Sensata Technologies

The supplier you want.
The partner you need.

At Sensata we do everything in our power to ensure your personal satisfaction. We apply our unsurpassed experience and expertise to focus on your needs. We adhere to technical, manufacturing and testing standards that are second to none. And our experts work with your experts to ensure the quality and precision it takes to meet the most demanding application requirements. No wonder a world of businesses rely on the more than 600 million Sensor and Control devices we manufacture each year to hone their own leading-edge technologies.

The Sensata Technologies success story.

It began in 1959. And although we have evolved over the years, we have always had one goal: to provide leaders in automotive, appliance, aircraft, industrial, HVAC, and other markets the sensors and controls they require to succeed. From our headquarters in Attleboro, Massachusetts to our manufacturing centers around the world, from our regional warehouses to our network of sales offices spanning the globe, we help customers everywhere to make their products safer, more effective and efficient. Every day.

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AUTOMOTIVE HVAC AND CABIN COMFORT SENSORS

AC Pressure Sensing

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AIR CONDITIONING SENSORS

Advanced Sensing Solutions for Tomorrow's HVAC Systems

The first car with an actual AC system was the 1939 Packard. It consisted of a large evaporator, called the "cooling coil", which took up the entire trunk space. The only control was a blower switch. More car makers followed suit but it wasn't until the late 1970s that AC-equipped cars became a craze. Systems were getting better and people realized the pleasures and benefits of cars fitted with AC systems. It is estimated that now over 75% of all new cars sold worldwide have AC and this number even continues to grow.

Today, Heating, Ventilation and AC, or HVAC, systems are very efficient. Modern automatic temperature control set-ups allow individual adjustments, even for those on the backseat. Computers ensure that both the passengers and driver are comfortable, maintaining the optimum temperature.

! *Every day Sensata produces 300,000 automotive sensors.*

Also within the pressure sensing business we have seen the changing trend from working with pressure switches into pressure sensors. Where the pressure switch has a maximum of 4 signals the sensor provides a linear relation between pressure and the output which is given in voltages. The sensor therefore makes it possible to more precisely inform the Electronic Control Unit (ECU) about the pressure within the AC system and enabling a more efficient operation of the AC system.

PRESSURE SWITCH FOR THE R134A AC SYSTEM

Pressure switches provide on/off controls for many automotive systems. The snap action disc reacts to changing pressure by reversing its curvature when critical pressures are reached and activating electrical switch contacts. The discs are specially formed out of stainless steel to provide long device life and durability. When pressure reaches a certain point, the disc trips the switch that cuts off power to the AC system providing reliable control and safety to the world of automotive applications. Pressure switches are used to provide reliable safety against high pressure situations, shut of AC equipment if there are leaks in the system, and control compressor and AC fan function.

AC: Continuous development

The future of automotive HVAC is changing, and for the better. Now there are new electronic compressor designs. The concern over environmental effects of refrigerant leakage into the atmosphere has induced innovations in order to reduce the emissions. Most cars today use the R134a refrigerant, which contains no chlorine, but recently the European Union has ruled that future systems should also help reduce global warming. Various concepts are currently under investigation, ranging from improved variants of the current refrigerant to the introduction of a completely redesigned AC system, using R744/CO_2, which will also feature additional cooling and heating performance at improved fuel efficiency ratings.

PRESSURE SENSOR FOR THE R134A AC SYSTEM

Sensata's pressure sensors for the R134a AC system measure the pressure of the refrigerant in an AC system. The pressure sensor translates the measured pressure within the AC system into a voltage that is sent to the ECU of a car. Based on the preferred temperature in the car the ECU will manage the compressor in such a way that the pressure in the AC system is most effective to create the required atmosphere in the car. Next to this the pressure will also be used to shut down the compressor when pressure gets out of limit and therefore protect the compressor against any damage pressure might cause.

Sensata's Capacitive Ceramic Sensor Technology is perfectly suited for this application. The sensors provide high accuracy at low pressure levels, while the robust design makes it capable of withstanding high pressure and temperature. As a consequence, Sensata Technologies' Pressure Sensors for R134a are the most used in AC applications.

! *Sensata produces the largest numbers of pressure sensor for automotive HVAC systems worldwide.*

PRESSURE SENSOR FOR THE R744/CO_2 AC SYSTEM

Sensata's pressure and temperature sensor is capable of measuring the higher pressure associated with R744/CO_2 AC systems. Due to the hermetic sensor higher pressures are no issue. Refrigerant leakage is negligible and both pressure and temperature are accurately measured. Due to the higher pressure of the R744/CO_2 AC system the temperature of the refrigerant can rise up to 180 degrees Celsius, the boiling point of the lubricant. The sensor enables closed loop control of the AC compressor around a desired pressure point while protecting the AC components from harm caused by a too high temperature of the refrigerant. The combination of pressure and temperature output can be used for static and dynamic (operation) leak testing as well as diagnostics during normal operation and/or maintenance.

The technology used for this sensor is the piezo-resistive technology where four piezo resistors are connected in a wheatstone bridge configuration. The piezo resistors are made of monocrystalline silicon and are fused to a stainless steel membrane using glass. Temperature is measured by using a NTC. A change in pressure will result in a slight deformation of the stainless steel membrane. This leads to a non uniform stress (and thus resistance) change in the four piezo resistors of the bridge, which results in an electrical output signal of the bridge. The output signal of the bridge is amplified and calibrated using an ASIC to provide the pressure signal. Since the sensitivity and offset of the bridge is temperature dependent, the pressure signal is also corrected for temperature influences using the same ASIC.

! *In 2011 each new introduced car platform in Europe must have an AC system with a refrigerant that has a global warming potential (GWP) less then 150.*