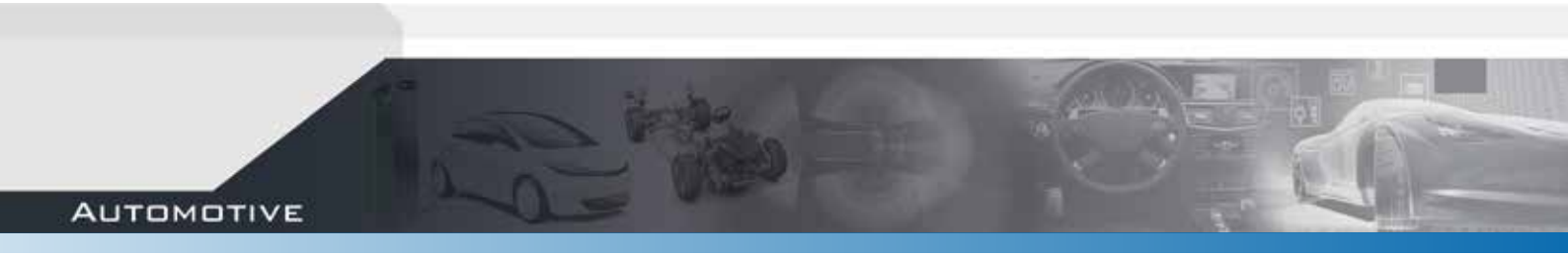
# Amphenol

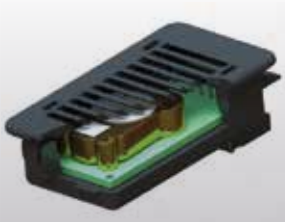
*Enabling the Electronics Revolution*




Lighting

Power Supply

Connectivity



Sensors & Switches

Connector Systems

Cable Assemblies

Mechatronics & Plastics

eMobility

Amphenol Turkey&MiddleEast

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# Amphenol is a leading supplier of advanced interconnect systems, sensors and antennas for a growing array of automotive electronics applications, high technology onboard electronics and automotive safety devices.

Amphenol offers automotive solutions across engine management and control, exhaust monitoring and cleaning, infotainment and communications, in-car power, lighting, safety and security systems, navigation and telematics systems. In addition, Amphenol has developed advanced technology solutions for hybrid-electric vehicles. Our automotive sensor product offering now spans temperature, pressure, rain and sun, and CO2 sensing, all important areas of modern automotive electronics. Amphenol's automotive antenna solutions enable satellite, Wi-Fi, Bluetooth™ and other functionalities.

**Amphenol** AUTOMOTIVE
Group Companies

**Amphenol** INDUSTRIAL

Amphenol ADRONICS

Amphenol Advanced Sensors

Amphenol ICC

Amphenol Automotive
Amphenol-Tuchel Electronics GmbH

Amphenol FILEC

CASCO
DRIVING POWER-FULL SOLUTIONS

CEMM THOME
A Member of the AMPHENOL Group

Amphenol AUTOMOTIVE
ONE

DO CHARM

Deutgen
Kunststoff-technik

FEP

KE ELEKTRONIK
an Amphenol company

i2s
an Amphenol company

PIHER sensing systems

SAA
Shanghai Amphenol Airwave

SGX
SENSORTECH

SSI

TECVOX
an Amphenol company

# Contents

# eMobility

"Amphenol offers a complete range of solutions for today's and tomorrow's eMobility requirements."

## Charging Connection

Amphenol provides charging connections compliant to below standards:

- SAE 1772
- GB-T
- IEC 62196-2 / 62196-3

## HV Cable Assemblies

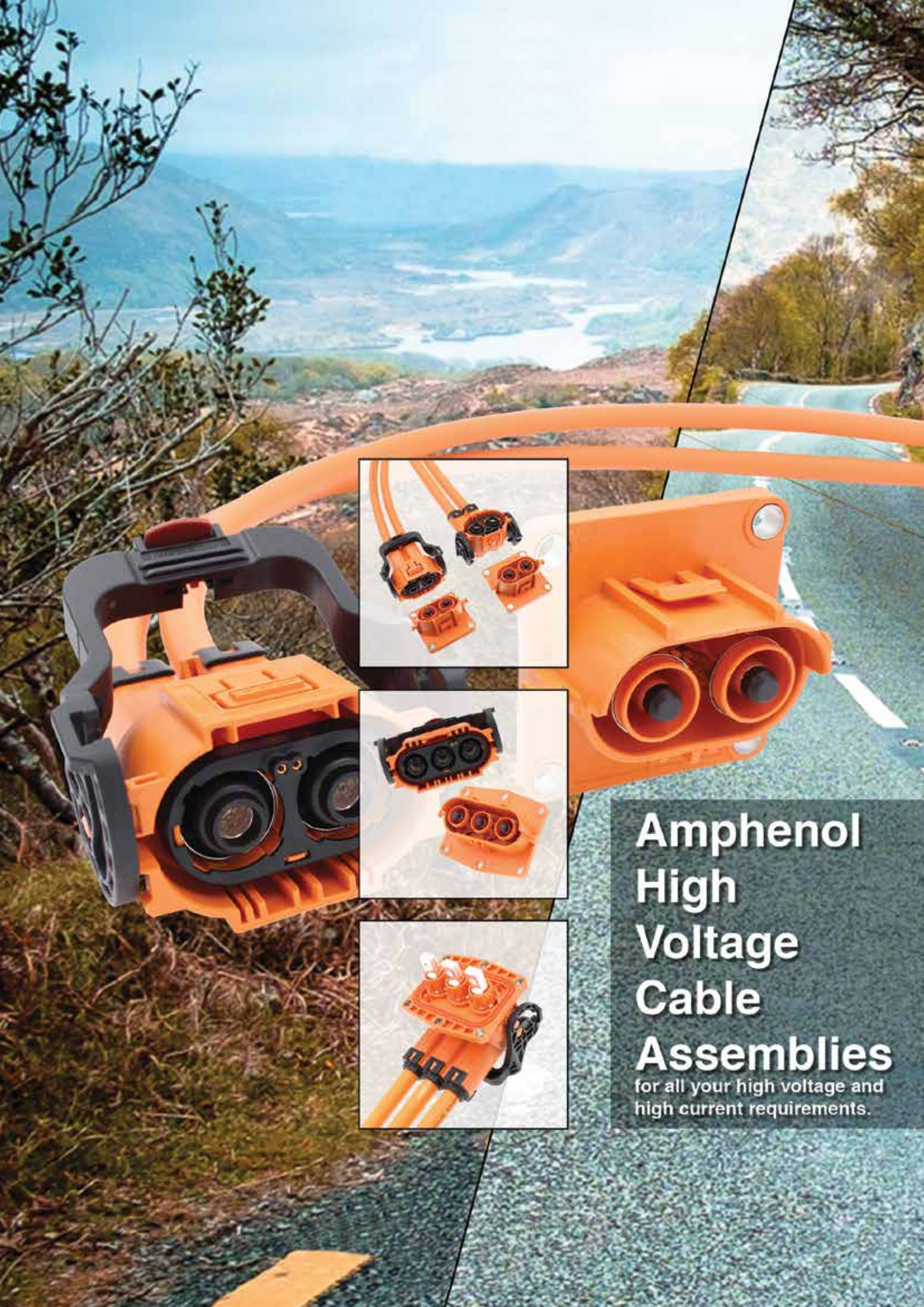
High Voltage Cable Assemblies Amphenol has the capabilities to create custom solutions for all your high voltage and high current needs common in many hybrid and electrical car applications.

## Manual Service Disconnect (MSD)

Amphenol's standard fused, and non-fused manual service disconnects can be configured to meet your packaging requirements. Our manual service disconnect with fuse packages a specially designed high-power fuse in a very compact package. Safety systems include last-mate, first-break, touch-proof contacts, as well as a convenient nylon handle for removing the unit. Our manual service disconnect without fuse includes a safety circuit to ensure that power is never going through the unit when disconnecting. For added safety, touch-proof contacts are included.

## IO Power Interface

Amphenol's finger proof, touch safe high current plugs and sockets are designed to meet the requirements of various hybrid and electric vehicle applications.
With patented RADSOK® technology, the connector features higher amperage, lower T-rise and voltage drop, and less resistance. The RADSOK® Technology and an interlock solution ensure a safe and reliable connection.


Amphenol
High
Voltage
Cable
Assemblies
for all your high voltage and
high current requirements.

## Cell Connection System (CCS)

Also referred to as a battery cover, the CCS is used on electric vehicles (EV) and hybrid electric vehicles (HEV). Used as the top cover to the battery pack it provides temperature sensing and voltage sensing of the battery cells as well as high voltage connectivity, via the busbars, across the battery pack/cells. The sensing capabilities allow the OEM to connect the sensor output to the battery management system (BMS) which supports monitoring/controlling the state of charge for the battery pack/cells.

**CCS –Wire Harness Style**

- NTC thermistors attached to the busbar to detect temperature
- Wire routing within CCS and bundled at exit to customer defined connector

**CCS–FlexiblePrintedCircuit(FPC)Style**

- Surface mount NTC thermistors attached to flexible printed circuit
- Reduced space requirements (FPC vs. wire harness)

## Battery Flex

This solution is a combination of single, multilayer, rigid flex-circuits and busbars assembled with sensors and connectors.
Benefits:

- Great performance in harsh environment
- Excellent signal integrity
- Dynamic flexure
- Weight and pack size reduction
- Lower assembly cost & labor time
- Design flexibility

## EV Battery Components

Amphenol provides various solutions for the EV battery applications as individual components or even as sub-systems like BMS.

- MSD
- Flex Circuits
- Sensors
- Busbars
- Cable Assemblies
- High Voltage Connections
- Inner Quick Connections

## Busbars

Amphenol's busbars are designed and developed for power & interface distribution. Busbars are available in various standard sizes and shapes as well as in custom designs. Busbars present high mechanical resistance and are resistant to high temperatures.

### Bi-Metallic Busbars

Amphenol has developed extensive expertise in solving a central issue experienced by all manufacturers of high energy storage systems - a cost effective production process for bonding dissimilar metals together. This Bi-Metallic welding expertise can provide you the turn-key parts you need for interconnecting battery cells.

## Battery Swapping Module (BSM)

BSM Series – Battery Swapping Module with RADSOK® Technology. Excellent physical shock and vibration specs, high mating cycles and distinct function for deviation-auto correction in both X, Y, Z directions.

## Signal Connectors

- Several pin / layout configurations
- Various amperage levels
- Up to IP67 / IP69k
- EMI shielding option
- Plastic or metal
- Different plating selection
- Different back-hardware options

## Sensors for EV/HV

Temperature, Air and Pressure Sensors for Motor Coil, Cooling System, Battery Cell/Pack/Inlet/Coolant.

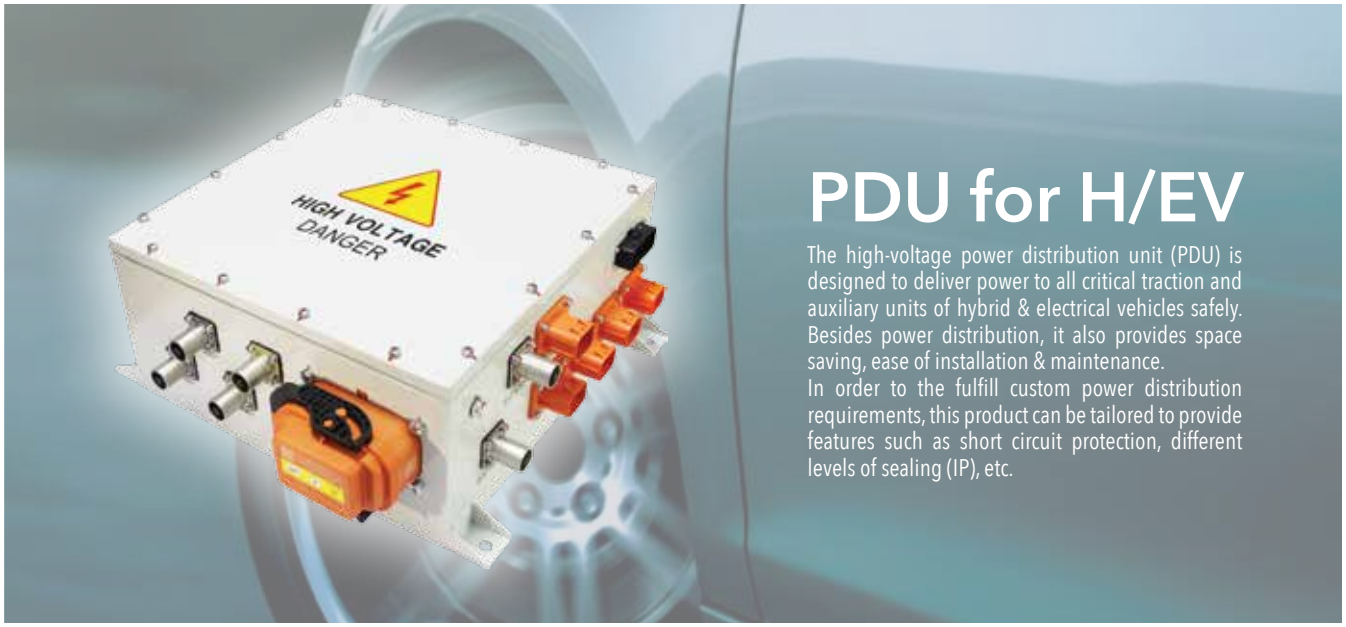
***Plase see the "Sensors & Switches" section in this catalog for further details.**

## AUX Connection

Amphenol's AUX Connection solutions are high voltage interconnects for auxiliary devices such as E-Heater, DC Converter, Charger, Air Conditioning, Coolant Heater Control etc.

## Transmission Connection

Amphenol's rugged crash test worthy transmission housing connector is designed to bring power to electric motors within transmission housings. It uses Amphenol's proven RADSOK® contacts which allow for far more power in a smaller package and provides high electrical performance in situations where space is at a premium. This award winning interconnect is specifically designed for the harsh environment found beneath the car.




## PDU for H/EV

The high-voltage power distribution unit (PDU) is designed to deliver power to all critical traction and auxiliary units of hybrid & electrical vehicles safely. Besides power distribution, it also provides space saving, ease of installation & maintenance.
In order to the fulfill custom power distribution requirements, this product can be tailored to provide features such as short circuit protection, different levels of sealing (IP), etc.

# THE ULTIMATE POWER CONNECTION

## High Voltage / **Power Automotive Contact System**

No E-Mobility without a powerful Connection System!
The new Generation of the RADSOK Contact System is already fulfilling tomorrow's requirements of E-Mobility. The optimized power density is specifically designed for use in sophisticated high-voltage and high-current applications. Even complex challenges can be mastered in minimal space. Amphenol guarantees the highest quality and an optimal price/performance ratio.

### Better

The snap-in connection of the contacts ensures the optimum size, weight and power transmission.

### Cooler

The **RADSOK © R8S** contact system is suitable for all temperature ranges in a vehicle.

### Cleaner

The self-cleaning contact grid ensures a consistent performance for the lifetime.

# Lighting

## Interior - LED Lighting Solutions

Electrical vehic Amphenol has developed interior lighting modules using LED technology which are used for functional and ambient lighting in vehicle interiors. Modules are equipped with single or RG B color LED electronics working as direct lighting or as light guides creating a safe and comfortable driving environment. les, battery systems

### Ambient Lighting

### Dome Lighting Modules

### Light Design

### Functional LED Lamps

## Exterior - Lighting Components & Harness

### Bulb Sockets & Connectors

Amphenol has developed standardized bulbsockets and connectors reflecting the latest trends in the automotive industry. These products, along with custom developed solutions, represent a wide portfolio of components – bulbsockets, connectors, grommets, modules – allowing lampmakers and OE Ms to choose the right connection. Amphenol lighting components are designed in line with common automotive standards.

### Exterior Lighting Horness Assemblies

Amphenol works with customers to produce specialized electrical harnesses for vehicle lighting. We develop and source the necessary parts such as connectors, terminals, housings, clips, tubes, and tape to build the right solution for the customer at the right price. These harnesses are used for complete vehicle lighting applications – headlamps, rear lamps, interior lighting.

# Connector System

## SRS Connection

**Connectors, Retainers, and Cable Assemblies**
Amphenol's safety restraint systems product family consists of the well established 10 mm interface and the 11 mm solutions AK 1, AK 2, and AK 2+. Different connector versions are available with latch, pushbutton, and reversed locking legs. The filter elements are coil, mono-block, and multi-material ferrite, straight and right angle versions. Our complete line of retainers are available with or without a shorting bridge and are 100% camera checked and printed for the highest class of traceability.

## High Power

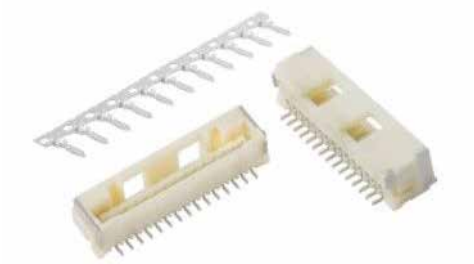
Amphenol's High Power connector interface has a high power RADSOK® contact with a unique locking mechanism in a functional and attractive plastic housing. This interface allows for quick and easy mating and unmating. Reliability is greatly enhanced due to audible and tactile locking action which assures the operator the connector is properly mated.

## Automotive RADSOK® Connectors

The RADSOK product family includes multiple contact sizes and standard housings for wire to wire as well as wire to board/lead frame connections. Many features such as TPA, CPA, water protection, and coding are implemented in the housings which can be adapted for customized solutions. RADSOK is approved by vehicle manufacturers and is already in use in mass production for high-power, high-current, and other applications.

## Standard Connector Housings

Flat contact housings are available for contact sizes 0.64 mm, 1.2 mm, 1.5 mm, 2.8 mm, 4.8 mm and 9.5 mm. They are used for contacting electrical / electronic components in the vehicle and can be used as a floating coupling (inline). Depending on the size and design these contact housings are available with up to 14 pins as sealed version or up to 52 pins as non-sealed version. The reliability of the connector is significantly enhanced by the integration of a secondary lock (TPA) and – optionally – a control positioning assurance (CPA).



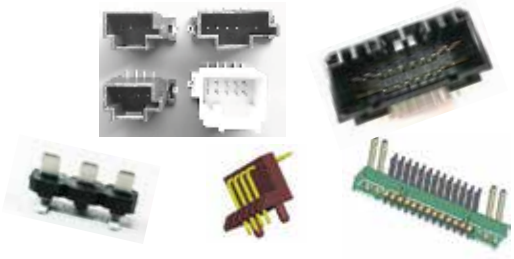
## Wire to Board

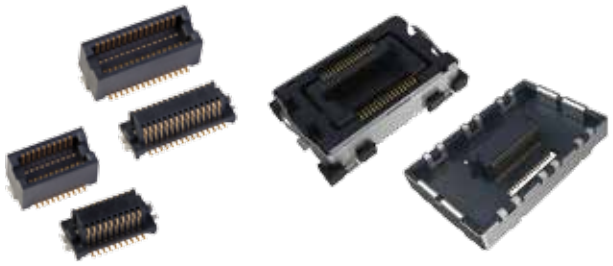
Amphenol's wire to board connectors are widely used in various applications. These connectors guarantee a robust connection and a stable withdrawal force with protection against wrong insertion.

## Pin Header & Socket

Amphenol's low profile, protected headers & sockets are the cost effective solutions to the applications requiring positive connect and disconnect capabilities. Headers and sockets are available with between 10 and 40 contacts in SMT, right angle, and straight mounting configuration. Lock and eject latches may be added to make un-mating absolutely reliable.

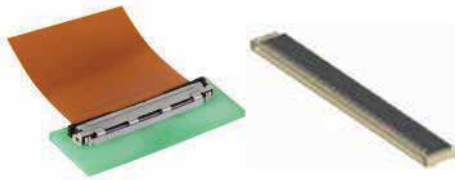
### Customized Header Design





## Fixed / Floating Board to Board

Amphenol's board to board connectors combine low profile with stable contact/mating force and with secured transmission reliability.



## FFC / FPC

Amphenol flexprint connectors accommodate 0.3 mm thick flexprint cable with different contact configurations and pitch sizes. The double sided, pre-stressed contact shape guarantees secure contact between the flexprint circuit and the connector and allows insertion of the flexprint cable in either upward or downward direction.

## Harsh Environment Connectors

Amphenol is the innovator and solution provider for all products that are to be used in the harsh and rugged environments. Amphenol has a big spectrum of rugged and harsh environment interconnects ranging from IP65 to IP69K.

**A Series Connectors** are available in a variety of standard positions (2-18 pos.). The AT, ATM, ATP and AHD Series connectors were designed as a high-performance, cost-effective solution within the Heavy Equipment, Agricultural, Automotive, Military, Alternative Energy and other demanding interconnect architectures. All of these connectors are compatible with other existing standard products industrywide, and feature rugged thermoplastic housing with superior environmental sealing and hand insertable/removable contacts for simplified service.

### High Speed FPC

COMPACT, LOW PROFILE, HIGH SPEED High Speed FPC (Flexible Printed Circuit) is a connector with capability to transfer data rates up to 10Gb/s. It has a 0.30mm pitch, in-line layout and back flip actuator coupled with locking feature for strong FPC retention. High speed FPC provides a low profile and compact solution whilst maintaining high speed signal integrity. It is ideal for applications where space is a constraint. It also complies with USB 3.1/3.0, PCIe 3.0, SATA 3.0, Displayport and MIPI M-Phy standards.

## HSD - High Speed Data

COMPLIANT WITH USCAR-2 SPECIFICATIONS; IDEAL FOR AUTOMOTIVE APPLICATIONS
HSD connector system is a fully shielded interconnect system that can be used with shielded twisted quad cables. It is a high-performance digital system for low-voltage differential signals which prevents interference from crosstalk and external sources. It has the minimum size to satisfy global automotive requirements such as LVDS camera, USB, and IEEE 1394 applications.

- USCAR-2 compliant
- 2.5x enhanced retention force
- Simple assembly design that is patent protected
- Resistant to reflow soldering temperature
- Compatible with other competing products

## Audio Jack

Amphenol ICC's 3.5mm diameter miniature jack connector is a family of connectors used for analog signals, primarily audio.
Available in 3 to 5 contacts, the connector comes with innovative contact design for robustness and high mating cycles. The miniature jack connector is designed with Surface Mount (SMT) termination.
Amphenol ICC's 3.5mm diameter miniature jack connector is a family of connectors used for analog signals, primarily audio.

## FAKRA

The German and American automotive industries have standardized a high-performing, cost-effective RF connector based on the FAKRA and USCAR standards for automotive telematics. FAKRA connectors are designed to perform up to 4GHz and meet the particular mechanical and environmental requirements of the automobile industry.

## USB

Amphenol USB receptacles and plugs is a complete system of interconnection technology designed in accordance with Universal Serial Bus Specifications.

**USB Type C - SCALABLE, SUPERSPEED CONNECTOR SYSTEM**
USB Type C connectors are expected to be widely used as a next-generation interface. They support a variety of protocols such as USB2.0/3.0/3.1 and meet Superspeed communication 10Gb/s, 5A and 20V power supply. The usability for USB 3.1 Type C connector is enhanced also by its low profile and reversible product design. It is ideal for emerging product designs.

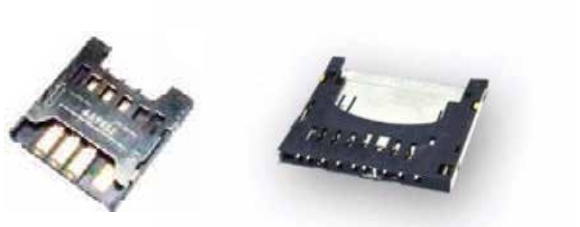
## Display Port / HDMI

COMPLIANT WITH HDMI TYPE E SPECIFICATIONS; IDEAL FOR AUTOMOTIVE APPLICATIONS.
Amphenol's HDMI connectors provide an interface between any compatible digital audio/video source and a compatible digital audio and/or video monitor. These connectors support standard, enhanced, or high-definition video, plus multi-channel digital audio on a single cable.

**Display Port** is a digital display interface standard put forth by the Video Electronics Standards Association (VESA). It covers provisions for high definition digital audio-video and graphics streaming via the interface through the same cable.

## Hybrid Dual-Position FAKRA

Hybrid Dual-Position FAKRA Amphenol's Hybrid Dual-Position FAKRA connectors contain one RF port and one DC power port. This connector is used for applications where both RF and power is needed such as amplified antennas for telematics systems.
High-Density Hybrid Dual-Position FAKRA is designed for applications requiring a small connector package.



## SIM / SD Card

The Top mount SD Memory Card Connector for CMD (Car Multimedia Device) market provide a more durable solution for dashboard and vehicular entertainment devices applications. It is shock proof and able to withstand vibrations.

## Terminals

Terminals with different plating and packaging options, in various types and sizes.

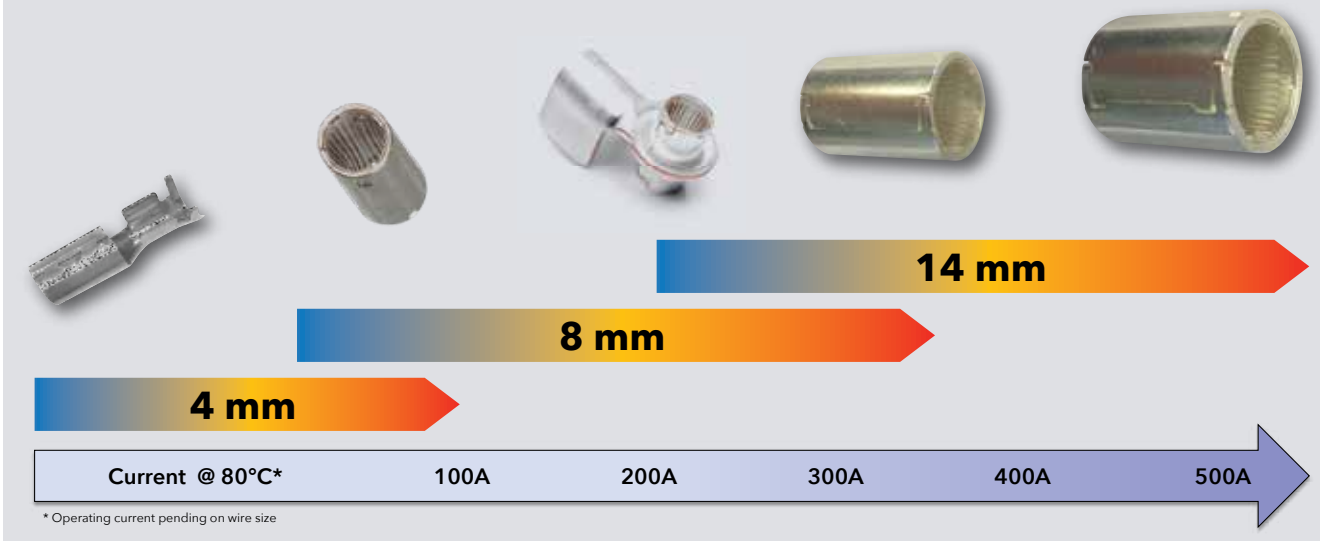
## Smart Card Systems

Amphenol has a long history of creating smart card systems for a multitude of applications. Amphenol's smart card systems are tailor-made for integration into EV charge stations for customer identification and payment. We also have unique expertise in RF solutions needed for contactless payment systems.

## Trailer Connectors

Vehicle connectors for trailer operation. 7 pole and 13 pole plugs & sockets, adapters and accessories.

## Connector Systems-RADSOK Terminal System



# Sensors & Switches

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 CO2 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 related 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 technology 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.

## 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 / Headlamp 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 windshield 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 before 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 conditions 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, CO2 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 surface temperature measurement. The product consist of thermo-elements, 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 sensors 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.

## TULC Sensor

SSI Technologies, LLC introduces our TULC Sensor, an in-tank combination 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

## 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.

## 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.

## 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 specifically designed and certified to your tank's configuration.
- Top mounted with standard and custom header configurations.

## Acu-Trac™ SMART 485

The Acu-Trac™ Smart 485 family ultrasonic level transducers are designed for continuous liquid level monitoring and liquid level control 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.

## 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.

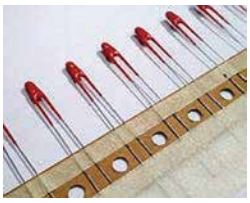
THERMOMETRICS
A COMMITMENT TO EXCELLENCE

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

## 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 temperature 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 temperature 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.

# 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 electronics make it possible to take very precise and stable measurements at temperatures of up to 150 °C, even under tough conditions. In addition, 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.

## PTM Pressure Sensor Module

**For system integration**
The pressure transmitter module (PTM) responds to the general trend towards miniaturisation and cost efficiency. Its ideal construction 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 temperature-compensated analogue signal or digital signal. Stable, exact measurements are generated over a broad temperature range in the process, also under adverse conditions.

## Transmission Pressure Sensor

Amphenol leverages its core silicon micromachining technology and utilizes advanced packaging technologies to offer pressure sensors that are industry leading in size and weight in automotive-proven 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-profile 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 market demands for flexible, customer specific behavior/solutions and overall system cost reduction for RT PF applications. The programmable version of this sensor is available for development purposes, allowing the customer to download the application code into an electrically programmable EPROM version.

## 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 current 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 excellently suited for use in oil, petrol, diesel, H2, CNG and LPG applications. 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.

## 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 industry requirements with respect to EMC and ESD.

## 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.

## 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 anemometer, the mass air flow sensor consists of temperature sensors and heaters each arranged in pairs. This arrangement permits bi-directional 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 characteristic 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.

## 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.

# 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

# Automotive Sensor Portfolio


## PRINTED PCB Carbon Resistors

PIHER
an Amphenol® company

**Repeatable high volume to accurate tolerances.**

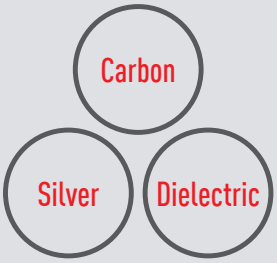
Printed Resistors PCB are thick-film resistive ink elements designed around customers' unique assemblies. PIHER's thick film inks can be printed on a wide range of substrates — from high temperature ceramics to common PCB materials.

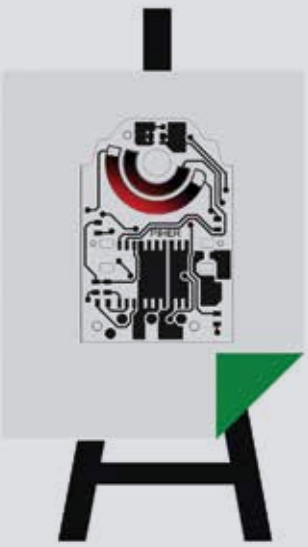
Our market-leading thick-film technology can be used to deposit any combination of fixed resistors, switches, potentiometer tracks and conductors onto virtually any size, shape or PCB form. This versatility offers an enormous range of design possibilities at competitive prices, even in low batch quantities.

### Carbon printing down to a ***fine*** art

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

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



# A global resource for your on-vehicle measurement needs

Engine management system

Cabin comfort

HVAC

Tire pressure monitoring

Safety system

**Cabin Comfort**

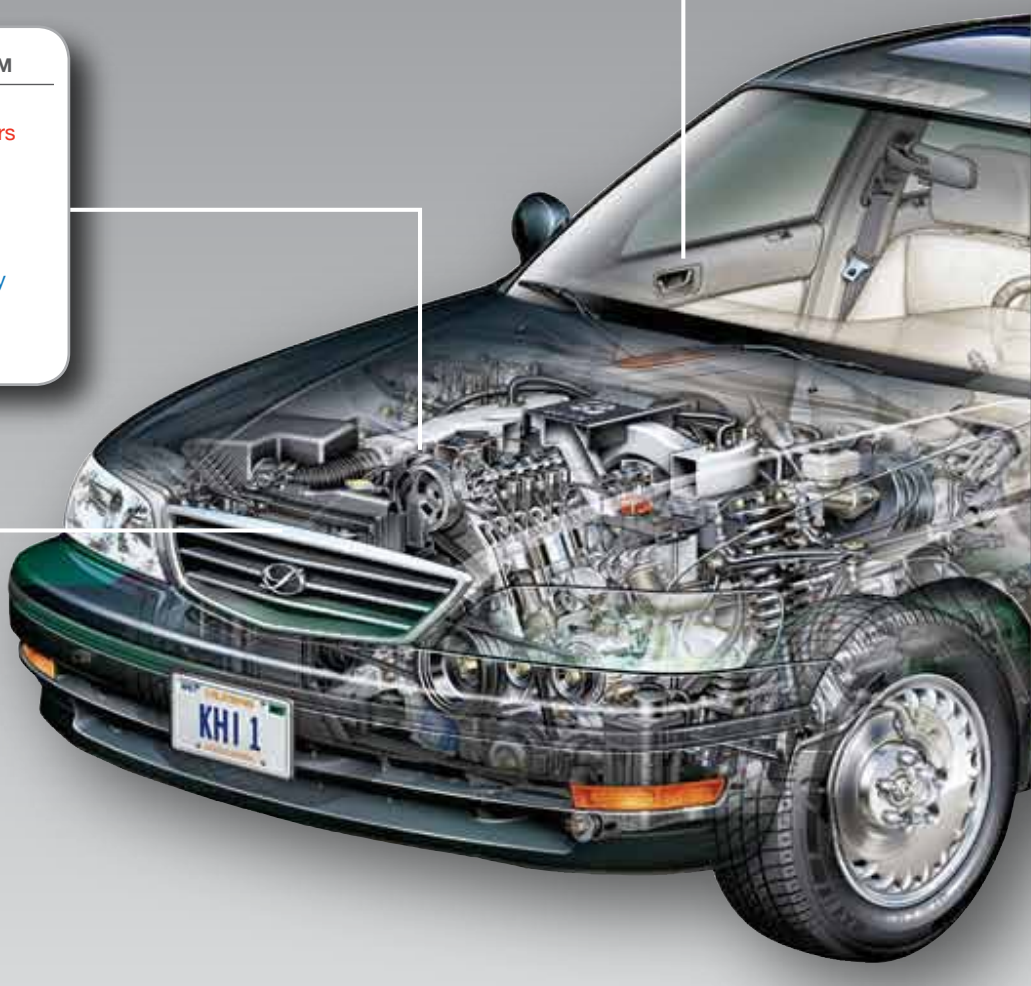
Cabin temperature sensors
Windshield temperature sensors
Seat temperature sensors
Infrared non-contact sensors
PTC in-cabin heaters
Humidity sensors
Air quality sensors
Solar/twilight sensors

**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

### Powertrain System

Fluid temperature sensors
System pressure sensors
Transmission speed sensors

### Fuel Handling System

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

### Tire Pressure Monitoring

Tire temperature sensors
Tire pressure sensors

### KEY

- Pressure
- Temperature
- Humidity
- Multi-Sensor
  Pressure, Temperature & Humidity
- Gas
- Infrared
- Solar
- Position
- Level

# Connectivity

## Media Hubs

Amphenol Media Hubs connect consumer devices to infotainment systems using an array of popular formats.
Using popular technologies like USB 2.0 and SD memory, Amphenol Media Hubs directly connect consumer device to their cars to provide the infotainment features that they have grown to expect.
With innovative improvements like our Halo Lighting system, Amphenol Media Hubs make the automotive experience effortless for consumers through smarter solutions.

**Key Features**

- Adaptive Charging
- Host-Independent Mode Switching
- Intelligent Profile Selection
- Multi-host, Flexconnect and Dual-Upstream Configurations Available
- Delayed Shutdown
- Current Rationing Options
- Programmable Modules
- Designed in USA

**Technical Specifications**

- USB 2.0 Compatible
- USB Type-C Compatible
- Apple MFi & CarPlay compliant
- BCS 1.2 Compliant
- USCAR Compliant
- High Speed data transmission at 480 Mbit/s
- Charges up to 3 Amps

## Infotainment Interconnect Solutions

Amphenol's comprehensive infotainment solutions encompass customized media interface hubs, ports, and integrated wireless charging pads. These solutions are the culmination of Amphenol's innovative engineering, planning, and production efforts that provides our customers with a comprehensive automotive infotainment system.

## Automotive Data Cable Assemblies

Amphenol has integrated the latest technology allowing all in vehicle infotainment modules to be connected through automotive grade assemblies. With our Automotive Data Cable Assemblies, vehicle OEM's can integrate the latest high speed **USB** and **HDMI** functionality with automotive grade supplier quality, product specifications, and support.

## Antenna Modules

Amphenol's automotive antennas and RF cable assemblies are integrated into car doors, window glass, and infotainment systems; and assembled onto vehicle roofs. From shark fin antennas to coaxial assemblies, Amphenol can provide solutions for GPS, SDARS, WIFI, Bluetooth, 3G, 4G LTE, and AM/FM.

## NFC Antenna Assemblies

## LDS Antennas

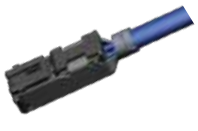
Laser Direct Structuring (LDS ) has lead to vast opportunities in innovative design. The laser activation technology produces thinner lines and smaller features than previously made possible by other molded interconnect device processes without compromising consistency and repeatability. Surface mounting components on LDS antennas is also possible.

## FAKRA Cable Assemblies

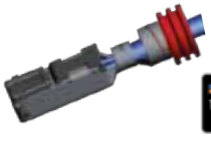
## Camera Cable Assemblies

## HSD Cable Assemblies

Ethernet 100MBps — Ethernet 1GBps UTP / STP — 10 + GBps Shielded / Coax - Triax



- 100 BASE-T1, BroadR-**Reach™**
- OPEN Alliance TC2,UTP
- IEEE802.3bw

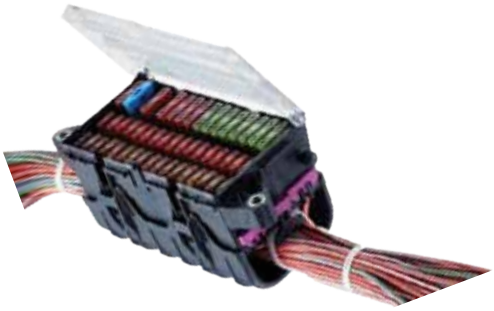




- 100 BASE-T1, BroadR-**Reach™**
- OPEN Alliance TC9,UTP / STP
- IEEE802.3bp

**Application specific solutions**
- Integrated housing
- Switches / Smart Hubs
- Bulkhead interface
- Multi Bit Ethernet as Backbone (>10 - 12 GBps)

# Power Supply



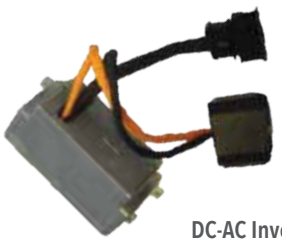
## Power Distribution

Amphenol's relay and fuse boxes are support systems for standardized relays and fuses and connect them to the vehicle-mounted on-board power supply system. They are customized according to customers' needs and designed and manufactured for different numbers and formats of fuses / relays. These solutions can be adapted across conventional, hybrid, and electric vehicles.


## HVPO - Assemblies

Amphenol High Voltage Power Outlets (HVPO) provide consumers with a reliable charging station for personal electronic devices.
Using cutting-edge technology like our 2-wire solution, Amphenol HVPOs give a quick and safe source of power to charge personal electronic devices that consumers rely on using a format they known and trust.
Amphenol HVPOs help complete any automotive infotainment system by providing consumers with the convenient resources to keep them connected

DC-DC Converter



DC-AC Inverter

## Power Electronics

Amphenol's power electronic products convert and efficiently manage energy in vehicles. Supplied through our AC outlets, DC power is converted from the vehicle's 12V electrical system to standard AC power for use with all devices. These products complement 12V power outlet and USB charger products to provide customers with most types of in-vehicle power. All of Amphenol's power products are designed and tested to function under extreme environmental conditions and meet stringent vehicle EMC standards.

# Power Supply


High Voltage Power Outlets


USB Dual Charger


Cigarette Lighter and 12V Receptacles

USB Charge Ports

## Power Sources

Amphenol's power source products are designed around 12V power outlets, which have been the industry standard for decades. These products have evolved from the classic cigarette lighter design, originally developed and patented by **Casco** (an Amphenol Company). Although alternative power delivery methods are now available (e.g., 5V USB and 110/230V AC outlets, both also offered by Amphenol), the power outlet remains the most cost-effective power delivery method in the market. Amphenol has recently re-designed the cigarette lighter for the 21st century, offering customers a unique value options with this new product.

# Cable Assemblies

Application Specific Designs
Customized Solutions

## SRS / Safety

Amphenol has worked with customers to design and build airbag electrical harnesses based on specific design requirenments. Based on these custom specifcations we design, source, and assemble air-bag connectors with other components such as terminals, housings, clips, tubes, cable ducts and tape to assure a high quality end-product.

## Engine Devices

Engine cooling, suspension, and exhaust systems are becoming more intelligent each year. To help customers cope with new components Amphenol creates robust and intelligent cable assemblies for all aspects of cooling, suspension, and exhaust systems.

## Micro Cable Assemblies - Coax

Amphenol is one of the leading providers of MCX cable solutions on the market. The current market demands a more integrated connectivity solution, including integrated hinge/MCX cable assemblies. Our Micro Coax Cable assembly is designed for high-speed transmission, high EMI shielding, and a very small bundle diameter for optimal spacing in tight applications.

## Lighting

Amphenol works with customers to produce specialized electrical harnesses for vehicle lighting. We develop and source the necessary parts such as connectors, terminals, housings, clips, tubes, and tape to build the right solution for the customer at the right price. These harnesses are used for complete vehicle lighting applications – headlamps, rear lamps, interior lighting.

# Cable Assemblies

## Harsh Environment

Our cable assemblies feature an environmentally sealed connection system. This new design creates a more robust system and can broaden the scope of applications for our technologies in harsh environment applications. Amphenol has also developed a unique overmolded RADSOK® cable assembly system for high-power automotive applications.

## High Power

Amphenol has leveraged its extensive background in power connectors and harnesses to create a line of high power interconnects for the automotive market. These solutions can also be combined with Amphenol's proven RADSOK® technology.

## Transsmission

These harsh environment wire harness and cable assemblies are able to withstand high-temperatures while undergoing high-vibration, high-abrasion, and high-humidity. Solutions are available for sealing requirements, chemical resistance, and custom harness securing through innovative overmolding processes and proven designs.

## Automotive Data Cable Assemblies

Amphenol has the cable assembly solutions you need to transfer data within a vehicle. Whether it is high-speed data systems, LVDS (low-voltage differential signaling) systems, navigation systems or parking distance control systems we will partner with you to develop the solution you need.

Module Harness

Defrosting Glass Electrical Harness

Power Steering System Harnesses

Camera Module

TNB (Buckle Connector) Electrical Harness

Door Switch Harness

# Mechatronics & Plastics

Bi Component - Insert Molding

## Cable Ducts

Cable channels ensure accurate and robust routing of cable harnesses. They are mounted in the interior, the engine compartment and the underbody of vehicles. Cable channels are designed for operating temperatures from -40° C up to 80° C in the interior and up to 140° C in the engine compartment. Depending on the material, two-piece (base and lid) or one-piece versions are manufactured (body with cover) ranging in length from 10 to 630 mm. Various standard mounting systems (clip/sockets) allow for easy installation in the vehicle)

## Insert Molded Housing

Inside our electronic housings we can integrate electronic components and sensors protecting them and allowing vehicle connections and mounting. Contacts inside the housing are encapsulated or pressed in - if required the components are pre-assembled according to the customer's needs. The connection to the onboard network is realized via standard connectors. Depending on the area of installation, the housings are available as sealed or non-sealed versions. In order to enable ventilation for sealed electronic housings, we can integrate a pressure release device.

## MIM - Micro Mechanics

Amphenol produces high quality parts with over 90% metal density through our metal injection molding (MIM) process. The MIM process provides greater flexibility in design complexity, prevents corrosion, and provides a resistant polish. It allows us to produce large runs with a very low material waste. The MIM process is used on components of various applications including mobile phones, laptops, and industrial and automotive platforms.

**Moving Mechanisms**
Amphenol's moving mechanisms are designed for your customized applications and match your required dimensions. Various types are as follows: Slide, Folding, Automatic, Friction, and more.

## CIM

Amphenol's CIM process uses ceramic zirconium to provide a scratch and wear resistant surface to components such as mobile phone camera decoration and side keys. The CIM material provides additional durability and strength in your products. We have applied our Metal Injection Molding (MIM) experience of large volume runs to CIM to create a hi-tech material process and provide various MIM/CIM solutions to mobile consumer product customers.

# Mechatronic & Plastics

## Custom Box Builds

Amphenol has vast experience in valueadd box builds for our customers worldwide. We will work with your engineers to create the complete assemblies that your business requires. We can source and integrate your specific circuits into a complete solution along with our connectors and cables.

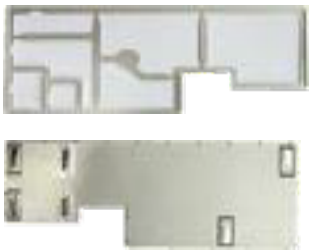
## Device Interface

Custom design and standard device interface solutions.

Weight Reduction

Precision Components

PDU Assemblies

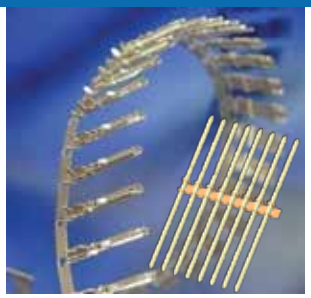


Shielding

# Technology Competences

## High Speed Stamping





## Selective Plating

## Automated Harness Assembly


## Molding

Bi Component / Reel to Reel
Clean Room Molding / Insert Molding

## Automated Assembly



# Testing Laboratory Competency

Designated Laboratory sides
for all relevant testing
according applicable
Automotive standards

DAkkS
Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition

**Accreditation**

The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory

**Amphenol-Tuchel Electronics GmbH**
**Testing Laboratory**
**August Häusser-Straße 10, 74080 Heilbronn**

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the following fields:

**Electrical, mechanical and environmental simulation tests under inclusion of temperature, humidity, corrosion, IP degree of protection, vibration and mechanical shock as well as combinations thereof for the validation of connectors and other technical products**

ISO 17025 accredited
Testing Laboratory @ Amphenol Tuchel Electronics - Germay

# Global Quality Standart


All production locations worldwide
certified according to **IATF 16949**

and environmental certification
**DIN EN ISO 14001**

# Amphenol

*Enabling the Electronics Revolution*

## AUTOMOTIVE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