

Technical article, published in:
Der Betriebsleiter 11-12/2016

Mobile and safe

Tailored safety technology supports the the flexibility of a welding cell

The mobile welding cell from the Guttroff group of companies offers a whole load of technology in a compact space, is delivered in no time and is enormously flexible in terms of potential applications. The user can select whether to buy or rent the “welding robot to go” and in either scenario gains access to welding know-how and services. The safety technology selected by Schmersal provides substantial support for the automated cell in terms of flexibility.

Traditional company Sauerstoff-werk Friedrich Guttroff GmbH with headquarters in Wertheim-Reicholzheim offers not only a comprehensive range of technical and medical gases but also a wide range of welding and automation technology. At the company's site in Pößneck in Thüringen, company activities focus on welding technology. Factory manager Thomas Weber explains: “Since 2005, we have been expanding our range to include made-to-measure robot systems for automatic welding after noticing a growth in demand in this area. Not least because it is becoming increasingly difficult to find qualified welding engineering experts.” Guttroff buys the robots from Fanuc and the welding systems from Fronius. With these basic elements, Guttroff develops and produces complete robot welding stations to the individual requirements of its customers, including the necessary equipment such as consoles, trolleys and rotary tilting tables.

“But the know-how we can offer our customers on welding engineering is more important than the hardware. Starting with a feasibility study, i.e. the question as to whether the relevant material or component can be welded, through training and welding qualifications in accordance with DIN EN ISO 9601-1 through to risk assessments in line with the Machinery Directive and CE declarations of conformity,” explains Thomas Weber. Buyers of Guttroff welding robot systems include those in the automotive supplier industry, steel construction and ship and container building.

As well as these customer-specific solutions, Guttroff also launched a standard module mobile welding robot cell three years ago. The cells, which measure 2300 x 2200 x 2300 mm (D x W x H) contain a Fanuc Arc Mate 100 IC welding robot and form a completely sealed, fused unit. In the cell, the robot can process components with a size of up to 1.30 m wide by 50 cm deep and 50 cm tall, with a maximum weight of 250 kg.

Safety light curtain protects operators

Parts are loaded and removed using a turntable which rotates in and out around 180°

through a window-like opening in the cell. The rotation takes under four seconds. While the robot is working in the cell, the opening remains closed. But the user can load the external section of the turntable while the system is operational. As soon as the window opens and the finished parts are provided for removal, the area around the turntable is secured with an SLC420 safety light curtain from Schmersal, the Wuppertal-based specialists in machine safety.

The opto-electronic safety systems in the SLC240 range are very robust, as the transmitter and receiver are built into two sealed sensor profiles. The multiple scanning with the infrared beams offers high availability given the interference light produced by the high-intensity UV welding light. In the Guttroff welding cell, the infrared beams are forwarded to the receiver via two deflector mirrors to form a square-shaped protective field around



The packaging industry places special requirements on machine safety



Reliable securing of access door

The welding cell is accessible via a door which is locked when in used with an AZM300 solenoid interlock from Schmersal. One of the particular features of the AZM300 is the patented principle using a rotating shaft and a Maltese cross. It has the advantage that the safety door is pulled into the end position held virtually without play when closed. The solenoid interlock operates as an integrated guard catch hence removing the need to fit a separate one. The integrated latching function ensures the guard stays in its closed position and doesn't open when the interlock is released. The locking force can be increased from 25 to 50 N simply by rotating the cross around 180°. "There is also an option to deliver the solenoid interlock with emergency exit release," reports Hans-Jürgen Seyfert.



the turntable. If a person breaks the safety field, a stop signal is immediately triggered in order to stop the robot. The safety signals are evaluated directly by the robot controller. This opto-electronic safety solution obviates the need for a fixed safety fence around the turntable. This has the benefit that, when the robot is operational and the cell is closed, the turntable is accessible to the operator from all sides for loading and unloading. For example, heavy components can be hoisted from all three sides onto the turntable using a crane. For the operator, side loading means shorter working distances.

An RFID sensor is used for the safe identification of the actuator, this has three different levels of coding and therefore also enables tamper protection. In the basic version, the sensor accepts any suitable target from the RSS family. A second version for increased protection against tampering reacts only to an individually assigned target. The teach-in process can be repeated as often as required. Finally, a third version is available for maximum protection against tampering; this version only accepts the target that was taught-in when it was first switched on. Here the allocation between sensor and target is irreversible. This means the AZM300 achieves a coding level of "high" in accordance with ISO 14119. The Tesk hinge switch from Schmersal provides additional manipulation protection on the other side of the safety door.

While the transmitter and receiver of the SLC 420 are permanently installed in the cell, the deflector mirrors are mobile units which can be repositioned if the cell is moved in order to set up the square-shaped protective field. "The SLC420 safety curtain is a very efficient solution for securing the area of the Gutroff welding cell. At the same time, it offers the best personal protection for the operators of the system," explains Hans-Jürgen Seyfert, Sales Manager at Schmersal.



Conclusion

"For series protection of components in high unit numbers, the mobile welding cell is a very economical solution," stresses Thomas Weber. This is a very space-saving system. The Fanuc robot, for example, is fitted with an internal hose packet so it can work in a very confined space. The fact that the welding cell can easily be moved to a different location within a production company provides a high level of flexibility.

The cell is also supplied as a turnkey solution, including the extraction system and the safety technology described. All the user has to do is to connect it to the supply media of gas, electricity and compressed air. "The all-round service package we also offer is also a benefit to our customers. We take over the planning of the cell and the programming of the components to the customers' requirements, plus we provide training for the operating personnel. We also offer a 24-hour on-site service so we can resolve any problems as quickly as possible," explains Thomas Weber. And anyone who wants the welding robot "to go" for orders with lower unit numbers need not buy it, they can also lease it. More flexibility is hardly possible.

New range of safety light barriers

The new SLB 240/440/450 range of safety light barriers, which Schmersal will be showcasing at SPS IPC Drives, have built-in analysis and impressively small dimensions. This means the SLB 240/440 with cable connection and dimensions of WHL 28x32x72 mm or with connector socket (WHL 28x32x91 mm) can easily be built into very confined spaces and can be mounted quickly and easily even where space is short. SLB 240/440 have a range of 15 metres, while the SLB 450 (dimensions DL 49 x 126 mm) can achieve a range of up to

75 metres. All SLB light barriers have safe semiconductor outputs (2 x PNP) and can be included directly into the safety circuit, even without external safety evaluation. All versions have a visual set-up guide which makes commissioning significantly easier. "By developing the new SLB range, we are completing our range of opto-electronic safety equipment products.

Depending on the size and complexity of the hazardous area, the customer can choose between light barriers in the SLB range, multi-beam SLG light barriers or light curtains in the SLC product range," explains Klaus Schuster, who is responsible for safe opto-electronics products at Schmersal. "Depending on the application, these opto-electronic ranges can then be combined with safety relay modules, safety controllers or AS-i system components. This means we can offer our customers complete safety systems, tailored solutions which are completely customised to the requirements of the relevant application."



Images:

K.A. Schmersal GmbH & Co. KG, Wuppertal

K. A. Schmersal GmbH & Co. KG

Mödinghofe 30
42279 Wuppertal
Telefon: +49 202 6474-0
info@schmersal.com
www.schmersal.com

