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- Mitigating EMI, Stray Ground Currents and Voltage Reflections in VFD Systems



Steady Growth and Diversification: Keys to Success at TCP Cable

By Joe Tito
Wiring Harness News

For over 40 years, TCP Cable has been manufacturing wire and cable assemblies for the specialty automotive, military, industrial/commercial, and home appliance sectors. As the second largest harness supplier in Canada, TCP has a plethora of OEM and

tier 1 customers throughout Canada, the United States, and Mexico.

TCP is actually a holding company formed as a result of the 2008 merger between Terminal & Cable Inc. of Canada, and Prodam (Canada) along with Prodam's Mexico assembly arm known as Promamex SA de CV. WHN recently caught up with Marc April, President of TCP Cable and Denis Coderre, Vice President, about the history of the company and the stra-

Basic Guide for Tensile Testing of Crimped Wire Terminals

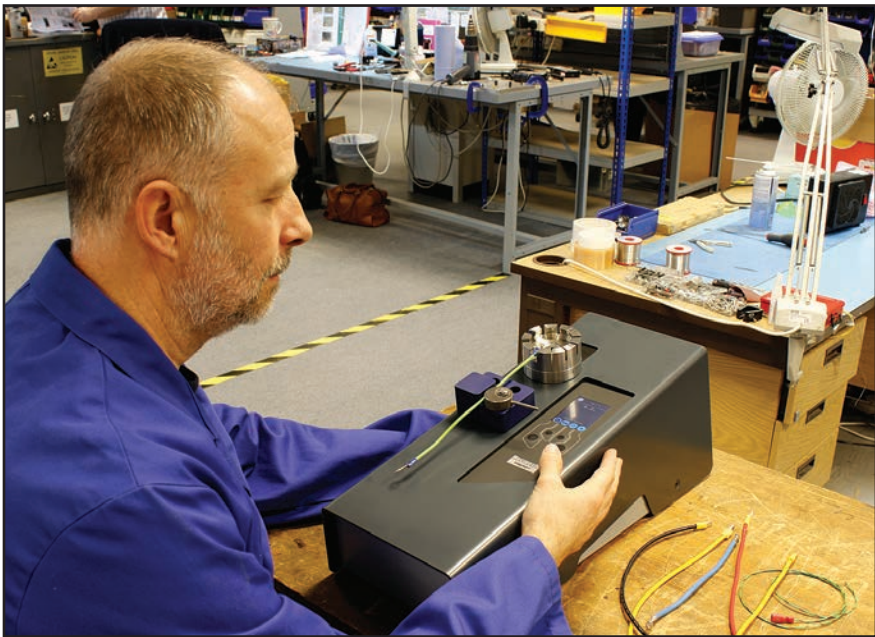
By Andie Davidson
for Wiring Harness News

Wire harnesses and looms are used everywhere in connecting electrical and electronic equipment, from aerospace to domestic machines. Whilst some are power conductors, many are signalling, connecting electronic controls and com-

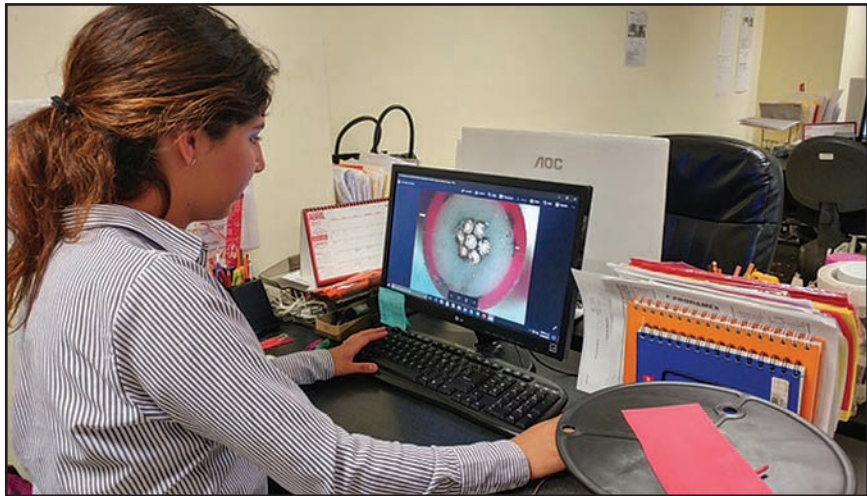
ponents. Predesigned for easy fitting, most are pre-bound and assembled with a variety of push-on connectors, and may include permanent splices. This enables rapid assembly in mass production lines, and complete electrical pre-testing of all connectors.

Simple wire connectors, with terminals on both ends may be made semi-manually with bench presses, or

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Typical setup for motorized crimp pull testing.



Cross sectional testing at Prodamex.

tegic rationale for the creation of the group.

Marc shared the company's humble beginnings in the garage of a Mr. Millette. He made cable assemblies for the fledgling snowmobile industry in the early 1970s. Having moved to a bespoke facility in Carignan, Quebec, Marc's father purchased Mr. Millette's shares in 1976. Tough times were ahead, though, as the snowmobile market flattened. "Everyone who

wanted one had one, inflation was high, and the industry had a difficult period," Marc revealed. They began to diversify and expand and Marc's father began to turn things around. In 1980, the company began a facility improvement phase of six expansions over the next 12 years.

Along the way, Marc acquired shares in the company, and com-

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Wire processing station at Prodamex.

The 2017 WHMA Shines in San Antonio

By Joe Tito
Wiring Harness News

If you've ever visited San Antonio, you no doubt remember the beautiful sights, rich history and the delicious food. But if you attended the 24th annual Wire Harness Manufacturers Association Annual Conference this past March, you also came away enriched by fresh relevant seminars, and the many new connections you made. Some 170 attendees were on hand for the event, with a record setting 42 first time attendees. There were 34 exhibitors on hand, which is the second highest for the event.

The Conference Planning Committee goes to great lengths to create a compelling seminar schedule designed for attendees to reflect on their operations, and return home with many new tools for improvement. This year was certainly no exception.



Joe Theismann

The keynote speaker was legendary quarterback Joe Theismann, who gave a riveting and inspiring speech on leadership. He related his successes on and off the field and also spoke of tough lessons he learned along the way. He was quick to point out that he has never had a failure, "just educational experiences that didn't go as planned."

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May/June 2017

1 Steady Growth and Diversification: Keys to Success at TCP Cable

Senior Management at TCP Cable discuss the group's history and share some keys to their success.

1 2017 WHMA Shines in San Antonio

Another winner is in the books for WHMA. Take a look at some of the highlights.

1 Basic Guide for Tensile Testing of Crimped Wire Terminals

THE essential guide for wire crimp pull testing.

4 Think. Plan. Do. Measure what gets done

Sound simple? Not really. We are great at Doing and Measuring, but how are we at the Thinking and Planning parts?

8 Creating Competition in the Deal Process

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Copies of *Wiring Harness News* (ISSN 1097-0789) are distributed bi-monthly to wiring harness & cable assembly shops, cord set manufacturers, companies that process electric wire & cable (including fiber optic) for use in their own products, their suppliers and other interested parties.

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International Harness Resources Inc., (IHR Inc.)

Wiring Harness News

PO Box 669

Schererville, IN 46375
USA

<http://www.wiringharnessnews.com>

Office Hours:

8:00 a.m. - 4:00 p.m. CST -
(Monday-Thursday)
Printed in the USA.

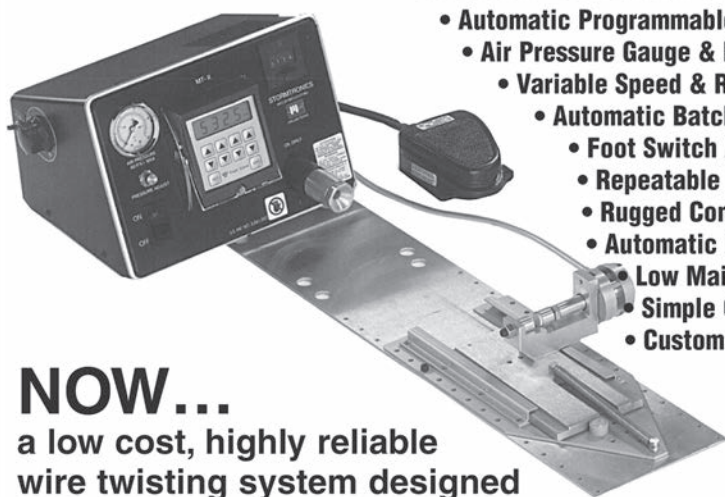
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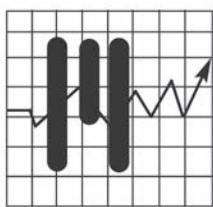
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Think. Plan. Do. Measure what gets done

By Paul Hogendoorn

When it comes to manufacturing, most shop supervisors and plant manager consider this as a statement they can relate to: “think, plan, do, and measure what gets done”.

Think about what you are going to do before you do it – it only makes sense.

Plan for it. Working without a plan is effectively planning to fail.

Do it. This is what manufacturers like most – the doing it part.

Measure what gets done. In our just-in-time world, its pretty easy to know when we have and haven’t hit our objectives. It becomes very tactile and obvious.

While there is plenty of technology readily available for the “doing” and the “measuring” parts of our manufacturing processes, there is not as much technology readily available for the “thinking” and “planning” parts of the job. We’ve all heard the analogy that if you catch a problem in design, it costs a dollar to fix; if you catch it on the floor, it costs \$10, but if you catch it in the field, it costs \$100. The same is true for thinking and planning your production – every improvement made in the thinking and planning stages results in far bigger



Paul Hogendoorn

benefits than any improvement in the actual “doing” or producing stage. This is where I believe the biggest opportunities for improvement exist in most manufacturing companies today.

Every year manufacturers make significant investments into “doing”. They replace machines, upgrade parts, and hire more employees. More machines, better equipment, and more people are easy to associate with more production capacity and more opportunity for revenue.

For improved measurements, companies also make investments in ERP systems and machine monitor-

Continued on page 6

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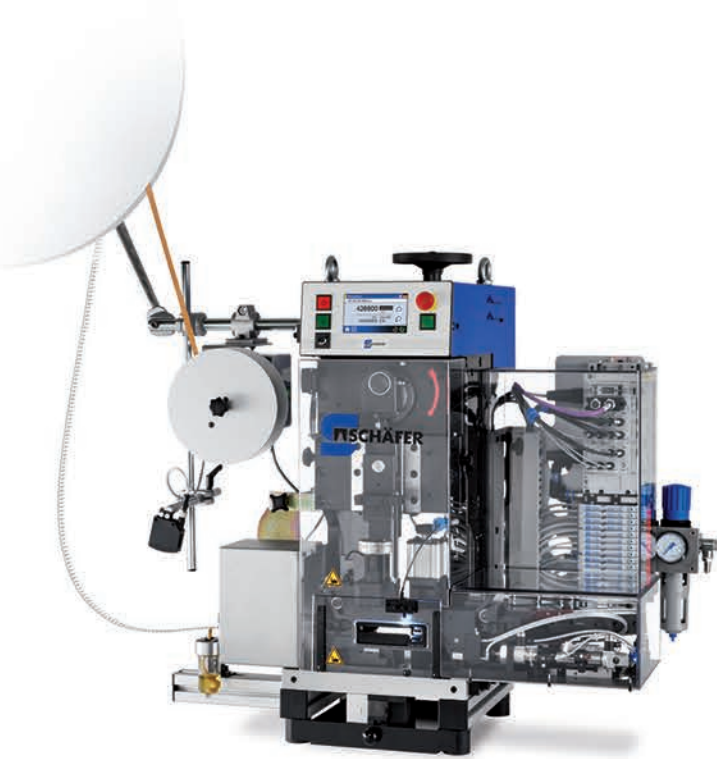
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Think. Plan. Do. Measure what gets done

Continued from page 4

ing technology, and these purchases make sense because manufacturers realize the importance of making data driven decisions - you can't improve what you don't measure.

With all these investments however, many systems are still failing to deliver on the benefits and advantages they offer, resulting, in many cases, in a limited return on those investments.

How can this be?

We have discovered that it is often caused by one of two beliefs:

1. That the thinking and planning has already been done, or,

2. That it is someone else's responsibility to do the thinking and planning

Many manufacturers have modeling and planning tools in place, but they are limited to select process or select individuals. Efficiency and effectiveness are not the same thing, and to run a plant effectively, you need everyone to think and plan.

For instance, if you run a part on the wrong machine while running that machine efficiently, you are really just wasting time efficiently. Or, if one final assembly requires 20 indi-

vidual pieces to be machined and 19 of them are done in time, you are not 95% on time, you are 100% late.

Manufacturers may be sensitive to these kinds of conditions, but yet they continue to experience them routinely.

Why?

Because they make it only one or two peoples' responsibility to think and plan, when in fact it should be a responsibility shared by many more.

Plant level software solutions need to do more than schedule production or monitor machines; it needs to engage everyone involved in the "Think. Plan. Do. Measure what gets done." process.

We love doing, and we have become quite proficient in measuring. Our next challenge, as manufacturers in North America, is to make the thinking and planning a part of everyone's responsibility. The good news is that this is just another opportunity to engage our people, and the generation than we aim to hire next is a generation craving engagement.

Bio: Paul Hogendoorn is cofounder of FreePoint Technologies. "Measure. Analyse. Share - don't forget to share." He can be reached at paul.hogendoorn@getfreepoint.com



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Creating Competition in the Deal Process

By Loren Smith

Whether you're a pro athlete looking to test the free agent market or a wire harness manufacturer looking to sell your company, dealing with competitive suitors is, quite obviously, an optimal situation. Less obvious is how to ensure competition.

Recently, we were retained to sell a \$25 million wire harness company, and our process might serve as a helpful example of the steps to take and the ideal outcome that can result.

On behalf of our client, we began by throwing out a wide net, contacting an assortment of prospective buyers: manufacturers of wire harnesses, printed circuit boards, and connectors; contract assemblers; and private equity companies. We then gauged levels of interest among the respondents and narrowed the pool to about a dozen serious prospects.

Our next step was asking each for a letter of intent (LOI)--a non-binding letter specifying the price and terms the buyer would offer for the business after doing its due diligence. We received three LOIs--each of them offering a price roughly 4.5 times the company's EBITDA.

The ensuing step was evaluating the candidates using non-financial criteria such as motivation. Granted, trying to determine a prospective buyer's motivation is similar in sub-



Loren Smith CEO
Blue Valley Capital

jectivity to judging seriousness, but certain scenarios are generally dependable. For example, a wire harness manufacturer who wants to reduce customer concentration or a private equity firm that owns a wire harness company and wants to create economy of scale by acquiring another harness company would each appear to be truly motivated.

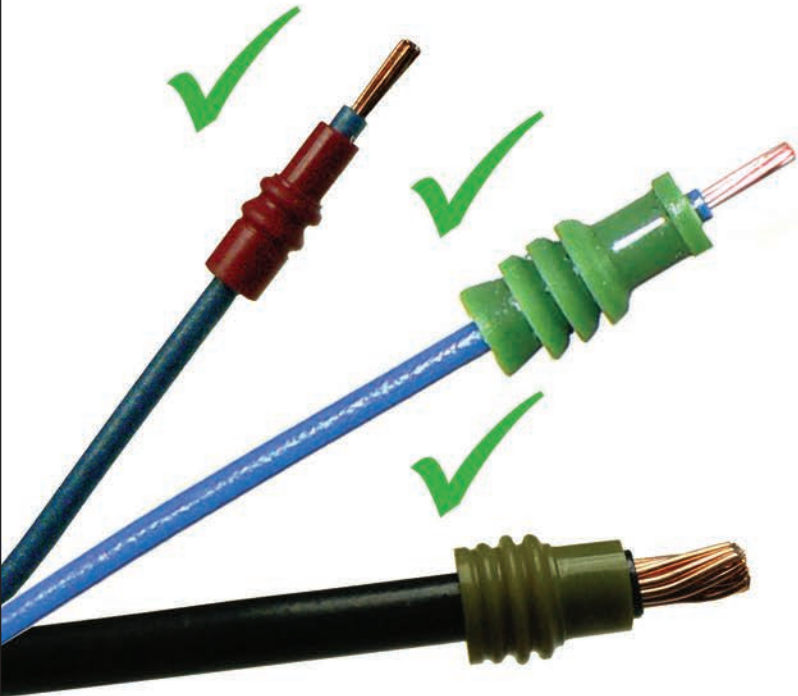
Now we were ready to make our number one pick and try to command a higher price. With our top prospect chosen, we delivered a message as follows: "Several companies have submitted letters of intent, and we have decided we would like to put a deal together to sell our

Continued on page 10

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Creating Competition in the Deal Process

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company to you. If you will provide us with a new letter within the next three days priced at a cash multiple of 5.5 EBITDA, we will sign your letter of intent.”

This process resulted in our top-ranked buyer providing us with a letter of intent at 5.5 times the EBITDA, versus the original 4.5 multiple, providing our seller with a \$22 million purchase price--\$4 million above any initial offer. (Had the buyer declined to come in at that level within our three-day deadline, we would have gone to our next-ranked buyer with the same proposal.)

Clearly, creating competition served the seller extremely well, which illustrates a key reason to rely on an experienced M&A firm (broker) to manage the sale process. Unfortunately, many harness owners try to manage the process themselves, often selling to a buyer who just happens to approach them.

This is not uncommon for two reasons: 1) Owners of harness companies tend to receive a steady stream of inquiries from prospective buyers and firms who represent them. This can convince owners that selling is not difficult. 2) Often these inquiries promise deals that seem, to the uninitiated, irresistible. Owners who go down this road, without taking advantage of a competitive environment, almost invariably leave money on the table.

Loren Smith can be reached at lms@blvcapital.com or www.bluevalleycapital.com

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Harness Builder 2017 for E3.series Focuses on Harness

Manufacturing Needs

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“Harness Builder 2017 for E3.series responds to customer requests for more test output capability and improved cost analysis,” said Paul Harvell, Director, E3.series Product USA. “Our customers appreciate the simplicity and cost effectiveness of Harness Builder for E3.series, and this release builds on those priorities.”

In the new release, users will see expanded test system coverage with support for Cirris Systems and Dynalab Test Systems. Test system support is a critical need for harness manufacturers and this release provides capabilities to generate test files that are fully compatible with these test systems.

“Our common cus-

Tinned wires...

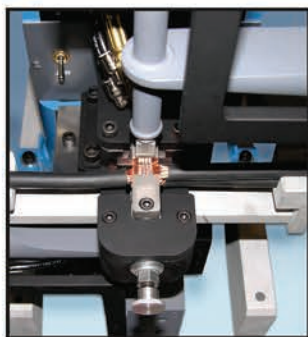
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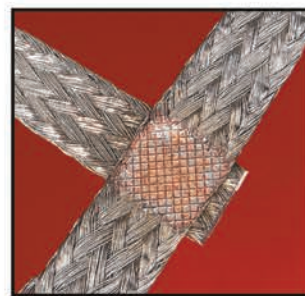
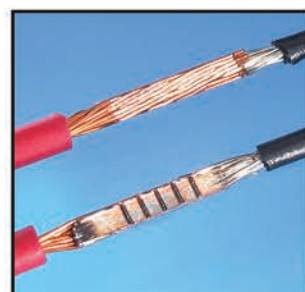
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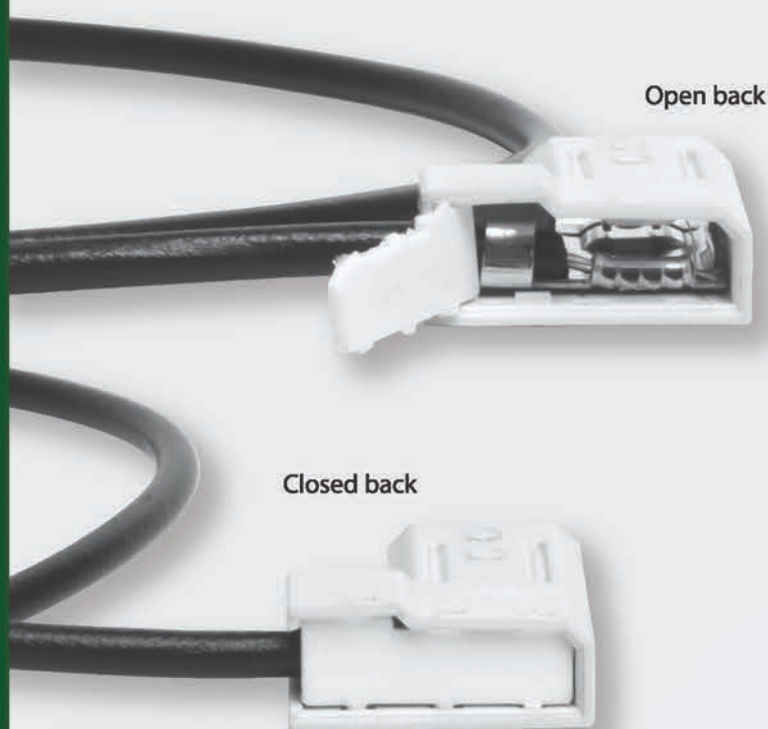
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Continued on page 20

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Remembering Bill Saxton

It's with great sadness that we share the passing of Bill Saxton. Bill was a long time manufacturers rep and mentor to the industry. Many will remember his smiling face at the EWPT shows in Milwaukee, and his customers will never forget his dedication and love of the industry. Bill was always optimistic and energetic, and not many knew he was fighting a three year battle with cancer.

WHN recently spoke with Treshona Saxton, Bills daughter, about his life and impact on the wire harness industry. After attending college in Arkansas, he moved to Milwaukee in 1972 and began working at Artos. He learned the equipment inside out, and was often sent to California on sales/engineering calls. Bill loved California and saw the potential for an entrepreneurial venture there. He convinced Artos to give him a sales representative territory, and set up a manufacturers rep business. He named the business Conrad Enterprises - Conrad being a boyhood nickname given to him by one of his brothers. In addition to Artos, Bill eventually added Lakes Precision to his line card, but also did repairs for Tulsa Power and Reel-O-Matic spooling equipment.

Treshona told of her fathers great relationship with his principles, and how much his customers loved him. "He made everyone feel like his family, and if there was ever anything anyone needed, he would be there," she



said. "He had a really good heart and I think everyone loved his dedication,, loyalty, and hard work ethic." Treshona mentioned that this dedication extended even through his battle with cancer. "It was his passion and he would leave chemo and go to a job, or leave a job and go to chemo...he was just that dedicated," she recalled.

Understandably, Treshona is very proud of her father. His influence on her was profound, and she followed his footsteps into the industry. "He taught me that attitude is everything and that if you do what you love, you'll never work a day in your life," she said.

Bill Saxton was a giant in the wire harness industry and will be greatly missed by his customers and those whose lives he touched.

~WHN~

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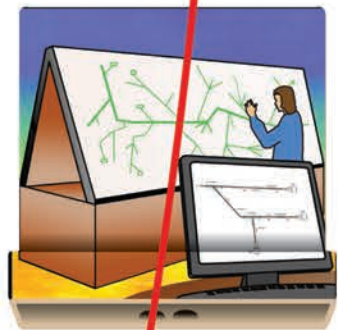
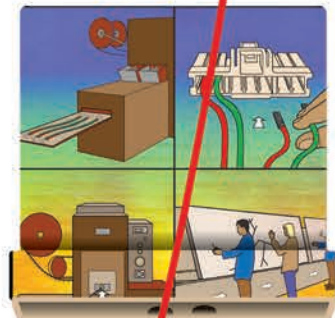
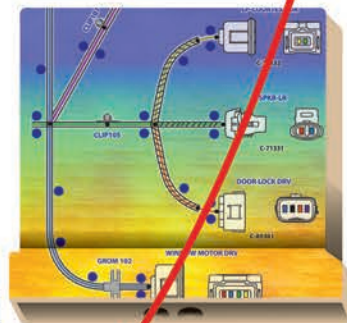
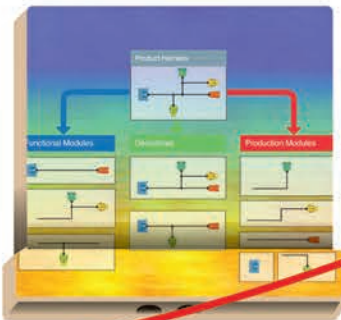
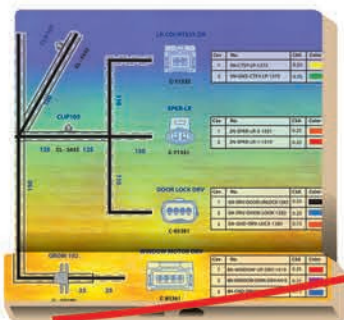
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The 2017 WHMA Shines in San Antonio

Continued from page 1

Joe's hero was his dad, and one of the most teachable lessons he gained was when his father said, "Joe, people don't care how much you know, until they know how much you care." Along those lines, Joe Theismann left the audience with the message, "Its nice to be important, but it's more important to be nice."

Dave Pheteplace of Bishop and Associates enlightened the crowd with his update on the cable assembly industry. He noted 2016's growth rate of 4.2% represented a recovery over 2015's 6.2% contraction. Dave revealed the growth was due mostly to the automotive sector, and likely fueled by low interest rates. Growth in China was comparatively weak, he showed. The semiconductor industry has historically been a leading indicator for the interconnect industry, but this phenomenon flipped in 2016, and he and his colleagues are not really sure why. He predicted a 5% growth in the cable assembly industry for 2017.

Dave then pivoted to the implications of the Trump presidency on the industry. He felt there might be some incentives for US manufacturers, but does not think tariffs are in our near future. The most he sees resulting from all the rhetoric on trade is a softening of some of the special provisions for Mexico outlined in the original NAFTA agreement. In addition, Dave reported seeing the following on the horizon:

- Immigration enforcement could increase crossing times at the boarder with Mexico, and there could be a lessening of available seasonal workers.
- Provisions of the Dodd-Frank legislation pushed smaller banks out and limited available dollars larger banks could lend. Trump has promised to fix this.
- There will be at least some changes to the Affordable Care Act that should make it less onerous on small to medium sized businesses.

The administration announced \$54 billion in new spending for the military which bodes well for the interconnect industry, especially in mil/aero. Increased spending on infrastructure is also good news for the industry but no specifics were outlined by the administration.

The concept of Total Cost of Ownership is very timely as companies analyze the true



WHMA Presented this year's Volunteer Excellence Award to Joe Roberts of Hellermann Tyton.

cost of overseas manufacturing. Art Thomas with the Purdue University Manufacturing Extension Partnership Center

Continued on page 18

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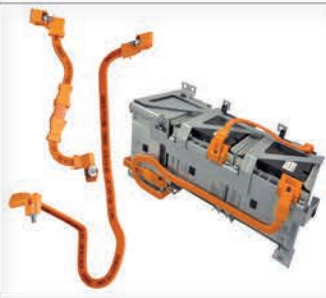
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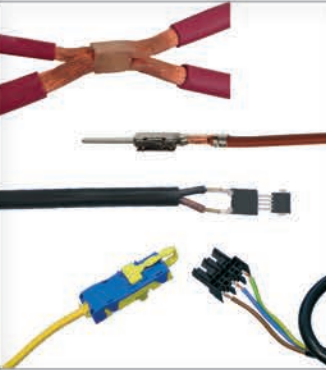
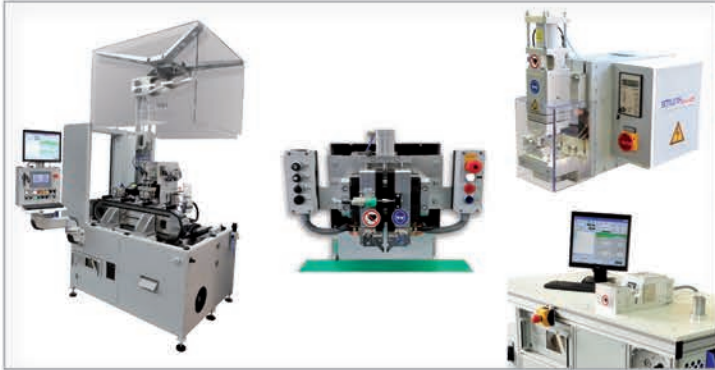
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The 2017 WHMA Shines in San Antonio

Continued from page 1

was on hand for a double session to explore TCO and its implications for harness manufacturers. TCO is the sum of all visible and hidden costs involved in the acquisition of a product. Hidden costs are things like, transaction costs, storage, higher safety and buffer levels, environmental impacts and other things that don't necessarily appear on an invoice. Art contended that companies too often look at low piece prices of products manufactured offshore, and ignore some of the true costs. Art reviewed a Total Cost of Ownership Calculator that covers 56 often overlooked hidden costs. He invited attendees

to connect with local Manufacturing Extension Partnerships and begin to use the calculator by visiting www.mepsupplychain.com. Paul Evans, Director of the Production and Simulation Technologies Department was on hand to explore the history of stationary and mobile robots, and discuss their future implications for harness assembly. Once reserved for high volume/low mix manufacturing, breakthroughs in sensor technology are enabling robots to recognize and grab a wider variety of parts, Paul revealed. He noted these advances have led to 'scan & plan' systems where the robot takes the perception data and automatically generates paths without any human



WHMA attendees enjoyed a boat cruise on the San Antonio River Walk.

programming. These robotic systems, he noted, are also trained to recognize humans working in the immediate area, greatly improving safety. In addition to the seminars, WHMA Presented this year's Volunteer Excellence Award to Joe

Roberts of Hellermann Tyton. Joe has worked diligently on this year's WHMA conference, as well as many in the past. Also on hand were Christine and Robert Siebert of The Siebert Consulting Group. The Sieberts have been contracted by WHMA to produce an exciting new website, and they presented some of its major highlights.

Special note should be given to the sponsors of all of the events at the WHMA Conference. The Monday evening River Walk Boat Cruise Reception was sponsored by The Entrada Group. The Tuesday Breakfast With Exhibitors was sponsored by Daniels Manufacturing, with the afternoon session co-sponsored by Cirris and Schleuniger. The Wednesday Lunch With Exhibitors was sponsored by Wiring Harness News, and the Wednesday Reception was co-sponsored by Mentor Graphics and IEWC. Media sponsors for the conference were Wiring Harness News, Wire & Cable Technology, and Wire World.

One thing seems clear. When you attend a WHMA event, you learn about your business and yourself. There is simply no better place to build the skill set needed to be successful in today's wire harness industry. Make plans to attend the conference next year at the Scott Resort & Spa in Scottsdale, Arizona in February. Keep track of specific dates and plans by visiting WHMA.org.

~WHN~



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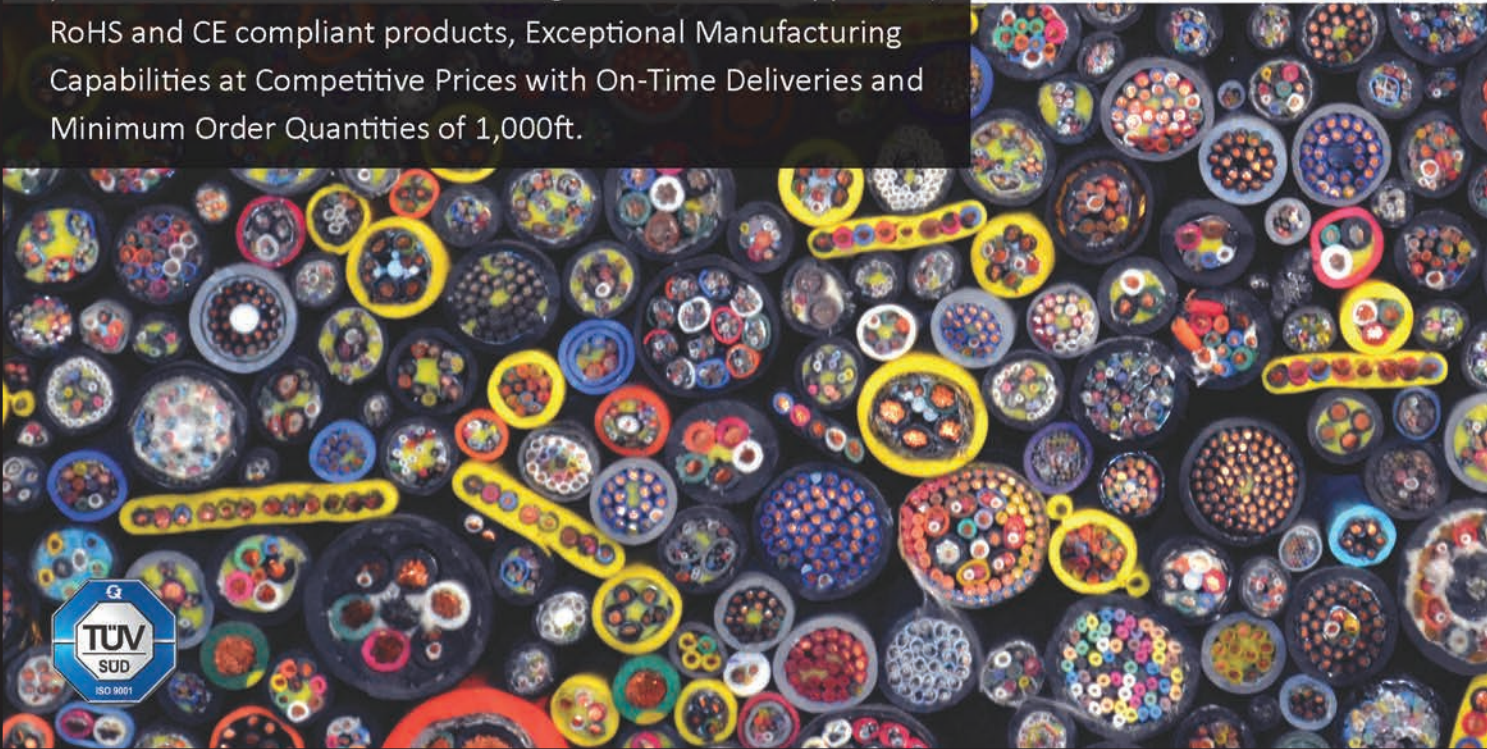
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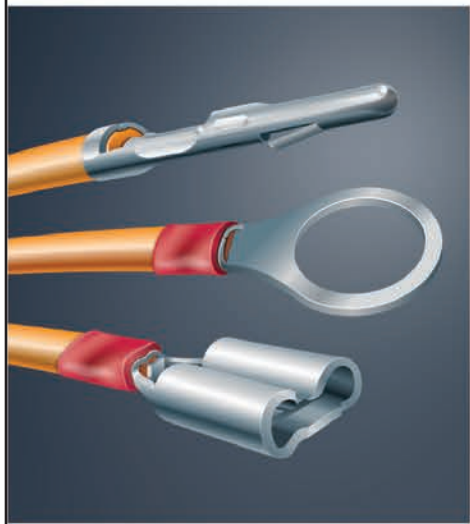
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NEWS PLUGS continued



Continued from page 12

tomers will immediately benefit from this new export capability in a Cirris tester compatible format,” said Kevin Ellsworth, Product Manager, Cirris Test Systems. “They will no longer have to input the same data into both systems, saving significant time. By linking Zuken’s Harness Builder for E3.series with Cirris Systems’ harness test products, we can deliver a more comprehensive solution to the harness manufacturing industry.”

Numerous factors can impact harness cost. Harness manufacturers require fast and accurate cost analysis tools and Harness Builder 2017 for E3.series takes into account new cost factors that include inspection time, labor rate, testing time and tooling cost. Incorporating these new cost factors into the design process will improve estimates with minimal additional effort.

- Other new features include:
- Fully integrated unit of measurement definition
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 - New library parts, including: SOURIAU – 8STA, DEUTSCH – AUTOSPORT, and MIL DRL-38999.

Harness Builder 2017 for E3.series is available today and is fully compatible with E3.series 2016 and 2017.

For further information, see www.zuken.com/harness-builder

Cirris Releases Major New Update of easy-wire Software

Cirris easy-wire Software version 2017.1.0 is faster, more reliable, and includes new features. In addition to bug fixes, the software has major updates to improve the testing experience from creating a test to reporting.

One of the first things users will notice is increased speed. Changes to easy-wire memory help the software perform more efficiently.

For shops using systems networked wirelessly, new updates in the software will increase the reliability of wirelessly networked testers.

Test methods available previously only on the CH2 and CR will now be available on the Easy Touch and 1100 series testers running easy-wire. The software also has a new test method called, “Single Test Repeat” that lets the user specify how many times in a row the tester runs a complete test.

Among the changes made are bug fixes and improvements to existing features such as reporting, Smart-Lights, etc.

Contact Cirris to learn more or to purchase this new software update by calling 1-801-973-4300 or visit cirris.com.



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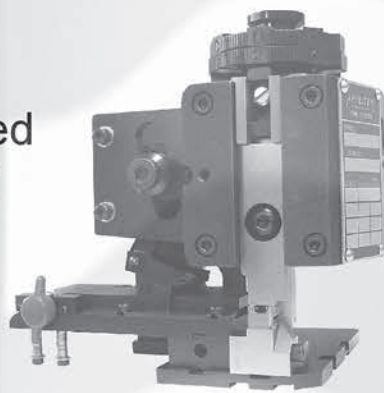


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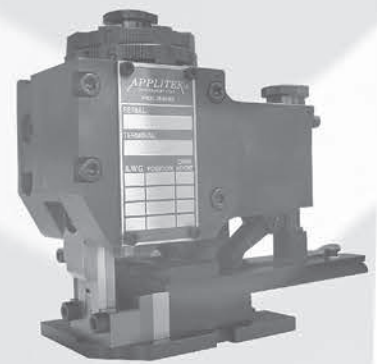
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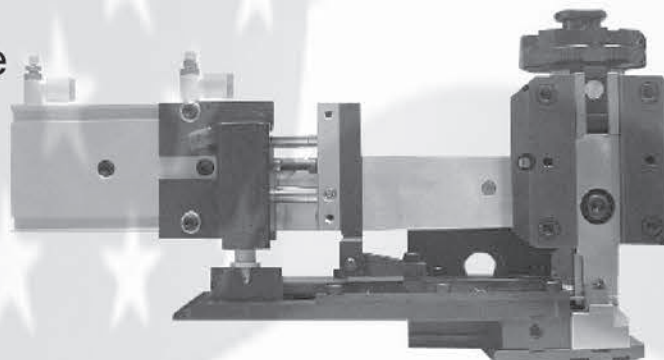


Model 1700

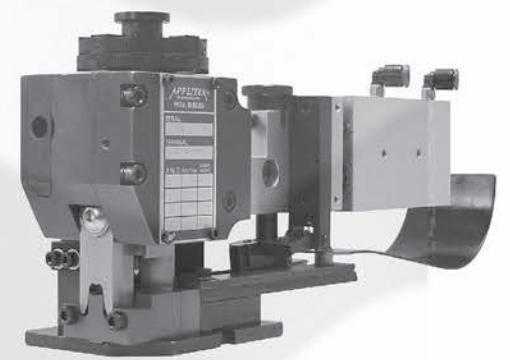


Model 2000

Pneumatic feed mini-style applicators can accommodate terminals with center to center distances up to 2 inches.

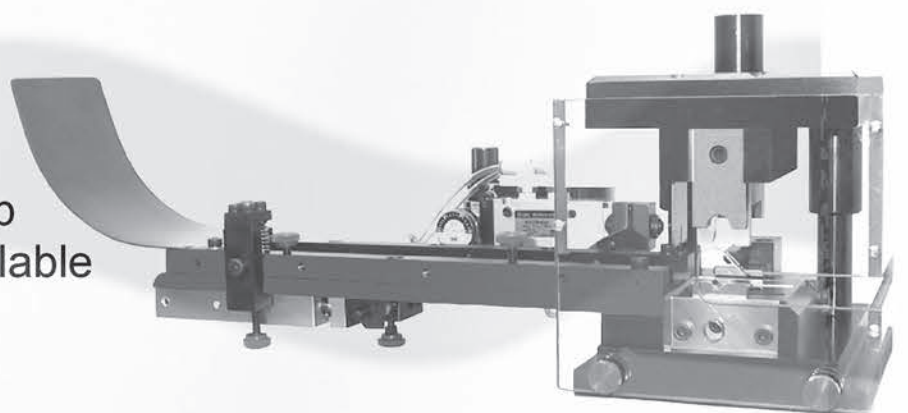


Model 1500



Model 2100

DSA applicators are designed for large terminals manufactured from heavy gage material with center to center distances up to 3 inches and widths to 3.5 inches. Available in left to right, right to left and rear feed configurations.



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Conflict Minerals Update: Recent GAO Report

By Joe Tito
Wiring Harness News

How has the Conflict Minerals legislation performed? Conflict Minerals. The legislation requires an annual report on the effectiveness of the rule “in promoting peace and security in the DRC and adjoining countries.” The most recent such GAO report was published April 27th of 2017, and of note it explained that:

“After conducting due diligence, an estimated 39 percent of the companies reported in 2016 that they were able to determine that their conflict minerals came from covered countries or from scrap or recycled sources, compared with 23 percent in 2015. **Almost all of the companies that reported conducting due diligence in 2016 reported that they could not determine whether the conflict minerals financed or benefited armed groups, as in 2015 and 2014. (emphasis added).**”

In addition to the GAO report, an April 5th hearing was held on the subject of Conflict Minerals by The Senate Foreign Relations Subcommittee on Africa. Many witnesses and Senators discussed what hasn’t worked with the rule. Mainly, the violence seems to have continued unabated, with criminal elements still exploiting the population and recourses of the region. The onerous, and sometimes hopeless, task of reporting was also discussed. Some witnesses proposed a type of “safe harbor” provision where issuers of due diligence reports can rely on supplier certifications.

There has been a general lack of enforcement of the legislation on the part of the SEC, so the rule has largely been relegated to a “name and shame” policy. But it doesn’t seem as though the public is on board, or even paying attention. There has yet to be any significant boycotting of companies that aren’t

doing the full due diligence reporting. Some companies like Apple and Intel like the transparency of the Conflict Minerals legislation, and have voiced support for its continuation. It seems, however, that they are among the few who have managed to institutionalize the due diligence reporting. President Trump has expressed frustration in the Dodd-Frank legislation in general, and some in his administration and in congress have voiced concerns specific to section 1502 on Conflict Min-

erals. It seems likely that the recent GAO report will, at the very least, bring about significant changes to the legislation in the future. It is important to note, however, that the rule is still very much in effect. WHN will continue to track any information or changes in Conflict Mineral legislation. If you would like to review current due diligence reporting requirements, please refer to our in-depth article found on the Recourses tab at wiring-harnessnews.com.

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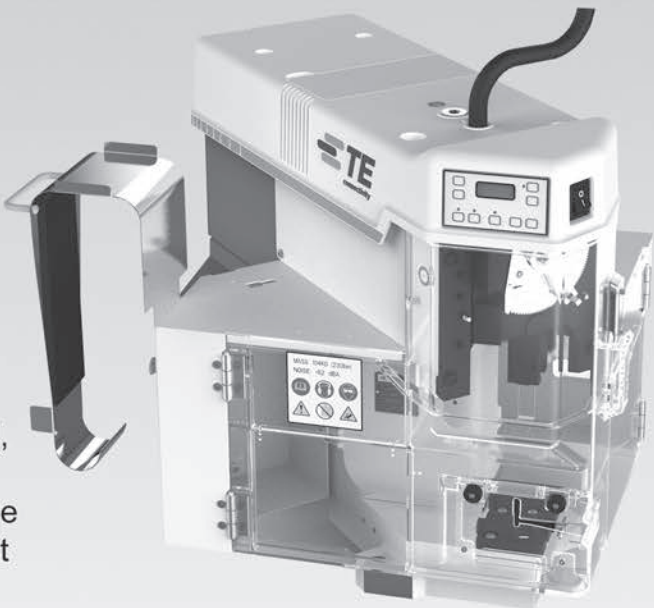
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AMP-O-LECTRIC MODEL G II TERMINATOR

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The new terminator improves key performance areas for operators. For operator convenience, TE improved access to, and significantly updated, lighting in the under cabinet and target area. A variable speed option was also added to provide more flexibility for those complex applications that benefit from slower ram and feed speeds.



The Model G II terminator is one of the quietest machines available and the improved guarding meets applicable CE and domestic safety requirements. The improved guarding also creates open access for quick and smooth installation of both end-feed and side-feed applicator styles.

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At the push of a button, you can power the motor on or off, jog forward or reverse, switch to split-cycle operation, turn the work light off or on, power the air feed on or off, or reset the batch counter. And, it’s all reported on an LCD display. The controls will also detect and report errors in the machine, and stop cycling when a bad crimp is detected by the CQM II. The operator must then push the reset button to continue. The Model “G II” will accept all existing TE miniature applicators.

Product Features

- Quiet operation
- Improved guarding and lighting
- Tool-less changeover of applicators
- Precision manual adjust for crimp height
- Total and batch counter
- Accepts all existing TE applicators, with minor modifications
- Reduced maintenance requirements
- Split-cycle operation
- Standardized 1 5/8 [41.3] stroke
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In every issue of Wiring Harness News Anixter will bring you informative articles about wire and cable technology.

Mitigating EMI, Stray Ground Currents and Voltage Reflections in VFD Systems

Over a dozen industry studies have been conducted regarding the role of motor supply cables in the safe and reliable operation of VFD (variable-frequency drive) systems. In one of the larger studies, extensive testing of 150-foot lengths of eight different cable constructions was performed on a 50-horsepower VFD system. In another major study, the magnitude and effect of reflected waves in the cable were studied in detail. Overall, the studies focused primarily on three concerns of motor-supply cable: EMI, stray ground currents and voltage reflections.

EMI

The semiconductor devices used in VFDs increase the potential for EMI (electromagnetic interference). The fast switching of the drive's IGBTs (insulated gate bipolar transistors) generates RF energy, which can be radiated by the drive's inverter-to-motor power cable and picked up by nearby circuits. This interference can cause malfunctions in sensitive electronics. As a result, VFD manufacturers usually recommend the use of a shielded power cable between the drive electronics and the drive motor to contain this RF energy.

Satisfactory shielding can be obtained with cable technology using impervious corrugated metal armor as the shield. This type of armor is

often called CCW for continuously corrugated and welded. Other shield types, such as copper tape, tinned-copper braid or aluminum/polyester foils, can also be used with slightly reduced effectiveness. The effectiveness of cable shields is typically determined by measuring the transfer impedance according to the procedure defined in NEMA WC 61. A cable shield with transfer impedance of less than 100 mΩ/m (milliohms per meter) is generally considered to be a "good" shield, and one of less than 10 mΩ/m is considered to be an "excellent" shield. Impervious corrugated aluminum armor typically has transfer impedance in the range of 1 mΩ/m to 10 mΩ/m from DC to 30 MHz, the frequency range of interest for VFD applications. Most other common shield types provide transfer impedance in the range of 10 mΩ/m to 100 mΩ/m.

Stray Ground Currents

A second concern is that stray electrical currents in the VFD's grounding system may flow through the drive motor's main bearings. The flow of electrical current through motor bearings in the milliamp range can cause damage to the races of bearings (known as fluting), which can result in excess noise and premature bearing failure. Motor bearing currents can be minimized by using an inverter-to-motor power cable with three symmetrically positioned grounding conductors in combina-

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For most VFDs operating at 480 volts or below, the recommended cable rating is 600 volts. However, 575-volt VFDs sometimes require a cable with a higher voltage rating depending on cable length and drive switching time. To determine the recommended cable voltage rating for a 575-volt drive system, refer to Figure 1 to determine if reflections are likely. If a reactor or a low-pass filter is used

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Basic Guide for Tensile Testing of Crimped Wire Terminals

Continued from page 1

fully automatically by machines that cut, strip, crimp and seal.

Most connectors are designed to be vibration-proof. Generally they are not designed to sustain any weight, the conductor thickness being related not to strength but to electrical current capacity. Connectors may have ring terminals to screws with or without gripping profiles; they may be inline sockets, and have clips for a positive fit security. They may be completely stable, or flexibly connect moving parts and control units. Maintenance must still be allowed, so disconnection must remain easy even after extended use, without risk to the crimped joint. In this context, crimped connections and terminals are almost universal.

Application

The crimping process is very precisely specified for strong, protected and durable termination of wires. Whilst hand tools are used for small applications, powered bench crimpers with different forming dies are generally used—electric, hydraulic or pneumatic according to cable size. The principle is to apply sufficient gripping force around the exposed strands of a cable by compressing to a defined dimension, rather than by applying a specific force. The crimping tools are not calibrated as such, but verified by the use of gauge tools of calibrated pin size. Tools are di-

mensionally adjusted as required.

In the course of termination, insulation is precisely stripped back, the strand ends inserted into crimp barrels to defined depth, and the crimping jaws effect the joint. Any risk of damage to strands is minimised in machine processes, but part of quality assurance is always visual testing and electrical testing. When specifying suitable connectors and terminals, other environmental tests may be applied, for example the effects of temperature or corrosion.

This is all good manufacturing practice and quality control, but the only way of really knowing the strength of a crimped terminal is to pull it. This can reveal production problems, where strand nicks, incorrect crimp height, or effects from changes in terminal supply, may not be clearly apparent. Assembling tensile test data in statistical process control (SPC) systems will also alert for tooling tolerance drift.

Testing

A number of international and industry test standards specify test methods, with little variation in their parameters other than definitions of acceptable load-bearing. Those in aerospace or military application are expected to be exceptionally robust. Originally, testing was done by hanging calibrated masses from wires that were gripped by their terminals, but

Continued on page 28



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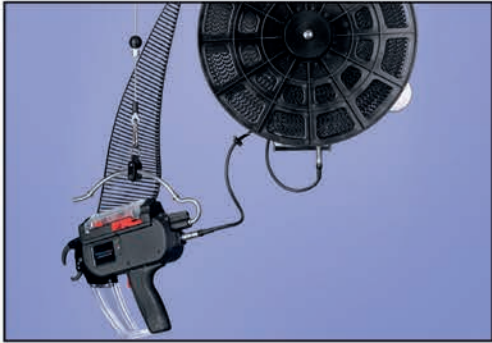
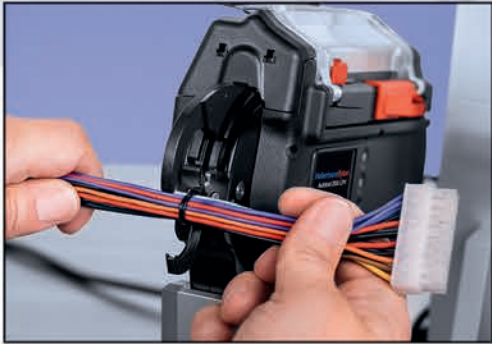
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Basic Guide for Tensile Testing of Crimped Wire Terminals

Continued from page 26

this is slow, cumbersome and less than precise. Instead, forces are applied by hand lever against a calibrated loadcell, or better, pulled at a known constant speed by motor control.



Manual controlled pull tester



Benchtop 1 kN unit



Programmable 5 kN tester

Machine selection is a matter of suitability for the forces required, the amount of testing being done, and where. Small, horizontal bench-mounted testers that can apply a force of around 1 kN, allow quality testers to insert single wires quickly, press a single button to activate the pull, and automatically record a peak or break force. Larger power connectors can require up to 5 kN applied force.

In design phases, it can be valuable to see not just at what force a crimped joint fails, but the manner in which it fails. Strands can begin to break, a connector itself may deform

and break, the whole conductor may break, or slip or pull out of the crimped barrel. Any elongation in the wire tail must not be construed as slippage in the joint. These features can be identified on a full force-time trace using programmable tensile testers, as part of the development of jointing specifications.

Other features of testing can include changes in electrical conductivity, or testing before and after environmental conditioning. Any of these tests may be accompanied by physical inspection, including sectioning and microscopic evaluation of the compacted strands for unevenness or voids.

Gripping

The simplest assembled terminals comprise a single wire and a spade or ring connector, but there are many custom requirements, such as angled loops and lateral flags, where applying an pull axial to the conductor, requires custom fixtures to grip the offset connector. Grips must be suitable for the terminal type, such that they hold without slipping and do not deform the terminal. Many can be held in a notch that allows a narrower wire

Continued on page 32

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NEWS PLUGS continued



tesa Tape Appoints Paul Sullivan as President and Regional Manager of North America

tesa SE announces the appointment of Paul Sullivan as the president and regional manager of its North American division based in Charlotte, N.C. This appointment was effective May 1, 2017. In his new role, Sullivan will manage the company's industrial business and operations for Canada, the United States, and Mexico. Previously, Sullivan served as the head of trade of industrial sales in North America.

Sullivan will succeed Carsten Meyer-Rackwitz, who served as the president and regional manager of North America for five years. Meyer-Rackwitz has been appointed head of tesa SE's electronics business unit based in tesa's global headquarters in Hamburg, Germany.

"Paul's dedication and leadership style are an excellent fit with our culture of providing solutions for our customers," said Carsten Meyer-Rackwitz. "As he leads tesa's North America region, he will be an invaluable resource with his extensive knowledge of the pressure sensitive adhesive industry."

With more than 25 years of experience within tesa, Sullivan has served in a variety of marketing and sales positions at manager, director and vice president levels. During his tenure with tesa, Sullivan also served as the international director of global automotive accounts, based in tesa's headquarters in Hamburg. Sullivan is a former board member of the Pressure Sensitive Tape Council.

"As I have been with tesa tape for more than 25 years, I share its commitment to not only providing a quality product but meeting the needs of our customers," Paul Sullivan said. "Carsten was instrumental in expanding tesa's North American business, and I look forward to continuing this success by developing new opportunities and strengthen-

ing our current relationships." Sullivan will report to Dr. Robert Gereke, chief executive officer of tesa SE. Stefan Sell,



Paul Sullivan

currently sales manager of specific industrial markets of tesa industry Germany, will succeed Sullivan as the new director of trade for industrial sales in North America, effective May 15, 2017.

For more information about tesa tape, inc., visit tesatape.com. tesa SE is one of the world's leading manufacturers of technical adhesive tapes and self-adhesive system solutions (more than 7,000 products) for industrial and trade customers as well as end consumers. tesa SE (4,100 employees) has been a fully owned subsidiary of Beiersdorf AG since 2001

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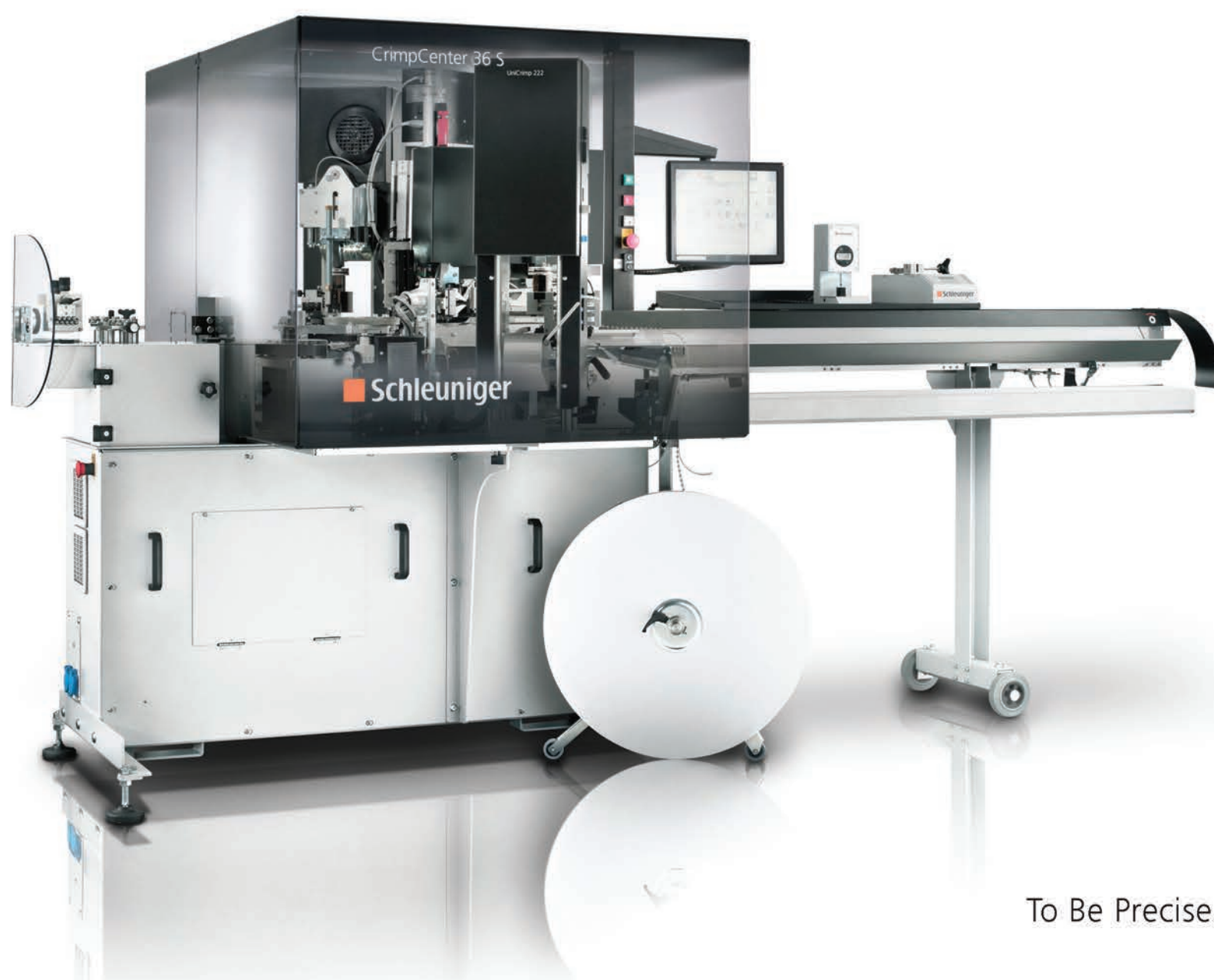
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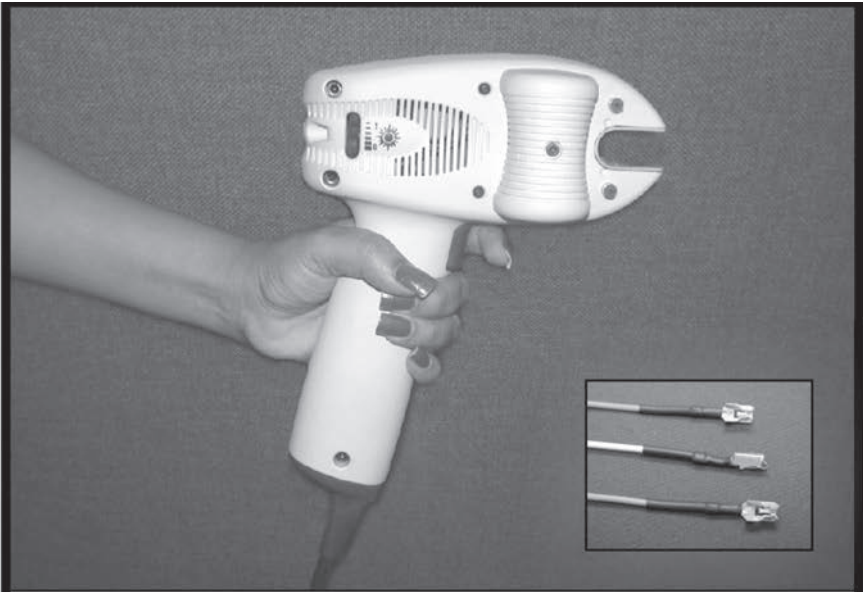
To Be Precise.

Basic Guide for Tensile Testing of Crimped Wire Terminals

Continued from page 28

through whilst pushing against the terminal barrel. Similarly, when gripping the tail of an insulated conduc-

tor, the grip must not bite and weaken the copper or aluminium, but neither grip the insulation sleeve too loosely, such that it slips and extends.



Our Gun out-shrinks the competition 5 seconds vs. 12 seconds*

*polyolefin, 5" length

The Focus-Lite™ FLG3™ by Judco Manufacturing, Inc., is the solution to all your heat-shrink operations. You can say goodbye to the high labor cost, excessive heat, and inefficiencies of other methods. The Focus-Lite™ **reduces the time** necessary to shrink most types of heat shrink tubing. It also **improves the process** control and **overall quality** of your shrink operation. The FLG3™ can be used for **high volume** benchtop applications and is completely **portable and mobile** for board mounted harnesses and tight space assemblies.

Focus-Lite™ technology uses radiant energy to shrink heat-shrink tubing in a fraction of the time of traditional methods.

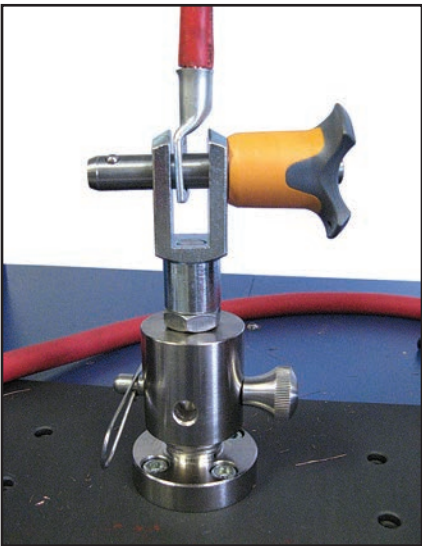
Here's why it works: Dual Quartz Halogen bulbs are focused to direct all of the usable radiant energy to the cable/wire diameter covered by shrink tube. This allows for 10 times the average energy expended by the bulbs to be delivered to the target zone. What you will see is an amazing difference in shrink time!

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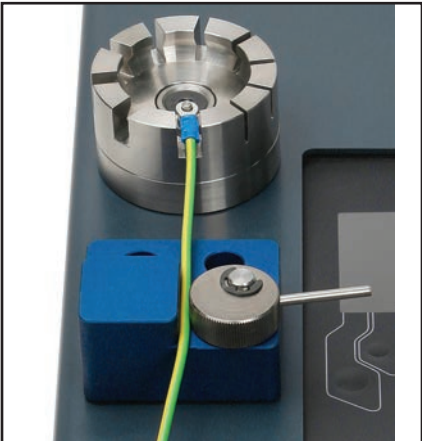
Focus-Lite™
Heat Shrink Processing Machines



Pin grip: large ring terminal



Custom grip



Slotted holder with ring pin, and cam

Terminals themselves are often sleeved—for insulation (typically flexible), or to stabilise the entry of the conductor into the barrel (typically harder nylon, crimped on). In addition the metal terminal may, for stability, incorporate insulation support. Do these features detract from the tensile test by hiding other weaknesses? Published test standards typically require their removal before pull-testing, but this can be difficult to do without damaging the conductor.

Standard methods

Standard methods are published to make testing consistent and repeatable anywhere, even with different test equipment. ASTM, BS, ISO, SAE, NASA and military standards bodies are among those with published methods. Typically, a constant speed of around 25 mm/min is specified for a destructive pull-out test, though the US Underwriters Laboratories standard UL 486A assesses joint security by holding to one minute at a force prescribed for the wire gauge. Pull-out forces in these standards are comparable, except for military applications, which are more stringent.

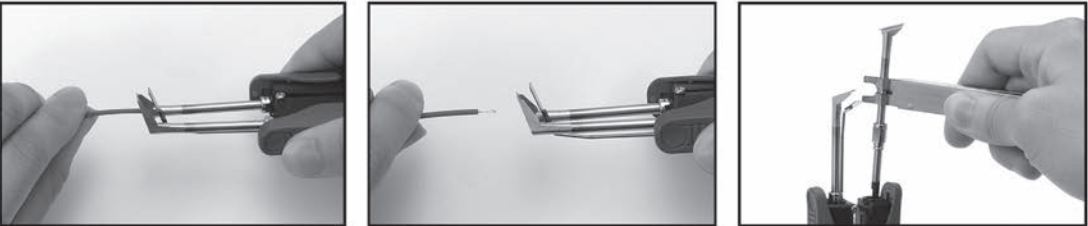
Universal tensile testers can also be used for connector insertion and withdrawal forces. With fixtures that precisely align male and female components, computer control can insert, withdraw, and cycle this action as required. Peak and average forces can be measured, and a load-time trace used to detect irregularities.

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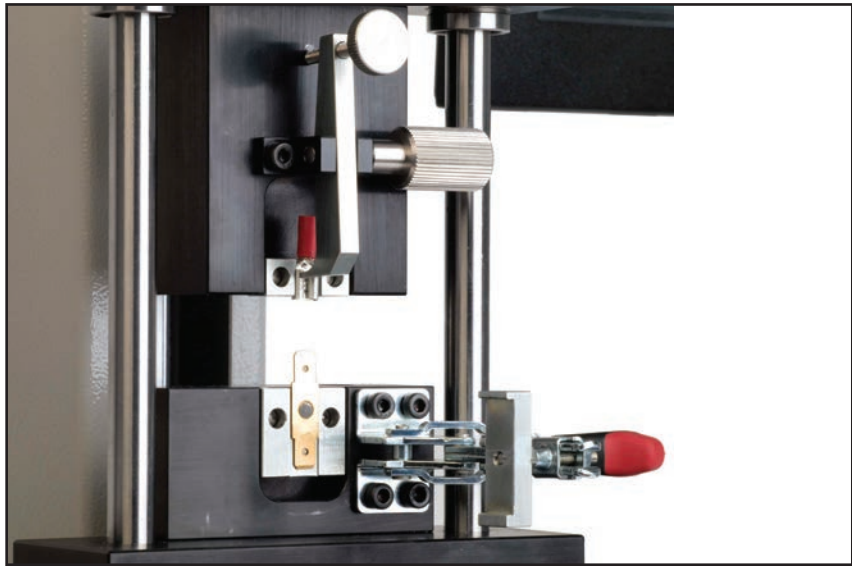
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Custom fixtures on this universal tester guide push-on connectors to measure insertion and withdrawal forces.

Test standards references

ANSI/EIA 364-38B : Cable pull-out test procedure for electrical connectors

ASTM B913 -05 : Standard Test Method for Evaluation of Crimped Electrical Connections to 16-Gauge and Smaller Diameter Stranded and Solid Conductors

BS 5G 178-1 : Crimped joints for aircraft electrical cables and wires. Specification for design requirements (including tests) for components and tools

BS EN 2591 : aerospace series - elements of electrical and optical connection, test methods

BS EN 61300-3-11 : fibre optic interconnecting devices and passive components - basic test and measurement procedures Part 3.11: examinations and measurements - engagement and separation forces

BS EN 60352-2 : Solderless connections. Crimped connections. General requirements, test methods and practical guidance

DEF STAN 59-71 : Crimped electrical connectors for copper conductors

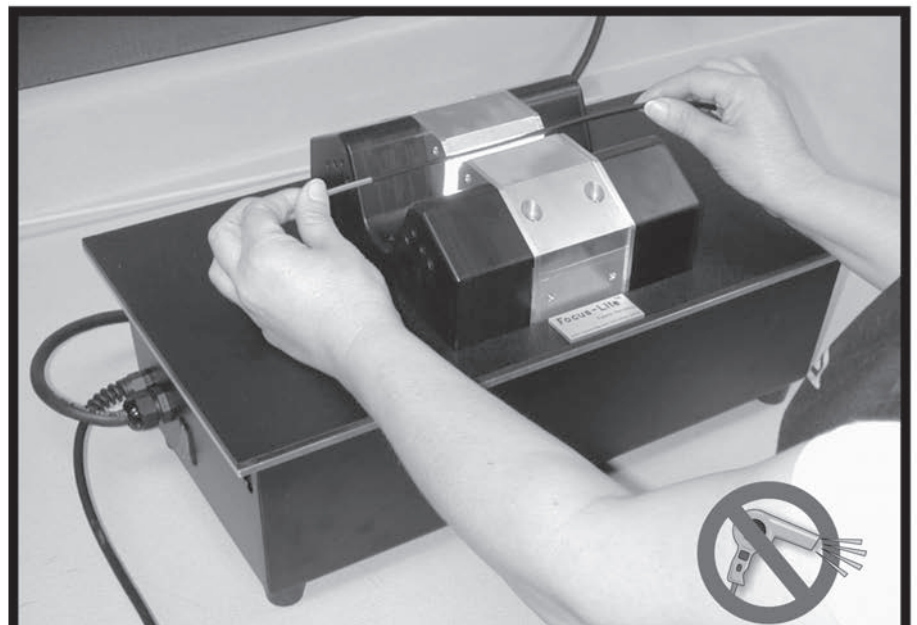
IEC 60512-13-1 : connectors for electronic equipment - tests and measurements - Part 13-1: mechanical operation tests - test 13a: engaging and separating forces

MIL C-39029 /31B : Contacts, electrical connector, pin, crimp removable

NASA STD-8739.4 : crimping, interconnecting cables, harnesses, and wiring

Andie Davidson is a technical writer at Mecmesin Ltd. For further information, call (703) 433-9247, email info@mecmesincorp.com or visit <http://www.wireterminal-strength.com>

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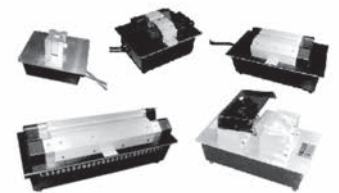
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The **Focus-Lite™** is equipped with an adjustable timer for repeatable shrinking, time after time. It also has a dimmer switch that controls the power for sensitive components. Visit our website at www.judco.net and see our full line of **Focus-Lite™** products.



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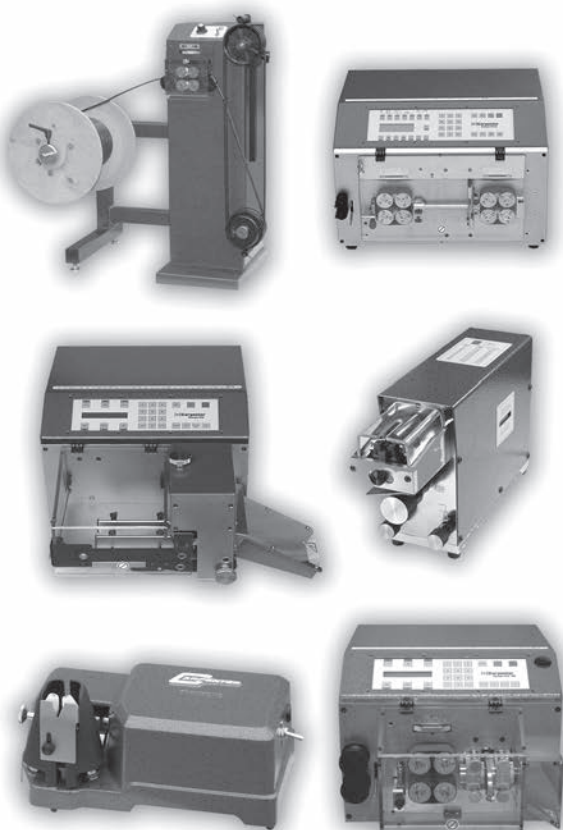
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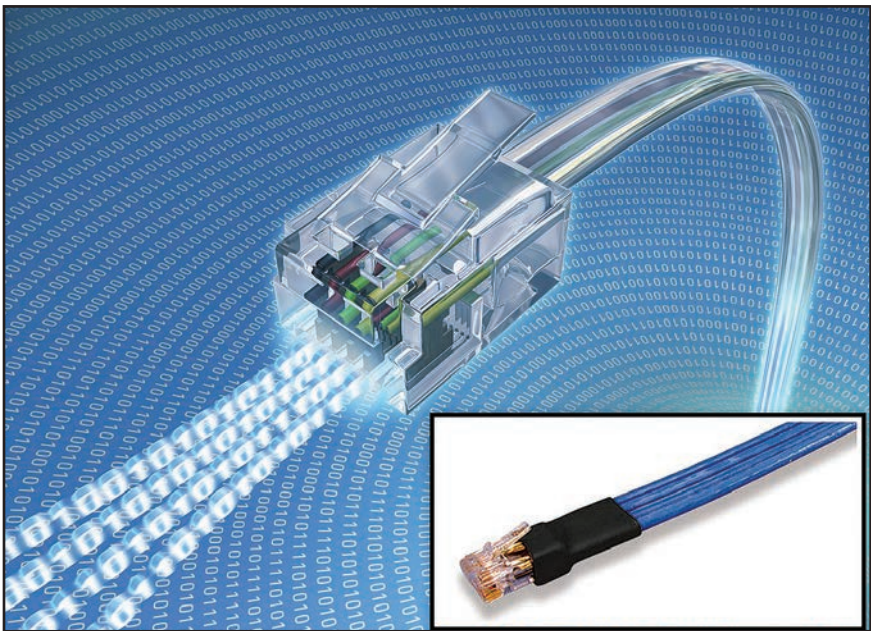
Filler-Free Flat Ethernet Cables

For Ethernet applications that require flexible and lightweight cable designs, Cicoil offers filler-free, Cat 5e and Cat 6A Ethernet Cables. These flexible flat cables don't require cumbersome insulating materials, fillers, talc and tapes, which results in a more lightweight, flexible and space savings cable design.

Cicoil's patented extrusion process allows 4 individually shielded 100 Ohm pairs to be placed in a small, flat profile, precisely controlling the spacing of each component, insulation thickness and the overall cable shape. Each pair is separately encased in a solid, one-piece construction, ensuring that they do not rub against each other and wear during a lifetime of 15 million flexing cycles. The rectangular cross-section also allows multiple

flat Ethernet cables to stack, or layer, with almost no wasted dead space between cables, providing maximum conductor density for a given volume. As compared to round bundled cables, which incorporate excessive materials and fillers, the simplicity of the flat Cicoil cables with their parallel conductor geometry eliminates many of the common sources of wiring error and malfunction. Registration of the individually twisted shielded pairs are one-to-one with the terminating connector on board so that proper contact assignment is almost automatic. Since the conductor spacing is fixed and the geometry of the cable is constant, the signal transmission is consistent

The unique outer jacket is self-healing from small punctures and will not wear, crack or deform due to long term exposure to vibration, sunlight, temperature extremes (-65°C to +165°C), acid, submersion in water, sea ice, steam, coarse sand, flames, radiation, alcohol, mechanical stress, humidity, ozone, UV light, high altitudes, autoclave and many chemicals. In addition,



Cicoil filler-free, Cat 6A Ethernet Cables

cable strength is enhanced by the fact that all conductors and insulation of the pairs equally share tensile loads. Standard "off the shelf" Cat 5e and Cat 6A Cables are available for immediate delivery and cable assemblies, complete with connectors are offered in 3 foot, 6 foot and 12 foot lengths. Cicoil offers low-friction coatings, custom shape and torsion designs by re-

quest. Cicoil's Flat Ethernet Cables are UL Recognized, CE Conforming, RoHS & REACH Compliant, Class 1 Clean Room Rated, are manufactured in an automated, climate controlled environment, and exceed Cat 5e/Cat 6A specifications. Visit www.cicoil.com for more information, or call 661-295-1295 to speak to an application engineer.

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Verify the bar code label is applied to the harness?



Transfer programs to tester via a memory card?



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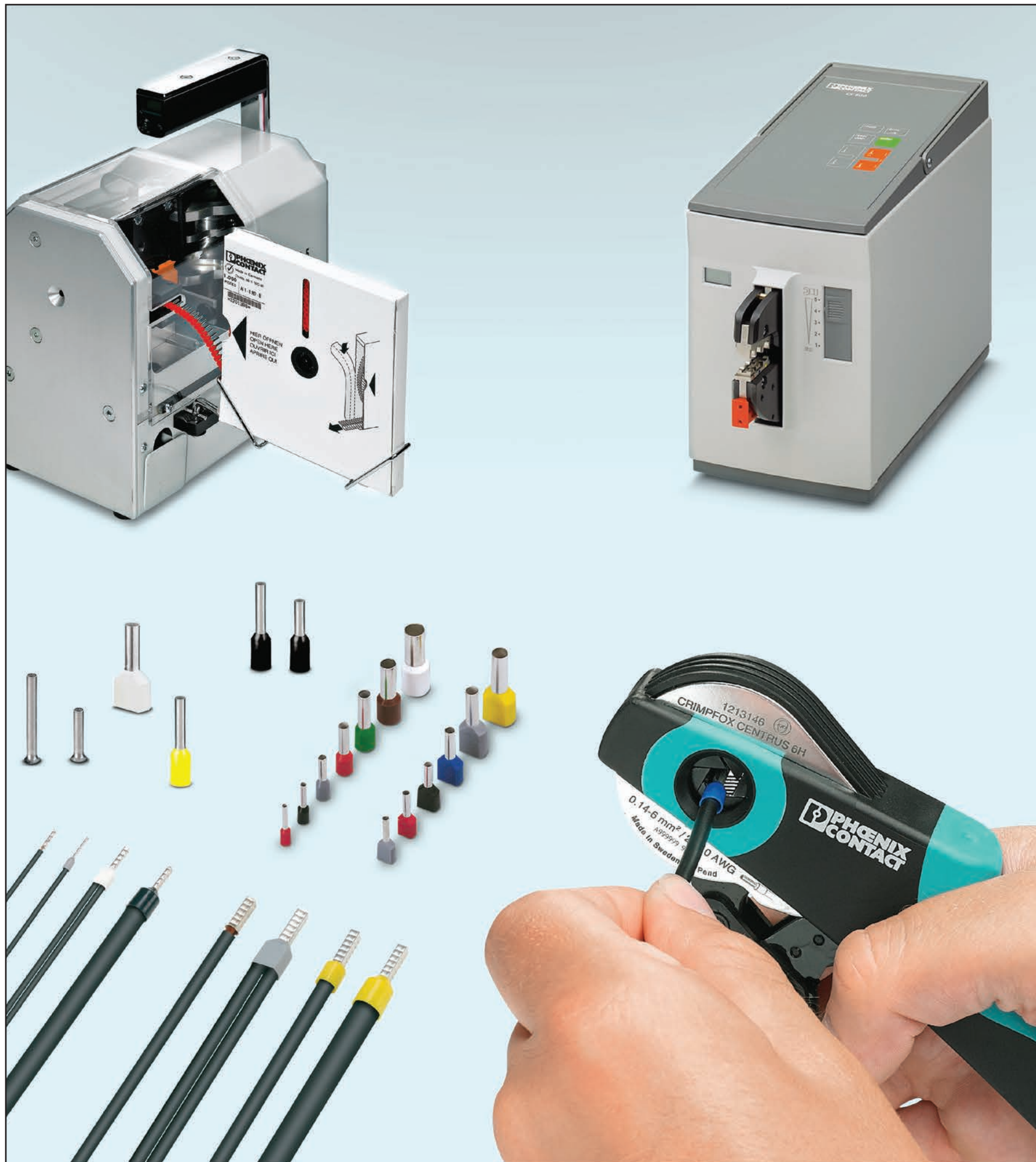
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TEST SYSTEMS



Siemon Receives Network World Middle East Cabling Vendor of the Year Award

Siemon, a leading global network infrastructure specialist, is pleased to announce that it was awarded Network Cabling Vendor of the Year during the 8th Annual Network World Middle East Awards. Hosted by Computer News Middle East (CNME), Siemon was selected as a finalist from a pool of over 250 nominations by an esteemed panel of judges. CNME readers were then able to vote online for the winners of each category.

Held in Dubai at the luxurious Habtoor Grand Resort and Spa Hotel, the event celebrated networking excellence and spotlighted organizations that continue to innovate and strive for success. This year's Network Cabling Vendor award was based primarily on the success of Siemon's ConvergeIT™ Cabling Solution for Intelligent Buildings, a unified structured cabling solution that converges critical data, voice, video and low-voltage building systems onto a single unified physical infrastructure, providing significant cost savings and sustainability over the life of the facility. Strategic partnerships such as Siemon's participa-



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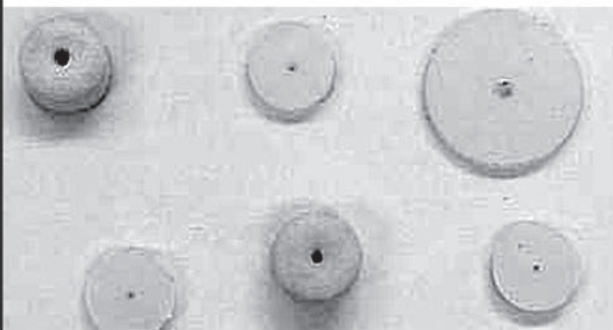


You can get it, too! Just combine our ferrules with our crimp tools* and get UL Listing number E488001 for the ferrules standard UL 486F. Phoenix Contact's UL certification covers uninsulated, insulated, twin, and CF 3000 reeled ferrules. We are one of the first companies to achieve this UL 486F certification for the U.S. and Canada.

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*Hand crimpers included are the Crimpfox 6, Crimpfox Centrus, Crimpfox 25R, Crimpfox 50R, Crimpfox 4in1, and the Crimpfox 16R.

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NEWS PLUGS continued



Continued from page 34

tion within Cisco's Digital Building Solution and alliances with digital lighting partners, as well as informative technical white papers, were also instrumental in earning Siemon a nomination.

"We are honored to be recognized at this year's Annual Network World Middle East Awards for our dedication to excellence within the industry," says Mennat El Nazer, Marketing Communications Executive, for Siemon Middle East and Africa. "Siemon is continuing to support the rapid advancement of intelligent buildings around the globe

with programs such as ConvergeIT. By supporting a facility's various low-voltage applications on a single IP-based structured cabling system rather than on separate and often proprietary cabling plants, ConvergeIT is taking the intelligent building approach a step further."

To learn more about Siemon and ConvergeIT, visit: www.siemon.com/convergeIT

Difference Between ATEX and IECEx

Standards Explained

In 2016, standards ISO 80079-36 and -37 for the certification of non-electrical equipment were made available. They succeed the standards from the well-known European EN 13463 series (EN ISO 80079-37 and -37). An IECEx certification can

help manufacturers export their products abroad. However, to some manufacturers the differences with the European ATEX directive remain unclear.

In contrast with ATEX, IECEx is a voluntary scheme. It is as a solid basis for manufacturers to export their products worldwide and to ready them for certification. Until recently, IECEx was limited only to electrical equipment. This changed in 2016, when the new ISO standards for non-electrical equipment were made available.

Self-Declaration and Zones

Electrical equipment meant for use in zone 0 and zone 1 must be examined. A Notified Body, such as DEKRA, must certify the equipment. If the equipment is meant for use in zone 2, self-declaration by the manufacturer under the ATEX directive is allowed. For non-electrical equipment meant for use in zone 1 the manufacturer can self-declare as well, provided that their technical construction file is retained with a Notified Body.

IECEx is a voluntary scheme. Therefore, certification is not obligatory for neither electrical nor non-electrical equipment. Manufacturers can choose to certify only the electrical or non-electrical part of equipment for equipment with electrical and non-electrical components. If a manufacturer decides to certify their equipment, they need to have a certified quality system in place, independent of the zones their equipment is meant for. For ATEX, the quality system needs to be examined only when certification of the product is obligatory.

Ignition Sources

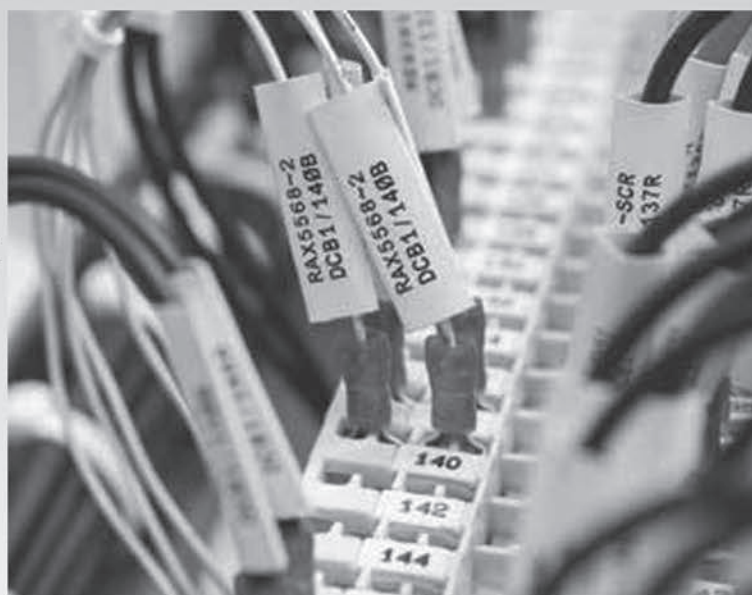
Electrical equipment is seen as a potential ignition source that needs to be explosion proof. However, with non-electrical equipment it is more complicated to determine whether a potential ignition source is present. A risk analysis can provide clarity. It should be noted that in this case only the internal ignition sources, such as the overheating of a bearing, are relevant. External ignition sources, such as the electrostatic charging of a conduit through a process medium, are not. For this reason, many products, such as conduits or pipelines, do not have to be certified. In this case, responsibility for the use of suitable products lies with the user.

WINTOTAL V6 IDENTIFICATION LABEL PRINTING SOFTWARE FOR RAIL, MASS TRANSIT AND INDUSTRIAL EQUIPMENT MARKET

TE Connectivity's WinTotal Version 6 is the new version of WinTotal software, supporting high quality wire and harness identification and basic label printing applications. WinTotal v6 software has a number of new user benefits like auto font sizing and comes with 2,500 standard TE Connectivity Identification products pre-installed. This makes the creation and printing of Identification sleeves or labels a quick and simple task.

Double Sided Print

WinTotal v6 allows both sides of a product to be viewed at the same time. This enables the user to see how the product will be printed and, with the active updating of the print preview screen, it is also possible to make orientation and order changes.



Key Benefits:

- Enable faster set up with the ability to view prior to printing
- Provide greater print accuracy with the ability to position text on TE product templates
- Improve efficiency with multiple label sizes with auto font sizing
- Enable printing in any language with Unicode support
- Enable ease of use with ribbon control for all functions
- Improve efficiency with new customizable quick access toolbar

Target Markets:

- Rail & Mass Transit
- Industrial Equipment
- Infrastructure
- Aerospace/Defense
- Offshore/Marine

Applications:

- Wire & Cable harness identification - Office environment & Industrial environment



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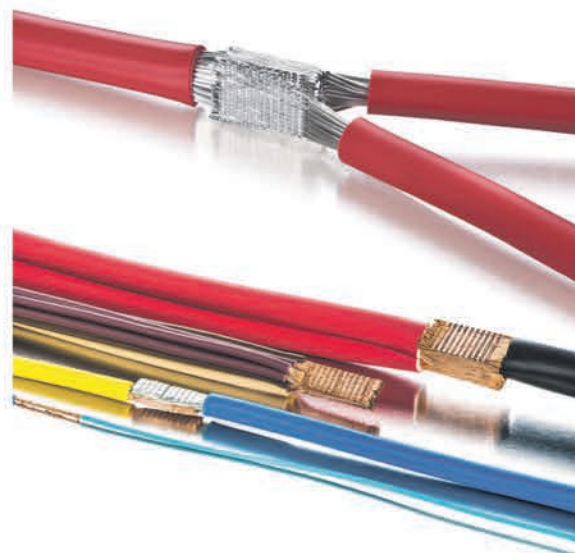
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Steady Growth and Diversification: Keys to Success at TCP Cable

Continued from page 1

pleted a buyout of his father in 2008. Having dealt with his father as a partner all of his life, Marc felt it wise to seek a strategic partnership arrangement that would take the company to the next level. After reviewing offers from several potential investors, he decided to team up with local competitor Prodam. Prodam also owned Prodamex, a small assembly subsid-

iary in Mexico, employing about 15 people. Along with the complimenting capabilities of Prodam, it was a perfect fit. He recalled, “We were now a sizable organization with Canadian operations and a low-cost facility in Mexico.” In 2011, the two Canadian facilities were combined under one roof at the Carignan facility.
Today, Prodamex, SA has some 325 employees in Mexico, and specializes



Recently opened 2nd facility at Prodamex.

in the production of assemblies for the home appliance (ovens, stoves, ventilation and air conditioning) and automotive industries. “We have recently opened a 2nd facility in Mexico to further expand our capabilities and to sustain our growth,” mentioned Denis. “That facility has implemented new work stations with state of the art assembly jigs which will further increase our performance,” he described.
Terminal & Cable TC, the Canadian arm, employs 100, and enjoys a strong presence in the specialty automotive and land-based military industries. The group has achieved many quality and safety certifications including ISO 9001: 2008, UL, CSA, SAE, as well as CGP/ITAR.
When asked what the company’s key to success has been over the years, Marc mentioned constant qual-

ity improvements, business diversification and quick turnaround times. But he was quick to mention these things are a given in today’s competitive environment. Marc seemed to think the ability to grow facilities and capabilities to meet tomorrow’s challenges is even more paramount to success. “Nowadays, you’ve got to be great at being responsive to the next challenge, and that’s not always an easy feat.” Both Marc and Denis stressed the importance of investing in new technologies that provide added value and increased flexibility to their group manufacturing capabilities.
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NEWS PLUGS continued

Pasternack Introduces New Series of 1.0 mm Flexible VNA Test Cables Operating up to 110 GHz

Pasternack, a leading provider of RF, microwave and millimeter wave products, has released four new 1.0 mm flexible cables that are designed to deliver precision testing results for Vector Network Analyzer (VNA) testing, semiconductor probe testing, automotive radar testing and military radar testing. They are ideal for applications such as test benches, radar, microwave radio and millimeter wave radio.

Pasternack's four new high-performance, flexible VNA test cables operate at up to 110 GHz and deliver precise results for testing using a coaxial cable and 1.0 mm stainless steel connector interfaces. The coaxial cable is covered by a non-conductive Nomex® outer sleeve. This light-duty armoring protects the small, 0.27-inch diameter cable and improves stability during flexure. These cables feature 50 Ohm impedance, a maximum VSWR of 1.5:1 and excellent phase/amplitude stability under flexure.

Pasternack's 1.0 mm flexible VNA test cables operate over a wide range of temperatures from -65°C to +125°C. They are RoHS and REACH compliant. Each cable assembly is fully tested and comes with serialized test data. These cables are available in standard 6-inch and 12-inch lengths with male-to-male or male-to-female configurations.

"We are extremely excited to add these 110 GHz test cables to our growing line of test & measurement products. As the number of millimeter wave applications continues to grow, our customers can take advantage of our off-the-shelf solutions and quickly fulfill their needs," said Dan Birch, Product Manager at Pasternack.

Pasternack's 1.0 mm flexible VNA test cables are in-stock and ready for immediate shipment with no minimum order quantity. For

detailed information on these products, please visit <https://www.pasternack.com/pages/RF-Microwave-and-Millimeter-Wave-Products/1.0mm-Flexible-VNA-Cables-110-GHz.html> . For inquiries, Pasternack can be contacted at +1-949-261-1920.

A leader in RF products since 1972, Pasternack is an ISO 9001:2008 certified manufacturer and supplier offering the industry's largest selection of active and passive RF, microwave and millimeter wave products available for same-day shipping.



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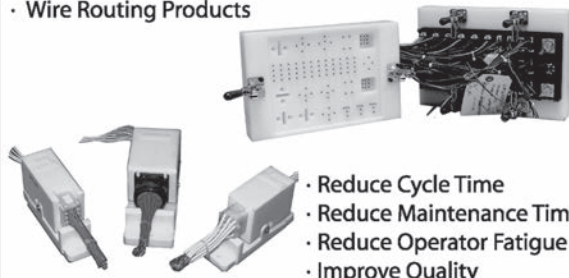
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NEWS PLUGS continued



Fiber Optic Center Announces Release of New Industry Glossary as latest Technical Resource

Fiber Optic Center, Inc., (FOC), an international leader in distributing fiber optic components, equipment and supplies and recognized as one of the most technically savvy fiber optics companies in the world, announces a new industry glossary as the latest in a series of technical resources rolled out in the past year to better serve FOC customers and industry.

Building on the recent resource rollouts of technical articles, blogs, AskFOC, video demos, helpful tips series, monthly e-news subscriptions, live consulting, and partnership with Wayne Kachmar's Technical Horsepower Consulting, the FOC Glossary is added to the website.

The FOC Glossary includes Acronyms and Military Specifications for Connectors in addition to the General Terms and Definition section. The goal is to make it easier to both reference and understand common industry terms and definitions as well as encourage a dialog with the industry.

Launched containing more

than 3,600 entries on fiber, cable, wire, optics, assembly, connectors, electrical, data communications and testing terms as well as the FOC ancillary expert areas of polymers, chemicals, lapping film, adhesives and epoxies, the FOC Glossary also includes an additional 2,000+ FOC Acronym entries and a core 18 MIL-SPEC for Connectors.

FOC plans to expand this latest resource with more standards, processes, edits, and additions that are requested through the email FOCGlossary@focenter.com.

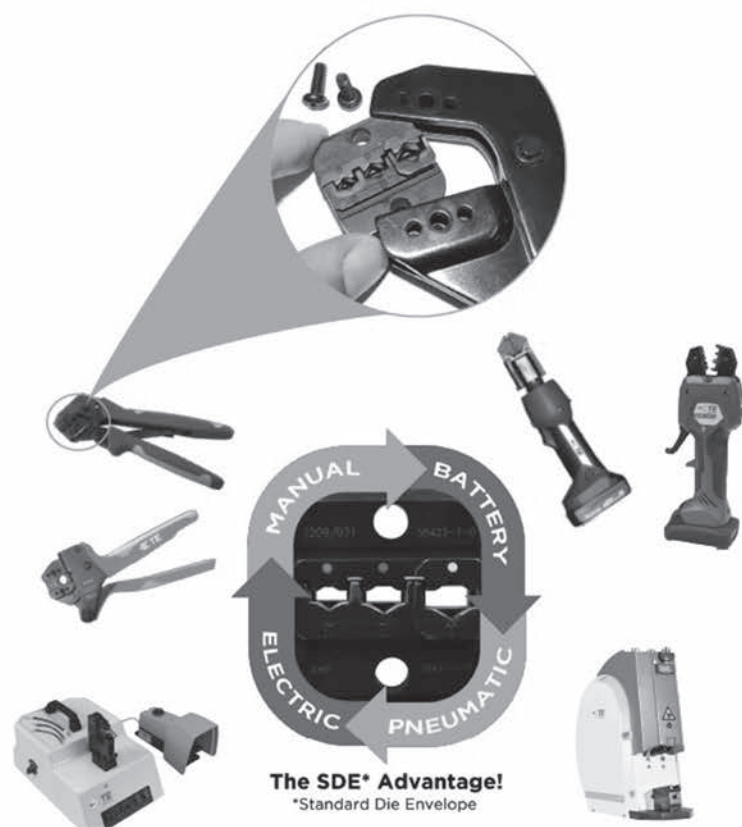
Uniquely positioned to be the "Go-To" resource with decades of global, practical cable assembly production experience

by the technical experts who work daily with customers improving their processes, FOC sells and delivers every piece of equipment needed for the automated production of fiber optic cable assemblies, also called patch cords: cable cutting and fiber stripping equipment, metered epoxy dispensing systems and curing ovens, laser cleaving systems, polishing machines and plates, and instruments for all three kinds of testing: interferometer for geometry, microscopes and software for visual inspection, and sources, power meters and switches for insertion loss and back-reflection (bi-directionally if required). FOC also carries all of the hand tools as well as consumables needed for production and testing: epoxy, polishing films, cleaning supplies and cassettes.

The glossary can be found online at <http://focenter.com/foc-glossary/>, acronyms at <http://focenter.com/acronyms/> and Military Specifications for Connectors at: <http://focenter.com/military-specs/>.

The main focus for the Fiber Optic Center, Inc., (FOC), is assisting cable assembly houses with supplies, equipment, consulting and technical support in the manufacturing and testing of fiber optic cable assemblies. FOC is the industry connection to the most innovative optical products, technologies and technical experts who integrate their manufacturing knowledge and vast experience into customers' worldwide operations.

SDE STANDARD DIE ENVELOPE CRIMP TOOLING



Standardize Your Crimp Tooling

SDE (standard die envelope) is a new, flexible approach to crimp tooling, from TE Connectivity, that allows use of the same dies on tooling across a range of application platforms. Dies are interchangeable in tools from portable hand tools—manual or battery-powered—to pneumatic hand tools and electric bench terminators. It's a family of tools that you can take from bench to production or into the field, without the need for dies fitted to each kind of tool. They're ideally suited for R & D, networking applications and on-site maintenance work.

You can be sure your dies will fit your long-term needs, because they are completely compatible with all tools in the SDE system. They move with you as your needs grow.



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MicroCare Europe Demonstrates Greener PCB Cleaning at Nuremberg Expo

MicroCare Europe bvba, the industry’s leading producer of critical cleaning fluids for the electronics industry, will showcase a radically new cleaning chemistry at the SMT Hybrid Packaging Expo in Nuremberg, Germany from 16-18 May.

The new Tergo™ High Performance Flux Remover is a unique, non-flammable, low-temperature vapour degreasing fluid formulated for high-volume production cleaning of circuit boards in automated vapour degreasing systems. It uses a formulation which enables companies to clean PCBs faster, more thoroughly and at a lower cost whilst meeting ever-more stringent European environmental and safety regulations.

“SMT Hybrid Packaging is the ideal platform in which to present Tergo™

High Performance Flux Remover,” said Scott Wells, MicroCare General Manager – Europe. “The show is big, it is entirely focused on electronics, and the German market makes every effort to be as environmentally responsible as possible. This new Tergo™ product is a win-win for everybody.”

The new product has been specifically engineered to clean even the most challenging solder pastes and flux residues, including water-soluble (OA) fluxes, lead-free materials and stubborn white residues. It is highly effective for quickly and gently cleaning complex shapes and delicate substrates. Importantly, it avoids the expense and global warming impacts of aqueous cleaning technologies as well as the environmental challenges of old-style chlorinated solvents. It can be used anywhere in Europe and is compatible with traditional vapour degreasing equipment and procedures. This makes it the ideal drop-in replacement for many older chemistries being phased-out in Europe under environmental, health, safety or economic

pressures.

Also at SMT Hybrid Packaging, MicroCare will exhibit the recently-introduced additions to the MicroCare aerosol series used for rework and repair. These include the Universal Flux Remover, Universal Contact Cleaner and Polar Flux Remover. Universal Flux Remover is a highly effective cleaner for the rosin-based, high-temperature, lead-free materials that are notoriously difficult to clean. Universal Contact Cleaner is formulated for cleaning electrical contacts, relays, switches and circuits.

Lastly, the Polar Flux Remover is the most aggressive of the three and is suitable for cleaning the heavy, aged fluxes and pastes found in today’s PCBs. All three products meet European F-Gas regulations and are REACH, GHS, WEEE- and ROHS compliant. All are designed to help manufacturers drive down the cost of cleaning.

For more details, visit the MicroCare team at SMT Hybrid Packaging stand #4-301, or visit <https://precisioncleaners.microcare.com>.



Tergo HPFR Drum and Pail

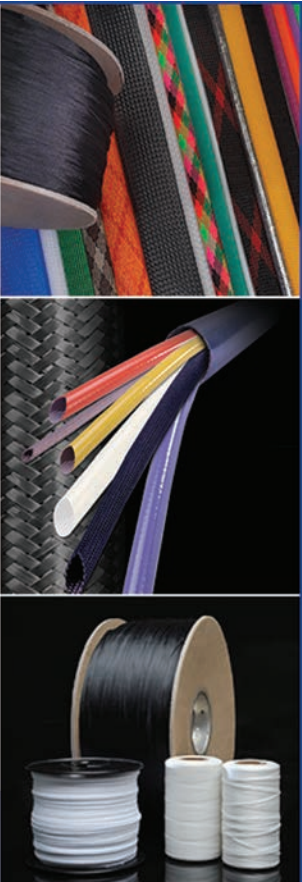
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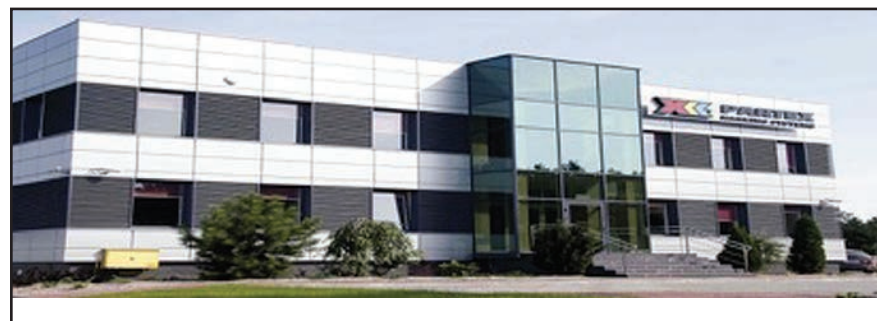
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Partex Marking Systems Inc., headquarters

NEWS PLUGS continued



Partex Marking Systems

Partex Marking Systems Inc. is a Swedish company renowned all over the world as a supplier of marking systems in a variety of materials such as PVC, halogen free/xerex, and 316 grade stainless steel. The systems are available for all types of wires, cables, pipes and electrical components.

It is obvious that the wire and cable marking industry does not have glamorous products; however, these products carry significant importance. From the smallest wire to the largest pipe, identifying unknown elements is crucial. Proper identification procedures save time, money, and helps keep your staff safe.

In 1948 Partex (formerly known as Electro-Löf) invented the first wire marker. This flagship product is what paved the way for the company's future. Since the invention of the flagship product, Partex has developed many other products for the wire and cable marking industry. From PA wire markers to the T1000 thermal transfer printer, we offer an array of products that make marking easy, efficient, and cost effective. With over 60 years of experience, we have become an industry leader for wire and cable marking products. Being receptive and flexible both in production and organization allows us to quickly and efficiently adapt our products to suit our customers' wishes and requirements.

Here at Partex, our staff has a serious investment in our customers and is ready to help educate, train, and assist with finding the best possible solution for your marking needs. The wire and cable marking industry is a niche market and not everyone

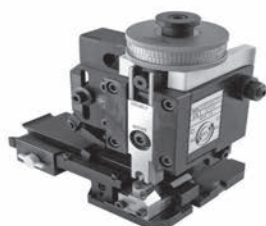
has the same needs. Contact us analyze your marking needs by calling 630-516-0400 or email us at sales@partexmarker.com.

Pasternack Releases New Low Phase Noise Amplifiers from 1.5 GHz to 18 GHz

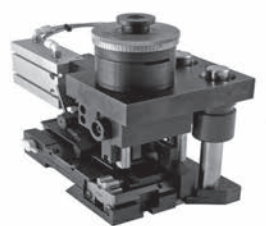
New Low Phase Noise Amplifiers from Pasternack Deliver High-Dynamic Range Performance for Sensitive Test, Radar and Communication Receiver Systems

Pasternack, a leading provider of RF, microwave and millimeter wave products, has released a new line of low phase noise amplifiers that incorporate GaAs HBT MMIC semiconductor technology to deliver ultra-low phase noise performance over a wide dynamic range. These amplifiers can be used to help optimize the sensitivity and dynamic range of higher performing test, radar and communication receiver designs where performance is dependent on how effectively the smallest and largest signal levels can be processed. Also, for systems that require amplification of weaker signals close to the noise floor, the low phase noise performance of these amplifiers can help reduce unwanted noise and distortion that can inhibit the quality of the transmitted signal. Typical applications in-

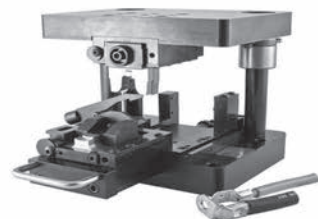
APPLICATORS / CRIMPING PRESSES / TOOLING



Mini
Left to Right



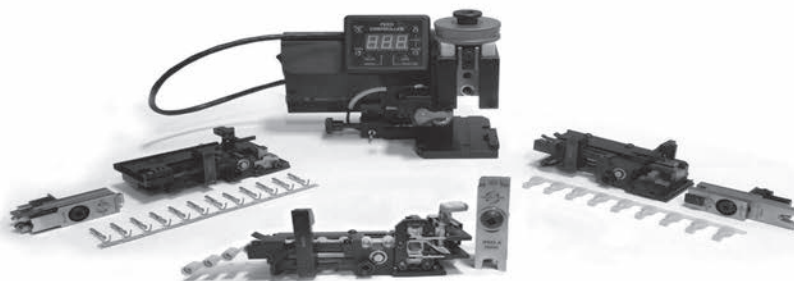
Mini (2 Post) Air
Left to Right



Heavy Duty Slide
Quick Change Tool Pack



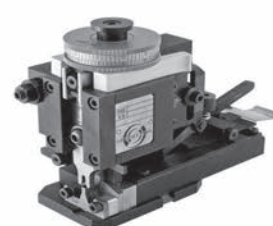
Mini (Power Drive II)



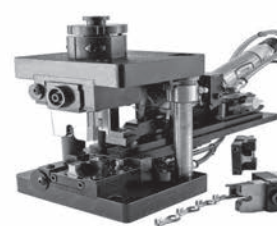
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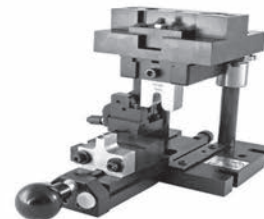
Quick Change Tool Packs
Change Over in 5 Minutes or Less!
Reduced Cost and Down Time!



Mini
End Feed



Med. Duty Air
End Feed
Quick Change Tool Pack



Med. Duty Slide
Quick Change Tool Pack

ODYSSEY CRIMPING PRESSES



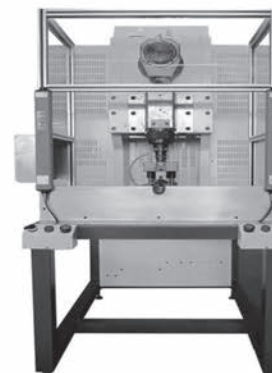
2.2 Ton



4 Ton



8 Ton



20 Ton

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Continued on page 44

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NEWS PLUGS continued



clude electronic warfare, microwave radio, VSAT, radar, space systems, test instrumentation and telecom infrastructure.

Pasternack's five new models of low phase noise amplifiers cover select frequency bands ranging from 1.5 to 18 GHz with residual phase noise levels as low as -180 dBc/Hz @ 10 KHz offset. Additional performance specs include small signal gain ranging from 9 to 14 dB, with typical noise figure of 5.5 dB. Psat levels for these amplifiers range from +16 to +25 dBm with Output IP3 levels as high as +34 dBm. All models feature single DC voltage supplies and input/output RF ports are internally matched for 50 ohms with DC blocking capacitors.

These compact module assemblies require no external components and are available in rugged Kovar™ metal drop-in packages that are gold-over-nickel-plated and support field replaceable SMA connectors. All mod-

els are EAR99 and guaranteed to meet MIL-STD-883 test conditions for hermeticity and temperature cycle.

"Pasternack's new series of low phase noise amplifiers is specifically designed for low-residual-phase noise performance that's ideal for highly sensitive test and radar systems, and communication receiver applications. These designs usually require long production lead-times, but we have

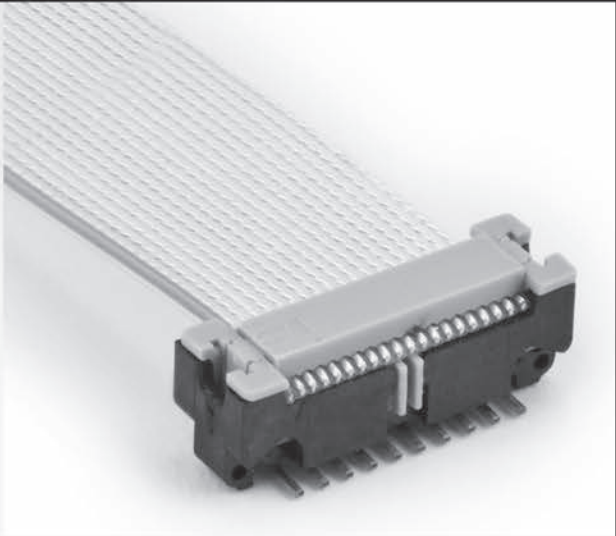


five different models with impressive performance ready and available for our customers," said Tim Galla, Active Component Product Manager at Pasternack.

Pasternack's low phase noise amplifiers are in-stock and ready for immediate shipment with no minimum order quantity. For detailed information on these products, please visit https://www.pasternack.com/pages/Featured_Products/low-phase-noise-amplifiers.html. For inquiries, Pasternack can be contacted at +1-949-261-1920.

3M™ CABLE-TO-BOARD 1.27MM (.050") CONNECTOR SYSTEM, 450 SERIES

The 451 and 452 Series interconnect products from 3M also deliver on performance, reliability and cost savings. The ribbon cable wiremount socket assembly incorporates 3M insulation displacement contact (IDC) technology in the connector, helping maintain secure connections and high signal integrity. The IDC connector's mass termination capability allows the termination of 30 lines in a single cycle, reducing the need for expensive automated termination equipment and allowing manual cable assembly operations. Available friction-latch configurations and an optional strain-relief accessory can further increase connection reliability. An optional, unique header ejector latch mechanism provides positive latch and ejection capability with minimal size addition.



The shrouded boardmount header is available in a variety of configurations in order to maximize design flexibility while minimizing PCB footprint. Tape-and-reel packaging for the SMT version of the header is available for automated placement applications, and PCB standoffs help enable pin-in-paste processing capability. The 1.27mm 451 and 452 series interconnect products from 3M deliver on performance, reliability and space savings.

451 and 452 Series Features:

- Extremely small: .050" pitch
- Enables mass termination
- Innovative header ejector latch mechanism
- Multiple configurations available

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SERIES
90

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Cablesan's Series 90 TestRite programs run under the most popular Windows operating systems, and can import wire lists, net lists, and CAD data. TestRite's browser window allows you to provide setup and work instructions using HTML, image, and audio files. With a simple click, everything is displayed, stored, and can be printed in seconds. High voltage and high current models are also available. Put simply, you reduce test and assembly cost dramatically. Visit our website or call us at (909) 483-2436 for more details. Cablesan, Inc., 3022 Inland Empire Blvd., Ontario, CA 91764



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NEWS PLUGS continued



**Hengtong USA, LLC
Announced at OFC 2017
a Collaboration Between
Hengtong Cable Group and
Inland Energy Inc.**

The formation of Hengtong USA, LLC, an American based optical cable sales and technical support company, was announced at the Optical Networking and Communication Conference & Exhibition in Los Angeles (OFC) 2017 based on a collaboration between Hengtong Cable Group of China and Inland Energy, Inc. of California.

Hengtong Cable Group, based in Suzhou, China (near Shanghai) is one of the largest and most successful manufacturers of optical and electric power cable in the world; it currently operates in 120 countries and has more than 13,000 employees worldwide. In its manufacture of power and fiber optic cable (FOC), the company has focused on internationally recognized quality and environmental standards including the ISO9001 quality system, ISO14001 environmental management system, OH-

SAS18001 occupational health and safety management system, national measurement system and United States UL safety certifications; its power cable production capabilities range from medium voltage (<35 kV) to High and Extra High Voltage (>230 kV) cables; Hengtong's state-of-the-art factories in Suzhou are also capable of producing large underground and undersea power cables which have been installed around the world. On the FOC side, Hengtong manufactures its own glass from pre-forms and its communication fiber optic cable products meet the requirements of European ROHS directive and its FOC products are currently used by British Telecom, China Telecom, Telmex and other major communication operators, as well as virtually every area of specialized communication networks, including aerospace, power, radio and television, national defense, and marine engineering.

Inland Energy Inc., located in Newport Beach, CA for more than 28 years, is a well-respected developer of major power plants of all kinds – solar, wind, waste-to-energy as well as natural gas and waste coal. Inland's key people have been involved

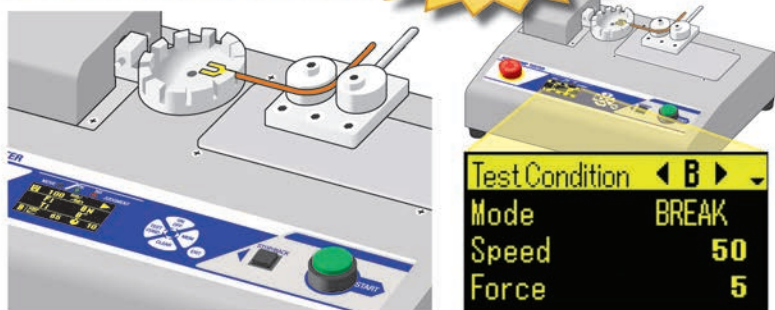
in financing and permitting power generation facilities in more than a dozen states and several countries. The award winning 830 MW High Desert Power Plant in Victorville, CA is one of Inland's most prominent successes. All of these projects have involved significant transmission line and fiber optic communication cable components.

The newly announced, Hengtong USA, LLC (Hengtong USA), has developed an aggressive sales program in the U.S. for its power and fiber optic cables. All Hengtong USA products are designed and built to U.S. standards, and tested by U.S. agencies. Initially, production will be provided through Hengtong's international facilities to capitalize upon manufacturing and cost efficiencies. Hengtong USA is rapidly ramping up its American sales force and establishing its U.S. distribution and service facilities. Hengtong's power cables are currently undergoing extensive testing at the NEETRAC facilities located at Georgia Tech in Atlanta and its FOC products are similarly completing testing at Expor Labs in Oxnard, CA as well as Underwriter's laboratories (UL).

Wire Crimp Pull Testers

Automatic Testers

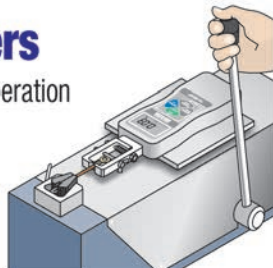
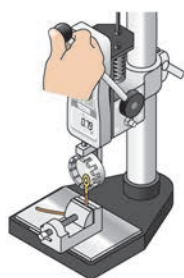
One Button
Operation!



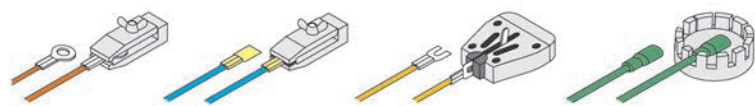
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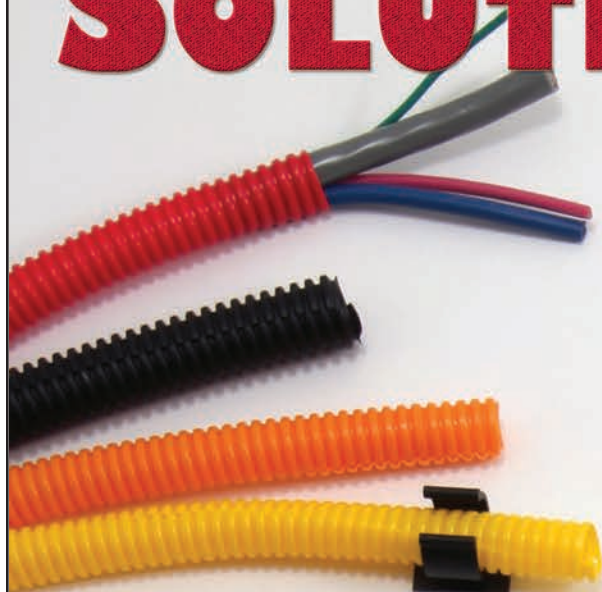
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NEWS PLUGS continued



Heilind Electronics to Exhibit at Offshore Technology Conference (OTC)

Heilind Electronics, a leading global distributor of electronic components, will be showcasing a variety of products next week at the Offshore Technology Conference (OTC) – the world’s largest event for energy professionals in the oil and gas industry. Heilind will be featuring harsh environment connectors, sensors, identification

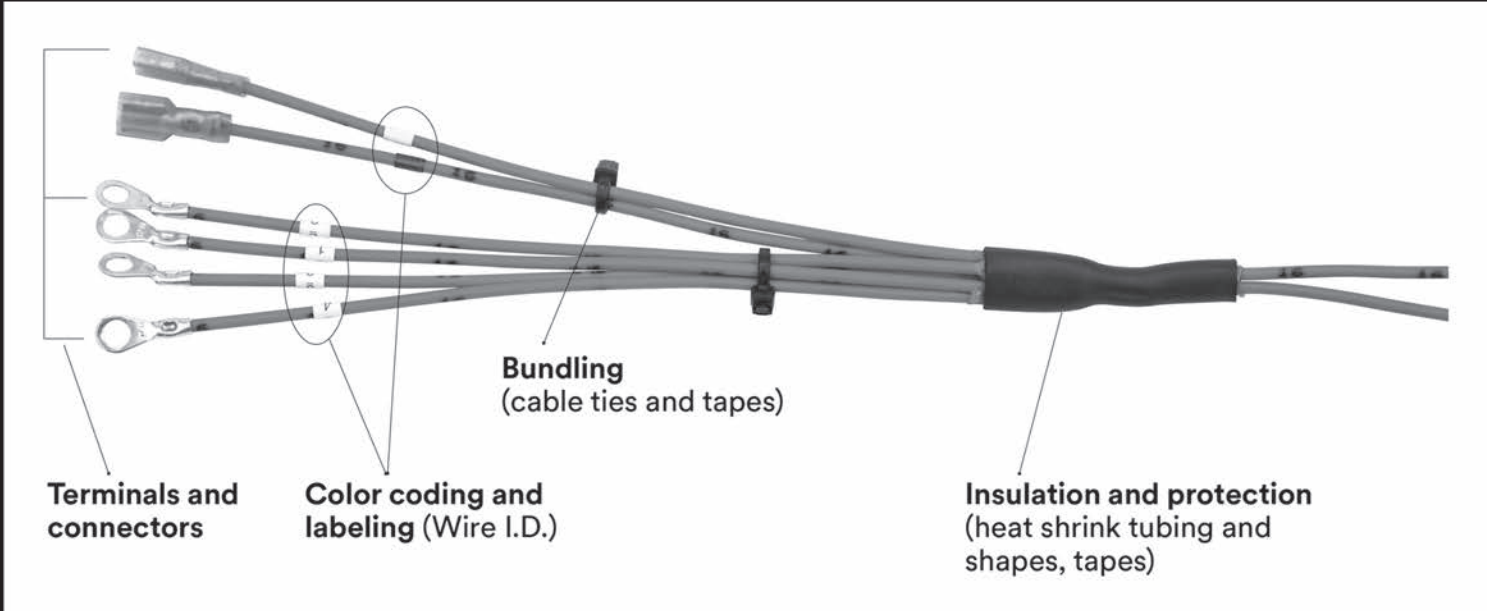


products, and wire management devices from leading manufacturers like Amphenol, Glenair, HARTING, Heyco, Molex, Omron, Panduit, SOURIAU, TE Connectivity, WAGO, and Weidmuller.

“We are thrilled to be a part of OTC this year,” said David Goforth, Heilind’s North American Director of Supplier Relations. “We’ve been serving the energy industry for many years, and are proud to offer a diverse and technologically advanced selection of products to our customers.”

Heilind Electronics caters to customers of all sizes, from start-ups to large multinational OEMs. It will have representatives at booth #12040 for the duration of the show, which will be held from 5/1 through 5/4 at NRG Park in Houston, Texas. Visitors are also encouraged to stop by the Heilind Electronics booth to enter a drawing for a \$500 Amazon gift card.

Founded in 1974, Heilind Electronics, Inc. (www.heilind.com) is one of the world’s leading distributors of connectors, relays, sensors, switches, thermal management and circuit protection products, terminal blocks, wire and cable, wiring accessories, and insulation and identification products. Heilind has locations throughout the U.S., Canada, Mexico, Brazil, Germany, Singapore, Hong Kong, and China. Follow Heilind on Facebook at facebook.com/Heilind and on Twitter at twitter.com/Heilind.



Terminals and connectors

Color coding and labeling (Wire I.D.)

Bundling (cable ties and tapes)

Insulation and protection (heat shrink tubing and shapes, tapes)



3M solutions help wire harnesses achieve high performance in challenging conditions

Today’s wire harnesses face a variety of challenges including high temperatures, abrasion, and exposure to such elements as water, diesel, and crude oil. These evolving challenges require a partner that can provide technical support, a variety of solutions, and continuity of service.

3M offers an impressive mix of products that protect wire harnesses in harsh environments and can help make the harness manufacturing process more efficient.

- Heat Shrink & Tubing
- Conductive & Insulating Tapes
- Resins
- Vinyl Tape & Mastics
- Terminals, Connectors, Cable Ties, and Wire I.D.
- Cold Shrink Insulators

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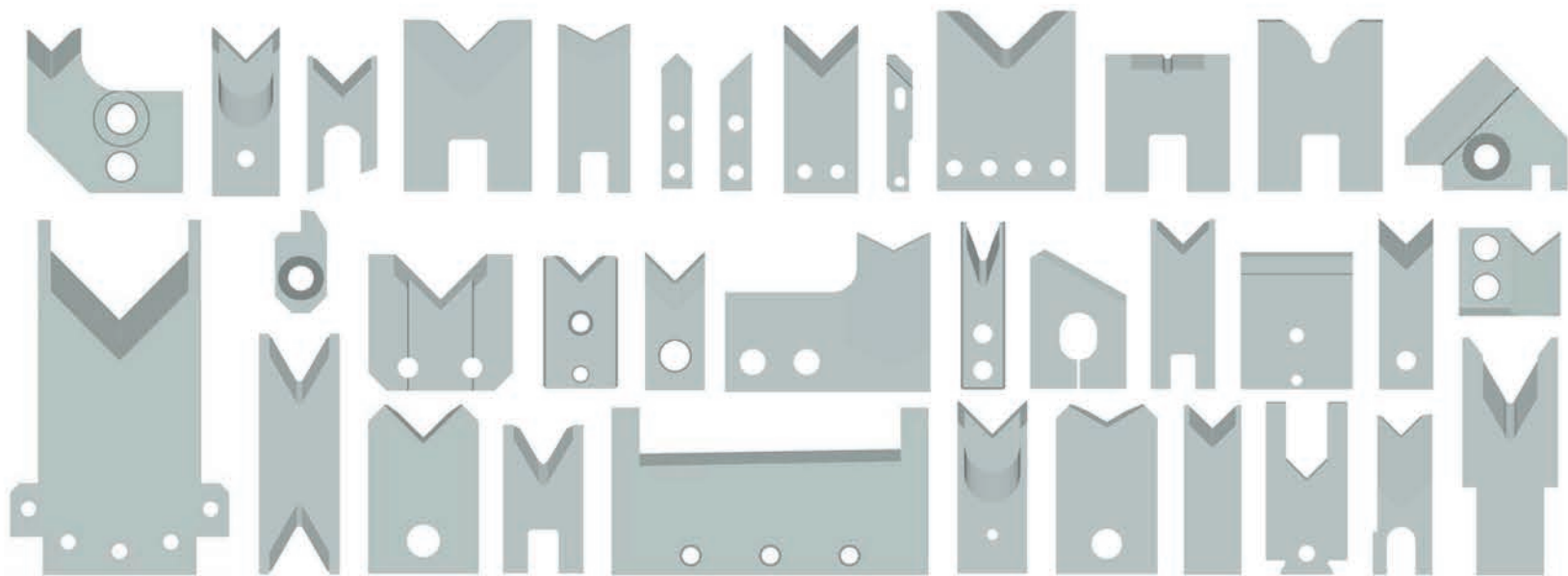
- MPF-33 Prefeeder for bench-top wire processing machines
- MPF-35 Prefeeder for high speed fully automatic wire processing machines



Mechtrix Stripping Blades

Mechtrix designs and manufactures standard replacement and custom stripping blades for:

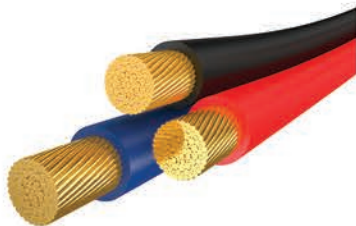
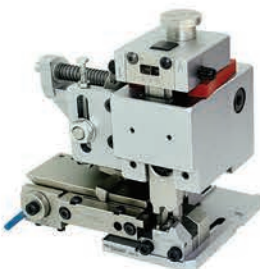
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| • Artos | • KM Digitech | • Koder | • Makfil | • Schleuniger | • Toyojamco/JAM |
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Mechtrix has designed a number of unique machines to solve specific wire processing problems. These machines range in complexity from our patented center stripping machines to terminal paper winding machines and include the following:

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Allied Wire & Cable Receives 2017 Outstanding Exporter Award

Allied Wire & Cable was a recipient of the 2017 National Small Business Exporter's Summit Award as an Outstanding Exporter.

The National Small Business Exporter's Summit meets each year as a celebration of World Trade Day. This year, Allied Wire & Cable was lucky to be nominated and awarded as an Outstanding Exporter for 2017. This summit recognizes top small and medium sized business exporters in the U.S.

Allied has a strong background in showing its exporting efforts; the company previously won the Presidential "E" award in 2014. President and CEO, Tim Flynn, has openly stated how important fair trade agreements and exporting is to the American economy. By serving new international markets through exporting goods, it allows the U.S. to provide more jobs and build up the economy.

Natalie Beers, Director of Marketing, accepted the award on behalf of AWC and addressed the audience on best practices and lessons learned in regards to lead generation. Allied welcomed the opportunity to share its knowledge with industry members on how to improve exporting capabilities to provide top quality "Made in USA" products abroad.

Allied Wire & Cable is a family-owned and operated specialty manufacturer and distributor of wire and cable with more than 25 years of experience. Allied serves all major global markets including: government, military, aerospace, automotive, and telecommunications industries. AWC is dedicated to personalized service and assigns an individual sales rep to each and every customer.

AWC is headquartered in Collegeville, PA, with sales and stocking locations in AZ, FL, NH, NY, and WI. Allied is proud to serve customers worldwide and has offices located in Southeastern United States and Canada.

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- 1 - SCHLEUNIGER CS9100 Cut/Strip Machine w/PF2000 Prefeed
- 1 - SCHLEUNIGER CT32 Crimp Press, 2008
- 1 - SCHLEUNIGER MS0600 MegaStrip w/PF4000 Prefeed
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Mando Can Do.



When Armando Zacarias goes out on a Eubanks service call, unusual things happen.

“Once I helped round up a cow that got loose in a customer’s plant.

“Another time, while driving to a customer’s site, our rep’s car caught fire. We eventually arrived there that night and finished the job in time for the morning shift,” Mando reports.

Customers report something unusual too: Mando’s “can-do” attitude.

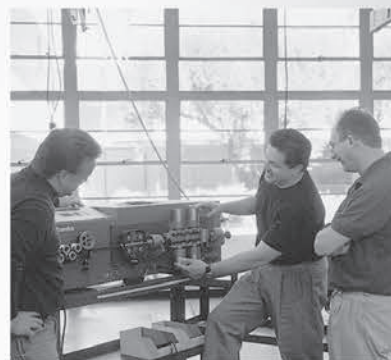
George Price, vice president of J&M Products, for example, writes how Mando takes time to answer questions, explain machine operation and even gave “tips on stripping some shielded cable that others said could not be done.”

“Can’t be done” is not in Mando’s vocabulary—either English or Spanish. On his own initiative, he solves problems, leads training classes, helps boost plant efficiencies, and makes lasting friendships while doing it.

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NEWS PLUGS continued



Fast Curing Epoxy Assembly Adhesives

A series of fast curing thixotropic Epoxy Assembly Adhesives was developed by Epoxies, Etc. These non-sag epoxy adhesives offer manufacturers the ability to improve productivity due to their quick 5-46 minute set times.

10-3005 NS 5 Minute Set Epoxy
10-3020 NS 20 Minute Set Epoxy
10-3046 NS 46 Minute Set Epoxy

In addition to providing rapid assembly they also offer good water resistance, chemical resistance, and thermal shock protection. They are suitable for many bonding applications in the electronic, electrical, industrial, and decorative industries. These epoxy adhesives also meet Underwriter's Laboratory (UL) 94HB flame out test.

All three of the adhesives in this series have a convenient 1:1 by volume mix ratio. For ease of use these products are offered in the convenient TriggerBond® cartridge system.

Epoxies, Etc. has been formulating solutions for electronic circuitry and assemblies for over 25 years. Our chemists and engineers are able to provide specific application support. Technical Support can be reached by phone 401-946-5564 or sales@epoxies.com.

More information about the Fast Curing Epoxy Assembly Adhesives is available at http://www.epoxies.com/_resources/common/bulletins/10-3005NS.pdf.

Allied Wire & Cable is AS9100 Certified


Allied Wire & Cable is AS9100 certified. AS9100 is similar to the ISO9001 certification, but supplements those requirements with additional aerospace industry quality system requirements. These additional requirements satisfy DOD, NASA, and FAA quality demands.

Allied Wire & Cable is now an AS9100 certified wire and cable distributor and manufacturer. Due to increased demand, Allied acquired the AS9100 certification to better serve Tier 1, Tier 2, and Tier 3 customers in the aerospace and defense industries. AWC was already ISO9001 certified but decided to upgrade to AS9100 to provide a higher-caliber quality management system.


The sales team has been provided with additional tools and techniques to communicate and document customer requirements, which ensures quality and on time delivery. Neil Sanderson, QMS Manager, says, "Allied is proud of the work we have done to earn this certification. We look forward to providing our unique brand of customer service to new clients, and will continue to meet and exceed the expectations of our current customers."

AWC recently hired Ron Holmes and Jonathan Aristizabal from A.E. Petsche to help support its aerospace customers. Ron and Jonathan have extensive experience in the aerospace industry, and look forward to taking Allied's excellent customer service reputation to new heights.

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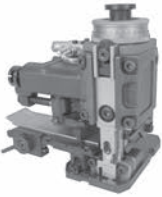
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ROMJ and Reshoring Initiative Cooperating to Bring Back One Million Jobs

Return One Million Jobs (ROMJ) was created to raise \$20 million to bring one million manufacturing jobs to the U.S. from offshore. The project will utilize global data analytics to help companies compare the total cost of supplying the U.S. market via manufacturing offshore vs. domestically.

Over the last few decades, as many as four million good paying manufacturing jobs have been lost to foreign nations to reduce costs. In the last few years, costs of production in China and other nations have been increasing, encouraging even many Chinese companies to begin producing in the USA. The Reshoring Initiative, the nation's leading organization working to return manufacturing jobs to the USA, estimates that as many as one million jobs can be returned based on objective cost analysis. This is the goal of ROMJ and the Reshoring Initiative.

Carl Carstensen, who recently retired after 37 years with IBM global consulting services with a focus on the industrial sector, is leading ROMJ. "I've seen so much offshoring in my career," said Carstensen. "Although lower labor rates encouraged tens of thousands of manufacturers to relocate production, total cost comparisons today may encourage as many as 25 percent to return jobs to the US."

Harry Moser, founder of the Reshoring Initiative said, "The Reshoring Initiative is pleased to cooperate on this important project. Funding by ROMJ will allow the Initiative to support ROMJ's efforts and dramatically increase our own promotion of reshoring and support of companies considering reshoring. The combination of ROMJ's resources and our tools will make One Million Jobs feasible."

The Return One Million Jobs campaign is organizing a \$20 million fund for a major data analytics program to consider all costs of production in the USA from all 100,000 companies with offshored production and sourcing. See www.returnomj.com. The project will seek to compare the total cost of offshored production with costs in the USA for all offshored manufacturing. Carstensen added, "It's quite possible to find synergy with thousands of companies bringing back jobs to America. Data analytics may find additional cost reductions as well as an increase in return-incentives."

ROMJ's first job is to inspire all 100,000 US manufacturers with offshore production to participate in the free data analytics project. Carstensen added, "If they use the TCO tools from the Reshoring Initiative and advanced data

analytics, if they do the math, many manufacturers should want to return jobs to the USA, to increase profits." For more information, contact ROMJ at jobs@returnomj.com and the Reshoring Initiative at harry.moser@reshorennow.org.

About the Reshoring Initiative

A 50-year manufacturing industry veteran and retired President of GF AgieCharmilles, Harry Moser founded the Reshoring Initiative to move lost jobs back to the U.S. For his efforts with the Reshoring Initiative, he was named to Industry Week magazine's Manufacturing Hall of Fame in 2010. Additional information on the Reshoring Initiative is available at www.reshorennow.org. The Initiative's

many sponsoring associations and companies are also acknowledged on the site. The Reshoring Initiative offers many tools and resources to help companies make supply chain sourcing decisions, including its Total Cost of Ownership Estimator® that uses advanced metrics to allow users to easily determine the total cost of offshoring by accounting for and understanding the relevant offshoring costs, which include inventory carrying costs, shipping expenses, intellectual property risks and more.

About Return One Million Jobs, LLC

ROMJ was recently incorporated with one mission; to return one million good paying manufacturing jobs to the USA. Although the process will

be time consuming, capital intensive and complicated, our plan is based on a few simple concepts. The cost of manufacturing in China and other foreign nations has been increasing, while costs for production in the USA have been decreasing. ROMJ's President, Carl Carstensen, retired in January after 37 years in leadership positions at IBM's Global Business Services, one of the leading business consulting firms. Carl's experience in data analytics, business development, staffing, finance and industrial operations will allow ROMJ to plan, build the team and manage the deployment of this Herculean task.

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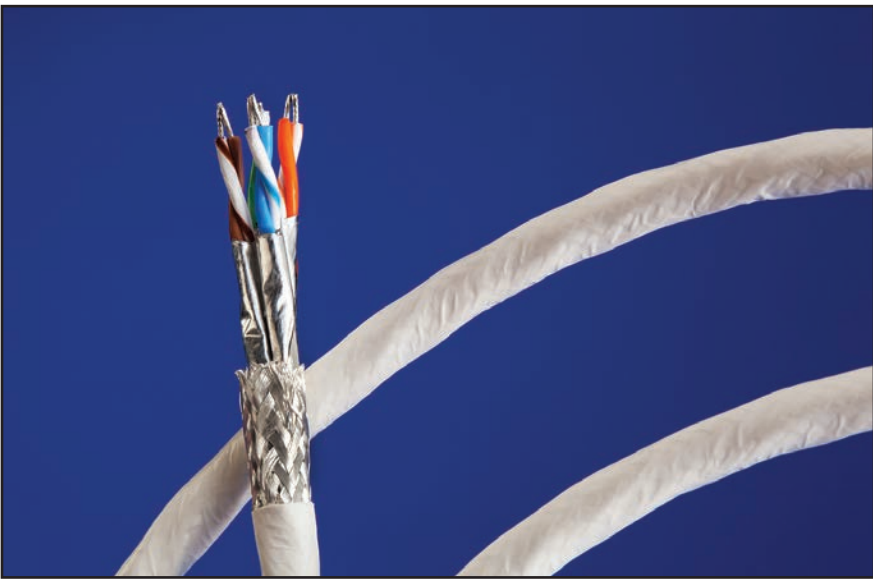
Gore’s High Data Rate Cables for Military & Civil Aircraft Applications Showcased in Schleuniger’s Wire Processing Equipment

W. L. Gore & Associates, Inc. (Gore) is pleased to announce that Schleuniger, a leading international manufacturer of wire processing equipment, showcased Gore’s high data rate cables for military and civil aircraft applications at the 2017 Electrical Wire Processing Technology Expo in Milwaukee, WI, May 10-11.

Schleuniger wanted to demonstrate the aerospace industry’s latest high data rate cables in their equipment at the expo. Specifically, they chose GORE® Aerospace Ethernet Cables for Cat6a protocol that deliver

excellent electrical and mechanical performance in a small, lightweight, flexible and routable package. They also chose GORE® Shielded Twisted Pair Cables that are highly flexible and easy to route in confined spaces of any aircraft because they are significantly smaller and lighter compared to standard cables.

Gore’s high data rate cables meet the latest protocols and system requirements such as Ethernet, Fiber Optics, USB, HDMI, and more. Cable designs that are smaller, lighter and more flexible with longer transmission lengths significantly improve



system performance in any aircraft.

Visit gore.com/high-datarateaircraftcables to find out more about Gore’s portfolio of high data rate cables that are engineered to perform reliably now and over time.

Visit schleuniger-na.com/wpte for more information on Schleuniger’s participation in the 2017 Electrical Wire Processing Technology Expo.

Gore is a technology-driven company focused on discovery and product innovation.

Well known for waterproof, breathable GORE-TEX® fabric, the company’s portfolio includes everything from high-performance fabrics and implantable medical devices to industrial manufacturing components and aerospace electronics.

The Schleuniger Group is a globally active technology company and a leading supplier to the wire processing industry. Most of the Schleuniger Group’s customers are active as suppliers for the automotive, entertainment, and information industries as well as for the communications sector.

The Schleuniger Group represents the wire processing business segment of the publicly listed Metall Zug Group and has approximately 640 employees and 30 apprentices worldwide.

UNIQA-PRO SINGLE CRIMP WIRE PROCESSOR

This lead making machine combines a proven platform, with a cost-effective, multiple station design and a wide range of customer options.

TE Connectivity’s UNIQA-PRO Single Crimp Wire Processor is an ideal cost-effective solution for companies looking to ramp up production from multiple bench top machines without making the large capital investment of a double ended lead maker. With this single ended-lead maker, you will be able to save labor costs by measuring, cutting, stripping both ends, and crimping one end of a wire lead all with a single machine.

Features:

- 20% smaller footprint than a typical double ended lead maker.
- The UNIQA-PRO can ramp up your throughput by approximately 4X over a standard wire prep. and benchtop applicator.
- User-friendly PC control.
- Available in three different models to fit your needs: Basic machine with a passive wire collection system, basic machine with a passive wire collection system, crimp force monitor, and terminal scrap chopper, and a high force machine with an active wire collection system, crimp force monitor, and terminal scrap chopper.



Applications:

- Appliance industry
- Medical equipment
- Wire sizes ranging from 12 AWG – 26 AWG
- Anywhere manufacturers want to keep labor costs down without a large capital investment

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NEWS PLUGS continued



CAMI Research Re-Releases Continuity-Testing Video Tutorial Series

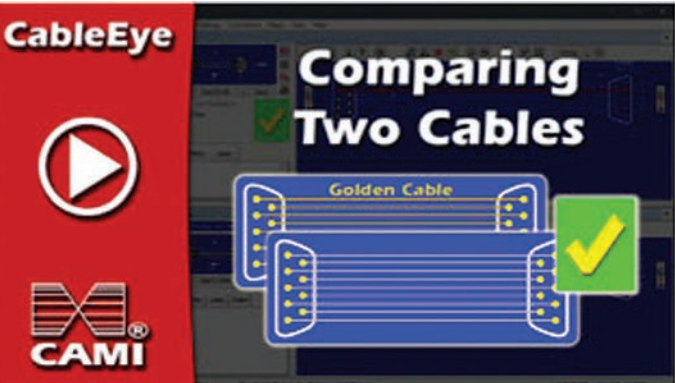
CAMI Research Inc. (Acton, MA) has re-released an instructional continuity-testing video series for the field of cable and harness testing. The series covers ‘golden’ cable creation, test, and documentation stages of the manufacture of cables and harnesses. The tutorials include techniques that can also be used with backplanes and components, and guided assembly, and are demonstrated with live examples using CableEye and its latest (v5) software.

For CableEye users, every instruction shown for low voltage testers may be duplicated for high voltage (hipot) testers because the software is a common operating platform shipped with every tester. Currently containing nine videos, in the coming months, the v5 series will be updated to include pin-mapping, barcode-tracking, archival data-logging, test automation, label-

ling, and the preparation of ISO9001-quality reports.

A leader in development of PC-based Cable & Wire Harness Test Systems for over 20 years, CAMI is also offering two live training sessions on Tuesday, May 9th at the EWPT Expo in Milwaukee: “Beyond Continuity & HiPot Measurements” and “Improving Reliability of Continuity & HiPot Tests”. Advanced registration is required for these sessions. Attendees will be eligible to participate in a drawing to win \$500 in CableEye accessories.

The video series and EXPO training is led by Christopher E. Strangio. Christopher is the President and founder of CAMI Research and holds degrees in Electrical Engineering from Villanova University and MIT. A lecturer at the MIT Lowell Institute for twenty years, and author/presenter of a microprocessors multimedia course for the MIT Center for Advanced Engineer Study, he has been awarded two patents, developed the CableEye PC-based cable & harness test system, and is a senior member of the IEEE.



Find the testing instructional video series at camiresearch.com/videoclips/. For further information, please call (978) 266-2655.



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- If you want to automate a test procedure to ensure consistency, our built-in scripting with operator prompts does the job.
- If you need to protect your stored cable data from inadvertent erasure or tampering, set each operator's log-in privilege as needed.
- If you require your system to be Future-Proof, you will like that we do not use embedded computers or screens.
- If you prefer to readily share files and fixtures between different models, our common software platform makes that a cinch.
- If you insist on reliable hardware and rock-solid support, we insist on that too. Here's what others have to say:

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NEWS PLUGS continued



Switchcraft's Right Angle Tini-QG Mini XLR Connectors Feature a Waterproof Design and Chuck-style Strain Relief

Heilind Electronics, a leading global distributor of electronic components and authorized distributor for Switchcraft, has added the company's new Right Angle Tini-QG Mini XLR Connec-



tors to its extensive selection of circular connectors.

These robust connectors are part of the XLR Sealed Series, which features an extra-long mating cycle and IP66-level waterproof protection. The Right Angle Tini-QG Mini XLR version accommodates cables up to 0.15 inches, with a larger flex relief available for lengths up to 0.21 inches. Additionally, the chuck-style strain relief and push-button latching mechanism allow for easy installation.

Right Angle Tini-QG Mini XLR connectors are used for a wide variety of applications, including industrial process controls and video recording, medical, and communication devices.

Visit Heilind's website for more information about Switchcraft Right Angle Tini-QG® Mini XLR Connectors.

Heilind has locations throughout the U.S., Canada, Mexico, Brazil, Germany, Singapore, Hong Kong, and China. Follow Heilind on Facebook at facebook.com/Heilind and on Twitter at twitter.com/Heilind.

Zuken Partners with Nano Dimension to Develop Seamless Design to Manufacture for 3D Printing

Zuken and Nano Dimension are working together to advance the 3D printing user experience and prototype turnaround times. Nano Dimension, a leader in electronic printing technologies, will take advantage of the support for implementing electronic technologies provided by Zuken's market-leading, native 3D, system-level design solution, CR-8000 Design Force. Simon Fried, Chief Business Officer,



Nano Dimension, said: "It has been an amazing few years for our company as we've fielded interest in our technology. We're excited about working with Zuken to harness Design Force and take our products even further, giving our users a seamless experience from design to output and optimization."

Nano Dimension develops advanced 3D printed electronics platforms, including the Dragon-Fly 2020 3D printer for multilayer printed circuit boards, and nanotechnology-based conductive and dielectric inks for their 3D printers. The printer continues to capture global industry and media attention. Future developments will see expansion to support additional board technologies including flexible circuits and embedded components.

Humair Mandavia, Chief Strategy Officer, Zuken USA, said: "Zuken's CR-8000 Design Force retains all the detailed data needed for 3D printing and allows export direct to manufacturing or 3D printing, without losing integrity. Nano Dimension's 3D printers are typical of the many applications we envisioned when we pioneered native 3D design for manufacturing."

Design Force is the sole design tool that allows specification of unique rules for materials, meaning no extra steps are needed when 3D printing to silver and any other future conductive material. Zuken also offers dedicated DFM solutions to support printed electronics via its DFM Inkjet module that optimizes CAD data for inkjet printers. With these solutions from Nano Dimension and Zuken users can expect to spend more time innovating and getting new ideas to market, rather than dealing with design administration. Visit Zuken at www.zuken.com.

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Versatile and reliable FineAdjust applicators offer minimal setup time, are easy to install and are designed for mid-to-high-volume semi- or fully-automatic operations. Molex applicators improve output while providing greater production flexibility.

Features:

- Applicators are designed to the industry standard mounting and shut height of 135.80mm.
- Quickly remove punches with the push of a button for fast and easy tooling changes.
- Crimp height, track and feed adjustments can be set without removing the applicator from the press.
- Independent adjustment rings allow users to quickly adjust the conductor or insulation crimp height.
- Fine adjustment allows users to achieve target with little effort by adjusting in increments of .015mm for conductor crimp height and .063mm for insulation crimp height.

Applications:

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- Commercial
- Industrial



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