



Innovative HMI and visualization systems for pharmaceutical processing

Human machine interface (HMI) operator terminals are critical to controlling processes in pharmaceutical industry. The next generation of MTL HMI hazardous area remote terminals, part of Eaton's Crouse-Hinds series portfolio, enables pharmaceutical plants to optimise productivity and reduce operational costs while increasing safety.

The business need

In a pharmaceutical plant, process and plant operators' needs are three-fold. First, to reduce costs, second to optimize productivity and, finally, to increase plant safety, all while maintaining a high degree of quality assurance of the final product. Reducing costs can be realized in a number of ways, for example, optimizing the purchase of new products and spares, supporting lean factory layout and reducing maintenance and upgrade costs. Optimising productivity can be achieved by reducing downtime, increasing output and reducing waste, and plant safety can be increased by having easy and understandable maintenance, one platform of zone 1 devices and reducing installation errors.

The latest HMIs are enabling process managers to achieve all this throughout the pharmaceutical manufacturing process. Pharmaceutical processing is typically a batch process, whereby the manufacture of drug substance, or active pharmaceutical ingredient (API), involves several unit operations and is created stage by stage over a series of processes. HMIs are an essential piece of equipment used to control and monitor these processes and they are used in many stages of the manufacture, extraction, processing, purification and packaging of the final product.

Typically, pharmaceutical processing initially involves several stages of reactions in which different functional groups are attached to the starting raw material. During the first stage of ingredient production, raw or pre-purposed material is added to a reactor together with heat and / or steam. HMIs need to provide the operator with clear data on various parameters such as the quantity of material being added to the reactor, the temperature and pressure, so the conditions within the reactor can be checked as correct and the process is optimized. Additional data such as a filling level is often required, which alerts users through the Distributed Control System if the reactor is too full. HMIs that can be customized and fitted with stop buttons enable users to stop the process safely and therefore increase the plant safety.

HMIs are also used in clean room applications for tablet coating where they are essential for monitoring and controlling the amount of coating fluid sprayed on the tablets. Here, stop buttons should be specified on HMIs in case the user needs to stop the process, for example if the coating fluid exceeds the required amount to coat the tablets, causing costly wastage.

Loading and unloading of liquids such as alcohol and chemicals into the plant require HMIs to be used to monitor and control the transfer of liquid. In this instance, when the liquids arrive by truck, they are pumped into the storage area and HMIs can indicate data such as the volume of liquid pumped and flow rate.

Packing and dispatch is the last area where monitoring and control are important. HMIs that can be integrated with barcode scanners and readers enable pharmaceutical manufactures to track and trace the final product easily for increased productivity.

continued

MTL GECMA pharmaceutical processing

October 2016

Users here frequently specify an HMI with a dual screen solution, where the first screen is for monitoring and controlling the process and the second is for access to an ERP system.

A key concern for pharmaceutical plants is the piping and plant design. HMIs need to be installed and retrofitted easily within an existing plant layout, thereby reducing downtime, exactly where the operator requires it. Many plants prefer to site their operator terminals on the plant floor next to the process, as it enables them to accurately control and monitor their process locally and directly in the field. However, this presents a challenge for traditional HMI systems which are built from one whole unit, because when it comes to upgrades and repair, they have to be dismantled off site, leading to costly downtime. Safety is also paramount in these hazardous areas and typically cables between the HMI and sensors in the process need external protection to make sure there is no risk of spark.

In addition, pharmaceutical plants need to be washed down as part of a regular cleaning programme to remove any residue drug dust and powders, and so HMI systems that are water resistant are necessary.

The solution

The new generation of MTL GECMA HMI has exceptional high reliability using the highest quality of standardized and certified components but now with improved features designed to meet all users' specifications and process needs.

At its core is an innovative modular design, the MTL GECMA consists of five electronic modules; the display unit, power supply, communications modules, keyboard and pointing device, which can each be separately removed and replaced on site as they are individually approved to global hazardous certification for Zone 1 environments. This offers safe handling on site independent of the housing and guarantees high reliability - worldwide. The modularity of the MTL GECMA means it can be installed easily within a pharmaceutical plant, exactly where the operator requires. The MTL GECMA can be used with barcode scanners and card readers, to suit the need of the application and is compatible with customer software.

The MTL GECMA provides exceptional levels of safety. The terminal features a visual alarm to immediately warn users in the event of a communication failure. The alarm visualization system checks the correct data transmission to the display in real time and alerts users by way of a red blinking frame around the display, enabling them to rectify the problem straight away. It can also be fitted with stop buttons, indicators or push buttons so that the operator can safely stop the process in an emergency or operate the machine remotely.

It has an intrinsically safe data cable for secure data transmission with no loss of data over a distance of up to 10,000m. Users can specify a copper or fibre optic cable between the control room and remote terminal, with no need for additional external cable protection.

The HMI is available with a range of cost effective specialist housing options. The flexibility of the design allows engineers to customise the housing to suit their application and the slimline stainless steel housing can be mounted to the floor, ceiling or other suitable stable objects as required. Roofs can also be added to ensure that the display remains clear during plant wash-down. The MTL GECMA is fully customizable with a number of different housing options including a stainless steel top shield that protects the screen.

Available from stock and pre-tested, the MTL GECMA offers full HD resolution for 22" and an even higher resolution for 24" displays which are of the highest industrial quality with excellent readability. They give detailed representation for a wide range of applications while LED backlit technology reduces energy consumption.

Front accessible standard interface with DVI and USB connections allow easy commissioning while connections can also be made using VGA and USB port for existing plant installations. The USB interface future-proofs investment and allows easy expansion for additional connected devices, such as scanners or printers.

The benefits

The MTL GECMA range provides a wide variety of benefits to the pharmaceutical manufacturing processes:

- Easy and fast upgrades of existing installations, saving up to several days each time.
- Quick repair on-site even in hazardous areas can be reduced from days to minutes and production stop can be prevented, therefore reducing downtime.
- Safe data transmission with no extra cabling protection, saving up to 50% on wiring cost.
- A single product line can be specified and installed globally which results in time and cost savings for engineering, installation and service teams.

.... reducing operational costs,
optimising productivity and
increasing plant safety.



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Publication No. AN 9042
October 2016

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