

# Simplifying cranes with crane controlling solutions

**Matthias Simon**, Johannes Hübner Fabrik elektrischer Maschinen GmbH, Giessen, Germany

Huebner Giessen system solutions are not only setting standards across the globe for crane controlling solutions with the compact and modular U-ONE® system, but also with single devices like EGS 4..® (programmable electronic overspeed switch) and FG 4 (incremental encoder with fibre optic signal transmission by direct cable connection or by means of fibre optic components transmitter and decoder).

## SIL 2 conformity

As the only 'on the market' available components, Huebner Giessen provides U-ONE® and EGS 41® with functional safety certification according IEC 61508 SIL 2 (software) and EN ISO 13849-1 PL d (software and hardware).

Current safety regulations for cranes require a safety analysis of the electrical control system. A determined failure of the control system must lead to a safe controlled overspeed signal. Therefore, the safety related measure must comply with SIL level 2. Otherwise the complete safety circuit must be improved by adding additional components and monitoring functions.

As of now the basic device U-ONE® fulfils these safety functions. With its 12 different electronic, functional modules (incremental output, BUS coupled absolute positions equipped with all BUS interfaces, synchronisation module, overspeed monitoring, electronics position switch for positioning and so forth) this solution offers a certified, reliable measuring systems for cranes.

## Key components

Modular system U-ONE®, electronic overspeed switch EGS 4..®, incremental encoders with direct fiber optic output and separate transmitter/decoder units for fiber cable transmissions are key components for crane applications around the world.

### Modular system U-ONE®

The system is based on a universal basic unit connected to electronic function modules in the switchboard via fiber optic cables that are immune to EMI. The electronic function modules are linked by an internal bus structure, and can be freely connected in series as required (series plug-in modules).

The main advantages of the system U-ONE® are:

- Space saving compact design
- EMI immune fiber optics signal transmission
- High safety by switchboard mounted electronic modules
- Easy central programming through common interface
- Extreme reduction of cabling costs by using only one dual fiber cable
- Reduction of commissioning time by the modular structure
- Easy extendibility by connecting the electronic modules in series as required
- Highly flexible and saving spares by the modular system

### Electronic overspeed switch EGS 4..®

This programmable overspeed switch provides decisive advantages over mechanical overspeed switches, such as adjustability for very low speeds, high shock and vibration resistance, and better

switching dynamics and accuracy. Electronic overspeed switches also achieve considerably higher reliability, thanks to their self-monitoring for functional faults and the possibility of verification.

As standard it is fitted with two electronic switch contacts that can be set independently of one another over the entire speed range from 0,63 – 4,800 rpm. This avoids having to install step-up gearboxes to use overspeed switches with very slow drives. As an option, it can be delivered with four programmable switching speeds. An additional pulse output is available as an option.

A separate switched output serves as a system check and monitors the supply voltage, functional faults and the output contacts.

The Windows-based software that is provided with the overspeed switch facilitates comfortable programming of both overspeed and underspeed limits, as well as a switching delay time to blank out very short overspeeds that can occur, for instance, during a load change.

### EMI proof signal transmission through fiber optic components

Electromagnetic interferences on signal transmission cables can e. g. be caused by close power cables, high starting currents of DC motors or strong magnetic fields of breaks. Huebner Giessen is providing fiber optic transmission components for incremental encoders with the following advantages:

- EMI immune fiber optics signal transmission
- Suitable for long distances up to 1,000 m
- Reduction of cabling costs by only one fiber optic cable for all encoder channels
- Decoder is equipped with two output blocks (TTL and/or HTL) saving a pulse splitter



Some of the main advantages of the U-ONE® include: Space saving compact design, EMI immune fiber optics signal transmission, easy central programming through common interface, and an extreme reduction of cabling costs by using only one dual fiber cable.



U-ONE® up close: electronic function modules mounted in switch board.

- Output blocks are galvanically insulated (optional)
- Warning on fiber optic cable disconnection (optional)

## New installations

In fulfilling these requirements, Huebner Giessen is continuing to implement customer requirements in their system solutions. Resulting from growing demands with regards to accuracy, safety, availability, user-friendly operability, as well as greater levels of automation, encoder systems often seen in the past as 'small components' are now considered 'key components' and are increasingly being specified by end users as well as for whole projects during the tender phase. This ensures the end customer receives the advantages of these system solutions (single source partner, integrated systems, cost savings) with the crane, and is able to benefit from these advantages.

Furthermore, U-ONE® offers the possibility of integrating special customer requirements into the system and, for example, visualising the solution in the associated crane management system.

## Retrofit projects

Thanks to simple electrical and mechanical adaption, the complete system is equally easy to retrofit, to upgrade a system or include in new installations. And be assured that with Huebner Giessen you have a vastly experienced partner who is ready and willing to provide you with assistance both during the electrical implementation phase and in making mechanical adaptations.

## Reducing spare parts

By using the programmable components, end users are able to reduce spares, saving money. Units are also able to provide identical functions and contacts for exchange of mechanical overspeed switches (no speed-increasing gear needed) and mechanical cam-limit switches.

## Experience & installation assistance

With more than 1,000 successful installations worldwide Huebner Giessen offers the foremost system solutions available. With more than 40 representatives worldwide, they can provide support on all continents, including on-site consultation and installed equipment measurements. All customer requirements can be implemented.

### ABOUT THE AUTHOR AND COMPANY



**Matthias Simon** is Manager, International Projects for Johannes Huebner Giessen GmbH. He has been with the company for over 10 years working in sales, marketing and applications – particularly in Asia and South America, with a special focus on crane business.

Johannes Hübner Giessen/Germany was established over 70 years ago and has over 40 representatives worldwide, acting as guarantors for reliable encoder technology. Hübner Giessen equipment is used in the Crane and Heavy-Duty Industries.

### ENQUIRIES

Matthias Simon, Tel: +49 641 7969-30

Email: [matthias.simon@huebner-giessen.com](mailto:matthias.simon@huebner-giessen.com)

Web: [www.huebner-giessen.com](http://www.huebner-giessen.com)

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ideas and solutions

## Modular encoder system

# U-ONE®

## An inspired concept

Functional safety: SIL 2 conform



## U-ONE®: Setting standards across the globe for crane controlling



The compact and flexible solution to meet the challenges of modern-day plant engineering such as for crane construction and hoist equipment, steel and rolling mills, mining and conveyors as well as the oil and gas industries.

### Separate electronic modules with up to 12 functions, e. g.:

- Measures speed and position
- Electronic overspeed switch with programmable switching speed from 0.63 rpm
- Wide variety of bus interfaces
- Diverse Ethernet connections
- Electronic cam controller



Johannes Hübner • Fabrik elektrischer Maschinen GmbH  
Siemensstrasse 7 • D-35394 Giessen/Germany • Phone +49 6 41/79 69-0  
Further information: [www.huebner-giessen.com](http://www.huebner-giessen.com)