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Wireless switching devices optimise press brakes

Wireless switching devices mean a high degree of flexibility. One example of this is in the press brakes made by Bystronic, where mechanical engineers employ remote control technology from the steute Wireless range, e.g. for communication between a press brake and a "mobile bending cell" automation unit.

[01] The Xpert 40 press brake from Bystronic is fast, flexible and suited to many different applications

The Bystronic Group, based in Switzerland, exports its laser cutting machines all over the world. Their product range also includes press brakes, manufactured at Bystronic Maschinenbau GmbH [1] in Gotha, the Bystronic centre of excellence for press brakes. Their Xpert series is manufactured here, including twelve basic models with press capacities of 40 t to 1000 t. The larger Xpert presses are capable of folding and bending metal parts of up to 10m in length, requiring a higher press capacity. The smaller presses (Fig. 1) can form small parts at very high speeds – from all sides. A foot switch (Fig. 2) is the central human-machine interface: the operator holds a sheet metal part against the back stopper and presses the right-hand pedal;

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the upper cheek of the press then moves down, bending the part as desired. For the observer this looks like a very rapid sequence of grasping (the sheet metal part), operating (the foot switch) and a downward movement (the upper press cheek). In parallel, the stoppers automatically position themselves so that the parts can always be placed correctly. If the operator needs to make a correction, for example because the angle of bend is inaccurate, he opens the tool using the second foot switch pedal.

[02] A foot switch – cabled or wireless – is the central control element of a press brake

Especially designed for press applications

The Xpert series uses a steute foot switch [2] from its GSF 2 VD series (Fig. 2). This foot switch from the steute "Automation" range is connected to the press as its central control element via a cable, making its positioning flexible. This series was developed especially for applications in presses and other bending and folding machines. It can be operated without fatigue, and a special three-stage switching insert means that the press stroke can be triggered without any jerking of the sort inevitable with "normal" switching inserts. Bystronic also offers its customers an option which makes operation even more flexible: "The Xpert machines can also be operated via remote control foot switches. From the point of view of the user, this wireless connection improves ergonomic comfort and also increases availability because no cables can become damaged", Karsten Trautvetter, Product Manager Bending and Bending Automation, informed us.

The foot switch from the steute "Wireless" range also has a three-stage switching insert and two pedals, and was also designed especially for use in presses and other bending and forming machines. Signals are transmitted by remote control via the safety-related wireless system "sWave-Safe" developed by steute.

The wireless option is popular with press operators. The foot switches quickly achieve a high number of switching cycles, as K. Trautvetter clarified: "When the presses are operated in three shifts, the switches achieve up to and above 1.8 million switching cycles per year." This is especially true of the smallest model, the Xpert 40, which manufactures smaller formed parts three times as fast as larger press brakes and which includes flexibility and universal applicability among its chief characteristics.

Battery status monitored and displayed

One critical point when using wireless switchgear from the operator's point of view is battery status. This is particularly true of machines which work continually at a high productivity level, as is often the case with press brakes. For this reason steute developed an additional module for Bystronic called an "extension board", facilitating communication of the battery status to the machine control. K. Trautvetter: "The board comes from steute and then we integrate it in a housing and

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offer the complete system to our customers, also for retrofitting existing cabled machines with wireless foot switches."

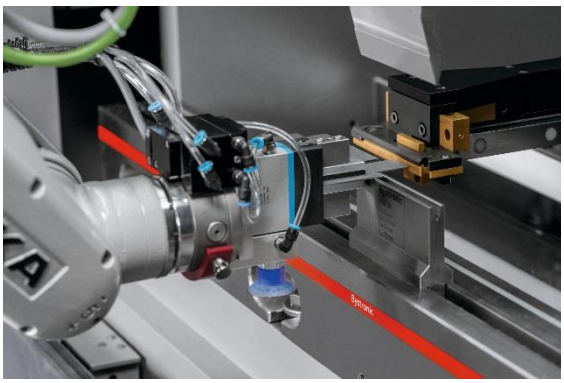
Mobile robot automates bending process

But this is not the only application for wireless switches in Xpert plants. Bystronic has also developed a solution whereby a "normal" press brake can work totally automatically if required. A mobile robot cell, with a six-axis robot which references itself to the press automatically, is positioned in front of the press. The robot removes sheets of metal from the integrated stack, positions them precisely, initiates the bending process, grasps the metal several times and then throws out the finished parts.

[03] A "mobile bending cell" makes conventional press brakes fit for automation

This "mobile bending cell" (Fig. 3) opens up new possibilities for press operators. "During the day shift, users can manufacture small series flexibly and manually. Afterwards the robot cell can be connected – which takes just 10 minutes – and the plant can produce serial parts automatically during a manpower-free night shift. This is flexible automation at its best", K. Trautvetter told us.

One of the prerequisites for automatic operation is recognition of the back stopper against which the bending parts are pressed. This task is assumed by a microswitch with a short switching travel which precisely monitors the positioning of the sheet metal against the stopper (Fig. 4).



[04] A microswitch senses when the back stopper is reached and sends this information to the robot automation unit via remote control

This posed the question for developers: how can the signal be sent from the press brake to the robot cell? The wireless technology from steute once again provided the answer. While the microswitch itself comes from Bystronic, the corresponding wireless module, the receiver and also the antenna integrated inside the robot cell all come from steute. Bystronic plays a major role in the manufacturing process. K. Trautvetter: "We produce the housing with its battery compartment and then integrate the steute wireless technology inside it."

According to K. Trautvetter, this innovative automation concept has already aroused huge interest: "When we presented our mobile bending cell at a fair for the first

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time, visitors immediately placed first orders", said the pleased manager.
The unit can be connected to various new Xpert-40 press brakes, while existing presses can be retrofitted for automation. In the latter case, the machine clamp is exchanged for a "wireless finger" and the remote control module can then communicate with the robot cell. In this way wireless technology provides flexibility while also fulfilling an essential prerequisite for automation of the press brake process.

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Images: steute Schaltgeräte GmbH & Co. KG and Bystronic Maschinenbau GmbH

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