The OMNI Transmitter

INSTRUMENTATION
ELECTRICAL
CONTROLS

NOVEMBER 2020 NEWSLETTER

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

MOPs Keep Pharma Plant Online During Reno Project

A multi-purpose pharmaceutical facility was slated to undergo renovation to repurpose an existing space into a new mission-critical blood processing area. It was stressed by the client that there could be no interruptions in neighboring departments where employees were laboring to fill important backorders. Omni's solution was to develop a Method of Procedure, or MOP, to ensure that ongoing plant activities would proceed with little to no disruptions.

An MOP is a document that meticulously coordinates, outlines, and organizes each project task down to the smallest detail and can be instrumental when mission-critical systems and processes are involved. It dictates the precise sequence of what has to happen, when, by whom, and at what time to ensure smooth project execution.

Six separate sub-MOPs were developed for the project, and each involved an unusual twist. Rather than dictating targeted dates and times, switch-over scheduling was left open-ended to allow critical process department managers to strategically select their own shutdown times.

Omni's first step on the project was to identify and map all required switchovers and create a timeline for the client's review and approval. The electrical work included removal and replacement of a 20-bucket existing motor control center. Multiple other motor control centers required rerouting of 480V feeders and branch circuits to make ample room for the new process area. Controls work included fire alarm, building automation, and existing process controls that needed to be relocated. This necessitated our tracking every conduit, wire, junction box, control panel and instrument.

Omni technicians worked 10-hour days prepping, prefabricating, preinstalling and completing all possible work that could be accomplished prior to switchover. Departments were then given a window in which to select a shutdown time that would have the least impact on their production. Through this process, the project was completed successfully and downtime was kept to a bare minimum.

Also In This Issue...

OMNI INSTRUMENTATION & ELECTRICAL SERVICES, INC.

Omni Instrumentation & Electrical Services, Inc.
NJ Office: 112A Sylvania Pl., South Plainfield NJ 07080 | PH: 908.412.7130
MD Office: 3600 Commerce Dr., Suite 613, Baltimore MD 21227 | PH: 240.341.7915
www.omniinst.com

The OMNI Transmitter

INSTRUMENTATION
ELECTRICAL
CONTROLS

Data Center Tiers and Redundancy Explained

Redundancy in data centers is critical for ensuring IT equipment is not impacted should there be a power disruption or equipment failure. The four data center tiers as classified by the Uptime Institute provide the international standard for data center performance, and higher tiers require higher levels of redundancy.

The four data center tiers match the system availability needed for a particular business function and define criteria for maintenance, power, cooling, and fault capabilities. Each of the tiers includes the required components of all the tiers below it.

A **Tier I data center** is the most basic capacity level that must include a UPS, an area for IT systems, dedicated cooling equipment, and a generator. No redundancy is required. **Tier II** has a single path for power and cooling and adds redundant and backup components. A **Tier III** facility has multiple paths for power and cooling with redundant components to serve the critical environment. Maintenance and equipment replacement can be performed without taking the system offline. A **Tier IV** data center is completely fault tolerant with redundancy for every component. It has multiple independent, physically-isolated systems.

Different data centers provide different levels of power redundancy depending on the assigned tier and user needs. Redundancy levels commonly applied in data centers are N+1, 2N, and 2N+1, with "N" representing the amount of capacity needed to power, back up, or cool a facility at full IT load. If a facility is classified as **N**, it means there is zero redundancy built in.

N+1 adds an additional component to support a single failure or required maintenance, typically one unit for every four needed. So, for example, if an N+1 facility requires eight UPS units, it would have ten units. The same principle would hold true for a N+2 system in that the same eight-unit system would require twelve UPS units. A **2N** system is fully redundant, with a completely independent, mirrored system. An entire side or leg of the system can go offline with no interruption of service. Highest data center reliability is provided by **2N+1**, which combines the two levels above. This equates to a fully redundant, mirrored system plus one additional backup unit.

For more information on our data center capabilities, please contact Omni Instrumentation & Electrical Services, Inc. at 908-412-7130 (New Jersey corporate office) or 240-341-7915 (Maryland regional office).

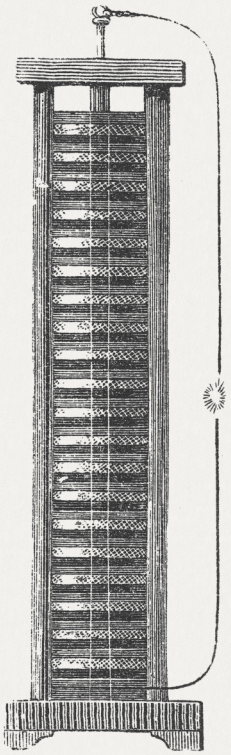
TECH TALK: The Uninterruptible Power Supply

Power problems like sags, spikes, surges, noise, frequency instability, harmonic distortion, and power failure and outages pose significant risk to critical systems and equipment. Data loss, equipment failure, down time, and even injuries and fatalities resulting from these issues can be prevented with an uninterruptible power supply, or UPS, a device that provides instantaneous, temporary emergency power when interruption or failure occurs. UPS allow time for generators or other standby sources to take over during power outages and supply clean power within a ±10% range.

There are three main types of UPS. **Standby** is powered directly by the input power and provides basic surge protection and battery backup in smaller applications like personal computer protection. **Line-interactive** UPS is similar in operation to standby, but offers improved performance by better regulating voltage and filtering features. It maintains the inverter in line and redirects the battery's DC path from charging mode to current supply when power is interrupted or lost. **Online** UPS provides the highest level of protection by combining a double conversion power circuit and an inverter to provide both conditioned power and outage protection. This type is recommended for critical applications.

When selecting a UPS, criticality of the load, power requirements, battery run time, installation, cost, and maintenance needs should all be factored in. Preventive maintenance is essential to proper UPS function, however it is frequently overlooked, and we've seen even the most sophisticated UPS systems fail when needed due to lack of care. In one instance, Omni was called in to address random dips and spikes that sent PLCs and VFDs into fault, shutting down various systems and causing others to limp along. Our technician traced the issue to loose connections and terminal corrosion in a central UPS that had not been regularly tested and maintained.

Volta vs. Galvani: A Dispute Between Scientists Yields Two Important Discoveries



At the turn of the 19th century, two Italian physicists named Alessandro Volta and Luigi Galvani engaged in an ongoing quest to disprove the other scientist's theories. But as it turned out, they both were right, and from their disagreement came the discovery of bioelectricity and the world's first electric battery.

While conducting experiments on a dissected frog in the late 1790s, Galvani discovered that the legs would contract when a charge was applied to a muscle or nerve. He attributed this phenomenon to what he called "animal electricity", an electrical fluid originating from within the animal and carried to the muscles by the nerves.

At first, an intrigued Volta praised Galvani's conclusions and set out to recreate the experiments, but in doing so, he began developing differing theories. Volta realized that most of the electrical behaviors Galvani had observed occurred in the presence of different types of metals – an iron scalpel and a brass hook, a copper hook and an iron wire. He deduced that the electrical reaction had derived instead from the metals used to connect the nerves and muscles and concluded that animal electricity did not exist. The disagreement became a subject of hot debate among scientists.

To prove Galvani's theory, Volta devised an experiment in 1800 that would eventually become known as the voltaic pile. He stacked a pair of discs – one copper and one zinc – separated by pasteboard soaked in brine, forming an electric cell that produced a current. He found that he could adjust the amount of electricity by increasing or decreasing the number of units in the pile, and with the addition of a wire he could produce a steady current.

The voltaic pile sparked excitement among the scientific community and was the subject of many public and private demonstrations, including one for Napoleon. Over time, the voltaic pile evolved into the modern battery. As for Galvani, he remained silent on the controversy, but many aspects of his hypotheses on animal electricity had merit and he has been credited as the earliest pioneer of bioelectricmagnetics. .

How to Keep Glasses from Fogging While Wearing a Mask

Face masks are some of the best weapons we have to prevent the spread of COVID-19, but anyone who wears eyeglasses or safety glasses knows that wearing a mask can causes lenses to fog up. This is not just an annoyance. Foggy lenses can pose a significant safety hazard, particularly in the workplace. Fortunately, there are number of things you can do to keep your lenses clear while you go about your day.

For those who don't require eyeglasses, the solution may be fairly straightforward: trade in your old eye protection for a pair of **high-quality anti-fog safety glasses** that come with a special fog-resistant coating**.** For those who do require prescription glasses, solving the problem of foggy lenses can be more challenging. Here are some things you can do to:

1. **Ensure that your mask fits snugly** to prevent moist air from exiting from the top of the mask and under your eyeglasses. Choose a mask that includes a moldable strip that can be contoured across the bridge of your nose. Wear your mask high on your face and press your glasses snugly down over the mask to create a better seal.
2. **Clean your lenses with dish soap**. Rub a small drop of on both sides of your lenses, rinse with warm water, and allow them to air-dry or gently dry with a clean microfiber cloth. The soap leaves a thin film that reduces fogging. A small dab of shaving cream may work, as well.
3. **Seal the mask across the bridge of your nose with double-sided tape**, and be sure to use a product that won't irritate your skin. Medical tape works well, as does medical-grade apparel tape, also known as fashion tape or body tape, which is used to adhere clothing to skin.
4. Apply an **anti-fog wipe, spray, wax or gel** to your lenses. Many of these products can damage anti-reflective lens coatings, so be sure to purchase the right kind to avoid ruining your lenses. Never use anti-fog products designed for automotive use.