

Wireless detection

Position monitoring of hooks and booms on telescopic cranes

Not cabled, but cable-free: true to this motto, Paus is currently equipping one of its crane series with new safety features. Wireless switching devices monitor the position of the crane hook and the extension of the telescopic elements.



The "Sky Worker PTK 25" aluminium crane was developed for work in confined spaces.

When a telescopic crane lifts a load, it is imperative that the hook block does not crash into the boom head. This requirement is taken care of by an "upper limit switch": a position switch sends a signal to the control panel when the hook block has reached its upper limit, and the drive of the hoisting unit then stops automatically.

This function usually requires power and signalling cables, which have to be flexible

because they run along the extendable telescopic elements to the top of the boom. Nearly all telescopic cranes, from "small" to 500 tons, are therefore equipped with a sprung cable drum (often very visible) to wind and unwind the cables.

Sprung cable drum replaced by wireless communication

The "Sky Worker PTK 25" crane from crane manufacturer Paus does not need such a

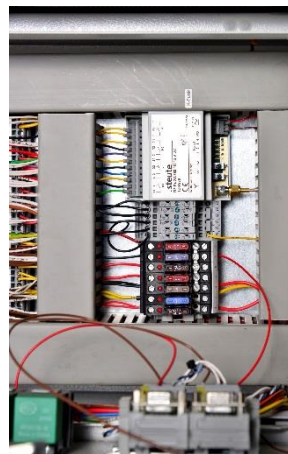
drum. When the hook block reaches its upper limit, a wireless pull wire switch from the Steute Schaltgeräte GmbH & Co. KG Wireless range is actuated and transmits a signal "on air" to the receiver unit.

The advantages from the standpoint of the crane manufacturer are as follows. Firstly, construction is simpler, an important factor when moving parts are involved. Secondly, the costs are reduced. A prerequisite for eliminating the sprung cable drum is use of a reliable wireless switching device in a robust design suitable for the often rough

environments in which cranes are used. The Paus engineers found just such a wireless switch in the steute Wireless range. The RF 95 WH/ 90° pull wire switch belongs to a series of switches used throughout automation technology. The wireless variant employed by Paus features the wireless technology "S-Wave 868", developed by steute especially for use in industrial applications. It features a bidirectional wireless protocol, as well as high transmission reliability without interference with other wireless systems.



A wireless pull wire switch causes the winch to stop when the hook block reaches its upper limit.



The receiver unit for the wireless switchgear is well protected within the control panel.



An antenna receives the signals from the wireless switches and sensors and passes them on.

Wireless sensors monitor the extension of the telescopic boom

An additional feature of this technology is "energy harvesting". When the hook block reaches its upper limit, it triggers the actuator (a roller lever) of the pull wire switch. On the plunger there is a miniature electrodynamic energy generator which converts kinetic energy into electrical energy. This small amount of energy is sufficient to transmit a signal to the receiver unit and also to receive

confirmation of its arrival. This means that all wireless switching devices which work with "S-Wave 868/915" wireless technology can do without not only signalling cables, but also external power supplies or batteries. Following successful tests, Paus went into serial production with this new type of upper limit switch, taking the chance to advance an additional function from cabled to cable-free operation.

Since the load bearing capacity of every crane depends on its outreach, the crane

control must also monitor the extension status of the telescopic boom. This usually happens via a mechanical length indicator which – just like the sprung cable drum – is fastened to the boom. Crane manufacturer Paus has instead mounted wireless magnetic switches to the individual telescopic parts, which record the individual positions of the latter via a status signal. A transmitter module sends the corresponding signals to the receiver unit. This means that the length indicator can be eliminated, offering the same advantages as the cable-free upper limit switch.

According to steute, the "S-Wave" technology has already been successfully implemented in many automation and control technology applications, as well as mobile applications. Over several years, the steute business unit "Wireless" has built up a modular switchgear portfolio containing different wireless technologies for a wide range of switchgear series – also for

explosive environments and functional safety. In addition to diverse electromechanical switching devices (position, foot, pull wire switches), non-contact switchgear (inductive and magnetic sensors, as well as optical sensors) and command devices are also available in wireless versions.

Robust construction, fatigue-free operation

Independently of the type of signal transmission and the function or application, the steute foot controls feature a low pedal height – an important prerequisite for simple and fatigue-free operation. They are also stable, which in this type of switch is important for ergonomic and intuitive operation. The metal housings can withstand high mechanical wear and tear, and there are no cables so they are also durable in rough ambient conditions.

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Images: steute Schaltgeräte GmbH & Co. KG