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- In the Blood: Following in Fathers’ Footsteps
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Serving the Electric Wire and Cable Processor

JULY
AUGUST
2016
Voice of
the industry

INDUSTRIAL INFO-TAINMENT

Buse Industries

By Fred Noer

Thinking outside the box assures and promotes the vitality and growth of any company, but at Buse Industries an emphasis is being placed on thinking inside the box – literally.

Box builds recently were added to



John Horgan
Buse president and CEO

the product line-up of the firm in Bridgeton, Mo., a community of 12,000 in the northwestern part of the St. Louis metropolitan area. The company primarily manufactures wiring harnesses and cable assemblies, and as a small portion of its business distributes wire, cable, connectors and terminals from Panduit, Molex, Belden and General Cable.

Buse president and CEO John Horgan, 57, is excited about the prospects for growing Buse by offering box builds. “Customers are demanding more box builds to go along with our other products,” he said. “More and more a turnkey solution is being requested.”

The expertise and equipment for doing box builds were acquired May 6 when Buse purchased Neeco-Tron Incorporated (NTI). It specializes in designing and manufacturing electromechanical assemblies as well as printed circuit boards integral to the assemblies.

Nick Nibert owned the 23-year-old company and served as its president. He has joined Buse as vice president of sales. NTI equipment has been moved 10 miles to the Buse facility from St. Peters,



Above is a harness for a refurbished X ray machine.

Mo., where NTI was located. Some of the staff transferred to Buse, too.

“Nick brings extensive industry contacts and a wealth of industry and technical knowledge in printed circuit boards and electromechanical assemblies used in a variety of industries,” Horgan stated in a release about the acquisition. “NTI also brings a very high quality customer base that has become the focal point of Buse’s growth strategy.”

NTI sales totaled \$3-4 million annually, according to Horgan. He noted that

means Buse should hit \$18 million by the end of this year and \$20 million in 2017. He added that the company was at \$17.5 million for 2013 but declined in 2014 and ’15.

“We’re going to concentrate on marketing and expect that to fuel a lot of our growth in 2017,” Horgan said. “We’ve hired a third-party firm to help us with e-mail so we regularly monitor and maintain our broadcast communication.”

Upgrades are planned for the company.

Continued on page 22

The 2016 Electrical Wire Processing Technology Expo - Another Hit!

By Joe Tito
Wiring Harness News

Value added performance is something we seek every day in the wire harness industry. Whether it's a new tool, an enhanced process, or a new training protocol, we

are always looking to justify money spent against the value it adds to us, and to our organizations. For sixteen years, the Electrical Wiring Processing Technology Expo has provided an outstanding value proposition for both exhibitors and attendees. The 2016 show, held this past May at its home in The Milwaukee Center, was certainly no exception.



Exhibitors enjoyed a breakfast before the show compliments of the Wisconsin Center and Wiring Harness News.

A new attendance record was set as over 2900 gathered from 41 states and 28 countries. They came to see 165 exhibitors of world class wire processing equipment and service providers. The show floor was once again buzzing

with all the latest equipment; on display, and actively processing. Several exhibiting companies set up meetings and training seminars at the Milwaukee Cen-

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INSIDE

JULY
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Read about Buse Industries, a leading manufacturer of electro-mechanical and cable assemblies as well as a distributor of connectors, wire, cable and related accessories.

1 Electrical Wire Processing Technology Expo

For sixteen years, the Electrical Wire Processing Technology Expo has provided an outstanding value proposition for both exhibitors and attendees.

5 How Much is My Business Worth?

Loren Smith reviews some key factors to help determine how much a business is worth.

7 News Plugs

Read about the latest products on the market and points of interest about companies and people in the industry.

8 In the Blood: Following in Fathers' Footsteps

Many people owe their careers, and some even their businesses to their father's influence and role model mentoring.

40 Wire Wisdom High Temperature Wire

The use of wire and cable products outside their designed temperature range can result in premature and often expensive failures in service.

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Over 10,000 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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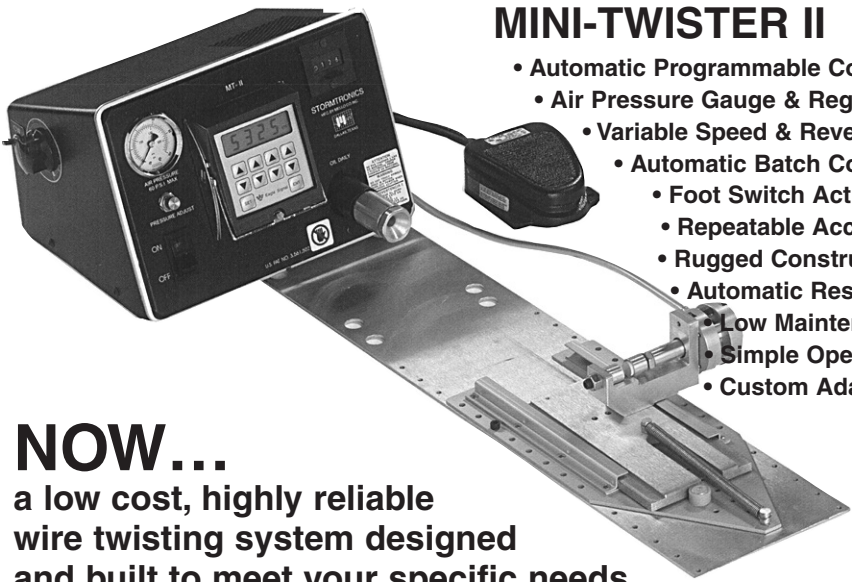
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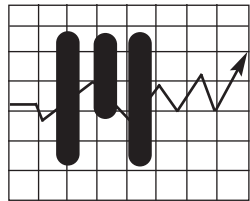
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How Much is My Business Worth?

By Loren Smith

When I am asked by owners of wire harness companies how much I think their business is worth, I can explain the data points that determine price ranges, but I always emphasize that these are just indicators. For example, if the sale process attracts a few highly competitive buyers, the projection can be exceeded. Let's review some key factors determining the sale price.

The starting point: EBITDA. The fundamental value of a business is a multiple of earnings before interest, taxes, depreciation and amortization (EBITDA) plus add backs. For wire harness businesses the sale price generally ranges from four to six times EBITDA.

EBITDA tells a prospective buyer what the company's cash flow is before paying interest and taxes and reducing income by calculations of annual depreciation and amortization. Add backs are expenses the company is incurring under current ownership that would not continue under new ownership.

For example, if an owner who wants to retire immediately after sale has been paying himself twice the normal salary for a CEO running a company of that size, the new owner can add back half



Loren M. Smith, CEO
Blue Valley Capital

the current owner's compensation. But this example illustrates the subjective nature of some add-back components. Perhaps no fully qualified CEO candidates can be found at half the current salary.

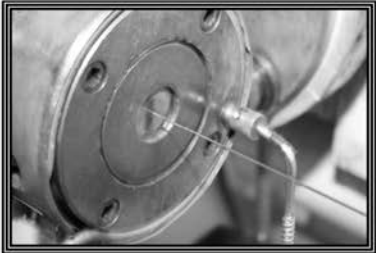
Risk. What is the probability that historic cash flow (particularly over the last few years) will continue in the near future? Is there reason to suspect that the next few years will see a precipitous drop in revenue and cash flow--or is there reason to anticipate a spike

Continued on page 6

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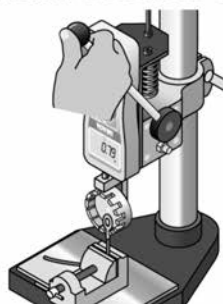
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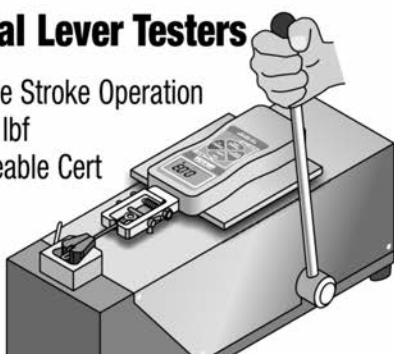


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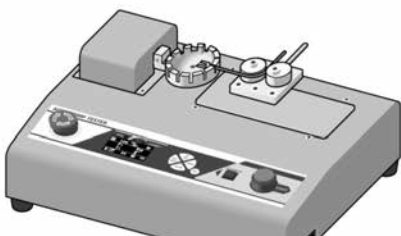
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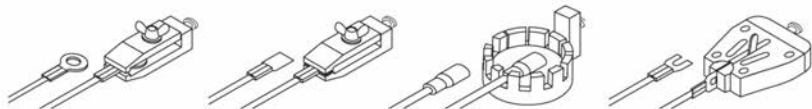


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How Much is My Business Worth?

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because of market conditions or opportunities that have not been realized?

High on the list of factors to consider are the quality and duration of the company's customer relationships. And if the company's large-customer base is highly concentrated, it can expect its multiple to be discounted because of the projected impact of losing one key customer.

Management team. Will the management team responsible for recent performance stay in place for the foreseeable future, and is the current management team capable of growing the business?

Growth potential. Two favorable factors for a harness company are customers that appear likely to expand and customers that currently award only a small percentage to the harness company and seem eager to increase that share based on recent performance. But the worth of a company needs to be downgraded if it is close to its ceiling in revenues from current customers.

Market. Some harness companies can demand higher multiples than the standard four to six times EBIDTA because they primarily sell to customers operating with higher margins. Cases in point are military and medical equipment har-

ness companies because their customers are in less competitive markets.

Size. A \$20 or \$30 million revenue harness company will demand a higher multiple than a \$5 million company.

Complexity of product. A company producing wire harnesses with hundreds of circuits often enjoys a more secure position with its customers. Specializing in complex products leaves less room for competition.

Status of computer system. Today, the capabilities of a company's hardware and software are crucial. Potential buyers will evaluate whether a company has outgrown its computer system or stayed ahead of the curve.

Bottom line. Many owners are so focused on running their business they have little idea what their business is worth. But once they do contemplate selling, a solid beginning is multiplying the EBIDTA by four to six and then adjusting for the kinds of factors I've suggested. If they score reasonably high on these measurements and engage in a competitive sale process, they will optimize the price.

But no matter how the calculations turn out, the decision to sell is almost always an emotionally difficult matter.

Loren Smith can be reached at lms@blvcapital.com or www.bluevalley-capital.com

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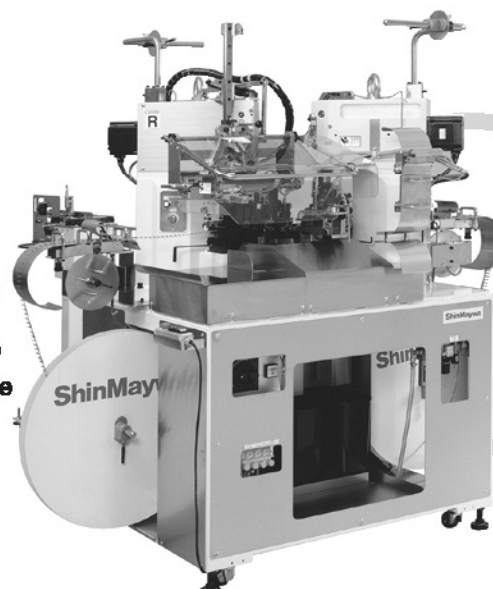


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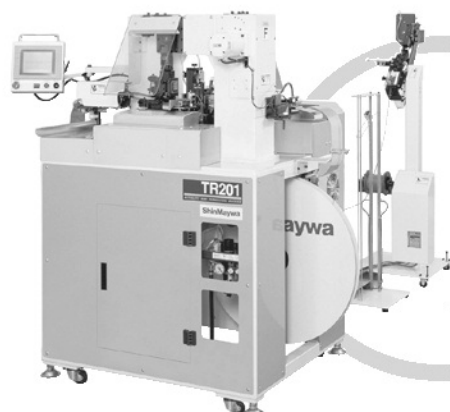


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NEWS PLUGS



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The Crimpfox Centrus 10S and 10H will process 24-8 AWG, and the 6S and 6H process 24-10 AWG, with a ratcheted mechanism, ensuring a proper crimp. The two crimp profiles, square or hex, were inspired by the terminal block standard. The symmetrical but slightly rectangular shape makes them compatible with Phoenix Contact terminal blocks.

Phoenix Contact develops and manufactures industrial electrical and electronic technology products that power, protect, connect and automate systems and equipment for a wide range of industries. Phoenix Contact GmbH & Co. KG, Blomberg, Germany, operates 50 international subsidiaries, including Phoenix Contact USA in Middletown, Pa.

For more information about Phoenix Contact or its products, visit <http://www.phoenixcontact.com/hand-tools> or call technical service at 800-322-3225, e-mail info@phoenixcon.com.

Heilind Wins Amphenol North American Distribution Award

Heilind Electronics, a leading global distributor of electronic components, was recently recognized as the winner of Amphenol's 2015 Best North American Performance in Distribution award.

The award is given to the distributor who demonstrates the highest point-of-sale growth in a region throughout the calendar year. It was presented to Heilind during Amphenol's annual EDS dinner reception in Las Vegas earlier this month.

"We at Amphenol are delighted that Heilind, with its unique focus on interconnect technologies, has achieved strongest performance in the North American market in 2015," said Adam R. Norwitt, President and CEO of Amphenol. "Congratulations to the entire Heilind team!"

Heilind is an authorized distributor for over a dozen Amphenol divisions. The manufacturer is one of Heilind's largest,

offering products in many of its core lines.

Bob Clapp, CEO and founder of Heilind Electronics, attributes his company's outstanding performance to several factors. "I am honored to accept this prestigious award on behalf of everyone at Heilind," Clapp stated. "This is a result of the hard work invested by our team members across all levels – from the sales staff to our warehouse employees. As we grow with Amphenol, we strive to stay committed to our core values of quality, innovation, supply chain integrity, and stellar customer service."

Founded in 1974, Heilind Electronics, Inc. (www.heilind.com/www.heilindasia.com) is a world leading distributor of connectors, relays, sensors, switches, thermal management and circuit protection products, terminal blocks, wire and cable, wiring accessories, and insulation and identification products.



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In the Blood: Following in Fathers' Footsteps

By Paul Hogendoorn

My father's birthday usually falls within days of father's day, so I often reflect on the influence he's had on my business life around that time of year, every year. Through my conversations with other

leaders in the manufacturing world, I have discovered that I am clearly not alone – many of us owe our careers, and some even our businesses, to our father's influence and role model mentoring.

My cofounder in FreePoint, Randy Hess, is a 3rd generation co-owner of a 65 year old manufacturing company. It

was started by his grandfather, built upon by his father and uncle, and now owned and lead by him along with his cousin and his sister. Each generation built upon the foundations laid by the previous generation; nothing was given other than opportunity. Everything else was learned and earned.

Over the years, I connected with quite a few other leaders that got their first taste of manufacturing from their fathers. Wes DeGier, the plant manager at Anchor Danly Cambridge, recalls being taken to work by his father as a 15 year old on an Easter Monday. Going into Anchor Machine and Manufacturing that day brought back the sounds and the smells he remembers as he tagged along on Saturdays as a young boy, to his dad's work. His father was part of a group of visionaries who purchased Anchor Machine and Manufacturing a couple of years previous. Wes states "when I showed up for my first day of work at Anchor, I knew I was where I should be."

The manufacturing workplace is a multi-sensory experience. Each work day is filled with a sense of accomplishment – things get done, built, and shipped. Thirty five years later, he, along with 3 brothers and one brother-in-law, continue to work for the company. It's a tactile kind of satisfaction that few other careers can offer.

Ben Whitney is a 3rd generation owner of Armo Tool (near London



Paul Hogendoorn

Ontario), and Jamie Bowman is the 3rd generation owner of J.P. Bowman (of Brantford). They have a lot in common, including now employing people that remember them when they were just kids. Both of them have told me that they felt the onus was on them to earn the respect of the people that were there before them, and not the other way around. Ben told me that he was never encouraged to take over the business, but was actually encouraged to stay in school and to find work elsewhere. He did work there part time as a young boy though, and that was enough to be bitten by the manufacturing bug. After

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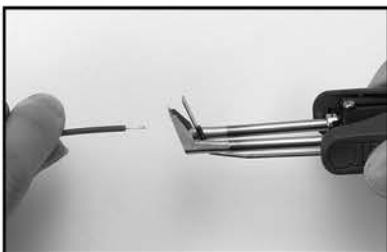
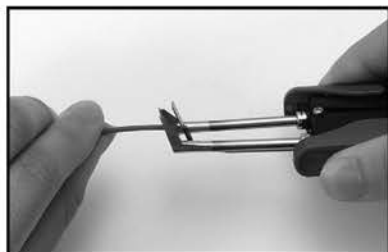
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Following in Fathers' Footsteps

Continued from page 8

graduating and working in a different company for a while, he came back 'home' to work at Armo. Similar to Randy's story, Ben and Jamie built on the foundation of the previous generations, evolving and expanding the vision, while adhering steadfastly to the values passed down. Times were sometimes tough, and sometimes so were the decisions, but they navigated through with the skills they were taught or learned along the way.

Andy Mavrokefalos is the founder of Attica Manufacturing. He also credits his father as being the primary influence in his decision to make manufacturing his career of choice. Sometimes the influence that extends from father to son is spoken, but most often it is modelled. Such was the case with mine.

My father was instrumental in building Danfoss Canada and it was there I experienced my first taste of manufacturing. Similar to Wes's first experience, I can still recall it vividly, including the tasks I took the most pride in (assembling motor starters), and the ones I hated the most (sandblasting bulbs). At times I was convinced that my dad made sure I got all the crumbly jobs just to make sure no one would think I got preferential treatment. But at the end of every day, whether it was a task I liked or one I hated, there was always the feeling of having accomplished something. Not every career comes with that.

Like everyone else in the story's father, my dad worked far more than 40 hours a week, often taking his work home with him. It was more than a job or a making a living; it was an important part of his life. I could see he found it satisfying and full of meaning. Through the company, he was able to do other satisfying and meaningful things, and I saw that too. The company sponsored all sorts of sports teams, and created many jobs for refugees, many of whom still send expressions of thanks. This month, the parent company is celebrating their 75th anniversary, and although he's been retired for 25 years or so, they've invited him to Denmark to mark the occasion with them. I couldn't be more proud.

This column is a late father's day present - a way to say thanks to all the fathers (and grandfathers) that gave us an apprecia-

tion of manufacturing, and that gave so many of us a chance to build, or help build, great companies.

Paul Hogendoorn is co-founder of FreePoint Technologies. "Measure. Analyze. Share." (Don't forget to share!) He can be reached at paulh@getfreepoint.com or www.getfreepoint.com

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Encore Wire's Chairman, President & CEO, Daniel Jones (center) was honored with the Copper Man of the Year Award. (Photography by Jerry Lacay)

Encore Wire's Chairman, President & CEO, Daniel Jones was honored with The Ankh Award, also known as the Copper Man of the Year Award, on Wednesday, June 15 in New York City at The Copper Club's Annual Dinner.

Attendees at this special event include industry leaders from around the world. The prestigious Ankh Award has been presented every year since 1962 to professionals who have made extraordinary contributions to the copper industry. By honoring those who have forged pathways in the industry, The Copper Club, formed in 1944, ensures the past, present and future of copper.

The Copper Club's Ankh Award, named for the ankh, a graphic symbol

for the red metal dating back to ancient Egypt, also known as the Copper Man of the Year Award, was first presented in 1962 to honor outstanding individual achievements in and contributions to the copper industry. The trophy awarded to recipients is a reproduction of Auguste Rodin's famous sculpture, The Thinker.

Each year, the club circulates a survey soliciting the copper industry for nominees for the award. It asks for the names of individuals who have made notable contributions to the industry, and the winner is selected by the Ankh Award committee.

For further information on the Copper Club please visit www.copperclub.org

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| 5 | 36 | 36 | 4W 249 m Ω | Pass | < 1 μ A | 1499 V | > 1 G | 0.204 mA | 996 V | 5 M |
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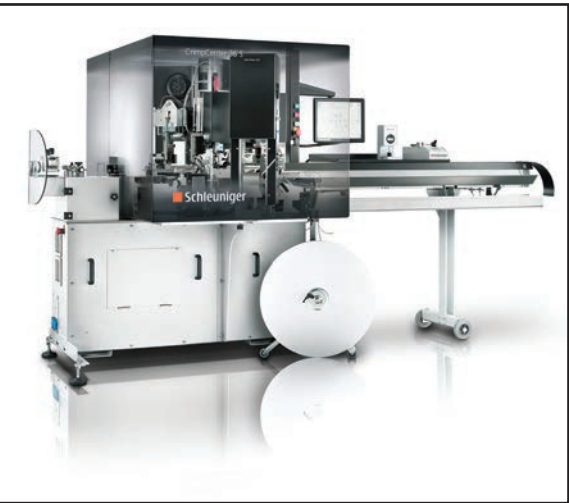
NEWS PLUGS continued



Schleuniger Provides Quality that Lasts Under Daily Use

Manufacturing Resource Group (MRG), founded in 1988 is an ISO-9001 and ISO13485 certified custom cable assembly and box build company serving a wide range of industries. With locations in Norwood, MA and Tecate, Mexico, MRG has a wire department in each area that is responsible for cutting and prepping all types of wires for manufacturing. MRG was using a small mix of wire processing equipment from various manufacturers, but was also doing a lot of cutting by hand.

Then in 1998, MRG bought its first piece of Schleuniger equipment, a jacket stripping machine that is still in use today!



Schleuniger's CrimpCenter 36 S

"Quality that lasts under daily use," is how MRG President, Joe Prior describes his Schleuniger equipment. Since that first machine, MRG has purchased 30 additional pieces of Schleuniger equipment, all of which are still in good working order!

From small benchtop wire strippers, like the UniStrip 2300, to two CrimpCenter 36 S fully automated cut, strip, terminate machines, MRG has a wide range of Schleuniger equipment. By integrating the equipment throughout their entire manufacturing process, MRG has reduced set-up times by 50% and increased processing speeds by 25-30%!

Prior attributes the dramatic cut in set-up times to the fact that most Schleuniger machines allow you to save a wire program within the machine's internal memory and quickly recall it at a later date on future builds. The company is even able to store programs in the cloud enabling them

to be easily recalled in both the Massachusetts and Mexico factory!

It is clear to MRG that Schleuniger helps them achieve their main objective; to provide high quality products and services, delivered on time at a competitive price; According to Prior, "Schleuniger products are critical to our success!"

For further information please visit www.schleuniger-na.com or contact Schleuniger, Inc., 87 Colin Drive, Manchester, NH 03103.

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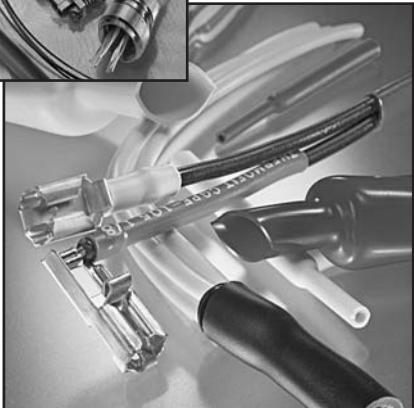


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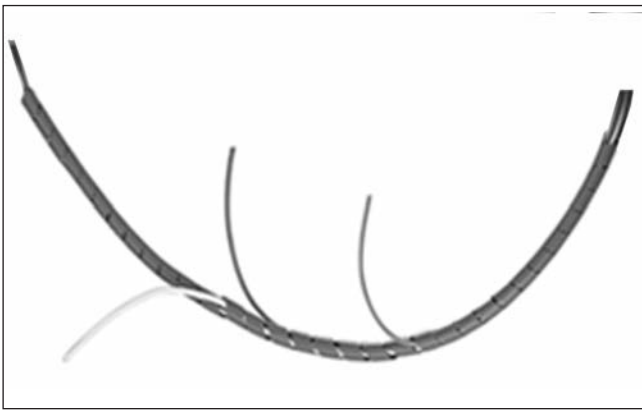
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An Electrical Interconnect Distributor

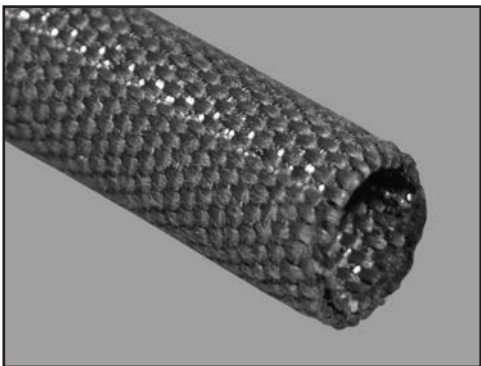
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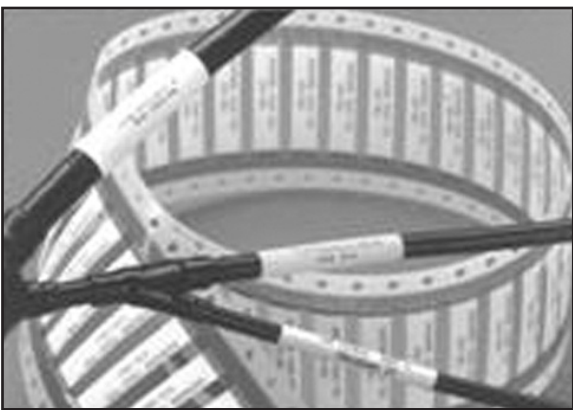
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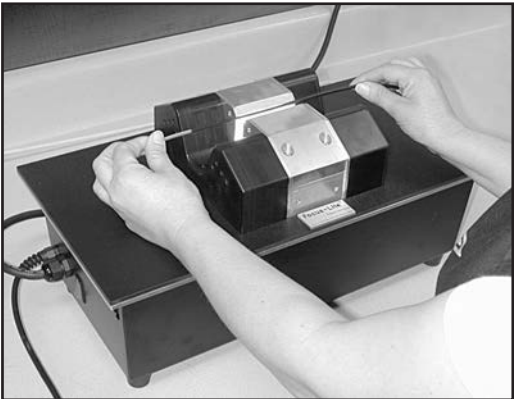
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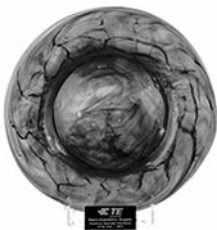
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NEWS PLUGS continued



Cirris Introduces New Software Package, Power User

Cirris Systems presents an all-inclusive software package called Power User. Built for owners of the Cirris CH2, this package combines all extra features of easy-wire into a one-time purchase.

Through Cirris easy-wire Software, users define connectors, wires, cables, and other information necessary for testing. For more complicated testing, some users require extra features such as custom instructions, LUA scripting, and other add-ons. Rather than purchase each feature one at a time, customers can now acquire all easy-wire features at once.

Customers with Power User have access to all areas of easy-wire. Every feature is made available for the customer to

utilize. Need custom scripts for specific tests? Want to automate the test process through Digital I/O? The features obtained through Power User give companies the ability to test with far greater efficiency and accuracy.

Customers who choose to purchase Power User also have access to certain future releases, such as custom scripts (Normally each script would have to be purchased individually). Customers with Power User can be sent the scripts without extra charge or hassle.

CH2 users who would like to learn more about Power User can visit cirris.com/power-user.

Tough Nylon 6/12 for Automotive Cable Jackets Has Excellent Chemical Resistance and Withstands High Temperatures

A new nylon 6/12 extrusion compound for automotive cable jackets provides excellent chemical resistance, withstands high service temperatures, and exhibits

good dimensional stability as a result of low moisture absorption, it was announced today by the Nylon Division of Teknor Apex Company, which will feature the new compound at K 2016 (Hall 6, Stand 6C58-02).

The chemical resistance of Chemlon® 890 HNT001 nylon 6/12 is superior to that of nylon 6 and exhibits greater stress corrosion resistance upon exposure to aggressive chemicals or mechanical stresses. The compound is heat stabilized to prevent embrittlement at high service temperatures and is lubricated to facilitate feeding into the extruder. (See table for property data.)

Chemlon 890 HNT001 compound has received General Motors and Chrysler approvals for heat stabilized nylon 6/12. It is currently used in brake jacketing for a U.S. OEM, and the jacket has passed the cable supplier's heat aging test at 135 °C for 168 hours.

"Chemlon 890 HNT001 is inherently tough and easily processed," said Jeff

Typical Properties of a Nylon 6/12 Compound for Automotive Cable Jackets

| Property | Test Method | Value |
|---|--------------|---------|
| Density, g/cm ³ | ISO 1183 | 1.06 |
| Linear mold shrinkage, % | ISO 294.4 | 1.1-1.4 |
| Water absorption @ 24 hrs., % | ASTM D570 | 0.27 |
| Tensile strength, MPa | ISO 527 | 62 |
| Tensile elongation at break, % | ISO 527 | >50 |
| Flexural modulus, GPa | ISO 178 | 2.1 |
| Flexural strength, MPa | ISO 178 | 59 |
| Notched Izod impact @ 23°C, KJ/m ² | ISO 180 (1A) | 4.5 |
| Heat deflection temperature (1.8 MPa), °C | ISO 75 | 57 |

Source: Teknor Apex Company

Schmidt, North American automotive market manager for Teknor Apex. "We can readily supply this material worldwide from our compounding facilities in the U.S. and Singapore."

More information on Chemlon 890 HNT001 is available at <https://www.teknorapex.com/nylon-612-compound-for-automotive-cable-jackets>.

About Teknor Apex. Teknor Apex Company, a privately held firm founded in 1924, is one of the world's leading custom compounders of plastics.

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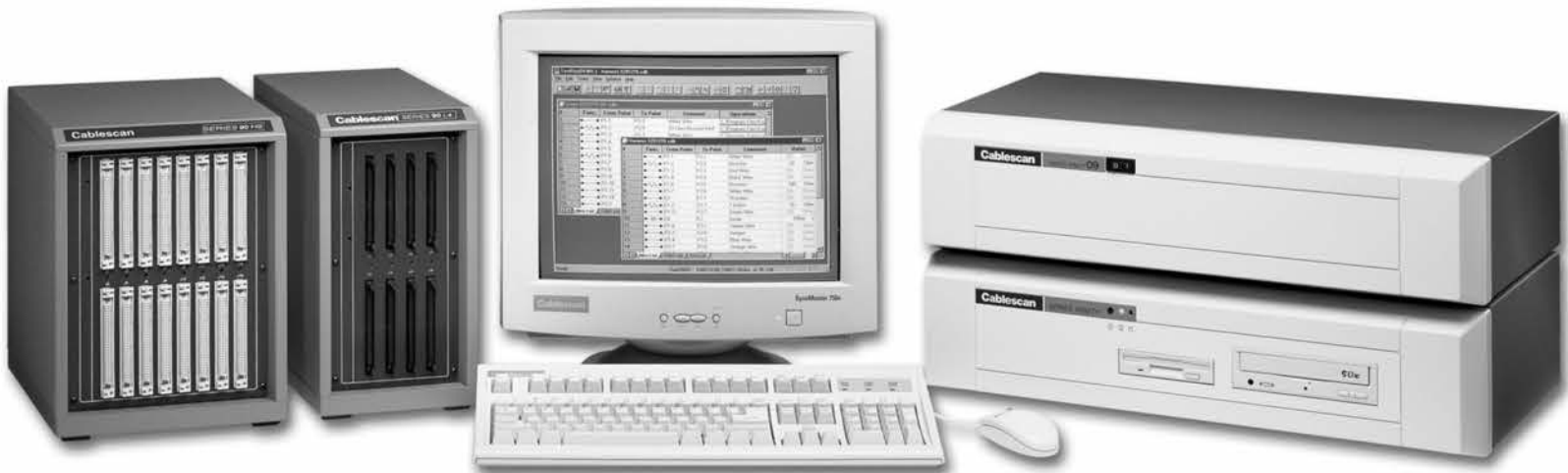
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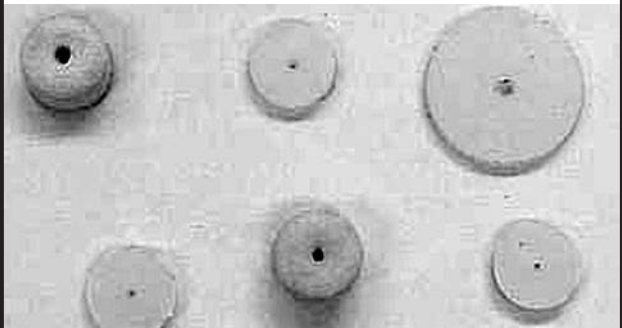
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BURNDY® Introduces Aluminum Lay-in Lugs for Solar Panel Applications

BURNDY® is pleased to announce new additions to their grounding product line. The new aluminum lay-in lugs are most suitable for solar panel applications. The connectors are for use with frames with a maxi-



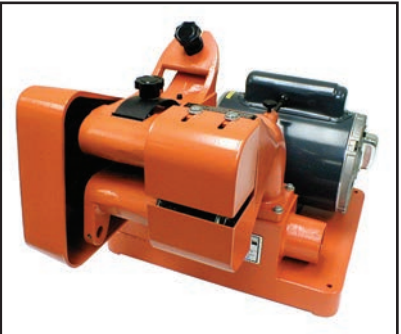
Aluminum Lay-in Lugs for Solar Panel Applications

mum thickness of 1/4 inch. They may also be used for cable to bus or cable to steel connections where the lay-in feature is necessary. Manufactured using high strength aluminum alloy, these connectors have the versatility to be used with aluminum and copper conductors. The serrations are provided to establish better contact and cut through oxidation, ensuring low contact resistance and high conductivity. The anodization on aluminum rails is nonconductive and electrical current cannot pass through this layer. BURNDY's cup point screw penetrates this layer allowing current to flow into the aluminum connector and consequently current flows to the conductor.

The connectors are UL467 and UL2703 Listed. The connectors accommodate copper cables from 14 AWG to 6 AWG and Aluminum

cables from 12 AWG to 6 AWG. The connectors are also available in bulk.

For further information please contact BURNDY® at 47 E. Industrial Park Drive, Manchester, New Hampshire, 03109, or visit website at www.BURNDY.com



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The powerful motor drives two counter-rotating stripping wheels at high speed to quickly remove tough insulations. FybR-glass® or Wire Brush wheels may be utilized with the E200. The selection of the correct grade of stripping wheel is critical. We recommend using the Eraser Certification Program to determine the correct wheels for your specific application.

A dust take off port is included on the machine, and an adjustable length stop insures consistent strip lengths. For more information, please visit www.eraser.com, or contact Eraser at (800)724-0594.

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Heilind Voted Best Electronics Distributor for Sixth Consecutive Year



Heilind Electronics, a leading global distributor of electronic components, was recently recognized as the #1 electronics distributor. The award was announced at this year's Electronic Distribution Show (EDS) in Las Vegas, and was based on results from an annual customer satisfaction survey conducted by Bishop & Associates – a market research firm for the interconnect industry.

Over 800 participants completed the survey, which compared the performance of the top 10 electronics distributors in North America. The 2016 award is the sixth consecutive one for Heilind, who ranked #1 in nearly every category – including on-time delivery, breadth of product offering, sales and technical support, and ease of doing business. The company ranked particularly well in terms of overall distributor preference,

scoring over 30 percentage points over competing distributors. “I am delighted to accept this award on behalf of everyone at Heilind,” said Bob Clapp, founder and CEO of Heilind Electronics. “The fact that we were rated first in almost every category shows the hard work and dedication exerted by team members in every department. We’ve always put customer satisfaction first; this has been the driver of our success thus far, and will continue to be in the future.” Founded in 1974, Heilind Electronics, Inc. (www.heilind.com/www.heilindasia.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.

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Innovative Navy Data Communications Cable Achieves Approval from U.S. Navy

Champlain Cable Corporation Equips Navy Fleet with 5x Faster Data Transmission

Champlain Cable Corporation, a leading developer and producer of wire and cable for extreme conditions and applications, has successfully achieved Qualified Product Listing status with the U.S. Navy for their latest secure Data Communication

Cable, developed specially for the U.S. Naval Fleet: MIL-DTL 24643C Slant “77” CAT 6A. These cables, which allow for data and communication secure transmittal at a stunning rate of 5x faster than the CAT 5E currently used, meet and exceed the rigorous requirements specified in MIL-DTL24643. Additionally, they can be installed without changing existing connections or the cable envelope for a quick and effective transition. Champlain Cable is the first company to qualify for this approval, which enhances the Navy’s on-board data transmittal capabilities for all U.S.

Naval vessels, ultimately saving the lives of our U.S. fighting men and women around the world.

Of the recent approval, Champlain Cable Director of Market & Product Development Jack Griffin said, “Champlain Cable was the first to produce category cable that met military specs back in 2008. Now we are continuing our legacy of innovation for the military with CAT 6A cables, which are groundbreaking for their ability to deliver improved and fully protected communication performance, meeting fireproof ratings, toxicity requirements and safety standards. It’s an

honor for us to help bring the Navy fleet to the cutting edge of communication technology and into the future, and to equip their vessels with the safest, most effective cable available.”

Champlain Cable Corporation is the primary manufacturer in supplying the U.S. Navy with Secure Data & Communication Cable Products. Their products are perfectly suited for harsh military and sub “V Line” conditions, in particular their proprietary Low Smoke Zero Halogen Dataclear™ Marine products.


Champlain Cable Corporation, www.champcable.com, is a wire and cable development and manufacturing facility based in Colchester, VT. Founded in 1956, Champlain Cable has innovated and manufactured essential wires and cables for the military, aerospace, communications, automotive, entertainment and electronic industries. With a “state-of-the-art” Research and Development department and laboratory, Champlain Cable continues to lead their industry in creating wire and cable solutions to the world’s most demanding challenges.



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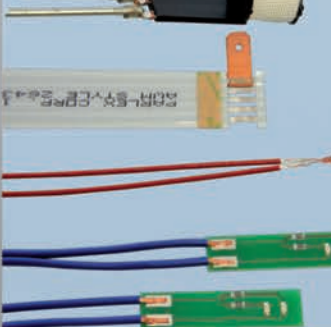


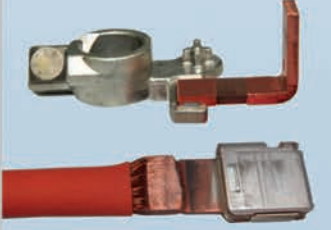

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Buse Industries

Continued from page 1

ny brochure and Power Point presentation. Marketing also is done through other brochures, calendars and a LinkedIn page in addition to a Website.

All the media are used by 10 people who handle sales – five company staffers and five outside reps. Four of the five Buse people work inside and double as customer service specialists.

Using his own money, Jack Buse founded Buse Industries in 1962 in St. Charles, Mo., northwest of Bridgeton. He initially distributed electronic products. But, in response to customer demand,

he started doing harness and cable contract manufacturing.

“There was a lot of organic growth because Jack was a great salesman,” Horgan said. “He dealt with companies such as Toshiba International and Vitek, which was part of McDonnell Douglas.”

Jack Buse died in 2001. Late in the previous year his company was purchased by Wynnchurch Capital, a private-equity investment company in Rosemont, Ill. The firm also bought Cleveland Cable, RBI, Connection Concepts and Elite Technologies and incorporated them into Buse Industries.

On June 30, 2011, Buse Industries



Buse’s 55,000 square feet of manufacturing capacity has been recently reorganized using the TQM/LEAN/ Six Sigma methodology into ten separate, but integrated “cells” running one 8 hour shift per day, five days per week, plus overtime as need.



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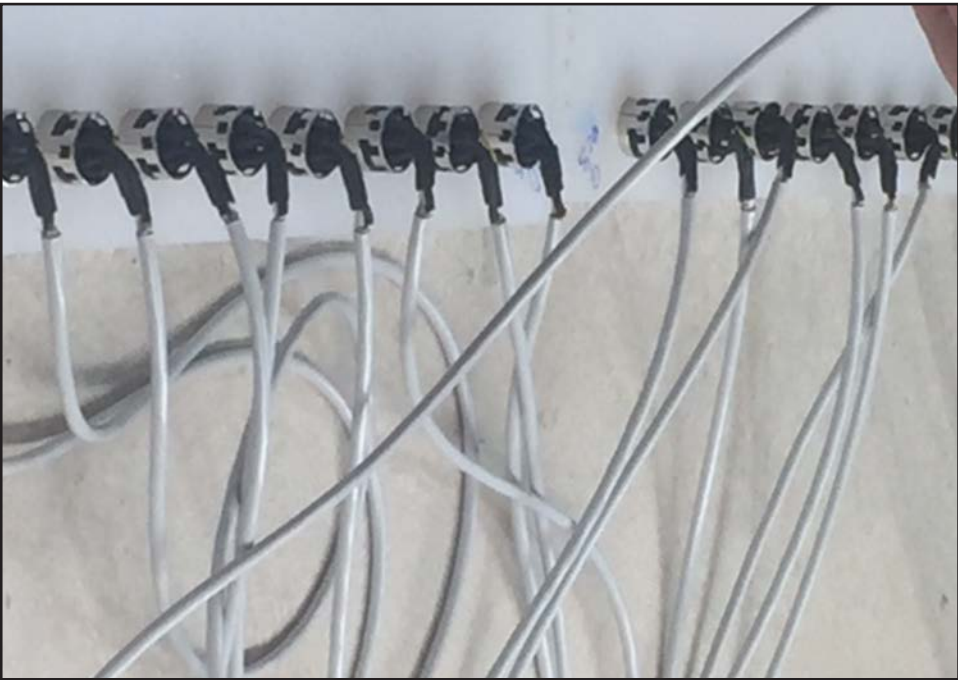
machine and in

real time.









Buse products include lead wires, simple to complex assemblies including Coax, Military, and Fiber Optic.

was acquired by Capital for Business (CFB) and Diamond State Ventures (DSV). CFB, located in Clayton, Mo., is a subsidiary of Commerce Bancshares, a bank holding company in Kansas City, Mo., and DSV in Little Rock, Ark., invests in companies through debt and equity financing.

Buse expanded Aug. 1, 2014, when CFB and DSV bought Custom Cable Assembly (CCA) in O’Fallon, Mo., 18 miles west of Bridgeton. CCA, founded in 1992, specialized in designing, manufacturing and modifying harnesses and cables for OEMs.

Similar to the process with NTI, CCA was folded into the Buse facility. CCA

president and CEO Vic Blair, who was with the company 15 years, became the VP of engineering at Buse, and other CCA staffers made the move.

Horgan joined Buse in February 2013. Before his current position he served as president and CFO at Cape Electrical Supply in Cape Girardeau, Mo., and VP of finance and CFO at Olin Corp. in East Alton, Ill. At Amdocs in Chesterfield, Mo., he was VP and general manager of the IntraISP business unit, VP of finance, VP of operations for the Americas region and director of finance.

Horgan’s career also includes posi-

Continued on page 24



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Buse Industries

Continued from page 23

tions at three other companies in the St. Louis area. He was executive VP at Trendmasters, VP and CFO at Pretium Packaging and senior manager at Ernst & Young.


He earned a bachelor's degree in accounting and an MBA from Saint Louis University. He also went through the executive program in corporate strategy at the University of Chicago Booth School of Business.

Horgan is an adherent of the late Stephen Covey, the leadership authority, organizational expert and teacher best known for The 7 Habits of Highly Effective People. He also wrote Great Work, Great Career as well as Everyday Greatness.

"I like Covey for his win-win leadership solutions," Horgan said. "I also had great mentors at Ernst & Young, Pretium Packaging and Olin Corporation. I've had to adapt to different cultures as I've gone from big to smaller companies. There are more resources in big companies, and you have to do it yourself in a small company."

Besides Nibert and Blair, Horgan is assisted at Buse by controller Terry Messmer, plant manager Lori Adams, quality control manager Ron Henderson and engineering manager Dave Linhoff. They are part of the 20 persons in management.


Continued on page 26



Simple assemblies ready to be kit-ted.

Ninety people work in production, which runs eight hours a day and five days a week. Although overtime is available, as many as 50 temporary employees are hired to meet spikes in customers' orders. "This is an excellent area for hiring regular employees and adding temporary staff," Horgan said.

Employee compensation includes health insurance and a 401(k) program with a company match. Should employees in a department meet a monthly target for quality and scrap, they are paid \$50 each. A bonus structure is being



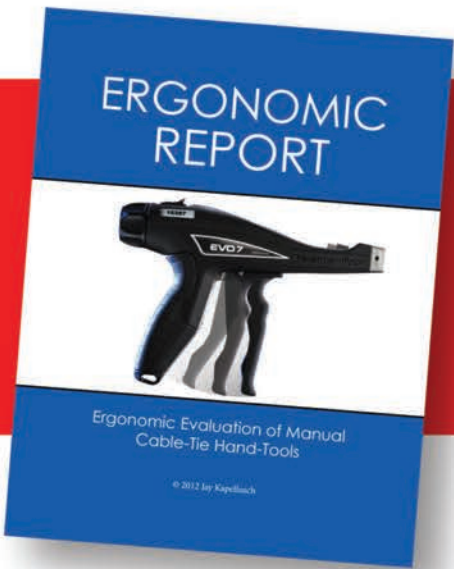
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Buse Industries

Continued from page 23 _____
developed for 2017.

A training room was set up in the last two years for every new or temp employee to be oriented. Training is also done for IPC-WHMA 620 standards, and Buse staffers have received training at

Molex, Komax and Schleuniger.
“Our three work areas of engineering, sales and production have collaboration tables for brainstorming,” Horgan said. “They are used at least once a week and many more times a week if there are many projects to be done. We encourage people to be vocal.”



Buse offers complete harness assembly, labeling and kitting for all of a customer’s interconnect solutions for a given product.

The engineering department has six people, who are organized by function. The senior engineer does quotes and meets with customers. Another engineer supports production, and another writes manufacturing instructions and revises bills of material.
More engineers may be added “to better meet customer needs,” Horgan said. “There is an industry trend to have engineering, and there are many opportunities for electrical engineers especially.”
Buse moved to its current location in 1995 and underwent an expansion in 2000. The building encompasses 60,000 square feet, with 55,000 for manufacturing.

Production was divided into 10 cells

in 2014 based on total quality management, lean and Six Sigma. Work and materials are scheduled and tracked on enterprise resource planning software from Cetec in Austin, Texas.
The cells are furnished with similar equipment for wire cutting, stripping, crimping, shrink-tube cutting, testing and measuring. The cells also have electrostatic discharge and assembly work stations.
Cells are broken down according to solder assemblies, basic assemblies, complex assemblies, heavy-gauge assemblies, kitting, first articles, box builds, Class 100,000 clean assembly and datacom and telecom assemblies.

Continued on page 28

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Buse Industries

Continued from page 26

Products are made for the medical market, which is 30 percent of Buse's revenue; commercial and industrial (including agriculture), 30 percent; military and aerospace, 20 percent; networking, telecom and datacom, 10 percent; and miscellaneous, 10 percent.

Production runs average 50-500 units for one order, and longer runs are thousands of pieces. Cell and plant productivity rates are monitored daily for labor and material usage.

"We've made a huge increase in quality, and it's the highest it's ever

been," Horgan said, noting a 99.6 percent acceptance rate. "We measure quality internally and externally and post the metrics daily. We've seen good improvement in on-time delivery, and we're getting better on scrap loss. We do need to improve on labor."

Buse has ISO 9001:2008, UL and CSA certifications and ITAR registration. AS 9100 was implemented July 1, and the company has six A-620 certified trainers.

Buse uses 400 suppliers, but the top 10 receive 70 percent of the orders. "With few exceptions, we're pleased with our vendors," Horgan said. "Our relationships have gotten

better because we hold lunch-and-learn programs at least once a quarter for suppliers to come in and meet with us. We've had a good response to that."

The number of customers is 150-175, down substantially from 600 a few years ago. "We politely moved away from small businesses spending \$50-100 a year because we were not serving our major customers," Horgan said.

Customers, which are located across the United States, include Boeing, Chicago, Ill.; Flight Safety International, New York City; Toshiba, New York City; Entrust Datacard, Minneapolis; Winegard Co., Burlington, Iowa; Parker Hannifin, Cleveland, Ohio; and Becton, Dickinson and Co., Franklin Lakes, N.J.

"One of our major challenges is the intense competition, both foreign and domestic," Horgan said. "We've repatriated a couple jobs from China. Shortening the lead times brings them back."

"This is a trend in its early stages," Horgan said. "More and more companies are considering moving back. Some are sourcing in Mexico because it is in the same time zone, has less messy communication and is easy to get to."

Horgan is proud that Buse has been in business nearly 55 years. "We're continuously improving and getting better," he said. "What I like best is helping customers solve problems and seeing them satisfied."

For more information, call 800-999-2873, e-mail jhorgan@buseinc.com, visit www.buseinc.com or write 177 Northwest Industrial Ct., Bridgeton, MO 63044.

UNIFORM TERMINATION JUST GOT EASIER - AND FREE

TE Connectivity's (TE) PIDG, PLASTI-GRIP, SOLISTRAND and FASTON Terminals and Splices are designed for complete and uniform reliability in the most difficult circuit environments. The many millions of TE terminals that are still deployed twenty years after installation are a testament to the rigorous testing and research that went into their design and manufacturing. Many of the TE PIDG terminals meet or exceed the requirements of SAE AS7928, Type II, Class 1 and 2.

TE's design of the crimping dies and construction of the terminal allows for uniform insulation thickness under crimping pressure, transmitting pressure evenly to the center of the crimp area. This produces a crimp and terminal that are alike in appearance and performance. PIDG products are available as rings, spades, flanged spaded, slotted rings, splices in several other varieties and sizes.

PIDG Terminals & Splices

- Terminals are made of high conductivity copper
- Most product is UL and CSA approved - Insulation is UL 94V-2 rated
- Product is rated for use up to 105 degrees C and 300 Volts for terminals and 600 Volts for splices
- PIDG terminals have copper sleeve for improved wire insulation support
- The body has serrations for maximum contact and tensile strength
- Insulation sleeves and the corresponding tooling are color-coded by wire-size for easier identification



PLASTI-GRIP Terminals & Splices

- Vinyl insulation sleeve provides good dielectric strength and supports the wire insulation so that no bare wire is exposed
- Most product is UL and CSA approved
- Most product rated to 105 degrees C, with an operating voltage of 600 V
- Insulation is 94V-0 rated
- Funneled wire entry on terminal prevents turned back wire strands and permits rapid wire insertion during high speed production
- Serrations in the crimp barrel provide maximum contact and tensile strength after crimping



SOLISTRAND Terminals & Splices

- Constructed of fine grade high conductivity copper for optimal electrical performance
- The brazed seam increases metal strength around the entire barrel area assuring withstanding harsh industrial environments. It also prevents pinched and stubbed wires.
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NEWS PLUGS continued

Technical Horsepower Consulting LLC Announces Release of New Website

Technical Horsepower Consulting, LLC. (THC), an international leader in consultation and technical training in the areas of optical cable, optical sensors, and cable/connector interface, announces the release of its new website, <http://technicalhorsepowerconsulting.com/>.

In 2015, Wayne Kachmar incorporated his consulting company Technical Horsepower Consulting, LLC. and joined Fiber Optic Center, Inc. as their Optical Cable Technical Expert.

The new website provides organization of Wayne Kachmar's extensive knowledge and now service in the areas of Cables, Connectors, Technical Training Programs, and On-Site Facility Reviews. Sub areas of Specification Editing / Creation, Cable Design, Cable Testing and Qualification Support, Cable Manufacturing and Best Practices, Connector Design, Connector Test and Qualification and Connector Assembly are additionally broken out and explained.

Building on recent resource rollouts with Fiber Optic Center, Inc. that include technical articles, blogs, AskFOC, video demos, helpful tips series, monthly e-news subscriptions, and the most recent FOC Glossary, Technical Horsepower Consulting, Inc.'s website includes Wayne Kachmar's blog, published papers, patents, and links to the FOC technical articles and glossary.

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.

The Technical Horsepower Consulting, LLC. and

Fiber Optic Center, Inc. partnership uniquely positions them to be the "Go-To" resource with decades of global, practical technical and production experience. THC also has @TechHorsepower tweets incorporated onto the new website and uses the tweet feature to connect with the industry.

Technical Horsepower Consulting, LLC. (THC) is an international high technology consulting company. THC was incorporated by Wayne Kachmar and built on his 38+ years of optical cable industry experience. Wayne Kachmar has participated in many innovations and seen the maturing of the industry. Over the years, Wayne has been involved in many unique projects to provide optical cable in diverse environments such as the underwater ROV that penetrated the Titanic, as well as

cable that is in service sensing subatomic particles in the Antarctic ice. Wayne developed a number of unique concepts and products using optical fibers as both information carriers and sensors where the cable became the sensor. These have included fiber laser ring gyroscope components and distributed acoustic sensors for terrestrial and underwater applications. As a principal investigator for many government sponsored projects, he has developed methods that push the state of the art in optical cable design and manufacture. Over his career, he has been able to fuse this state of the art knowledge with conventional fiber cable design to significantly cost reduce both materials and processes. With over 50 granted patents in

Continued on page 31



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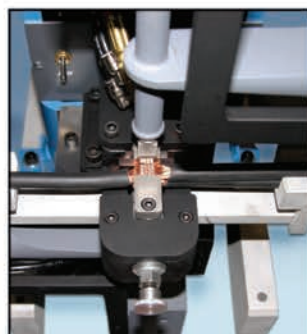


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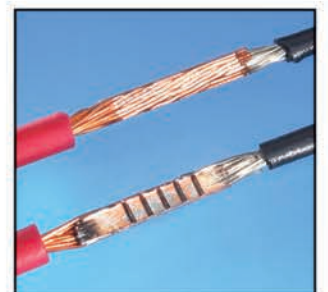
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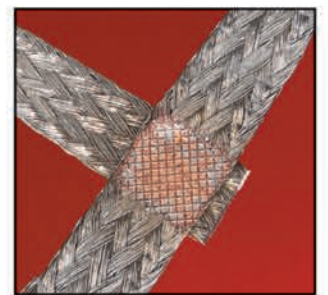
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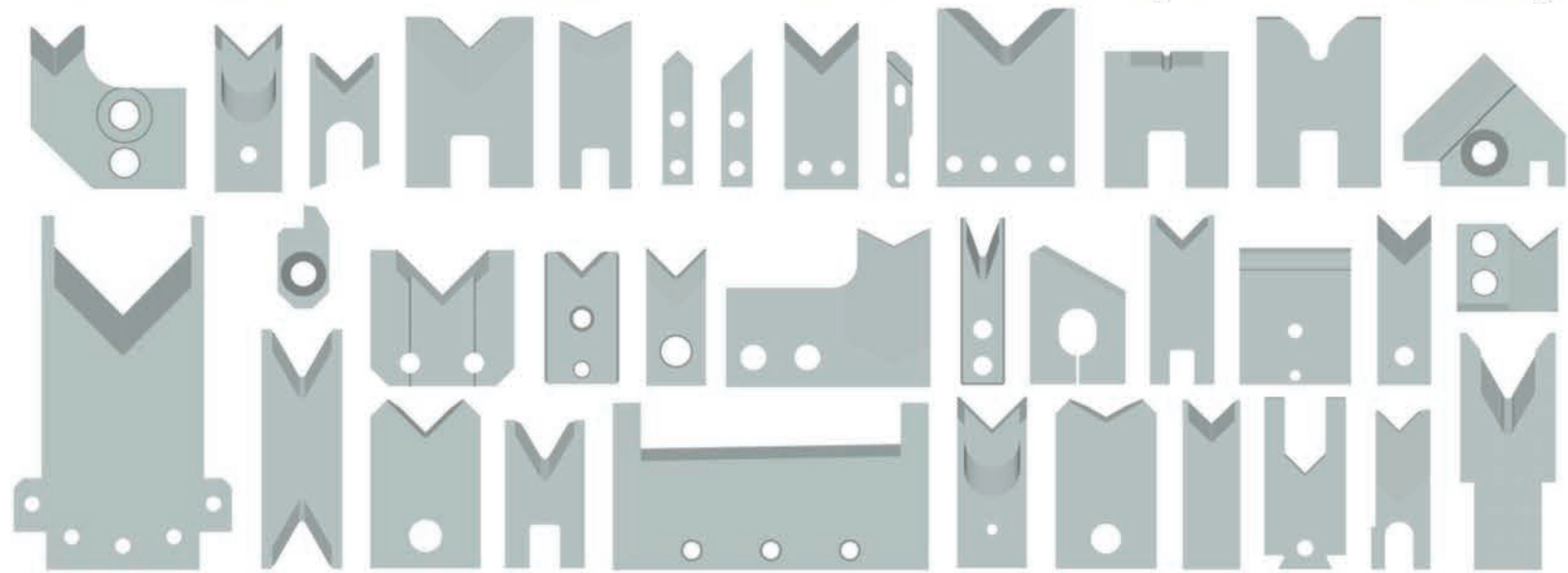
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| • Automatic Center Stripping Machines | • Terminal Applicators |





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NEWS PLUGS continued



Continued from page 29

fiber optic cables, connectors and tools and over 60 patents published or in process, Wayne's path to TE Connectivity started when he founded and ran Northern Lights Cable, Inc. in 1988. He sold the company to Prestolite Wire in late 1997 continuing as division CEO until 2000. In 2000, Prestolite Wire was packaged with other holdings of the owner to become GenTek (a publicly held company), which also acquired Krone that year. Wayne's position transitioned to Director of R&D, managing the RD&E center. In 2004, all Krone divisions were acquired by ADC who itself was acquired by TE in December 2010. In 2012, Wayne was named a TE Fellow in electro-optic engineering based on the length and depth of his technical knowledge and accomplishments. This is the highest technical title within the TE structure with less than 20 persons worldwide out of 8000 scientists and engineers within TE. In 2015, Wayne incorporated his consulting company Technical Horsepower Consulting, LLC. and joined Fiber Optic Center, Inc. as their Optical Cable Technical Expert.

For further information contact: Technical Horsepower Consulting, LLC., 514 Oredbed Road, North Bennington, VT 05257 . Direct 802-379-1130

Indium Corporation's Bastow Among First to Earn SMT Processes Re-Certification

Indium Corporation's Eric Bastow, Assistant Technical Manager, has become one of only a handful of technologists to earn a re-certification of the Surface Mount Technology Association's (SMTA) SMT Processes designation.

Recertification is required every five years in order to ensure that the individual's knowledge is kept on the cutting-edge of electronics assembly technology. It entails an online course with several modules and a corresponding exam for each module. Engineers are required to pass every module's exam in order to earn their recertification.

SMTA Certification is a unique program that recognizes and certifies competence across the entire SMT

assembly process at an engineering level. This certification is one of the global electronics assembly industry's most respected validations of process excellence.

Indium Corporation has one of the largest SMTA-certified engineering teams in the industry, with more than 30 certified employees.

Bastow first earned his SMT Certification in 2005. He provides technical support for Indium Corporation's full range of solder products for the electronics assembly, semiconductor packaging, and thermal management markets. He earned his Six Sigma Green Belt from the Thayer School of Engineering at Dartmouth College, Hanover, NH. Bastow is also a certified IPC-A-600 and 610D specialist.

Founded in 1934, Indium has global technical support and facto-



Eric Bastow, Indium Assistant Technical Manager

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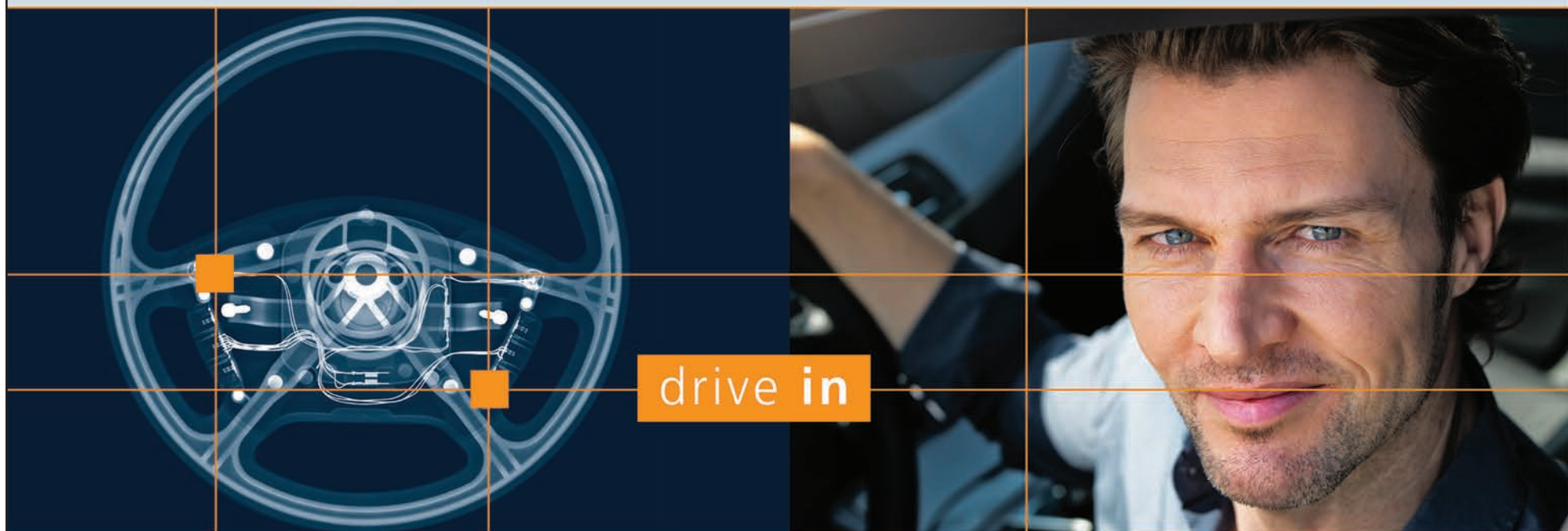
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PreFeeder 3300



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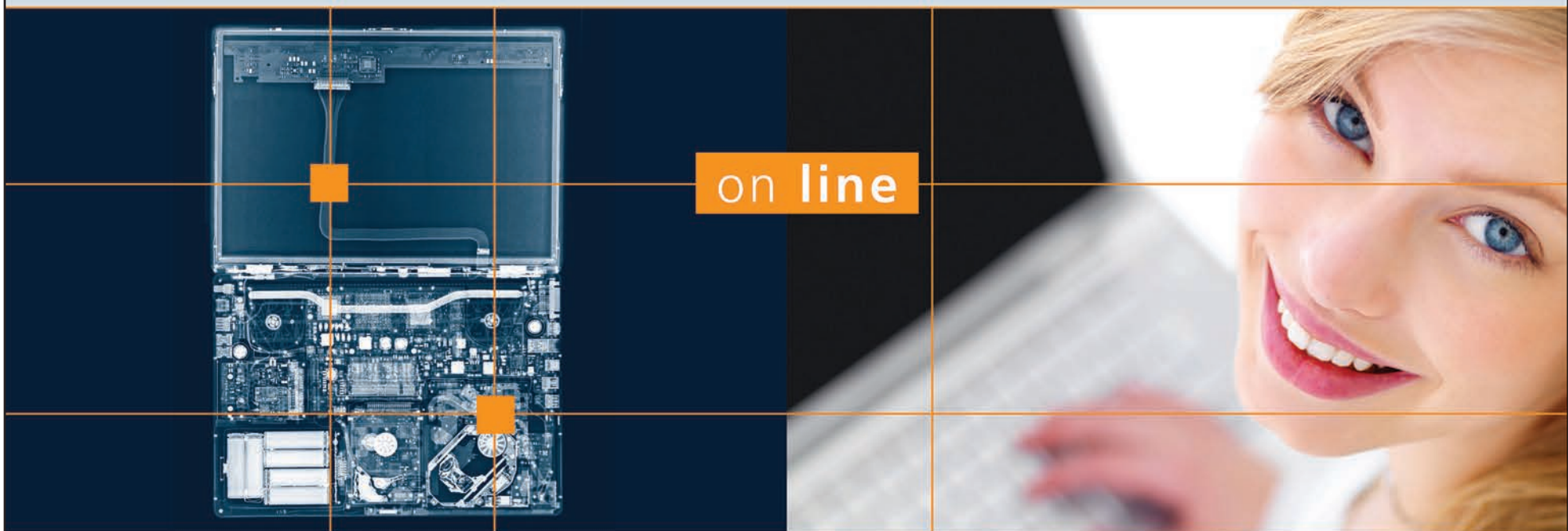


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NEWS PLUGS continued



Heilind Introduces Solid State Relays and More from Crydom

Heilind Electronics, a leading distributor of electronic components, has added Crydom products to its growing portfolio of relays and switching solutions. With over 40 years of experience, Crydom is a global leader in SSR design, development, and manufacturing.

As an authorized distributor of Crydom products, Heilind will be stocking a wide range of solid state relays, contactors, and power modules, as well as custom-designed solid state switching solutions. These items comply with the latest legal

environment directives, including RoHS regulations.

The new selection of relays and related products are designed to serve a variety of industries, including building equipment; energy and infrastructure; food and beverage; industrial OEMs; healthcare; and transportation.



Crydom Relays and Contactors

Visit Heilind's website for more information about Crydom solid state relays and switching solutions.

Founded in 1974, Heilind Electronics, Inc. (www.heilind.com/www.heilindasia.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.

Newark element14 Expands Range of ROHM Automotive-qualified Products

Newark element14 has expanded its portfolio of automotive-qualified products with the addition of over 250 new ROHM semiconductors. Exclusively avail-

able in-stock for same day dispatch from Newark element14, the ranges include LSI, diodes, transistors and power management solutions, suited for the different automotive application segments.

To meet the increasing needs of digitization in new automotive applications, ROHM is developing new products to deliver full system solutions. ROHM has strengthened its offering at Newark element14 with ranges of products for use in applications including Automotive Cluster, Power, Head-up displays, Charger and Advanced Driver Assist Systems.

These are among the new ROHM automotive-qualified products available at Newark element14.

- Ideal for automotive applications requiring a direct connection to the battery and low current consumption such as in the body, audio and navigation systems, the ROHM series of AEC-Q100 qualified LDO Voltage Regulators feature ultra-low quiescent current of 6µA (Typ.) and output current capability of 200mA.

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The new ranges of over 250 ROHM semiconductors are available from Newark element14 in North America, Farnell element14 in Europe, and element14 in APAC.

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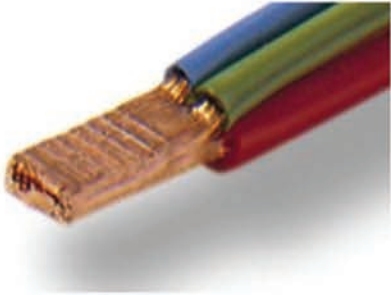


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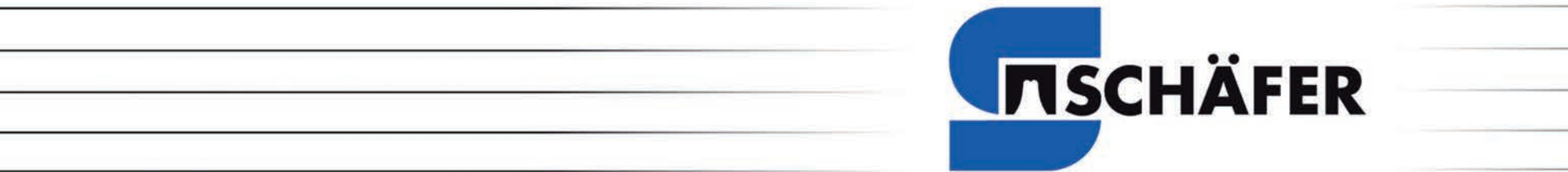
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NEWS PLUGS continued



E3.series 2016 is Available Now

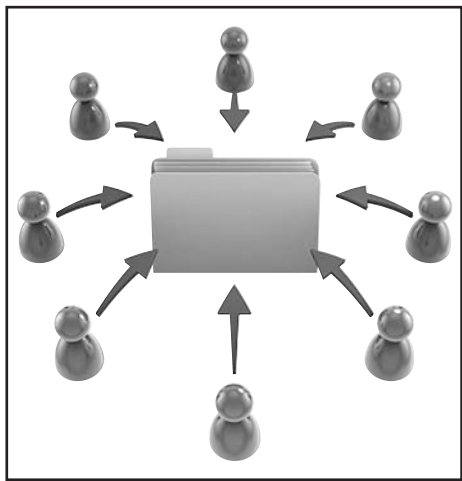
Zuken's latest version of E3.series offers engineers a live-feel, collaborative environment, along with a range of individual and multi-user usability and productivity features. These include dynamic block functionality that helps maximize design reuse, automatic connect and autoroute functions that significantly reduce routing time and effort; and a tabular terminal editor.

E3.series 2016 has been enhanced to offer a smoother user experience for today's globally dispersed design teams. Collaborating on designs is now easier with an enhanced multi-user, real-time environment; users can design concurrently without checking-out sheets before use. Users can work simultaneously on one sheet and instantly see in the sheet tree if another user has opened it, as their user name is visible. And with the latest collaboration technology, including Oracle updates, all objects can now be accessed online.

Maximizing reuse using known-good designs is enhanced with dynamic, functional blocks in schematics. Unique to E3.series, hierarchy is available within a block and offers numerous productivity benefits. Dynamic blocks can be created by simply dragging components or symbols from the library onto a block, drawing internal connections as well connections to the outside, and creating hierarchies by placing hierarchy blocks ports.

New cabinet layout features include automatic placement optimization when inserting, changing or deleting components; placing complete preconfigured terminal strips; and sorting terminal blocks according to customer criteria, as well as defining cabinet layout models for block components in the library. This enhances rack-based cabinet layouts with predefined slots.

The tabular editing functionality has been extended to allow terminal strips across a whole project to be managed and edited directly within a table, with modifications made automatically following changes. Users will benefit from increased productivity through having a bird's eye view of their whole project, particularly with medium to large-sized projects, as there is no need to navigate within the design. Time savings can be found using a global search function that filters and searches for terminal connections, and sorting is available within the terminal editor.



Collaborating on designs is now easier with an enhanced multi-user, real-time environment.

Automatic adjustments are made after making changes, such as swapping components or reordering terminal strips. Finally new integrations with manufacturers' configuration tools make configuring and ordering strips quick and easy.

A new automatic connect and autoroute function significantly reduces overall design and completion time and effort. Movie: <https://www.youtube.com/watch?v=ysKGhhXUOb8>

Following component selection, connections are automatically cut to allow repositioning, then elements are automatically moved and once placed, connections are re-routed back. This gives users a fluid experience and confidence that they can try design alternatives without worrying about losing connections.

For more information about E3.series updates, see www.zuken.com/e3series-whatsnew

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Today's Smaller Cables Require Automated Processing

By Pete Doyon, VP Product Management, Schleuniger

The trends in mobile electronics today are smaller, thinner and lighter. Yet, mobile electronic devices, such as cell phones, tablets, portable GPS devices, etc. are more powerful than ever. Applications, like wireless internet connections, RFID and Bluetooth, that have become essential in today's devices, require more complex transmission mechanisms, increasing the requirements for the antenna components mounted inside of the device. In order to meet the need to manufacture smaller devices, while also meeting a growing demand for more powerful next generation wireless

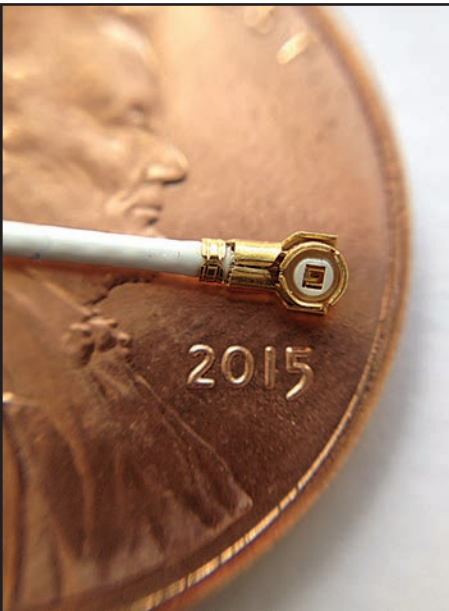
devices, smaller cable assemblies and connectors are being developed.

As a result, ultra miniature RF cable assemblies are now quite common. Ultra-miniature RF cable assemblies are used to connect tiny antennas to the circuit board inside mobile electronic devices. The connectors of these RF

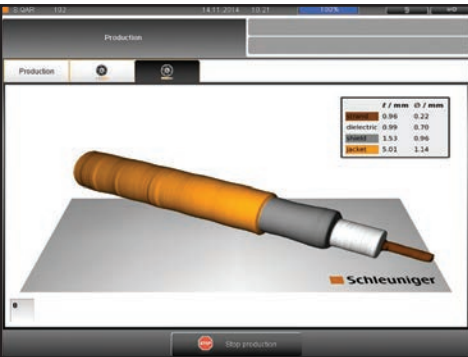
cable assemblies need to not only have a very low mating height, as to not increase the thickness of the device, but they also need to easily mate and unmate so the device is serviceable.

One of the smallest connector systems currently in use has a mating height of only 1.2 mm! These tiny RF connectors are typically interfaced with a 36 AWG micro-coaxial cable with an outer diameter of 0.81 mm (0.032"). Smaller connector systems with even smaller micro-coaxial cables are already in development and will likely become the new standard soon.

Manufacturers find themselves faced with the challenge of working with and processing these tiny wires and components with the accuracy needed to maintain device reliability and the speed



Ultra-Mini RF cable



Example of a 360 camera view for quality assurance.

needed to keep up with a growing market.

One of the major challenges for manufacturers working with ultra-miniature cable assemblies is overcoming human error and maintaining consistent precision. The tiny cables need be measured and cut to length within very tight tolerances. Then one or both ends of the micro-coaxial cable must be stripped with up to 3 steps (jacket, shield and center conductor). All of this needs to be accomplished in a high-production environment. Due to the small size of the cable, it has become practically impossible to achieve the required length tolerances with manual work or with semi-automatic tools.

Another challenge manufacturers face is quality control. In many cases, strip lengths and diameters must be viewed, measured and recorded to make sure they are within the required tolerances before terminating. With micro-coaxial cable, this would be extremely complicated and time consuming to accomplish manually. In addition, the use of microscopes or magnifying glasses is not only inefficient, but the quality of such measurements is subject to human error. Instead, a powerful camera with a 360 degree view that automatically measures and records the dimensional data is needed to not only guarantee quality, but ensure traceability of the data as well.

Achieving flexibility while maintaining speed also presents a challenge for manufacturers. The end of the micro-coaxial cable must be terminated using

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an automatic crimping press designed for the specific connector and cable combination being processed. Manufacturers need an automatic machine that can accommodate a wide range of cable sizes and connector types and also allow quick changeover between jobs. The automation platform must be flexible and have space to integrate additional processing steps, such as tinning, window stripping, stacking, etc because transporting the cables between the individual processing steps is also problematic. Even the smallest touch to the cable end can bend and render it unusable. In the worst case scenario this can even result in failure of the end product. Therefore, it is important to have a fully automatic cable assembly system automation system that incorporates all assembly and quality control process

steps.

As the need for smaller cable assemblies continues, speed, precision and quality control will be hot topics among manufacturers dealing with ultra-miniature RF cable assemblies. Manual hand tools are no longer sufficient for manufacturing mobile electronic devices, but a fully automatic machine can help overcome the challenges manufacturers face and will save time, money and waste in the long run. Precision, flexibility, high production output and quality monitoring with traceability of data are things that should be considered as manufacturers working with ultra-miniature RF cable assemblies consider future equipment purchases.

After all, the demands on these manufacturers are only expected to grow bigger as devices get smaller.



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In every issue of Wiring Harness News Anixter will bring you informative articles about wire and cable technology.

HIGH-TEMPERATURE WIRE

Cables can be installed in environments with harsh conditions and high ambient temperatures, but selecting the right cables for the correct environmental conditions is essential to ensure the cable's expected life span will not be affected. The use of wire and cable products outside their designed temperature range can result in premature and often expensive failures in service.

UNDERSTANDING HIGH-TEMPERATURE WIRE

High-temperature wire is often defined as a wire with a temperature rating of 125°C or higher, although high-temperature can also refer to temperature ratings as low as 90°C. High-temperature cables can either be single-conductor or multiconductor. These products commonly consist of a conductor (usually annealed, tinned copper, copper-plated or nickel-coated copper) and insulation. High-temperature wires may also have an additional jacket consisting of a fiber-glass braid or K-fiber material.

Two key components to ensure

high-temperature wires are suitable for the application are the wire's temperature rating and ampacity. Temperature ratings can be defined as the maximum continuous temperature that a wire can withstand during its lifetime. If a cable's temperature rating is not suitable for the environment and ambient temperature, the expected lifespan of the cable could be affected.

The ampacity is the maximum current an insulated conductor can safely carry without exceeding its

insulation and jacket temperature limitations. If the cable is undersized, the heat produced by circuit load may exceed the cable's temperature rating and the cable may be compromised. For more information, please see *Anixter's Wire Wisdom Wire and Cable Ampacity Rating*.

Continued on page 42

| Trade Name | Description | Temperature | Voltage | Size | UL Styles, CSA Standards |
|------------|---------------------------------------|----------------|---------|-------------------|---|
| EPDM | Ethylene propylene diene monomer | 125°C to 150°C | 600 V | 18 AWG to 4/0 AWG | UL 3284, UL 3374; CSA 1254 |
| SRK | Silicone rubber with a K-fiber jacket | 200°C | 600 V | 18 AWG to 4/0 AWG | UL 3071, UL 3074, UL 3075, UL 3125, UL 3126; CSA SEW-2 3410 |
| TGGT | PTFE/glass | 250°C | 600 V | 24 AWG to 4/0 AWG | UL 5256, UL 5196 |
| EPDM | Ethylene propylene diene monomer | 125°C to 150°C | 600 V | 18 AWG to 4/0 AWG | UL 3284, UL 3374; CSA 1254 |

Table 1 - Common UL Style High-temperature Wire Types



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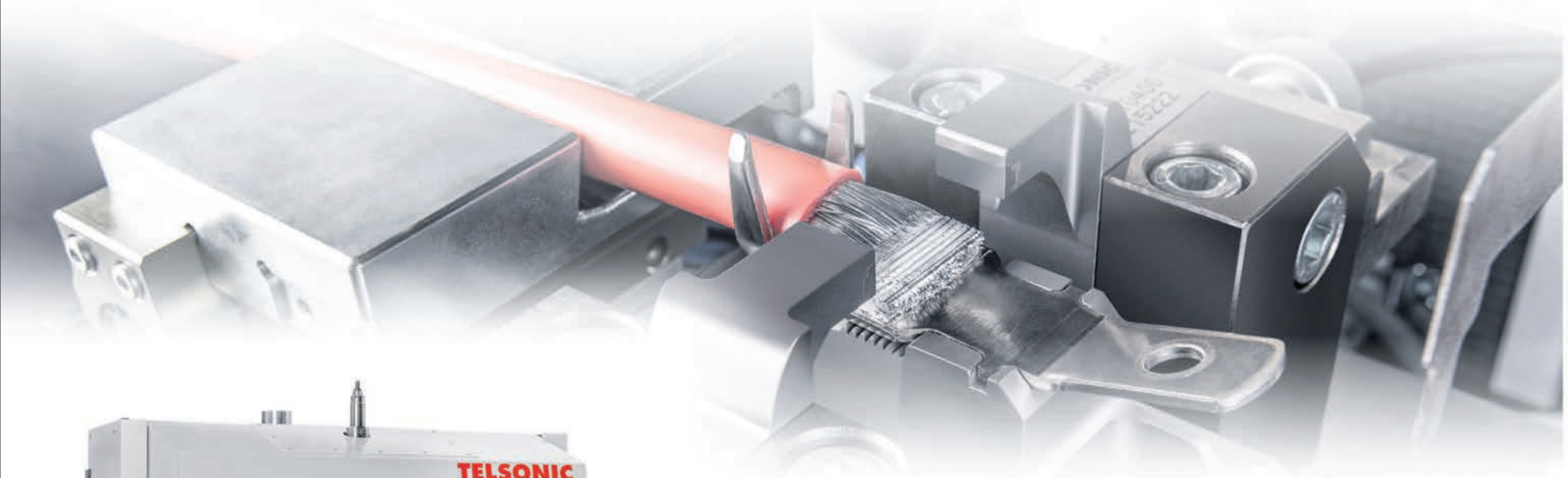
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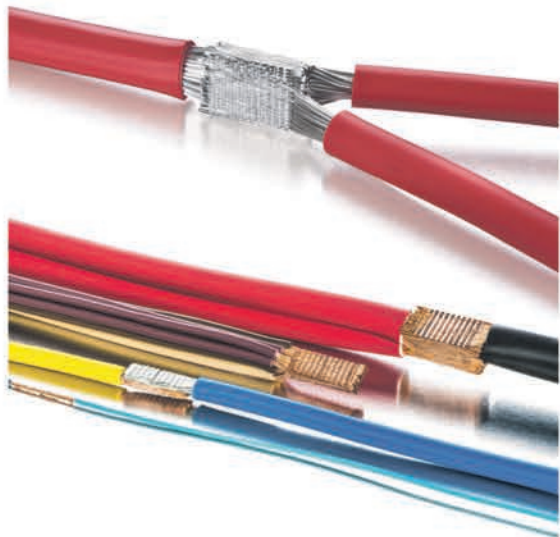
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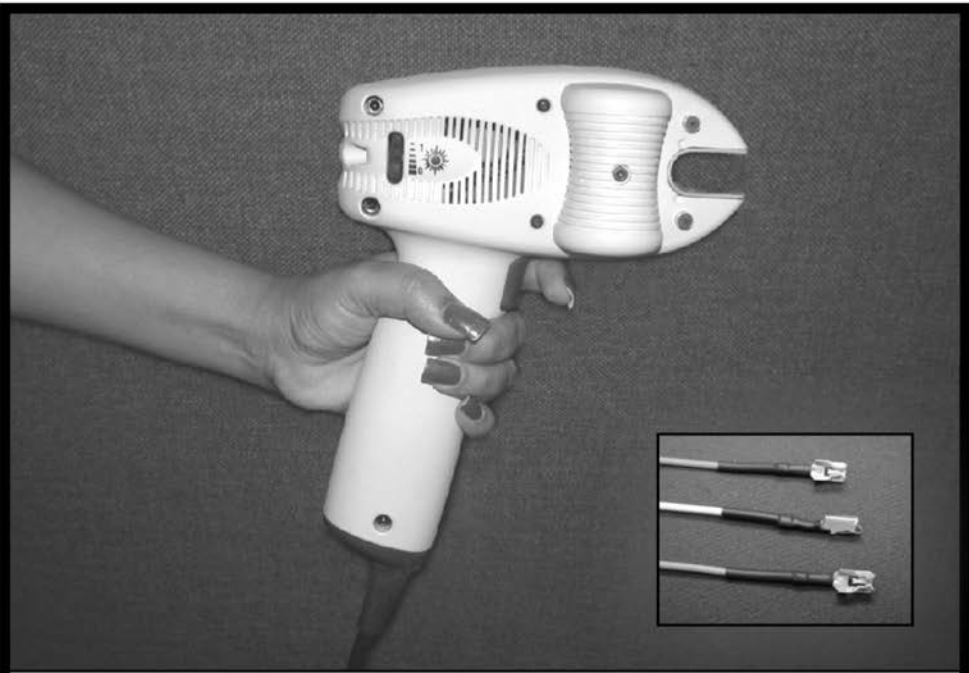
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Continued from page 40

HIGH-TEMPERATURE CABLE STANDARDS

High-temperature wire can be classified as Appliance Wiring Material (AWM) meeting UL 758 Appliance Wiring Materials. Even though AWM wires are not considered to be “UL Listed” products, they are Recognized Components that can be used in UL Listed products. If a high-temperature wire is to be considered a UL Recognized Component, the wire follows the guidelines that are detailed by UL 758 through a UL style page. This style page lists specifications on gauge size range, insulation material, temperature rating and voltage rating. Some UL AWM styles can be dual listed with Canadian standards, such as UL AWM 3284 and CSA CL1254. For more information, please see *Anixter's Wire Wisdom Understanding and Identifying UL AWM Styles*.

In addition to high-temperature cables meeting AWM requirements, high-temperature products can also meet and be UL Listed to the UL 83A Fluoropolymer Insulated Wire standard. UL 83A provides requirements on the cable's construction and test performance for high-temperature listed products. Performance tests include longterm aging of insulation and insulation resistance testing.



THE DIFFERENT STYLES OF HIGH-TEMPERATURE WIRE

Due to the wide range of temperature ratings and applications available for high-temperature wire, there are many different agency approvals available. High-temperature wires can be UL Recognized per UL 758, UL Listed per UL 83A or meet CSA standards.

Table 1 (page 40) provides some common high-temperature wire types that meet various UL AWM Styles per UL 758 and/or CSA standards.

| UL Listed Name | Description | Temperature | Conductor Metal | Size | Voltage |
|----------------|--------------------------------|-----------------------------------|---|-------------------|---------|
| FEP | Fluorinated ethylene propylene | 90°C (200°C special applications) | Soft-annealed copper | 14 AWG to 2 AWG | 600 V |
| PFA | Perfluoroalkoxy | 90°C (200°C special applications) | Soft-annealed copper | 14 AWG to 4/0 AWG | 600 V |
| TFE | Tetrafluoroethylene | 250°C | Nickel-coated copper or nickel-base alloy | 14 AWG to 4/0 AWG | 600 V |
| ZW | Ethylene Tetrafluoroethylene | 90°C (150°C special applications) | Soft-annealed copper | 14 AWG to 2 AWG | 600 V |

Table 2 - UL Listed High-temperature Wire Types



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| High-Temperature Application | °C | °F | Wire Trade/Listed Name |
|-------------------------------|-----|-----|--------------------------------|
| Apparatus and Motor Lead Wire | 150 | 302 | SRG |
| | 200 | 392 | SRK, FEP |
| | 250 | 482 | TGGT, TKGK |
| | 450 | 842 | MG |
| Appliance and Fixture Wire | 150 | 302 | SRML, SF-2, SEW-2 |
| | 250 | 482 | TGGT, TKGK, TFE |
| | 450 | 842 | MG, MGT |
| Control Cable | 200 | 392 | SRGK, SRGT, SRK |
| | 250 | 482 | TKGT, TKGK |
| Heating Cable | 200 | 392 | PFA |
| | 450 | 842 | MG |
| Instrumentation Cable | 250 | 482 | TKGT, TKGK |
| Power Cable | 200 | 392 | SRGK, SRGT, SRK, FEP, TFE, PFA |
| | 250 | 482 | TKGT |

Table 3 - High-temperature Wire Applications

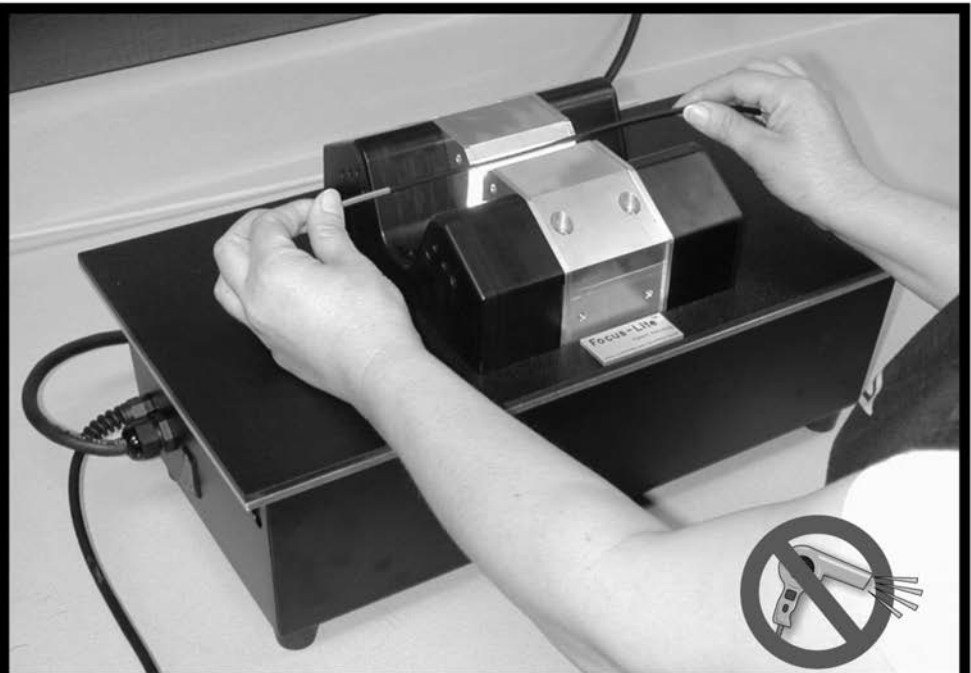
In addition to the AWM high-temperature wires, Table 2 provides examples of UL Listed high-temperature wires per UL 83A.

APPLICATIONS OF HIGH-TEMPERATURE WIRE

As mentioned above, high-temperature wire can be found in environments with elevated temperatures and harsh conditions. These applications commonly include motor leads and internal wiring of appliances, such as refrigera-

tion equipment, heat pumps, clothes dryers, lighting fixtures, commercial and industrial ovens, room cooler units and electrical ranges. High-temperature wire can also be found in steel mills, glass plants and chemical plants.

Table 3 provides common applications where high-temperature wires are commonly installed. Depending on the application, further information such as UL listings, cable size and other environmental conditions may be required to select the correct product.



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NEWS PLUGS continued



Interstate Connecting Components, a Division of Heilind Mil-Aero, is Now Stocking TE Connectivity's Harsh Environment CII FC-325 Series Relays

Interstate Connecting Components, a division of Heilind Electronics and a leading distributor of harsh environment connectors and backshells worldwide, has added CII FC-325 Series relays from TE Connectivity (TE) -- a global leader in connectivity and sensors.

These non-latching relays are constructed with a double make/break contact design for added durability. Additionally, features like hermetic sealing, a corrosion-protected metal can, and an all-welded enclosure make FC-325 Series relays more

reliable than similar alternatives.

TE Connectivity CII FC-325 Series relays are qualified to MS27418 -- and at 25A, they accommodate higher current ratings than standard M83536 mid-range versions. FC-325 Series relays are ideal for applica-



TE Connectivity CII FC-325 Series Relays

tions like launch systems, power distribution, fuel pumps, navigation and weapon systems, aircraft cabins, and ground support equipment.

Visit ICC's website for more information about TE Connectivity CII FC-325 Series Relays.

Founded in 1985, Interstate Connecting Components (<http://www.connecticc.com>) is an AS9100C-certified value-added distributor of the entire spectrum of electronic connectors, fiber optic connectors, backshells, tools, cable marking systems, and connector contacts. A division of Heilind Electronics, North America's largest interconnect distributor, ICC specializes in the military-aerospace market and offers T'DA® 2-day assembly on D38999, M28840, and many other mil-spec connector lines. Follow ICC on Facebook at [facebook.com/connecticc](https://www.facebook.com/connecticc) and on Twitter at twitter.com/connecticc.



Patricia Zwergel, Graham Engineering Vice President of Finance

Patricia Zwergel Appointed Graham Engineering Corporation Vice President of Finance

David Schroeder, president and chief executive officer of Graham Engineering Corporation, has appointed Patricia Zwergel as vice president of finance.

The company's business comprises Graham Engineering blow molding systems, Welex sheet lines, and American Kuhne extruders and extrusion systems.

"Patricia understands how finance can drive value in a custom machinery business," said Mr. Schroeder. "Her background in finance and management information systems, leadership skills, and experience in national and international manufacturing help position us for continued growth."

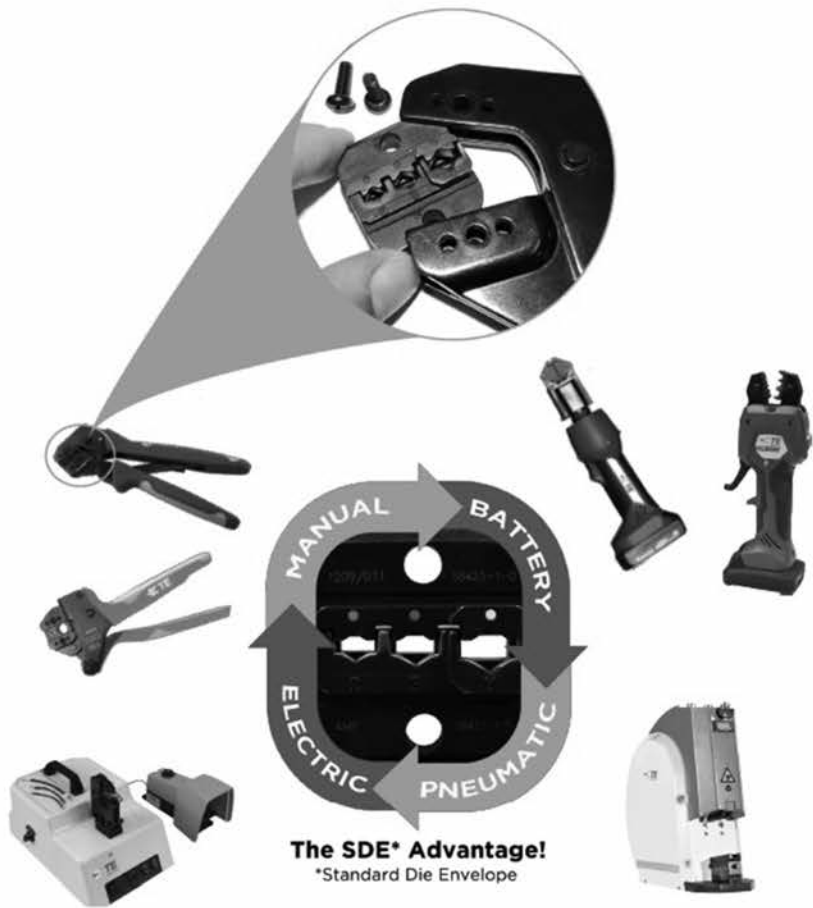
Ms. Zwergel previously served in similar roles at York Wallcoverings and The Maple Press Book Manufacturing Group, following cost accounting and controller positions with KBA North America and P.R. Hoffman Machine Products.

She holds a BSc. degree in accounting from Elizabethtown College where she has also completed coursework toward her MBA.

Graham Engineering is the global standard in wheel and industrial extrusion blow molding solutions, with 400 installations in 20 countries.

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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/>.

Fiber Optic Center (FOC) is an international high technology sales, marketing, distribution, manufacturing and consulting company. FOC has several areas of specialization and expertise, in which they are the industry leader, making them the preferred choice for many of the world's fiber professionals. In these key technology areas, FOC is "at least as technical as the manufacturer" about the products they sell. FOC also strives to "make the business part easy," offering outstanding and personal customer service, low or no minimum purchase order values, and from-stock delivery on industry-leading products and technology. Their main focus 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.

For further information contact: Fiber Optic Center, Inc., 23 Centre Street, New Bedford, MA 02740-6322. Toll Free in US: 800-IS-FIBER or 800-473-4237. Direct 508-992-6464. Email: sales@focenter.com

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2 - ARTOS CS26A Cut and Strip Machines
1 - ARTOS CS7 Cut and Strip Machine
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1 - AUTOJECTOR HS30-S Injection Molding Machine
1 - BRANSON Model OMNI-1012-25-CAS Cleaner
3 - CARPENTER Model 70B Strippers
LOT- CIRRISS Testers - CR EasyWire, 1000M, 1000R+
1 - EUBANKS 4000-04 Tandem Cut and Strip Machine, #890-151, w/extra Blade Sets
3 - EUBANKS 8000-01 Cut and Strip Machines
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1 - KINGSLEY Model MCM-650 Sleeve and Tube Marker
2 - KODERA Model C566 Processing Machines
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1 - KOMAX Gamma 333LLC
1 - KOMAX Alpha 411
53 - KOMAX/WEIDENBACH InkJet Printers, Models IMS291. TSS-GK201AE
1 - MECHTRIX Model MPF-35 Prefeed, 2013
1 - METRONIC Alpha Jet C Inkjet Printer, currently set up for black ink, approx. 2006/07
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FOC Glossary

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1-Part, AL-12xx Series

Angstrom, inkjet non-curing gels. Also known as thixotropic gels, or greases, these are 1-part materials that flow when pressure is applied, and remain in place when the force is removed (like toothpaste). These materials are generally used to displace the air gap between two optical elements and do not form a permanent bond between the two elements; generally need other mechanical fastening to insure structural integrity of the joint. Joints interconnected in this way are easily unmade and remade.

10 Gigabit Ethernet


The IEEE has initiated work on the specification of 10 Gigabit Ethernet over optical fiber cabling. The standard is planned for completion in 2001 or early 2002, with specifications for multimode and singlemode fiber.

A Carrier

Search Glossary


Search for:

If you would like to offer Fiber Optic Center any requests for edits, changes or additions to this Glossary, please contact us at FOCGlossary@focenter.com.
We consider this a resource for everyone in our community and intend to make it as helpful as

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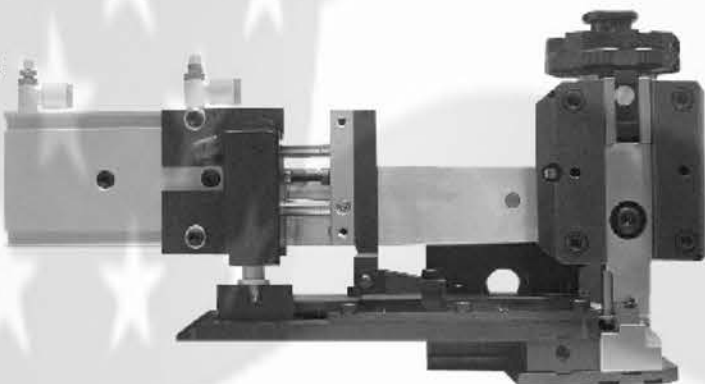


Model 1700

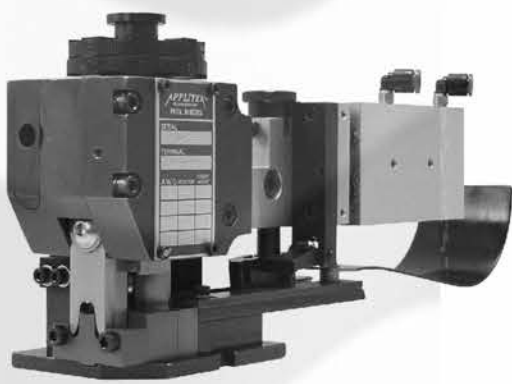


Model 2000

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

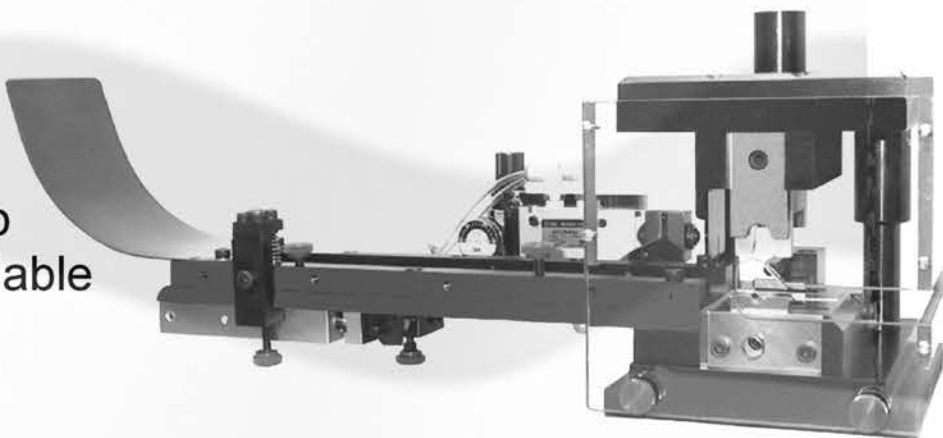


Model 1500



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NEWS PLUGS continued



BURNDY® introduces new Bolted Wedge In-Line Disconnect Switch

BURNDY® is pleased to announce the new Bolted Wedge In-Line Disconnect Switch, combining an innovative bolted-wedge hybrid connector with industry standard components to bring the most reliable performance to switch/distribution

line connections. The Bolted Wedge In-Line Switch features recognized and proven MindCore Technologies blade components, as well as Advanced Rubber Products Inc. insulators attached to a BURNDY-designed yoke plate assembly. It is ideal for use in gloving and hot stick applications when paired with an industry standard loadbreak tool.

The Bolted Wedge In-Line Switch utilizes dual insulators to minimize switch movement during opening and closing of the blade. Installation steps are kept to a minimum as the

switch can be snapped directly onto the line and secured with the BURNDY conductor pivot retainer. This retainer acts as a third hand to free up the line worker's hands to safely install the connectors.

The innovative BURNDY bolted wedge connectors utilize bolted technology to provide a highly reliable mechanical and electrical connection and combines it with sliding wedge technology to ensure the connection stays tight even if the line experiences high mechanical loads. The hybrid design also takes some of the guess work out of tightening the hardware. Simply tighten the bolts near the recommended tightening torque and the hybrid system takes over.

In addition to improving the safety and reliability of the connection, the new Bolted Wedge Connector

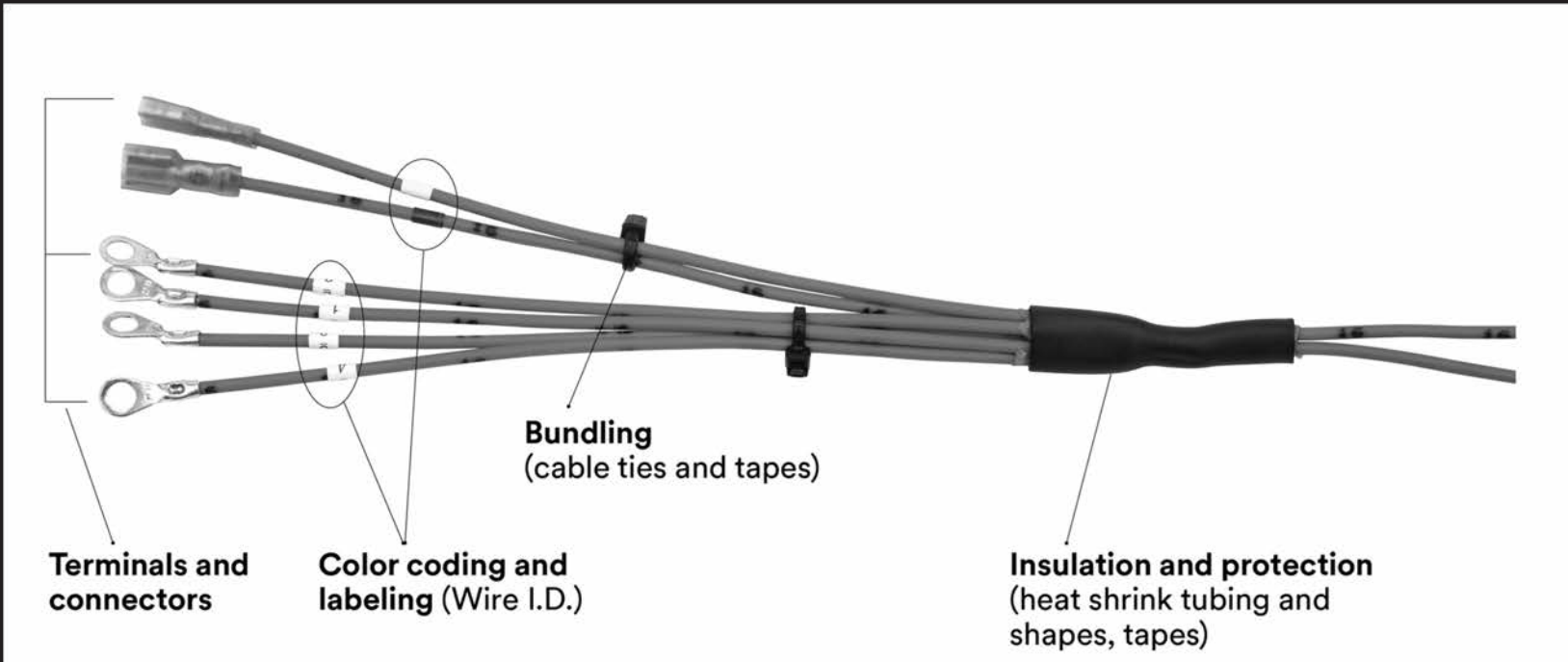
system also increases the range of conductors it accommodates. Two switches now accommodate conductors ranging from 1/0 ACSR up to 556.6 (26/7) ACSR. This increase in range taking ability reduces the number of different SKUs required by a utility for switching applications.

Headquartered in Manchester, New Hampshire BURNDY has over 90 years of dedicated customer support in both service and product. Our customers need to look no further than BURNDY for all their connector, tool, and accessory needs with our BURNDY Engineered Systems of coordinating dies, connectors and tools. The three elements have been specifically designed to work together and engineered to meet stringent, accepted quality standards – providing the user complete confidence in the integrity of the connection.

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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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President Barack Obama and German Chancellor Angela Merkel visit Weidmuller’s Industry 4.0 Cockpit at Hannover Messe

The United States of America was Partner Country at the 2016 Hannover Messe, the world’s most important trade fair focused on industrial technology. Companies from around the world exhibited their solutions for integrated industry at the Hannover Exhibition Center and had the opportunity to meet potential business partners during the week long April event. President Barack Obama had the honor of opening Hannover Messe and visited the exhibition with German Chancellor, Angela Merkel. The two leaders visited the exhibits of several companies that are highly respected for their

outstanding industrial technology solutions, including Weidmuller. Dr. Peter Köhler, Chief Executive Officer of the Weidmuller Group said, “This visit is an honor for us and at the same time a distinct recognition that our efforts and innovations concerning Industry 4.0 are not only very well received by our customers, but also by the public sector.”

President Obama and Chancellor Merkel showed great interest in the Industry 4.0 Cockpit at the Weidmuller exhibit. A sample application demonstrated how the central control of a production facility of the future could look. It combined, into a single exhibit, the wide range of Industry 4.0 solutions. The Weidmuller Cockpit exhibited technical systems networking capabilities as well as other integrated solution approaches

for customers. The Industry 4.0 solutions on display included applications for industrial analytics, cloud services, energy management, digitalization and networking, as well as data consistency. “The topic of networking in particular,” continues Dr. Peter Köhler, “is an extremely exciting field for the USA because of the high level of software competence in the country. During their visit, the two heads of state gained an in-depth insight into the topic of industrial networking at various exhibits. We are proud that we could also make our contribution to their visit.”

For further information contact Weidmuller, 821 Southlake Blvd., Richmond, Virginia 23236 Phone: (800) 849-9343 FAX: (804) 379-2593. Visit www.weidmuller.com



Members of Weidmuller’s management team, Christian Glaesel and Dr. Peter Köhler (from left), hosted the visit of Chancellor Merkel and President Obama (from right) to their Industry 4.0 Cockpit.

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The 2016 Electrical Wire Processing Technology Expo - Another Hit!

Continued from page 1

ter during show hours and in the days surrounding.

The seminars are always the keystone of the value proposition of the show, and this year was no exception. Rob Boyd, Senior Product Manager at Schleuniger Inc., started things off with his topic, The Impact of LV 214-4: The German Automotive Connector Test Specification. The specification is intended for terminal validation in automotive production, and is largely based on crimp force monitoring. Rob maintained that the LV specification provides a great knowledge base for the production characteristics of various terminals, but

warned that some areas are theoretical, as the industry currently lacks measurement technology.

Dave Kelly, Standards and Industry Liaison at Daniels Manufacturing Corp. (DMC), was next to present on The Evolution and Status of Standards for Aerospace Wiring Systems and Components. In 1994 the Secretary of Defense imposed a directive to DoD imposing commercial, off-the-shelf (COTS) procurement of parts, and a mandatory shift to non-government standards. Dave took attendees through the various U.S. government support organizations, and highlighted the SAE structure for specification development. He strongly encouraged the group to get involved in the



various industry standards committees, and begin to take ownership in the decisions that drive component performance and manufacturability.

The next seminar was given by Patrick Boyer, Applications Product Manager for Komax, and was titled Optimizing the High-Mix, Low-Volume Manufacturing Environment.

Patrick reviewed the challenges in this environment, and outlined quality systems that detect errors as early in the production process as possible. He warned of the high cost of field detection of errors, as highlighted by some case studies he reviewed. A common theme of his seminar was the need to automate where possible, while redirecting people to less repetitive tasks.

Terry Curtis, Sales Associate at Applitek, was next with How Well Do You Know Your Crimping Process?. Terry defined crimp quality as the sum all the activities (proper wire preparation, correct terminal selection, machine setup, etc.) that go into the crimp. Any single element out of control will affect the crimp. He noted the crimp press is often the last place people look when problems arise. It should, however, be the first part of the system to be scrutinized. Terry drove home the importance of crimp press maintenance, cleaning, and lubrication.

A staple on the EWPT Expo was an update on IPC/WHMA-A-620B. It was given by Donjie Hill and Rick Bromm representing WHMA, and Randy Cherry, Director of Validation Services at IPC. The presentation covered an overview of the standard, with an emphasis on the B Revision changes and additions. They also covered upcoming revisions, validation program, and how A-620 can be used as a sales and marketing tool. Like

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Dave Kelly with the aerospace seminar, the group stressed the importance of involvement from the user community in further development of the specification.

The final presentation was by Michael Reeve, VP Business Development of OES Technologies, and was entitled Automate and Error-Proof the Plant Floor Process. Connectivity of process equipment offers a plethora of advantages to the harness manufacturer, Michael stressed. He further advised that error-proofing machine setup will not only improve quality and reduce rework and scrap, but will greatly enhance productivity and profitability.

One thing sets the EWPT Expo from all other shows, and that's hospitality. These sponsored events are much more than an opportunity to showcase a company name. They are truly appreciated opportunities for exhibitors to meet and network in a relaxed, fun setting. EPI Shows and the staff at the Milwaukee Center excel at making everyone feel like family at these functions, and the food and entertainment are incredible. A VIP is always defined as anybody who comes to the show! Special thanks for this year's event sponsors:

- Assembly Magazine**
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- Wisconsin Center**
Wednesday Exhibitor Breakfast
- WHMA (Wiring Harness Association)**
Wednesday and Thursday Lobby Coffee

- Komax**
Wednesday Morning Break and
After Hours VIP Party
- KM USA**
After Hours VIP Party
- Schafer**
Wednesday Afternoon Break
- Mecal By Starn**
Wednesday Morning Mimosa Bar
- TE Connectivity**
Thursday Bloody Mary Bar
- Schleuniger**
Thursday Morning Break
- Mecalbi**
Thursday Afternoon Break
- Southwire**
Charging Stations
- Wire & Cable Technology**
Seminar Rooms

The crew at *Wiring Harness News* were proud to present the After Hours VIP Party, Attendee Bags, Business Center & Lounge, Directory, Lanyards, Massage Area, and Exhibitor Breakfast, Move-Out Refreshments and Wi-Fi Access.

The 2016 show sold out early for exhibition space. There are plans for the additional space, and some other exciting additions, for next year's show. If you are a purveyor of equipment or service provider to the wire harness industry, now is the time to make an inquiry to Cheryl Luck at EPI Shows at cheryl@epishows.com.

Look for more photos from the Expo on pages 54 & 55.





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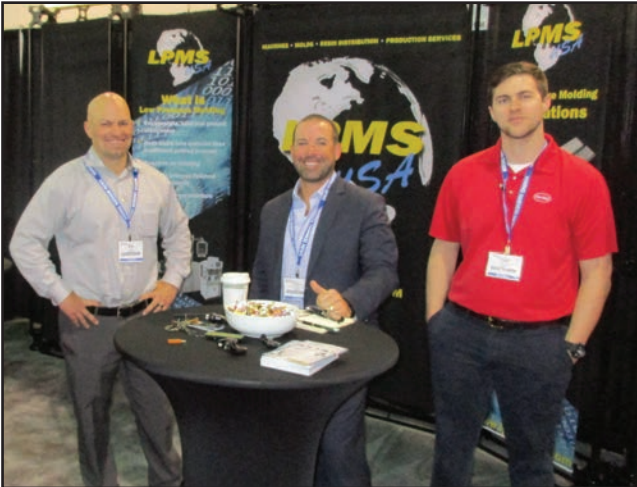
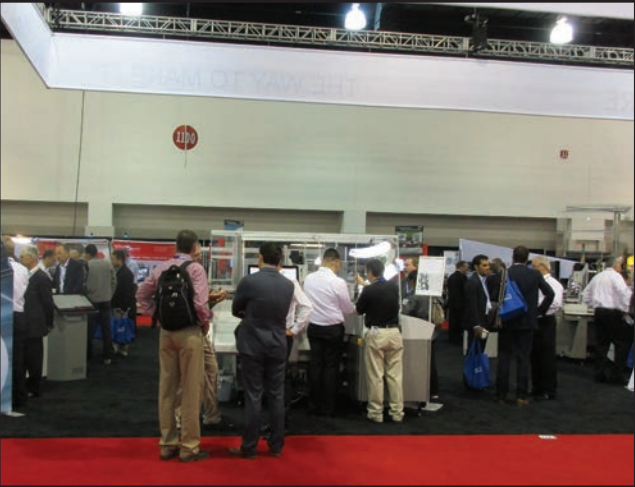
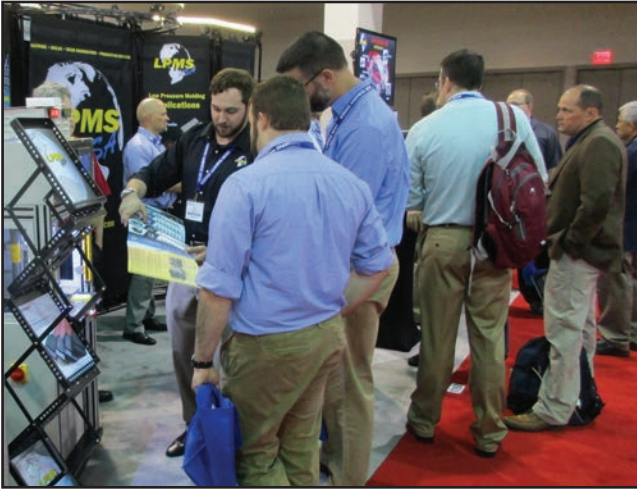
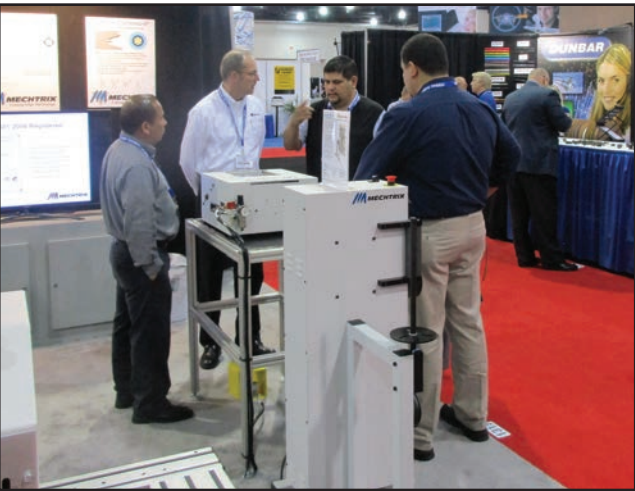
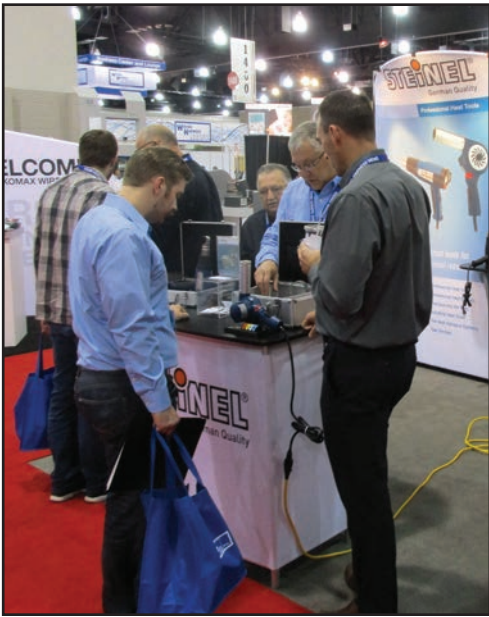
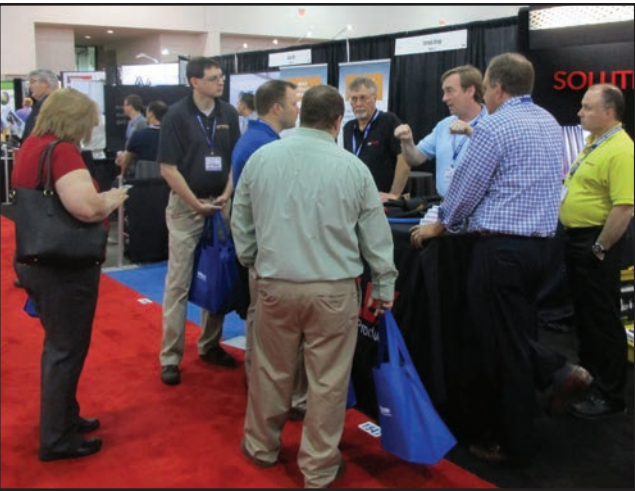
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NEWS PLUGS continued



CAMI Research, Issues New Catalog

CAMI Research Inc. has issued its latest catalog featuring new products and services. Available immediately, the catalog showcases their expanding CableEye suite of Low and High Voltage (HiPot) test system products for cable & wire harness manufacturing.

The following new products are included:

- M3UH continuity tester with down-shifted resistance threshold (viz. 0.1Ω to $5M\Omega \pm 0.1\Omega$) compared to that of M3U
- Mini SAS/SFF connector board, CB26S

- 2100Vdc Screw terminal connector boards, CB29H & CB29AH

- Micro-Match connector board, CB49

- Tester calibration verification boards, CB50, and CB50H

- 500Vdc Quick-change, shielded RJ45 adapter board, CB18C: Eight RJ45 connectors may be unplugged and changed by the customer with no soldering required. This board is frequently used in high-volume Ethernet cable testing.

- 500Vdc Mini HDMI with mini display-port daughter board, CB26T

- Training and tester operation validation board, CBT1

Healthcheck services are now available for all models and would be required prior to renewing an expired warranty, or to earn a certificate of normal operation.

Healthchecks are recommended when bringing a tester back on line after being in storage, or when the tester typically operates within a challenging environment (e.g. when experiencing any or all of dust, high temperature, high duty cycle).

In a healthcheck, all systems will be evaluated for correct operation, cleaned (circuit boards, connectors, case), inspected for bent or broken pins, subject to a calibration verification check, and checked for integrity of all interlink cables.

Additionally, HiPot testers will undergo a check of overcurrent limiters, relay function, and front panel buttons and indica-



tors. Please see camiresearch.com/healthcheck for further details.

To request a catalog, please go to camiresearch.com/get_brochure.html or call (978) 266-2655.

CAMI Research produces expandable and upgradable diagnostic Cable & Harness Test Systems for assembly, prototyping,

ing, production, and QC of standard or custom cables. CableEye® Testers display, and document basic electrical properties such as continuity, resistance, dielectric breakdown, insulation resistance, miswires, and intermittent defects. camiresearch.com

Newark element14 expands AEC-Q200 Qualified Portfolio of Passive Components from AVX, Bourns, Kemet and Murata

Newark element14 has expanded its portfolio of AEC-Q200 qualified products with the addition of the newest passive components from AVX, Bourns, Kemet, Murata, Panasonic and Vishay, which include capacitors, resistors, inductors and other passives.

"Newark element14 understands the challenges faced by design engineers and buyers searching for the newest automotive qualified products and the requirements for fast delivery," said Jesper Rasmussen, Global Category Director – Passives, Newark element14. "We provide a one-stop solution and purchasing channel to easily review, compare and select AEC-Q200 qualified products from industry-leading suppliers."

AEC-Q200 qualified passives have been designed for automotive electronics applications where reliability and stability are required in challenging conditions of high temperature, temperature changes, pressure resistance, humidity and mechanical stress.

These components meet the stringent AEC standards for operating in harsh automotive environments, and

AMP-O-LECTRIC MODEL G II TERMINATOR

TE Connectivity's (TE) Model G II is the latest and most advanced design in the long-standing series of their AMP-O-LECTRIC machines for terminating wire using reeled terminals and contacts. This unit is designed and built to continue the tradition of work-horse terminators from TE.

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

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are also suited for use in other electronics applications such as wearables, medical, industrial equipment, communications and Internet of Things.

The new ranges include:

The Vishay IHLD series of low-profile, high current dual inductors in 3232 and 4032 package sizes, offering critical board space saving by combining two inductors in one 9.75mm by 9.14mm package that is optimized for automotive and commercial class D amplifier circuits.

The FKS Series from Panasonic features increased capacitance, space saving in the same can size and the option of vibration-proofing for automotive applications. The FKS series of aluminum electrolytic capacitors, comprising 25 new part numbers, is available in voltage classes between 6.3V and 50V and capacitance ranging from 33 μ F to 1800 μ F in SMD can sizes from 4x5.8mm to 10x10.2mm.

The newest Radial Lead Type Monolithic Ceramic Capacitor RH Series from Murata is suitable for ECU management where EMI noise and motor surge protection is required. The Murata RH capacitor series provides resistance to solvents and excellent mechanical shock while operating under high temperature conditions of maximum 150°C.

Kemet's ultra-low ESR T598 high humidity-high temperature Polymer Electrolytic capacitor delivers higher capacitance and ESR stability for 1,000 hours with 85°C-85% RH load. The T598 Organic Capacitor (KO-CAP) combines the low ESR of ceramic, the high capacitance of electrolytic and volumetric efficiency of tantalum into a single SMD package.

The Bourns CST0612 series 4-Terminal Current Sense Resistor comes in a 0612 package that offers low resistance values of 0.5 m Ω and handles a maximum power rating up to 1 W. The CST0612 series' metal alloy current sensing element allows for low thermal Electromotive Force (EMF) and Temperature Coefficient of Resistance (TCR).

The AVX Glass Encapsulated TransGuard® VGAS Series Multilayer Varistors offer high reliability SMD case sizes from 1206 to 2920 with working voltage from 16 to 65 Vdc for bidirectional overvoltage protection,

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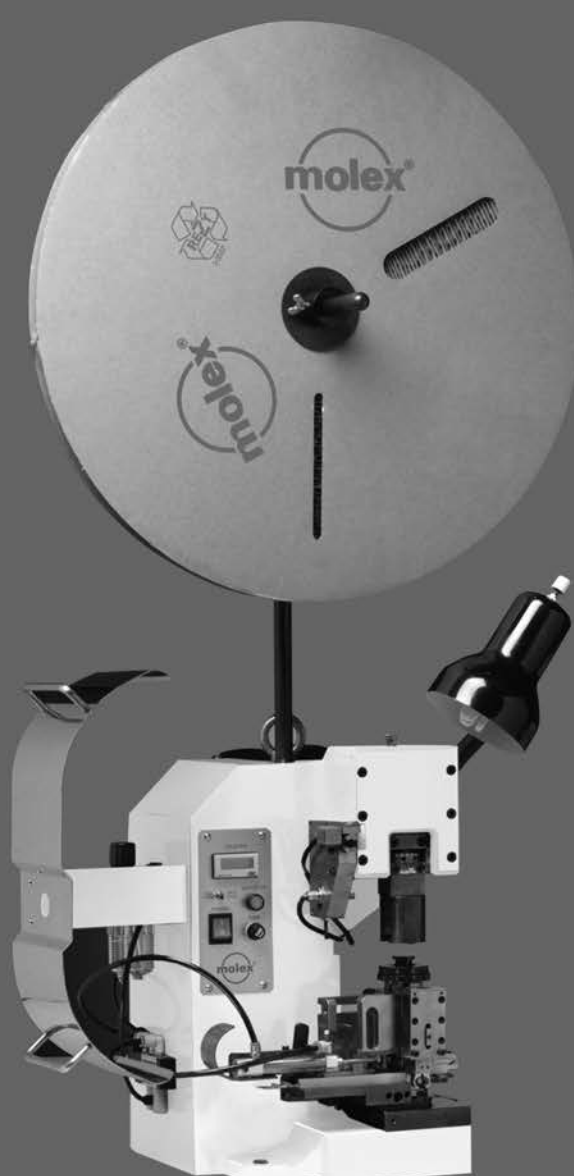
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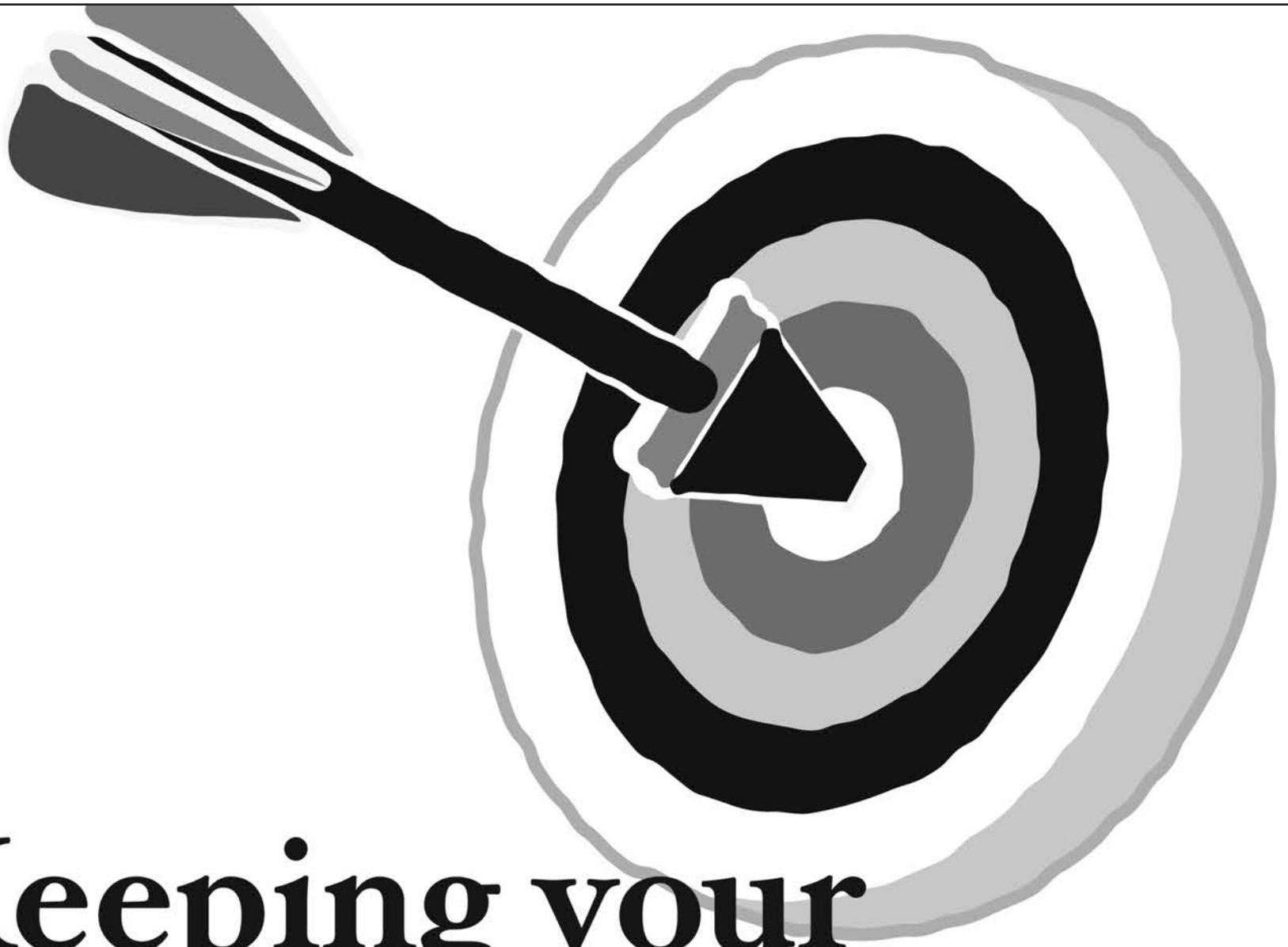


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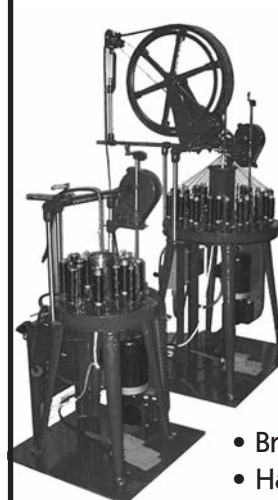
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