

Audi Uses Semi-Passive Tags to Make TTs

At its plant in Ingolstadt, the German carmaker is employing RFID to help manage robots positioned at about 80 manufacturing and assembly stations.

By Beth Bacheldor

Jan. 29, 2007—Expanding on its existing use of RFID in its manufacturing operations, German automaker Audi is incorporating semi-passive tags able to withstand high temperatures and painting into the assembly process for its Audi TT sport cars.

The carmaker is utilizing an OIS-P RFID system from Identec Solutions at its Ingolstadt, Germany, manufacturing plant. This system allows it to communicate and confirm assembly instructions and other information more accurately to robots positioned at approximately 80 manufacturing and assembly stations. The tags operate at the 2.45 GHz frequency and use a proprietary air-interface protocol. They have a communication range of up to 10 meters and are heat-resistant up to 235 degrees Celsius. The battery is used only to support the tag's 32 kilobytes of memory, but the data transmission is passive.

The use of 2.45 GHz tags provides for more accurate reads in an industrial environment, says Gerhard Schedler, president and CEO of Identec Solutions. The frequency is more immune to the interference of electromagnetic noise that can be generated by welding robots and other factory machinery. The RF communication beam between the Identec tag and the interrogator is well defined, Schedler explains, preventing overlapping reads of nearby tags. "What is really important is that this [implementation at Audi] is in a really tough environment. The tag goes through a lot of stress, and it is important to get reliable reads, and that you read the right tag," he says. "That takes years and years of experience, which Identec Solutions has."

Each tag is reusable and encoded with a unique ID number associated with a specific chassis. It also contains information concerning the chassis' intended color and other production process information.

Encased in a bracket designed by Audi, an OIS-P tag is affixed to the side of a skid carrying the chassis down the production line via a conveyor system. Fixed readers positioned either above or underneath (depending on the point in the assembly line) scan the tags for the encoded data. The interrogators are wired to programmable logic controllers (PLCs), which monitor and control the robots as they perform the various manufacturing and assembly operations.

The Ingolstadt factory has 350 skids for the Audi TTs. The RFID tags are designed to make sure the appropriate steps occur at the right time, and to the right chassis. "The automotive line is very complex, and you always have to know what is where, and which step is occurring, such as which color is needed. It is a work in process," explains Schedler. "Now the skid is intelligent and can tell the manufacturing machines what to do. It gives the car a voice."

RELATED_ARTICLES In addition, the tags help control the flow of the chassis through the production line. If, for example, a defect is discovered on a chassis, necessitating its removal from the line, the production sequence must change. The robots are made aware of the sequence change because each receives specific

instructions from the RFID tags. "The order of the cars is different, but RFID makes the line very flexible," Schedler says.

Audi has been using the OIS-P RFID system for several years in the manufacture of its other car models, according to Berthold Fabian, Identec's VP of customer service. The automaker currently uses about 6,000 OIS-P semi-passive RFID tags in its Ingolstadt plant, 800 on the Audi TT. According to Fabian, Audi is now beginning to use the tags in the production of its new R-8 sports car, and the next generation of the A4 will be produced with OIS-P.

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