THE TECHNICAL ISSUE

Flying high

Complicated welded assemblies for high-rack storage components - SSI Schaefer CZ welds using modern CLOOS Robot Technology

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Bilder: SSI Schäfer/CLOOS

HRANICE – At its Czech factory, SSI Schäfer has started using a high-performance CLOOS robot welding machine for its complex welded assemblies. Fitted with single wire and tandem welding torches, laser sensors and a dynamic 7-axis robot, the machine operates a 4-shift system and provides continuous high quality.

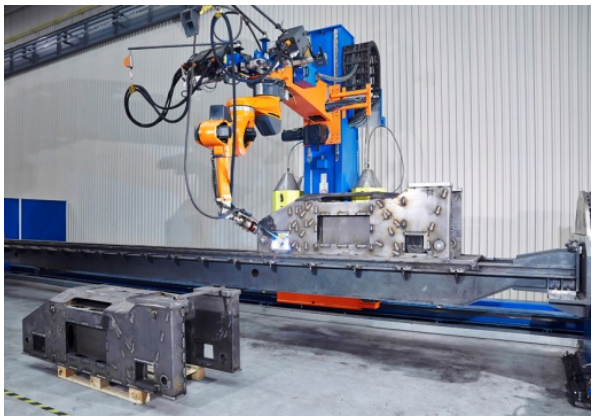
From the component manufacturers right through to the machine constructors, in recent years the factory has never stopped developing. “Today we construct complete machines, add the electrics, fit components and assemblies into complete machines and, if the customer wishes, we carry out the servicing” explains Robert Selzer, managing director of the SSI Schäfer factory in Hranice. SSI Schäfer is also always adding to its own machine park: punch-nibbling machines can be found in the large production halls as well as laser and plasma centres and modern powder coating facilities on which parts can be painted to meet the customer’s requirements. “We utilise third party products for about a quarter of our production “ says Selzer. “In that way we have the possibility of testing our competitiveness in the market for real”.

7-axis robot with 15 m manipulator

In addition to the 200 qualified hand welders, five CLOOS robot systems are also used in the factory. The most recent investment is a seven-axis CLOOS QIROX robot, which moves along a 15 m long pavement between two 5-tonne turntables. Correspondingly large components can be clamped between them.

The largest part at present is the partial mast for the storage and retrieval device, measuring a good 10 m in length: later the lifting truck will travel along it up and between the shelves. Up to 4 masts can be fitted on top of one another to give a total height of 45 m for high-rack storage, which certainly earns its name.

Selzer: “Their components are designed in such a way that they only have to be welded externally. That therefore takes away the time-consuming internal welding for the welded assemblies. The individual steel parts are put together, fixed manually with few weld points and then welded on the robot machine”.



On this CLOOS robot equipment SSI Schäfer welds the up to 10 m long components of the new storage and retrieval device – the image shows a lifting truck weighing a good 600 kg. (Image: CLOOS)

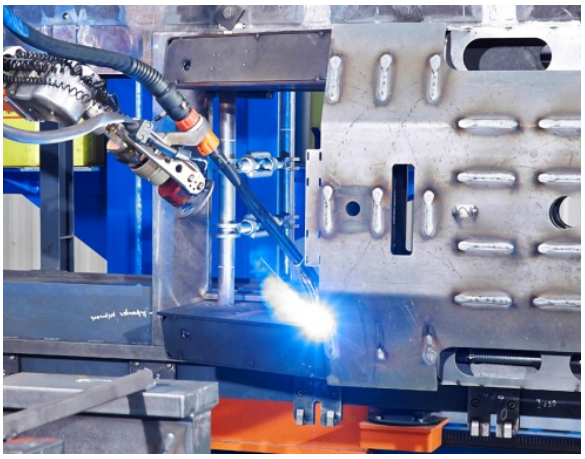
Single wire and tandem welding torches with laser sensors for optimum welding results

The CLOOS machine has several special points: the robot changes automatically between single wire and tandem welding torches in order to achieve the best weld seams for each case and to use maximum welding speed. A torch nozzle cleaning station is also integrated and, when needed, is automatically brought in by the robot. “The laser sensor is also unique, as it is fixed on the robot arm and, irrespective of the torch used and the particular clearance, it ensures optimum arc welding performance. We have integrated this system although our clearance with tolerances of only two to three tenths of a millimetre is there from the pre-production work stage” says Robert Selzer, proud of the accuracy and high quality of his production.

From a welding technology viewpoint the robot machine is fed by two Quinto GLC 603 welding power sources which are computer-controlled to deliver the parameters for the speed and tandem weld MAG process used, the sheet metal thickness of between 4 and 12 mm and the various seam shapes.

The QIROX robot automatically changes between single wire and tandem wire welding torches – depending on the welding speed required. The automatic torch cleaning station is also located above the robot. (Image: CLOOS)

I/I adjustment for the lower and U/I adjustment for the upper performance range deliver exactly the welding current required in each case. Individual parameter sets based on the characteristic curves provided can easily be programmed via the variable synergy mode. The large frontal LCD display with a hand wheel ensures surveillance and simple operating. Once a quality has been programmed, it can be called up at any time. Options are, for example, integrated welding data and porosity monitoring. The components in the SSI Schäfer real-time operating devices are welded with a gas mixture of 10.5 % CO2, 3% oxygen and 86.5% argon and a 1 mm weld seam.



The laser sensor on the robot arm ensures perfect positioning of the single wire and tandem welding torch for a seam. (Image: CLOOS)

Gesteuert The whole machine is controlled by the advanced CLOOS controller, which is located in a switch cabinet positioned between the two robot working areas. The SSI operators have control over the CLOOS machine via the handy teach pendant operating device with its large membrane keys and the visible LCD screen

Welding robot works 4-shift operations

The decision about the new CLOOS robot machine was taken by SSI Schäfer on the basis of its good experiences and high levels of skill in welding technology. “For a few years now four smaller CLOOS welding robots have proved very reliable for us “ says Robert Selzer. “As the new machine must operate for 4 shifts and we focus on the quality of our welding technology, only CLOOS came into the equation as our supplier“. The welding machines at the Hranice factory are looked after by the on-site representative and the CLOOS subsidiary in Prague. “Together with our in-house maintenance department we work on the basis that the machines will operate for a good 8,000 hours a year“. In order to use the times when a new workpiece is being clamped to the positioning device, Selzer had another turn and tilt positioning device installed. “Smaller parts up to 3 tonnes weight can be welded on it“.

Components weighing up to 3 tonnes are welded onto this turn and tilt positioner – here a chassis – whilst a new workpiece is clamped between the two large turntables. (Image: CLOOS)

The CLOOS experts also met his expectations during the six-month planning and development phase for the corresponding production technology, of which the robot machine is an important integrated component. It took another six months before it was all constructed, delivered and commissioned. In so doing, SSI Schäfer and CLOOS also, for example, designed the positioning device which picks up parts each 10.5 m in length and which during the

welding process turns in such a way that the torch is always in the ideal welding position. “We let CLOOS program the first part, with the result that commissioning was very short. Robot programming was taken over by our own operators after they had been trained” says the satisfied managing director, Robert Selzer.

The use of the RoboPlan offline programming software offers a considerable savings potential. The software developed by CLOOS allows to prepare welding programs which are directly transferred into the Qirox controller via the SSI-Schäfer information net on a PC working place during welding. This minimises retrofit works at the welding robot system and considerably increases the productivity.

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The new storage and retrieval device is manufactured in the SSI Schäfer factory in the Czech Republic at Hranice. (Image: SSI Schäfer)

The SSI Schäfer Group – a world-wide presence in storage and operating equipment

Across the world, SSI Schäfer is the leading provider of storage and logistics systems. The services offered stretch from working out a design for the storage unit with products from its own production through to completing complex logistics projects as the general contractor. Bringing skills together under the overall SSI Schäfer brand forms the basis for developing market-appropriate, industry-wide storage systems and for designing holistic solutions in intralogistics.

The SSI Schäfer group of companies, born of the company of the same name founded in 1937 by Schäfer, is today represented world-wide and has many branches in Germany.

Schäfer products are used everywhere: in iindustryy, the craft sector, service industries, municipalities, research centres and administrations, right through to the end user.

Automated high-rack storage with the new RGB [storage and retrieval] system from one supplier

For some time now SSI Schäfer has been a significant provider of automated high-rack storage systems. Whether it is for the automobile industry or brand discounters, SSI Schäfer delivers everything itself, from the halls, via the storage racks and the rack operating device through to the control technology and automation.

It is expected that the new Exyz generation of operating devices will continue this history of success. The devices provide more storage capacity, flexibility and efficiency. Because of the modular concept, standard components can produce individual combinations. The basic elements – of a single or double mast device with one or two pick-up elements for single, double or multiple storage/picking or an orbiter version – provide a comprehensive reservoir for customer-specific end devices, which can cover the entire RBG market from 8 to 45 m high.

The term “Exyz” stands for the focus of the new storage and retrieval system: “E” means efficiency or energy consumption and performance – and that means on all three dimensional axess, “X”, “Y” and “Z” on which an RBG works: longitudinal movement, lifting and storing and retrieving movements.

With its innovative mast concept SSI Schäfer has also achieved a unique selling point in the market. Here, the lifting truck can be fitted with accompanying counterweights which offset up to two thirds of the truck’s own weight and thus increase its performance whilst at the same time reducing energy consumption. In this way, customers achieve up to 25% energy saved just with lifting, compared to conventional devices and thus significantly reduce their operating costs. Efficient energy recovery devices are already standard in the Exyz system.