The OMNI Transmitter

INSTRUMENTATION | ELECTRICAL | CONTROLS

FEBRUARY 2019 NEWSLETTER

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

Inside This Issue…

Omni Looks to the Future

We've Changed Our Name & Logo

OMNI INSTRUMENTATION & ELECTRICAL SERVICES, INC.

Formerly known as Omni Instrumentation Services, Inc., we are now **Omni Instrumentation & Electrical Services, Inc**. Our new name is intended to better reflect **who we are, what we do, and our vision for the future.**

Since 1986 Omni has steadily grown and transformed from a small instrumentation and controls specialist to a **full-service, multi-discipline electrical contractor** with two locations to accommodate our clients' ever-evolving needs. As electrical systems – power distribution, lighting, teledata, A/V, fire security, fiber optics, process control, instrumentation, etc. – **have become more and more integrated**, it makes better sense for clients undertaking important projects to place trust in a single capable contractor, **Omni Instrumentation & Electrical Services, Inc.**, rather than many.

We are proud of our growth in the past 33 years and look forward to serving our valued customers for years to come. Please call us for all of your instrumentation and electrical needs.

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: 10075 Tyler Ct., Ste 16, Ijamsville, MD 21754 | PH 240.341.7915
www.omniinst.com

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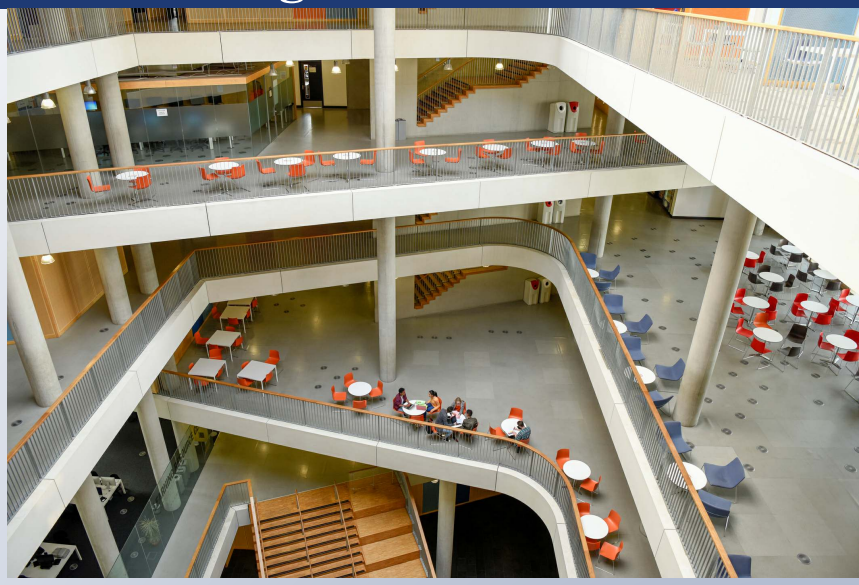
Phase Imbalance Problem Solved at College Student Center



Electrical phase imbalance is a condition in a three-phase system where the amperage draw is uneven between phases A, B and C. This condition exists in most buildings, but if the imbalance is severe (more than 10% between phases), it can cause unexplained nuisance tripping on large breakers. Facility personnel should check periodically for phase imbalance. If it exists, have a trained professional carefully identify the problem and redistribute the load to make sure all phases are evenly distributed.

A northern New Jersey university was experiencing frequent electrical problems that were becoming very troublesome in one of its campus buildings, a six-year-old, four-story, 125,000 sq. ft. building that housed a large, open student center with cafeteria and several retail shops. Electronic distribution breakers were randomly tripping, turning off power and highly inconveniencing users and students. Omni Electrical & Instrumentation, Inc. was called in to diagnose and correct the issues.

Our technicians' first action was to record voltages across various parts of the system, from phase to phase and phase to ground, finding them within 1-2.5%. Amperage readings, however, taken in different parts of the building at different times of day, clearly showed an imbalance. Phases A and B were within 1-2% of each other, but the C leg was carrying at least 10% more current than the other two, causing the electronic breakers to fault or trip to protect the circuit.

Next, we set out to find where the amperage phase imbalance was occurring. Working on off-hours, our technicians started from the top down, shutting off distribution and panel breakers one by one to see where the imbalance would point. Issues were found with distribution of the lighting load across phases, providing only a partial solution.

The main culprit was discovered in the mechanical penthouses when shutting off the breaker to the large HVACR packaged chillers immediately corrected the imbalance. The problem was narrowed down to a single faulty chiller that was promptly isolated and locked out, and the manufacturer was brought in to address electrical problems in the equipment. The Student Center was quickly back in business, and the client highly satisfied with our service.

OMNI TECH TALK: Bearing Current & Shaft Voltage in VFDs

Bearing failure in motors, fans or pumps can put a building out of commission for days or weeks depending on the severity of the failure and the availability of replacement parts. Performing periodic dynamic balancing and vibration testing can greatly reduce bearing failure, but two phenomena that can cause shaft voltage are on the rise due to the increase in the use of variable frequency drives, or VFDs.

Bearing currents and shaft voltage occur in VFDs when voltage pulses couple from a motor's stator to its rotor. When this voltage exceeds the insulating capacity of the bearing grease, voltage arcs or electrical discharge machining can occur, damaging bearings and causing premature motor failure. Voltage-damaged bearings will show frosting, fluting or pitting of the bearing race surfaces. Shaft voltage can cause damage to bearings in as little as one week.

Shaft voltage discharge can be measured using a shaft voltage probe and a shaft voltage tester. One of the best ways to reduce VFD-induced shaft voltage is to install a shaft grounding ring, which conducts voltage discharge currents away from the bearings to ground. A grounding brush is another economical way to provide a low-impedance path to ground, but these devices are subject to a number of drawbacks including excessive wear, contamination and oxidation buildup. Nonconductive ceramic bearings are fairly effective but costly. Insulated bearings are costly, as well, and may not prevent bearing damage in all cases.

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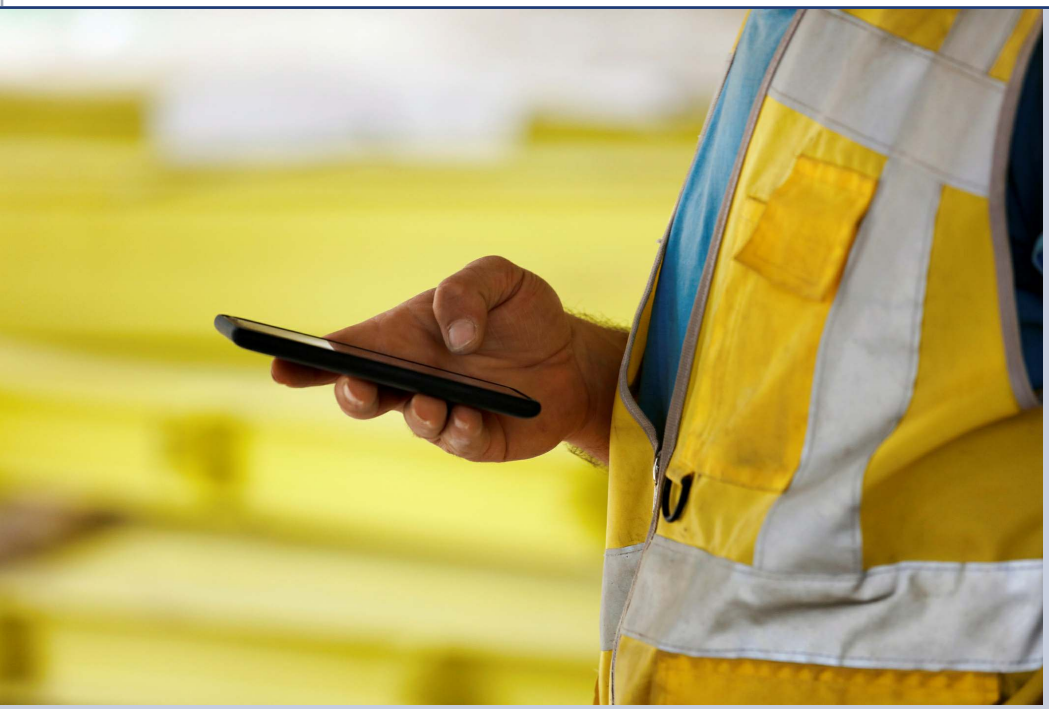
Distraction Danger: Regulating Cell Phone Use on the Jobsite



Cell phones are ubiquitous in the workplace; almost every American has one. Before the advent of the smartphone, cell phones were used primarily for making calls, which was easier for an employer to monitor and control. Nowadays, however, we as a society are addicted to our phones and find them hard to ignore, even when the distractions hamper productivity and put health and safety at risk. Used properly, however, a smartphone can be a vital workplace tool. This dichotomy is precisely why clear and effective workplace cell phone policies are so important.

Clearly one of the most important cell phone safety requirements is the prohibition of texting and talking while driving or operating equipment on a jobsite. Many construction sites employ phone-free zones where workers do not have access to their phones during working hours. Regulations can be tailored to allow different rules for different workers; a supervisor may be allowed near-unrestricted mobile phone use for work purposes while an equipment operator is strictly prohibited. Avoiding distraction while working is an imperative, and employers should establish clear cell phone policies and ensure they are well communicated and strictly enforced.

From the New York Times, Dec. 3, 1912:

The Electricity Diet

The international science community was intrigued back in 1912 when Professor Bergonie of Bordeaux, France, announced his theory that food can be replaced by electricity as nourishment for the human system. Specifically, application of an electric current can supply as many calories as a meal of "porterhouse steak and potato chips".

Prof. Bergonie believed he'd proven that a current of two to three amperes and a voltage of 1,000 to 2,500 could furnish a person with about 1,000 calories per hour. To prove his theory, he conducted several experiments including one on a man who "ate plenty of meat but was unusually light in weight" and "had hardly the strength to walk and always felt very cold". According to the professor, the man was given a course of treatments during which he absorbed 1,700 calories with each 40-minute session. His weight increased considerably and subsequently he ate less and had more energy.

Prof. Bergonie told the New York Times that he could foresee a time when "all troubles arising from insufficient food will disappear" through application of high frequency current. Needless to say, his theory eventually proved too good to be true.