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## Hook and mast: position monitored

### Wireless switchgear from steute on telescopic crane booms

Wireless means cable-free: with this motto in mind, Paus is fitting its Sky Worker PTK 27 crane series with special safety equipment. Wireless switching devices monitor the position of the crane hook and the extension status of the telescopic parts. The crane engineers have managed to develop a solution which is as reliable as it is affordable.



*The Sky Worker PTK 27 aluminium trailer crane was developed especially for compact spaces*

When a telescopic crane lifts up a load, the hook block must not be allowed to crash into the boom head. This is prevented by a so-called upper limit switch: when the hook block reaches its upper limit, a position switch sends a signal to the control panel

and the hoist drive is automatically stopped.

This functionality usually requires power and signal cables. They are guided up to the top of the mast over the extendable telescopic parts and therefore need to be

flexible. For this reason, nearly all telescopic cranes – from small cranes for roofers to 500-tonne giants – are fitted with (often very visible) spring-driven cable reels to wind and unwind the cables



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

## Wireless means no spring-driven cable reel

The Sky Worker PTK 27 trailer crane built by Paus manages without cable reels and instead exploits the freedom offered by radio communication. When the hook block reaches its upper limit, a wireless pull wire switch from the steute Wireless range confirms this by sending a remote control signal to the receiver unit.

For the crane manufacturer this is doubly advantageous. Firstly, construction is

simpler, which is an important factor when moving parts are involved. Secondly, construction is cheaper.

## Reliable transmission even in rough conditions

The spring-driven cable reels can only be eliminated, however, if the wireless switching devices used are reliable and robust enough to withstand the adverse environments in which cranes are often located.

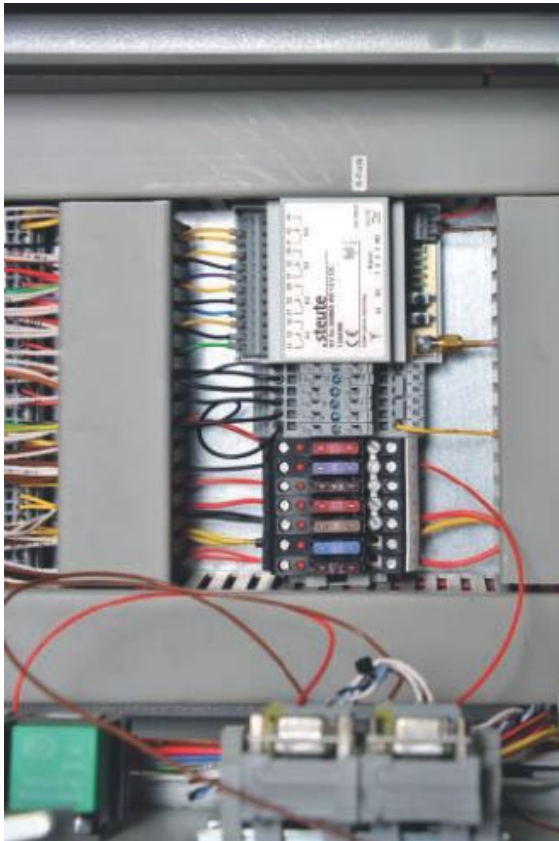
The Paus engineers found the answer in the steute Wireless range. The RF 95 WH/90° pull wire switch is based on a switch series used throughout automation. The wireless variant selected by Paus works with the sWave 868 wireless technology developed by steute especially for industrial applications. It features a bidirectional wireless protocol, as well as excellent transmission reliability without interference from other wireless systems.

## Self-sufficient operation

A further feature of this technology is energy harvesting. When the hook block reaches its upper limit, the actuator of the pull wire switch (a roller lever) triggers the switching action. A miniaturised electro-dynamic energy generator located on the plunger transforms the kinetic energy from the movement into electrical energy. This small amount of energy is completely sufficient to send a signal to the receiver unit and receive confirmation of its arrival. This is why all the steute Wireless switching devices which work with the sWave 868/915 wireless technology require neither signal cables nor an external power supply or batteries.

Following successful tests, Paus went into serial production with this new type of

upper limit switch – and at the same time took the opportunity to change another functionality from cabled to wireless: a similar application crucial for safe crane operation.



*The receiver unit for the remote control switches is well protected within the instrument panel*

## Wireless sensors monitor extension status of telescopic mast

Since the load bearing capacity of a crane is dependent upon its reach, the crane control system must also monitor the extension status of the telescopic mast. This is usually performed with a mechanical length gauger which is installed – just like the spring-driven cable reel – on the mast.

Paus has found a simple solution for this task, and once again with almost no visible components. Wireless magnetic switches are attached to the individual telescopic parts and monitor their position by emitting status signals. A transmission module then transmits these signals to the receiver unit. This means that the crane no longer needs a length gauger, providing the same advantages as the wireless upper limit switch: moving components subject to wear and tear, and thus also to malfunctioning, become unnecessary. Manufacturers and customers both benefit from this cost-saving solution.

## A tried-and-tested wireless technology...

The sWave technology developed by steute has been tried and tested in countless automation and control technology, as well as mobile applications. Over a period of several years, the steute business unit Wireless has developed a modular range working with different wireless technologies – also for explosive environments and functional safety – which is available for many different switchgear series.

In addition to diverse electromechanical switching devices (position, foot and pull wire switches), wireless versions of non-contact switching devices (inductive, magnetic and optical sensors) and command devices are also available.

## ... and an innovative crane concept

The motivation of a machine, plant or vehicle constructor to use wireless devices is usually a desire for a flexible and simple connection between switching device and receiver unit which offers high availability and yet remains affordable. A need always emerges when power and signal cables are

complex to install, for example – as shown here – on moving or telescopic machine components.



*Wireless magnetic switches monitor the extension status of individual telescopic parts*

The wireless switching devices incorporated in the Sky Worker PTK 27 have been tried and tested on many building sites to date. Engineers in the Paus business division Lifting Technology developed this aluminium trailer crane especially for building trades such as carpenters and roofers. Here their focus was on the necessary combination of safety, reliability and compact installation space. The newly constructed folding tow mechanism facilitates elimination of a stiff towing bar, thus reducing the crane installation area to a minimum. In addition, passage height can be reduced to under two metres. The performance data of this mobile crane are nevertheless excellent, with a load bearing capacity of 1000 kg and a mast extension length of 27 metres. This is appreciated by construction workers and crane hire companies alike

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Images: Hermann Paus GmbH , steute Schaltgeräte GmbH & Co. KG