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Considerations for Selecting an Electrical Enclosure Cooling Solution

*Optimal air circulation is key to
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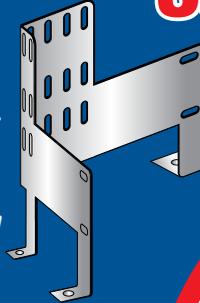
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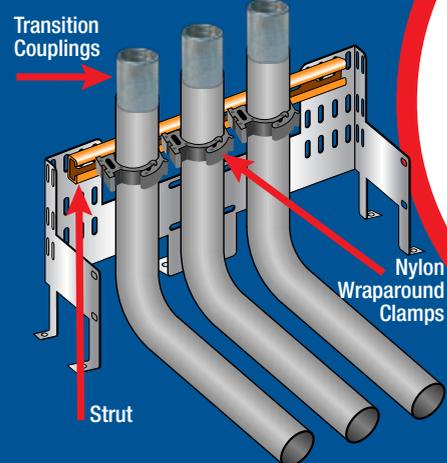
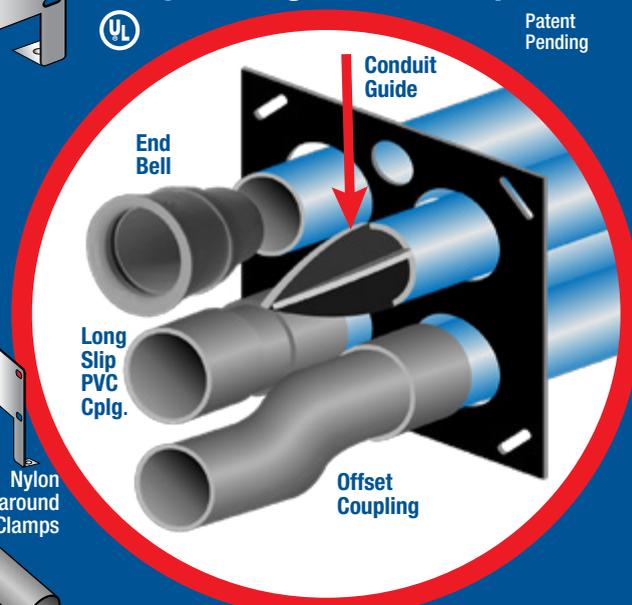
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COMPANY PROFILE

6 Protect Yourself
Miller Safety Consultants —
A Leader in Arc Flash Protection
BY VINCENT MILLER

COVER STORY

8 Considerations for Selecting an Electrical Enclosure Cooling Solution
Optimal air circulation is key to protecting critical components
BY LUCAS FAULKNER AND MATTHEW ROBERTS

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ON THE COVER

Photo courtesy of Pfannenberg



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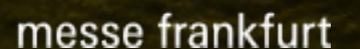
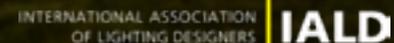
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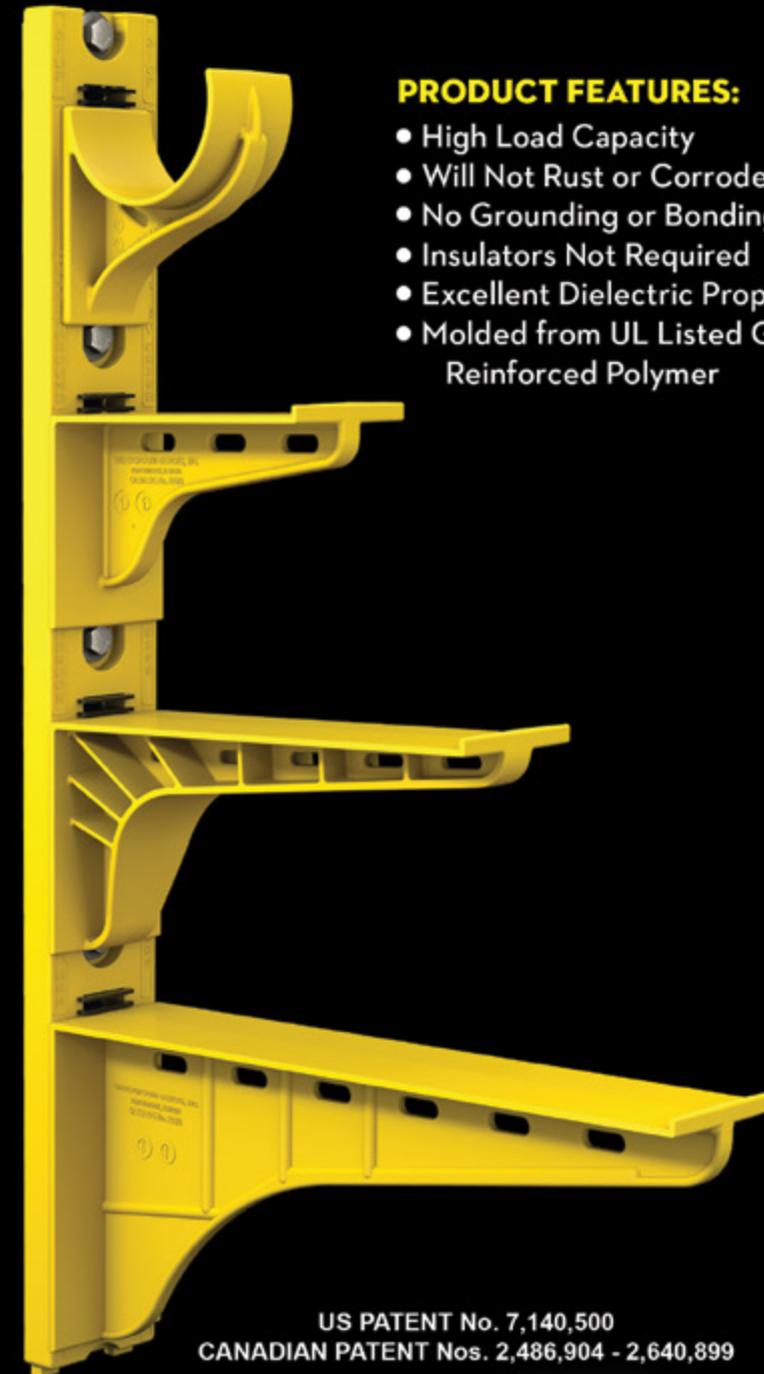
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HDL Arm Lock shown with RA04 Arm and CR36-B Stanchion



3HDS - 3" throat saddle shown with a cable secured by cable ties.



RA08 - 8" arm shown with three cables secured by cable ties.

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Miller Safety Consultants — A Leader in Arc Flash Protection

Vince Miller started Miller Safety Consultants, a veteran owned business in 1999. The goal of the business was to provide cost effective safety consulting, employee training such as: confined space entry, fall protection, electrical safety and provide sales of electrical shock and flash protective equipment and fall protection equipment to businesses in the Washington DC area.

Reliance Industries provided fall protection products and much of the sales and training was on behalf of the supplier. In 2000, the owner decided to retire from his business, and Vince decided to discontinue the fall protection line of his business and concentrate more in the electrical training and products.

Vince had been a distributor for Certified Insulated Products (CIP), a manufacturer of electrical insulated tools and electrical arc flash clothing manufactured by Otex in Rochester, New York. As a distributor, Vince provided sales through his internet website and much through relationships with electrical contractors. His training was a classroom environment and was provided directly to customers but he also taught as a sub-contractor for other safety consulting companies and the

Chesapeake Safety Council in Baltimore, Maryland. In 2005, Vince partnered with Vivid Learning Systems in Cascades, Washington to provide on-line training in safe work practices.

Training in electrical safe work practices is still provided locally in the Washington DC area and as a partner with an electrical engineering firm and online. The training is based on the Occupational Health and Safety Administration (OSHA) standards and the National Fire Protection Association (NFPA) 70E standard.

Miller Safety Consultants is now a distributor for Cementex USA, Burlington, New Jersey, for insulated tools and equipment and clothing from OTEX Protective, Rochester, New York. The majority of his sales of products

are from the web-based store. Cementex is nationally known for their quality equipment. Otex Protective is becoming more known for their quality clothing. For years, they have manufactured their products under other provider labels. Vince chose to not create his clothing line, but to sell the manufacturer product.

Vince has worked with many electrical company employees to fine-tune the clothing to be more comfortable for the user. Working closely with the manufacturer, they have made slight changes in how the cloth pattern was modified to meet final production. An example is the lightweight 40 Calorie vented hood offered by Otex.

The material is of the latest technology. The vented assembly is constructed for balance on the back of the hardhat and the airflow is 27 CFM to prevent fogging of the face shield and provide cooling to the worker. It took over a year to develop the product with the user prior to having the hood "flash tested". This product is now standard issue with many electrical contractors.

Being a small business and having quality providers has resulted in satisfied customers for Miller Safety Consultants. Being a direct supplier for OTEX Protective, another small business means customized customer needs can be met. □

For more information, visit
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Considerations for Selecting an Electrical Enclosure Cooling Solution

BY LUCAS FAULKNER AND MATTHEW ROBERTS, PFANNENBERG, INC.

ELECTRICAL ENCLOSURES HOUSE CRITICAL COMPONENTS

that generate heat during operation. Proper air circulation can make or break an electrical enclosure. Inadequate air circulation can lead to isolated temperature accumulation, running the risk of system malfunctions, reduced component lifespan, and compromised reliability.

To select the best cooling solution for an electrical enclosure, consider such factors as the unit's proximity to operators, whether it will be installed in a temperature-controlled facility, and the type of airflow inside the enclosure. Read

on for an overview of electrical enclosure cooling challenges, a review of tools that can be used to simulate and optimize airflow patterns within the enclosure, and considerations for designing electrical enclosures for optimal air circulation.



Electrical enclosure basics and challenges to proper heat dissipation

Electrical enclosures serve as protective housings for power supplies, circuit boards, drives, motors, and electrical components. The enclosures must maintain optimal operating temperatures to operate these components efficiently, avoid the need for costly replacement, and get the longest possible lifespan from expensive equipment.

Unfortunately, as manufacturing floor space has become increasingly limited, companies have begun to install smaller electrical enclosures. This poses serious challenges to the effective air circulation necessary to dissipate the heat generated by electrical components in the enclosure. This dissipated heat needs to either be cooled or carried outside the enclosure to the ambient environment to prevent temperature-related issues like thermal stress, accelerated aging, and potential component failure. Proper air circulation also ensures a uniform distribution of temperature within the enclosure, reducing the likelihood of localized hot spots.

Cooling electrical enclosures maintains the optimal operating temperature and prevents potential damage to electronic components. Common cooling strategies for managing this thermal challenge include incorporating fans that utilize open loop cooling, or using closed loop cooling, such as heat exchangers and air conditioning systems designed specifically for enclosures.



Enclosure air cooling considerations

Before selecting the electrical enclosure cooling solution, begin by evaluating the environment in which the unit will be installed. If you are exhausting heat out of the enclosure in proximity of any operators, install baffling to avoid the air hitting the operators. The solution can also be positioned away from the operator.

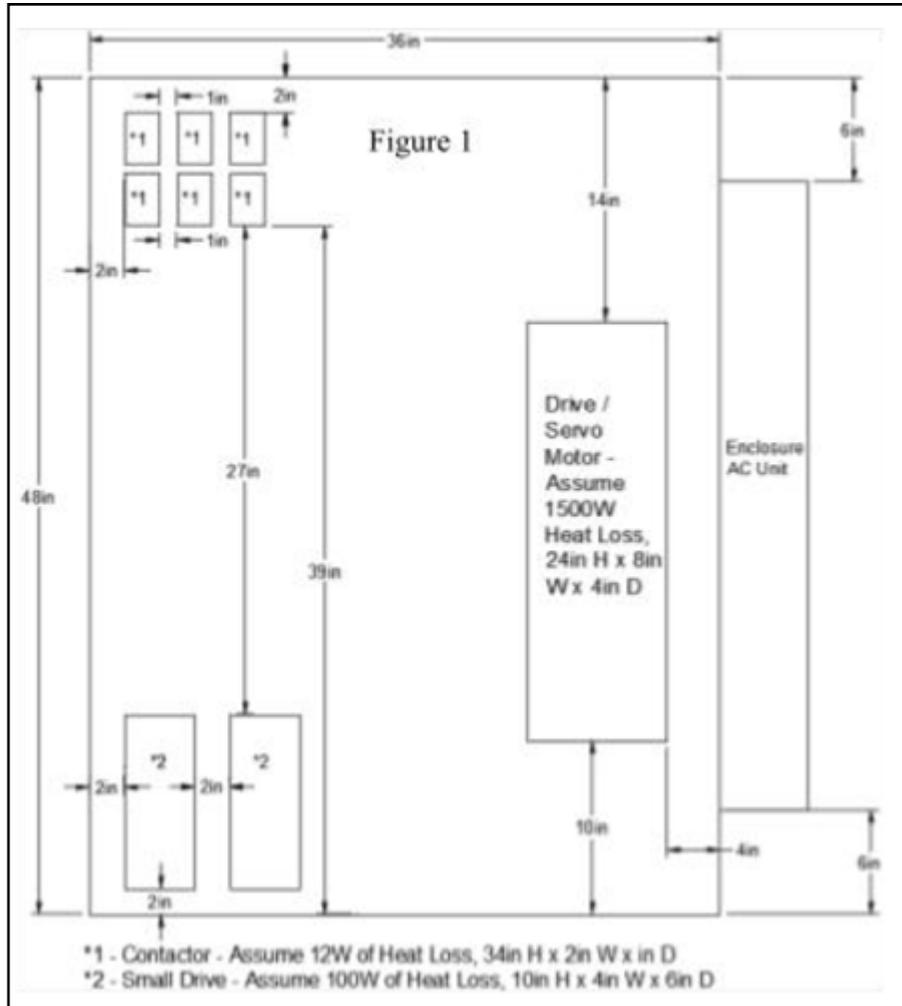
Next, determine if the solution is being installed in a temperature controlled facility. This is important, because the heating, ventilation and air conditioning (HVAC) systems cooling the facility must account for heat rejected into the ambient environment; failure to take this into account may cause overheating because the enclosure's heat becomes rejected into the facility. Working with a mechanical contractor can establish if the heat load inside the enclosure can be exhausted into the facility. In certain scenarios, an air-to-water heat exchanger can be more beneficial, as it rejects heat into the water where a liquid chiller can handle the additional heat load.

Another factor to consider is airflow inside the enclosure. Since enclosures are becoming more densely packed, companies must maintain proper and consistent airflow to prevent hotspots or potential condensation from overcooling.

Use computational fluid dynamics to simulate and optimize enclosure airflow patterns

To ensure that the enclosure cooling solution meets application-specific needs, consider using a computational fluid dynamics (CFD) analysis to simulate and optimize airflow patterns within the enclosure. The tool can be used to identify potential hotspots within the enclosure, verify that temperature distribution within the enclosure is manageable for components, check the potential for pressure pockets between components, and even determine if specific components are being overcooled.

Below are three CFD analysis test scenario examples. The scenarios



feature a variable frequency drive (VFD) positioned in front of an air conditioner's (A/C's) outlet to show the impact on airflow, because the VFD is the component that would be creating the most heat in an enclosure. The scenarios were designed to examine a common misconception made by cooling solution designers who often mount the most sensitive/highest heat generating components closest to the A/C unit to ensure it is properly cooled, without understanding that this placement will create disturbances in airflow.

Figure 1 The test scenarios were designed to push the drive deeper into the cabinet for each scenario away from the cold air outlet on the bottom of the AC unit. The other components were mounted in positions to show potential hotspots that could be generated. Drives inside of enclosures typically include

an internal fan or heat sink to reject the heat from the drive.

The density of the lines and arrows of airflow paths mean more airflow is traveling in that direction. The colors of the lines are representative of the temperatures of the air travel – blue is the coldest air and red is the hottest air.

In Test Scenario #1, the blockage was 4 inches from the cool air outlet. In this configuration, a majority of the cold air leaving the A/C unit would be blocked by the large drive in front of it, resulting in it cycling right back into the A/C unit's fan inlet. The cooler air being redirected immediately back into the cooling unit "tricks" the A/C unit into believing setpoint has been reached and will shutoff immediately. Once the heat from the other part of the cabinet rises, the A/C unit will turn on again. The short interval between the A/C turning off and on is referred to as short cycling.

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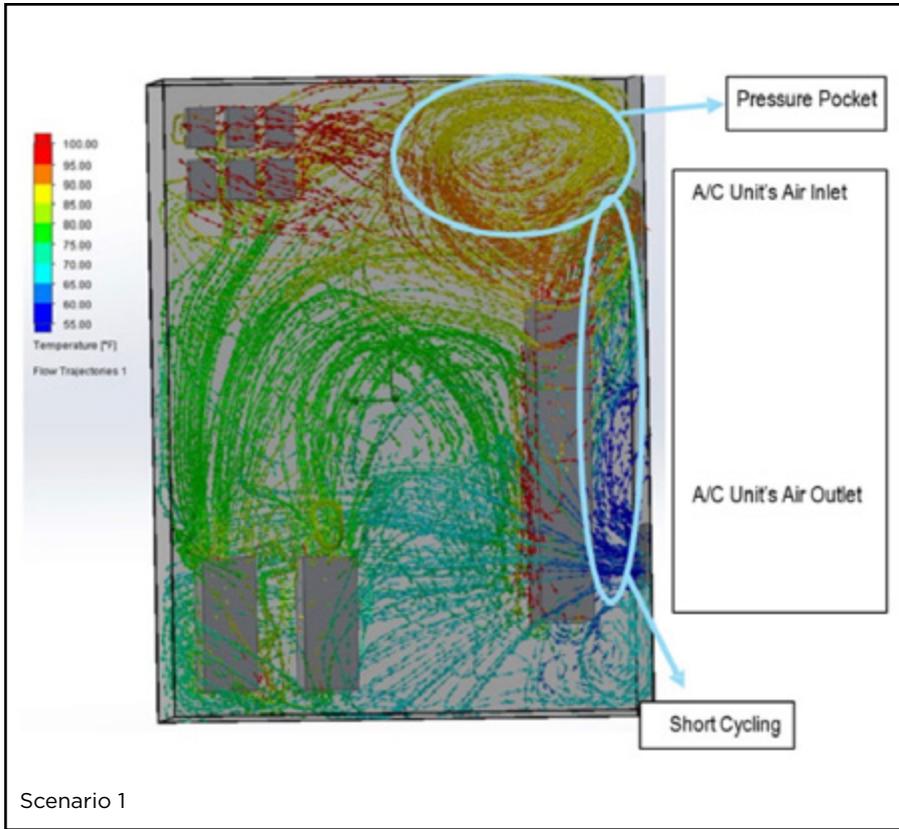
- 11" long Class 00 rubber insulating gloves
- Leather protectors
- Canvas storage bag



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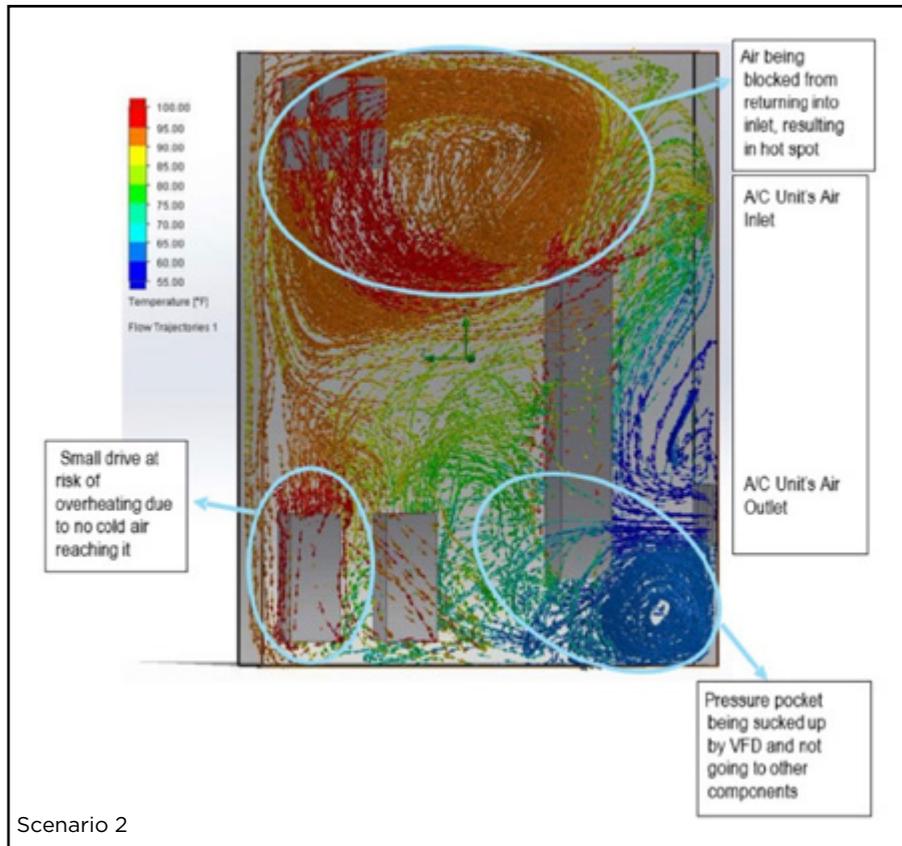
cooling. The two smaller drives in the corner are at risk of overheating, with the left one vulnerable as the right drive takes in cold air before it reaches the left one.

Test Scenario #3 pushes the blockage to 12 inches of total distance between the A/C unit's air outlet and drive. This unit has the lowest chances of short cycling out of the three scenarios. Additional airflow can get across and reach the other side of the enclosure because the pressure pocket in the lower right corner disperses under the drive and to the rest of the enclosure. The large pressure pocket of hot air that formed in Scenario 2 is completely dispersed; the airflow path can travel at the top and around the drive while still being able to cool the drive. The airflow from the two smaller drives can push cooler airflow near the contactors and is able to carry the heat from them and bring it to the A/C unit.

Scenario #3 presents the least possible likelihood of short cycling cold air being redirected into the A/C unit and all components have airflow going

This means that the A/C unit is failing to remove the heat from the cabinet as well as placing a strain on the A/C unit's compressor for it to turn on and off in consecutive use, which could lead to potential icing inside of the A/C unit's air outlet. A pressure pocket forms in the top right hand corner of the enclosure due to the drive's exhaust being sucked directly into the A/C unit's fan inlet and blocking the airflow path for the hot air to return to be cooled by the A/C unit.

In Test Scenario #2, the blockage was pushed to 8 inches of total distance between the A/C unit's air outlet and drive. While the unit still risks short cycling with cold air being pushed back into the evaporator fan inlet, increased airflow reaches the other side of the enclosure. A smaller pressure pocket forms in the lower right corner where air is drawn into the large drive's fan, leading to improper airflow inside the cabinet. The large drive's fan blocks airflow to the A/C unit's air inlet, causing a large pressure pocket of hot air to form, which prevents hot air from escaping. This could lead to overheating of the contactors due to insufficient



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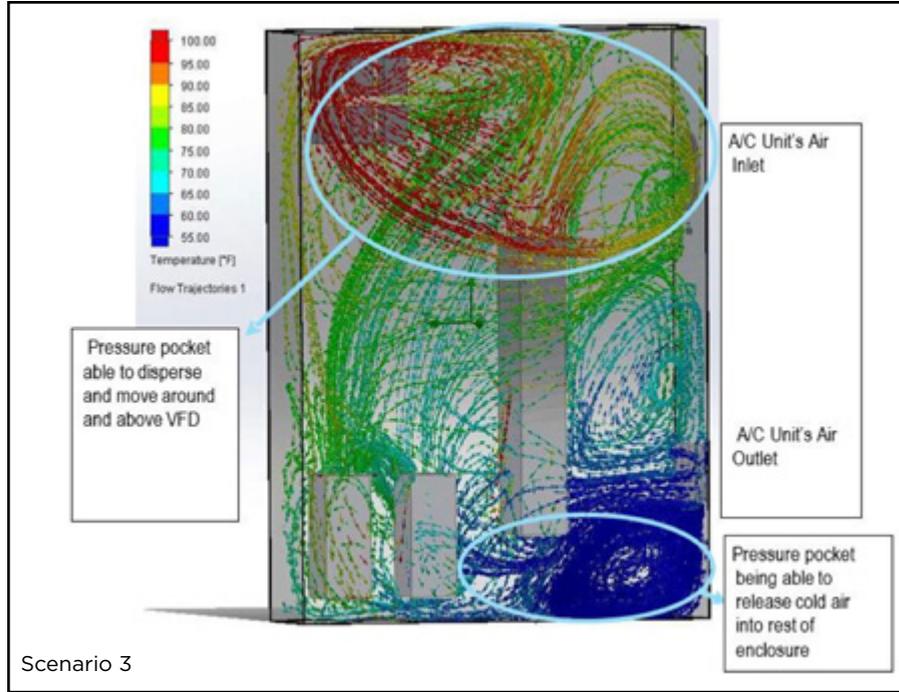
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Scenario #3 presents the least possible likelihood of short cycling cold air being redirected into the A/C unit and all components have airflow going to them.

to them. Scenario #1, had the highest chance of short cycling overall which would cause the unit to shut off early and not cool the enclosure to the desired temperature. Scenario #2 featured a large pressure pocket of hot air that would not be able to cycle correctly and would end up causing most of the contactors to overheat.

While these scenarios are simulated, and may not exactly replicate real world conditions, they can be used as best practices when designing the enclosure layout. For example, the scenarios showed that, as the blockage was pushed further out, there was better airflow in the enclosure, but it became apparent that the large drive's exhaust air was blocking airflow in the cabinet. This is why components with larger fans internally should typically be mounted farther away from the A/C unit to help cycle airflow throughout the enclosure.

Another common misconception is that since the large drive is the most sensitive component, it would need to be mounted as close as possible to the A/C unit to receive the coldest air.

This is incorrect, because it would end up restricting airflow for the other components inside of the enclosure. Instead, it should be mounted farther away from the A/C unit. This would allow for airflow to travel towards it and would support a full circular motion of airflow throughout the enclosure.

Other design considerations

When designing electrical enclosures for optimal air circulation, engineers should consider the following:

Ventilation and cooling systems

Integrating ventilation and cooling systems, such as fans or heat sinks, can complement the effects of component spacing. These systems can further enhance heat dissipation within the enclosure. Using enclosure fans inside electrical enclosures are a great way to help move air within the enclosure. In scenarios where possibility of repositioning components is limited, enclosure fans can be installed to help ensure air is reaching all points of the enclosure.

Enclosure material and color

In outdoor applications or hotter environments, heat transfers into the enclosure from the hotter ambient air through the metal enclosure or from the sun hitting the enclosure. Using a darker color absorbs more heat from the sun, while use of a light color reflects the heat from the sun and has less likelihood of solar loading. Every metal has a heat transfer coefficient and can affect the amount of heat transfer from the environment into the enclosure and vice versa. Insulation can be used on the inside of the enclosure to help prevent the ambient environment's heat transfer from affecting the enclosure. Alternatively, a sun roof can be used to keep the sun from directly hitting the enclosure to prevent solar loading.

Enclosure mounting style

The amount of surface area of the enclosure can affect the amount of heat transfer to the environment if the ambient environment is cooler than the enclosure, or the amount of heat transfer to the enclosure if the ambient environment is hotter than the enclosure. Surface area is often overlooked as a factor that can lead to large amounts of unplanned heat inside the cabinet due to heat transfer from the ambient environment. For example, there is no need to factor the heat transfer from the back of the enclosure if the enclosure is mounted up against a wall.

Achieving a better enclosure system design

To ensure smooth and successful operations, companies can strategically space and position components within electrical enclosures to enhance air circulation and mitigate hot spots. Proper spacing strategies empower companies to optimize air circulation, effectively dissipate heat, and improve overall system performance. Use of CFD analysis helps companies design enclosures that factor in enclosure temperature and air flow. Other considerations, like integrating ventilation and cooling systems, enclosure color, materials, and mounting style, all play a part in achieving the best overall system design. □



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LEDVANCE Welcomes Graham Wark as Vice President of Trade Sales, US

Experienced leader returns to LEDVANCE USC region to drive growth and innovation.



Graham Wark

LEDVANCE is excited to announce the appointment of Graham Wark as Vice President of Trade Sales, US. With over 35 years of experience in the lighting industry, including a distinguished history with LEDVANCE, Graham brings unparalleled expertise and leadership to his new role.

During his previous tenure at LEDVANCE, Graham made significant contributions across multiple roles, including leadership positions as President of Canada for Osram Sylvania, LTD, and at Sylvania Lighting Services.

“Graham’s return to LEDVANCE marks an exciting chapter for our organization,” said Jonathan Lubeck, USC REGION CEO of LEDVANCE US & CANADA. “His extensive industry knowledge and proven leadership will help us adapt to the changing landscape in the lighting industry. Graham’s insights will be

a driving force behind our focus on growth and innovation.”

“I am delighted to rejoin LEDVANCE and lead the Trade Sales US team during such an exciting time for the industry,” said Graham Wark. “The lighting market is undergoing transformative changes, and I look forward to collaborating with the talented team here to seize new opportunities, support our customers, and strengthen LEDVANCE’s position as a market leader.”

Through these last stages of legislative phase out of traditional lighting technology, LEDVANCE continues to lead the way with expanded platforms of innovative LED Lighting Products and Controls to bring customized products, services and solutions to its customers. Graham’s leadership will further enhance the company’s ability to exceed these goals while delivering value to customers and partners. □

“I am delighted to rejoin LEDVANCE and lead the Trade Sales US team during such an exciting time for the industry. The lighting market is undergoing transformative changes, and I look forward to collaborating with the talented team here to seize new opportunities, support our customers, and strengthen LEDVANCE’s position as a market leader.”

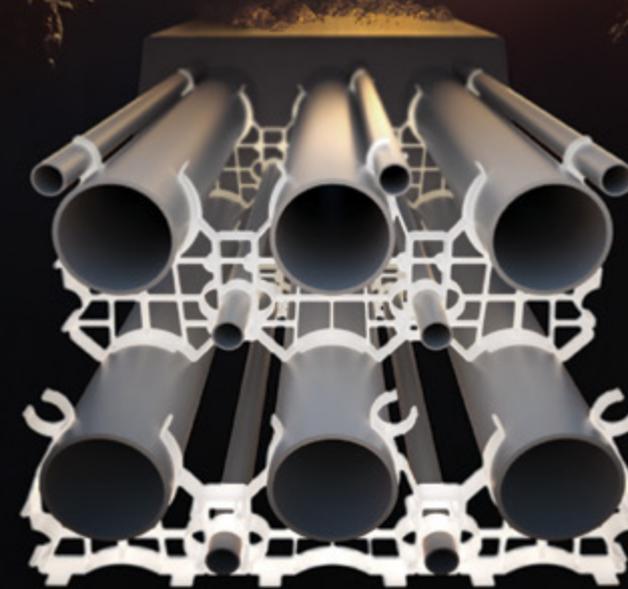
—Graham Wark

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NSI Industries Announces Key Changes to Commercial Sales Leadership

Mark Fallico Named Vice President of Sales;
Tom Wallace Transitions to Vice President of National Accounts

NSI Industries, LLC is pleased to announce updates within the Commercial division, designed to strengthen the company's sales strategy and enhance relationships with NSI's largest customers.

Mark Fallico Named Vice President of Sales

Mark Fallico has been promoted to Vice President of Sales. Fallico has a record of driving results through smart strategies and exceptional leadership. In his new role, he'll lead NSI's sales efforts across all markets, fostering stronger connections with our customers, addressing their evolving needs, and keeping NSI on track for continued growth and success.



Mark Fallico

Tom Wallace Transitions to Vice President of National Accounts

With years of dedication and deep expertise, Wallace will focus on strengthening partnerships with NSI's largest customers, ensuring they receive the exceptional value and service they've come to expect from NSI.

Both Fallico and Wallace will report to Electrical Division President Joe Saganowich and are working closely together to make the handoff seamless and ensure continued collaboration. "These leadership changes reflect

our commitment to fostering strong relationships with our customers while executing a best-in-class sales strategy," said Saganowich. "Mark and Tom are incredible leaders who've consistently gone above and beyond. Mark's vision and expertise will keep us ahead in the market, and Tom's dedication and insights will help us build even stronger connections with our biggest customers. I couldn't be more excited for what's ahead."

NSI Industries, LLC is a leading provider of electrical, HVAC, and



Tom Wallace

building technology product solutions for more than 45 years. NSI has many well-respected brands, including Bridgeport Fittings®, Polaris® Power Connectors, TORK® Timers and Controls, WarriorWrap® Professional Tape, TERMINATOR™ Premium Wire Connectors, RHINO Safety™, Platinum Tools®, TechLogix Network, Duro Dyne® Sheet Metal Accessories, Metallics™ Fasteners, Remke Industries, and LYNN™.

For more information, please visit www.nsiindustries.com.

ABOUT NSI INDUSTRIES, LLC

NSI's core philosophy is Making Connections. Focused on the electrical, building technology, and HVAC markets, NSI connects distributors to products, services, and technologies by providing a fresh perspective and caring approach that drives smart solutions. The driving force behind a stable of market-leading brands and a large breadth of products, the company's primary job for more than 45 years has been to fulfill the needs of distributors and their customers. By staying grounded in the principles of service and value, NSI continues to deliver high-quality, industry-advancing, and comprehensive product solutions that enable growth.



NSI has many well-respected brands, including Bridgeport Fittings®, Remke Fittings®, Polaris® Power Connectors, TORK® Timers and Controls, Metallics™ Fasteners, Platinum Tools® Network Connectors, Lynn™ Network Components, ENET Solutions, Inc., Duro Dyne® Air Duct Solutions and SUPCO HVAC Repair Products. For additional information about NSI Industries and our family of brands, visit www.nsiindustries.com.

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IP19

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QwikBlock

Vertical support from only one 1/4", 3/8" or 1/2" threaded rod by attaching two machine screws 1/4" x 20 thru the existing holes in back of the box. Eliminates knocking out center KO on box and traditional nut and washer method to support a single box.



J-Hook

Gripple Cable

Conduit

IP20a

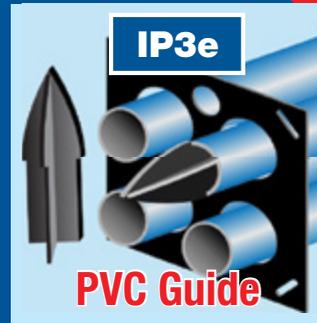
Box Support Rod Cubes

Vertical support from only one 1/4" or 3/8" threaded or threadless rod with 4 holes for Gripple applications as well as 4 threaded 1/4" or 3/8" holes for conduit support hardware.



IP3e

PVC Guide



IP2b

PVC Driver



TE15

Conduit Layout Tool



IP3g

Long Slip PVC



IP3f

Slip PVC/RGD



IP4

EZ Raised Bracket



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Plus More Being Invented for SAFER BETTER FASTER Jobs . . . Call With Your Ideas!

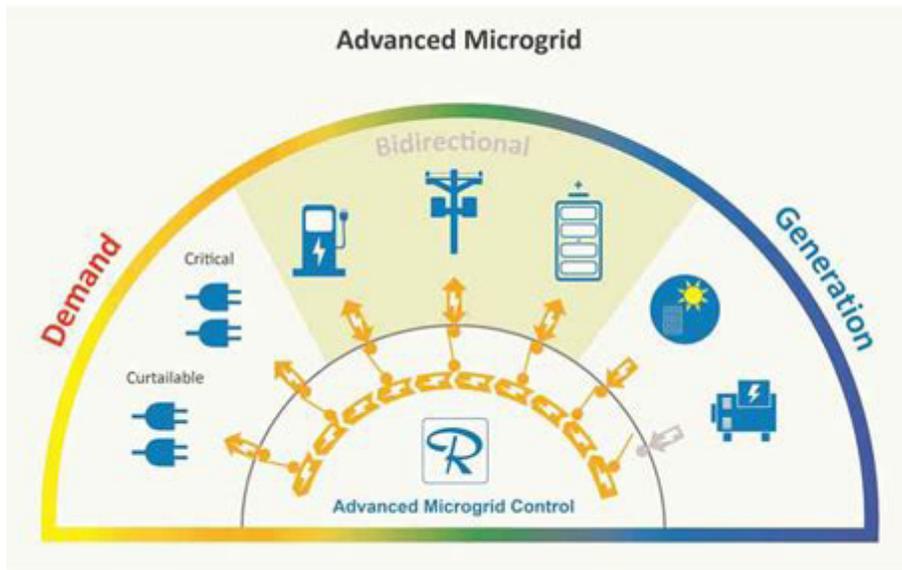
Russelectric, A Siemens Business, Highlights Advanced Microgrid Controls Solution for Enhanced Power Resiliency in Critical Sectors

Offers significant benefits, including energy cost reduction, carbon footprint minimization, and improved business continuity

Russelectric, A Siemens Business, highlights its Advanced Microgrid Controls Solution, an integrated hardware and software platform designed to optimize facility power management and enhance resiliency in critical sectors. This comprehensive solution may present significant benefits, including energy cost reduction, carbon footprint minimization, and improved business continuity during grid outages.

The Advanced Microgrid Controls Solution is a modular, scalable, and seamless integration of hardware and software components. At its core, the system utilizes Russelectric's transfer switches, switchgear, and power controllers to provide comprehensive integration of a facility's onsite demand and generation assets. The solution connects, controls, and optimizes facility generation assets such as generators, battery back-up, photovoltaic arrays, and loads, delivering benefits from a wide range of distributed energy resource (DER) technologies.

Ideal for critical sectors such as healthcare and data centers, Russelectric's Advanced Microgrid Controls Solution improves business continuity during grid outages through dynamic islanding capabilities, fast and reliable decoupling, automatic black start of backup generators, and seamless grid resynchronization. Additionally, the Advanced Microgrid Controls Solution



helps reduce energy costs and minimize carbon footprint while improving facility power quality.

Expertise and Support

With over 50 years of experience in microgrid control installations, Russelectric offers comprehensive support throughout the project lifecycle. This includes engineering and design assistance, project management, manufacturing, testing, installation and commissioning, and 24-hour factory field service. The company backs its solutions with an industry-leading 2-year complete warranty, ensuring

reliable performance and customer satisfaction.

Holistic Approach to Microgrids

Russelectric offers a range of products, including individual components such as switchgear, integrated options that combine switchgear with microgrid controllers, and complete turnkey microgrid solutions available through Energy as a Service agreements. This diverse product portfolio positions Russelectric as a single source for all microgrid requirements, regardless of the project's scale or complexity. □

ABOUT RUSSELECTRIC

Founded in 1955, Russelectric®, A Siemens Business, provides high-integrity power control solutions for mission critical applications in healthcare, information technology, telecommunication, water treatment, and renewable energy markets. The company maintains vertically integrated manufacturing facilities in Massachusetts and Oklahoma, where it designs and builds a full line of automatic transfer switches, switchgear, and controls. Russelectric products carry the longest and most comprehensive warranty in the industry and are backed by a team of expert factory-direct field service engineers. To learn more about Russelectric products and the company's commitment to customer satisfaction, visit www.russelectric.com, call (781) 749-6000, or email info@russelectric.com.



CANNON iK

ELIMINATE HAND PULLS & INCREASE JOBSITE EFFICIENCIES.



Milwaukee® Enhances Safety, Puts Distance Between Cablemen and Live Wires

Driving innovation while improving safety for underground cable professionals, Milwaukee Tool introduces the new M18™ FORCELOGIC™* 5" Underground Cable Cutter with Wireless Remote, the smartest way to cut. Integrated with cutting-edge Bluetooth® Technology, this solution eliminates the need for direct tool handling, significantly enhancing jobsite safety. Featuring an ergonomic design with advanced electronics, Milwaukee's new Underground Cable Cutter sets a standard for intelligent cutting solutions.

Simplifying the set-up and application process, the M18™ FORCELOGIC™ 5" Underground Cable Cutter with Wireless Remote features an enhanced ergonomic design for improved balance and maximum control. Designed with a guillotine jaw style, this cable cutter allows Cablemen to cut up to 5-inch (127 mm) Diameter Communications, Armored, Lead Sheath, Copper, and Aluminum Power Cables wirelessly. The adaptable forward handle rotates and pivots independently of the head to provide users maximum control, while its balanced design and hang hook enable the easiest setups in vaults. Featuring a head that rotates 180 degrees, the quick-release and turn-to-close style latch pin is easily opened or secured with just one touch. For added confidence, an integrated Last Cut application shut-off ensures a battery will never die in the middle of a remote cut and leave the application incomplete. Whether cutting locally or with a wireless remote, Milwaukee delivers an optimized cutting experience.

Potentially live cables create additional hazards on the jobsite. Increasing the distance between cable professionals and potential live wires serves as an effective strategy to mitigate these risks and build reassurance of a safe working environment. Utilizing cutting-edge Bluetooth® Technology, the M18™ FORCELOGIC™ 5" Underground Cable Cutter with Wireless Remote provides cut confirmation confidence for advanced user safety. The wireless remote operates via an exclusive connection, eliminating the possibility of interference from other smart devices. Following setup, Cablemen can activate the remote cutter and remove themselves from the hazardous area. Once the tool has completed the cut, a green LED on the wireless remote gives a positive indication to provide users confidence in the cut's completion. By providing the ability to remotely cut and separate the user from the tool, Milwaukee's Underground Cable Cutter eliminates the hazard of cutting potentially live cables for professionals on the job, driving safety and productivity.

**FORCE LOGIC™ is engineered to not only improve upon, but fundamentally change the way high-force tools are used in the field. Through thoughtful design focused on workflow, each tool simplifies a complicated process to deliver the best user experience of its kind and the smartest way to work.*

For more information, visit www.milwaukeetool.com



Dewalt® Compound Action Long Nose Pliers

The Compound Action Long Nose Pliers include induction hardened cutting blades giving these pliers 70% more cutting power over standard cutting pliers. The bi-material handle allows for a strong grip and provides added comfort.

- Chrome vanadium steel for strength and durability
- Induction hardened cutting blades for improved strength and durability
- Beginning of a premium pliers line with more SKUs to come

We take extensive measures to ensure all our products are made to the very highest standards and meet all relevant industry regulations.

For more information, visit www.dewalt.com



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First there was 4 square... and now the REVOLUTIONARY 5 Square® Box!!

You've struggled with 4 Square boxes for years - you know how small, cramped and time consuming they are. Finally, there is a solution that allows you the space you have always needed.

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Create a robust and unrivaled infrastructure for the life of your facility with the 5 Square® Products!



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- SAVE LABOR...INCREASE PROFITS
- ELIMINATES TROUBLESHOOTING TIME AND COST
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Telecommunications



- INTEGRAL CABLE MANAGEMENT
- SAVE LABOR...INCREASE PROFITS
- FACILITATES MIN. BEND RADIUS REQUIREMENTS
- SUPPORTS CURRENT AND EVOLVING SYSTEMS
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Making Communications & Fire Protection More Reliable & Cost-Effective!

Greene Tweed Highlights Seal-Connect® Portfolio for High-Performance Electrical Connections

Innovative Solutions for Reliable Power and Signal Transmission in Challenging Environments

Greene Tweed, a leading global manufacturer of high-performance sealing solutions and engineered components, showcases its Seal-Connect® portfolio, a comprehensive range of high-performance electrical connectors engineered to meet the most demanding conditions in the energy sector. Trusted by the world's largest oilfield service companies, Seal-Connect® products provide reliable signal integrity and power transmission, even in extreme environments.

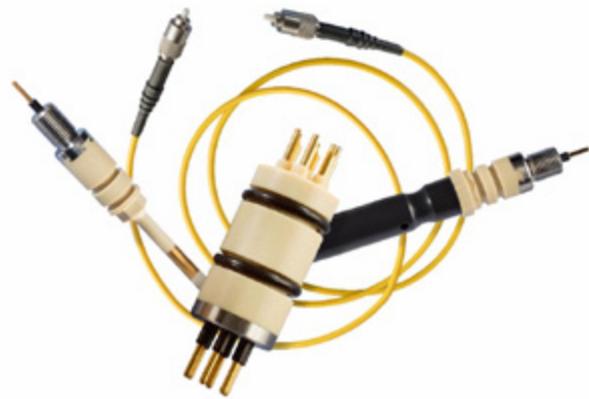
The Seal-Connect® portfolio includes cutting-edge designs for drilling, completions, and production applications. With decades of research and innovation, Greene Tweed offers connectors rated up to 260°C (500°F) and 45,000 psi, ensuring unparalleled performance in high-pressure, high-temperature (HPHT) conditions. The portfolio encompasses a wide variety of solutions, including:

- Single-Pin Connectors: Ideal for precise power and signal transmission.
- Multi-Pin and KTK-Style Connectors: Designed for versatility in complex applications.
- Rotatable and Wet Stab Connectors: Engineered for rugged environments, including submerged conditions.
- Custom Solutions: Tailored to meet unique customer requirements with the support of advanced 3D modeling, rapid prototyping, and extensive testing capabilities.

At the core of Seal-Connect® is Greene Tweed's expertise in materials science. The connectors leverage proprietary materials like Arlon® PEEK and Chemraz® FFKM, offering superior resistance to chemicals, extreme temperatures, and mechanical stress. Each product undergoes rigorous testing at ISO-certified facilities to ensure reliability and compliance with industry standards.

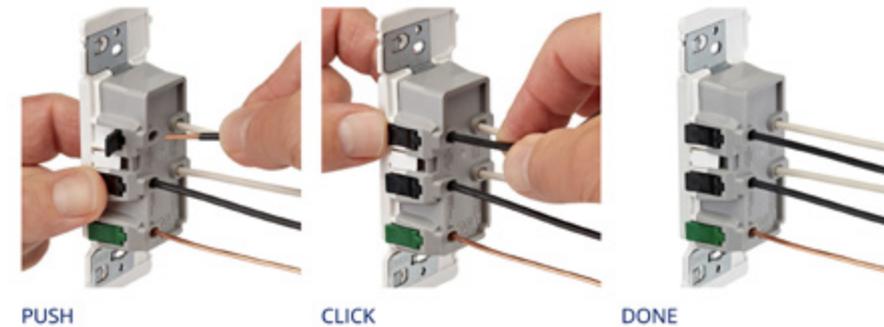
Backed by over 80 patents, the Seal-Connect® portfolio stands as a testament to Greene Tweed's dedication to advancing electrical connection technology. With a global presence and local expertise, the company continues to support industries where performance and safety are paramount.

For more information, visit <https://sctcatalog.gtweed.com>



Leviton Expands Award-Winning Lever Edge™ Portfolio

The new devices fulfill customer demand for patented Lever Edge design which provides fast, safe and easy installations in residential, commercial and industrial applications



Leviton recently announced the launch of four new Lever Edge (formerly Decora Edge) devices – a 15A Tamper-Resistant GFCI, a 15A Weather/Tamper-Resistant GFCI, a Dimmer and a 20A Tamper-Resistant Duplex Outlet. The new GFCIs, Dimmer and 20A Outlet more than double the current residential Lever Edge offerings – a Single Pole Switch, a 3-Way Switch, and a 15A Tamper-Resistant Duplex Outlet – all of which are in high-demand among Leviton DIY and professional contractor customers.

Overall winner of the 2023 Home Depot Innovation Awards and part of Leviton's Decora brand of outlets and light switches, Lever Edge devices offer the classic appearance and superior performance of Leviton electrical solutions in a new, easier-to-install and safer design – it's as easy as push, click, done. The Lever Edge patented design has a snap feature with an audible "click" so installers can be confident with every termination. The devices feature patented color-coded levers which allow for quick and safe installation by helping to efficiently identify the correct terminal for wiring, including a lever terminal for the ground wire. The Lever Edge GFCI models have a clearly identifiable blue lever terminal for the load wire to help avoid line/load reversal when wiring.

Lever Edge 15A GFCIs

As with all Leviton GFCIs, the Lever Edge GFCIs are engineered to meet the UL standard for auto-monitoring or self-test, periodically conducting an automatic internal test to confirm that protected power is available. If the GFCI detects a problem, one or more of the following will occur:

- Power will be denied with no ability to reset
- Trip with the ability to reset, subject to the next auto-monitoring test cycle or repeated trip
- Visual indicator with red light

Lever Edge GFCIs feature a large strap, making installation easier, and work with No. 12 and No. 14-gauge solid and stranded copper wire. They are ideal for residential and commercial applications.

For more information, visit www.Leviton.com/LeverEdge

New HyLite LED 18W Multi-CCT Tube Light

Introducing the New NexGen OptiMax 18W Tube Light, a versatile LED solution featuring Multi-Mode and Multi-CCT capabilities. Designed for easy installation, these tube lights seamlessly replace T8 and T12 fluorescent tubes in both new and existing fixtures.

Key Features:

Five Color Temperatures in One Tube: Our patented technology supports Multi-CCT options of 3000K, 3500K, 4000K, 5000K, and 6500K, enabling you to customize the lighting environment to suit your needs.

Flicker-Free Lighting: Designed to eliminate eye strain and headaches commonly associated with fluorescent lighting.

Multi-Mode Compatibility:

- Ballast Compatible: Works with electronic or emergency ballasts.
- AC Direct Input: Operates on 120-277VAC.
- Power Input Flexibility: Supports both single-end and double-end power input.

Efficiency and Longevity: Our tube lights deliver ultra-efficient illumination with a luminous efficacy of up to 125 lumens per watt. They maintain over 85% of their initial lumens throughout their lifespan, which can extend up to 50,000 hours—equivalent to over 15 years of use at 9 hours per day. By

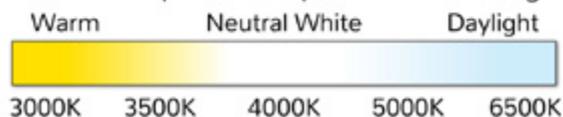
switching to HyLite's NexGen OptiMax Tube Lights, you can achieve utility cost savings of up to 60-63%. These 18W tube lights are a direct replacement for traditional 44W fluorescent tubes, offering significant energy savings and reduced maintenance.

For more information, visit www.hyliteledlighting.com/tube-lights

HYLITE™
LED Lighting



5 Color Temperature Options - 1 Tube Light



Introducing the new Multi-Mode Commercial Downlights

- Compatible with Triac & 0-10V Dimmers
- Wattage and CCT Selectable
- c-Max compatible with 12v aux supply
- Field installable Emergency Battery back up kit available

Any Dimming Will Do!
Triac and 0-10V Dimming in one downlight

For more information, visit www.maxlite.com





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Productivity and value thru ideas
FOR SAFER BETTER FASTER JOBS



Galvanized Rigid Transition Couplings to Schedule 40/80 PVC Stub-Up



Save at Least **1 Hour** per Installation.

When Concrete is Poured and Metal Below the Slab is Needed

Transitions in Less Than 5 Minutes!

Save Cost on the Rigid Nipple, Tape & Labor

Use for Entire Job - Not Just for Repair

See Our Conduit Plug See page IP27c



See Our REAMING BITS for Transition Couplings



See page IP15

PATENT PENDING



Saves a great deal of time transitioning from PVC conduit to Rigid Conduit above slab without damaging PVC risers and chipping concrete eliminating a concrete repair job!

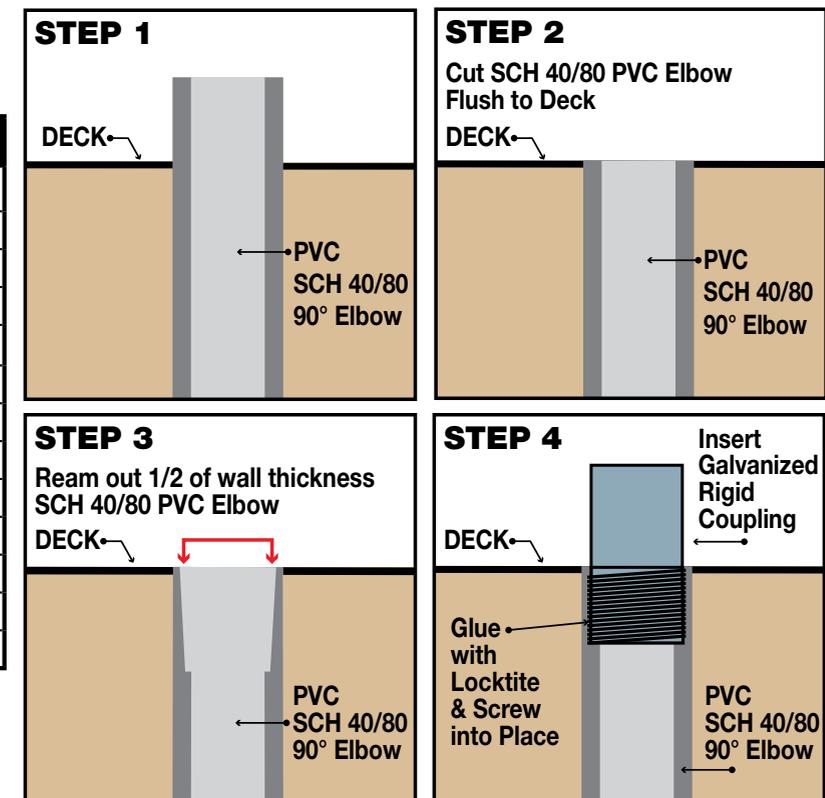
All SP Products Inc. Transition Fittings are manufactured for installation to either meet or exceed in accordance with NEMA TC2, TC3 or UL 651 specifications

1/2" thru 6"

Transition Couplings

Size	Catalog #
1/2"	50-PVC-R-GRC
3/4"	75-PVC-R-GRC
1"	100-PVC-R-GRC
1-1/4"	125-PVC-R-GRC
1-1/2"	150-PVC-R-GRC
2"	200-PVC-R-GRC
2-1/2"	250-PVC-R-GRC
3"	300-PVC-R-GRC
3-1/2"	350-PVC-R-GRC
4"	400-PVC-R-GRC
5"	500-PVC-R-GRC
6"	600-PVC-R-GRC

All Above Meet UL651 CSA C22.2, No.85 and US Army Corps Engineers Specifications



Customer must satisfy all codes and owners' specifications.

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Productivity and value thru ideas



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FlexRad® FacetTile™ from MetroSpec Technology® – High-Performance, Directional Light Control for Indoor and Outdoor Fixtures

Bill Brown Sales presents the innovative FacetTile™ light source from MetroSpec

Technology, designed for fast, high-performance integration into outdoor lighting applications. Ideal for acorns, pendants, globes, bollards, and virtually any outdoor fixture that needs powerful and precise light distribution, FacetTile offers unmatched performance and versatility.

- Powerful Output – Delivers up to 16 watts per 2-inch length
- Simple Setup – Two-wire connection, with no extra wiring required
- American-Made – Fully BAA and BABA compliant
- Inventory Optimization – Customizable wattage and shapes from a single SKU
- Precision Optics – Offers any beam shape and directionality
- Effortless Assembly – Slip-on or peel-and-place installation (click video for details)

FacetTile provides the highest light output and efficacy, with excellent light quality and uniformity. Available in any CCT, CRI, or custom color control options, it's the best choice for outdoor path and street lighting fixtures.

Connect with your BBS Sales Manager to explore how FacetTile and MetroSpec's FlexRad® product line can elevate your next fixture design project.

For more information, visit www.billbrownsales.com

Milwaukee Tool Advances Jobsite Safety with New Durable Anti-Vibration Gloves

Committed to delivering advanced safety innovation to the jobsite with a glove that excels in dexterity, comfort, and protection, Milwaukee® announces two new Anti-Vibration Gloves to join their existing lineup of safety gear. Designed for Carpenters, Remodelers, Masonry, Maintenance, and Mechanical professionals, these gloves can be worn for professional applications while protecting from harmful tool vibrations. Providing vibration protection while maintaining high dexterity, the Anti-Vibration High-Dexterity Nitrile Dipped Gloves deliver professionals a solution with the best in class full hand vibration reduction*.

“Hand-Arm Vibration Syndrome (HAVS) is a permanent medical condition that causes loss of feeling in the fingers, hands, and arms. With 2 million workers exposed to harmful vibrations daily, we set out to address the risks of prolonged exposure to vibrations from tools and machinery by delivering essential proper protection.” Says Austin Dorman, Senior Product Manager at Milwaukee Tool. “Designed for primary applications such as concrete drilling, sanding, grinding, cutting, chipping, breaking, and demolition work, the Anti-Vibration Cut Level 4 High-Dexterity Nitrile Dipped Gloves and Anti-Vibration Work Gloves meet the critical needs of vibration reduction, dexterity, durability, and comfort.”

Providing vibration protection while maintaining high dexterity, the Anti-Vibration High-Dexterity Nitrile Dipped Gloves deliver professionals a solution with the best full hand vibration reduction*. These gloves provide a Cut Level 4 rating to protect professionals from lacerations and meet safety requirements on the jobsite. With a soft and comfortable liner, the 18-gauge material provides total hand mobility when working with small fasteners. With back-of-hand protection to shield against bumps and scrapes, the long-lasting nitrile dip ensures these hold up to abusive jobsite condition. For further protection and convenience, these gloves feature a cut level 4 rating, a light and breathable material to keep hands cool and dry and are equipped with SMARTSWIPE™ for a touchscreen compatible fingertip.



For more information, visit www.milwaukeetool.com

Affordable test equipment for 2025



Spitfire - Buried Low Voltage Cable Fault Locator

- ◆ Accurate
- ◆ Easy to use
- ◆ High energy output
- ◆ Proven reliability
- ◆ Compact design
- ◆ Lightweight

Wayfind'r - Impulse cable tracer

- ◆ Accurate
- ◆ Easy to use
- ◆ Connects directly to energized cables
- ◆ Distinct signal for easy tracing
- ◆ Traces direct buried and cables in conduit
- ◆ Rugged, compact design

Impulse Phaser - Cable / phase system

- ◆ Accurately identifies cables in trenches, vaults, conduits and enclosures
- ◆ Identifies jacketed, shielded, cables, even in pipe
- ◆ Accurately identifies phases in multi-conductor cables
- ◆ Easy to understand and use



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Arrow Hart Slim Arc Fault Circuit Interrupter (AFCI) Receptacles

Eaton's Wiring Devices Expand its Next Generation of Slim Protection Devices

The National Fire Protection Agency's (NFPA) designates October as Fire Prevention Month, which educates consumers about the risk of home fires and ways to minimize them. Accordingly, Eaton's Wiring Devices has announced the expansion of its family of slim protection devices to now include AFCI (Arc Fault Circuit Interrupting) receptacles.

Designed to recognize dangerous arcs in wiring and immediately break the flow of electricity to help prevent an electrical system from becoming an ignition source for a fire, the next generation Arrow Hart Slim AFCI Receptacle have been redesigned to now feature:

- A 1.03-inch depth in the electrical box which provides for more room for quick and easy wiring.
- Wider TEST/RESET buttons making it easier to test and reset the device.
- An intuitive large reset indicator light for easy identification of a trip incident.
- An end-of-life indicator light allowing for easy identification of a device failure.

The National Electric Code (NEC) mandates AFCI protection in residential areas such as sunrooms, parlors, libraries, dens, recreational rooms, and closets. Additionally, AFCIs are required in commercial applications like dormitories, guest rooms, nursing homes, police stations and similar locations.



For more information, visit www.Eaton.com/SlimAFCI

Ruselectric, A Siemens Business, Highlights System Control Upgrades for Critical Power Equipment

Enhance Performance, Extend Life, and Increase Capabilities



ATS Upgrades

Ruselectric offers upgrades to automatic transfer switch/bypass isolation switch control systems during a scheduled shutdown to enhance switch operating accuracy and functionality. Control, monitoring, and communication protocols are upgraded to eliminate concerns about legacy component availability.

Operator Interface Technology and Communications

Upgrade to the latest operator interface technology and communications equipment to significantly enhance system monitoring capabilities. Ruselectric will provide detailed information on the current system status through a dynamic one-line graphical interface, along with complete alarm and event history for a quick problem response. In addition, optional TJC (The Joint Commission) reporting and optional remote system access are offered by Ruselectric.

PLC Upgrades

Many existing systems utilize legacy or soon-to-be obsolete PLC architecture. Ruselectric will upgrade control systems to the latest technology with minimal program changes to improve performance and accommodate advanced communications. Most upgrades can be completed without interrupting critical loads or operational changes, with drop-in replacements available.

Breaker Upgrade Solutions

Ruselectric will replace obsolete/unsupported vintage power breakers and accessories with new OEM-supplied replacements adapted for form, fit, and function to improve overcurrent selectivity. Updating circuit breakers enables the utilization of new options and accessories such as arc reduction modes and Zone Selective Interlocking (ZSI), while eliminating concerns about parts availability for circuit breaker repairs. Upgrades are available for various circuit breaker manufacturers.

For more information, visit www.siemens.com

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The built-in capstan switch automatically turns the puller on and off. Simply tug on the rope to start the pull and slack off the rope to shut it down. Delivers dynamic performance in remote locations or areas where power is not yet available.



When it comes to transformer cooling fans, Krenz-Vent is the industry recognized gold standard. Our leadership position is earned through 80+ years of R&D plus our superior engineering and customer service. You can rest easy when you specify Krenz fans.

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Electrical Products & Solutions

Transition Couplings
PVC Bell End Adapter
Galvanized Rigid Conduit - 1/2" thru 6"

Warming Up to Electrical Heating Cables

WHAT'S NEW

- Conduit Repair Systems, Inc. The World Leader in Split Conduit Products
- DMF Lighting Expands its M Series Commercial Collection with High Lumen Packages for Hospitality and Mix-Use Spaces
- New Multi-Tester from Klein Tools Combines Core Electrical Products into One Model
- RPS Launches SlowWave Filter To Safeguard Motor and Cables



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FOR SAFER BETTER FASTER JOBS



We're Proud to be the Electricians' Friend for Over 50 Years!

IP5

"The Original"

Enter Any KO on Both Sides of the Box



PATENTED



IP19/20

4-Conduit Block
PATENTED

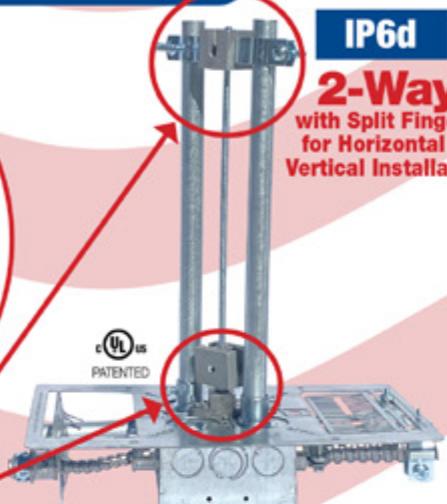
IP21a

QwikBlock
PATENT PENDING

Use 4-Conduit Block (IP19 or IP20) with QwikBlock (IP21a)

IP6d

2-Way
with Split Fingers for Horizontal or Vertical Installation



PATENTED



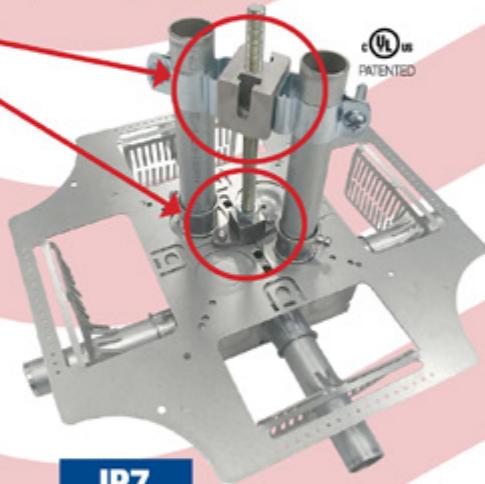
PATENTED

IP6

4-Way

Enter Any KO on All 4 Sides of the Box Plus 4 Large Open KOs in Center Allows Entering Back of Box

Our Family of Conduit & Box Support Plates Saves Valuable Time & Money!



PATENTED

IP7

4-Way

with Split Fingers for Horizontal or Vertical Installation. Enter Any KO on All 4 Sides of the Box Plus 4 Large Open KOs in Center Allows Entering Back of Box.

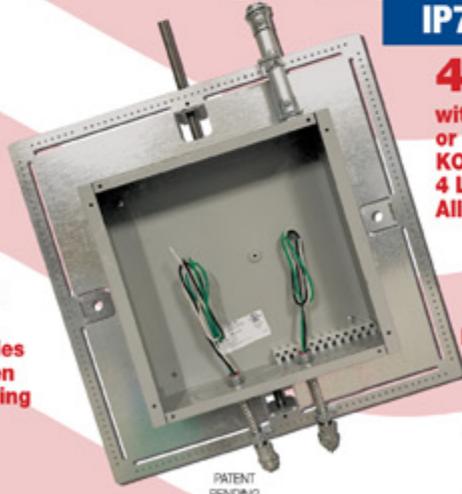


PATENTED

IP6a

2-Way/Half

Enter Any KO on 1 or 2 Sides of the Box Plus Large Open KOs in Center Allows Entering Back of Box



PATENT PENDING

IP8

Mount Horizontally or Vertically from One Single Support

20 x 20

Supports up to 12 x 12 J-Box

28 x 28

Supports up to 20 x 20 J-Box

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