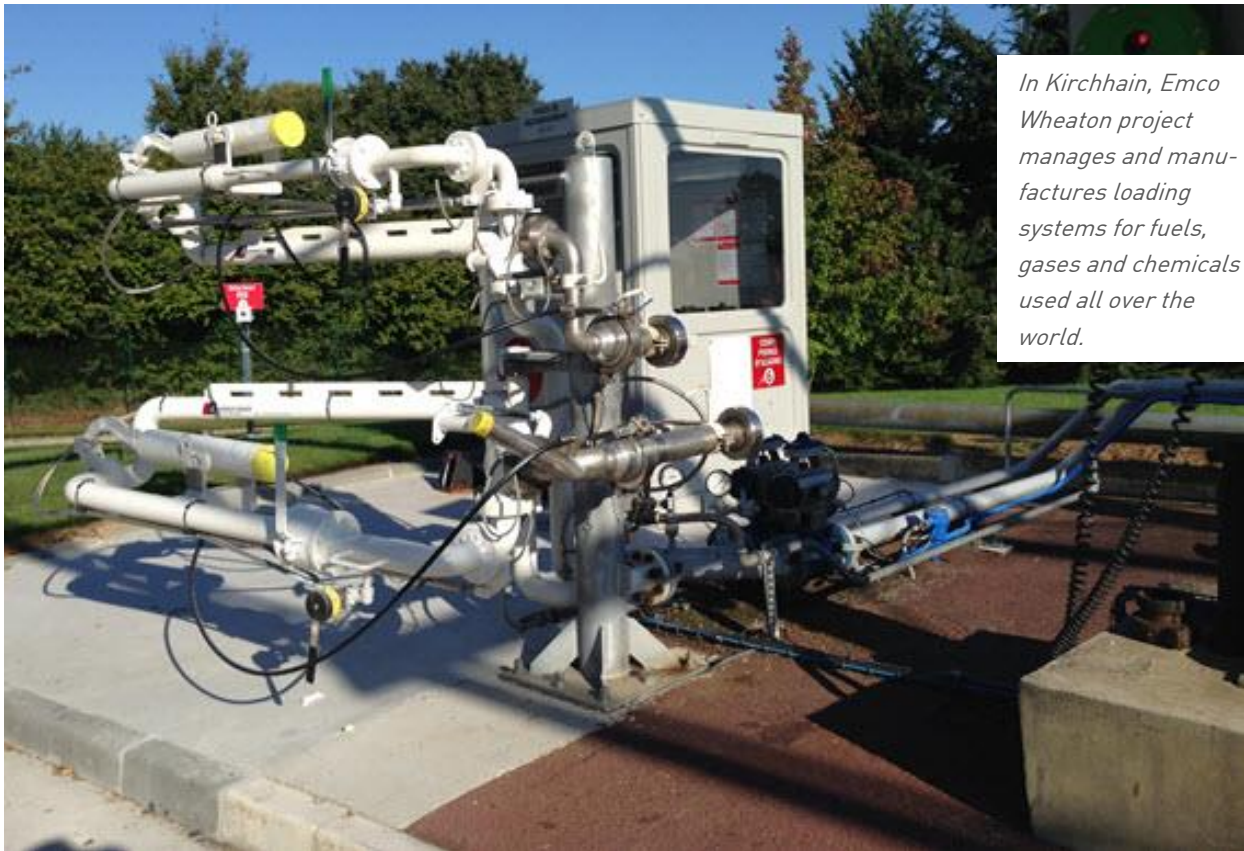


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In Kirchhain, Emco Wheaton project manages and manufactures loading systems for fuels, gases and chemicals used all over the world.

Safe loading of explosive gases

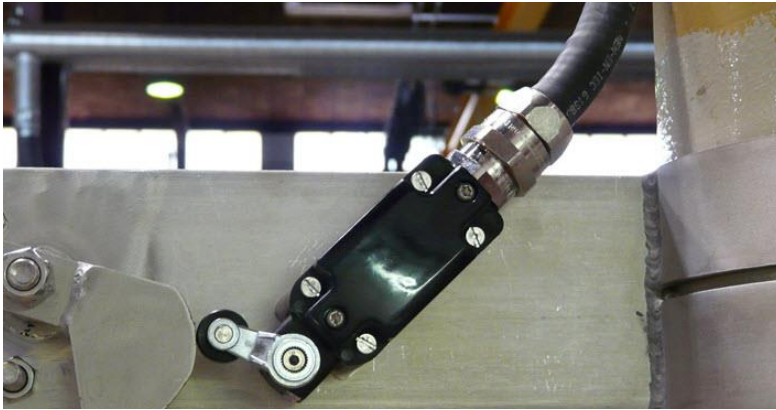
"Extreme" position switches in action

Emco Wheaton loading systems are used all around the world for the handling of large quantities of petrol, natural gas, liquid gas, chemicals, etc. The company, which is based in Kirchhain near Marburg, monitors the positions of its loading arms using Ex position switches which are reliable in the long term, even in subzero temperatures.

How do you fill 100 empty tank wagons – i. e. a block train – with liquid gas as fast as possible and yet still safely? The project engineers at Emco Wheaton GmbH in Kirchhain near Marburg, which belongs to the Gardner Denver- Group, are experts at

developing and building loading systems to solve precisely this problem.

The core element of such a system is the loading arm, which Emco Wheaton produces in different variants: for loading from above, from below or from the side, with a



The position of the loading arms is monitored by steute "Extreme" position switches.



The Ex 97/ Ex 99 Ex position switches and the Ex RC M20 KST Ex magnetic switches are suitable for use in subzero temperatures down to -60°C.

fixed or a variable range, with heating lines, with vapour recovery. To balance the conveyor systems, customers can choose between hydraulic, pneumatic and electrical drives, as well as manual systems, for example with spring cylinders or counter-weights. The technical components and systems for this kind of handling equipment are always complex: the loading arms are equipped with several – usually four – swivel joints which must be exactly sealed because of the explosive gases, liquid fuels like petrol, or chemicals which are being loaded.

Special requirements and ambient conditions must be taken into consideration

The design of the loading arms must take into account the temperature of the media being handled and of the ambient surroundings, as well as the pressure range. And in nearly all projects, (gas) explosion requirements must also be met.

This also impacts the switchgear which can be selected to monitor the positions of the loading arms. Either position switches can monitor the baseline and final positions, or a mechanical cam switch can be used

to cover a predefined range. Because the position monitoring of the loading arms is a safety-related function, the machine directive regulations apply and switches with normally closed contacts are needed.

In addition to explosion protection and machine safety, it is often necessary to take other special requirements and ambient conditions into account – for example very high or low temperatures. When, for example, hot bitumen or other hot media need to be loaded, heated or thermally insulated loading arms are used. In such cases the switchgear also has to be heat-resistant. Emco Wheaton uses Ex 98 position switches from the steute "Extreme" range. They are Atex certified for gas Ex applications in zone 1, fulfil comparable international Ex regulations (UL/ CSA, GOST, NEPSI...), and can be used for safety-related functions. In addition, they are suitable for use in temperatures up to 70 °C.

Ex switchgear for subzero temperatures

Increasingly frequently, the Emco Wheaton engineers design loading systems for extremely low temperatures. One reason for this is that exploration fields for crude oil and natural gas are increasingly being opened up in colder regions of the world.

For these applications, the steute "Extreme" range again offers suitable Ex position switchgear. The recently launched Ex 99 series can be used in temperatures down to -60 °C and also in corrosive environments. The actuators are roller levers made of brass. The following project is a typical example illustrating the possibilities presented by Ex position

switches with safety function from the steute "Extreme" range.

A current project from Emco Wheaton involves a loading system for liquefied petroleum gas (LPG) and comprises 108 individual stations and 216 loading arms. It enables a block train with multiple tank wagons to be loaded and unloaded at a terminal in Central Asia very quickly and without having to shunt the train.

The LPG must be kept at a pressure level of 170 to 180 bar if it is to remain liquid and thus transportable. This means that the pressure level must also be maintained during the loading process. For Emco Wheaton this is a completely normal requirement for the handling of LPG, and to meet it the company has developed special components for both the swivel joints of the loading arms and the sealing of the couplings to the tank wagons.

Safety-related position monitoring for every movement

Three steute "Extreme" Ex 99 position switches are installed at each of the 108 stations. Two of them – in combination with a cam switch – are responsible for safe signalling as soon as one of the two end positions of the loading arm is reached. The third switch communicates to the central control unit the position of the foldable ladder granting operators access to the top of the tank wagon. This guarantees that all safety-relevant movements at each individual station within the terminal are monitored with a high degree of reliability at all times – in an explosive environment and in subzero temperatures. The system has now been installed in Asia, where it is performing its task reliably and safely.

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Images: steute Technologies GmbH & Co. KG