



Virtually fully automated body shop

Production in the fast lane

With a 95 per cent degree of automation, the Scania body shop in Oskarshamn, Sweden, is one of the most modern vehicle manufacturing plants in the world. At the same time, the plant supports extensive customisation. By the time they reach the end of the assembly line, virtually no two truck cabs are the same. So is this Industry 4.0 in action? Automation products from Festo have certainly provided a solid basis.



In perfect harmony: panel parts are clamped in pneumatically actuated devices and welded, controlled by valve terminals CPX/VTSA (front right). Standing among the products are the initiators Evert Forsberg (left), Lars Kreutner (right), both from Scania, and Leif Lindahl (centre) from Festo.



“We chose preconfigured Festo valve terminals type CPX/VTSA. They offer the benefits of Ethernet, diagnostics, safety and energy efficiency.”

Evert Forsberg, Automation and Electrical Engineer in the press shop and body shop, Scania (left in photo).

Since 2016, premium manufacturer Scania has been assembling customised truck cabs to order – and doing so almost exclusively with the aid of 288 robots. “It’s completely clear to me that a premium product needs to be built in a premium plant,” explains Marcus Holm, Plant Manager in Cab Body Production at Scania in Oskarshamn. “The high degree of automation results in excellent quality, as well as good working conditions and ergonomics for our operators,” he adds.

Factory of the future

The robots place the panel parts on the joining stations and weld them. All employees have to do is load the stations

and monitor the machines. In any case, Swedish occupational health and safety regulations have made it impossible to use hand-held welding equipment. On the one hand, welding tools have become too heavy and unwieldy, while on the other hand occupational safety directives require a minimum distance between the welding gun and the operator because of radiation.

The banning of manual welding from the assembly workshop has benefited Scania in two ways: “It means better processes and quality,” explains Lars Kreutner, Project Leader Cab Body Production at Scania in Oskarshamn. To make full use of the automation technology, Scania has set

up a training division where employees learn how to use the robots and automation technology.

Many variants possible

All the trucks that Scania builds weigh more than 16 tonnes. The company has built a reputation as a manufacturer of special vehicles for fire services or waste collection, for example. These niche markets alone account for hundreds of thousands of variants.

“It may surprise people to learn that we offer even more customisation options for trucks than there are in passenger car production,” says Evert Forsberg, Automation and Electrical Engineer in the press shop →



At the Scania body shop in Oskarshamn, 288 robots weld truck cabs together.

Scania in Oskarshamn

Oskarshamn is an industrial town on Sweden's east coast, around 300 km south of Stockholm, with transport links to the holiday islands of Gotland and Öland. In 2017, 2,700 people assembled a wide range of cabs for all Scania models here. Vehicle transporters take the cabs from Oskarshamn and deliver them to the Scania assembly plants in Södertälje near Stockholm, Zwolle in the Netherlands, and Angers in France, where they are assembled to create the complete truck chassis.

and body shop at Scania. In passenger car production, every vehicle type has its own assembly line. "We, on the other hand, assemble all of the cabs that Scania supplies on a single assembly line," says Forsberg.

Industry 4.0 in practice

This means that the factory has many of the key features of Industry 4.0 – mass production of customised vehicles, adaptability and flexibility thanks to control technology, diagnostic capability as well as energy efficiency and safety solutions. "There is a modular standardisation concept for all plant manufacturers,"

says Forsberg. At the end of the day, plant operators need to be able to rely on proven automation products.

Another objective is avoiding unnecessary stock of spare parts. All panel parts are clamped in pneumatically actuated devices, and then welded. "We decided in favour of the preconfigured Festo valve terminals type CPX/VTSA," says automation expert Forsberg: "They deliver numerous benefits – such as the Ethernet connection and web interface, diagnostics, safety, PROFINET and energy efficiency." The valve terminal CPX/VTSA is actually the only interface to PROFINET – no extra

wiring is required. The valve terminal provides diagnostic data via the automation platform CPX and that can be used to monitor the systems as part of predictive maintenance: "We can replace system components before they fail and paralyse entire parts of the system," explains project manager Kreutner.

Different pressure zones

"We were also impressed by the valve terminal's safety concept," says Forsberg. The CPX makes it possible to operate different pressure zones and to exhaust areas when intervention is required. "We can check affected system parts using mobile panels and don't have to search the entire system for errors – which can be like looking for a needle in a haystack." Furthermore, re-pressurising individual system parts is much more energy-efficient than starting up the entire system.

Welding robots require compressed air to move the welding guns and to clamp metal sheets. Cooling water protects the welding systems against overheating. Festo delivers complete solutions for supplying



Integrated in the safety fence for ease of operation: ready-to-install complete solution for the compressed air and cooling water supply of welding lines, including MS series compressed air preparation.

compressed air and cooling water for welding guns. At Scania, these solutions are integrated in the safety fence for ease of operation – including MS series compressed air preparation.

Reliable electrode milling

For the static welding guns, Festo developed a pivoted arm exactly as per the specifications of Scania and ABB which brings the electrode milling device, the so-called tip dresser, to the electrodes after 150 spot welds have been completed. The pivoted arm is precisely positioned by Festo electric cylinders DNCE and is powered by stepper motor EMMS. With this solution Festo has cut the cycle times by well over half.

The reason for this is that the electrodes of welding guns become blunter as they are being used and must be milled after approximately 150 spot welds so they ensure the spot welding is perfectly accurate. “Electrode milling operates on the same principle as the sharpening of a blunt pencil,” explains Leif Lindahl, former Key Account Manager for Scania at Festo.

The control cabinet from Festo for electrode milling comprises the motor controllers CMMS and CPX, which communicates with the motor controllers and the higher-order robot controller. “Safety has also increased, since plant operators no longer have to enter the robot cells after milling to adjust the electrodes to the correct position for the spot welds,” adds Lindahl.

Right down to a batch size of 1

Scania is ushering in a new era in vehicle manufacturing in Oskarshamn. As it is almost completely automated, but still allows huge flexibility right down to a batch size of 1 on a single assembly line, the body shop is already well on its way towards Industry 4.0. The new factory has set a precedent, and Scania will build a similar factory at the Scania plant in São Paulo, Brazil. ■

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