the evaporator core temperature so that it doesn't freeze over, preventing a costly repair. The evaporator cools the refrigerant that is pumped around the vehicles HVAC system. The ultra-fast response time aides in the HVAC system efficiency by enabling the evaporator core to operate closer to 0° C without the risk of a freeze over condition. Small size & flexible packaging facilitates installation and service. Probe construction protects the internal components from moisture.

Water & Oil Temperature Sensor

Amphenol's temperature sensors for either oil or water applications provide a crucial link in preventing damage to engines in automotive applications. The sensors offer both integral and flying lead designs with numerous resistance values to choose from with temperature ranges of -40° C to 185° C and higher.

High Temperature Sensor

This sensor operates over a temperature range from -40 °C to 850°C. It monitors the temperature before and after SCR system in diesel engines as part of the engine control strategy. It is designed for fast response, optimized for thermal dissipation and suitable for high vibration and corrosive environments.

Active in vehicle Temperature Sensor

An integrated, low-noise fan draws a greater volume of cabin air across the temperature sensor providing a faster response as compared to traditional passive sensors. This can result in a more accurate climate control, leading to better cabin comfort. This sensor can also help improve the efficiency of the temperature control system by reducing the on / off cycles of the heating and cooling system. It is quiet in operation, a coreless type motor and low in current consumption. Amphenol can also supply with a humidity sensor in the package along with temperature sensor.

Outside Air Temperature Sensor

This sensor measures the temperature outside the passenger com- partment and is usually mounted inside or near the front bumper or in the side mirror. The sensor relays the outside air temperature to the controller of the automatic HVAC systems. The sensor has high sensitivity, a compact design, an integral sealed connector and ensures single hand installation with no tooling.

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Discharge Air Temperature

The Discharge Air Temperature is used to measure the temperature of the air that is emitted from the air ducts. Fast response time and "Fir-Tree" or "Twist-Lock" designs for fast installation & easy service. Alternate resistance versus temperature thermistors are available.

Intake Air Temperature Sensor

The intake air temperature sensor measures the temperature of the air into the engine and reports to the engine control unit (ECU). The ECU uses this information to optimize fuel delivery and the air-to-fuel ratio to produce efficient combustion. The sensor has fast response times as well as a snap-fit housing that eliminates wiring insulation damage.

Transmission Fluid Temperature

The transmission fluid temperature sensor measures the tempera- ture of the transmission fluid. The sensor provides input to the control module to modify shift patterns for smoother shifting in automatic transmissions and also provides over-temperature protection by locking the torque convertor. The twist and lock design ensures easy installation.

Battery Temperature Sensor

Amphenol's hybrid battery temperate sensors can withstand the harsh environment required for hybrid battery systems. These sensors give the customer high accuracy at a wide range of operating temperatures.

Fuel Temperature Sensor

The fuel temperature sensor is designed to measure the tempera- ture of the fuel and relay this information to the engine control unit, so that it can optimize the air to fuel mix ratio, depending on what the fuel temperature is with respect to the intake air temperature.

VST Temperature Sensor

For alternative drive and storage systems

The VST temperature sensor is used in applications that require a high degree of flexibility and special adjustments. The specially developed measurement element not only guarantees fast response times, but also highly accurate results. The sensors are available in a resistive configuration with an NTC element or PT100/PT1000 element. As a transmitter version with a linearised, analogue output signal, the VST also offers electrical protective and diagnostic functions, which are typical for the automotive industry.

Amphenol
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PRESSURE SENSORS

As a leader in Microelectromechanical (MEMS) elements, sensors and advanced packaging solutions, our MEMS pressure sensor line includes highly cost effective families of surface mount, hybrid, and media isolated sensors that serve a medical, industrial and transportation applications. Available in all levels of calibration, from uncalibrated to fully calibrated, amplified analog and digital output versions. Check out our MEMS line to find a product either off the shelf or contact our applications team to customize a solution to meet your needs.

VSP Pressure Sensor

For oil pressure applications

One of our smallest pressure sensors, the VSP has a robust and submersible design which makes it a reliable partner for any oil pressure application in motor and commercial vehicles. The VSP is able to measure absolute or relative pressure in a nominal pressure range of up to 600 bar. The specially developed evaluation electron- ics make it possible to take very precise and stable measurements at temperatures of up to 150 °C, even under tough conditions. In ad- dition, the VSP also complies with the high ESD and EMC standards applicable in the automobile industry. Our assembly machines have a wide range of flexible settings enabling a customised production of the sensor and an optimal adaption to the respective application.

Transmission Pressure Sensor

Amphenol leverages its core silicon micromachining technology and utilizes advanced packaging technologies to offer pressure sen- sors that are industry leading in size and weight in automotive-prov- en applications. Sensors based on this technology are qualified for use in transmission control systems and fuel delivery systems, among others. We offer an unusually small and robust sensor for use in automatic transmission control. These sensors are among the lightest in the industry, weighing only 3.55 grams, and are low-pro- file for integration into today's limited design space.
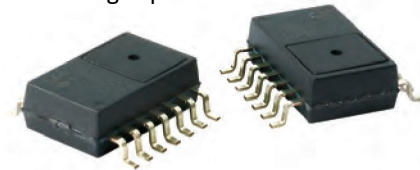
Tire Pressure Sensor

The NPX1 sensor represents the next generation of Remote Tire Pressure Monitoring (RT PM). NPX1 integrates a silicon pressure sensor, an 8-bit RISC processor, and a LF -input stage to meet mar- ket demands for flexible, customer specific behavior/solutions and overall system cost reduction for RT PF applications. The program- mable version of this sensor is available for development purposes, allowing the customer to download the application code into an electrically programmable EPROM version.

PTM Pressure Sensor Module

For system integration

The pressure transmitter module (PTM) responds to the general trend towards miniaturisation and cost efficiency. Its ideal con- struction size ensures that the sensors of the PTM series are easy to use and versatile in applications where installation space is scarce. The modular design with a wide range of possibilities for electrical and mechanical interfaces also permits easy integration in existing customer systems. The use of highly accurate evaluation electronics directly on the ceramic pressure cell permits the output of a temper- ature-compensated analogue signal or digital signal. Stable, exact measurements are generated over a broad temperature range in the process, also under adverse conditions.

CCT Pressure Sensor

For vehicle climate control systems

The Climate Control Pressure Transmitter (CCT) was specially designed for measuring the pressure of vehicle coolants. Its high-quality stainless steel measurement element makes the CCT not only compatible with a broad range of media, but also ideal for high-pressure applications (R744). Its innovative evaluation electronics provides reliable, precise measurement data over a broad temperature range. Specially adapted to meet the needs of the automobile industry, the CCT also fulfills cur- rent EMC and ESD regulations.

IPS Pressure Sensor

For heavy-duty applications

The IPS pressure sensor is used in applications requiring a sensor with a high degree of robustness and media compatibility. The IPS provides precise and stable measurements over its entire life, even when used in tough conditions, when handled roughly and when exposed to high levels of vibration. The pressure sensor elements and pressure connectors are made of stainless steel and designed for absolute and relative pressures of up to 600 bar. The IPS is ex- cellently suited for use in oil, petrol, diesel, H2, CNG and LPG appli- cations. The sensor's flexible design with a wide range of electrical connectors and output signals also means it can be adapted to fit any system perfectly.

LMS Mass Air Flow Sensor

For emission control and motor management

The LMS mass air flow sensor was specially developed for measuring air volume in connection with emission and motor control in vehicles. Based on the measurement principle of a hot film ane- mometer, the mass air flow sensor consists of temperature sensors and heaters each arranged in pairs. This arrangement permits bidirectional measurement, which makes backflow and pulsations detectable. The modern semiconductor hot film technology ensures fast response times as well as reliable, stable measurements over the entire life cycle. Application specific, electronic calibration of the mass air flow sensor also guarantees high precision and a character- istic curve that is fully attuned to the respective system. Its compact design featuring a flange mount not only permits simple integration in the flow channel (pipe), but also guarantees flexible installation in a wide range of systems. The LMS can also be optionally equipped with a temperature sensor for additional measurement of the media temperature.

MDPT Differential Pressure Sensor

For exhaust aftertreatment

The mathematical differential pressure sensor (MDPT) was specially developed for measuring differential pressure in diesel particulate filters (DPF). The MDPT consists of two robust independent pressure sensors, which measure pressure upstream and downstream of the filter. This setup makes it possible to output the system pressure in addition. The design with properly configured pressure connections guarantees installation that is resistant to freezing. Developed for the utility vehicle industry, the MDPT of course also meets all indus- try requirements with respect to EMC and ESD.

Oil Pressure Switch / Sensor

Amphenol's oil pressure switches are used to monitor oil circuits in internal combustion engines and machines. Media pressures ranging from 0.05 bar up to 4.6 bar can be monitored in the temperature range from -40° C to +160° C. The switches are available as single-pole NO ("normally open") and NC ("normally closed") variants. The electrical connection is customized according to customers' needs. The mechanical connection can be equipped with or without seal/sealant and with metric or imperial threads. For particularly heave loads, there are system pressure-free and hydraulically damped versions.

Fuel Pressure Sensor

Amphenol has developed an integrated quick-connect and pressure sensor combination. This sensor greatly simplifies the incorporation of the pressure sensing function into fuel delivery lines, reduces weight, and eliminates several additional parts and operations that were traditionally required.

Amphenol
Turkey&MiddleEast

COMBO SENSORS

Designed for heavy duty transportation applications, the combination absolute pressure and temperature sensor is suitable for gas and fluid applications. The sensor provides separate analog outputs for pressure and temperature. Using proven design blocks from current production sensors a rugged sensor capable of withstanding harsh environments is available.

CCT Pressure & Temperature Sensor

For climate control systems with a heat pump

The CCT pressure temperature sensor is installed in climate control systems, particularly in vehicles with alternative drives, and heat pumps. The specially developed thermoreceptors permit a fast response time in flowing media and guarantee high temperature accuracy. The design excels due to its compact size and minimal weight, which makes it easy to integrate and ideal for lightweight systems. The specific evaluation electronics make the pressure and temperature signal available via a digital single wire interface (LIN). High quantities can be realised at an affordable price thanks to fully automated production.

Combo Pressure & Temperature Sensor

The P61 Pressure and Temperature MediaSensor™ family consists of bulk micro-machined, absolute and sealed pressure transducers and transmitters for both harsh and benign media. These pressure transducers boast a superior zero/span error of +/- 0.5% full scale at room temperature and +/- 1.00% full scale and a temperature sensor accuracy of ±3 °C over -40 °C to 105 °C. These compact, robust sensors measure pressures from 100 PSI to 3,000 PSI and are well suited for a variety of automotive, industrial, and commercial applications.

Combination Sensor

Thermometrics Combination Sensor is a smart combination intake manifold sensor capable of providing up to five measurements, including manifold humidity, manifold temperature, manifold pressure, atmospheric pressure and atmospheric temperature. This sensor is designed for transportation applications that demand highly accurate and reliable measurements, with typical application within the intake air duct. Unique technology designed into the sensor provides unsurpassed accuracy in the marketplace.

Humidity & Temperature Sensor

The Telaire ChipCap 2 offers the most advanced and cost effective humidity and temperature sensing solution for virtually any type of application. A capacitive polymer sensor chip and a CMOS integrated circuit with EEPROM are integrated into one embedded system in a reflow solderable SMD package.
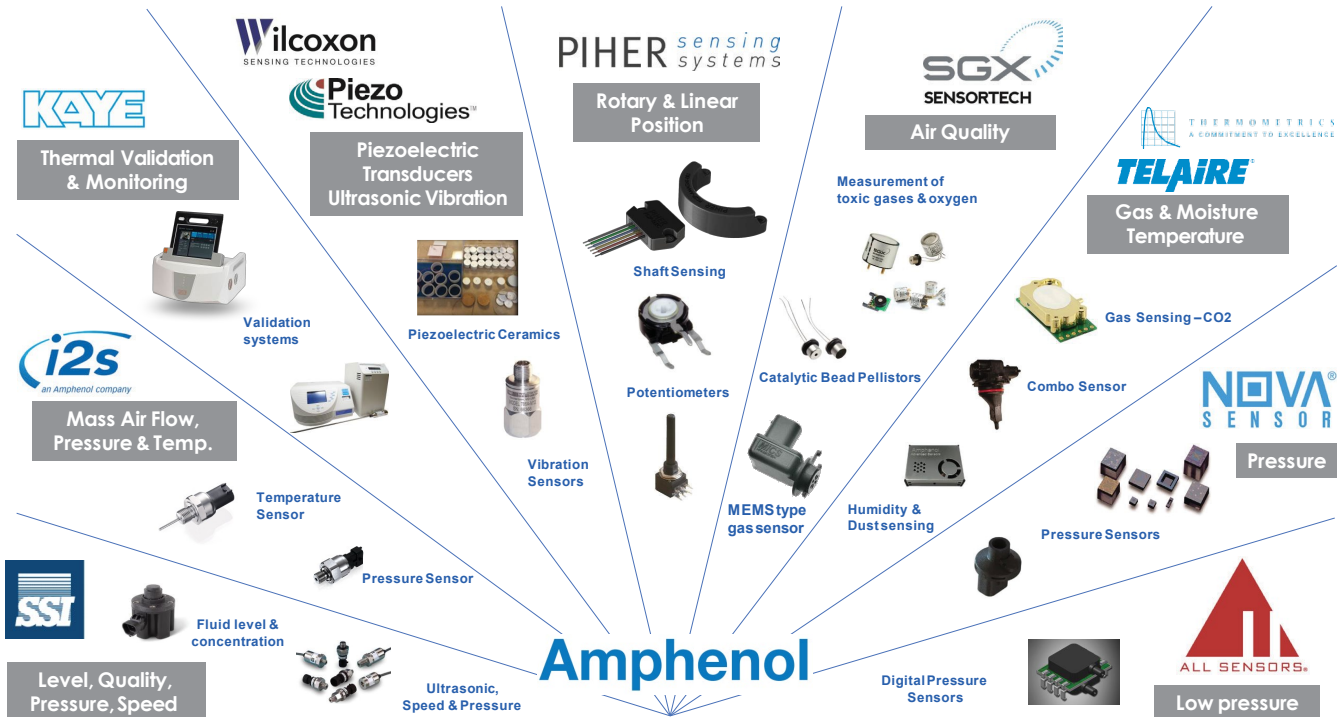
Individually calibrated and tested, ChipCap 2 performs at ±2% from 20% to 80% RH (±3% over entire humidity range), and is simple and ready to use without further calibration or temperature compensation.

ChipCap 2 provides linear output signals in various interfaces to customer requirements:

I²C interface

PDM convertible to analog signal

Alarm function for preset control at min/max humidity

Wilcoxon
SENSING TECHNOLOGIES

KAYE

Piezo Technologies™

PIHER sensing systems

SGX SENSORTECH

THERMOMETRICS
A COMMITMENT TO EXCELLENCE

TELAiRE

Thermal Validation & Monitoring

Piezoelectric Transducers Ultrasonic Vibration

Rotary & Linear Position

Air Quality

Gas & Moisture Temperature

Measurement of toxic gases & oxygen

Validation systems

Shaft Sensing

Gas Sensing – CO2

i2s
an Amphenol company

Piezoelectric Ceramics

Catalytic Bead Pellistors

Combo Sensor

NOVA SENSOR

Mass Air Flow, Pressure & Temp.

Potentiometers

Pressure

Temperature Sensor

Vibration Sensors

MEMS type gas sensor

Humidity & Dust sensing

Pressure Sensors

SSI

Pressure Sensor

Amphenol

ALL SENSORS®

Fluid level & concentration

Level, Quality, Pressure, Speed

Ultrasonic, Speed & Pressure

Digital Pressure Sensors

Low pressure

PRINTED **PCB Carbon Resistors**

PIHER
an Amphenol® company

Repeatable high volume to accurate tolerances.

Printed Resistors PCB are thick-film resistive ink elements designed around customers' unique assemblies. PIHER's thick film inks can be printed on a wide range of substrates from high temperature ceramics to common PCB materials.

Our market-leading thick-film technology can be used to deposit any combination of fixed resistors, switches, potentiometer tracks and conductors onto virtually any size, shape or PCB form. This versatility offers an enormous range of design possibilities at competitive prices, even in low batch quantities.
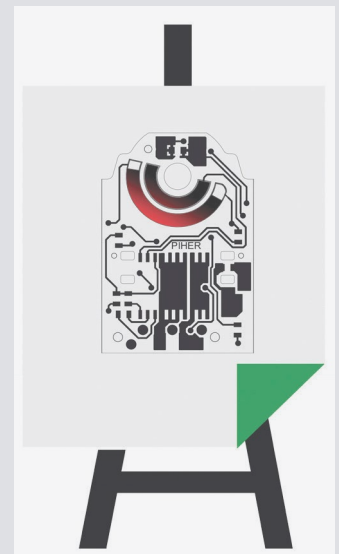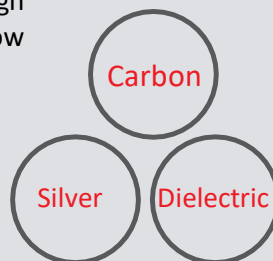
Carbon printing down to a *fine* art

High volume, **low tolerance** printed PCB resistors

Carbon printing alt the **cutting edge** of **laser-trimming** technology

Carbon

Silver   Dielectric

HVOR Sensing Solutions

● Temperature ● Pressure ● Gas ● Humidity ● Dust/Particulates ● Position ● Level ● Combination

Fuel Handling System
- ●●● Fuel
- ● EVAP

Cabin Comfort
- ● Discharge Air
- ● Steering Wheel
- ● Seats
- ● Dewpoint
- ● Cabin Air Filter
- ● Particulate Detection
- ● Joystick Control Handles

Safety Systems
- ● Steering Wheel
- ● Seats
- ● Defog
- ● Battery
- ● Leak Detection
- ● Brakes
- ● Seatbelts
- ● Washer Fluid

HVAC
- ● Outside Air
- ●●● Refrigerant/Coolant
- ● Evaporator
- ● Air Quality
- ● Particulate Detection
- ● HVAC Actuator

Powertrain
- ●●● Transmission - Fluid, Oil
- ● Transmission - Gearbox, Park Lock, Speed
- ● Power Steering
- ● EURO-6 Urea
- ● Steering Angle
- ● Pedals

Engine Management
- ●● Engine Air
- ●● Engine Oil
- ●● Coolant
- ● Intake Air
- ● Exhaust Gas Recirculation (EGR)
- ● Cylinder Head
- ● MAP/TMAP
- ● Hydraulic Fluid

After-Treatment
- ● Diesel Particulate Filter (DPF)
- ● Diesel Exhaust Fluid (DEF)

Amphenol
Turkey&MiddleEast

www.amphenol.com.tr
sales@amphenol.com.tr

Thermometrics Sensor Assemblies | Water Detection Sensor

According to sharp growth of Electrical Vehicles (EV), many OEMs are using cooling systems for their battery pack systems. However, if an instance of water leakage were to occur in Li-ion battery packs, it would create dangerous conditions.

Thermometrics Water Detection Sensor detects moisture leakage via a change in resistance value of the sensor and feeds a signal to the Battery Management System (BMS) to warn the driver.

Applications:

- Battery pack water detection
- Overflow of water/fluid
- Leak detection from a burst pipe
- Level detection on tank fill applications
- Condensate overflow sensor for HVAC applications
- Sump pumps

Telaire DSF Series | PM2.5 Automotive In-Cabin Particulate Dust Sensor

Telaire DSF Series of PM2.5 Automotive In-Cabin Particulate Dust Sensors are designed specifically to meet the needs of OEM manufacturers for a low-cost dust sensor with Lin2.2 Output for in-bulkhead mounting.

- An affordable dust sensing solution for OEMs
- A reliable sensor design based on extensive research, field testing, engineering and manufacturing expertise
- Lin bus 2.2
- Embedded filtration for longer life
- Easy to mount with external tabs
- AEC-Q200 qualified components
- Extended operating temperature range
- Laser Light Scattering Technology
- Sensors shipped factory-calibrated
- Custom housing and connector subject to commercial consideration

Automotive Air Quality

SGX introduced the worlds first MEMS type gas sensor for integration into vehicle vent control.

External AQ - Detection of car exhaust gases

Gasoline & Diesel & Odors

Sensor module features:

- Fast response time, < 1s
- Detection of carbon monoxide
- Detection of NO2
- Detection of NH3
- Analog signal output, PWM, LIN

Contactless Position Sensors

Piher is a specialist designer and manufacturer of true non-contact absolute on Tier One and OEM platforms including contactless magnetic technology complete sub-assemblies.

With truly non-contacting sensing (no gears inside subject to wear), high repeatability, low power consumption and wireless option, these sensors provide an all-in-one integrated and maintenance free solution for Hostile environments. Thanks to its unique and patented design, Piher can provide fully magnetic Hall Effect contactless position feedback in through-shaft configurations.
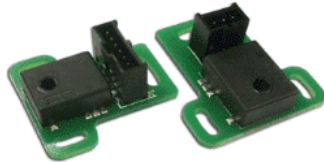
MTS-360	MTS-360 PCB	PST-360
Hollow / through shaft family		
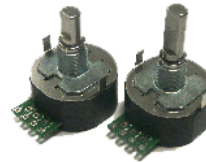
PSC-360	PSC-360U
Shaft driven family	

Rotary concentric touchless sensor.

Linear touchless position sensor.

Variable air gap touchless sensor.

PS2P-CON	PS2P-LIN	PS2P-ARC
Touchless magnetic hall effect		

Piher sensors adapt to the customer´s shaft so they do not require extra-operations such as assembly of magnet & sensor unlike other solutions in the market.

Applications:
- Agricultural, forestry, material handling and construction sensor.
- Pedal angle sensor.
- Marine engine shifter control.
- Steering wheel angle and steer-by-wire.
- Engine throttle control.
- Transmission engine.
- Joystick control.

- Active suspension sensor.
- Valve actuators angle position sensors.
- Motor-shaft position sensor.
- Non-Contacting potentiometer.
- Articulated joint angular position sensor.
- Transmission & gearshift sensor.
- Medical devices.
- Unmanned ground vehicles (UGVs).

Non-Contact Inductive Position Sensors

Inductive position sensor for absolute rotary or linear motion sensing in automotive, off-highway, industrial, medical and consumer applications.

Our inductive position sensors use the physical principles of induction in a wire loop and eddy currents to detect the position of a solid metallic structure that is sliding or rotating above a set of coils consisting of one transmitter coil and two receiver coils.

The coils are printed as copper traces on a printed circuit board (PCB) and arranged such that the transmitter coil induces a secondary voltage in the receiver coils that depends on the position of the metallic target above the coils. The absolute angle measurement provides instant feedback of the metallic target's angular position with a resolution of up to 12 bit.

Custom product design packaging can be provided to meet any form, fit and function including the choice of wire harness and interface connector.
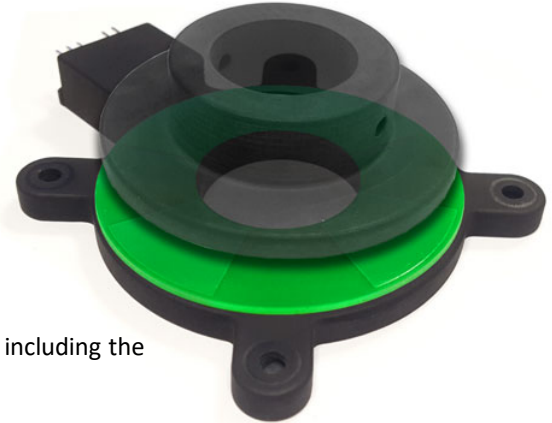
Main Features:

- Rotary and linear stroke.
- 360° electrical rotational angle.
- AEC-Q100, Grade 0 automotive qualified IC.
- High accuracy. Full resolution for every angle range.
- Wide operation temperature: -40°C to +160°C.

- Supply voltage 4.5 to 5.5V +/-10%.
- Overvoltage and reverse-polarity protection: -14 V to +18 V max.
- Analogue, PWM or SENT output (10- and 12-bits resolution full scale).
- Power or ground loss detection.
- Long linear stroke up to 800mm.
- Stray field immunity, no shielding required.
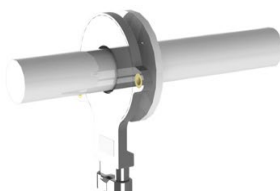- ESD and short-circuit protection.

Arc off-axis. Narrow angles
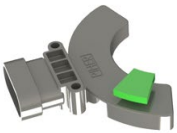
End of shaft on-axis

Through shaft on-axis rotation

Benefits:

- Flexible integration and output protocols.
- Easy assembly.
- Low profile.
- Low power consumption.
- Non-contact solution: wear free.
- Robust against dust and vibration.
- On-shaft, off-shaft and arc sensor design available.
- Applicable for low and high-speed applications not losing output resolution bits.
- Maintains original accuracy for small rotary angles.
- Tolerant to mechanical misalignment in any direction.
- Cost effective as no magnet is needed. Metallic target can be milled into the end of a metallic shaft or be part of the customer's application.

Linear motion
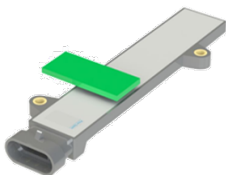
Examples of applications

- e-motor Rotor Position Sensor.
- Brake / Clutch / Throttle pedal sensor.
- Hand throttle - TPS Throttle Position.
- Boom arm position.
- Suspension height sensor.
- 2 in 1 sensor.
- Steering wheel position or Steer-by-wire.
- Seat position, Chassis level position.
- Transmission sensor.

- Joystick control, Fin controls.
- Hitch position, Bucket position.
- Fork position and hight.
- Mast tilt.
- Telehandler arm position.
- Power trim and tilt angle.
- Crankshaft and camshaft position.
- Motor-shaft resolver replacement.
- Steering torque and angle sensor

Amphenol
Turkey&MiddleEast

Controls / Through hole and SMD Potentiometers

Over 60 years perfecting product design, automation and process stability for bespoke and standard potentiometric sensors and controls.

In addition to customizing and configuring our established catalogue of six to 21mm rotary position sensors and controls, we will design and manufacture any contacting solution in any size based on our tried-and-tested potentiometer technology and processes. Typically, this includes the deployment of shafts, gears, detent, connectors and harnesses in a single module.

Additional features and optional extras: built-in switch, long life, non-flammable, low torque, improved linearity & hysteresis, crimped terminals, multiple wiper positions, multi-gang, cermet substrate, rotor and shaft color and version selection, packaging (bulk, tape on reel, ammo pack, magazine and embossed tape, J Lead Surface Mount Trimmer Potentiometer).

Application:
- Appliance controls.
- Automotive controls and sensors.
- Industrial/Instrumentation controls.
- Power tool control.
- Timer relays.
- Light switches.
- Climate controls.
- AFL (Adaptive Front Lighting).
- Infotainment controls.
- Seat heating and memory position.
- PIR sensors.

A global resource for your on-vehicle measurement needs

Engine management system

Cabin comfort
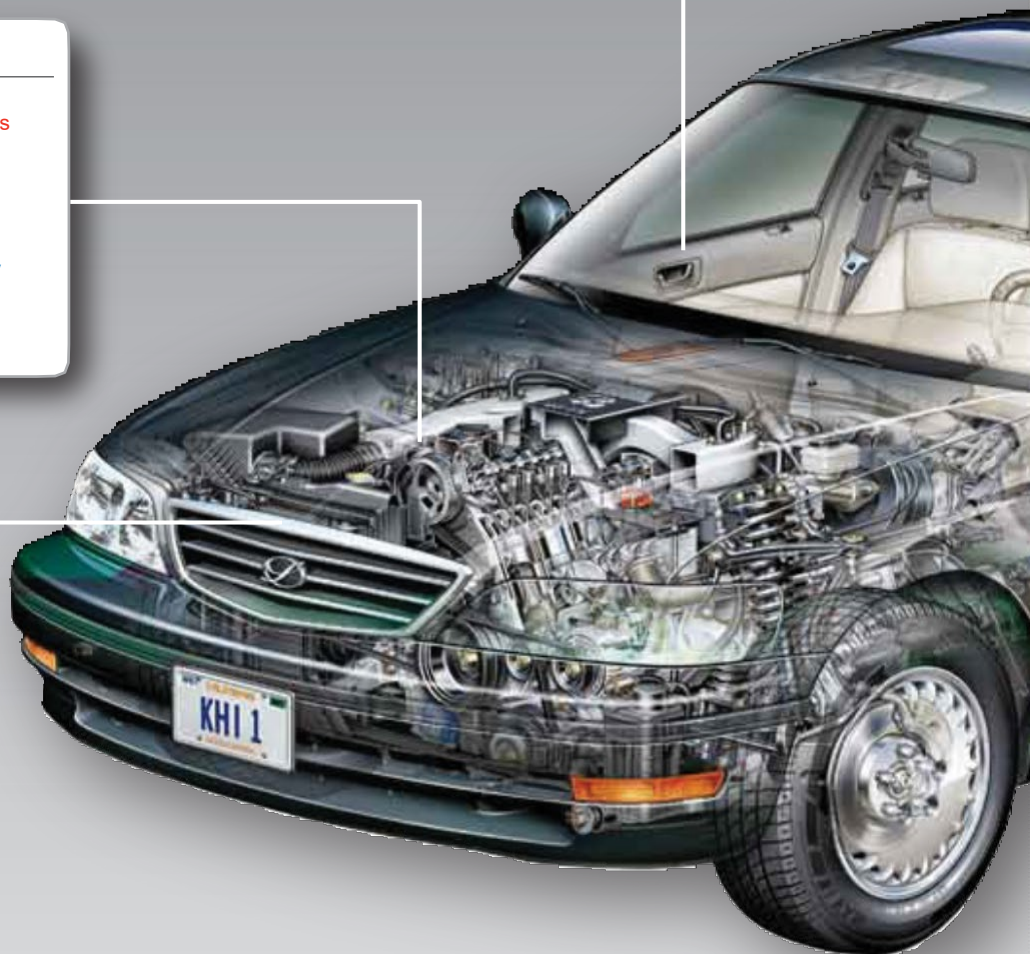
HVAC

Tire pressure monitoring

Safety system

CABIN COMFORT

Cabin temperature sensors
Windshield temperature sensors
Seat temperature sensors
Infrared non-contact sensors
PTC in-cabin heaters
Humidity sensors
Air quality sensors
Solar/twilight sensors

ENGINE MANAGEMENT SYSTEM

Coolant temperature sensors
Engine air intake temperature sensors
EGR temperature sensors
Exhaust gas temperature sensors
Inlet air humidity sensors
Air pressure sensors
Pressure, Temperature and Humidity
Fluid level sensors
Motor-shaft & crank shaft position

HVAC

Outside air temperature sensors
Evaporator temperature sensors
Duct temperature sensors
Refrigerant temperature sensors
Refrigerant pressure sensors
CO_2 and HC gas sensors

Amphenol is your best source for automotive sensors, offering the technology that brings your systems together—to protect the vehicle, its occupants and the environment.

Our sensors regulate the temperature and air quality of the cabin. They monitor engine temperature. They watch tire pressure for dangerous deflation that causes accidents. And they protect the environment from harmful emissions.

Consider us your global partner for all your automotive sensor needs. We'll deliver innovative solutions and high-performing products with the finest customer support—bringing the best results to you and your customers.

ELECTRONICS AND WIRING SYSTEM

Temperature compensation sensors
Battery temperature sensors
Circuit protection sensors
Wheel speed sensors
Vehicle speed sensors
Pedal position sensors
Seat position sensors
Mirror position sensors
Headlight position sensors

SAFETY SYSTEM

Side impact pressure sensors
CO_2 and HC gas sensors
Seat belt switch/sensors

KEY

Pressure

Temperature

Humidity

Multi-Sensor
Pressure, Temperature & Humidity

Gas

Infrared

Solar

Position

Level

FUEL HANDLING SYSTEM

Fuel temperature sensors
Fuel vapor pressure sensors
DEF levels sensors
DEF/SCR Tank systems

POWERTRAIN SYSTEM

Fluid temperature sensors
System pressure sensors
Transmission speed sensors

TIRE PRESSURE MONITORING

Tire temperature sensors
Tire pressure sensors
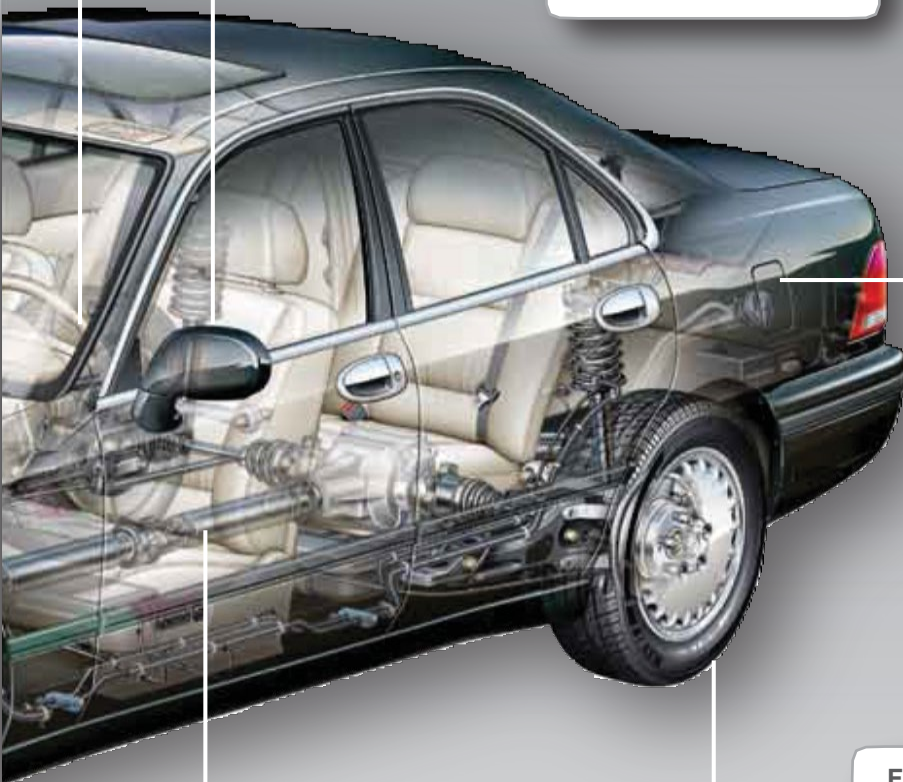
Sensing Technologies

MAJOR MARKETS SERVED	Thermometrics, Inc. Temperature	Telaire Gas & Moisture	NovaSensor Pressure	Protimeter Moisture Meters	Kaye Thermal Validation	SGX Sensortech Gas	Piher Sensing Systems Position	Wilcoxon Sensing Technologies Vibration	Piezo Technologies Ultrasonic	i2s Pressure & Temperature	All Sensors Ultra Low Pressure	SSI Technologies Level, Quality & Pressure
Aerospace (Commercial)	●		●			●	●				●	●
Agriculture	●	●		●		●	●			●		●
Air Quality		●		●		●					●	●
Automation	●	●					●	●			●	
AUTOMOTIVE	●	●	●			●	●			●		●
After-Treatment	●											
Cabin Comfort	●	●	●			●	●					
Engine Management	●		●							●		●
Fuel Handling System	●		●							●		
HVAC	●	●				●	●			●		
Powertrain	●		●				●			●		
Safety Systems	●	●	●				●			●		●
Construction & Restoration				●								●
Electrification (EV/HEV)	●	●	●			●	●			●		●
Energy	●					●		●	●			
Environmental Monitoring					●	●					●	
Heavy Equipment & Off-Road (HVOR)	●		●				●			●		●
HVACR	●	●	●			●	●	●		●	●	●
Industrial	●	●	●	●		●	●	●		●	●	●
Marine	●					●	●	●				
Medical	●	●	●		●		●			●	●	●
Military	●		●				●			●	●	●
Non-Destructive Testing (NDT)									●			
Oil & Gas	●		●			●	●	●	●		●	●
Pharmaceutical & Biotech					●						●	●
Railway	●							●	●			●
Thermal Validation					●							

Industrial HVACR

Connecting your world through
Sensing Innovations

Amphenol Sensors is a leading innovator in sensing technologies and measurement solutions. Offering the most diverse sensor portfolio of standard and customized products for the world's most demanding regulatory and industry-driven applications, Amphenol creates value by providing critical information for real-time decisions.

With changes in regulations and increasing consumer emphasis on improved quality of life, the demand for more energy efficient buildings and improved air quality in the workplace has never been so important. Not to mention, growing energy costs and worsening outdoor pollution are compounding efforts by HVAC system designers to leverage sensor capabilities to make indoor environments healthy and efficient.

That is why Amphenol Sensors' extensive range of sensor solutions and capabilities are at the forefront of the HVACR industry. Our product offerings are simple to integrate and provide the very latest in sensing technology, backed by extensive engineering resources and manufacturing expertise.

OUTDOOR AIR • DUCT MEASUREMENT ROOM & FILTER MONITORING

Temperature Sensors
- Robust design for harsh environments
- Thermal cut-off fuses for added safety
- Customizations available

THERMOMETRICS

Gas Sensors (CO_2)
- OEM and sensors and transmitters
- NDIR dual and single channel technology
- Connectivity to Building Automation Systems

TELAIRE®

Gas Sensors (VOC, Flammable and Toxic)
- Detectable gases: VOC, NO, NO_2, NH_3
- 1000 ppb to 1000 ppm

SGX SENSORTECH

Humidity Sensors
- Duct and wall-mounted transmitters
- Fully-calibrated OEM sensors
- Connectivity to building automation systems

TELAIRE®

Pressure Sensors
- High stability, accuracy and over-pressure
- Low drift

NOVA SENSOR

Ultra Low Pressure Sensors
- High sensitivity, stability and repeatability
- Compact package size

ALL SENSORS an Amphenol company

AIR HANDLING UNIT

Temperature Sensors
- Robust design for harsh environments
- Thermal cut-off fuses for added safety
- Customizations available

THERMOMETRICS

Gas Sensors (CO_2)
- Lifetime calibration
- Outputs: I2C, UART, BACnet and analog
- Combination models with CO_2, humidity and temperature

TELAIRE®

Gas Sensors (Refrigerant)
- Detectable gases: R290, NH_3, R454, R32, R1234
- Outputs: Linearized and analog voltage
- 500/1000 ppm to 100% LEL

SGX SENSORTECH

Humidity Sensors
- Transmitters and OEM sensors
- Field replaceable sensors
- High IP rating protection

TELAIRE®

Pressure Sensors
- Types: Absolute, vented gauge and sealed gauge
- Stainless steel, robust for harsh environments
- Pressure range: 3psi - 7500psi

SSI

Position Sensors
- Flap motor positioning
- High accuracy (2% linearity)
- Low-cost and long life

PIHER sensing systems

Vibration Sensors
- Condition monitoring for fault detection of fans and motors
- Optimized performance and equipment life

Wilcoxon SENSING TECHNOLOGIES

BOILER & CHILLER CONTROL

Temperature Sensors
- Robust design for harsh environments
- Thermal cut-off fuses for added safety
- Customizations available

THERMOMETRICS

Pressure Sensors
- Types: Absolute, vented gauge and sealed gauge
- Stainless steel, robust for harsh environments
- Pressure range: 3psi - 7500psi

SSI

Pressure Sensors
- Internal metal-to-metal sealing
- Stainless steel element with excellent long-term stability

i2s an Amphenol company

Combined Pressure & Temperature Sensors
- High pressure and temperature accuracy
- Compatible to all currently used coolants
- Low (up to 600psi) and high (up to 2900psi) versions available

i2s an Amphenol company

Vibration Sensors
- Condition monitoring for fault detection of components
- Maximizes performance and reduces downtime

Wilcoxon SENSING TECHNOLOGIES

WATER MANAGEMENT

Temperature Sensors
- Robust design for harsh environments
- Thermal cut-off fuses for added safety
- Customizations available

THERMOMETRICS

Pressure Sensors
- Media compatibility
- High stability, repeatability and over-pressure

NOVA SENSOR

Vibration Sensors
- Vibration monitoring of pumps with alarms
- Maintain water usage throughout buildings

Wilcoxon SENSING TECHNOLOGIES

Ultrasonic Fluid Level & Concentration Sensors
- Continuous monitoring of fluid level and concentration
- 1% accuracy
- Robust, non-contact sensing with slosh and aeration filtering

SSI

BUILDING PRESSURIZATION

Pressure Sensors
- Differential Pressure (DP) measurement
- Duct-mounted transmitters

TELAIRE®

Pressure Sensors
- High stability, accuracy and over-pressure
- Low drift

NOVA SENSOR

Ultra Low Pressure Sensors
- High sensitivity and repeatability
- Compact package size

ALL SENSORS an Amphenol company

Pressure Sensors
- Internal metal-to-metal sealing
- Stainless steel element with excellent long-term stability

i2s an Amphenol company

Pressure Sensors
- Types: Absolute, vented gauge and sealed gauge
- Stainless steel, robust for harsh environments
- Pressure range: 3psi - 7500psi

SSI

MDPT Differential Pressure Sensor

Telaire T6723-8K5 CO2 Alarm Modules are designed for heater applications requiring high limit controls. They are individually factory-calibrated to trigger Alarm Signal at 8500 ppm CO2, Ventilation Warning Signal at 7500 ppm CO2, and Low Battery Warning Signal (for applications using batteries). They are compliant with the latest NF128 LNE test protocol.

Carbon Dioxide (CO2) Transmitters

Telaire T3000 Series | CO2 Sensors for Harsh Environments

Telaire T3000 Series is a range of Carbon Dioxide (CO2) Sensors designed to meet the specific needs of customers who require measuring CO2 in harsh or difficult environments. Based on a series of modules, the casing offers a number of combinations to meet the needs of range, supply voltage, and output type in various applications. Example applications include incubators, buses, refrigerators, subway stations, and railway carriages.

Applications:

- HVAC control
- Incubators
- Buses
- Refrigerators
- Subway stations
- Railway carriages

Telaire T8000 Ventostat | Wall Mount CO2, Humidity & Temperature Transmitters

The Telaire Ventostat 8000 Series represents a full range of wall mount carbon dioxide, humidity and temperature transmitters with display options plus active humidity and temperature outputs. The Telaire 8000 Ventostat Series provides controlled ventilation with easy installation and a clean, modern look that suits most indoor environments.

Applications:

Controlled ventilation of indoor environments, such as a conference rooms, classrooms, meeting halls, etc.
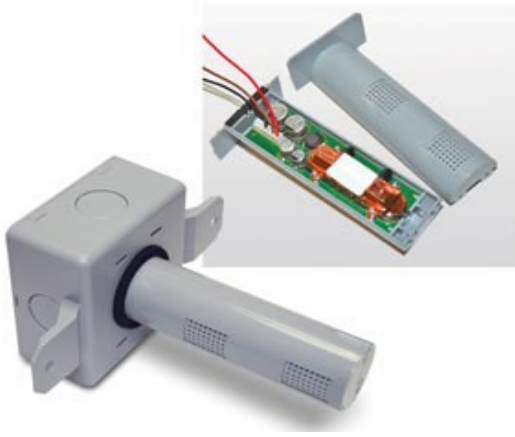
Telaire T8041/T8042 Ventostat | CO2 Duct Probe Transmitter

The Telaire Ventostat T8041/T8042 CO2 Duct Probe Transmitter is suitable for indoor air quality and energy conservation applications, offering accuracy and versatility at an affordable price. This exceptional product line touts an unobtrusive form factor that is easy to install, simple to use, and remains accurate over the expected life of the device using Telaire's patented ABC Logic™ (Automatic Background Calibration) technology.

• CO2 transmitters can be used in a broad range of applications including air quality monitoring in buildings.

• CO2 concentration levels in buildings are monitored to provide an indication of occupancy and to drive a ventilation control strategy. An effective DCV (Demand Controlled Ventilation) strategy will conserve energy and maintain indoor air quality.

Telaire SM-UART-01L+ | PM2.5 Laser Dust Sensor

Telaire SM-UART-01L+ Laser Dust Sensor detects dust particle concentration in air by using an optical sensing method. A laser light emitting diode (laser LED) and a photosensor are optically arranged in the device. The photosensor detects the reflected laser LED light by dust particles in air, including particles sizes below PM2.5. The dust sensor can detect small particles, such as cigarette smoke, and distinguish small particles, such as smoke from large house dust, by the pulse pattern of the signal output.

Applications:
• Indoor Air Quality Monitoring
• Air Cleaners and Purifiers
• Air Conditioners and HVAC
• Outdoor Dust Monitoring

Telaire SM-UART-04L | PM2.5 Particulate Dust Sensor

Telaire SM-UART-04L PM2.5 Particulate Dust Sensor is designed for a wide range of air quality applications where fine particle dust needs to be measured. Applications include air quality meters and air purifiers for both residential and light industrial monitoring and control. The optical design leverages laser technology, which allows customers to achieve excellent performance with balanced reliability. SM-UART-04L is an ideal solution for industrial and consumer applications.

SM-UART-04L is a PM2.5 laser-based Particulate Dust Sensor that detects dust particle concentration in air by using an optical sensing method. A laser light emitting diode (laser LED) and a photo sensor are optically arranged in the device. The photo sensor detects the reflected laser LED light by dust particles in air. The dust sensor can detect small particles from large house dust, by the pulse pattern of the signal output.

Applications:

· Indoor Air Quality Monitoring
· Air Conditioners and HVAC
· Air Purifiers and Cleaners
· Outdoor Dust Monitoring (with Additional Protection)

Telaire T9602 | IP67 Harsh Environment Humidity & Temperature Sensor

Telaire T9602 IP67 Harsh Environment Humidity & Temperature Sensor is a fully-calibrated and temperature-compensated combined humidity and temperature sensor supplied in a water-resistant IP67 package, making it the most advanced and cost-effective sensing solution for virtually any type of harsh environment application.

Telaire T9602 provides linearized output signals in one of two interfaces – Digital (I2C) Output or Pulse Density Modulated (PDM) Output convertible to an analog signal – to meet a wider range of customer requirements.

HVAC Control Applications:

Process and Control Instrumentation:

- Air Conditioning
- Refrigeration
- Indoor Air Quality
- Vent Fans
- Home Appliances
- Humi/Dehumidifiers

- Medical Instruments
- Handheld Devices
- Weather Stations
- Food Processing
- Printers
- RFIDs

Telaire MiCS-VZ-89TE | Integrated VOC Sensor Module

The Telaire MiCS-VZ-89TE Integrated Sensor Module combines state-of-the-art MOS sensor technology with intelligent detection algorithms to monitor tVOCs and CO2 equivalent variations in confined spaces, e.g. meeting rooms or vehicle cabins.

The dual signal output can be used to control ventilation on-demand, saving energy and reducing cost-of-ownership.

- Calibration-free
- Low power
- Wide VOCs detection range
- High sensitivity
- High resistance to shocks and vibrations

Telaire HumiTrac | Relative Humidity and Temperature Transmitter

Telaire HumiTrac™ Relative Humidity & Temperature Transmitter is Telaire's next generation relative humidity and temperature transmitter, designed to serve the building automation/HVAC market, as well as a wide variety of general-purpose relative humidity monitoring applications. All HumiTrac models incorporate a NIST traceable, field-replaceable sensor tip, a rugged capacitive sensing element capable of full-scale 0 to 100% RH measurement and a host of field configurable output options.

Applications:
- HVAC/building controls
- Energy Management Systems (EMS)
- Enthalpy control
- Indoor Air Quality (IAQ)
- Clean rooms
- Museums/archives
- Hospitals/labs
- Refrigeration control
- Pharmaceutical
- Animal rooms
- Food Storage

Thermometrics | Temperature Sensors

Thermometrics Current Limiters | NTC Inrush CL Series

Thermometrics CL Series of Inrush Current Limiting Thermistors consists of a disc thermistor with uninsulated lead-wires, and are used to control inrush current when switching power supplies. The main purpose of limiting inrush current is to prevent components in series with the input to the DC/DC convertor from being damaged. Typically, inrush protection prevents nuisance blowing of fuses or breakers as well as welding of switch contacts.

Thermometrics Infrared (IR) Sensors | ZTP-315

Thermometrics ZTP-315 Infrared (IR) Sensors consist of thermo-elements, flat infrared filter and a thermistor for temperature compensation, all in a hermetically-sealed TO-46 (18) package. Thermopile IR Sensors are used for non-contact, or infrared, surface temperature measuring. There are also a variety of filters available to help maximize performance in specific applications.

Applications:
• HVAC
• Occupancy detection
• Automotive

Thermometrics Infrared (IR) Sensors | ZTP-315MIH Module

Thermometrics ZTP-315MIH Thermopile Infrared (IR) Sensor Module presents temperature-compensated single outputs via voltage output with optics (glass lens for high temperature detection). It can also provide compatibility with the customer's device without the need for recalibration. The ZTP-315MIH uses 3-wire connections for output signal, single power supply and ground. The field of view is approx ±9 degrees for 50% normalized output with a total size is only 33 mm X 17 mm.

Applications:
• Induction Heater/Cooker
• Appliances

Thermometrics NTC Thermistors | Epoxy Interchangeable Type 65

Thermometrics Epoxy Type 65 NTC Interchangeable Thermistors are epoxy-coated interchangeable chip thermistors with heavy isomid insulated nickel lead wires. They provide accurate temperature measurement, control and compensation with use over a range of -40°C to 105°C (-40°F to 221°F) and high sensitivity greater than -4%/°C at 25°C (77°F).

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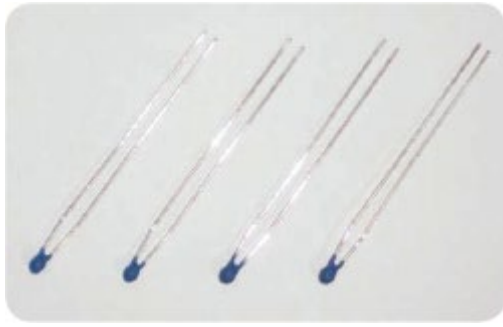
Thermometrics NTC Thermistors | Epoxy Type NK

Thermometrics Epoxy Type NK NTC Thermistors are epoxy-coated chip thermistors with tin-coated steel wires and epoxy resin coating. Designed for accurate temperature measurement, control and compensation. With operation up to 155°C (311°F), they are used in automotive, HVAC and white goods applications.

Applications:
• Automotive Applications
• HVAC Applications
• White Goods Applications

Thermometrics NTC Thermistors | Glass Diode

Thermometrics Diode Series of Glass-Encapsulated NTC Thermistors consists of a range of NTC chip thermistors in DO-35 style glass package (diode outline) with axial solder-coated copper-clad steel wires. Glass body provides hermetic seal and voltage insulation and excellent stability. Designed for accurate temperature measurement, control and compensation in various applications, including automotive, telecom, HVAC and white goods. Also for use in temperature sensing for household appliances, such as rice cookers, electronic ranges and ovens, and industrial products, such as pharmaceuticals, chemicals, and components.

Applications:
• Automotive, telecom, HVAC and white goods applications
• Temperature sensing for household appliances, such as rice cookers, electronic ranges and ovens
• Temperature sensing for industrial products, such as pharmaceuticals, chemicals, and components
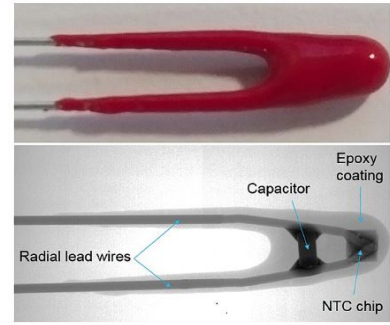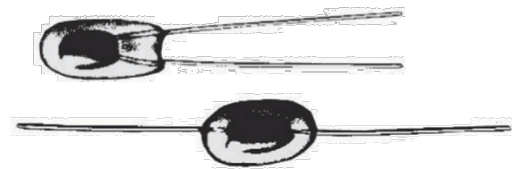

Thermometrics NTC Thermistors | Epoxy Type NK

Thermometrics Epoxy-Coated Type NKI of Noise Immune Thermistors are newly developed, cconsisting of a noise immune NTC thermistor with an integrated radio frequency (RF) decoupling function, providing protection from electromagnetic interference (EMI) at the component level over a wide frequency range.

With increasing complexity of electric systems and density of electronic components in modern vehicles, conventional NTC thermistor sensors are vulnerable to stray electromagnetic interference causing self-heating.

Applications:
• EV/HEV/PHEV Markets
• Battery Temperature Sensing
• Existing Automotive - Upgrade
• Drive Systems
• HVAC
• Air Intake / Coolant

Thermometrics NTC Thermistors | Glass BR Series - Glass-Encapsulated Bead

Thermometrics BR Series of Glass-Encapsulated Bead Thermistors consists of glass-encapsulated bead thermistors on fine diameter (alloy or platinum) lead wires. Rugged glass encapsulation provides hermetic seal and better strain relief than glass-encapsulated bead thermistors. Suitable for self-heated applications, such as liquid level sensing or gas flow measurement. Recommended for applications where the customer will perform further assembly operations.

Applications:
• Low cost temperature measurement, control and compensation
• Self-heated applications, such as liquid level sensing or glass flow measurement
• Applications where the customer will perform further assembly operations

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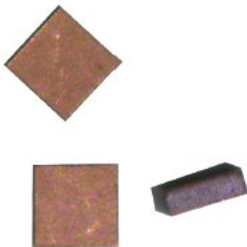## Thermometrics NTC Thermistors | Glass Diode

Thermometrics Miniature Series of Glass Bead NTC Thermistors offers a range of miniature thermoprobes consisting of a large bead thermistor hermetically sealed in the tip of a shock resistant solid glass rod. They offer improved, long-term stability and high reliability.

Type P20/P25/P30:
The longer body length makes them particularly well-suited for applications where fast response and immersion in fluids are the major requirements.

Type P60/P65/P85/P100:
General purpose applications involving temperature measurement and control, circuit temperature compensation, liquid level sensing or fluid flow sensing.
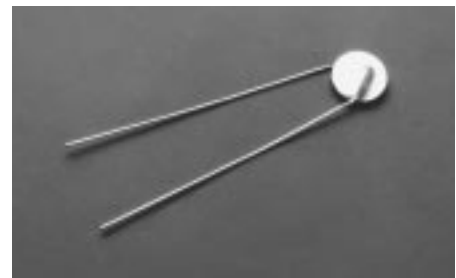
Thermometrics NTC Thermistors | Harsh Environment CR1

Thermometrics Type CR1 are NK format NTC Chip Thermistors consisting of Tin (Sn) coated Alloy 52 leads with a high-performance acid and moisture resistant coating. They are ideal for harsh environment applications and high-volume assembly.
Applications:
• Automotive
• HVAC
• White goods
• Marine
• Aerospace
• Military
• Industrial
• Healthcare

Thermometrics NTC Thermistors | Leadless Chip

Thermometrics NTC Lead Chip Thermistors are compact in size and designed for accurate temperature measurement, control and compensation in automotive, HVAC and white goods applications.

Applications:
• Automotive
• HVAC
• White goods

Thermometrics NTC Thermistors | Radial Lead Type RL35/40/45

Thermometrics Type RL35/40/45 of Radial Lead NTC Thermistors consist of point-matched disc thermistors with bare lead wires. They are suitable for PCB and probe mountings with high sensitivity to changes in temperature and a wide operating range of -58°F to 302°F (-50°C to 150°C). Available in a wide range of material systems and with an epoxy coating.

Applications:
· PCB and probe mountings
· Suitable for temperature measurement, control and compensation

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Thermometrics NTC Thermistors | Surface Mount Devices (SMD)

Thermometrics Surface Mount Devices (SMD) Series of NTC Thermistors are intended for temperature measurement, control and compensation. They are suitable for standard soldering techniques and available in a range of sizes, including 0402, 0603, 0805 and 1206.

Applications:
•Temperature measurement, control and compensation
•Standard soldering techniques

Thermometrics PTC Thermistors | Type PTF

Thermometrics Type PTF PTC Type Thermistors consist of a range of radially-wired bare PTC disc thermistors. They are designed for general purpose over-current and short circuit protection.
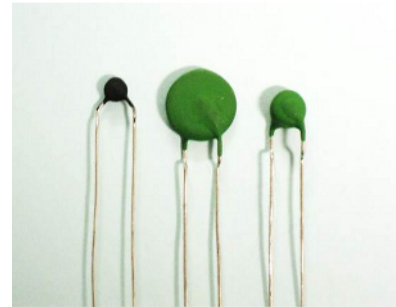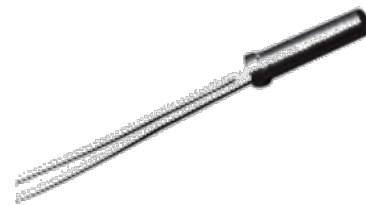
Thermometrics PTC Thermistors | Type YP

Thermometrics Type YP PTC Thermistors consist of a range of radially-wired PTC disc thermistors with silicone coating, intended for use as a current limiting device. Available in a wide range of operating current and voltage levels with excellent stability and fail-safe operation.
Applications:
• General purpose over-current protection
• Overvoltage protection
• Direct over-temperature protection

Thermometrics PTC Thermistors | Type YP

Thermometrics NTC Type JD Series of Fast Response Sensors are NTC thermistor assemblies in a metal housing with flying wires. Typical applications include electric showers and other water appliances/systems where fast, accurate control is required.

Applications:
•	Electric showers
•	Water appliances/systems

Thermometrics PTC Thermistors | Type YP

Glass-encapsulated thermistor housed in a stainless-steel probe body with PTFE lead-out wires, terminated with a connector assembly. Typical applications include domestic ovens and combination microwaves.

Applications:
• Domestic ovens
• Combination microwaves

Thermometrics Sensor Assemblies | Type JI/JIC Waterproof IP68 Temperature Sensor

Thermometrics Waterproof IP68 Temperature Sensors include Types JI and JIC NTC Thermistors. Both types are molded onto a flexible circular cable. The tip and outer cable insulation material is thermoplastic elastomer rubber. The tinned copper conductors have individual polypropylene insulation. Type JIC offers the option of a stainless-steel housing.

Applications:
• Ventilation
• Refrigeration
• Heat pumps
• Water heaters
• Weather stations
• Outdoor temperature measurement
• Under-floor heating
• Fish tanks
• Evaporators
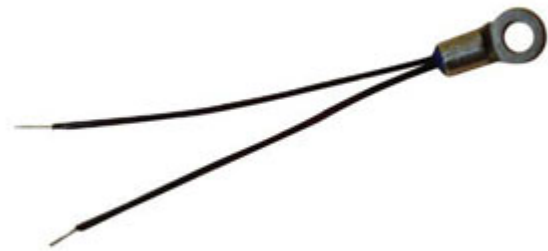
Thermometrics Sensor Assemblies | Type JR NTC Chip Thermistor in Eyelet Tag

Thermometrics Type JR NTC Chip Thermistors in Eyelet Tag are chip thermistors with insulated flexible wires and housed in an eyelet tag. They are suitable for surface temperature measurement. Typical applications include semi-conductor heatsinks and enclosure panels.

Applications:
• Surface temperature measurement
• Semi-conductor heatsinks
• Enclosure panels

Thermometrics Turbidity Sensors | TSD-10

Thermometrics Turbidity Sensor TSD-10 measures the turbidity (amount of suspended particles) of the wash water in washing machines and dishwashers. An optical sensor for washing machines is a measuring product for a turbid water density or an extraneous matter concentration using the refraction of wavelength between photo transistor and diode. By using an optical transistor and optical diodes, an optical washing machine sensor measures the amount of light coming from the source of the light to the light receiver, in order to calculate water turbidity.
Applications:
•   Detecting the turbidity degree of water
•   Washing Machines
•   Dishwashers

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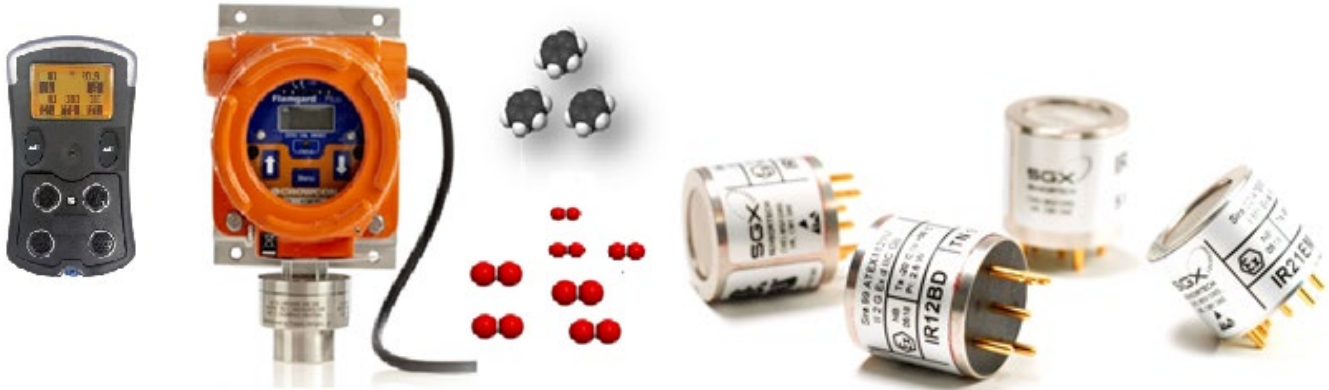
NDIR (Nondispersive Infrared gas sensors)

• Specialized for Hazardous area applications, Gases – Hydrocarbons(Methane, Propane, Butane) and Carbon Dioxide
• Concentrations: 1000 ppm up to 100% volume
• Gas exposure: Continuous
• Do not require air or oxygen to operate
• Temperature range: -40C to +75C
• Calibrated from the factory
• Ruggedized version with supported IR thermal filament

SGX -INIR – Refrigerant Gases

• Early detection for R290, R32 and R1234 Refrigerant gas leakage
• Live monitoring and reporting
• Long calibration period
• 0-100% LEL
• -40C to +65C
Typical applications :
• Incubator systems for plants, Bacteria growth, cell culture
• Industrial refrigeration or HVAC
• NOT Home or Office HVAC
• New market driven by European requirements

Standard Catalytic Gas Sensors

• Used for Lower Explosive Limit measurements for Flammable gases (Normal range 0-5% volume maximum)
• Hazardous area components available
• Will not work without normal air levels of Oxygen
• Are not suitable where there are Silicon based substances like polishes, release agents, shiny surface lubricants
• Catalytic sensors have been successfully used in fixed and portable gas detection instrumentation for many years in safety applications, but the catalytic design has limited the instrument performance of portable instruments
• Power – platinum wire has reached minimum diameter
• Run time – battery size

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Electrochemical Cells

• Gases:
Toxic(0-1000 ppm), Hydrogen Sulphide, Sulphur dioxide,
Carbon monoxide, Ethylene Oxide, Ammonia, Nitrous Oxide,
Nitrogen dioxide, Oxygen(0-100% v/v)
• Low power (< 10uAHrs)
• Gas exposure: Intermittent
• Require ambient levels of Oxygen
• Temperature range: -20C to +50C
• Accuracy +/- 1 ppm
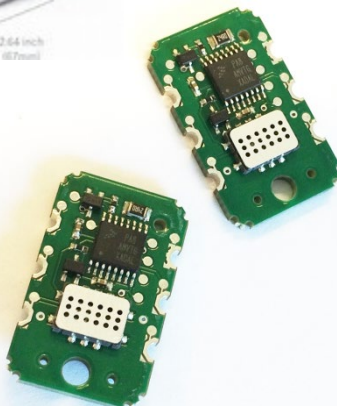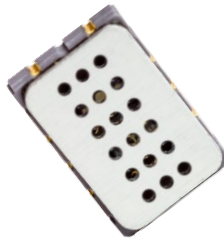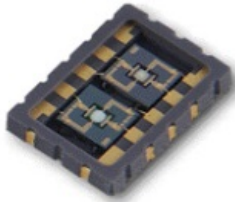
Metal Oxide Gas Sensor

Metal Oxide Semiconductor
High-volume low-cost solution
Gas trend monitoring Not for absolute measurement

Gases:
Reducing Gases –VOCS and HCs
Oxidizing gases- NO,O3
Ammonia gases-Ammonia, fertilizers etc.

Range :
low ppb to 1000 ppm
Temperature range -30C to +85C
VOC module available for VOCs building applications
Sensors for room air cleaner

Vibration Sensors

Seismic Accelerometer

Model 731A

Top exit, ultra low frequency seismic accelerometer, case isolated, 2-pin MIL-C-5015 connector, 10 V/g sensitivity.

Features:
• High sensitivity
• Ultra low-noise electronics for clear signals at low vibration levels
• Low-pass filtering to eliminate high frequencies
Included accessories
• SF7 mounting stud

General Purpose Accelerometer

Model 786B-10

Top exit, 2-pin MIL-C-5015 connector, case isolated, 100 mV/g general purpose accelerometer

Features:
• Hermetic seal
• Wide frequency range
• Reverse wiring protection
• Case isolated
• Corrosion resistant stainless-steel case

4-20mA Loop-Powered Sensor

Model PCC421VP-20-R6

Side exit, 105°C, 4-20mA, 2.0 inch per second full-scale measurement range, ±5% tolerance at full-scale, proportional to peak velocity

Features:
• Peak velocity output
• Corrosion resistant
• Hermetically sealed
• ESD, overload and reverse wiring protection
Included accessories:
• 1/4-28 mounting screw

4-20mA Loop-Powered Sensor

Model PCC423VP-20-J9T2A

Side exit with 16ft integral cable, 105°C, 4-20mA, 2.0 inch per second full-scale measurement range, ±5% tolerance at full-scale, proportional to peak velocity

Features:
• Peak velocity output
• 16 ft. high temperature integral cable
• ESD, overload and reverse wiring protection
• Hermetically sealed

HART-Enabled 4-20mA Velocity Sensor

Model PCH420V-R6

HART-enabled, field-configurable 4-20mA digital velocity sensor with three independently programmable vibration bands, MIL-C-5015 connector, 0.5-5.0 in/sec peak (user-configured)

Features:
HART protocol for digital communication with plant infrastructure
3 independently programmable vibration bands
Enables single or multi-drop loop installations
Hazardous area certified models available

Class I, Division 2 Certified Accelerometer

Model 786A-D2

Top exit, API 670 compliant, 100 mV/g accelerometer, certified for use in Class I Div 2/Zone 2 hazardous areas.

Features:
Class I, Div 2/Zone 2 certified - non-incendive
API 670 compliant
Longest product lifetime in the industry
Included accessories
SF6 mounting stud

Certified Triaxial Sensor with Integral Cable

Model 993B-7-33

Top exit, w/ 16' integral Teflon® cable, armored, 10-32 captive screw, 100 mV/g

Features:
- Rugged design
- CSA certified for Class I, Div 1 areas
- Broad frequency response
- Easy to mount
- EMI/RFI protection

Explosion-Proof Loop-Nowered Sensor

Model PC420VP-50-EX

Explosion-proof, 4-20mA output proportional to peak velocity, 5.0 in/sec full-scale measurement range, ±5% sensitivity tolerance at full scale

Features:
- Explosion proof certification
- 4-20 mA output, peak velocity
- Corrosion resistant
- Hermetic seal
- ESD, overload, and reverse wiring protection

Vibration transmitter

Model iT150 Series

Vibration transmitter, IEPE accelerometer, velocity sensor or dual output (vibration + temperature) input, 4-20 mA outputs, factory configured full-scale range, factory configured frequency bandwidth. Choose parameters on data sheet to order or see the ordering guide (also available for download below).

Features
• DIN rail mountable
• Accepts dual output (vibration + temperature) sensors
• Two separate 4-20 mA outputs
• Front panel BNC for dynamic signal output
• Reverse wiring and ESD protection

User-Configurable Intelligent Vibration Transmitter

Model iT300

The iT300 transmitter provides an easy means to connect a standard vibration sensor to a PLC, DCS or SCADA system. The transmitter's input provides power to and measures the signal from either an accelerometer, piezovelocity sensor or dual output sensor. The input circuitry has a wide frequency response, capable of measuring signals between 0.2 Hz and 20,000 Hz. The transmitter has two independent processing bands with flexible mapping options to two 4-20mA analog outputs. The processing channels contain selectable integration, allowing input from accelerometers to be output as acceleration or velocity. Selectable band filters and detector types (ie. RMS, peak) make it easy to tailor the processing to specific machines or applications. The transmitter continually measures and processes both configurable vibration bands, a true peak detector band, a temperature input and the sensor's bias output voltage (BOV). The band results may be mapped to a pair of 4-20mA analog outputs, allowing a number of unique processing options.

Features:
• Accepts inputs from accelerometers, piezovelocity sensors and combined acceleration + temperature sensors
• Can be configured to monitor high or low speed machinery (0.2 Hz - 20,000 Hz)
• Easily monitor multiple faults using the two bands with independently configurable filters and selectable integration
• Simple transmitter configuration using a laptop or PC with compatible web browser; no standalone software required
• 500 VAC isolation between power, input and outputs reduces noise caused by ground loops
Included accessories:
• T-BUS connector

Military Applications

Connecting your world through
Sensing Innovations

Amphenol Sensors is a leading innovator in sensing technologies and measurement solutions. Offering the most diverse sensor portfolio of standard and customized products for the world's most demanding regulatory and industry-driven applications, Amphenol creates value by providing critical information for real-time decisions.

For Military Applications, Amphenol Sensors provides advanced engineering design and product offerings to solve diverse challenges across today's sophisticated military technologies and rugged applications. We provide sensing solutions for military aircraft, ground systems, vehicles, missiles, munitions, soldier-worn systems, unmanned systems, underwater naval applications and space satellites.

SOLDIER-WORN SYSTEMS

Temperature Sensors
***Applications*: Various**
- High accuracy ▫ Proven reliability
- Various temperature and resistance values

Pressure Sensors
Application: Blast gauge
- High stability ▫ Miniature size
- Low power requirements ▫ Board-mounted

GROUND VEHICLES

Pressure Sensors
Applications: Engine fuel and air filter, transmission fluid
- High accuracy ▫ Harsh media compatibility

Gas Detection Sensors
Application: Fuel leakage
- 0 to 100% LEL ▫ Approved EX-d
- Mechanically robust

Position Sensors
Application: Multi-turn steering wheel angle
- Patented through-hole solution
- Long life for harsh environments

Ultrasonic Level & Concentration Sensors
Applications: Fuel, coolant, hydraulic fluid, DEF SCR systems
- Continuous monitoring ▫ ±1% accuracy
- Robust, non-contact sensing
Applications: Wheel speed, engine speed and position
- Variable reluctance, active hall effect or magneto resistive sensors ▫ Zero speed, large air gap capability

Vibration Sensors
Application: Vibration HUMS
- Rugged ▫ Reliable ▫ Durable
- Condition-based maintenance of vibrating / rotating parts

MISSILES • MUNITIONS • TORPEDOES

Temperature Sensors
Applications: Torpedo guidance and tracking
- High accuracy ▫ Proven reliability
- Various temperature and resistance values

Pressure Sensors
Application: Torpedoes
- Calibrated -55°C to 200°C
- Robust and rugged ▫ Long-term stability

Gas Detection Sensors
Application: Fuel leakage
- 0 to 100% LEL ▫ Approved EX-d
- Mechanically robust

Shock & G Sensors
Applications: Fuzing and alarming
- Accelerometers
- Rugged ▫ Reliable ▫ Durable

MILITARY AIRCRAFT

Gas Detection Sensors
Application: Jet fuel leakage
- 0 to 100% LEL ▫ Approved EX-d
- Mechanically robust

Ultra Low Pressure Sensors
Applications: Test/simulation, unmanned aerial vehicles (UAV)
- High stability ▫ High repeatability
- Total error band ▫ Compact size
Applications: General military grade and barometric pressure
- Calibrated -40°C to 125°C ▫ High stability and repeatability
- Digital and amplified outputs

Vibration Sensors
Application: Vibration HUMS
- Rugged ▫ Reliable ▫ Durable
- Condition-based maintenance of vibrating / rotating parts

Ultrasonic Level Sensors
Applications: Fuel, coolant, hydraulic fluid, DEF SCR systems
- Continuous monitoring ▫ ±1% accuracy
- Robust, non-contact sensing

Applications: Helicopter landing gear and fuel systems
- Absolute, gauge and sealed gauge
- From 3 psi to 7500 psi ▫ ±1% accuracy

NAVAL

Vibration Sensors
Applications: Underwater acoustics, ordinance monitoring
- Ultra low-noise internal amplifier
- Encapsulated in polyurethane

Application: Underwater
- High pressure rating ▫ High sensitivity
- Wide frequency range
- Ground isolated to eliminate ground loops

Applications: Towed arrays, sonobuoys, deep ocean
- Incorporates low-noise preamplifier with calibration circuit
- Electrostatically shielded and molded in polyurethane

Applications: Underwater unmanned vehicles (UUV), towed arrays, ACOMM
- 4-channel combination: Orthogonal axis accelerometers and omnidirectional hydrophone ▫ Improved signal-to-noise ratio

SPACE

Temperature Sensors
Application: Atomic clock
- Long-term stability ▫ Proven reliability
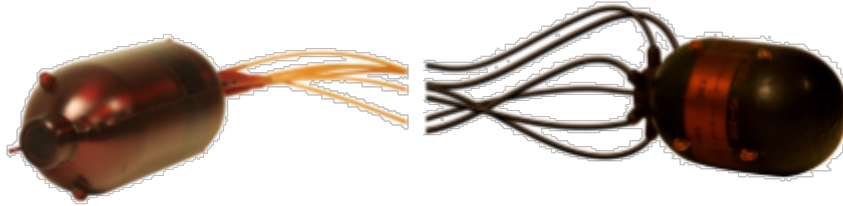- All definitions and test methods per MIL-PRF-23648

Pressure Sensors
Application: Satellite propulsion
- Robust and rugged ▫ Long-term stability
- High repeatability ▫ High accuracy

Vibration monitoring technologies for underwater and marine monitoring, seismic sensing.

Vector sensors

Wilcoxon vector sensors measure the acoustic pressure and particle acceleration in three orthogonal axes. These four sensing elements are located in a single housing with a common acoustic phase center. The four channels of the vector sensor, when combined, produce a cardioid directivity pattern which provides approximately 4.8 dB improvement in the signal to noise ratio over a traditional omni-directional pressure sensor. In addition, engineering sensors are embedded within the housing and, when combined with acoustic sensors, can provide a bearing to the target.

Typical applications:

- Oil and gas exploration
- Marine wildlife monitoring
- Underwater acoustic research
- Harbor and inlet security
- Homeland security
- Military surveillance
- Towed arrays
- Stationary arrays
- Underwater monitoring stations
- Sonobuoys

Hydrophones

Hydrophones are underwater microphones for acoustic measurements. Wilcoxon Sensing Technologies hydrophones are built to withstand the rigors of continuous underwater exposure in both sea water and freshwater environments. Each hydrophone uses piezoelectric crystals with a built-in electronic amplifier, to boost the low-level signal of pressure waves underwater signals. The output is a dynamic AC signal superimposed upon the DC Bias Output Voltage (BOV).

Typical applications:
- Underwater biological studies
- Ship noise studies
- Pump and machinery studies
- Monitoring of underwater ordinance

Test and Measurement

Test and measurement accelerometers are generally characterized by smaller size than industrial units and typically use a 10-32 coaxial connector to connect to measurement equipment.

Typical applications:
- Industrial machinery vibration collection
- Laboratories
- Modal and structural testing

Seismic Sensors

Combine a supersensitive piezoelectric accelerometer, an ultra low-noise amplifier, and excellent electrical/mechanical isolation, and the result will be unmatched performance in measuring low-level vibration. Seismic accelerometers have internal amplifiers similar to the industrial accelerometers. They are powered using the same method: a constant-current diode to provide power to the accelerometer. The seismic accelerometer amplifier output has a characteristic bias output voltage (BOV) and the vibration is superimposed upon this DC voltage level. The accelerometer circuit is isolated from the case, making installation and mounting simple, while the two-wire powering and signal method simplifies the wiring.

Wilcoxon seismic sensors are all characterized by good low frequency response, high output sensitivity and a low noise floor. They are primarily designed to measure low amplitude low frequency signals in applications such as structural monitoring and vibration isolation verification.

Common applications:
• Earthquake detection
• Geophysics, geothermal development
• Structural analysis
• Mine safety

Underwater Accelerometers

Wilcoxon underwater accelerometers are designed to be used virtually anywhere under continuous submersion. They are built to withstand the high pressures of deep submergence. Titanium cases are useful when it is desired to have the accelerometer be highly resistant to galvanic corrosion or mounted on titanium structures. Stainless steel can be used for applications where the accelerometer will be mounted on cast iron or mild steel structures since they are near one another on the galvanic series list.

The ability to retain a hermetic seal while submerged is paramount for underwater accelerometers. All Wilcoxon underwater accelerometers are designed for continuous exposure to 650 PSI of water pressure. Helium leak testing is used to verify the hermeticity of the welding for accelerometers.

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Turkey&MiddleEast

Amphenol Sensors

Military Sensing Solutions

Soldier-Worn Systems
- Temperature Sensors
- Pressure Sensors

Ground Vehicles
- Pressure Sensors
- Gas Detection Sensors
- Position Sensors
- Ultrasonic Level & Concentration Sensors
- Vibration Sensors

Military Aircraft
- Gas Detection Sensors
- Pressure Sensors
- Vibration Sensors
- Ultrasonic Level Sensors

Missiles • Munitions • Torpedoes
- Temperature Sensors
- Pressure Sensors
- Gas Detection Sensors
- Shock & G Sensors

Naval
- Vibration Sensors

Space
- Temperature Sensors
- Pressure Sensors

Sensing Technologies

MAJOR MARKETS SERVED	Thermometrics, Inc. Temperature	Telaire Gas & Moisture	NovaSensor Pressure	Protimeter Moisture Meters	Kaye Thermal Validation	SGX Sensortech Gas	Piher Sensing Systems Position	Wilcoxon Sensing Technologies Vibration	Piezo Technologies Ultrasonic	i2s Pressure & Temperature	All Sensors Ultra Low Pressure	SSI Technologies Level, Quality & Pressure
Aerospace (Commercial)	●		●			●	●				●	●
Agriculture	●	●		●		●	●			●		●
Air Quality		●		●		●					●	●
Automotive	●	●	●			●	●			●		●
Automation	●	●					●	●		●		
Construction & Restoration				●								●
Electrification (EV/HEV)	●	●	●			●	●			●		●
Energy	●					●		●	●			
Environmental Monitoring					●	●				●		
Heavy Equipment & Off-Road (HVOR)	●		●				●			●		●
HVACR	●	●	●			●	●	●		●	●	●
Industrial	●	●	●	●		●	●	●		●	●	●
Marine	●					●	●			●		●
Medical	●	●	●		●		●		●	●	●	●
MILITARY	●		●			●	●	●	●		●	●
Ground Vehicles			●			●	●	●				●
Military Aircraft						●		●			●	●
Missiles • Munitions • Torpedoes	●		●			●		●				
Naval								●				
Space	●		●									
Soldier-Worn Systems	●		●									
Non-Destructive Testing (NDT)									●			
Oil & Gas	●		●			●	●	●	●		●	●
Pharmaceutical & Biotech					●						●	●
Railway	●							●				●
Thermal Validation					●							

Amphenol Sensors

Industrial HVACR Sensing Solutions

Energy Efficiency   Indoor Air Quality

Outdoor Air
- Temperature Sensors
- Gas Sensors
  (CO_2, VOC, Flammable, Toxic)
- Humidity Sensors
- Pressure Sensors

Air Handling Unit
- Temperature Sensors
- Gas Sensors (CO_2, Refrigerant)
- Humidity Sensors
- Pressure Sensors
- Position Sensors
- Vibration Sensors

Duct Measurement
- Temperature Sensors
- Gas Sensors (CO_2)
- Humidity Sensors
- Pressure Sensors

Filter Monitoring
- Gas Sensors (VOC)
- Pressure Sensors

Room Monitoring
- Temperature Sensors
- Gas Sensors (CO_2, VOC)
- Humidity Sensors
- Pressure Sensors

Water Management
- Temperature Sensors
- Pressure Sensors
- Vibration Sensors
- Ultrasonic Fluid Level & Concentration Sensors

Building Pressurization
- Pressure Sensors

Boiler Control
- Temperature Sensors
- Pressure Sensors
- Combined Pressure & Temperature Sensors
- Vibration Sensors

Chiller Control
- Temperature Sensors
- Pressure Sensors
- Combined Pressure & Temperature Sensors
- Vibration Sensors

Sensing Technologies

MAJOR MARKETS SERVED	Thermometrics, Inc. Temperature	Telaire Gas & Moisture	NovaSensor Pressure	Protimeter Moisture Meters	Kaye Thermal Validation	SGX Sensortech Gas	Piher Sensing Systems Position	Wilcoxon Sensing Technologies Vibration	Piezo Technologies Ultrasonic	i2s Pressure & Temperature	All Sensors Ultra Low Pressure	SSI Technologies Level, Quality & Pressure
Aerospace (Commercial)	●		●			●	●				●	●
Agriculture	●	●		●		●	●				●	●
Air Quality		●		●		●					●	●
Automotive	●	●	●			●	●				●	●
Automation	●	●					●	●			●	
Construction & Restoration				●								●
Electrification (EV/HEV)	●	●	●			●	●				●	●
Energy	●					●		●	●			
Environmental Monitoring					●	●					●	
Heavy Equipment & Off-Road (HVOR)	●		●				●					●
HVACR	●	●	●			●	●	●			●	●
Air Handling Unit	●	●				●	●	●				●
Boiler Control	●							●			●	●
Building Pressurization		●	●								●	●
Chiller Control	●							●			●	●
Duct Measurement	●	●	●								●	
Filter Monitoring		●	●			●					●	
Outdoor Air	●	●				●					●	
Room Monitoring	●	●	●			●					●	
Water Management	●		●					●				●
Industrial	●	●	●	●		●	●	●		●	●	●
Marine	●					●	●	●				●
Medical	●	●	●				●		●		●	●
Military	●		●				●		●		●	●
Non-Destructive Testing (NDT)									●			
Oil & Gas	●		●			●	●	●	●		●	●
Pharmaceutical & Biotech					●						●	●
Railway	●							●				●
Thermal Validation					●							

Medical Applications

Connecting your world through
Sensing Innovations

Amphenol Sensors is a leading innovator in sensing technologies and measurement solutions. Offering the most diverse sensor portfolio of standard and customized products for the world's most demanding regulatory and industry-driven applications, Amphenol creates value by providing critical information for real-time decisions.

Today's patient care demands the ultimate in accurate and reliable monitoring of critical parameters. Amphenol is a pioneer in the development of new and increasingly robust sensor technology for medical applications. We offer innovative solutions, fast development cycles and excellent quality control to meet the most stringent requirements.

Amphenol Sensors
Medical Sensing Solutions

◆ Temperature ☐ Pressure ◆ Position ☐ Ultrasonic ☐ Thermal Validation

Patient Monitoring
◆ Thermometry
◆ Skin Temperature
◆ Intra-Uterine Pressure
◆ Blood Pressure
◆ ☐ Glucose Monitoring
◆ ☐ ☐ Wearables

Respiratory Care
◆ Ventilation
◆ ☐ Pulmonary
◆ Spirometry
◆ Sleep Apnea
◆ ☐ Anesthesia
◆ Inhalers

Critical Care
◆ ☐ ☐ Catheters
◆ Ablation
◆ ☐ ☐ Fluid Management
◆ Defibrillation
◆ Ultrasonic Air-in-line Detection

Medical Instrumentation
◆ ☐ ☐ Clinical & Laboratory Equipment
◆ ☐ Insulin Pumps
◆ ☐ Kidney Dialysis
◆ ☐ Clinical Mattresses
◆ Laboratory Analysis
◆ Tissue Ablation
◆ Ultrasonic Bone Healing
◆ Temperature Validation Systems
◆ Calibration Equipment
◆ Environmental Monitoring
◆ Cold Chain Monitoring

Surgical Assemblies
◆ Heat Ablation
◆ Liposuction
◆ Medical Lasers
◆ Catheters
◆ Ultrasonic Tissue Ablation
◆ Ultrasonic Recanalization
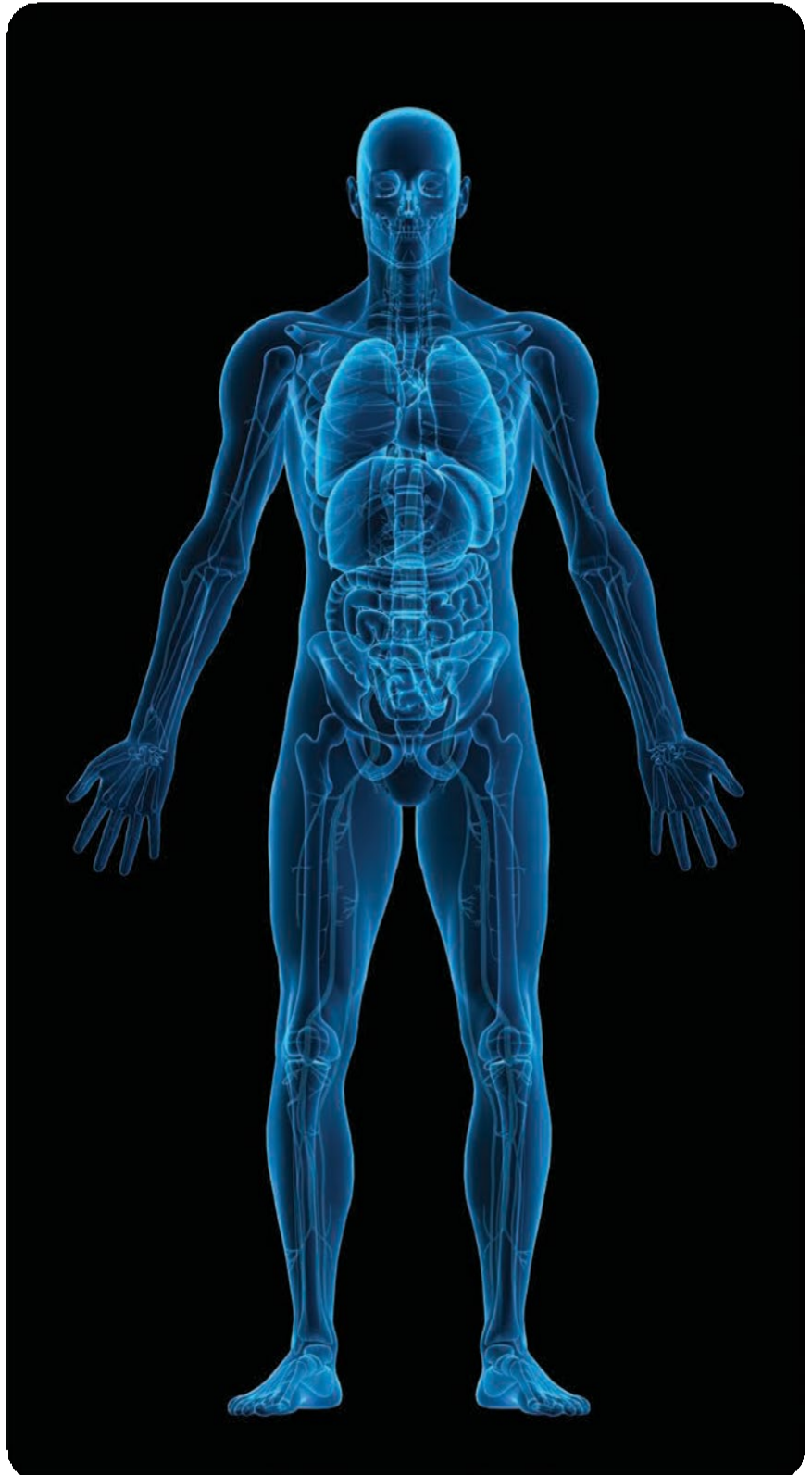
PATIENT MONITORING

Temperature Sensors
- Highly accurate • Proven reliability
- Fast response time • Continuous monitoring
- Small profile for tight spaces • Customization options

THERMOMETRICS

Pressure Sensors
- AAMI compliant • High reliability and quality
- Low cost, disposable • High performance
- Customizable designs

NOVA SENSOR

Position Sensors
- Low profile • Long life • Excellent resolution
- Custom form-factor ready
- Linear and rotary position feedback

PIHER sensing systems

RESPIRATORY CARE

Temperature Sensors
- Highly accurate • Proven reliability
- Fast response time • Continuous monitoring
- Small profile for tight spaces • Customization options

THERMOMETRICS

Pressure Sensors
- High accuracy and stability
- Multiple output options: Analog, Digital I2C, SPI
- High over-pressure capability

NOVA SENSOR

Ultra Low Pressure Sensors
- High accuracy and repeatability
- Fast response
- Customized options available
- Sized for portable or handheld equipment

ALL SENSORS an Amphenol company

Position Sensors
- Low profile • Long life
- Excellent resolution
- Excellent linearity • Custom connectors and wires

PIHER sensing systems

SURGICAL ASSEMBLIES

Temperature Sensors
- Highly accurate • Proven reliability
- Fast response time • Continuous monitoring
- Small profile for tight spaces • Customization options

THERMOMETRICS

Pressure Sensors
- Extremely small size • Stable and accurate
- Media compatibility • Customizable designs
- Die, wire assembly and eval-kits available

NOVA SENSOR

Ultrasonic Sensors
- High power and low self-heating
- Combined imaging and therapy
- High accuracy • High reliability
- Tunable transducers

Piezo Technologies

CRITICAL CARE

Temperature Sensors
- Highly accurate • Proven reliability
- Fast response time • Continuous monitoring
- Small profile for tight spaces • Customization options

THERMOMETRICS

Pressure Sensors
- Extremely small size • Stable and accurate
- Media compatibility • Customizable designs
- Die, wire assembly and eval-kits available

NOVA SENSOR

Ultra Low Pressure Sensors
- High accuracy and repeatability
- Fast response
- Customized options available
- Sized for portable or handheld equipment

ALL SENSORS an Amphenol company

Position Sensors
- Low profile • Long life
- Excellent resolution
- Excellent linearity • Custom connectors and wires

PIHER sensing systems

Ultrasonic Sensors
- Custom solutions
- Piezoceramic capability • High reliability
- Integration capability for occlusion and flow

Piezo Technologies

MEDICAL INSTRUMENTATION

Temperature Sensors
- Highly accurate • Proven reliability
- Fast response time • Continuous monitoring
- Small profile for tight spaces • Customization options

THERMOMETRICS

Pressure Sensors
- High accuracy, stability and reliability
- Media-isolated stainless steel
- Customizable designs
- Pressure ranges: 2" H_2O - 15,000 psi

NOVA SENSOR

SSI

Ultra Low Pressure Sensors
- High accuracy and repeatability
- Fast response
- Customized options available
- Sized for portable or handheld equipment

ALL SENSORS an Amphenol company

Position Sensors
- Low profile • Long life
- Excellent resolution
- Custom form-factor ready
- Linear and rotary position feedback

PIHER sensing systems

Ultrasonic Sensors
- High reliability • Low profile
- Full device capability
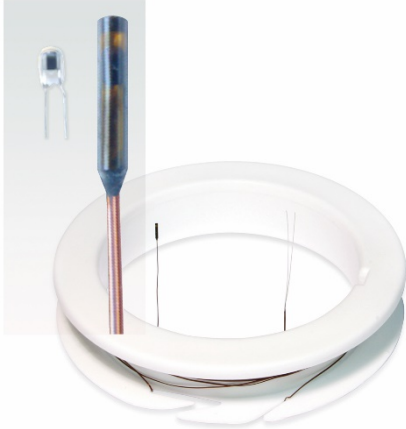
Piezo Technologies

Thermal Validation
- Wired • Wireless • RF-based real-time systems
- Data integrity meeting GXP requirements

Environmental Monitoring
- Complete solution • Regulatory compliant
- Robust, scalable system architecture
- Monitor • Alarm • Secure • Report • Access • Visibility

KAYE

Amphenol
Turkey&MiddleEast

AB6 NTC Thermistor Assembly

Thermometrics NTC Type AB6 Series Thermistor Assemblies consist of small thermobeads and GCs (chip-in-glass) that are welded to insulated extension leads. Thermobead and GC assemblies are used where a small thermistor must be further connected to longer leads, and for applications requiring fast response measurements in confined spaces.

The thermobeads or GC (chip-in-glass) are hermetically sealed in glass and have fine diameter 0.0007 in to 0.004 in (0.01778 mm to 0.1016 mm) platinum alloy leads. The platinum leads are cut short and welded to insulated extension leads and the joints are covered in one of several insulation types, depending upon the application or environment. The assembly is then ready for insertion into hypodermic needles, catheters or other small housings that require extended leads.

Biomedical Chip Thermistors MA Series

Thermometrics Biomedical Chip Thermistor Assemblies are designed for use in applications involving both intermittent and continuous patient temperature monitoring. Repeatability and fast response are essential, not only for the intermittent temperature requirements associated with oral and rectal fever measurements, but also for the continuous monitoring often necessary during induced-hypothermia and general anesthesia, or when employed in the care of infants and premature babies. Intensive care units, along with recovery rooms, have also adopted patient temperature as part of their vital sign monitoring procedures. Temperature monitoring for skin surface, tympanic, esophageal, foley catheters, and biofeedback applications has also improved due to the high stability and tight interchangeable tolerances designed into each Thermometrics' Biomedical Sensor Assembly.

Within our Type MA line of NTC Thermistors, we offer a complete line of standard sub-assemblies. Continuous research and development efforts within Thermometrics have resulted not only in these field-proven designs, but in the development of our Unitherm Thermochip Thermistor, designed exclusively for biomedical applications in the range of 32°F to 122°F (0°C to 50°C).

Although low in cost, these highly stable, precision thermochips provide the reliability, tight interchangeable tolerances, geometries, and fast response times that are often required in medical applications.

Application Spotlight

Cardiac Output Catheterization

Applications

Cardiac output catheterization is a procedure used to diagnose and treat cardiovascular conditions. Narrowing of arteries may decrease blood flow to the heart, leading to pain, breathing issues, and even a heart attack. Cardiac catheterization locates problems in blood vessels and assesses the overall pumping function of the heart, allowing for the prevention and correction of issues. Amphenol Advanced Sensors' part in this important application is providing highly accurate and robust assemblies using NTC thermistor technology for temperature measurement.
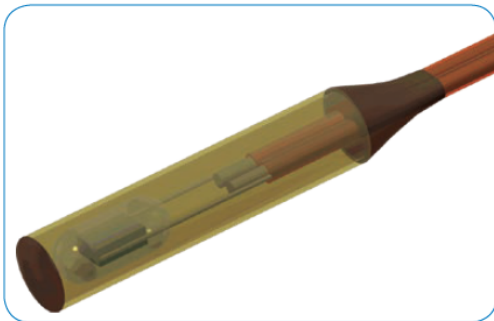
How do we help?

Amphenol Advanced Sensors carries an extensive line of AB and MA style NTC thermistor sub-assemblies. The NTC thermistors are housed in small, controlled diameter tips, providing a small profile for tight spaces and excellent point isolation of measurement. Various diameter and lead length offerings allow customers to incorporate our sub-assemblies into many different lumen sizes. The thermistor provides fast and accurate temperature information of the blood, which is used in the calculation for determining flow and providing a diagnosis.

What makes us better?

In addition to our catalog offerings, Amphenol Advanced Sensors prides itself in our ability to customize a unique solution for each customer. Whether superior resistance stability, a small diameter, fast response, or all the above are critical for your design, **our team is ready to partner with you**.

Amphenol
Turkey&MiddleEast
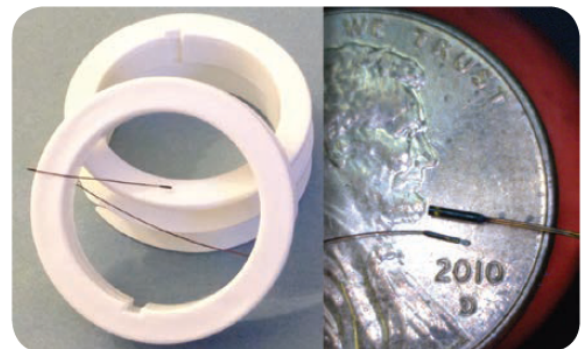
Thermometrics Infrared (IR) Sensors | ZTP-135SR

Thermometrics ZTP-135SR Thermopile Infrared (IR) Sensors consist of thermo-elements, flat infrared filter and a thermistor for temperature compensation, all in a hermetically-sealed TO-46(18) package. There are also a variety of filters available to help maximize performance in specific applications. Thermopile IR Sensors are used for non-contact, infrared, surface temperature measurement.

Thermometrics Infrared (IR) Sensors | ZTP-148SR

Thermometrics ZTP-148SR Infrared (IR) Sensors consist of thermo-elements, flat infrared filter and thermistor for temperature compensation, all in one hermetically-sealed TO-46 (18) sensor package. There are a variety of filters available to maximize performance in specific applications. Thermopile IR Sensors are used for non-contact surface, or infrared, temperature measurement. The Amphenol Antenna Solutions TwinLine series are Side- by-Side panel antennas for site sharing applications.

Applications
- This product range enables two (or more) operators to share an antenna enclosure while at the same time enabling each operator to control their antenna on a stand-alone basis.
- Integrating new bandwidths/technology on an existing site (e.g. UMTS and GSM on 900 MHz for the same operator). This avoids the use of a combiner.

Thermometrics Temperature Standards | Types S/AS/ES Precision Probe Thermistor

Thermometrics Types S/AS/ES Temperature Standards consist of ultra-stable thermistor probes assembled into thin wall stainless steel housings with shielded extension leads. All thermistor temperature standards are ruggedly constructed and are suitable for liquid immersion with special processing to ensure long-term stability.

- Secondary or working temperature standards for all laboratory metrology applications
- Unaffected by shock and vibration and, consequently, are also suitable for field use
- General laboratory and hospital use, clinical applications and process temperature measurements
- Special versions available for military and space use

Application Spotlight

Temperature Sensing in Medical Devices

Medical applications demand the ultimate in accurate and reliable monitoring of critical temperature measurement.

From the Amphenol Advanced Sensors family of brands, Thermometrics, Inc., designs and manufactures an extensive line of NTC thermistors and non-contact infrared (IR) based temperature sensors for this vital market.

In addition to our standard product offerings, Amphenol Advanced Sensors prides itself in our ability to customize a unique solution for each customer's application needs.

Whether superior resistance stability, tight temperature accuracy, small diameter, fast response, or all the above are critical for your design, our team is ready to partner with you.

Application Offerings

Cardiac Care
Small diameter chip-in-glass or glass bead thermistor assemblies for thermodilution catheters and continuous cardiac output systems.
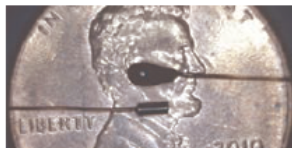
Type AB

Respiratory Care
Glass diode or epoxy-coated chip thermistors for temperature monitoring of ventilator flow tubes and humidifiers.

Type Glass Diode / Type 95 / Type CR1

Skin Surface
Interchangeable thermistor assemblies with temperature accuracy of ±0.05°C @ 37°C for continuous patient monitoring and neonatal incubator systems.

Type MA

Thermometry
Interchangeable thermistors and IR sensors for oral, rectal, tympanic, and auxiliary temperature measurements for predictive, clinical, or home thermometers.
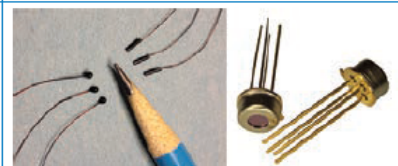
Type 65 / Type SC / Type ZTP

Dialysis
Small interchangeable thermistors for assembly into metal housings used to monitor fluid temperature during dialysis.
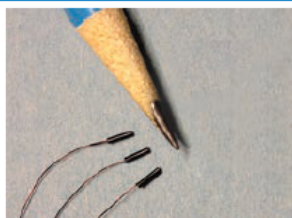
Type SC / Type MA

Surgical
Miniature chip-in-glass or sleeved chip thermistors with fine diameter wires for insertion into hypodermic needles for myocardial surgeries and external attachment to metal lumens used during laser surgery.

Type SC / Type MA / Type A040

Thermometrics Sensor Assemblies | Adhesive Mounted Surface Sensors

Thermometrics Adhesive Mounted Surface Sensors feature a surface mount cup for use as skin temperature sensors or on flat surfaces. They consist of small bead, disc or thermistor types <0.100" OD with shielded, jacketed or coaxial cable extension leads, as well as a maximum temperature rating of 140°F to 500°F (60°C to 260°C).

- Adhesive skin temperature sensors
- Adhesive flat surface sensors
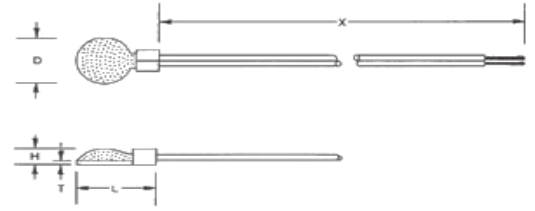
PRESSURE SENSORS

NovaSensor NPA Series | Surface Mount Pressure Sensors

The NovaSensor NPC-100 Series of Disposable Medical Pressure Sensors is specifically designed for use in disposable medical applications. The device is compensated and calibrated per the Association for the Advancement of Medical Instrumentation (AAMI) guidelines for industry acceptability. The sensor integrates a high-performance, pressure sensor die with temperature compensation circuitry and gel protection in a small, low-cost package.

Applications

- Medical instrumentation
- Blood pressure measurement
- Infusion pumps
- Kidney dialysis machines

NovaSensor NPA Series | Surface Mount Pressure Sensors

NovaSensor NPA Series of Surface-Mount Pressure Sensors is provided in a miniature size as a cost-effective solution for applications that require calibrated performance. Packaged in a SOIC14 pin surface mount, the NPA Series is available in gauge, absolute and differential pressure ranges with either mV, amplified analog or digital outputs. The sensor is intended for printed circuit board mounting and delivered in tape and reel form to simplify manufacturing handling.
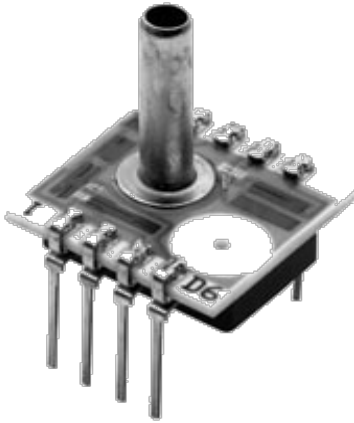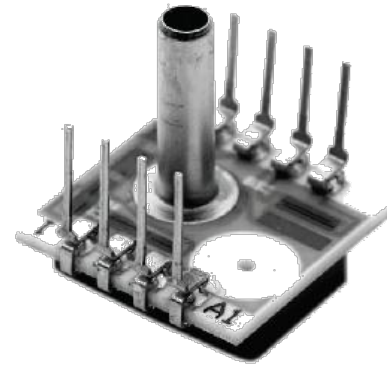
NovaSensor NPC-1210 Series | Low Pressure Sensors

The NovaSensor NPC-1210 Series of Low Pressure Sensors provide a cost effective solution for applications that require calibrated performance over a wide temperature range. Packaged in a dual-in-line configuration, the NPC-1210 Series is intended for printed circuit board mounting. Optional pressure port and lead configurations provide superior flexibility in low profile applications where pressure connection orientation is critical.

Applications

- Industrial automation
- Air flow monitors
- Process control
- Medical equipment
- Underground cable leak detection
- Ventilation
- Respirator monitoring

NovaSensor NPC-1220 Series | Medium Pressure Sensors

The NovaSensor NPC-1220 Series of Medium Pressure Sensors are solid state pressure sensors that provide a cost-effective solution for applications that require calibrated performance over a wide temperature range. Packaged in a dual-in-line configuration, the NPC-1220 Series is intended for printed circuit board mounting. Optional pressure port and lead configurations give superior flexibility in low profile applications where pressure connection orientation is critical.

Applications

- Industrial aıtomation
- Air flow monitors
- Process control
- Medical equipment
- Underground cable leak detection

NovaSensor NPC-410 Series | Medium Pressure Sensors

The NPC-410 Series of solid-state pressure sensors are designed to provide a cost effective solution for applications that require long-term stability and high volume. Packaged in a dual-in-line configuration, the NPC-410 Series is intended for printed circuit board mounting. Optional pressure port and lead configurations give superior flexibility in low profile applications where pressure connection orientation is critical.

Applications

- Industrial automation
- Air flow monitors
- Process control
- Medical equipment
- Underground cable leak detection

NovaSensor NPH Series | Solid-State Low-Pressure Sensor

NovaSensor NPH Series of Solid State Low Pressure Sensors consist of an integrated circuit silicon sensor chip housed in a standard TO-8 electrical package that is printed circuit board mountable.

The latest techniques in micromachining have been used to ion-implant piezoresistive strain gauges into a wheatstone bridge configuration that is integrally formed on a micromachined silicon diaphragm. As with all NovaSensor silicon sensors, the NPH Series employs SenStable® processing technology, providing excellent output stability. Constant current excitation to the sensor produces a voltage output that is linearly proportional to the input pressure.

Applications

- Process control, P-to-I converters
- Pneumatic control systems
- HVAC controls
- Biomedical: Infusion pumps, sphygmomanometers, respirators
- Aerospace: Altimeters, barometers, cabin pressure sensors
- Computer peripherals

NovaSensor NPH Series | Solid State Medium Pressure Sensors

An integrated circuit silicon sensor is housed in a standard TO-8 electrical package that is printed circuit board mountable. The latest techniques in micromachining have been used to ion-implant piezoresistive strain gauges into a Wheatstone bridge configuration that is integrally formed on a micromachined silicon diaphragm. As with the all NovaSensor silicon sensors, the NPH Series employees SenStable processing technology, providing excellent output stability. Constant current excitation to the sensor produces a voltage output that is linearly proportional to the input pressure.

Applications

- Process control, P-to-I converters
- Pneumatic control systems
- HVAC controls
- Biomedical: Infusion pumps, sphygmomanometers, respirators
- Aerospace: Altimeters, barometers, cabin pressure sensors
- Computer peripherals

NovaSensor NPI-15 Series | High Pressure Sensors

The NovaSensor NPI-15 Series of current-driven, media-isolated High-Pressure Sensors are designed to operate in hostile environments, and yet give the outstanding sensitivity, linearity, and hysteresis of a silicon sensor. They incorporate state-of-the-art IsoSensor technology, which gives the OEM user the best in price and performance. The piezoresistive sensor chip is housed in a fluid-filled cylindrical cavity and isolated from the measured media by a stainless-steel diaphragm and body. As with all NovaSensor silicon sensors, the NPI-15 Series employs SenStable® processing technology, providing excellent stability.

Applications

- Process control systems
- Hydraulic systems and valves
- Automobiles and trucks
- Biomedical instruments
- Refrigeration and HVAC controls
- Appliances and consumer electronics
- Ship and marine systems
- Aircraft and avionic systems
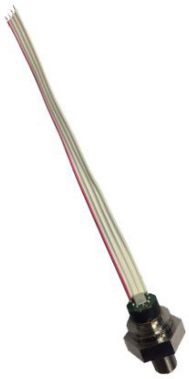
NovaSensor NPI-19 Series | Digital Pressure Sensor I2C

The NovaSensor NPI-19 Digital I2C Pressure Sensor is a member of the NovaSensor® NPI Series and incorporates state-of-the-art IsoSensor technology with I2C interface protocols, which gives the OEM user the best in price and performance. They are designed to operate in hostile environments and yet give the outstanding sensitivity, linearity, and hysteresis of a silicon sensor. The piezoresistive sensor chip is housed in a fluid filled cylindrical cavity and isolated from measured media by a stainless-steel diaphragm and body. As with all NovaSensor® silicon sensors, the NPI Series employs SenStable® processing technology, providing excellent output stability.

Applications

- Industrial process control
- Corrosive fluid and gas measurement
- Hydraulic systems and valves
- Tank level measurement
- Barometric pressure measurement
- Ship and marine systems
- Aircraft and avionic systems
- Medical equipment

NovaSensor NPI-19 Series | Low Pressure Sensors

NovaSensor NPI-19 Series of Low Pressure Sensors consists of media-isolated pressure sensors that are designed to operate in hostile environments while still providing the outstanding sensitivity, linearity and hysteresis of a silicon sensor.
The piezoresistive sensor chip is housed in a fluid-filled cylindrical cavity and isolated from measured media by a stainless steel diaphragm and body. As with all NovaSensor silicon sensors, the NPI Series employs SenStable® processing technology, providing excellent output stability. It is available in either a constant current or constant voltage version.

Applications

- Process control systems
- Hydraulic systems and valves
- Biomedical instruments
- Refrigeration and HVAC controls
- Appliances and consumer electronics
- Ship and marine systems
- Aircraft and avionic systems

NovaSensor NPI-19 Series | Medium Pressure Sensors

NovaSensor NPI-19 Series of Medium Pressure Sensors consists of current-driven, media-isolated pressure sensors, incorporating state-of-the-art IsoSensor technology. They are designed to operate in hostile environments while still providing the outstanding sensitivity, linearity and hysteresis of a silicon sensor.

The piezoresistive sensor chip is housed in a fluid-filled cylindrical cavity and isolated from measured media by a stainless steel diaphragm and body. As with all NovaSensor silicon sensors, the NPI Series employs SenStable® processing technology, providing excellent output stability.

Applications

- Process control systems
- Hydraulic systems and valves
- Biomedical instruments
- Refrigeration and HVAC controls
- Appliances and consumer electronics
- Ship and marine systems
- Aircraft and avionic systems

NovaSensor P330W | Absolute Pressure Sensor 1F

NovaSensor P330W Absolute Pressure Sensor is a Piezoresistive (PRT) Pressure Die, offering the same superior stability and sensitivity as in larger die, but in an extremely small footprint, making it ideal for invasive applications where small size is critical. Additionally, it has excellent measurement accuracy, which also makes it ideal for demanding applications with restricted dimensional profiles, such as medical catheters and IC packages.

Applications

- Cardiovascular
- Respiratory
- Intracranial
- Urological/Rectal
- Ablation
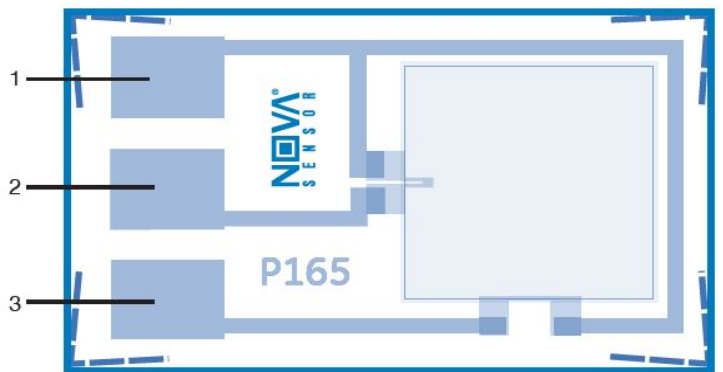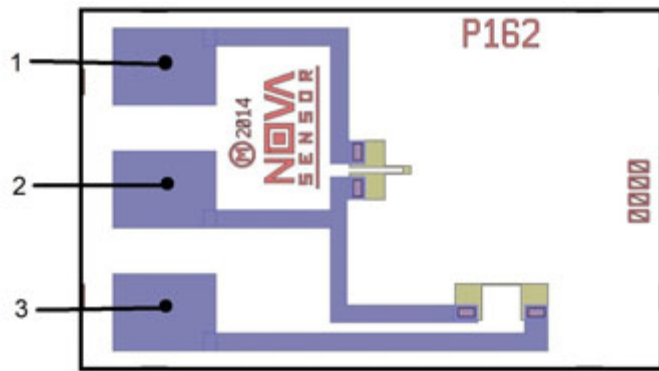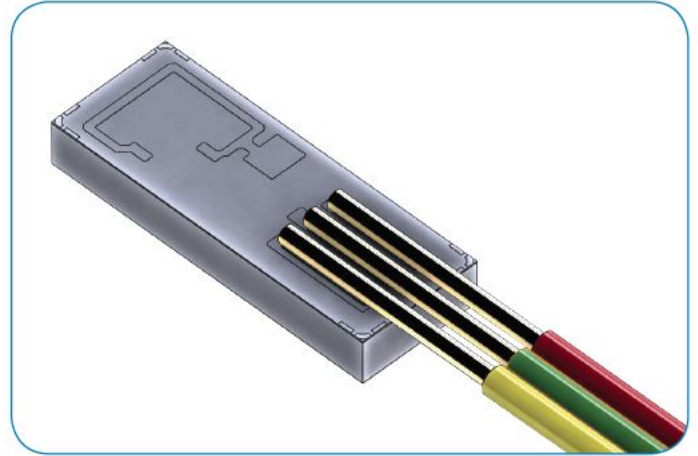
NovaSensor P162 | Medical Pressure Sensor Die

NovaSensor P162 Medical Silicon Gage Pressure Sensor Die are piezoresistive pressure sensor die offered in a miniature 1150 x 725 mm die that is small enough for three French catheters. The small die size is made possible by NovaSensor's proprietary Silicon Fusion Bonding (SFB) process. When excited with an AC or DC voltage source, the P162 produces a mV output that is proportional to input pressure.

Applications

- IUP
- Intracranial
- Disposable Pressure Catheters: Intrauterine, Intracranial, Body

NovaSensor P165 | 3F Medical Absolute Pressure Sensor Die

NovaSensor P165 Medical Silicon Absolute Pressure Sensor Die is a piezoresistive pressure sensor die offered in a miniature 1150 x 675 mm die that is small enough for three French catheters. The small size is made possible by NovaSensor's proprietary Silicon Fusion Bonding (SFB) process. When excited with an AC or DC voltage source, the P165 produces a mV output that is proportional to input pressure. NovaSensor P165 is in a halfbridge design, where external resistors are needed to complete a full bridge configuration.

Applications

- IUP
- Intracranial
- Disposable Pressure Catheters, including Intrauterine, Intracranial, and Body
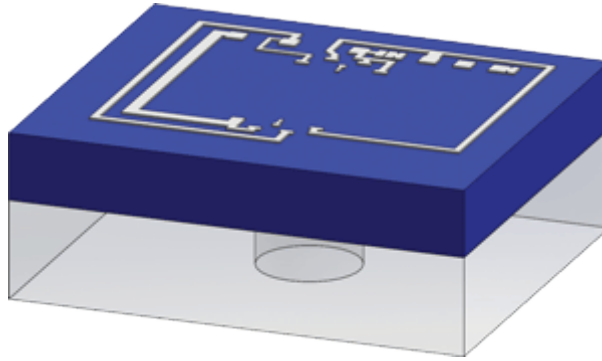
NovaSensor P2701 | High Sensitivity Low Pressure Sensor Die

The NovaSensor P2701 is a high sensitivity, low pressure sensor die. When excited with 5.0 V, the P2701 die produces a millivolt output that is proportional to input pressure. It is usable over a wide pressure range of 1.25 kPa (5" H2O) to 7.5 kPa (30" H2O). With NovaSensor's SenStable® process, the P2701 die provides excellent long-term stability and repeatability.

Applications

- Respiratory ventilators
- Sleep apnea
- Spirometers
- HVAC

NovaSensor P2705 | Miniature Low Pressure Sensor Die

The NovaSensor P2705 Miniature Low Pressure Sensor Die utilizes four piezoresistors combined in a Wheatstone bridge circuit. When excited by constant voltage, the P2705 die produces a differential millivolt output signal directly proportional to the applied pressure. Available as gage, the P2705 sensor die also features high sensitivity, excellent overload capability, and small temperature hysteresis over a wide temperature range. The product is 100% visually-inspected and electrically-probed. Samples from each wafer are tested over temperature for resistance, sensitivity, linearity, offset, and hysteresis.
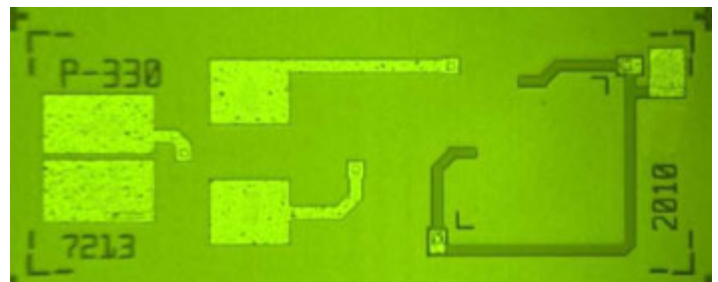
Applications

- Respiratory ventilators
- Sleep apnea
- Spirometers
- HVAC
- Process control

NovaSensor P330 Series | Absolute Pressure Sensor Die

The NovaSensor P330 Series of Absolute Pressure Sensor Die, or piezoresistive pressure die, offers the same superior stability and sensitivity as in larger chips, but in an extremely small footprint for invasive applications where small size is critical. It has excellent measurement accuracy, which is ideal for demanding applications with restricted dimensional profiles such as medical catheters and IC packages. NovaSensor's proprietary SenStable® process provides excellent long-term stability and repeatability.

Applications

- Cardiovascular
- Respiratory
- Intracranial
- Urological/ Rectal
- Ablation
- Body Cavity
- Research

NovaSensor P330B | Absolute Pressure Sensor Die 1F

NovaSensor P330B Piezoresistive (PRT) Pressure Sensor Die offers the same superior stability and sensitivity as larger chips, but in an extremely small footprint for invasive applications where small size is critical. It has excellent measurement accuracy, which is ideal for demanding applications with restricted dimensional profiles, such as medical catheters and IC packages. NovaSensor's proprietary SenStable® process provides excellent long-term stability and repeatability.
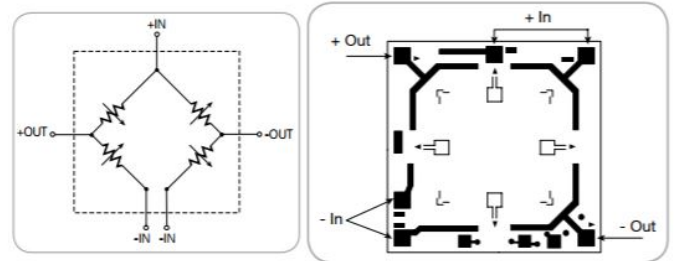
Applications

- Cardiovascular
- Respiratory
- Intracranial
- Urological/Rectal
- Ablation
- Body Cavity
- Research
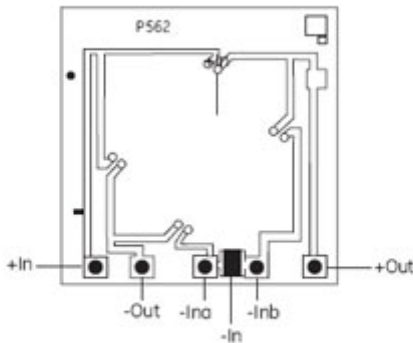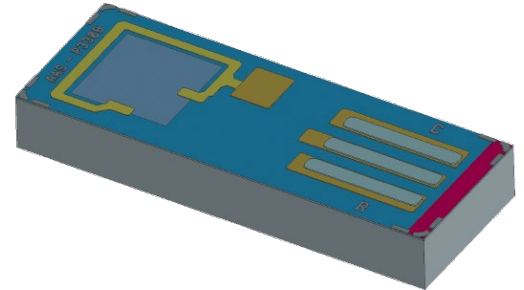
Die dimensions: 0.08 in × 0.08 in × 0.01 in (2.1 mm × 2.1 mm × 0.4 mm)

P562 schematic and wirebond diagram

Die dimensions with 63 mil Glass:
0.08 in x 0.08 in x 0.08 in (2.1 mm x 2.1 mm x 2.0 mm)

NovaSensor P562 | Medical Pressure Die

The NovaSensor P562 Medical Silicon Pressure Die is a piezoresistive pressure sensor that is specifically designed for medical applications. Low linearity errors and low input and output impedance make the P562 an industry standard for disposable pressure sensor die. The sensor die is radiation tolerant for newer sterilization methods. Wire bonds are located on one side to minimize package width for DPT's and IUP's. Choose an open bridge wirebond configuration depending on your compensation circuit. Sensitivity can be easily scaled with external circuitry to meet the AAMI standard of 5 µV/V/mmHg sensitivity.

Applications

- Disposable pressure transducer (DPT)
- Intrauterine pressure (IUP)
- Biomedical instruments
- Infusion pumps

NovaSensor P883 | Medium & High-Pressure Sensor Die

The NovaSensor P883 Medium and High-Pressure MEMS Sensor Die utilizes four piezoresistors combined in Wheatstone bridge circuit. When excited by either constant voltage or constant current, the P883 Die produces a differential millivolt output signal directly proportional to the applied pressure. Available as gage (differential) or absolute, the P883 also features high sensitivity, excellent overload capability and small temperature hysteresis over a wide temperature range. The product is 100% visually-inspected and electrically-probed. Samples from each wafer are tested for resistance, sensitivity, linearity, offset, temperature coefficients and hysteresis.

Applications

- Level sensing
- Automotive systems
- Process control
- Pneumatic controls
- Hydraulic systems
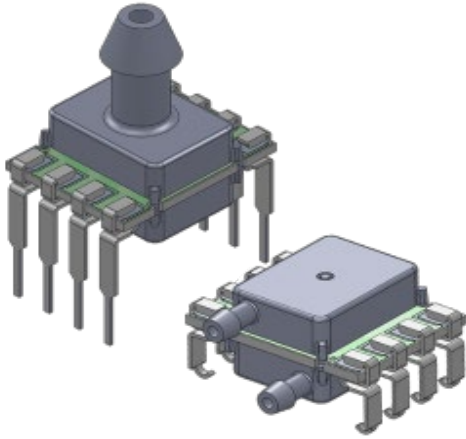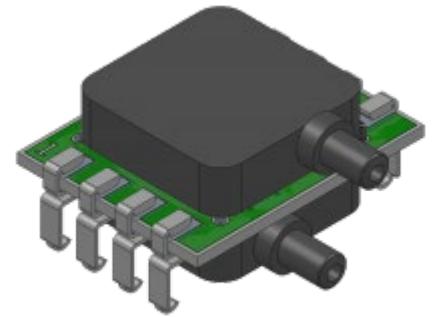
ELVH Series Pressure Sensors

The ELVH Series Pressure Sensors are based on All Sensors' ultra low pressure CoBeam2 TM Technology. This innovative sensing element technology provides pressure sensors with best in class ultra low pressure sensing which reduces package stress susceptibility, resulting in improved overall long-term stability and vastly improved position sensitivity.

The digital interface eases integration of the sensors into a wide range of process control and measurement systems, allowing direct connection to serial communications channels. For battery-powered systems, the sensors can enter very low-power mode between readings to minimize load on the power supply.

ELVR Series Pressure Sensors

All Sensors' superior, dual-die CoBeam2™ Technology allows for greater sensitivity while reducing package stress. Product highlights include an I2C or SPI interface, an analog 0.5 to 4.5V output signal, and significantly reduced position sensitivity.
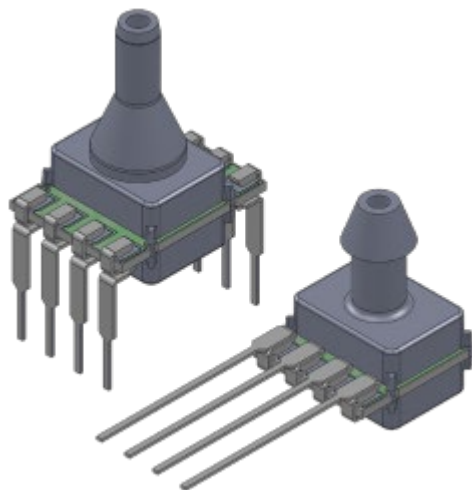
The ELVR sensors can communicate directly with microcontrollers, eliminating the need for additional A/D converters. Operating at a low supply voltage (3V or 5V), the ELVR series is well suited for portable applications. A wide range of miniature SIP and DIP package options allows for flexible and space-saving PCB-mounting.

Devices are available in bidirectional and unidirectional 2.5, 12.5, 25, 50, and 75 mbar pressure ranges.
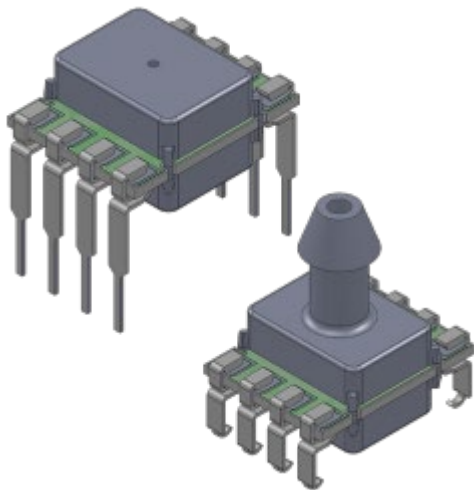
ELVI Series Pressure Sensors

The ELVI Series Pressure Sensors are based on All Sensors' ultra low pressure CoBeam2 TM Technology. This innovative sensing element technology provides pressure sensors with best in class ultra low pressure sensing which reduces package stress susceptibility, resulting in improved overall long-term stability and vastly improved position sensitivity.

The digital interface eases integration of the sensors into a wide range of process control and measurement systems, allowing direct connection to serial communications channels. For battery-powered systems, the sensors can enter very low-power mode between readings to minimize load on the power supply.

Applications

- Medical Devices
- Medical Instrumentation
- Respiratory
- Portable / Hand-Held Equipment
- Environmental Controls
- Environmental Instrumentation
- Environmental Monitoring
- HVAC
- Industrial Controls
- Altimeters
- Chemical Analysis
- Meteorology

ELVE Series Pressure Sensors

The ELVE Series Pressure Sensors are based on All Sensors' ultra low pressure CoBeam2 TM Technology. This innovative sensing element technology provides pressure sensors with best in class ultra low pressure sensing which reduces package stress susceptibility, resulting in improved overall long-term stability and vastly improved position sensitivity.

The digital interface eases integration of the sensors into a wide range of process control and measurement systems, allowing direct connection to serial communications channels. For battery-powered systems, the sensors can enter very low-power mode between readings to minimize load on the power supply.

Applications

- Medical Devices
- Medical Instrumentation
- Respiratory
- Portable / Hand-Held Equipment
- Environmental Controls
- Environmental Instrumentation
- Environmental Monitoring
- HVAC
- Industrial Controls
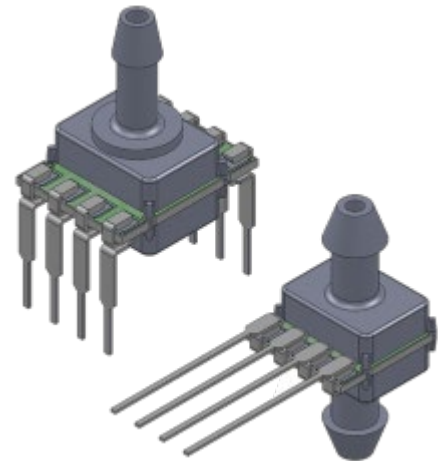- Altimeters
- Chemical Analysis
- Meteorology

ELVA Series Pressure Sensors

The ELVA Series Pressure Sensors are based on All Sensors' ultra low pressure CoBeam2 TM Technology. This innovative sensing element technology provides pressure sensors with best in class ultra low pressure sensing which reduces package stress susceptibility, resulting in improved overall long term stability and vastly improved position sensitivity.

The digital interface eases integration of the sensors into a wide range of process control and measurement systems, allowing direct connection to serial communications channels. For battery-powered systems, the sensors can enter very low-power mode between readings to minimize load on the power supply.

Applications

- Medical Devices
- Medical Instrumentation
- Respiratory
- Portable / Hand-Held Equipment
- Environmental Controls
- Environmental Instrumentation
- Environmental Monitoring
- HVAC
- Industrial Controls
- Altimeters
- Chemical Analysis
- Meteorology

Amphenol Turkey&MiddleEast

Amphenol Sensors

HVAC for Medical Facilities

Application		Solution	Technology & Features	
Carbon Dioxide (CO₂)	Fresh Air Ventilation Control	• Monitors patient/staff occupancy to ensure proper CO_2 levels • For use in temporary medical facilities with no standard Building Automation System (BAS) in place	• Dual channel automatic calibration • Outputs: 0-10v, 0-5v, 4-20mA, relay, BACnet	TELAIRE
Oxygen	Inline Oxygen Measurement	• Aids patient breathing in ventilator equipment	• 0-100% Volume Oxygen • Wide pressure range • Realtime measurements • Linear • Low power electrochemical sensor	SGX SENSORTECH
Humidity	Humidity Control	• Prevents condensation that can cause mold growth, in addition to harmful respiratory conditions • Ensures human comfort and energy efficiency	• Accuracy Options: 2%, 3%, 5% • Outputs: 0-10v, 0-5v, 4-20mA • Field replaceable Relative Humidity (RH) sensor	TELAIRE
Pressure	Differential Pressure Measurement	• Negative-pressure patient isolation room monitoring	• Outputs: 0-10v, 0-5v, 4-20mA • Range: 0-0.3"WC T30 • Range: 0-0.5"WC, T10, T20 • Piezoresistive sensor • Offsets: 0, ¼, ½ span • Units: In. WC, Pa, or mm H_2O • Accuracy: ±1% of span	TELAIRE MODUS
		• Negative-pressure patient isolation room monitoring • Fan/filter monitoring • Sensing components for ventilators, sleep apnea, and oxygen concentrators	• ±0.5" H_2O and above • High volume • Accuracy: ±1.5 % of span	NOVA SENSOR ALL SENSORS SSI
	Climate Control Systems	• Measures coolant pressure in HVAC systems	• Stainless steel pressure sensing element, aluminum housing, RD-connector • Pressure Range: -1-10bar to -1-100bar, gauge • Temperature Range: -40°C to 125°C (150°C) • Outputs: LIN, PWM, analog voltage	i2s an Amphenol company
	HVAC Refrigerant	• Measures low and high pressures of HVAC refrigerant	• Stainless steel, media-isolated • 3psi – 7500psi • Gauge, sealed and absolute piezoresistive transducers • Output Options: 5V, 4-20mA, 4.5V • Accuracy: 1% • Variety of ports • Harness accessories available	SSI

Application	Solution	Technology & Features	
Combined Pressure & Temperature			
Climate Control Systems	• Measures pressure and temperature of coolants in HVAC systems	• Compatible to all currently used coolants (R134a, R1234yf, R744) • High temperature accuracy and fast response time • Stainless steel pressure sensing element, aluminum or steel housing, RD-connector or MQS-connector • Pressure Range: -1-10bar to -1-200bar, gauge • Temperature Range: -40°C to 125°C (150°C) • Output: LIN	i2s at Amphenol company
Temperature			
Equipment Temperature Conditions	• Monitors critical equipment for over-temperature conditions	• Sensing element isolated from tag • Dielectric 750 Vac • Eyelets to fit M3/M4/M5 screw sizes; additional diameters available • Suitable for surface temperature measurement	THERMOMETRICS
HVAC Systems Temperature	• Provides temperature control for nearly every aspect of a medical facility, from maintaining the air temperature in an operating room to monitoring hot water temperature supplied to restroom sinks	• Configuration: Pipe Clip • Designed for 250,000 thermal cycles between 25°C to 85°C • Pipe Diameter Range: 13-30 mm (1/2-1-1/8 in)	THERMOMETRICS
		• Configuration: Integrated Pipe Clip • IP57 Ingression Protection Rating • AEC Q200 REV (D) - pending • Sensing Element: Dielectric 750 Vac • Pipe Diameter Range: 15-18 mm (5/8-1 in) • Self-adjusts to irregular pipe surfaces	THERMOMETRICS
		• Configuration: Boiler Probe • Connector Series: Molex Minifit • Full range of TCO temperature ratings according to EN60691 • Range of connectors available	THERMOMETRICS
		• Configuration: Cable Probe • IP66 Rating • Long-term stability • Good thermal response time	THERMOMETRICS
Floor Heating	• Provides uniform temperature for in-floor heating	• Various resistance values available • Various lead lengths available	THERMOMETRICS
Air Conditioning	• Directly measures object temperature for automatic adjustments	• Auto control of fan and blowing rate • Long detection range (~5M)	THERMOMETRICS
Position			
Medical Equipment	• Provides position feedback for respiratory devices, infusion pumps, and electrophoresis devices	• Programmable measuring angle with built-in redundancy • Truly contactless operation with no wear; maintenance free • Immunity to dust, moisture, vibration and extreme temperatures • Robust, compact, and low profile up to IP69K Protection • Absolute position feedback; position is not lost even on power loss • High resolution up to 14-bit	PIHER sensing systems
Hospital Beds and Wheelchairs	• Provides rotary angle/position feedback for power beds and power wheelchairs		PIHER sensing systems
HMI Controls	• Provides linear and rotary position sensing for centrifugators, X-ray and imaging systems, ventilators, patient monitor equipment, and HVACR	• Low profile • Long life • Excellent resolution and linearity	PIHER sensing systems

CO2 and Humidity Sensors

Telaire T3000 Series | CO2 Sensors for Harsh Environments

Telaire T3000 Series is a range of Carbon Dioxide (CO2) Sensors designed to meet the specific needs of customers who require measuring CO2 in harsh or difficult environments. Based on a series of modules, the casing offers a number of combinations to meet the needs of range, supply voltage, and output type in various applications. Example applications include incubators, buses, refrigerators, subway stations, and railway carriages.
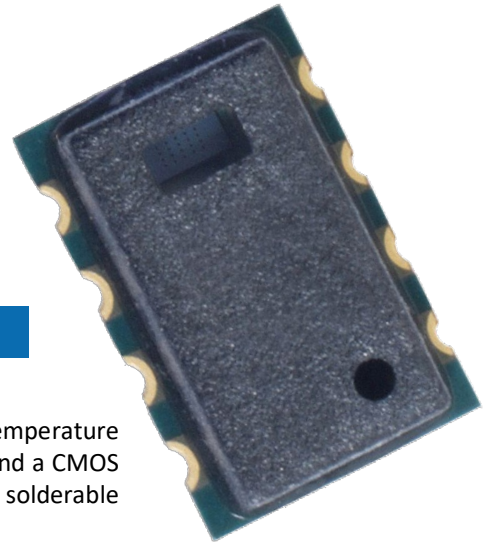
Telaire ChipCap 2 | Humidity and Temperature Sensor

The Telaire ChipCap 2 offers the most advanced and cost-effective humidity and temperature sensing solution for virtually any type of application. A capacitive polymer sensor chip and a CMOS integrated circuit with EEPROM are integrated into one embedded system in a reflow solderable SMD package.

Individually calibrated and tested, ChipCap 2 performs at ±2% from 20% to 80% RH (±3% over entire humidity range) and is simple and ready to use without further calibration or temperature compensation.
ChipCap 2 provides linear output signals in various interfaces to customer requirements:

- I²C interface
- PDM convertible to analog signal
- Alarm function for preset control at min/max humidity

Applications

- Energy Saving HVAC Control —Air Conditioning, Refrigeration, Indoor Air Quality, Vent Fans, Home Appliances, Humi/Dehumidifiers
- Process Control & Instrumentation—Medical Instruments, Handheld Devices, Weather Stations, Food Processing, Printers, RFIDs
- Automobile & Transportation—Cabin Climate Control, Defogging Control Condensing Preventive Device
- Medical — Nebulizers, Oxygen air, CPAP/Sleep Apnea devices
- OEM assemblies available

Sensing Technologies

MAJOR MARKETS SERVED	Thermometrics, Inc. Temperature	Telaire Gas & Moisture	NovaSensor Pressure	Protimeter Moisture Meters	Kaye Thermal Validation	SGX Sensortech Gas	Piher Sensing Systems Position	Wilcoxon Sensing Technologies Vibration	Piezo Technologies Ultrasonic	i2s Pressure & Temperature	All Sensors Ultra Low Pressure	SSI Technologies Level, Quality & Pressure
Aerospace (Commercial)	●		●			●	●				●	●
Agriculture	●	●		●		●	●			●		●
Air Quality		●		●		●					●	●
Automotive	●	●	●			●	●			●		●
Automation	●	●					●	●			●	
Construction & Restoration				●								●
Electrification (EV/HEV)	●	●	●			●	●			●		●
Energy	●					●		●	●			
Environmental Monitoring					●	●					●	
HVAC - Industrial	●	●	●			●	●	●		●	●	●
HVAC - Medical Facilities	●	●	●			●	●			●	●	●
Air-Conditioning	●											
Climate Control Systems										●		
Differential Pressure Measurement		●	●								●	●
Equipment Conditions	●											
Floor Heating	●											
Fresh Air Ventilation Control		●										
HMI Controls							●					
Hospital Beds and Wheelchairs							●					
Humidity Control		●										
HVAC Refrigerant												●
HVAC Systems	●									●		
Inline Oxygen Measurement						●						
Medical Equipment							●					
Industrial	●	●	●	●		●	●	●		●	●	●
Marine	●					●	●	●				●
Medical	●	●	●				●		●		●	●
Military	●		●			●	●		●		●	●
Non-Destructive Testing (NDT)									●			
Oil & Gas	●		●			●	●	●	●		●	●
Pharmaceutical & Biotech					●						●	●
Railway	●								●			●
Thermal Validation					●							

Amphenol
Turkey&MiddleEast

Medical/HIFU Transducers

Piezo Technologies provides semi-custom, modular, and pure custom ultrasonic transducer products for High Intensity Focused Ultrasound applications. None of our transducers are off-the-shelf. Each solution is designed for your specific applications. Our vast database of past projects provides a base for developing many new products as semi-custom or modular devices. This reduces both cost and turnaround time, while still providing a unique product.

High Power Transducers

Piezo Technologies offers high power, custom-designed ultrasonic transducers for many industries, including:
- Medical
- Cleaning
- Process Control
- Liquid Dispensing
- Distance Ranging
- Gas Flow Measurement

Other areas of use (that can include separate imaging assemblies) include:

- Medical therapy transducers for tissue and fracture healing
- Hypothermia treatment
- State-of-the-art High Intensity Focused Ultrasound (HIFU) Transducers for non-invasive surgery and tissue ablation – available in single- and multi-element designs

Piezo Technologies High Power Ultrasonic Transducers can be developed in frequencies from <20KHz to 20MHz, sizes from < ½ inch (13mm) to >8-inch (200mm) diameter, and operating temperatures to >500° F (260° C).

Sensing Technologies

MAJOR MARKETS SERVED	Thermometrics, Inc. Temperature	Telaire Gas & Moisture	NovaSensor Pressure	Protimeter Moisture Meters	Kaye Thermal Validation	SGX Sensortech Gas	Piher Sensing Systems Position	Wilcoxon Sensing Technologies Vibration	Piezo Technologies Ultrasonic	i2s Pressure & Temperature	All Sensors Ultra Low Pressure	SSI Technologies Level, Quality & Pressure
Aerospace (Commercial)	●		●			●	●				●	●
Agriculture	●	●		●		●	●			●		●
Air Quality		●		●		●					●	●
Automotive	●	●	●			●	●			●		●
Automation	●	●					●	●			●	
Construction & Restoration				●								●
Electrification (EV/HEV)	●	●	●			●	●			●		●
Energy	●					●		●	●			
Environmental Monitoring					●	●					●	
Heavy Equipment & Off-Road (HVOR)	●		●				●				●	●
HVACR	●	●	●			●	●	●			●	●
Industrial	●	●	●	●		●	●	●		●	●	●
Marine	●					●	●	●				●
MEDICAL	●		●		●		●		●		●	●
Critical Care	●		●				●		●		●	
Medical Instrumentation	●		●		●		●		●		●	●
Patient Monitoring	●		●				●					
Respiratory Care	●		●				●				●	
Surgical Assemblies	●		●						●			
Military	●		●			●	●	●	●		●	●
Non-Destructive Testing (NDT)									●			
Oil & Gas	●		●			●	●	●	●		●	●
Pharmaceutical & Biotech					●						●	●
Railway	●							●	●			●
Thermal Validation					●							

Amphenol
Enabling the Electronics Revolution

SENSORS