Flexible, yet standardised

Just as PCBs have successfully managed to pack an increasing amount of power into a smaller space, developers of plug connectors are working to accommodate more power and a higher contact density into smaller, lighter plug connectors. The family owned British manufacturer Harwin plc relies on Festo automation to safeguard the quality and flexibility of its production using equipment such as the servo press kit YJKP and the compact handling system YXMX.
Harwin's connectors are high quality, reliable and durable and can thus be used in harsh ambient conditions. They don't only fit the bill for customers in industry sectors such as cost conscious consumer electronics, but also in the ultimate performance seekers such as aerospace, motor sports and the automotive industry, where extreme operating temperatures between –65 °C and +150 °C as well as severe vibrations are the order of the day. This means the connectors have to consistently be made to very high standards.

High standards
The response by Harwin to these market requirements has been to launch the Gecko range of connectors. These advanced connectors have a pin pitch of only 1.25 mm and are half the size and 75% lighter than micro D connectors. Their robust screw connection makes them extremely safe and reliable and able to withstand countless mating operations without damage.

The Gecko connector manufacturing process has been continuously refined from an initially manual process to today’s highly automated solution, capable of producing hundreds of thousands of connectors a year with a wide range of connector configurations ranging from 4 to 50 pins per connector and many PCB mounting options.

Modular concept
Harwin started developing a new production line with the aim of making the production of the Gecko series more efficient. Both a high level of automation and a high degree of flexibility were needed to be able to produce differently shaped and sized connectors on one assembly line. “That is why we developed a modular concept together with Festo,” explains Paul McGuinness, Operations Director at Harwin.

The new assembly lines at Harwin are built around the servo press kit YJKP and the compact handling system YXMx from Festo. The handling system takes care of the XY movements of the workpiece carriers and the plastic housings assembled in several of the system stations. The servo press kit, which provides easy-to-configure position- and force-controlled movement along the Z-axis, is used for press-fitting and bending the contact pins.

Standard parts
In all stations, the electric and pneumatic drives are each controlled by their own controller CECC-X together with a valve terminal CPX/MPA. “These Festo systems enable maximum standardisation and modularisation, as standard parts are used everywhere. This makes commissioning and maintenance easier,” explains McGuinness. One of the assembly lines...
“The modular concept developed together with Festo future-proofs our assembly lines.”

Paul McGuinness, Operations Director at Harwin
Setting standards

The new assembly lines for electric connectors are not just setting high standards from a technical point of view, they are also a modular and scalable automation concept. The three main stations for inserting the pin contacts into the connector housings, press-fitting the pins and bending the pins are based on modules with as many standard parts as possible:

- All three stations have a common base plate.
- The moulded connector bodies are moved using the compact handling system YXMx.
- All the electric and pneumatic actuators are controlled by a controller CECC-X in combination with a valve terminal CPX/MPA.
- The press-fitting and bending stations use the servo press kit YJKP.

for manufacturing the connectors consists of three central stations: for inserting, press-fitting and bending the contact pins. In the first station, the workpiece carriers are equipped with the connector housings and are positioned using the compact handling system YXMx so the contact pins can be inserted. In the second station, the servo press presses the contact pins into the connector housing. The precision gripper HGPT from Festo locates the workpiece carriers holding the connector housings while the pins are fitted.

Dynamic and precise

The kinematics of the compact handling system enable dynamic and precise movement and ensure the connectors are precisely placed under the press-fitting tool. This works flawlessly thanks to the low moving mass.

The modular servo press kit YJKP consists of a closed-loop servo motor, a mechanical axis, a motion controller, force detection as well application software. The result is precise, powerful and gentle movement of the pins to the correct position. Evaluation functions such as insertion or block force monitoring by the application software supplied detect whether the fit is within tolerance.

Modular and reliable

The handling system and the servo press kit are also used in the last station for bending the contact pins to the required angle. The CoDeSys software in the controller CECC-X allows comprehensive control of the servo press profile, providing position and force control throughout the cycle.

The application software supplied with the servo press makes programming extremely easy thanks to an intuitive graphical user interface. It makes it easy to adapt the press profile to the different connector variants without the need for special programming skills. Three valve terminals CPX controlled by the master controller CECC-X actuate the numerous electric and pneumatic grippers and actuators.

“The automated modular concept ensures low production costs and high reliability, precision, repetition accuracy and flexibility,” explains automation expert McGuinness.

www.festo.com/yjkp
www.festo.com/yxmx

Harwin plc Europe
Fitzherbert Road, Farlington
Portsmouth, PO6 1RT
United Kingdom
www.harwin.com

Area of business:
Manufacturer of electric connectors and mechanical components for PCBs