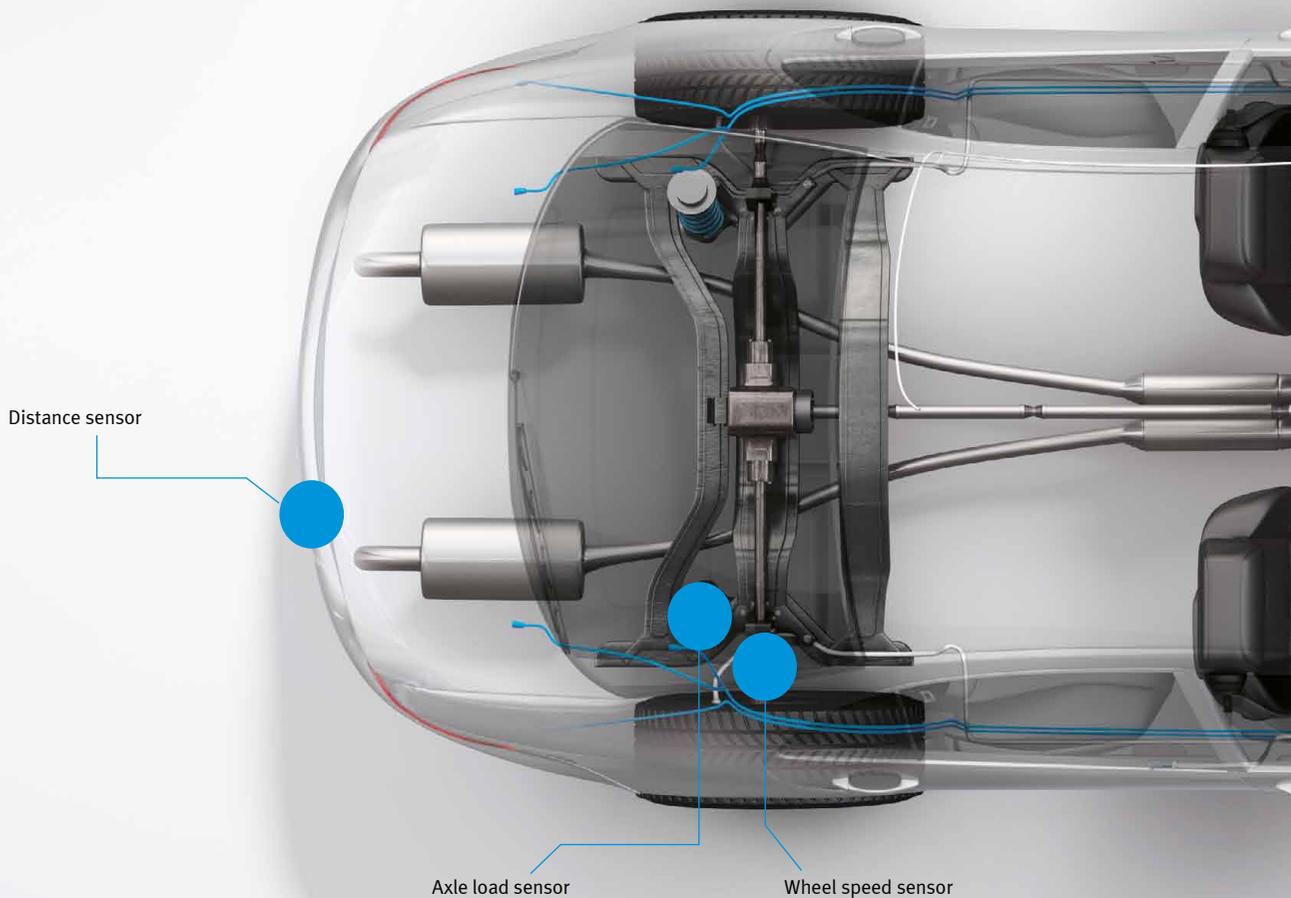


Selective soldering of sensors in the protective housing

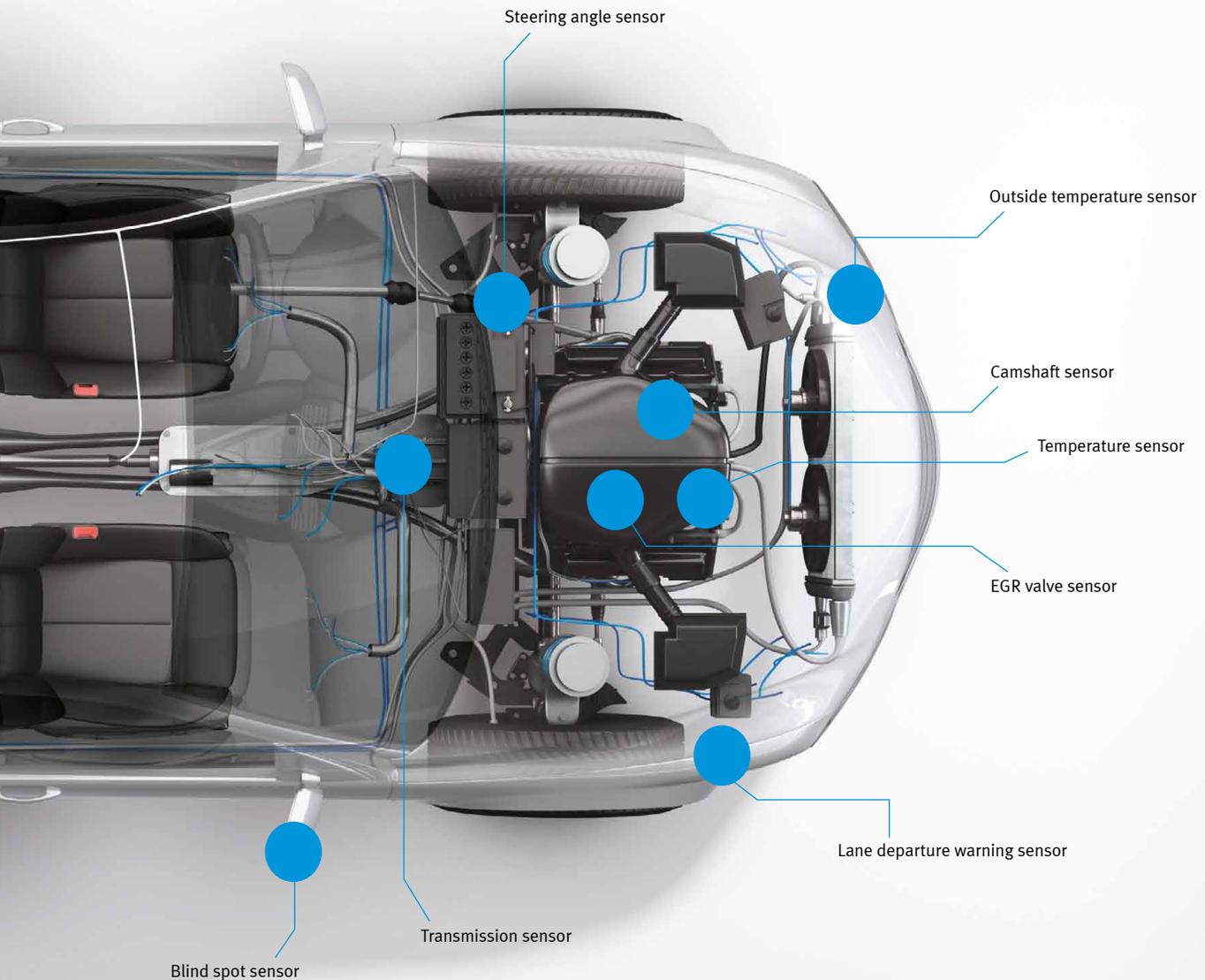
# To the point



**The production of sensors for the automotive industry** requires increasingly sophisticated solutions. A new machine concept developed by IPTE Factory Automation enables fast and reliable soldering of printed circuit boards in the plastic housing. The ready-to-install handling system from Festo used in the concept enables cycle times of less than three seconds, despite a moving mass of more than 60 kg.



The typical car today has on average up to 100 sensors on board. Sensors located outside the car interior, of which a selection can be seen here, need special protection and demand special production methods.



**T**hese days, a car is much more than just a means of getting from A to B. It can also provide intelligent feedback thanks to all kinds of comfort and safety functions. The typical car today has on average up to 100 sensors on board, with the number set to increase further in the future. With the number of sensors on the rise but the available space staying the same, more compact and in some cases also more

robust sensors will be in greater demand. Innovative production solutions are needed in order for the production process to keep up with this level of sophistication. Belgian company IPTE Factory Automation n.v. has met the new challenge head on with its latest systems. The experts in factory automation worked with Festo to develop an innovative machine concept for the selective soldering of sensors directly in the housing.

#### Reliable soldering in the housing

Sensors located outside the car's interior have to withstand harsh environments, with temperatures ranging from below  $-40\text{ }^{\circ}\text{C}$  to over  $100\text{ }^{\circ}\text{C}$ , and they also need to be corrosion and shock resistant. These sensors are enclosed in a tough housing to protect them. However, the inner parts of the sensor cannot be inserted into the housing fully pre-assembled. Certain soldering work has to be done directly in →



**Reliable handling, reliable operation:** spindle axis EGC, toothed belt axis EGC with integrated displacement encoder, electric slide EGSL plus a customised module based on the ERMB.



“Using the ready-to-install gantry system not only allows us to focus more on the rest of the system, but Festo also guarantees us trouble-free operation, which gives us great peace of mind.”

Antonio Rodrigues, Technical Director at IPTE

the housing. Conventional soldering techniques such as wave or reflow soldering are not possible here, since the plastic housing would not be able to withstand the temperatures involved. The only option is the more demanding technique of selective soldering. An essential requirement for this technique is applying the right force at the right angle. The high process quality, repetition accuracy and production speed needed to achieve this calls for fully automated processes.

**Development of a new machine concept**  
IPTE developed a new, programmable selective soldering system for connecting the battery and printed circuit board directly in the protective housing of the car sensors. A complete machine concept was created for this in cooperation with Festo. The ready-to-install handling system by Festo enables a cycle time of less than three seconds through quick and precise movements along the X-, Y-, Z- and W-axes, despite a moving mass of more

than 60 kg. The solder is fed with an accuracy of 0.1 mm and the speed at which the solder is uncoiled from the reel is controlled. Other advantages of the compact IPTE system include automatic tip calibration, integrated tip cleaning, operation with solder reels, colour detection and an option to switch to unleaded soldering. A reliable suspension system ensures that the soldering tip is applied to the printed circuit board with the right force for optimum thermal contact during soldering.



**A snug fit:** IPTE concentrates the entire soldering process in the smallest of spaces.



**All in one:** mechanical components, servo motors, controllers, compressed air preparation and valve terminals from Festo.

An integrated crash sensor protects the boards against excessive pressure.

#### **Custom-made and complete package**

IPTE designed the XYZW-gantry system with four degrees of freedom, with support from Festo during the design and production process. The X-, Y- and Z-axes use standard spindle and toothed belt drives of the type EGC and EGC with integrated displacement encoder and mini slide EGSL. For the rotary unit (W-axis), Festo developed a custom-made module. The gantry for flexible and controlled speed and acceleration (XYZ-axis) and a rotary module ERMB were specially adapted to the system and are used for lifting and rotating the soldering needle. This means that the system can reach even difficult to access locations in the sensor housing, and solder at precisely the right angle with the right force. It is capable of high-speed positioning, despite the high moving mass.

#### **Guaranteed more reliability**

IPTE's new machine concept can be used anywhere. Apart from soldering applications, it can also be used for many other tasks such as dispensing. The gantry, which includes servo motors and controllers of the type CMMP with EtherCat interface, is adapted by Festo to the specific requirements of the different applications and supplied as a ready-to-install complete system. Festo provides an additional level of reliability by guaranteeing the function of the system on delivery. The customer not only receives a ready-to-install handling system, he can also be sure that it will function properly right from the start. ■

- 🌐 [www.festo.com/catalog/cmmp](http://www.festo.com/catalog/cmmp)
- 🌐 [www.festo.com/catalog/egc](http://www.festo.com/catalog/egc)
- 🌐 [www.festo.com/catalog/egsl](http://www.festo.com/catalog/egsl)

#### **is 2.14-04 | is 2.14-05**

Rotating, gripping, vacuum |  
Motors and controllers

📄 [www.festo.de/trends](http://www.festo.de/trends)

### **IPTE Factory Automation n.v.**

Geleenlaan 5  
3600 Genk  
Belgium  
[www.ipte.com](http://www.ipte.com)

Area of business:  
Development of turnkey automation solutions for the production, testing and further processing of printed circuit board assemblies and end products