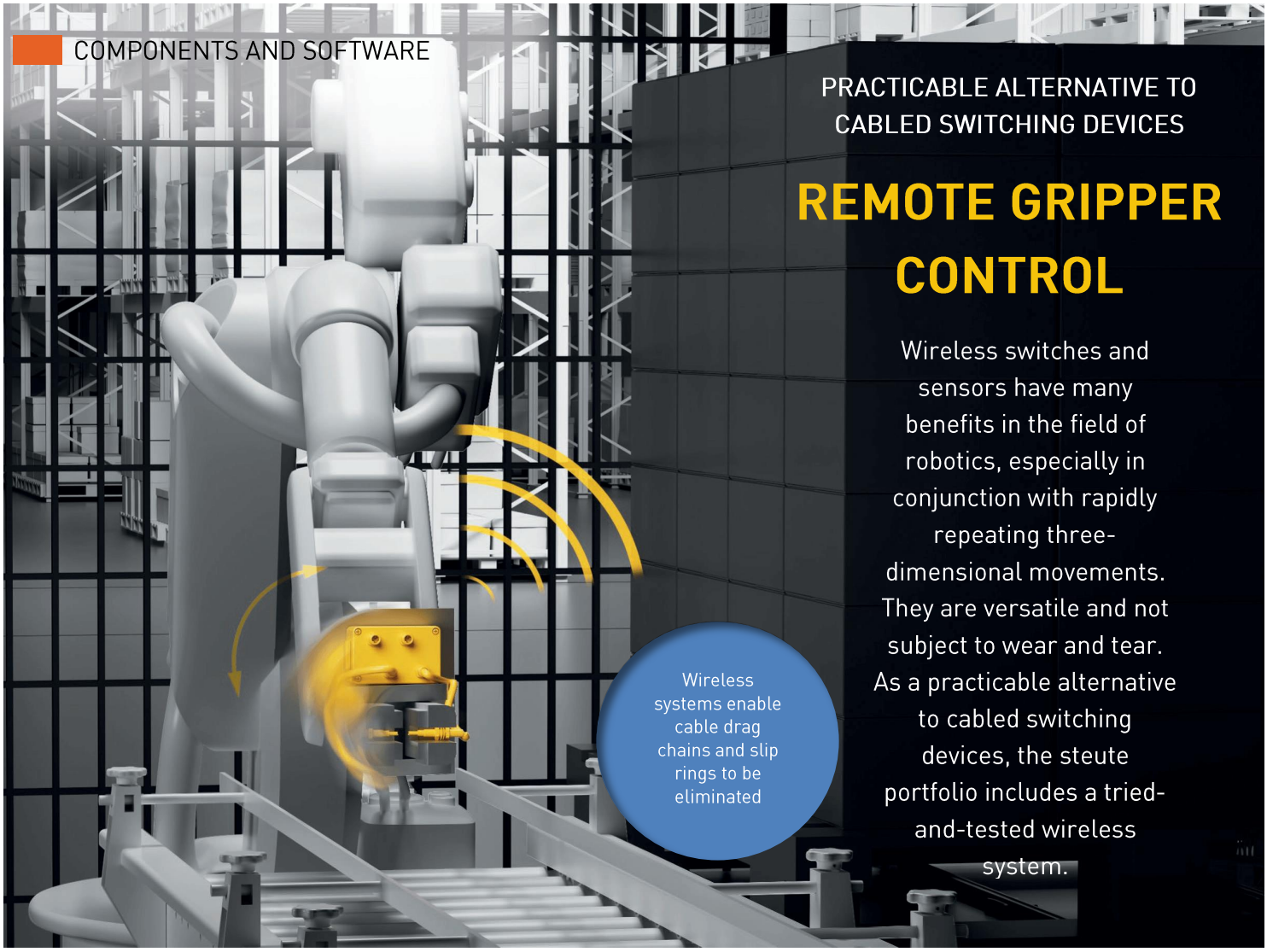
Technical article, published in: INDUSTRIELLE AUTOMATION (01/2025)



Two or three-dimensional movements in rapid succession: that is basically the essence of robotics. And because power and signal cables have to be laid right to the end of the robot arm, i.e. to the gripper, these cables have to withstand a great deal of stress.

A simple calculation should illustrate this level of stress. With a cycle time of 5 seconds, which is not even all that fast in modern robotics, a robot performs a total of 5,760 identical movements during every 8-hour shift. With daily operation, this amounts to approximately 2 million cycles per year.

That alone places high demands on the moving components. But in addition, the ambient conditions are often unfavourable – including, for example in metal machining, metal shavings, flying sparks and high temperatures. Moreover, there must be enough space for the cables, and they must remain safely in place while the machine is moving. Slip rings, which are also subject to

steute Technologies GmbH & Co. KG
Brückenstr. 91
32584 Löhne, Germany
Phone: + 49 5731 745-0
Fax: + 49 5731 745-200
info@steute.com
www.steute.com

Inductive sensors communicate via a radio module (middle left) with the corresponding receiver unit (middle right) or also with gateway receivers

wear and tear, are deployed wherever endless rotation is involved. The conditions are even more demanding when movements are three-dimensional, as is the case with classic six-axis robots. Taking all of these factors into consideration for power and signal cables, one conclusion seems obvious: an alternative to cables would be practical. And the good news is that there is such an alternative. With sWave, the steute business division Controltec has developed a wireless system proven to transmit reliably even under the adverse ambient conditions of industrial and automated production (reflections from metal enclosures, coexistence of different wireless networks).

This wireless system uses the free 868.3 MHz waveband. Increased availability in complex wireless environments, for example involving interference, is guaranteed by the "listen before talk" function.

EXTENSIVE RANGE OF WIRELESS SWITCHES AND SENSORS

For this technology, the steute Industrial Wireless range offers both electromechanical switches (e.g. position switches and foot switches) and non-contact sensors (e.g. inductive sensors and magnetic sensors) with an integrated or external radio module. Rechargeable lithium-ion batteries enable the switches and sensors to function without power cables.

Users are not limited to this special wireless range, however. Many conventional steute product series can be connected to a separate radio module – a universal transmitter – and are then ready for radio transmission. To increase the efficiency of the system, multiple transmitter variants can convey signals from up to four connected switching devices.

On the receiver side, the wireless switching device or universal transmitter communicates with compact receiver units installed, for example, inside the control cabinet. Via these receivers, the transmitters are easy to programme, and the output signal can be configured in the same way.

EXAMPLES OF WIRELESS POSITION MONITORING

One of the sWave applications which steute Controltec has realised in connection with robotics is a robot cell for an automotive supplier. The task of this cell is the end machining of pipes used to make shock absorbers. Robots place the pipes inside the machining cell. The position of the gripper in relation to the workpieces is monitored by a wireless inductive sensor. It transmits the position signals remotely, via an RF/IO universal transmitter, and has stood the test of

steute Technologies GmbH & Co. KG
Brückenstr. 91
32584 Löhne, Germany
Phone: + 49 5731 745-0
Fax: + 49 5731 745-200
info@steute.com
www.steute.com

time in this application. Previous experiments had shown that cabled sensors in the same application only survived for a few weeks.

In another project, an inductive sensor in combination with an RF 96 ST wireless universal transmitter monitors the position of the workpiece in the gripper. In this case, the workpieces are precision-made moulded parts used in the construction of power station turbines and aircraft engines. The elimination of cables increases the reliability of the handling system and also increases its freedom of movement because it is unhindered by cables.

In a third application example – also from the automotive industry – metal components are picked by robots at high speed. A sensor in the gripper serves here as the "eye" of the automation, visualising the positions of the stamped parts on the conveyor belt. The very fast and short movements would mean high stress levels for cables and correspondingly short lifetimes. The combination of inductive sensor and RF 96 ST universal transmitter ensures uninterrupted signal transmission between the gripper and the robot control unit. And users can eliminate the cables and/or slip rings susceptible to wear and tear.

WIRELESS UNIVERSAL TRANSMITTER WITH EXTERNAL ANTENNA

The steute Industrial Wireless range is continually expanding. A brand new transmitter addition is a variant of the RF/IO universal transmitter with an additional connector facilitating the installation of an external antenna. With the RF/IO SMA, a longer signal range can be achieved – without repeaters – because the antenna can be positioned outside enclosures or in areas without radiation.

Author:

Sascha Elsner
Product Manager Wireless Applications
steute Technologies

Images: steute Technologies GmbH & Co. KG

steute Technologies GmbH & Co. KG
Brückenstr. 91
32584 Löhne, Germany
Phone: + 49 5731 745-0
Fax: + 49 5731 745-200
info@steute.com
www.steute.com