

JULY 2022

Electrical Products & Solutions™

The Purchasing Guide for Electrical Contractors

www.epsmag.net

Choosing a Power Quality Analyzer to Meet Your Accuracy Needs

To visit an advertiser's website,
simply click the QR Code or
Company Name in their ad.

CORDLESS CANNON 6K

iTOOLco.

WWW.iTOOLco.com | 865.670.3713



Speed, versatility, and performance are all yours with iTOOLco's Cordless Cannon 6K™. This portable 6,000 lb. puller is intuitively designed to handle all of your day-to-day wire pulls.

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.



BONUS
FEATURE

TO VISIT AN ADVERTISER'S WEBSITE, SIMPLY CLICK THE QR CODE OR COMPANY NAME IN THEIR AD.

made with FLIPHTML5

COVER STORY Emerson

Since electronic components are sensitive to heat, an optimal thermal design can be the determining factor for a product achieving its lifetime claims and avoiding quality issues. LED color shift, driver failures, short circuits, and more can all be tied to poor thermal design.

Corrosive and Wet Atmospheres

Exposure to caustic chemicals and solvents, adverse weather, salt water, and moisture will corrode unprotected luminaires, leading to premature failure. Almost 50% of all electric, electronic and mechanical component failures are caused by corrosion. The World Corrosion Organization estimates the worldwide annual cost of corrosion at \$2.2 trillion, more than 3 percent of global GDP.

Part 2 of this article from Emerson will conclude in the July issue of *Electrical Products & Solutions* magazine.



56% of industrial facility managers reported lighting problems were heat-related.

Heat-Related Lighting Problems

Response	Percentage
Yes, all	5%
Yes, most	20%
Yes, some	32%
No	44%

Extend Luminaire Life While Reducing Energy Consumption

The Appleton™ Mercmaster™ Connect LED by Emerson is designed to illuminate hazardous and harsh industrial locations with integrated motion and illuminance sensors. Paired with Emerson's Plantweb Insight Connected lighting Application, operators have access to lighting usage data and sustainability analytics.

The Mercmaster Connect LED provides facility managers with continuous monitoring of their LED lighting with real time insights gained into sustainability goals, diagnostics and lumen levels from any remote location at dramatically lower costs as compared to wired alternatives, with faster installation time and minimal disruption to plant operations.

Learn more at: masteringled.com

APPLETON

EMERSON

CONSIDER IT SOLVED

Electrical Products & Solutions | JUNE 2022

10-11

Electrical Products & Solutions™

The Purchasing Guide for Electrical Contractors

www.epsmag.net



PUBLISHER

Danny J. Salchert

OFFICE MANAGER

Anita Salchert

CREATIVE DIRECTOR

Derek Gaylard

CIRCULATION DIRECTOR

Pam Fulmer

CONTRIBUTING WRITER

John Olobri



PRESIDENT

Danny J. Salchert

EXECUTIVE AND ADVERTISING OFFICES

2009 Eagle Ridge Drive
Birmingham, AL 35242

phone: 205.981.4541

www.epsmag.net

danny@epsmag.net

Electrical Products & Solutions™ is published twelve times a year on a monthly basis by ABD Communications, Inc., 3591 Cahaba Beach Road, Birmingham, Alabama, 35242, USA. *Electrical Products & Solutions™* is distributed free to qualified subscribers. Non-qualified subscription rates are \$57.00 per year in the U.S. and Canada and \$84.00 per year for foreign subscribers (surface mail). U.S. Postage paid at Birmingham, Alabama and additional mailing offices. *Electrical Products & Solutions™* is distributed to qualified readers in the electrical contracting industry. Publisher is not liable for all content (including editorial and illustrations provided by advertisers) of advertisements published and does not accept responsibility for any claims made against the publisher. It is the advertiser's or agency's responsibility to obtain appropriate releases on any item or individuals pictured in an advertisement. Reproduction of this magazine in whole or in part is prohibited without prior written permission from the publisher.

POSTMASTER: Send address changes to ABD Communications, Inc., P.O. Box 382885 Birmingham, Alabama 35238-2885

FOLLOW US ON



FEATURE

4 LED Luminaires Outperform in Demanding Industrial Facilities - PART 2

COMPANY PROFILE

10 Protect Yourself Miller Safety Consultants — *A Leader in Arc Flash Protection*

COVER STORY

12 Choosing a Power Quality Analyzer to Meet Your Accuracy Needs

BY JOHN OLOBRI

DEPARTMENTS

18 INDUSTRY NEWS

22 NEW PRODUCTS

32 AD INDEX

ON THE COVER

Photo courtesy of AEMC® Instruments





**MADE
IN USA**



PRODUCTS, INC.

Productivity and value thru ideas

FOR SAFER BETTER FASTER JOBS



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

Qwik Duct Safer Better Faster

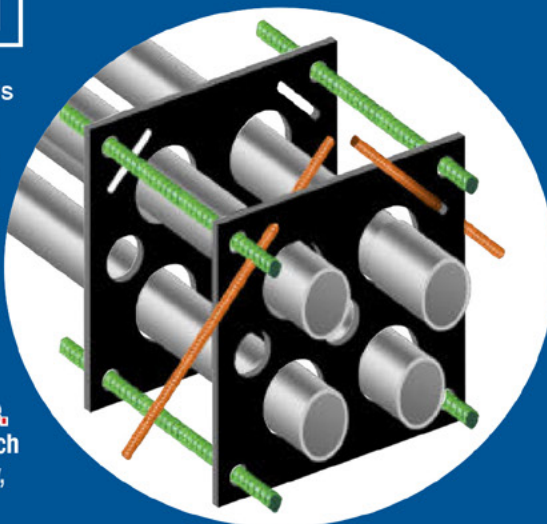
HDPE CUSTOM TEMPLATES

In Any Configuration Required

IP1



Patent
Pending



IP3b

Patent
Pending



PVC Offset

Sizes 1/2" thru 6"
Meets Flexible Mandrel
Test Requirements

Bore Spacers

Sizes 1/2" thru 6"
Roll assembled conduit into
caissons and under
obstructions

IP2



IP13A-F

Conduit Transition Couplings



PVC Schedule 40 & 80

*Transitions in Less Than
5 Minutes*

PATENT
PENDING



IP15

**End Bell
Adapter**

Schedule
40/80 PVC



PATENT
PENDING

PVC/PVC

PVC/EMT

PVC/Rigid

PVC/Liquidtight

PVC/Stainless

PVC/Alum

PVC/Flex

IP14a

**1 Piece
Reaming Bit**

1/2" thru 6"
Schedule 40/80

**Save Cost on the Rigid Nipple, Tape & Labor
Use for Entire Job - Not Just for Repair**

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



SPPProducts.com 800-233-8595 info@SPPProducts.com

PART 2:

LED Luminaires Outperform in Demanding Industrial Facilities

Heavy Vibration

Another issue adversely affecting the performance of industrial lighting is vibration. For example, a coal crusher generates strong vibrations throughout a power plant when crushing coal blocks. Vibration from the crusher can disengage fixtures from mountings, as well as endanger the safety of employees who may be struck by components coming apart and plunging into work areas or process machinery. Severe vibrations will damage a standard commercial fixture beyond repair and leave employees without lighting.

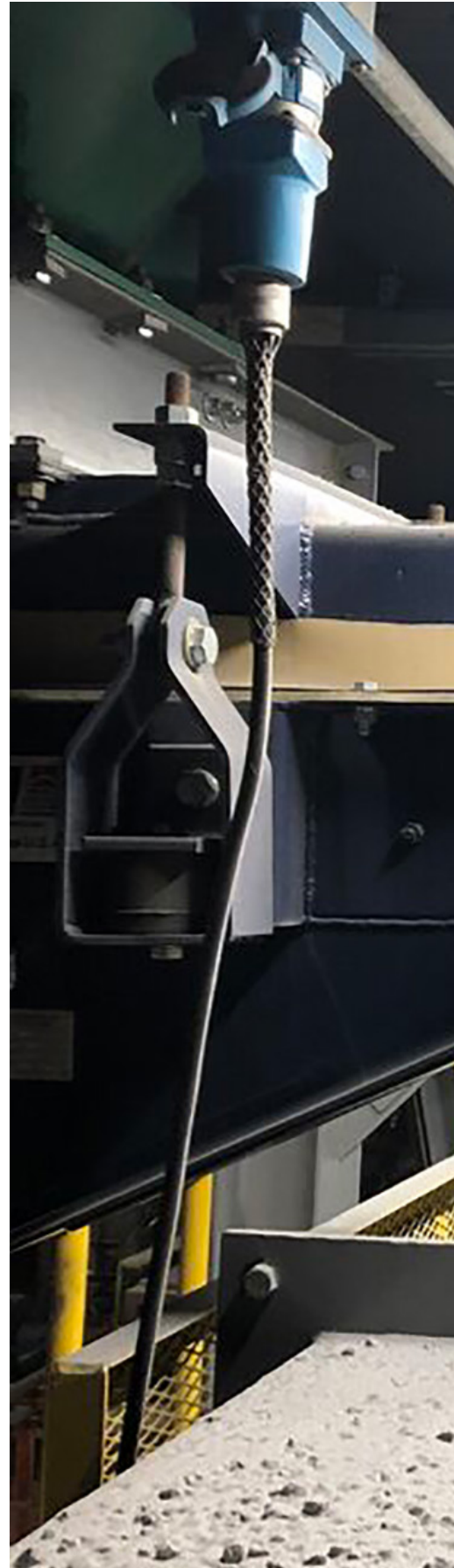
When deciding on an LED luminaire for your facility, factor in the strength of the vibratory load, the distance between the luminaire and the vibrations, and whether vibrations are intermittent or continuous. Fortunately, LEDs generate light using solid state engineering that is largely impervious to vibration. However, LED drivers do contain wires and connections. In a lower quality luminaire, excess vibration will loosen these connections, which in turn will cause flickering or failure.

Dust Accumulation

Dust is an especially destructive agent to luminaires. In addition to accelerating the corrosive process, dust will affect the cooling of the luminaire by acting as insulation and preventing heat from escaping. Dust will accumulate inside unsealed luminaires, creating problems with conductivity, moisture ingress, electrical shorts, increased arcing and carbon tracking, and ultimately, premature failure.

Dust absorbs water. The more dust particles that settle on a luminaire, the more water that could come into contact with its metal surfaces and promote corrosion, especially in humid air conditions. This gives rise to the formation of pinholes and local pit sites on the surface. Dust can contain oils, organic materials, minerals, and chemicals, all of which can diminish the reliability and life span of the luminaire. It can also contain small amounts of carbon-based debris that might act as a conductor, or prevent conduction of electricity, and could cause serious damage to the internal workings of an LED luminaire.

When deciding on an LED luminaire for your facility, factor in the strength of the vibratory load, the distance between the luminaire and the vibrations, and whether vibrations are intermittent or continuous.







The increasing frequency of dust storms, particularly in the Middle East, has made dust settlement one of the challenging problems in this region for luminaires. But the fact is, dust is everywhere, from mining to paper mills.

Electrical Disturbances

The term “dirty power” refers to abnormalities in an electrical signal

that compromises quality. Caused by electromagnetic interference, dirty power will lead to lighting irregularities such as flashing, strobing, flickering or premature luminaire failure. There may also be a noticeable loss of brightness due to damage to the LED driver. The most common form of dirty power are voltage surges, also known as transients. Surges can be caused by lightning, power

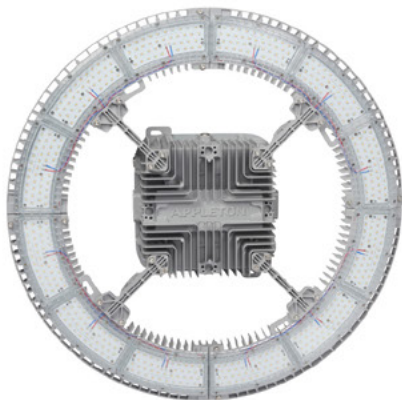
outages, overloaded circuits, damaged wiring, or simply turning on motors, pumps or furnaces. Voltage surges have a destructive impact upon LED lighting systems by wearing out LED drivers and increasing service interruptions.

24/7 Manufacturing Operations

In industrial environments running round-the-clock, a well lit facility leads



Lighting Your Way at Greater Heights



Appleton™ IHC LED Luminaire

The Appleton™ IHC LED Luminaire by Emerson is the ideal solution to deliver light from mounting heights of 50 to over 100 feet. With outputs up to 90,000 lumens, an IP66 marine and wet location rating, and an ambient temperature range of -40 °C (-40 °F) to 75 °C (167 °F), the IHC was designed to meet the demands of your harsh industrial environment and lighting requirements.

Learn more at: masteringled.com

APPLETON™

The Emerson logo is a trademark and a service mark of Emerson Electric Co. © 2021 Emerson Electric Co.



CONSIDER IT SOLVED™

to higher productivity, safer machine operation, improved product quality, and accident prevention. It also leads to a major upsurge in energy expenses with lighting consuming up to 40% of utility bills.

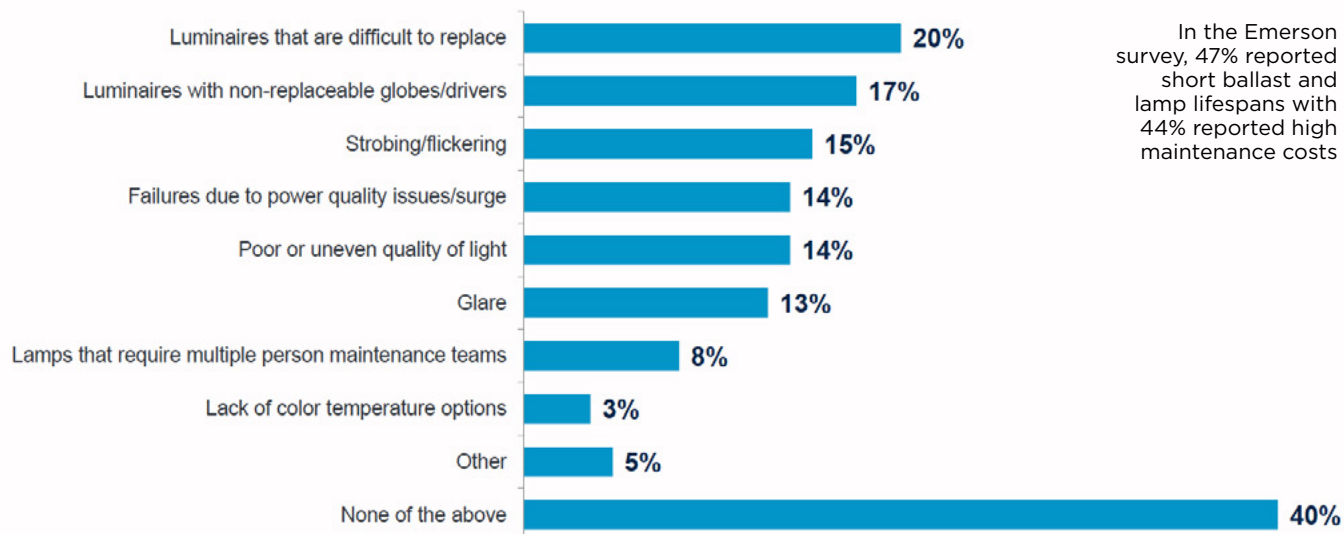
Conclusion

When specifying LED luminaires for a wet and/or harsh industrial environment, there are a number of performance factors to consider. However, while the criteria can vary depending on a specific application, there are common performance metrics that need to be incorporated into the luminaire to ensure reliability, safety and energy-efficiency. Those are:

1. LED reliability depends on good thermal design.
2. Look at Ingress Protection and NEMA Enclosure Type ratings.
3. Consider the corrosive elements luminaires will be being subjected to in the work environment.
4. Recognize that transient surges pose a threat to LED lighting installations.
5. Employee safety is tied not only to the quality of light but the overall reliability of the LED luminaire. □



Problems Reported with Non-LED Legacy Lighting Systems





Extend Luminaire Life While Reducing Energy Consumption



Appleton™ Mercmaster™ Connect LED

The Appleton™ Mercmaster™ Connect LED by Emerson is designed to illuminate hazardous and harsh industrial locations with integrated motion and illuminance sensors. Paired with Emerson's Plantweb Insight Connected Lighting Application, operators have access to lighting usage data and sustainability analytics.

The Mercmaster Connect LED provides facility managers with continuous monitoring of their LED lighting with real-time insights gained into sustainability goals, diagnostics and lumen levels from any remote location at dramatically lower costs as compared to wired alternatives, with faster installation time and minimal disruption to plant operations.

Learn more at: masteringled.com

APPLETON™

The Emerson logo is a trademark and a service mark of Emerson Electric Co. © 2021 Emerson Electric Co.



CONSIDER IT SOLVED™

Protect Yourself

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
Miller Safety Consultants at:
www.electricalsafetysupply.com, email
Vince at: sales@millersafetyltd.com.*



Deluxe Maintenance Tool Kit



Class O Glove Kit

AUTHORIZED
Cementex
The Safety Tool Specialists
DISTRIBUTOR

**Give Vince a call at
(703) 367-0404**



Protect yourself from "Arc Flash"

ARC FLASH LIFT-FRONT HOOD WITH V¹² HIGH-VOLUME VENTILATOR Compact. Powerful. Reliable

Our V¹² High-Volume Ventilator boasts an unexpectedly quiet, high output (35+ CFM) turbine fan to cool and circulate the ambient air within the hood. Fully protected beneath it's durable ABS shell and added fabric layering, the V¹² High-Volume Ventilator isn't just compliant, it's superior.



40 CAL/CM2 ULTRALIGHT CLOTHING BY OTEX

Our new dual-layer Ultralight clothing takes advantage of DuPont's® dedication to scientific advancement and Westex's® industry leading dependability. Weighing in 37% lighter than traditional HRC4 PPE, our Ultralight Clothing is the most innovative contender in the lightweight arena.

HYBRID LAYERING

Combined Fabric Weight: 14 oz

Outer Layer: DuPont® Protera
Color: Navy

Inner Layer: Westex Ultrasoft
Color: Safety Orange



CALL US TODAY

(703) 367-0404

OR VISIT OUR ONLINE ELECTRICAL SAFETY EQUIPMENT STORE
www.electricalsafetysupply.com

Instruments with built in web server allow smart devices to review data in real time.



Choosing a Power Quality Analyzer to Meet Your Accuracy Needs

BY JOHN OLOBRI

TODAY THERE ARE MANY CHOICES AVAILABLE

when selecting an instrument for power quality analysis. The features and functions vary tremendously across offerings by the manufacturers of these products.

Let's first look at the international standard IEC 61000-4-30. It describes the measurement requirements, and the

way power quality analyzers should make measurements. The standard defines the specific measurement

procedures and methods for measuring power quality parameters such as Line Voltage, Voltage Fluctuations, referred to as Flicker, Voltage Unbalance as well as Harmonics associated with Voltage and Current.

One of the first, and most important choices, you need to make is the accuracy required for your ongoing



Power Quality Analyzers & Loggers

MONITOR ANY POWER SOURCE OR LOAD

VERIFYING BACKUP POWER
LOAD STUDIES
COST & ENERGY ANALYSIS
MEDIUM VOLTAGE MOTORS
POWER QUALITY
COMMISSIONING
HARMONIC DISTORTION
PREDICTIVE MAINTENANCE
DC POWER TESTING
400HZ MONITORING
AND MUCH MORE



COMPACT - CAPABLE - VERSATILE POWER ANALYZERS

IT'S ALL WE DO.

BUY • RENT • TRADE IN

SCAN ME



The World's Only
Medium Voltage
Direct Connect
Solution



Made in USA
with US &
Imported Parts

Products in Stock!



Most Orders Ship
in 1-2 Days!

PowerSight.com • sales@powersight.com • 1-925-444-7027



InRush capture

applications for power quality monitoring. To do this you will need to review and understand the IEC 61000-4-30 Standards' classification on time accuracy. There are three classes of accuracy to consider. These are Class A, Class S and an older standard, Class B. A brief review of each of these accuracy conditions spelled out in the standard is presented here.

Class A identifies the measurement time accuracy to be better than ± 0.3 sec/day for voltage, current, harmonics and other measurements. With specific procedures and understanding for uncertainties. This time accuracy requires that the instrument incorporates a Global Positioning System (GPS) which is a network of satellites and receiving devices used to determine the location of something on Earth.

Power Analyzers that meet Class A performance requirements of the IEC 61000-4-30 standard, will repeatedly achieve the same measurement responses when connected to the same signals. Class A devices are required to meet the highest performance and accuracy requirements in the standard.

Class S also defines the measurement time accuracy to be better than ± 0.3 sec/day for parameters such as voltage, current and harmonics. It has less stringent defined measurement methods and tolerances for Line Voltage, Flicker and Harmonic measurement methods and uncertainties in accordance with IEC 61000-4-7 Class I. The accuracy and performance requirements for Class S are not as rigorous as Class A.

The Class B performance class was included in the second edition of IEC 61000-4-30. It facilitated making many older power analyzers still viable at the time the standard was issued and allows their measurements to still be useful. Class B compliant power analyzers offer accuracies that are typically used for power surveys, trouble shooting and other applications where a high level of accuracy is not needed. The inaccuracies associated with Class B Power Quality Analyzers for the typical measurements of voltage, flicker, current, harmonics



Versatile Mounting for Extreme Environments



*SolaHD™ SCP-X Series Standalone
IP67 Power Supplies*

The SolaHD™ SCP-X Series Standalone IP67 Power Supplies by Emerson can be mounted almost anywhere on a machine, conveyor, or wall. With no enclosure required they offer safety against arc flash hazards.

Quick-connect cables ensure the IP67 rating and eliminate costly wiring. Available from 100 Watts to 240 Watts, the SCP-X Power Supplies meet the diverse needs of automotive manufacturing, conveyor systems, and equipment where 24 Vdc power is required for geographically dispersed devices.

Learn More at: www.solahd.com

SOLAHD™

The Emerson logo is a trademark and a service mark of Emerson Electric Co. © 2021 Emerson Electric Co.



CONSIDER IT SOLVED™

and frequency are defined and listed by individual manufacturers.

The latest edition of IEC 61000-4-30 Edition 3 published in 2015 no longer lists Class B in the standard as a performance class.

If you are looking to purchase a power quality analyzer today, you should strongly consider either a Class A or Class S device depending on your accuracy needs. There are also cost considerations you need to review in the process. If you think of power quality analyzers as good (Class B), better (Class S) and best (Class A), the costs increase accordingly with pricing ranging from the \$3000 to \$12,000 range.

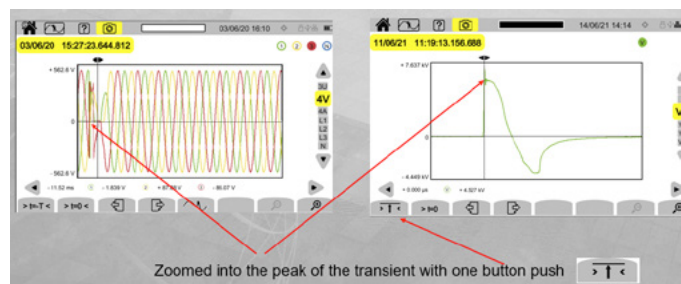
Once you have made the decision on the accuracy class you need to comply with the application, you should look at the most frequently required parameters to be measured and does the instrument you are selecting have the ability to measure these parameters.

The parameters defined in IEC 61000-4-30 Edition 3 include:

- Frequency
- Magnitude of supply voltage
- Flicker
- Voltage surges and Sags
- Voltage Interruptions/Transients
- Unbalance
- Harmonics
- Interharmonics - defined as frequencies that are not multiple of the fundamental
- Line Carrier Signaling
- Deviation from nominal values, both above and below
- Rapid voltage changes (a.k.a Shockwaves)

Let's take a look at a few of the new parameters outlined in the standard.

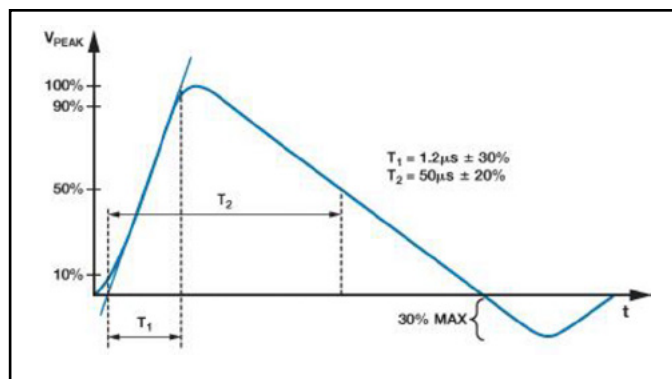
These features are available to make it a lot easier to analyze these conditions along with the more common monitoring of surges and sags and transients. Below is listed a transient capture with the ability to zoom in to the actual offending transient at the push of a button.



Transient condition easily and quickly identified

Shockwave - Usually caused by lightning or inductive loads turning on and off. Shockwaves are huge instantaneous electrical voltage surges. They also propagate in the digital network.

Class A Power Analyzers can typically withstand some shockwaves up to 12 kV which are sampled every 500 ns. The standard only requires up to 6kV.

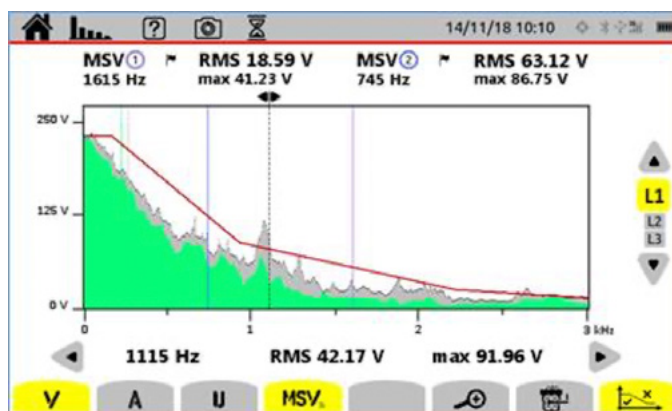


Shockwave capture

The waveform above represents a typical shockwave capture.

Line Carrier Signaling or Main Signaling Voltage (MSV) is a function that tracks non-harmonic bursts of remote-control signals that ride on the fundamental frequency. They are typically used in remote control of industrial equipment and on automation applications and eliminates the need for running additional wiring.

IEC 61000-4-30 defines measurement of the frequencies for line carrier monitoring that are typically below 3kHz. The plot below depicts a line signal capture in the 1600 Hertz range. The green area represents the carrier signal and the red line represents the acceptable parameter tolerances. Deviations above the red line indicate areas of potential concern.



Shockwave capture

In review, the requirements and standards for power quality analysis have advanced significantly particularly in the area of accuracy and repeatability of measurement. New features such as rapid voltage change monitoring and line carrier signal monitoring have added additional ability to analyze power quality issues along with the traditional voltage, current, harmonic, surge, sag and transient monitoring.

These capabilities come at varying costs in instrumentation.

You would be wise to understand the standards and the requirements needed for the various applications you have for power quality analysis in order to choose the right instrument for the task. □



Compact and Easy to Install DC UPS for Harsh Industrial Locations



SolaHD™ SDU DC - B Series DIN Rail UPS

The SolaHD™ SDU DC - B Series DIN Rail UPS by Emerson are perfect for mitigating power quality issues, minimizing loss of data and downtime.

The SDU DC - B UPS combines an industry leading compact design, wide operation temperature range -15 °C to +50 °C (+5 °F to +122 °F), enhanced communication and unique installation options to solve common application problems.

Learn more at: www.solahd.com

SOLAHD™

The Emerson logo is a trademark and a service mark of Emerson Electric Co. © 2021 Emerson Electric Co.



CONSIDER IT SOLVED™

You're Invited: TCP Lighting to Host Exclusive Event to Celebrate New Florida Warehouse

TCP is holding a ribbon cutting ceremony to celebrate the opening of their brand new Florida warehouse.

Following the ribbon cutting ceremony, join TCP for a two-day, grand opening event. The celebration will include food and drinks, an iPad raffle each day, plus \$50 Visa gift cards for every attendee.

Guests can enjoy refreshments while they tour the facility and see the latest lighting innovations from TCP. The event will also provide an opportunity for lighting experts to connect with other industry pros.

Ellis Yan, TCP CEO, and Lesley Matt, TCP Senior Vice President, will attend the event to help welcome guests to the new space and celebrate the new warehouse.

As a vertically integrated lighting manufacturer, TCP's U.S.-based warehouses are part of its overall commitment to producing and delivering the highest quality products.

The lighting industry has not been immune to supply chain challenges as a result of the COVID 19 pandemic. By increasing its warehouse ownership, TCP increases its control of distribution to help keep customer projects on track.

"We are so excited for what this new warehouse will mean for our turnaround times," says Matt. "We pride ourselves on our availability to customers, and



the Florida warehouse will assist in our commitment to provide top-quality service and deliver top-quality products."

The new Florida warehouse will help to reduce transit times so TCP products arrive to customers more quickly. The location will also offer will call and pickup orders.

The new warehouse, located in Dania Beach, Florida, is one of four U.S.-based warehouses owned by TCP. The other warehouses are located in

California, Texas, and Ohio.

"TCP is always pushing for growth, whether that's new lighting innovations or new warehouse locations," says Matt. "We can't wait to celebrate our newest facility with our guests."

TCP's exclusive event will be held July 27 and 28 from 11:00 a.m. – 4:00 p.m. at the brand new warehouse, located at 3400 SW 26th Terrace, Dania Beach, FL 33312, Units A05 and A06.

TCP hopes you will join the festivities! [Click here](#) to RSVP.

ABOUT TCP

With more than 20 years of lighting experience, we are a lighting manufacturer who understands what goes into producing quality lighting systems. TCP's comprehensive product line includes CFL and LED ENERGY STAR rated lamps, along with DesignLights Consortium rated fixtures. We have leading LED driver designs and patents. That's why it's no surprise that we earn top product and supplier awards. Our strategic partnerships with industry leading vendors have allowed us to achieve just that. Lamp quality is determined by how the lighting manufacturer controls the components and the way the company brings them together to form the finished product. In order to get good LED performance, you need quality chips, drivers, optics and thermals in your lighting system. That's why TCP assembles lamps and fixtures in our U.S. based facility.



For more information, visit www.tcpi.com.

SPP PRODUCTS, INC.

Productivity and value thru ideas

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



IP26 Flat "Big O" Box Support Plate



PATENT PENDING



SAVES OVER 1 HOUR PER INSTALLATION

Prefabricated Assemblies

SAVE More Than \$1500 per Wall Outlet

PFA3



Conduit & Box Support Plates



UL

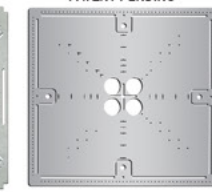
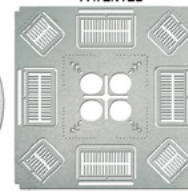
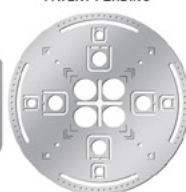
IP5
PATENTED

* IP6
PATENTED

* IP6c
PATENT PENDING

* IP7
PATENTED

IP8
PATENT PENDING



Support From Only ONE Rod Plus Eliminates Conduit Clamps
Save More Than One Hour per Installation! *

IP11

Trapeze Brackets

Original EZUTB - Size 1/2" thru 1 1/4" Conduit or equal size MC Cable.

SAVE OVER 20 MINUTES PER FOOT



TRAPEZE Eliminates ALL Conduit Clamps!



PATENTED

NECA SHOW STOPPER 1991

Mount Boxes on Both Sides or Between Studs

IP28a
PATENTED
UL

Strong 16 Gauge Galvanized Steel



2 Box Flat Fixed Position

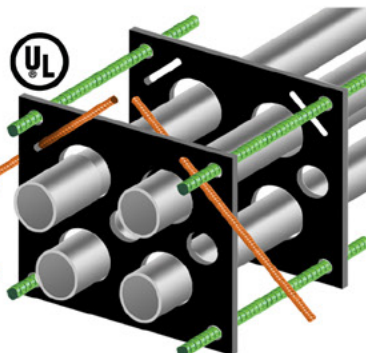
IP1

QwikDuct HDPE CUSTOM TEMPLATES

LOWER CONDUIT FROM ABOVE
NO WORKERS BELOW PREVENTS INJURIES OR DEATHS
4,000 PSI TENSILE STRENGTH AT BREAK
OVER 12X FASTER THAN SPACERS & CHAIRS

PATENT PENDING

NECA SHOW STOPPER 2000



IP13a-13h

Transition Couplings



a

PVC to PVC

b

PVC to EMT

c

PVC to Rigid

d

PVC to Flexible

e

PVC to Aluminum

f

PVC to Stainless

g

PVC to Liquitite

h

PVC to EMT Comp.

Sizes 1/2" thru 6" Schedule 40/80 Conduit

IP15
1 Piece Reaming Bit
PATENT PENDING
1/2" thru 6"



High Speed Steel for Long Life.

Installation in Less Than 5 Minutes

- Use For Entire Job -
Not Just for Repair!

IP19 4-Conduit Block

PATENTED

Support up thru 4 conduits From ONLY 1 ROD!

SAVE OVER 30 MINUTES PER INSTALLATION



IP21a QwikBlock Box Support

PATENT PENDING

NEW



Accepts Both 1/4" & 3/8" Threaded Rod

NEW

Snap-ON Adjustable Back Box Support

IP18a

PATENT PENDING



IP3a

End Bell Adapter



Smooth Edges Allow Trouble Free Wire Pulls.
PVC Schedule 40 & 80
Sizes 1/2" thru 6"



PATENT PENDING

IP3b

PVC Offset

1/2" thru 6" Conduit
1/2" thru 2" Offset

PATENT PENDING



Plus More That Do Jobs **SAFER BETTER FASTER** Constantly Being Invented!



SPPProducts.com 800-233-8595 info@SPPProducts.com

Hammond Power Solutions Appoints Chief Commercial Officer

Hammond Power Solutions (HPS) a leading manufacturer of dry-type and cast resin transformers and related magnetics, has announced the appointment of David Kinsella to the position of Chief Commercial Officer effective August 1, 2022. Mr. Kinsella will succeed Mr. Dale Sidey who is retiring at the end of the year.

“On behalf of our Board of Directors and all of us here at Hammond Power Solutions, I thank Dale for his unwavering commitment and dedication in representing the Hammond brand in the marketplace along with his impressive career of growing our brand presence in North America throughout his nearly 41 years with HPS,” stated Bill Hammond, Chairman and CEO of Hammond Power Solutions. “Dale’s guidance has been especially critical as he helped lead our growth in the U.S. distribution business and recent introduction to the Mexico / Latin America region. I want to personally wish Dale all the best as he prepares for the next chapter of his life.”



David Kinsella
Chief Commercial Officer

Mr. Kinsella will be joining the Hammond Power Solutions Executive Team after 14 years with Affiliated Distributors (AD), most recently in the electrical sector, one of the oldest and

largest divisions of AD representing over \$18 billion in revenue, where he held the position of President driving value for members since 2008. Prior to his appointment to President in 2020, David held several leadership roles of increasing responsibility with a proven leadership track record of achievements of developing member engagements and building supplier relationships. Prior to AD, David held the role of National Sales Manager with Intermatic Inc. a family owned electronic and electro-mechanical timing and controls manufacturer. David brings deep and vast relationships within the electrical industry and broad depth of exposure in electrified products, along with proven capabilities and experience in sales leadership and business development.

David holds a BA in Mass Communication from the University of Missouri with an emphasis in Marketing and Advertising.

We would like to welcome David and his family to the Hammond Power Solutions team.

ABOUT HPS

Hammond Power Solutions Inc. (TSX: HPS.A) is a North American based leader in the design and manufacture of standard and custom electrical dry-type and cast resin transformers and reactors. Leading edge engineering capabilities, high quality products, and responsive service to customers’ needs have all served to establish HPS as a technical and innovative leader in the electrical and electronic industries.

HPS has operations in Canada, United States, Mexico, and India, and is a Bronze Technology Partner with Rockwell Automation in the Americas and EMEA (Europe, Middle East & Africa).

For more information, visit www.hammondpowersolutions.com



Electrical Products & Solutions™ <small>The Purchasing Guide for Electrical Contractors</small> www.epsmag.net	NECA	20 22 ★
COME SEE US AT BOOTH # 1537	 <i>Austin</i>	OCT. 15-18

REPAIR CONDUIT IN A SNAP!

No Tape • No Plastic Straps • No Metallic Straps

NO KIDDING!

*Designed especially for power, communications
and fiber optics.*



STEP 1
Remove damaged
conduit



STEP 2
Cut split duct
conduit to fit



STEP 3
Snap in
place

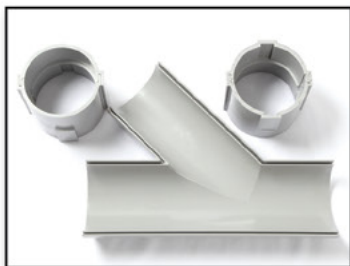
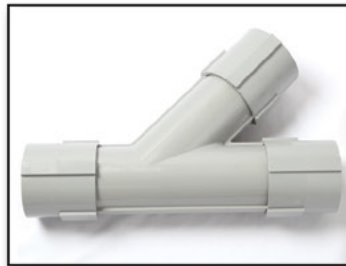
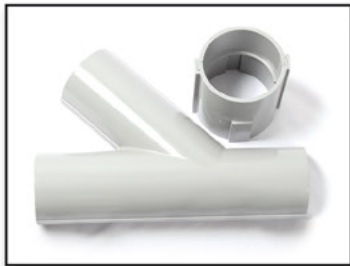


STEP 4
Attach
adapters



STEP 5
Finish job in
record time

"The World Leader In Split Conduit Products"



Conduit Repair Systems, Inc.

The World Leader In Split Conduit Products



800.670.1804 • 435.673.8724 fax • crs@conduitrepair.com • www.conduitrepair.com

DEWALT® Expands ToughSystem® 2.0 Storage Line With Soft Tool Bags & Organizers To Provide Customizable, Convenient and Durable Solutions For Extreme Jobsite Conditions

The ToughSystem® 2.0 Full-Size Organizer is proudly Made In The USA with global materials



DEWALT, a Stanley Black & Decker (NYSE: SWK) brand and leader in total jobsite solutions, today announced the expansion of its ToughSystem 2.0 Storage line, which offers improved durability and modularity. Joining the lineup are tool bags in 11-in and 22-in sizes, an organizer that is proudly made in the USA with global materials, as well as a two-drawer unit. These storage solutions provide further customization and protection of tools and accessories in harsh jobsite environments.

“With countless tools, accessories and other equipment on a jobsite, keeping organized is essential to productivity in the construction industry,” said Tabata Gomez, President, Hand Tools, Power Tools Accessories & Storage Group, Stanley Black & Decker. “DEWALT ToughSystem® 2.0 products provide mobile storage solutions to keep tools organized, with the advantage of durability to help weather volatile conditions on the job, such as exposure to dust and dirt.”

ToughSystem® 2.0 Tool Bags

Designed to withstand extreme conditions on the job, the new ToughSystem® 2.0 Compact 11-in Tool Bag (DWST08025) and 22-in Jobsite Tool Bag (DWST08350) are made with durable dirt-repellent 1680D Ballistic Nylon and a waterproof base. The bags have all-around accessibility to enable fast and easy tool changing on the job. The bungee cord on each bag allows for additional storage space and both bags have separate designated compartments for power tools, hand tools, tablets, and other electronic devices, as well as personal belongings. The bags are compatible with all ToughSystem® 2.0 products.

**For more information, visit
www.dewalt.com**



Focal Point Expands Seem 1 Family with High-Performance Louvered Optics

Seem 1 Louver with ID+ technology marries the best of linear luminaires and downlights into a flexible, configurable system

The broad Seem® 1 product portfolio has long been a staple for specifiers who desire a sophisticated, narrow-aperture luminaire that can support their creative impulses and the lighting needs of each application with recessed, surface mount, wall mount, and suspended linear luminaires. Plus, the broad family offers unique opportunities for visual and acoustic comfort with products such as Seem 1 Point Source, Seem 1 Lit End Caps, Seem 1 Acoustic, and Seem

1 Acoustic Trio. Focal Point is now adding a new tool to the lighting professionals' arsenal with Seem 1 Louver. As the name, implies, louver cells with a multitude of beam spreads and finishes can now be integrated with lensed illumination or in entirely louvered luminaires.

Seem 1 Louver was engineered as a flexible system that allows specifiers to combine louvered cells, lensed illumination, and unlit faceplates in multiple configurations, many of which are pre-designed, thus orderable directly from the cut sheets and available within standard lead times. Lambertian and batwing distributions are offered for lensed direct illumination while indirect illumination offers the choice between Lambertian, batwing, and asymmetric light distributions. The louver cells offer beam angles from Narrow Flood (20°), to Flood (29° & 43°), to Wide Flood (67°), as well as a Louver Mixing Chamber (68°). Independently controlled light sources support the creation of precise lighting scenes, completely transforming spaces with the use of a single, purposely configured luminaire.

Color temperatures of 2700K, 3000K, 3500K, and 4000K are available at CRI 80 or 90, with lumen outputs up to 625 lumens per foot for direct lensed illumination, up to 1000 lumens per foot for louver cells, and up to 1250 lumens per foot for indirect illumination. Louver cell finishes of Black Specular, Matte Black, Clear Diffuse, Clear Specular, and Matte White alter the appearance of the luminaires, from inconspicuous, with nearly invisible light sources, to bold, with diffusely illuminated louver cells. As a result, the transition to the lit area, striking or smooth, is experienced differently by the users of the space.

**For more information, visit
www.focalpointlights.com/Seem1**

Affordable test equipment for 2022



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



TIMCO INSTRUMENTS, LLC

Phone: (401) 539-7120 Fax: (401) 539-6018

www.timcoinstruments.com





**MADE
IN USA**



PRODUCTS, INC.

Productivity and value thru ideas

FOR SAFER BETTER FASTER JOBS

2021 NECA
ShowStopper
WINNER

Transition Couplings



**PVC Schedule 40 & 80 to
Inside PVC to Inside PVC
When Exiting Concrete Slab**

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

NEW

**Transitions in
Less Than 5 Minutes!**

**Save Cost on the Rigid
Nipple, Tape & Labor**

**Use for Entire Job -
Not Just for Repair**



PATENTED

1/2" thru 6"

Transition Couplings

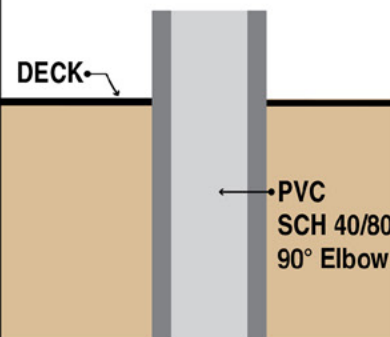
Size	Catalog #
1/2"	50PVC-IN/PVC-IN
3/4"	75PVC-IN/PVC-IN
1"	100PVC-IN/PVC-IN
1 1/4"	125PVC-IN/PVC-IN
1 1/2"	150PVC-IN/PVC-IN
2"	200PVC-IN/PVC-IN
2 1/2"	250PVC-IN/PVC-IN
3"	300PVC-IN/PVC-IN
3-1/2"	350PVC-IN/PVC-IN
4"	400PVC-IN/PVC-IN
5"	500PVC-IN/PVC-IN
6"	600PVC-IN/PVC-IN

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

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

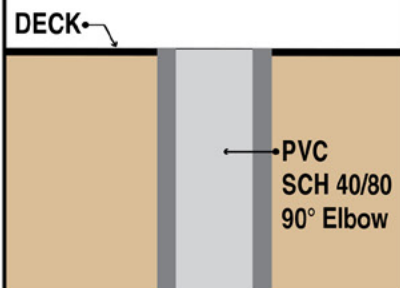


STEP 1



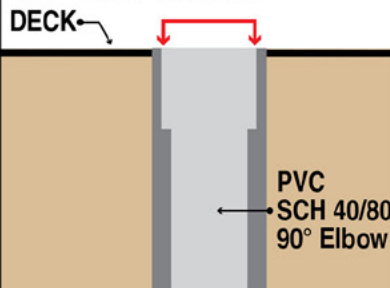
STEP 2

Cut SCH 40/80 PVC Elbow
Flush to Deck



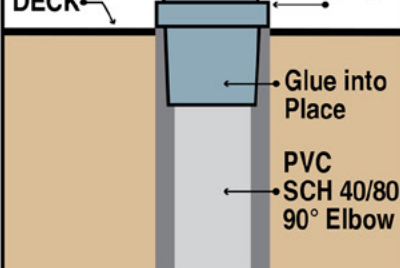
STEP 3

Ream out 1/2 of wall thickness
SCH 40/80 PVC Elbow



STEP 4

Insert
Specified
Transition
Coupling



See Our
Conduit Plug
See page IP16



See Our
REAMING BITS for
Transition Couplings



See page IP15

SP PRODUCTS, INC
Productivity and value thru ideas



**PATENT PENDING
PATENTED**

LABELS APPLY TO PRODUCTS ONLY WHERE SHOWN ABOVE



730 Pratt Boulevard • Elk Grove Village, IL 60007
P: (847) 593-8595 • F: (847) 593-8629 • Toll-free (800) 233-8595
E: info@spproducts.com • www.spproducts.com

IP13k

Klein Tools® Launches Multi-Bit Drivers with 26 Precision Tips Stored in Handle

Klein Tools, for professionals since 1857, introduces the 27-in-1 Precision Multi-Bit Screwdrivers, which house all the bits you need for everyday precision driving, plus an integrated 3.5 mm nut driver.

27-in-1 Multi-Bit Precision Screwdrivers

- On-board storage of 26 different precision tips and a 3.5 mm nut driver
- Barrel contains powerful Rare-Earth magnets for securing bits and fasteners
- Spin cap for optimum and precise control
- Industrial-strength, double-sided bits are conveniently housed in the handle, eliminating the need for a bulky bit block or case
- Cat. No. 32328 includes bits to repair most Apple® products
- Stainless steel barrel provides great impact and wear resistance
- Cushion-Grip handle for maximum comfort

“Saving space in your tool bag is a main priority for trade professionals given how many different tools are often required for any particular job,” says Austin Minor, group product manager at Klein Tools. “The new 27-in-1 Multi-Bit Precision Drivers feature powerful magnets, a stainless-steel barrel, and 27 different driver tips. The tools save space and eliminate the need for carrying cases. Plus, the driver is available in two different models depending on your application needs.”



For more information, visit
www.kleintools.com/new-products

HyLite LED NexGen Omni-Cob Lamps

The Next Generation of Compact, Energy-Efficient, and High Lumen Output Lamps are here!

The NexGen LED Omni-Cob Lamps are Heavy-duty, Industrial Grade Lamps with Highly Efficient Lighting Design and offer Excellent Illumination all around. Saving between 67%-90% they significantly Reduce Energy Consumption and Re-lamping Costs. Designed for Easy Installation in New and Existing Fixtures, the NexGen LED Lamps are suitable for Damp Locations and for Fully Enclosed Fixtures which make them Excellent for use in a Variety of Applications.

The NexGen Omni-Cob Lamps are ideal for replacement of traditional CFL, MV, HID and HPS Lamps. Quick and Easy Installation make it an Easy Retrofit into the Existing Socket. With Lamp Life of up to 60,000 hours, they significantly decrease Maintenance and Disposal Costs.

The NexGen Omni-Cob Lamps comes in these popular wattages: 12W, 16W, 20W, 25W, 35W, 50W, 100W that replace HID Equivalent from 50W to 400W of Traditional Lighting. The NexGen Omni-Cob Lamps have Universal Input Voltage of 100-277V or 120-347V which ideally makes them for use anywhere in the world.

Optimized Lighting Beam provides Maximum 360° Luminance while producing Brilliant Light which makes it Ideal Replacement for CFL, MV, HID and HPS Lamps for use in Various applications. The NexGen Omni-Cob Lamp feature Excellent Optics for Increased Visibility with Low Power Consumption. The Omni-Cob Lamps can be Oriented in any Position and does not affect or Diminish the Lamp Life. Perfect for use in Bollards, Low and High-Bays, Post Tops, etc.

For more information, visit
HyLiteLEDLighting.com/nexgenproducts



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.

The **5 Square®** Boxes (5" x 5" x 2-7/8") provide up to 88 in³ of interior volume which more than doubles that of most existing boxes on the market.

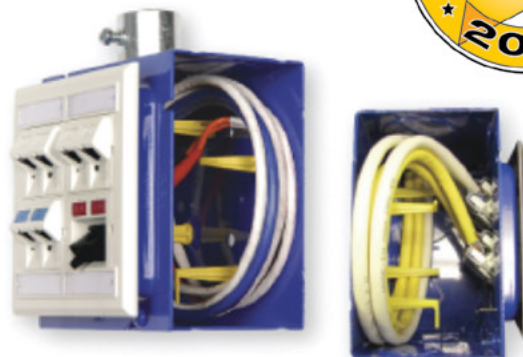
Create a robust and unrivaled infrastructure for the life of your facility with the **5 Square®** Products!

Fire Signal



- TWICE THE VOLUME AS MOST BOXES
- SAVE LABOR...INCREASE PROFITS
- ELIMINATES TROUBLESHOOTING TIME AND COST
- FULLY UPGRADEABLE SYSTEM
- SPECIFIED BY ENGINEERING FIRMS, HOSPITALS, UNIVERSITIES & GOVERNMENT AGENCIES
- AVAILABLE IN ZINC OR RED

Telecommunications



- INTEGRAL CABLE MANAGEMENT
- SAVE LABOR...INCREASE PROFITS
- FACILITATES MIN. BEND RADIUS REQUIREMENTS
- SUPPORTS CURRENT AND EVOLVING SYSTEMS
- SUPPORTS PoE PLUS
- SPECIFIED BY ENGINEERING FIRMS, HOSPITALS, UNIVERSITIES & GOVERNMENT AGENCIES



REGISTRATION IS OPEN.
Use Code 22EPS for FREE Trade Show Admission.



For more information on attending **NECA 2022 Austin**:
T 202-991-6263 • meetings@necanet.org



DRIVEN TO DELIVER

THE CONSOLE X



- Clean up those cabs and get your fleet organized!

Your Total Mobile Office Solution

The Truck Console -X combines your Laptop Work Station, Radios, Speakers, Cables, Storage and Cup Holders, No Drill Installation Brackets Included.

The **Truck Console -X** is the latest innovative mobile office solution to join the Mobile Desk brand family of products. This complete control, communication and convenience Utility Truck Console is becoming the new standard for fleets of all sizes. The design of the **Truck Console -X** has originated from our years of experience working directly with the lineman, supervisors, communications, and fleets of some of the most notable utility companies in America. Loaded with standard and optional features that maximize ergonomics, productivity, and fleet/telecom standards into one Mobile Office Solution.

Screen Out™ SCREEN-DISABLER™
Blanks your screen while you drive!

Our Patented Screen Out App **Stops texting** while driving for all employees on all tablets, laptops and smart phones that run Windows, iOS or Android Operating Systems. **It's that easy!**

877-663-3375 Ext 303. www.screenout.net

Find us on:



MOBILEDESK
MOBILE OFFICE SOLUTIONS

1-877-663-3375

www.mobiledesk.com

©2018 Mobiledesk



Milwaukee Tool Releases 2022 Heated Gear Lineup

Milwaukee® announces their 2022 Men's and Women's Heated Gear lineup, featuring next-generation Jackets, Vests, and Hoodies constructed to withstand harsh and cold jobsite conditions. Each user-driven, ground-up design utilizes an advanced heat technology system with carbon fiber heating elements providing warmth no matter the situation. With functional garment evolutions, re-engineered materials and a total portfolio battery upgrade, optimal protection and comfort has been delivered through this release of the M12™ TOUGHSHELL™ Jacket and Vest, next-generation Men's & Women's M12™ Heated AXIS™ Jackets and Vests, and Men's & Women's M12™ Heated Hoodies.

M12™ Heated Hoodies

Now available in both Men's and Women's versions, the M12™ Heated Hoodie delivers heat built for complete comfort combining a durable cotton/polyester fleece and comfortable jersey lining with a closer-to-body fit. The raglan sleeve construction and 4-way stretch fabric allows for free range of motion. Featuring 3X faster heat-up time and multiple heat temperature settings, Milwaukee's M12™ Heated Hoodies provide a versatile, three-season solution to keep heat in and not add bulk.

The next generation of Heated Gear demonstrates Milwaukee's continued commitment to provide purposeful, user-driver innovation of best-in-class heated products that meet the demands of the jobsite. With Milwaukee's ground-up designs and materials, each innovation within the Heated Gear category delivers products that are jobsite-built to conquer real-world applications.

For more information, visit
www.milwaukeetool.com

Lumileds New Very Small, Very Powerful LUXEON HL1Z Opens Opportunities to Create Compact Solutions with Precise Beam Control

Lumileds newest high-power CSP LED is LUXEON HL1Z, an un-domed, single-sided, emitter that delivers high efficacy – 137lm/W or more – from a very small package just 1.4mm square. The top emission prevents “cross-talk” and contributes to the superior color over angle performance and color consistency. Compactness and directional emission allow engineers to create tight arrays and precisely control the beam which enables smaller optical solutions and a path for system cost reduction. LUXEON HL1Z is particularly ideal for high center beam candle power applications such as high-end retail spots, tunable white solutions, aftermarket automotive, and other high density array lighting.

“Demand for the next generation of high power LEDs is increasing as the need for higher intensity, beam steering, compact arrays, color tuning, and high center beam candle power solutions become the drivers of new applications,” said Alvin Yeoh, Product Manager.

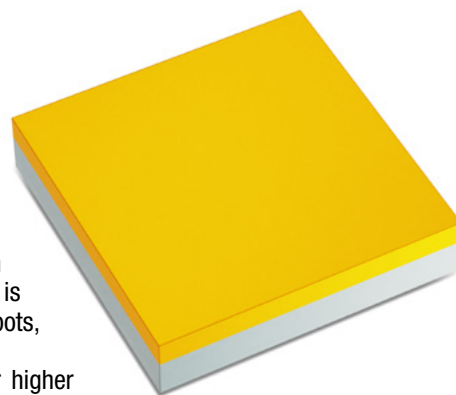
Lumileds pioneered the high power LED space more than twenty years ago with LUXEON and the company continues to develop new and differentiated solutions like LUXEON HL1Z for lighting solution manufacturers.

“Lighting engineers are taking full advantage of the light output to size ratio that's unique to LEDs,” said Yeoh. “Emitters like HL1Z provide new design freedom without sacrificing quality or efficacy.”

LUXEON HL1Z is immediately available through Lumileds distribution network in CCTs from 3000K to 6500K and CRIs of 80 and 90. Additional CCT/CRI combinations will follow over the coming months and are available for pre-order.

About Lumileds

Lumileds is a global leader in OEM and aftermarket automotive lighting and accessories, camera flash for mobile devices, MicroLED, and light sources for general illumination, horticulture, and human-centric lighting. Our approximately 7,000 employees operate in over 30 countries and partner with our customers to deliver never before possible solutions for lighting, safety, and well-being.

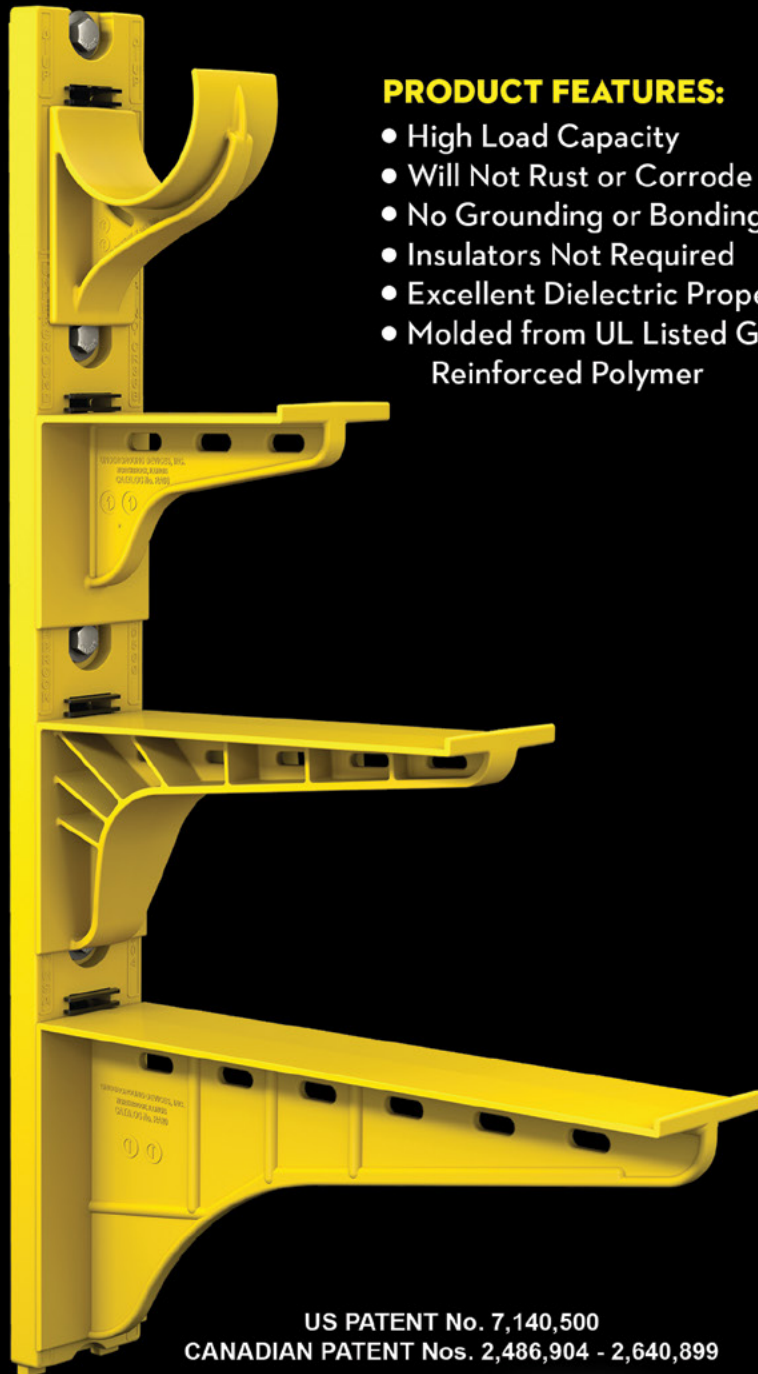


For more information, visit
lumileds.com

The Heavy Duty Nonmetallic CABLE RACK



For Power and Communications Manholes And Vaults



PRODUCT FEATURES:

- High Load Capacity
- Will Not Rust or Corrode
- No Grounding or Bonding
- Insulators Not Required
- Excellent Dielectric Properties
- Molded from UL Listed Glass Reinforced Polymer



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.

US PATENT No. 7,140,500
CANADIAN PATENT Nos. 2,486,904 - 2,640,899

UNDERGROUND DEVICES
INCORPORATED




420 ACADEMY DRIVE
NORTHBROOK, IL 60062
Phone: 847-205-9000 • Fax: 847-205-9004
Website: www.udevices.com


This advertiser index is compiled as a courtesy to our readers. While every effort is made to provide a complete and accurate listing of companies and page numbers, the publisher is not responsible for errors.

Company	PG#	Company	PG#
2022 NECA SHOW	28	RANDL INDUSTRIES	27
APPLETON / EMERSON	7	SOLAHD / EMERSON	15
APPLETON / EMERSON	9	SOLAHD / EMERSON	17
CONDUIT REPAIR SYSTEMS	21	SP PRODUCTS INC	3
GREAVES USA	BC	SP PRODUCTS INC	19
IToolco	IFC	SP PRODUCTS INC	24, 25
KRENZ & COMPANY	32	TCP	IBC
MILLER SAFETY CONSULTANTS, LTD	11	TIMCO INSTRUMENTS, LLC	23
MOBILE DESK	29	UNDERGROUND DEVICES	31
POWERSIGHT / SUMMIT TECHNOLOGY INC	13		

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.

ENGINEERED TO COOL
There is no comparison.



 **KRENZ & COMPANY, INC.**

KRENZVENT.COM • 262.255.2310 • KRENZ@KRENZVENT.COM

Electrical Products & Solutions™
The Purchasing Guide for Electrical Contractors www.epsmag.net

**COME SEE US AT
BOOTH # 1537**

NECA

2022

Austin

OCT. 15-18

WANTED

High Lumen LED Filament Imposters

CRIMES

Impersonating TCP's industry-leading filaments while delivering inferior illumination and a shorter lifespan.

LUMENS PER WATT

TCP High Lumen LED Filament Lamps

200

The Imposters

170

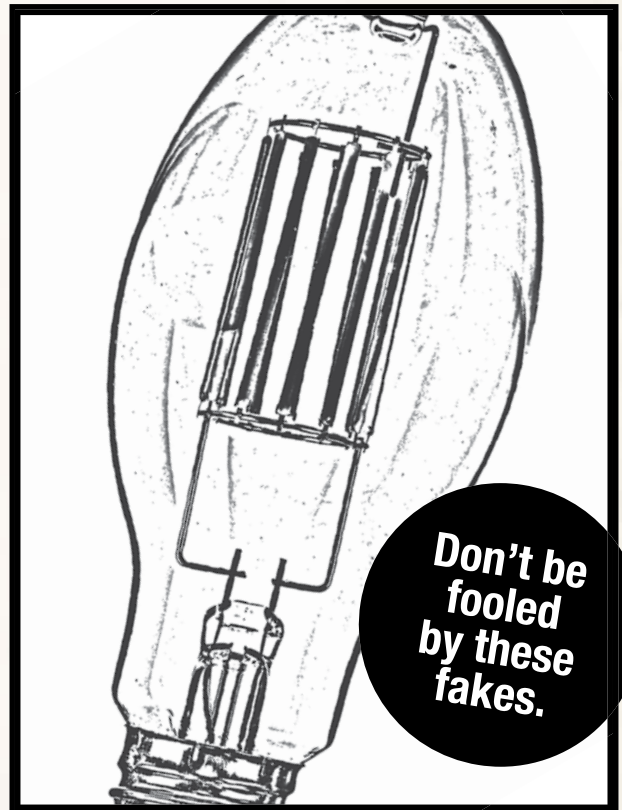
RATED LIFE

TCP High Lumen LED Filament Lamps

50,000 Hrs.

The Imposters

25,000 Hrs.



MULTIPLE SIZES AND COLOR TEMPERATURES:



TCP High Lumen
LED Filament Lamps



The
Imposters



Get the real deal with TCP High Lumen LED Filament Lamps – more lumens, longer rated life and multiple sizes and color temperatures.

Learn more at TCPI.com/corn-cob-killers
or call 888.399.4217



Making perfect connections has never been simpler. In fact, now it's a **SNAP!**

NEW *SNAP Connectors* from Greaves. A revolutionary compression connector concept that gets the job done with just a few turns of a standard wrench!

- ▶ Time-saving, easy installation
- ▶ Superior pull-out strength and conductivity
- ▶ No bulky and costly tools and dies



GREAVES

860-664-4505 | 800-243-1130 | www.greaves-usa.com | info@greaves-usa.com