

Operator Interface Systems for Plants: The Ins and Outs and Ups and Downs

By Bill Fleming

Chemical plant operators face specific challenges when selecting an operator interface system (OIS). Like most organizations that process sensitive materials, they need stainless steel systems for their aseptic and cleanability properties; systems that are designed and engineered to withstand years of rigorous use; access to a wide range of customizable options so that the system meets their specific needs; and a compact, ergonomic design that allows the system to be deployed exactly where needed. The systems also must be easy to maintain and convenient for operators to use.

In addition, chemical companies have the added consideration of environmental and safety hazards that, if not taken into account, could result in explosions, fire, operator injury, and product contamination or loss.

Poorly designed systems can cost companies immeasurably in terms of data inaccuracies, unnecessary downtime, employee safety, and time to market. To prevent these costs, consider the following when selecting an OIS.

Regulatory Compliance

Safety and compliance are paramount in the chemical plant environment and must be at the top of your list of OIS requirements. Your OIS should be intrinsically safe and able to withstand any deviation from a normal processing environment.

Volatile chemical processing environments that are classified as hazardous areas may require an OIS that incorporates a purge and pressurization system. This prevents dangerous gases or dust from entering the enclosure, which if allowed to do so could result in an explosion upon contact with interior electrical components. When specifying an OIS, it is important to know exactly what hazardous class, division, and group represent your application.

The class defines the type of hazardous substances present. A Class I area is where ignitable concentrations of flammable gases or liquid vapors are present. A Class II area is where ignitable concentrations of combustible dusts are present.

The division defines the level of hazardous substance concentration. Division I means hazardous substances are present during normal operation. Division II means hazardous substances are present only during abnormal conditions such as a leak.

The group defines the type of hazardous substances as shown below.

Class I Substances

Group A: Acetylene

Group B: Hydrogen

Group C: Ethylene

Group D: Methane

Class II Substances:

Group E: Conductive Dust

Group F: Carbonaceous Dust

Group G: Agricultural Dust

There are a variety of purge system types to choose from, each specifically designed for use in a particular classification area as shown below.

• Type X purge systems protect general purpose equipment in Class I or Class II Division I hazardous areas.

• Type Z purge systems protect general purpose equipment in Class I or Class II Division II hazardous areas.

• Type Y purge systems protect Division II rated equipment in Class I or Class II Division I hazardous areas.

For Division II areas, you can also take advantage of UL-approved non-incendive systems that secure all interior electrical connections with specially designed brackets. This type of system can eliminate the need for expensive purge/pressurization hardware.

Cleanability



An operator interface system must be easy to maintain and convenient to use.

When deploying an OIS into a chemical plant, cleanability is a primary concern. The challenge of installing an OIS into a washdown environment requires the OIS to meet NEMA 4X standards. These standards require the enclosure to protect the interior components from splashing water, water seepage, hose-directed water, falling water, or severe exterior condensation. NEMA 4X enclosures also need to be corrosion-resistant. To meet these requirements, the OIS must be constructed of stainless steel and incorporate specially designed doors and seals to prevent water from entering the enclosure. Additionally, the OIS should be designed in such a way that any crevices and ledges are minimized, reducing the accumulation of

particulates and allowing the system to be easily cleaned.

Design Options



Suitable for aseptic pharmaceutical applications, this display option eliminates the ledge associated with traditional panel-mount styles.

Before committing to a specific operator interface system, it is important to recognize that one size doesn't fit all. Chemical plants need access to a wide range of customizable options to avoid retrofitting or frequent investments in new systems. When choosing to install an OIS, it is important to consider durability, compliance, and ease of installation.

There are five main configurations of operator interface systems. They are described below.

1. **Vertically Adjustable Systems:** These units typically provides up to 30 in. of counterbalanced vertical repositioning with additional rotational articulation. They can be attached to a wall, floor post, ceiling, or machine top.
2. **Low-height Console Systems:** These units are designed to provide improved process visibility.
3. **In-Wall Stations:** These units fit into the confines of a shallow wall, minimizing protrusion into the room. Front door access permits interior access to components without compromising the wall seal.
4. **On-Wall Stations:** Similar to in-wall stations, these systems mount directly to the wall via tabs or holes in the rear of the enclosure. They are ideally suited for areas where space is at a premium.
5. **Mobile Systems:** These specially designed systems allow you to bring the operator interface to the process, eliminating the need for multiple fixed stations. Mobile systems are ideal for bulk product, batch pre-weigh, and QA applications and are typically outfitted with integrated weigh scales, bar-code scanners, and label printers.

The vertically adjustable OIS has proven to be the best solution for process control

applications, particularly when the operator is required to spend long periods of time at the OIS. This configuration is the most ergonomically adjustable system, allowing for easy adjustment between different-sized operators and precise positioning of the display. The vertically adjustable OIS also allows the operator to use the display for setup and subsequent repositioning up and out of the way during operation as well as to move the display up and over an obstruction.

Chemical companies can expect to pay \$10,000 to \$20,000 for an OIS, depending on the type and configuration, the selection of components, and any required purge-pressurization hardware.

Component Selection

To increase efficiency, it is important to select the proper components of your OIS. This will improve the user-friendliness of the system and reduce the likelihood of data entry errors. Consider the following components when selecting an OIS.

1. Touchscreens: Popular technologies include resistive, infrared, or SAW. SAW, or surface acoustic wave, is the best choice for hazardous areas because the display uses sound waves to locate the cursor, eliminating the use of exposed electrical components.
2. Keyboards: Membrane mechanical keyswitch keyboards are completely sealed and easily cleanable, making them the preferred choice for harsh chemical environments.
3. Pointers: A wide variety of pointer options are available to the user including trackballs and glide pads. A recent innovation is the NEMA 4X rated industrial mouse, which is constructed of stainless steel. The use of an industrial mouse provides the operator with a familiar pointing device, greatly improving their comfort and efficiency.
4. PCs: A PC can be installed within the system itself or preferably in a remote location where it can be easily maintained without having to open the OIS — an important consideration in hazardous environments. The PC can be connected to the OIS via a KVM extender and a simple CAT-5 cable, allowing the PC to be located up to 1,000 feet away. This also allows the OIS to be more compact and eliminates the need for additional cooling to maintain the proper operating environment for the PC.

Bill Fleming is with StrongArm Designs, a leading manufacturer of operator interface systems. His expertise is built on a 20-year career serving the manufacturing needs of pharmaceutical and other process companies. More information is available at 215-443-3400 or www.strongarm.com.

Source URL (retrieved on 08/01/2015 - 2:13pm):

<http://www.chem.info/articles/2007/12/operator-interface-systems-plants-ins-and-outs-and-ups-and-downs>