

In an automotive world of Electric Vehicles, Plug-in Hybrid Vehicles, Green Diesel, and ever-advancing computerization...

What lies at the leading edge of the soldering technology needed to support automotive electronics?

What soldering technology is demanded by automotive electronics and on-board components?

Electronics technology is essential for the advancement of automotive performance and functionality today. Beginning with hybrid cars' use of the motor as an actuator, a large number of objects, operated by mechanics in past times, have begun moving into the realm of electronics. Soldering technology has seen its presence increased by the advancements in computerization. The specialists at Japan unix, based in Tokyo, reported the latest soldering case in automotive electronics.



The importance of soldering technology is tightly coupled to the advancing computerization of automobiles

The number of electronic components in automobile has been rapidly increasing, due to the appearance of hybrid and electric vehicles.

Sensors and other electronic components are essential to the increasing performance of modern automobiles.

The already-dramatic increase in on-board electronics due to the computerization of automobiles will only continue to rise

There has been an increase in electronics within automobiles, in practice, the parts that have changed are mostly in the fields of actuators, fuel efficiency, safety features and comfort and amenity.



[Actuators] Due to the use of motors as actuators, there has been an increase in motors and motor drivers. Additionally, a higher number of ECU (engine control units) and DC-DC converters are added in hybrid cars.

[Fuel efficiency] With the change to hybrid vehicles, parts which were previously driven by the engine have now become electric. For example, whereas the air conditioning compressor was previously spun by the rotation of the engine, current electric models use electricity from the battery to generate spin. Furthermore, the water pump used to circulate engine coolant fluid has switched to an electric pump, which is a rather significant change.



[Safety features] When a sensor detects an abnormality, an electric signal is sent, and the relevant function is invoked. ABS and airbags are characteristic examples of the realization of electronic controls, which activate in an instant and can only be implemented with electronics. The collision avoidance and prevention systems also have electronic controls at their foundation. From these examples, we can see how electronic parts support safety features.



[Comfort and amenity-related parts] Here, we can find GPS navigation systems, keyless entry, reverse monitors and seat position adjustment mechanisms, among others. While they do not affect the automobile's primary purpose as a mode of transportation, they make transportation more fun and comfortable.

All of the aforementioned items are mounted by way of soldering. When viewed in this way, it is clear that soldering plays a vital role in the

increasingly-high efficiency and functionality of automobiles.

Automotive soldering demands high quality and reliability.

Mechatronical integration requires better technology.

The powerful technology behind automobiles can, with a single misstep, have a significant impact on human life. With the increase in electronically controlled parts and functionality, the solder used in on-board electronics is held to much higher quality and reliability standards than it in regular electronics.

For example, the temperature when soldering is fixed for a given joint strength. In the automotive industry, it is imperative that the soldering process is managed in such a way that it is carried out at the required and exact temperature.

Furthermore, while in the past soldering was done in order to mount electronic components to a substrate, there has been a recent increase in "mechatronical integration." For automobile manufacturers, these modules offer several benefits in cost and space requirements and weights. However, for those who manufacture the modules, they must cope with maintaining the previous quality of the product, while coping with a complicated facility and taking into account soldering and conveyance methods. As a result, there is a demand for new levels in high technology to deal with these issues.

**Now picking and grappling happen
at the same time as the soldering,
and all automatically.**

**Introducing the cutting-edge soldering
robot, SOLDER MEISTER UNIVERSE
Series, no jig needed!**

New product, the Universe S adopted a laser technology, which is an ideal soldering robot for automotive manufacturing with lead-free, less solder and less labor. It unites electronic components picking, substrate insertion, and soldering into one sequence. It uses a SCARA robot above the substrate and an articulated robot on the below the substrate to handle insertions. It takes advantage of a feeding unit, which provides solder on demand, thus, it significantly reduces a large amount of solder.

Since all path lengths are handled fully automatically, the cycle time is cut to 1/3 of the previous time. In addition, the footprint of the equipment itself has been greatly reduced, and it can reduce labor costs and improve product quality percentages.

Until now, the process of most electronic component mounting took place in the following four stages:

1. A laborer places components into the substrate
2. The substrate is placed into a specially-made jig
3. The substrate is rotated
4. The components are soldered.

This process was carried out by several laborers. In contrast, the flow with the UNIVERSE S is as

follows:

1. An articulated robot inserts the components into the substrate from below and holds them in place, while from above the substrate a SCARA robot does the soldering.

Thus, the process has successfully been reduced to a single, unified step.



SOLDER MEISTER UNIVERSE S overview

In one factory where the UNIVERSE S was installed, it had previously taken one laborer 150 seconds to solder-mount one component. However, after the installation of the UNIVERSE S, that time dropped to approximately 55 seconds, cutting the time to 1/3 of the previous number. The space required for the manufacturing machines was also reduced to 1/3 of the previous area. On top of this, whereas the factory's previous soldering product quality percentage was 95%, due to the new uniformity introduced by the robot, the same factory reported that they were able to improve their quality percentage to nearly 100%, which was resulted from a vision sensor function. It identifies defective pieces before insertion and throws them aside.

Furthermore, since the soldering process is performed by laser, the iron tip's dissipation and related replacements are no longer an issue. This leads to huge costs cuts, such as consumption spending dropping to 1/50, and maintenance-related labor costs being reduced to 1/6. Needless to say, maintenance time has never been needed. Thus, the factory above has achieved full automation and has been able to run for 24 hours.

The UNIVERSE S is a product that was developed from our customers' requests to reduce manufacturing costs. The company's strength lies in our ability to meet our customers' needs and overcome their troubles through production lines. The future as a dedicated soldering company will see them continue to develop new technologies that will solve their customers' manufacturing problems in the world.

Laser soldering feature



Pick and place feature



Youtube: UNIVERSE Series

<http://www.youtube.com/watch?v=RKNwsfjPNDQ>

