The OMNI Transmitter

INSTRUMENTATION
ELECTRICAL
CONTROLS

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Instrumentation | calibration | loop check | startup | commissioning | electrical installation | control panel design & fabrication | project management

End User Needs Take Precedence in Electrical/Controls Coordination

In today's digital world, the number, size, and variety of electrical and controls technology required in a new facility are ever-evolving and growing. Things like remote control panels, vendor panels, indicating transmitters, panel views, VFDs, HMIs, and process manufacturing equipment provide users with the information needed to run systems and make critical decisions for successful operation and production, so it is essential for the installing contractor to ensure these items are located precisely where they're needed.

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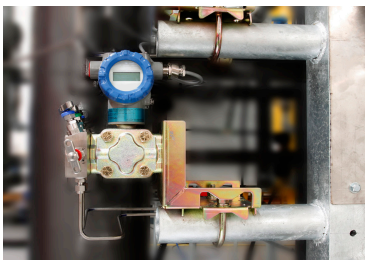
Interface point location details are oftentimes absent from design drawings, and when they are included, their positioning may not be conducive to usability; BIM 3D modeling rarely includes any of these specifications at all. Experienced electrical and instrumentation contractors like Omni must look beyond design drawings to determine where interface points should be ideally located and how they should be positioned. This process must include the input of the end user.

Ensuring that client ease-of-use needs are met might lead to installation complications for the contractor, but these challenges must take a back seat to client requests whenever and wherever possible. Once panels, interface points and conduit are installed and a new facility goes into operation, relocation becomes difficult, expensive, and therefore highly unlikely, and poorly-located items can have a detrimental effect on workflow and production and frustrate users for years to come.



Small considerations like turning a transmitter 90 degrees or locating a panel at the bottom of a platform vs. on top can make a huge difference not only in usability and production, but in how the contractor is ultimately remembered. Accommodating user needs might mean changes in conduit routing or fabrication of custom steel supports, but client satisfaction in the long term should be what matters most for all involved.

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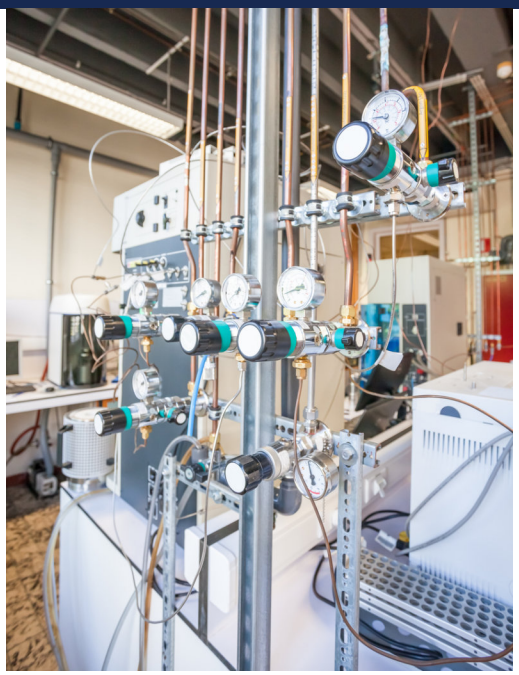
From the Panel Shop: Purge and Pressurization



Purge and pressurization is a method of explosion protection for equipment enclosures installed in hazardous environments that is performed prior to power-up to ensure the enclosure is free of any flammable gases. It is generally used when XP or intrinsically-safe enclosures are unsuitable or impractical.

There are two basic methods of purge and pressurization, constant flow and leakage compensation. In constant flow systems, compressed air first is pumped into an enclosure to displace hazardous gases, then a steady flow of pressurized air is used to maintain a constant positive pressure that prevents gases from entering. Leakage compensation provides an initial high flow rate to purge gases, then reduces and maintains the flow at just-above leakage level. This is the preferred method as it minimizes compressed air consumption and is less expensive to run.

Depending on the classification of the hazardous location (Type X, Y or Z), regulations dictate the number of purging volume changes, minimum pressure differential, and system status indication. Most systems are equipped with alarms and will interrupt power when pressure loss is detected to prevent explosion.

XP Planning

Panel design in explosive environments always poses unique challenges. First, XP codes are exceptionally stringent and require strict adherence, so plan and install with close attention to detail. Take special care to choose the appropriate devices for the specific hazards in your XP environment and NFPA zone classifications. Be aware that XP equipment is notoriously large and takes up a lot of valuable real estate. Meticulous planning is needed to coordinate placement of cumbersome XP panels, equipment and devices to ensure that they not only fit, but function at an optimal level.

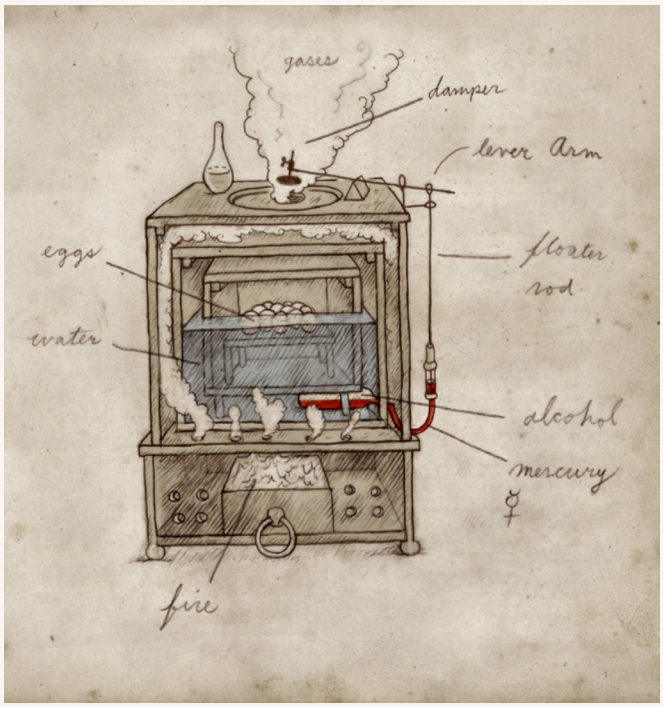
Omni Tech Talk: Electromagnetic Induction

When electrical anomalies during startup and testing make it seem as though poltergeists are at work, the problem can often be traced to electromagnetic induction issues created during wire installation. Induction occurs when lower-voltage cables are run within the magnetic flux of higher-voltage cables, which induces voltage into the lower-voltage cables. Any time words like “weird”, “odd”, or “bizarre” to describe an electrical problem, induction should be considered a prime suspect.

Induction can be easily avoided simply by following good wiring practices. High and low voltage wires should be separated by at least six inches, as should discrete wires and analog wires. Wire intermixing is a notorious source of problems in variable frequency drives, and it’s not uncommon for an inexperienced electrician to set off inadvertent glitches by mixing cables in control cabinets and Panduit trays. It’s also important to use the right type of wire for an application to prevent induction. Substituting twisted, shielded analog wire for jacketed discrete wire, for example, can often cause problems.

Induction problems usually become apparent when abnormalities occur at startup, so it’s important to use the right wire and maintain separation from the outset to avoid the headache and expense of diagnosing and fixing the issues.

History's First Thermostat was Part of a 17th Century Egg Incubator



One of history's earliest examples of a feedback control system was a circulating oven equipped with a simple thermostat invented around 1620 by Cornelius Drebbel. The Dutch engineer and inventor began formulating the idea for his thermostat after seeing a diagram of device from ancient Greece that controlled water level, similar to the way float valves function in modern day toilets. Having studied how heating and cooling air and water caused expansion and contraction, he reasoned that the same principles used in the water device could be applied to heat flow.

Drebbel's thermostat consisted of an L-shaped glass tube filled with alcohol and topped off by mercury in which he floated a metal rod. When the alcohol was heated, it expanded, thereby pushing up the mercury and causing the floating rod to rise. The incubator consisted of three nested metal boxes situated above an enclosed fire. The outer box functioned as a chimney that swept heated fumes around the inner boxes and vented from the top. The second box, which was filled with water, acted as a heat buffer for the innermost box in which the eggs would be incubated.

A horizontal section of the glass thermostat was inserted into the water-filled section, just touching the exterior of the innermost box. The floater rod in the vertical exterior tube was connected to a lever arm that controlled a damper on the top of the outer box. The rod would rise and fall accordingly and adjust the damper to either curtail or boost the fire's heat, and a threaded adjustment screw allowed the user to set the desired temperature.

Though his invention never made him a rich man, Drebbel's thermostat-controlled egg incubator was a success in his time and and served as a basis for many Industrial Age feedback control inventions that would follow.

2,000 Job-Related Eye Injuries Occur Each Day; Proper PPE Could Prevent 1,800 of Them

Common sense tells us that proper eye protection could prevent or minimize injuries, but far too many workers neglect to wear them. Here are some startling statistics about work-related eye injuries that might make them think twice:

- Each day, about 2,000 workers receive medical treatment for eye injuries sustained on the job
- 10-20% of these workplace eye injuries will cause temporary or permanent vision loss
- 90% of job-related eye injuries could have been prevented if workers had been wearing appropriate eye PPE.

Employers should provide appropriate eye protection based on the worker's job and specific hazards they encounter in the workplace. Safety eyewear manufacturers are continually working to improve fit, weight, performance, comfort and style of protective glasses and goggles, and there are countless types and styles on the market today to fit every need. Lenses can be prescription, bifocal, trifocal, progressive, photo-chromatic, anti-glare, or polarized, and most frames come in a wraparound style that increases protection. Fogging is often cited as a reason for not wearing eye protection, but many advances have been made over the past few years in anti-fog technology.