

## This Issue Features:

- Reality Check
- Global Aviation Technologies
- Golden Rule for Customer Retention
- Continuous Improvement Goal for 2015
- Defining Reliability at Teledyne Oil & Gas, ODI
- Wire Wisdom - Wire & Cable Cold Temperature Ratings



# Global Aviation Technologies

By Fred Noer

Of the many and varied companies in the wiring harness industry, Global Aviation Technologies (GAT) is one of the most unique.

The multifaceted operation in Wichita, Kan., provides products and services to companies, organizations, governments and individuals in the United States and foreign countries that have business, commercial, military and personal aircraft. GAT designs, engineers and manufactures wiring harnesses and electrical assemblies for systems and displays primarily on small jets for business, charter and personal use.

The components and parts are for power distribution, communication, flight management, radar, navigation, instrument panels, interior lighting and entertainment systems in such aircraft as Bombardier (including the famous Learjet), Hawker, Beechcraft, Cessna and Gulfstream. GAT also installs equipment, does structural repairs and performs maintenance.

GAT was founded in April 2002 by Woody Cottner, 55, vice president of business development. He shares ownership with his wife Candace, 51, director of operations.

“Our company has made a living doing what the OEMs don’t want to do and from people who want to take care of legacy aircraft that are out of produc-



GAT provides maintenance for a A Hawker 4000.

tion,” Woody Cottner said. “Our work includes things for supplemental type certificates issued by the Federal Aviation Administration.” The certificate means a plane can be modified from its original design.

Cottner noted a customer may spend \$3-5 million on upgrading the cockpit, interior, avionics package and paint of a plane. While that is a considerable expenditure, he stated a new Learjet costs \$17-23 million. And, the modifications are good for 10-15 years.

GAT has 20 customers. Its first was Walmart with its Learjet fleet, which GAT still services. Other clients are BJets, Hiller and Bombardier in Wichita, Skyservice in Canada and Piedmont Airlines in Salisbury, Md.

One of the simplest GAT harnesses is produced for ASI in Wichita. The three-foot harness with five wires in a sleeve

has a connector attached to the bottom of a seat in a Boeing 747 commercial airliner.

A complex harness is made to run from nose to tail on a Beechjet 400 business jet for its avionics. “That is a very intense harness,” Cottner said. “It has lots of wires, with the trunk six to eight inches in diameter. There are 20 to 25 connectors in the nose alone.”

Printed circuit boards and electromechanical assemblies also are produced by GAT to be used in conjunction with the harnesses or in converter boxes. An example of the latter is to convert autopilot from analog to digital.

Because of the degree of specialization at GAT, most of the harnesses are one off – the prototype and final product being one in the same. As a result,

Continued on page 38

## Reality Check:

### How Three Common CFM Sensor Configurations Really Perform

By Michael Reeves  
VP Business Development  
OES, Inc

Millions of wire terminal crimps are produced every day for the automotive, appliance, aerospace, and electronics industries. These wire terminal crimps are made by a wide range of processes and with a vast array of terminal and wire combinations. Crimp force monitors (CFM’s) are widely used in these production processes for the assurance of crimp quality and to eliminate the risk of supplying defective product into the supply chain.

CFM’s monitor every wire terminal crimp by using complex mathematical algorithms to discriminate between good and defective crimps. Many informative articles have been written about CFM’s – how they work, their performance, capability, and best practices to ensure these mission-critical monitoring systems function at top performance. This article is focused on an overlooked component of the CFM system – the force sensor.

The force sensor provides the raw signal to the CFM and is one of the key components that determine the capability of the CFM system to discriminate

Continued on page 14

## Defining Reliability at Teledyne Oil & Gas, ODI

By Joe Tito  
Wiring Harness News

I recently had the honor of touring the Teledyne Oil & Gas (TOG) ODI facility in Daytona Beach, FL. John Flynn, Vice President of Global Marketing, was kind enough to show me around, discuss their product line; and educate me on the unique reliability challenges in their industry.

TOG is an alliance of Teledyne companies developing and producing high-reliability interconnect systems in support of subsea oil and gas exploration and production. The ODI facility specializes in subsea power and broadband data transmission. When we think of an oil platform, we generally think of the iconic rig on the ocean surface. But that’s only a small portion of what’s real-

ly going on. For every rig, there is a labyrinth of subsea pumps, power/data hubs, pressure/ temperature sensors, corrosion monitors, etc., that are doing most of the work (See Fig. 1, Page 28). These undersea processing facilities can span miles and connect multiple well heads. Assemblies produced at ODI supply power and data to connect these elaborate systems.

To augment their existing 100,000 sq. ft. ODI manufacturing facility in Daytona, TOG recently completed a 52,000 sq. ft. Technology Center to develop and test interconnect technologies in support of offshore oil and gas production. The manufacturing facility is a 95% vertically integrated center with state-of-the-art injection molding, CNC machining, clean assembly, and full testing capa-

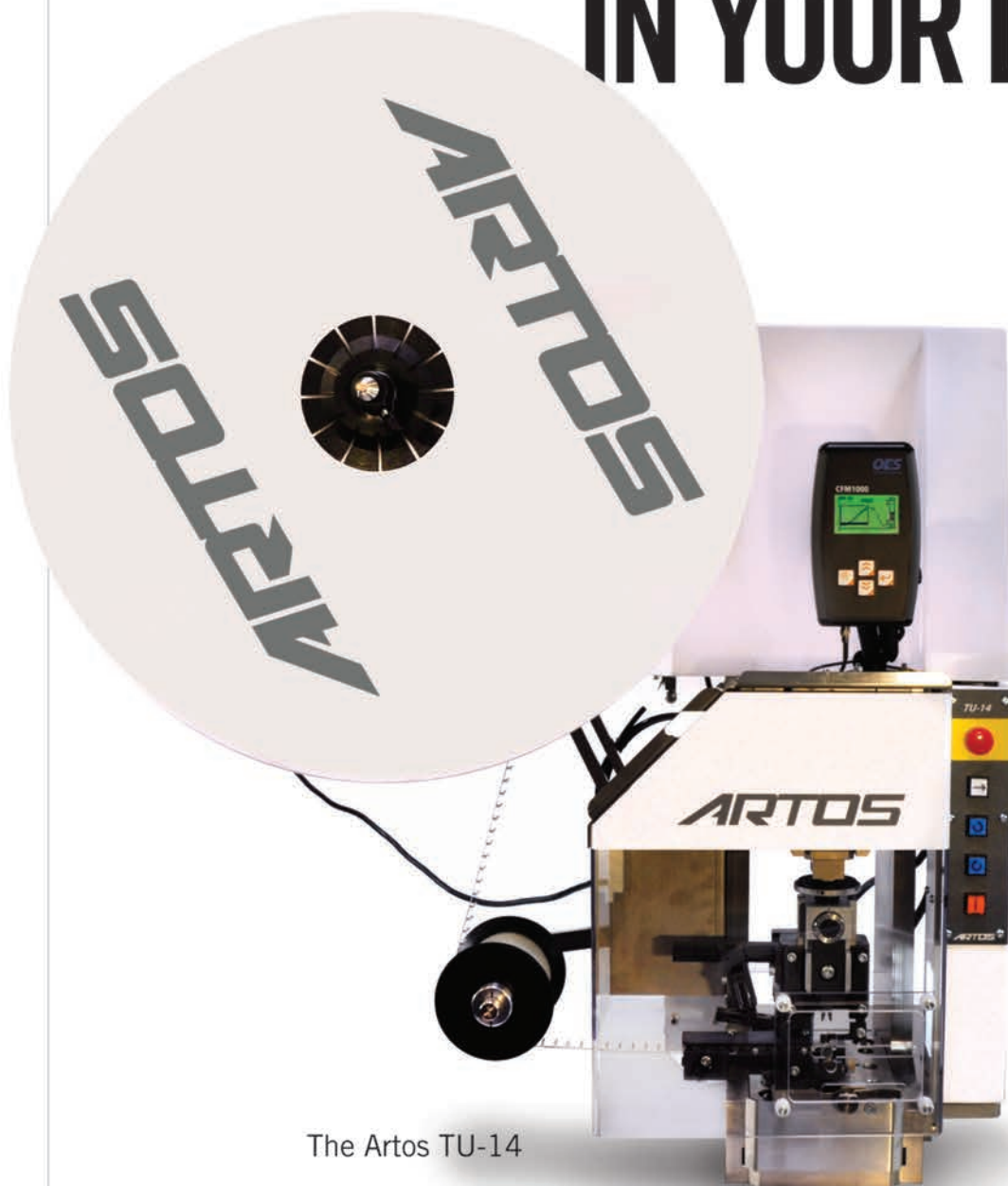
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INSIDE

NOVEMBER  
DECEMBER  
2014**1 Global Aviation Technologies**

This multifaceted operation in Wichita, Kan., provides products and services to companies, organizations, governments and individuals in the United States and foreign countries that have business, commercial, military and personal aircraft.

**1 Reality Check**

How three common CFM Sensor Configurations Really Perform.

**1 Defining Reliability at Teledyne Oil & Gas, ODI**

CFM's monitor every wire terminal crimp by using complex mathematical algorithms to discriminate between good and defective crimps. This article focuses on an overlooked component of the CFM system - the force sensor.

**5 Continuous Improvement Goal for 2015**

Connecting "work" with "meaning"

**10 The Golden Rule for Customer Retention**

Holding onto existing customers - why the golden rule of retention is crucial to businesses.

**12 News Plugs**

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

**40 Wire & Cable Cold Temperature Ratings**

Understanding temperature ratings is key to ensuring that cable will withstand the rigors of installation and last its expected lifespan.

**Classified**

- 60..... Machinery, Job Line & Misc.  
62..... Subscription Order Form  
62 ..... Advertiser Index

**MANAGING EDITOR**

Marilyn Magowan  
mjmagowan@yahoo.com  
Phone (262) 275-5558

**ADVERTISING/CIRCULATION MANAGER**

Kathy Freund  
kfreund2000@yahoo.com  
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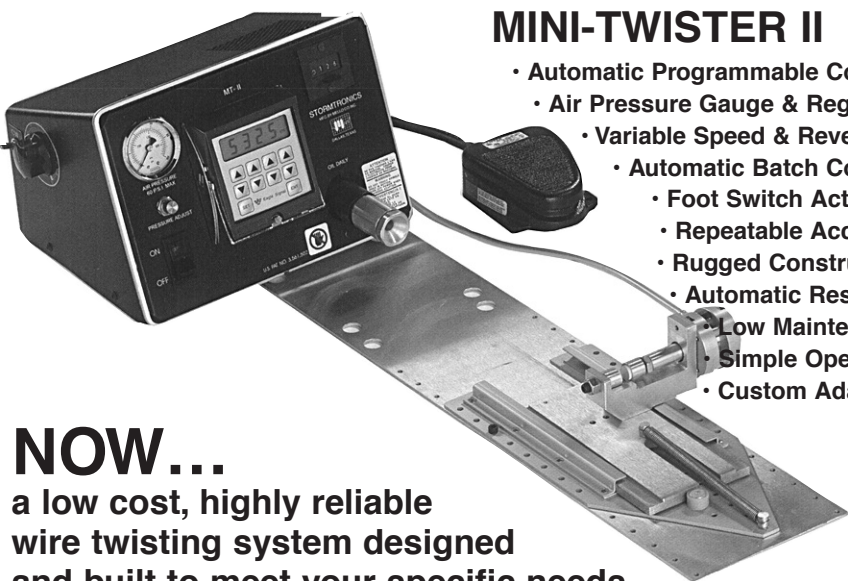
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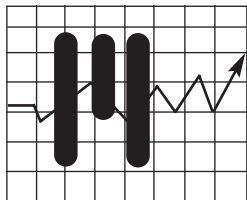
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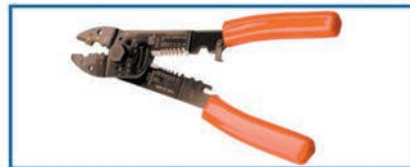


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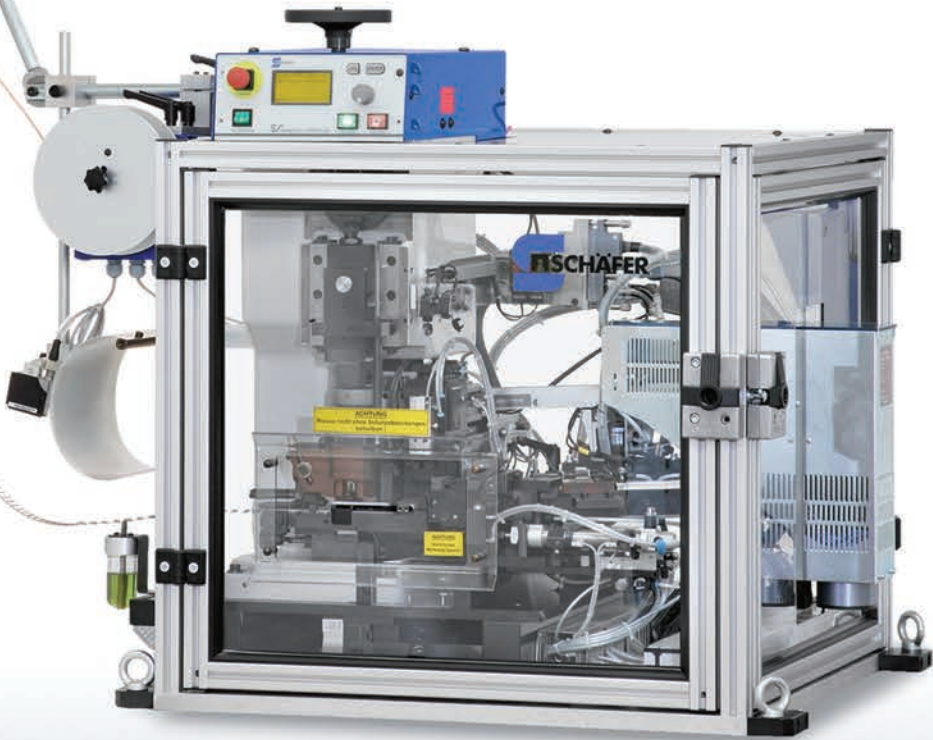
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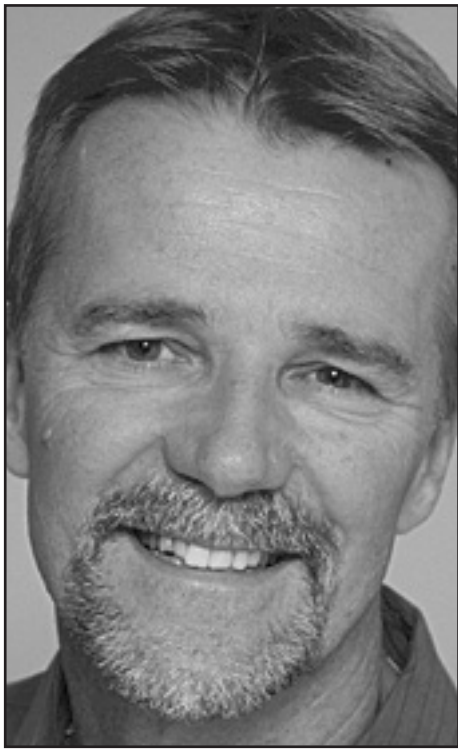
# Continuous Improvement Goal for 2015: Connecting 'work' with 'meaning'

By Paul Hogendoorn

Up until the industrial revolution, the typical working man (forgive the political incorrectness for now) was able to easily measure the achievements of his efforts. How much wood was chopped; how many cows were milked; how many miles of fences mended or rows tilled; how much seed was sown and how much crops were harvested. The payoff for every day's effort invested was not just the tactile results, but also the pride and satisfaction that went with it.

The assembly line kicked the industrial revolution into a higher gear, and that yielded a lot of benefits to the middle class, and to our society as a whole. Cars, and many other things, became affordable for the average person, not just because the cost to produce them came down, but also because the wages being paid went up as well. Another great benefit attributable to that revolution is the freedom we continue to enjoy today; without North America's superior manufacturing capacity, WW II would have had a different outcome.

The industrial revolution has come



Paul Hogendoorn

with some costs, and one of those (in my opinion), is the individual's sense of satisfaction that used to come with simply doing a good job. ('A job well done is its own reward') The feedback in today's plants, if any, is indirect. A lot of the time, it's only given when the desired or

*Continued on page 7*

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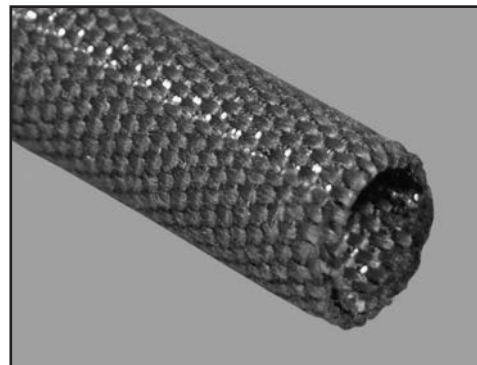
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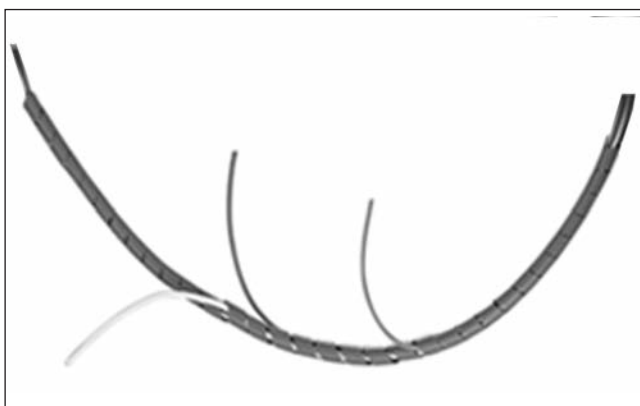
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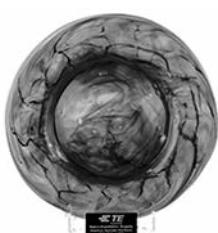
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# Continuous Improvement Goal for 2015:

Continued from page 5

expected results were not achieved, or a new deal needs to be negotiated. In most plants, individuals are no longer driven by intrinsic motivators (such as their natural sense of pride in a job well done, and the satisfaction of achieving an objective), they are driven by extrinsic motivators instead, and often these are negative; the threat of demotion, or the fear of losing a job or having a plant close, for instance. Positive extrinsic motivators, such as financial incentives, promotions etc., are short lived, and sometimes they are counterproductive. Intrinsic motivators have the most benefit - for the company and the worker - and they have the longest lasting positive effect.

Deep down inside, people are more comfortable being measured by others when they are confident in what they are doing, and when they know what they are being measured by. The first step to helping them become more confident and comfortable is to allow them first to measure themselves. That's the way it used to be, before industrialization made it management's job to measure them.

Having people measure themselves is just one way to connect work with meaning, and it's an important connection to make. After all, most people's personal self-image and identity is connected to what they do for a living. What they do for a living matters greatly to

them. Why then, don't we tap into that connection, and make the work they do more meaningful to them every day? Looked at from the other perspective, most companies' biggest investment is the wages they pay to their workers, and they often boast that their strength and biggest asset is their people. The engagement question looms even larger.

Let's go back and look at two significant changes that occurred during WW II. The first was that women flooded the manufacturing work places to fill shortages as men left for the battlefields. The second change was not as obvious, but was just as significant. Production work not only had value, it had real meaning. The women were motivated every day to arm, equip, feed, and clothe their men overseas - their husbands, brothers, boyfriends and fathers. I know that this extreme level of connecting work with meaning was only possible because of the circumstance, but I do visit plants every now and then that are able to make that connection; they are able to engage their workers, by connecting work with meaning. (A friend recently lent me a video showing manufacturing workers in low cost regions. It bothered me greatly seeing not only the conditions, but also seeing people doing the same tedious tasks repetitively, not just for hours or days, but for years.)

As our industries pursue competitive advantages and sustainability objectives,

applying Lean practices and investing in more equipment, I wonder how much improvement is possible simply through engaging our workforce better. Productivity would be better, people would be happier, and stresses and tensions removed from the workplace. The bottom line would be healthier, and people

would be too. I believe that the next new thing in industry needs to be engagement: connecting work with meaning. That should be our continuous improvement goal for 2015.

Paul Hogendoorn is president of Free-Point Technologies. He can be reached at paulh@getfreepoint.com

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# The Golden Rule for Customer Retention

By Loren Smith

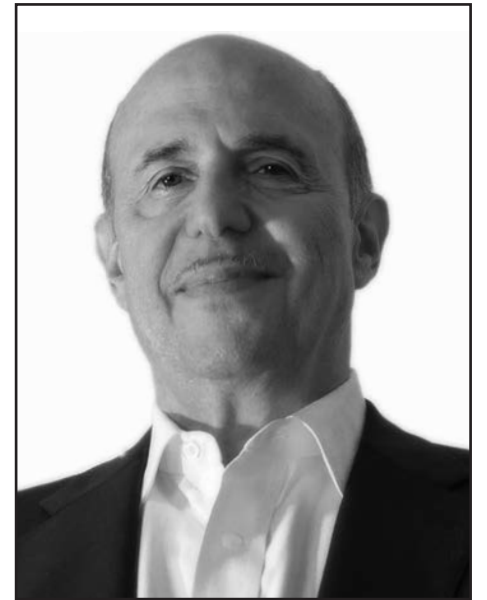
Arguably, there is no more important issue for a wire harness company--or just about any business--than holding onto existing customers. That's why the golden rule of retention is so crucial. To violate it is to flirt with upheaval, but embedding it in your culture gives you an invaluable insurance policy.

Although I didn't invent the golden rule, I sure have preached it: Regardless of the strength of your quality delivery and price performance with a given customer, unless your company has regular, frequent, face-to-face contact with that customer, you risk losing that customer.

*A couple of examples:*

When I was in the wire harness business, myself, I got a call from a major customer who wanted to visit my plant. Our track record with this customer was exemplary. Consistent on-time delivery. Impeccable quality. Feedback that our pricing was very competitive.

To my great surprise, shortly after the



Loren Smith, CEO

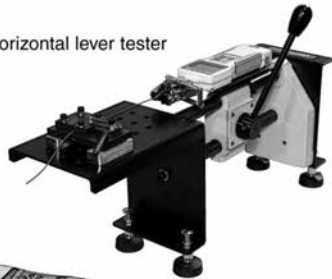
buyer arrived and we exchanged pleasantries, he told me his firm had found lower pricing on everything we were doing with them, and if we didn't meet those prices they were going to move the business.

When I weighed his expectations against our cost structure, I didn't see how we could possibly provide the

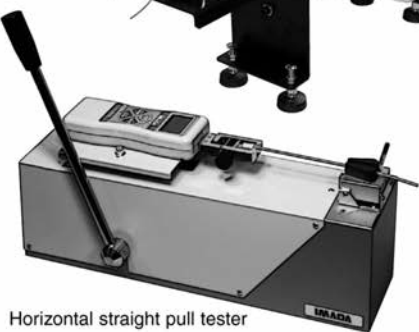
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## Wire Crimp Pull Testers

Horizontal lever tester



Vertical lever tester



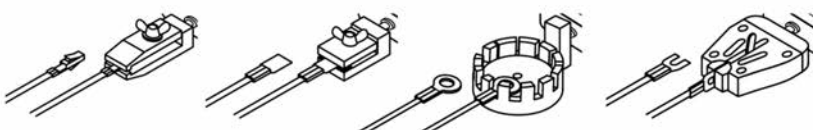
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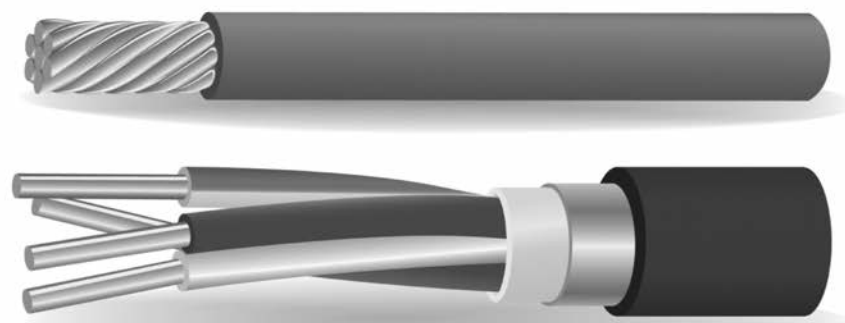
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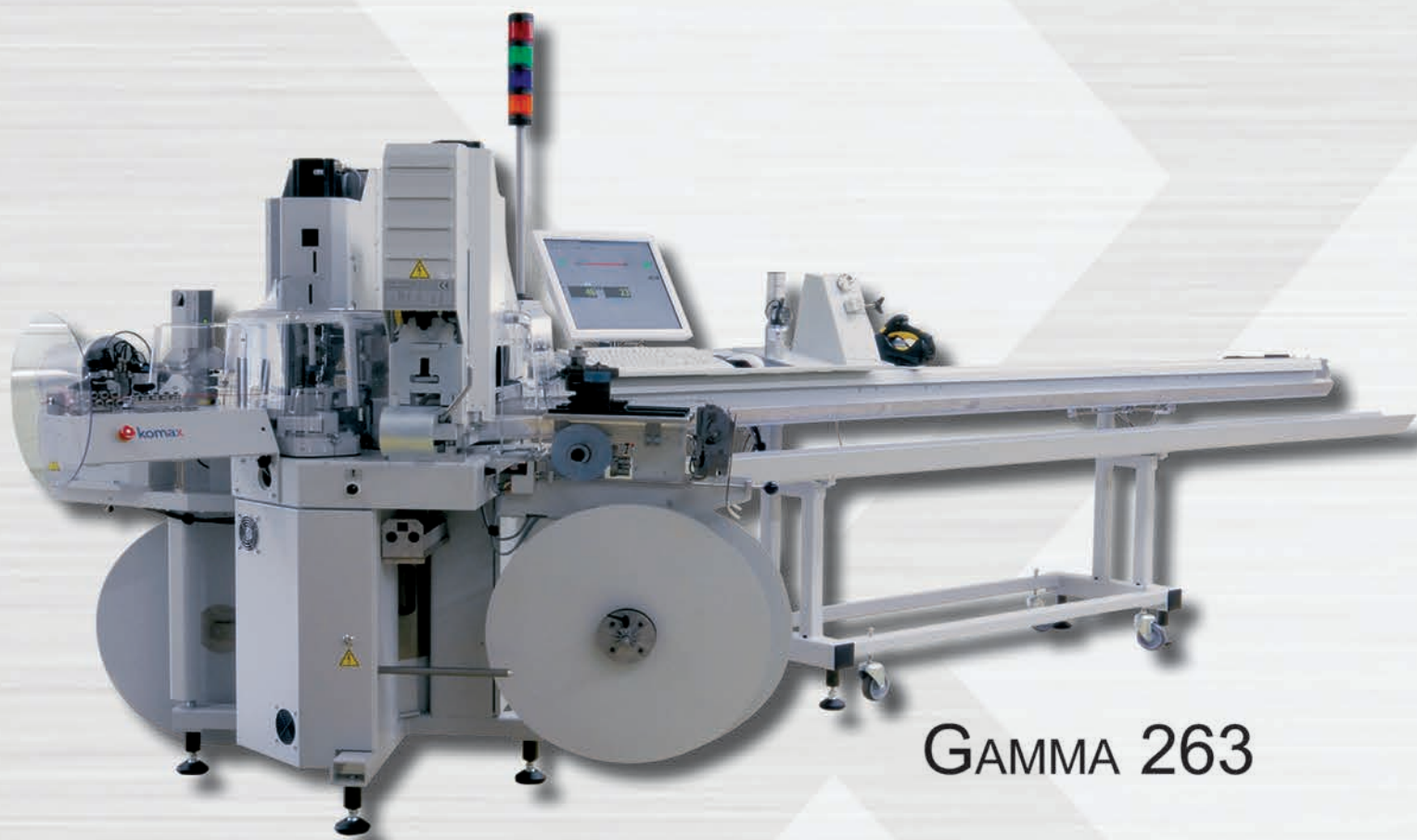
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# The Golden Rule

Continued from page 8

price reductions he was asking for, so I asked for time to take a harder look. But further analysis did not change the picture, and I had to tell the buyer we needed to keep our prices where they were. We lost the business, we lost the account, and we never got it back.

When I reflected on how we might have prevented this total loss, I concluded that if we'd had early indications that our longevity with the company was in jeopardy we might have been able to work with the customer to avoid this outcome. To avoid repeating the scenario with other customers, we had to put a mechanism in place immediately to ensure regular, face-to-face contact with our major customers.

Happily, the second example occurred after we committed to ongoing contact: One of our customers was sold to a much larger company. Through our regular contact with the customer's engineering folks, we learned the buyer was market testing all purchased components including electrical wire assemblies.

Armed with this information, we told the new company's purchasing group that we wanted to put a team in place to look at the designs of their top 10 harnesses to see if we could lower both material and labor costs through design

modifications. Our idea was enthusiastically embraced, which resulted in our ability to stay ahead of their cost reduction process. The net result: We were never given a price reduction ultimatum, and we experienced strong growth with the customer over many years.

The golden rule reaps untold benefits for two primary reasons:

1. Face-to-face contact solidifies relationships and yields information that might otherwise never be revealed. The sources of this information can come from a wide variety of functions in any company.

2. Companies get bought and sold every day. Ongoing, personal contact heightens the chances of knowing something is afoot and preparing for potential changes.

Given all the pressures of running a business and the need to douse daily fires, it's human nature to slack off with a loyal customer. That's why institutionalizing a system of regular, face-to-face contact with every important customer is essential.

Loren Smith can be reached at [lms@blvcapital.com](mailto:lms@blvcapital.com) or [www.bluevalley-capital.com](http://www.bluevalley-capital.com)

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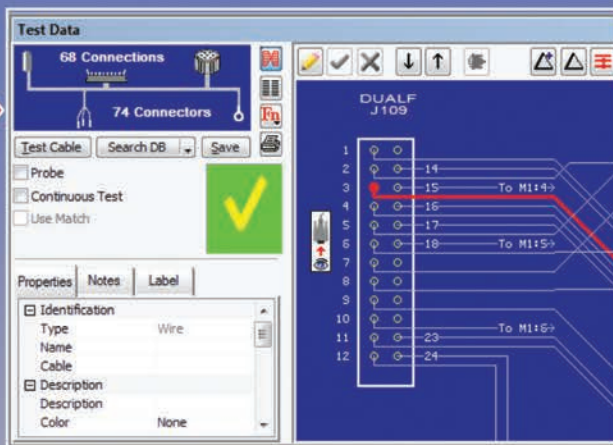


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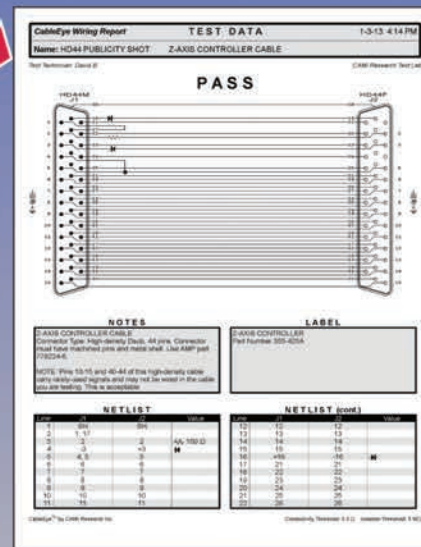


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# NEWS PLUGS

## AMP-O-LECTRIC Model GII Terminator

The Model G II terminator is the latest and most advanced design in the long-standing series of 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 Connectivity (TE).

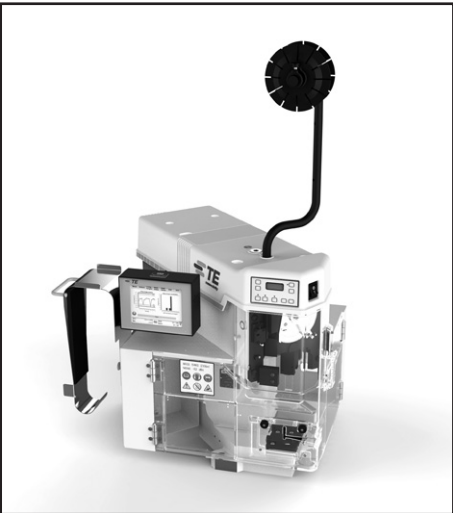
The new terminator improves key performance areas for operators. For operator convenience, we've improved access to, and significantly updated, lighting in the under cabinet and target area. A variable

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 style.

All Model "G II" terminator versions include precision adjustment for crimp height — an important feature, which, in combination with the optional CQM II, enables repeatable, tight crimp tolerances required for today's demands for higher levels of quality. By simply resetting a dial, the operator can adjust crimp height in 0.013 [.0005"] increments over a 0.457 [.018"] range.

Another user-friendly feature is its control system. We have added simple buttons to control: motor powering on or off, adjusting the ram speed, jogging the motor, setting the machine to switch split-



AMP-O-LECTRIC  
Model GII Terminator

cycle operation, turning the work light off or on, powering the air feed on or off, or resetting the batch counter. All functions are reported on an LCD display. The controls also detect and report errors in the machine, and stop cycling when a bad crimp is detected by the CQM II. If a crimping error is identified, the operator must then push a reset button to continue.

The Crimp Quality Monitor (CQM II) and Strip Module are both options that can be added from the factory or in the field. A splice version of the terminator includes specialized guarding that enables thru-splice applications.

For additional information, visit web site at [www.tooling.te.com](http://www.tooling.te.com) or contact TE Connectivity at 1-800-722-1111.

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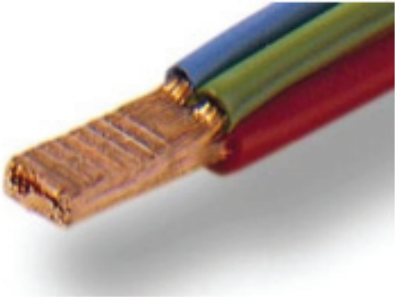
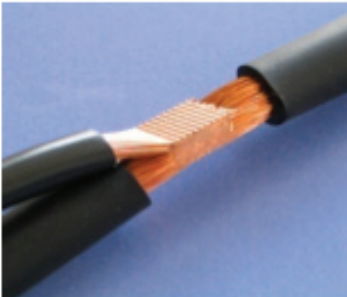


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# Reality Check:

Continued from page 1

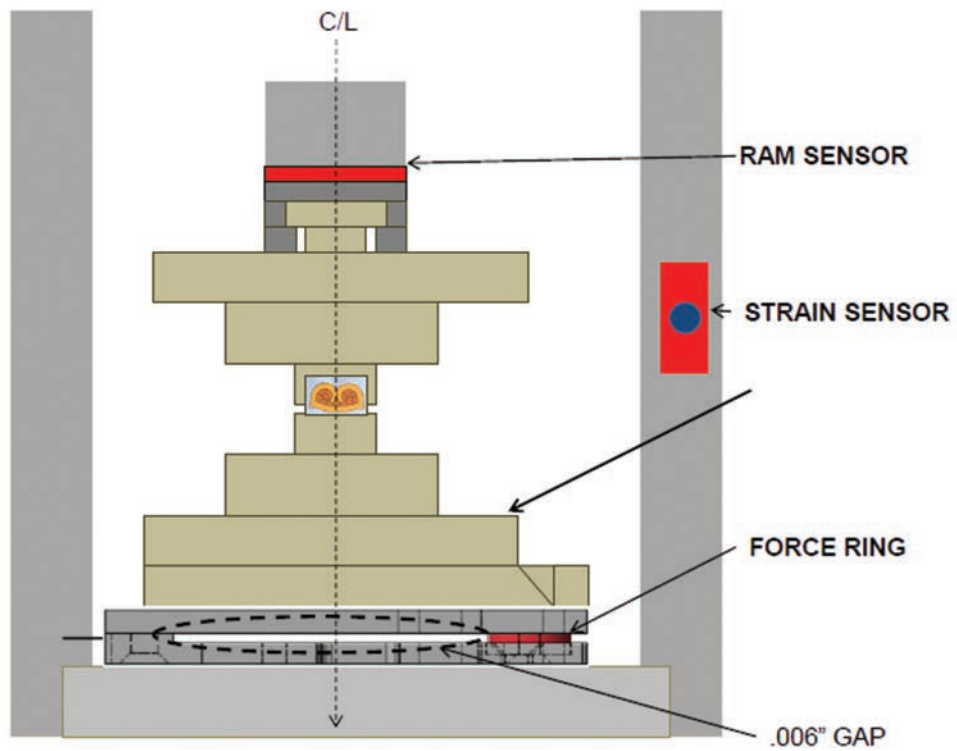
between good and defective crimps. The sensor is typically a piezo electric sensor that, during the crimping process, converts force or strain into an electrical signal which is captured by the CFM. The CFM conditions the sensor output, analyzes the force signature and compares the results to established limits for a decision: good or defective. All of this happens within milliseconds of the wire terminal crimp being made.

The mechanical integration of the

sensor is very important to the overall CFM performance with consideration for three criteria:

1. The sensor should be installed as close to the work (crimp tooling) as possible to eliminate undesirable mechanical noise and force influences on the sensor which are unrelated to the actual crimping force.
2. The sensor should be mounted so as to avoid any influence from shunting - a detrimental effect that occurs when

Continued on page 15



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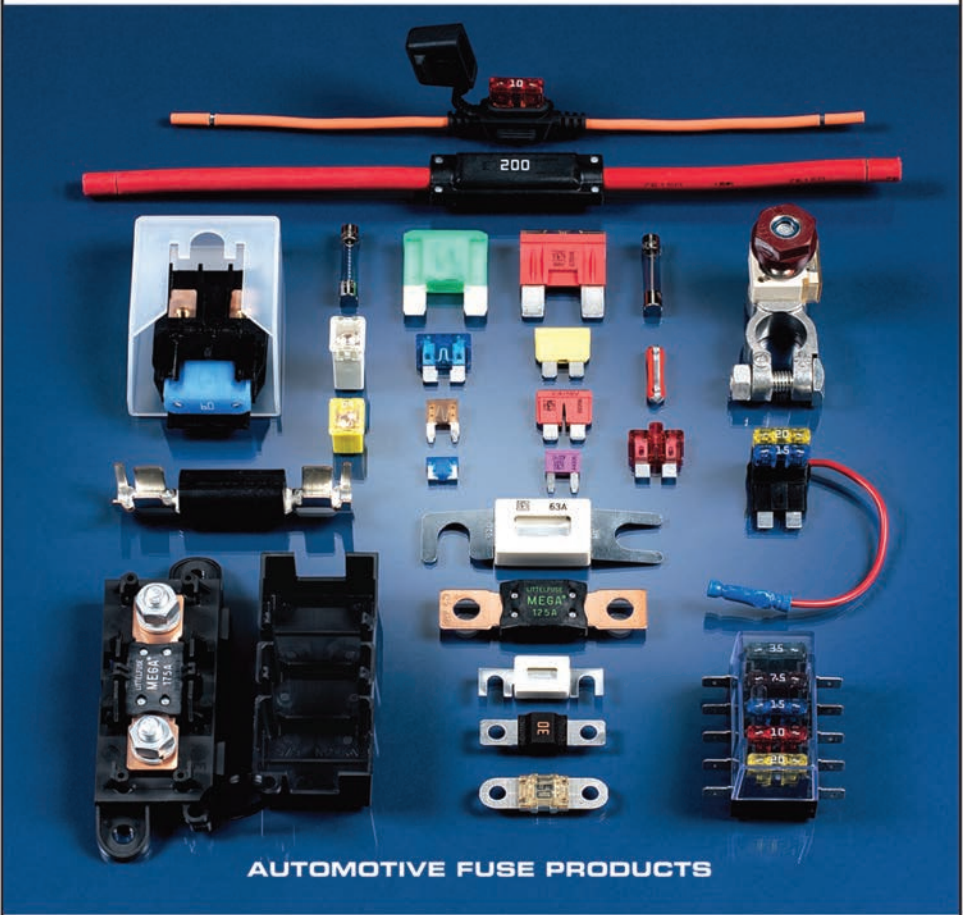


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# Reality Check:

Continued from page 13

the sensor is not completely in series with the force applied during the crimping process, and as a result, some of the crimping force will bypass the sensor.

3. The sensor should be installed in a location that will ensure reliable and continuous performance with consideration for the application and the environmental conditions that might otherwise degrade the sensor performance, or expose the sensor to damage.

Let's now review the three most common sensor mounting configurations typically seen on the production floor today based on the criteria above.

### 1. SENSOR IN THE BASEPLATE

The sensor in the baseplate is close to the work (crimp tooling) and meets our first criteria well. However, shunting is an issue because of the sensor mounting arrangement. The force sensor will provide optimum performance when mounted directly in series with the work, eliminating any possibility of the force bypassing the sensor. The optimum location for the sensor is directly under the crimp tooling. This is not possible on most crimping presses however because of the baseplate design. Most baseplates have a large opening near the optimal sensor location for the terminal cut-off material to escape (scrap chute). To accommodate this opening the baseplate sensor is often mounted in an offset position and consequently not aligned directly in series with the work. This mounting arrangement increases the shunting effect and reduces the sensitivity, since a portion of the crimping force will bypass the sensor (in parallel) into the mechanical components of the baseplate rather than completely through (in series) the sensor. This shunting effect is more pronounced for low force crimping applications typically found in small cross section terminal crimps. Because of this the baseplate mounted sensor scores poorly for criteria number two.

By design, the performance of the sensor in the baseplate is dependent on maintaining a physical gap

in the range of .08mm (.003") in order to isolate the sensor as much as possible for optimum sensing of force during the crimping process. This gap is critical to the sensor performance. The baseplate area of the press is where various lubricants and waste materials naturally collect and if this gap around the sensor becomes saturated with oil the shunting effect will increase degrading the sensor performance. Also, contact surfaces between the applicator and baseplate must be kept completely parallel or sensor performance will be affected. Misaligned applicators or applicators improperly seated on the base-

plate may still produce good crimps however the sensor signal and CFM performance can be degraded. This gap in the baseplate is required for the baseplate sensor to function. However this gap typically across a large area of the baseplate introduces unwanted process variation introducing compression and "spring action" of the baseplate during the crimping process.

Furthermore, force rings installed into baseplates must be very thin (typically 5mm) to physically fit inside the baseplate. Because of its small size these force rings have a reduced

Continued on page 16



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# Reality Check:

Continued from page 15

mechanical over-range capacity. A typical baseplate force ring has a calibrated range of 2268kg (5000lb) and a physical maximum force rating of the 2268kg (5000lb). This limited sensor over-range capacity exposes the sensor to mechanical failure such as a terminal jam condition or tooling strike that can easily exceed the maximum force rating of the sensor. When this force rating is exceeded the result is a catastrophic failure of the force sensor which results in costly and ongoing sensor replacements with associated downtime. So the baseplate sensor scores poorly for number three.

## 2. STRAIN SENSOR MOUNTED ON THE PRESS FRAME

The strain sensor is widely used and is a popular choice for many crimping press applications. The strain sensor senses the resulting micro-tension on the press frame during the crimping process and its performance never ceases to amaze when demonstrated, evaluated and compared to the performance

of direct force sensors. However, this indirect sensing method is far from the actual work being performed, and therefore more susceptible to the external influences of mechanical noise. Vibration, for example, can degrade the strain sensor performance as it senses the micro-tension on the frame during the crimping cycle. Vibration can also contribute to unwanted mechanical noise that influences the sensor signal, and so the strain sensor scores poorly for number one.

Shunting effect is an issue for the strain sensor since the micro deflection of the press frame is typically shared across two side frames in parallel to the strain sensor. The strain sensor is sensing the micro tension at only one position so the strain sensor scores poorly for #2.

Conversely, the strain sensor exceeds all other sensor options for reliability with simple integration to almost any press and scores high for criteria number three.

Continued on page 18

Sensor Performance Factor	Baseplate Force ring	Frame Mounted Strain Sensor	Ram Mounted Force Sensor
1 - Installed Close to Work	3	1	3
2 - Minimize Shunting	1	1	3
3 - Reliable Performance	1	2	2
Total Score...	5	4	8

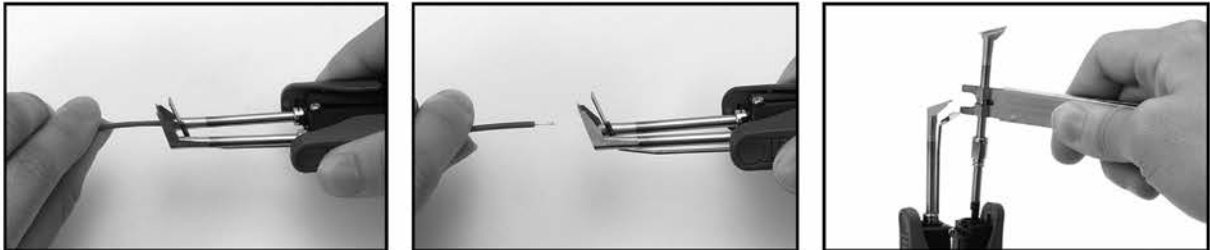
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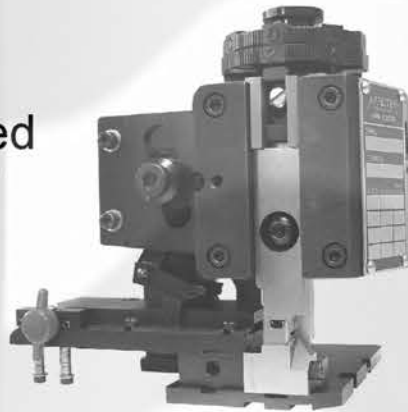


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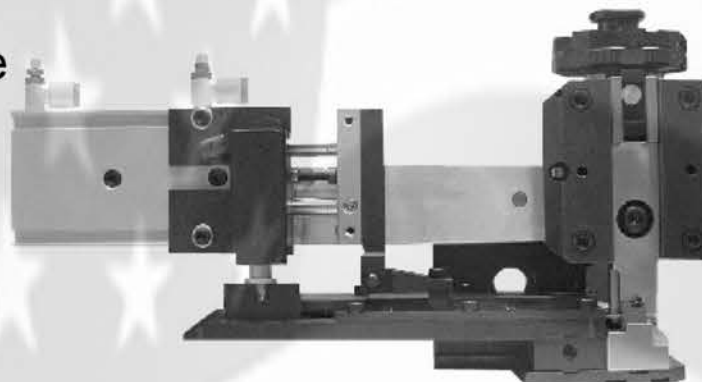


Model 1700

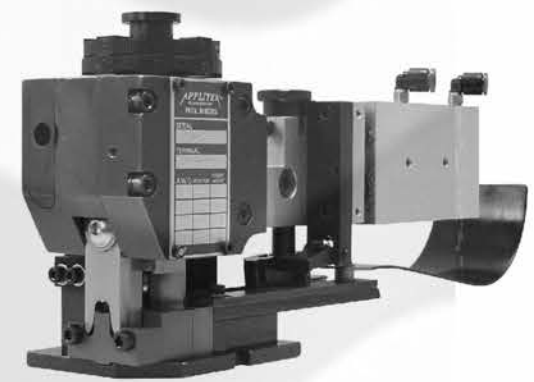


Model 2000

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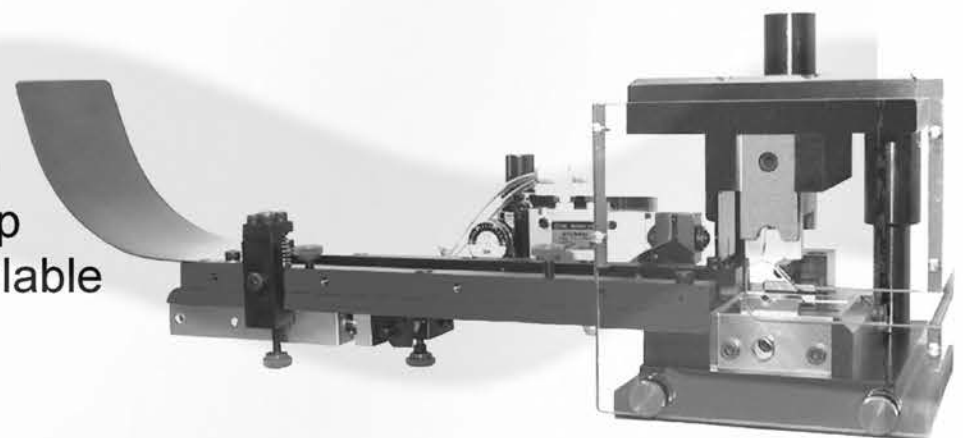


Model 1500



Model 2100

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## NEWS PLUGS continued

*Continued from page 12*

connectors of your choice, 100% tested and inspected, are also available with minimum lead times. For rugged environments where cables are subjected to abrasion, Cicoil offers Anti-Friction Coatings by request.

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Cicoil's unique Flexx-Sil™ flat

cables provide high flexibility, extremely long life, and they can withstand temperature extremes from -65 degrees to +260 degrees Celsius. Cicoil's flat cables are used in thousands of demanding applications; including aircraft fuel control cells, semiconductor automation, and the Space Shuttle. Cicoil designs and manufactures its Flexx-Sil™ jacketed cables and cable assemblies in an automated facility in Valencia, California. Cicoil's quality assurance system is certified to the ISO 9001 (AS9100) standard. Visit [www.cicoil.com](http://www.cicoil.com) for more information, or call 661-295-1295 to speak to an application engineer.

### KOA Speer Introduces Fast Acting Chip Fuse CCF1F Rated to 15 Amps

KOA Speer Electronics, Inc. intro-



**Fast-acting Chip Fuse, CCF1F**

duces its new fast-acting chip fuse, CCF1F, with a rated current of up to 15 amps. Due to the original chip fuse technology, this fast-acting chip fuse provides over-current protection with stable fusing characteristics.

The CCF1F, in a 2410 size, has a range of rated current from 0.4 to 15 amps, and meets IEC 60127-4 specifications (7A or less). The CCF1F ceramic case provides excellent mechanical strength and offers an operating temperature range of -55oC ~ +125oC.

The EU RoHS-compliant CCF1F is ideal for consumer electronics, industrial and automotive markets, in applications such as base stations, car audio and navigation, LED lighting, switching equipment and DC-to-DC converters.

Lead time for the CCF1F is 10 weeks. Samples are available upon request. Link to datasheet: <http://www.koaspeer.com/products/circuit-protection/fuses/ccf1f/#x3>

KOA Corporation, whose global presence includes corporate headquarters in Japan, and sales locations in the USA, Germany, China and Singapore, offers a wide range of products which include thick and thin film resistors, current sensing resistors and resistor arrays; thermal sensors, fuses and varistors; wire wound, multi-layer, power and thin film inductors; LTCC's and modules. KOA Speer Electronics, an affiliate of KOA Corporation, has served the electronics industry since 1980. Visit [www.koaspeer.com](http://www.koaspeer.com).

**Advertise in Wiring Harness News  
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# Tinned wires...

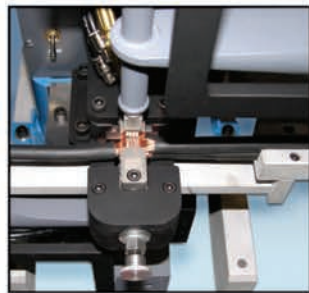
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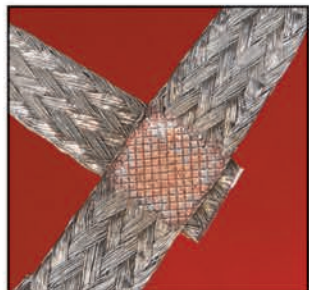
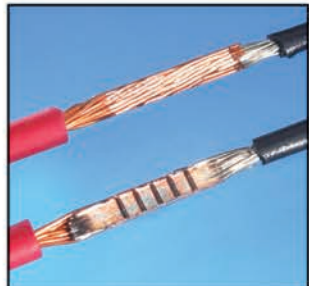
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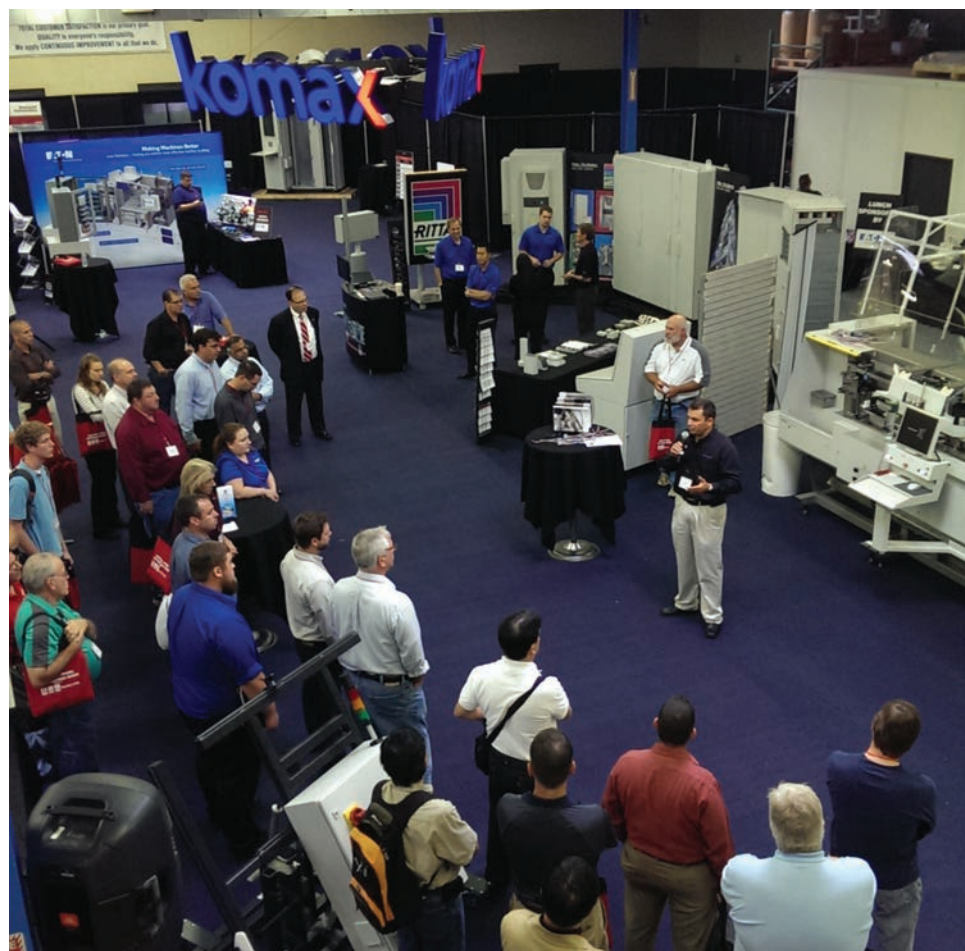


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**K**omax Wire recently hosted the 2nd Annual Control Panel Automation Show at our North American headquarters. With over 14 vendors on exhibit, the show showcased a broad range of wiring processing solutions for all attendees. The show not only provided attendees with a look at Komax's vast range of products and solutions but also provided attendees with a concentrated overview of maximizing control panel assembly efficiency. Additionally, attendees were able to experience hands-on workshops, educational seminars, and networking

opportunities with experienced professionals. Komax's own Patrick Boyer presented the advantages of the Zeta 633 that is ideal for customers with high mix, low volume production. Patrick provided an in-depth presentation that addressed many trigger points for today's production environment that includes reducing change-over time, networking production jobs with materials management, and improving production efficiency. For more information, please contact your local Komax sales representative or visit the Komax website at [www.komaxgroup.com/wire](http://www.komaxgroup.com/wire).

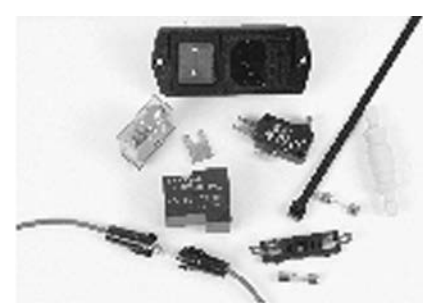


**"PROTOTYPE THROUGH PRODUCTION"**

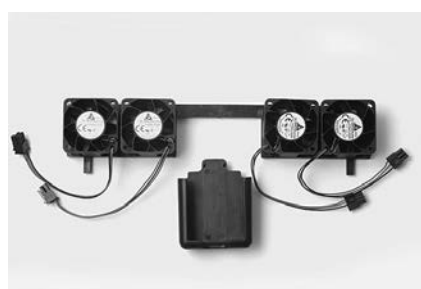
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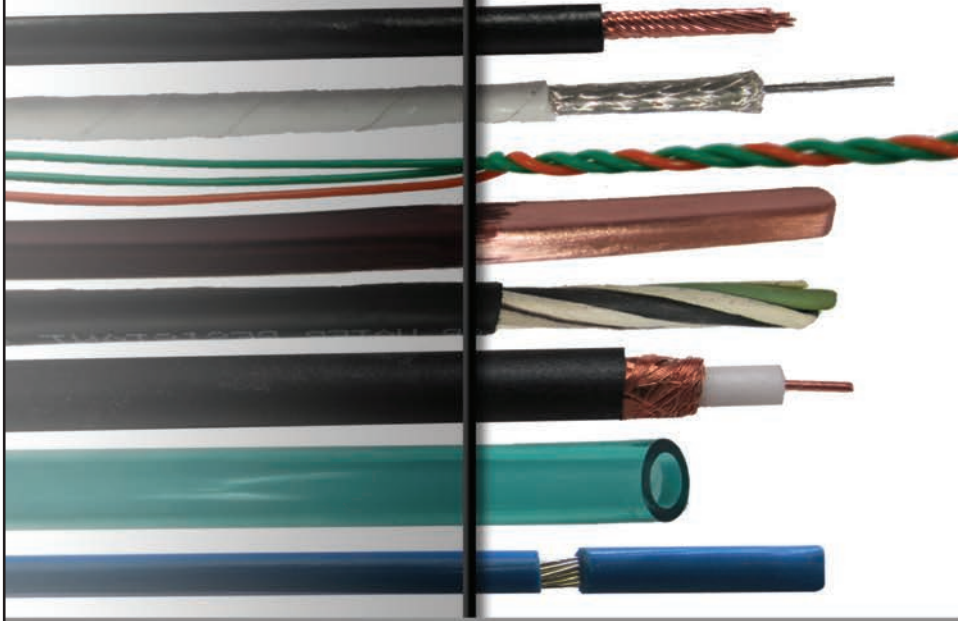
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## Schleuniger Oktoberfest Celebration and Open House a Huge Success!



The entire Schleuniger team posed for a picture after a successful event.

On September 19, 2014, Schleuniger, Inc., a leading international manufacturer of high-precision wire processing machines, hosted an Oktoberfest themed open house at its headquarters in Manchester, NH. Cirris Systems, Fiber Optic Center, Inc., Gem Gravure, Panduit and Telsonic Ultrasonics exhibited at the event.

Enthusiastic guests were greeted by Schleuniger employees dressed in Oktoberfest themed attire and were given an

Oktoberfest T-Shirt and glass liter beer stein to get in the spirit themselves.

The event's special guest, City of Manchester Mayor, Ted Gatsas, helped kick off the celebration by tapping the keg and sharing the first beer with Schleuniger VP, Technical Service, Marc Lussier. Opa's Oompah Band performed throughout the afternoon as guest dined on a traditional German buffet in our

*Continued on page 24*

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[www.telsonic.com](http://www.telsonic.com)

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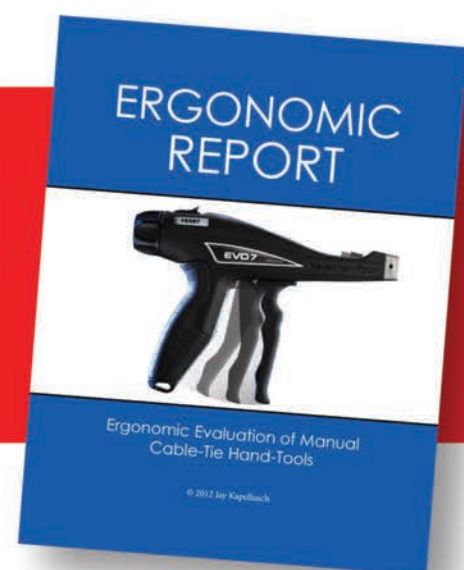


An independent ergonomic study of cable tie hand tools found the EVO 7 requires an amazing **21.7% less** grip force than other tools.

## EVO 7

Study participants rated the EVO 7:

- Best in overall comfort
- Best in overall ease of tension setting
- Best in overall ease of use
- *Overall, the most preferred cable tie tool*



Visit:

**[hellermann.tyton.com/EVO7](http://hellermann.tyton.com/EVO7)**

to learn more about the ergonomic study and the revolutionary technology behind the EVO 7 cable tie tool.

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## Schleuniger Oktoberfest Celebration

Continued from page 22

very own “Biergarten” and tried their luck at a game of corn hole or penalty kick soccer. Many also participated in one of the “Masskrugstemmen” (beer stein holding contests) held throughout the day.

All six exhibiting companies provided live product demonstrations showcasing the latest in wire processing, cable testing, marking and coding, end to end wire management solutions and ultrasonic welding to the large crowd of attendees.

The technical seminars were very well received and a highlight for many guests. Presentations included:

- “Wire Processing Quality” presented by Schleuniger
- “Ultrasonic Welding for Wire Harnesses” presented by Telsonic Ultrasonics
- “Success Depends on the Crimp” presented by Panduit
- “Marking Simplified – Ink Jet & Beyond” presented by Gem Gravure
- “S.WOP – Software for Wire Optimized Production” presented by Schleuniger

Several raffles were held throughout the day with Erik Rothkopf from Inside Track Cabling winning the grand prize iPad Air and Bose Wi-Fi music system.

All who attended had a great time and were impressed with the level of information and education available to them during the event. Schleuniger would to thank all attendees and partners who participated in the event and made it a huge success!

Should you have any questions, please e-mail [sales@schleuniger.com](mailto:sales@schleuniger.com) or call (603) 668-8117.



Mayor Ted Gatsas enjoys a beer with Schleuniger President Darren Teasck and VP, Technical Service, Marc Lussier.

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## NEWS PLUGS continued

### BURNDY® Introduces the RHCC4UAL Remote Cutting Head

BURNDY®, a leading manufacturer and provider of connector and tooling solutions to the industrial, energy, construction, telecommunications, petrochemical, data center, and transportation industries, introduces their largest capacity cutter to date — the new RHCC4UAL.



The RHCC4UAL cutter is designed to cut Copper and Aluminum cables up to 4.00" diameter. This new remote head cutting tool features high strength hardened steel, scissor-action cutting blades for mid-span cuts, and a unique 360° swivel hose fitting for ease of use in confined spaces. With the addition of this new cutter, BURNDY has greatly expanded its CU/AL cutting capacity. Note: A battery operated version will be coming out shortly.

The RHCC4UAL comes with a durable canvas carry bag and is provided with a 5-year limited warranty (excluding blades). Replacement blades are available, catalog number RHCC4UALBLD, sold separately.

Headquartered in Manchester, New Hampshire BURNDY has over 85 years of dedicated customer support in both service and product.

For further information contact BURNDY at 47 E. Industrial Park Drive, Manchester, New Hampshire, 03109, call Customer Service at 1-800-346-4175, or visit our website at [www.BURNDY.com](http://www.BURNDY.com)

### Nordson EFD Expands Japanese Sales and Support Capabilities

Nordson EFD, a Nordson company (NASDAQ: NDSN), a leading precision fluid dispensing systems manufacturer, announces a new business collaboration with Unicontrols Co., Ltd., a leading manufacturer of small to medium size stainless steel tanks in Japan. This new business collaboration will significantly expand the availability of Nordson EFD fluid management systems

to Japanese companies and provide them with an even higher level of service. Major markets for equipment of both companies include electronics, automotive, and medical industries.

According to Masaru Uchida, representative director of Nordson in Japan, "The combination of Nordson and Unicontrols' products, technologies, application expertise, and sales reach will provide a wide range of options and excellent support to customers."

Stable fluid reservoirs from Unicontrols paired with precision fluid dispensing systems from Nordson EFD will enable manufacturers to apply accurate, repeatable volumes of adhesives, lubricants, or other similar fluids. Applications range

from large automotive assemblies to implantable medical devices and tiny electronic components. Benefits of controlled fluid application include greater profitability through higher yields, better quality, and lower production costs.

The new partnership will significantly expand its local sales force to provide Japanese companies with an even higher level of service.

Unicontrols, established in 1976, has been a leading company for providing small to medium sized stainless steel tanks with professional technology and knowledge. The company also owns a manufacturing plant that delivers high quality tanks at low cost.

Visit Unicontrols on the web at [www.unicontrols.co.jp](http://www.unicontrols.co.jp).

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TURNKEY CELL for E-DRIVE production

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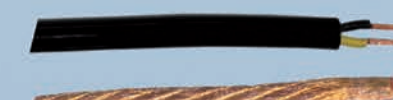

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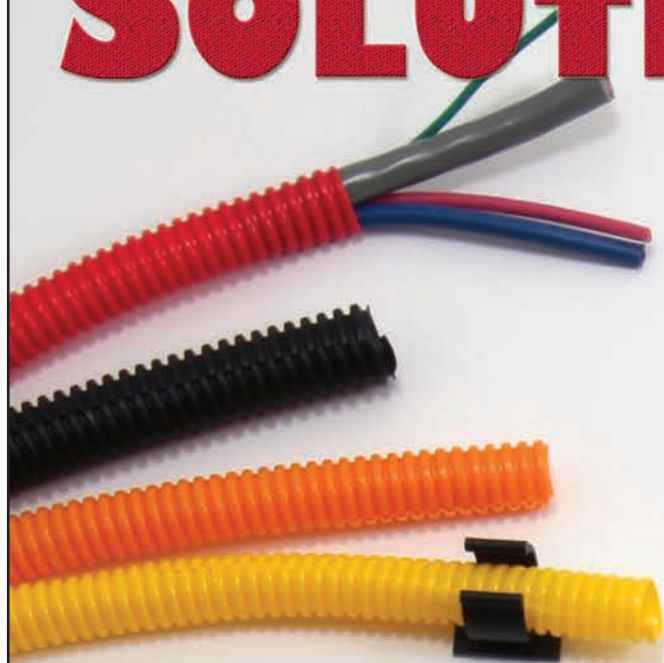
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# NEWS PLUGS continued

## What Medical Device Companies Need to Consider in Selecting an EMS Company

Digicom Electronics, Inc., a technology and quality driven electronics manufacturing services (EMS) company, announces that the white paper, What Medical Device Companies Need to Consider in Selecting an EMS Company, is now available on the Digicom Electronics website at [www.digicom.org/selecting-ems-company.html](http://www.digicom.org/selecting-ems-company.html). The article discusses the factors that contribute to a successful contract electronics manufacturing relationship and the things a medical device company needs to keep in mind and consider during the selection process. The article details the steps to take in selecting the contract manufacturer best suited to handle the design, prototyping, material selection and purchasing, manufacturing, test, process validation, shipping and logistics, and/or other special needs of a medical device company. Information ranges from checking for certifications such as ISO 13485:2003 medical devices quality and quality system regulation 21 CFR 820, to the board cleaning processes used, to handling process validation.

"Although most EMS companies perform the same basic services, every EMS is different," explained Mo Ohady, general manager, Digicom Electronics. "You can tell when you walk into a place, examine the equipment and processes, and speak to the people. It's important to use due diligence in choosing an EMS company, but the rewards can be great. A properly functioning EMS brings decades of experience and knowledge to embrace and enhance the product you want to build in a time-efficient and cost-effective manner. Making the wrong choice could damage or destroy your company's relationship with its customers, its reputation in the market, and even its standing in the financial community."

For more information contact Digicom at +1 510-639-7003, email [info@digicom.org](mailto:info@digicom.org)

com.org, or visit our website at [www.digicom.org](http://www.digicom.org).

Digicom Electronics offers advanced electronics manufacturing with "Made in the USA Quality". Digicom collaborates in all aspects of the process from the design to the final, fully compliant product. Material procurement and management services include planning, purchasing, expediting and warehousing of components and materials. Digicom is certified for ISO 9001:2008, ISO 13485:2003 medical devices quality, quality system regulation 21 CFR 820, and ITAR certification.

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# Defining Reliability at Teledyne Oil & Gas, ODI

Continued from page 1

bilities. Here, ODI manufactures the wires, jacketing, and connectors for their products. The new Technology Center houses engineers and technicians who develop and test new technologies to support the advanced life-

time requirements (up to 25 years) for ODI's interconnect products.

### The Products

At the heart of ODI's value proposition is their wet mate connectors. This enabling technology allows assets to be placed on the sea floor where needed,

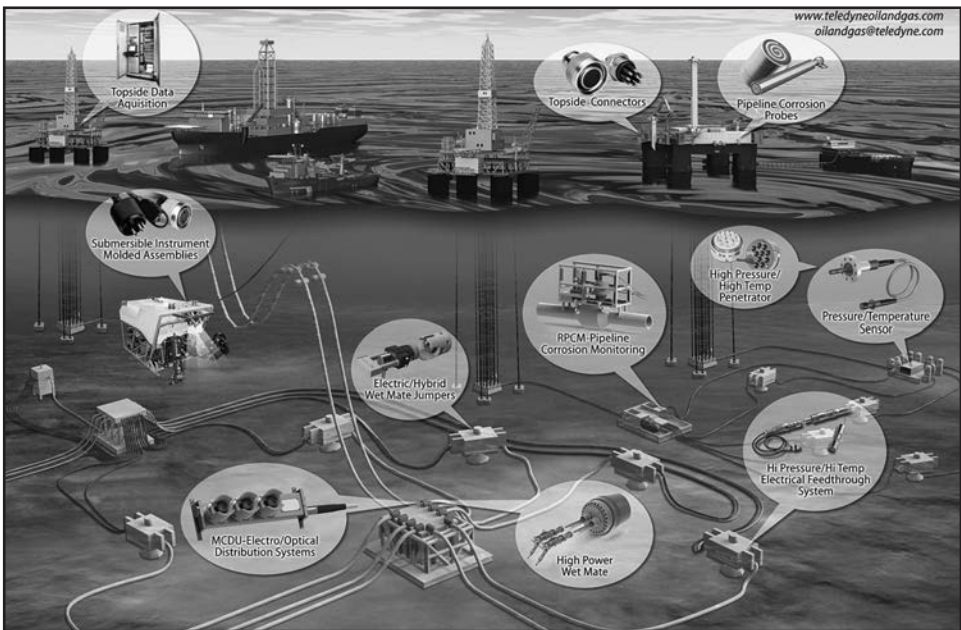


Figure 1 - Subsea oil field.

while remotely operated underwater vehicles mate the components together (See Fig. 2 on Page 30). These underwater components can be reconfigured as production parameters change, and ODI leads can be mated and demated up to 1000 cycles. The connectors are specially designed to displace sand and debris during mating.

In order to maintain the integrity of the cables at operational depths (6000 meters and beyond), ODI's cables use a Pressure-Balanced Oil-Filled (PBOF) housing for the wires and cables. Essentially, an elastomeric conduit is filled with oil allowing the sea pressure to equalize the pressure in the assembly.

The oil-filled conduit acts like a pressure suit to maintain a constant pressure along the cable. The combination of this system, coupled with the wet mate technology, allows ODI to supply reliable and configurable cable systems for their customers' subsea applications.

### Unique Quality Approach

Before our meeting, John sent me an article outlining the Teledyne Oil & Gas reliability model. The article discussed how this model is key to the culture at Teledyne, and represents three pillars:

Continued on page 30



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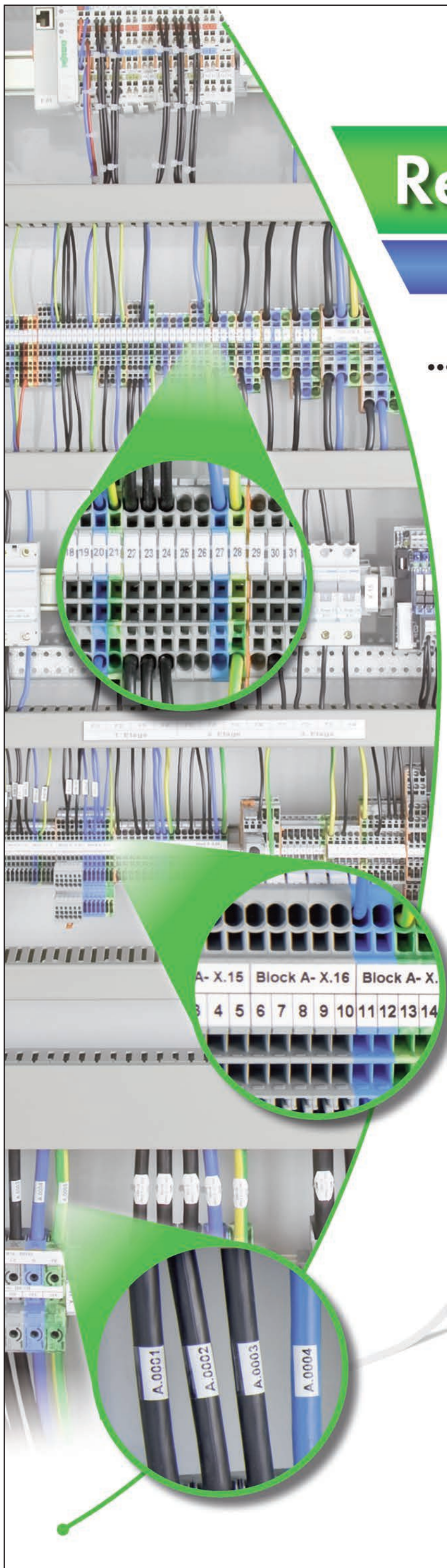
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# Defining Reliability at Teledyne Oil & Gas, ODI

Continued from page 30

ecosystems, livelihoods, and a host of other concerns at risk in the oil and gas industry; but accessibility is nonexistent. Once the subassembly is in place, it's in place. It can be demated and mated with receptacles within a relatively close proximity. But as John pointed out, "if one of our assemblies fails, your looking at \$1million just to deploy the ship to perform the operation."

So this culture or reliability at TOG is really derived from the understanding of the entire system. It is really a result of

reliability thinking all the way back through subsystems and individual components. To illustrate this, during my visit I noticed completed assemblies being tested in salt baths and hyperbaric chambers. I also noticed technicians with microscopes testing the corrosion attributes of individual polymers at the molecular level.

### Reliability in Unlikely Places

I discussed the extreme operating pressures of ODI assemblies, and the corrosive nature of saltwater alone leads

to great challenges from a materials standpoint. But as John pointed out, "most of the bad things happen in transportation, storage, and deployment of the product." Even though the operational temperature of the assemblies might be around 0° C, the temperature in an outside storage facility in Iceland might be -50° C, he noted. Due to the length and bulky nature of the assemblies, careful consideration must be given to what can happen during transportation and deployment; adding further to the reliability equation.

### Reliability Moving Forward

There are two major industry trends that are pushing the reliability curve to greater limits at ODI and throughout TOG. First, there are much more stringent yield requirements imposed as governments issue leases on new wells. In the past, a typical yield for an oil well might be in the 5% to 7% range, and would be limited to the oil harvested as a result of the natural pressure of the well. Beyond that level, it becomes much more expensive to extract the oil; and a complex pumping system is required to do so. This increases the need for TOG's interconnect systems, and puts a further burden on the reliability equation. As mentioned, current specifications call for a 25 year life span for assemblies. As yield levels are increased to 25% and beyond, the system in place will have to withstand a life cycle of 40 to 45 years. "That's someone's whole career in this industry," quipped John.

Second, there is increased pressure towards subsea processing. The oil rig of the very near future will be invisible above the surface. This will require more subsea equipment, more connections, and a more adaptable systems to handle the challenge.

### Uniquely Positioned

TOG is in a unique position within its industry. "The cost of our products is low to compared to other components in the system," John said, "but our mission critical [to the oil companies] is



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very high.” Because of their track record with oil producers, and coupled with the critical nature of their products,TOG has been able to leverage development costs as part of customer paid orders. In addition, TOG has maintained most patents,licenses,and intellectual property as part of this development.

John left me with the notion that the economic viability equation in the oil and gas industry is changing. Current price levels make it possible to extract oil from wells that were simply capped at a certain depletion level in the past.At

the same time, governments are imputing new yield levels that are pushing the barrel price higher. Increased pressure will be applied to assembly and component suppliers to achieve even higher levels of engineered reliability.TOG, and especially the ODI facility in Daytona, seem well poised for the challenge.

You can jump on the Teledyne Oil & Gas website at teledyneoilandgas.com. You can see their products at the Off-shore Technical Conference and at Off-shore Europe trade shows every year.



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3	3	67	↔ 0.1 Ω	✓	< 1 µA	1200 V	> 1 GΩ	0.071 mA	820 V	12 MΩ
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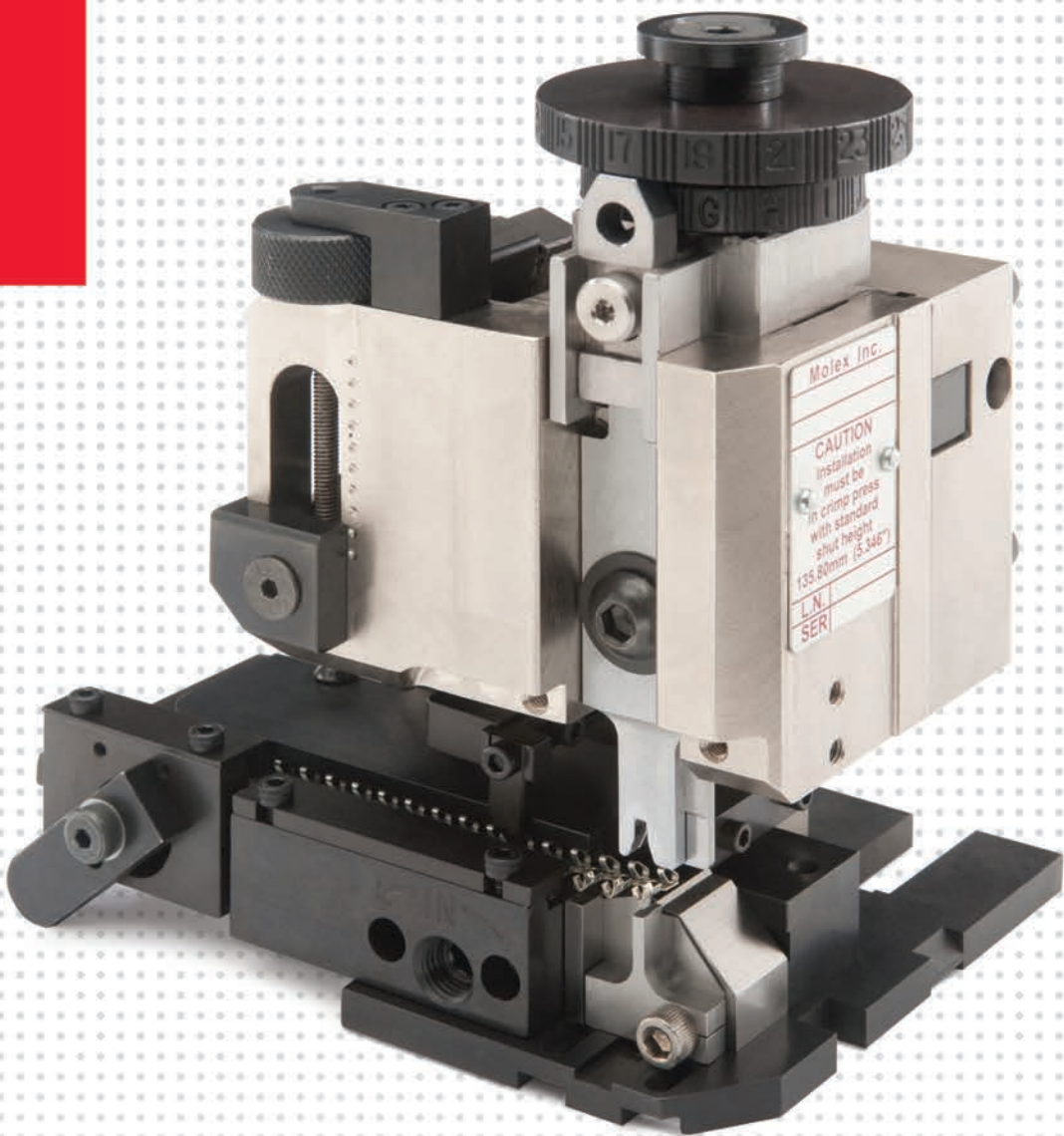
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## Komax Corporation and TE Connectivity Team Up

**K**omax Corporation is now a distributor for TE Connectivity applicators and bench top terminating machines. Komax Corporation and TE Connectivity have recently teamed up to provide a one stop shop solution for all customers' wiring processing needs. Komax is streamlining the sales order process for its customers. No longer does a customer have to talk to multiple sales representatives or issue multiple purchase orders. Komax now offers an extensive bench top product offering to all our customers.

Some of the products that Komax now distributes include: the OCEAN



Applicators, AMP-O-LECTRIC Model G Terminating Machine, and the AMP 3K/40 & 5K/40 Terminators. Tim MacAlpine, the President of Komax Corporation, stated, "We couldn't be more thrilled to team up with TE Connectivity to provide all customers with a complete product line offering, and we are excited to see the future business opportunities that this new partnership will generate." For more information, please contact your local Komax sales representative.

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# Global Aviation Technologies

Continued from page 1

minimal automation is used, an exception being a laser marker that measures and strips wire from Tri-Star Technologies in El Segundo, Calif., for example. Through-hole PCBs are produced, but Cottner would like to switch to surface mount and acquire the appropriate equipment.

Each harness is tested by equipment from Cirris Systems in Salt Lake City, Utah. Rarely are faulty harnesses found, since GAT has been approved for parts production by the FAA, and the company has ISO 9001:2008 and AS 9100c certifications.

“Three sets of eyes and a technician look at every piece,” Cottner said. “In avi-

ation you only have one shot at it. This is a small community, and word would travel fast if your quality was poor. You have to be on top of your game always.”

“We live up to the expectations of our customers,” Cottner said. “We have an impeccable record of doing a harness right the first time. We do not miss delivery schedules, and we are known for our responsiveness and value-added services.”

A major challenge in almost every project is lead time, always dependent on when components can be obtained. They can take 8-16 weeks to arrive because suppliers often have to build to order.

“Suppliers don’t carry what we need



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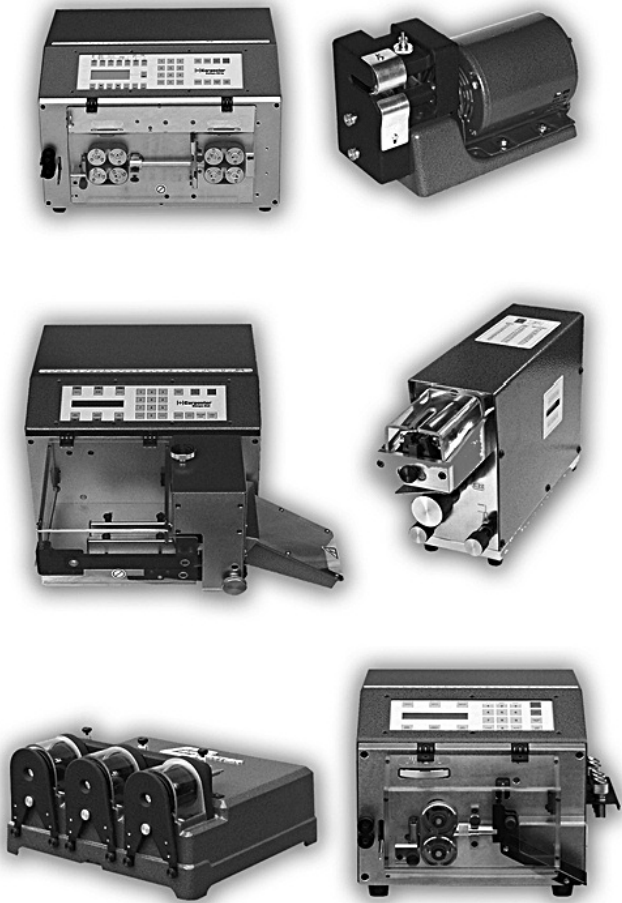
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in stock, and it is not a production run,” Cottner said. “We get pieces when we can. I don’t know how to mitigate that because we can’t stock them to sit there and wait and have money tied up. We have to work with our customers, and the quicker they can get us a purchase order the better.”

All GAT suppliers are approved and audited, and certain metrics must be maintained to remain on a list. “We have a good, strong supply base,” Cottner said. “Overall, I’m pleased with them.”

Another major aspect to GAT is its engineering department. Design is done in 2-D, and 3-D is used for mechanical parts. “OEMs are doing more outsource-

ing of engineering and rely on their partners to do it,” Cottner said. “We augment the OEMs because they have no bandwidth to do extra engineering.”

GAT also designs, produces and markets its own products. They include a replacement harness for a Honeywell TFE731 jet engine; LED landing, taxi and navigation lights for Learjet models 20, 30, 50 and 60; a power-distribution panel for a King Air B300; and a master warning light box for Learjet models 25, 35 and 36.

Another GAT product is the Xcelight Series 2 overlay instrument panel that

Continued on page 46

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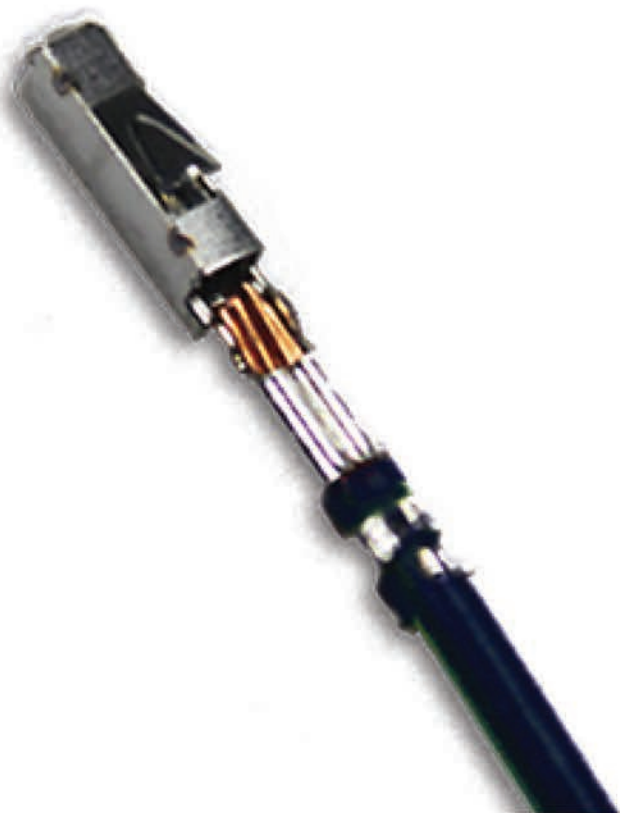
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WIRE & CABLE COLD  
TEMPERATURE RATINGS

Understanding temperature ratings is key to ensuring that cable will withstand the rigors of installation and last its expected lifespan. Many end-users specify the high end of the operating temperature ratings when requesting cable, but fail to specify the low temperature range or understand cable's low temperature limitations.

Extreme cold temperatures can cause cables to become brittle and less flexible. These conditions can lead to difficult installations and even cause damage to cable jackets and insulation. The minimum operating temperature and minimum installation temperature are important to understand and are discussed below.

COLD BEND AND COLD  
IMPACT TESTING

Cold bend and cold impact testing determine the minimum cold temperature rating (also known as the minimum operating temperature) of cable. These cable tests were designed to see how the entire cable (conductors, insulation, jackets, etc.) performs under cold conditions. UL and CSA have different requirements for the tests, but follow the same

basic procedures.

**Cold bend testing** determines the cable's ability to retain flexibility and plasticity while being bent. The test specimen is placed in a low temperature freezer set to a specified temperature for a number of hours. The cable specimen is then wound at a uniform rate around a mandrel with a diameter determined by the cable's OD. As an example, UL Standard 444 Communication Cables requires a nonshielded cable to be conditioned to a temperature of -20°C and be bent around a mandrel eight times the cable's OD. Once the cable is bent, it is removed from the mandrel and set aside for a period of time before inspection for surface damage (cracks, splits, tears, etc.). The cable passes if there is no visual surface damage.

**Cold impact testing** assesses the cable's ability to resist damage at low temperatures. The procedure consists of a cable specimen and a set of wooden anvils cooled to a low temperature for a period of time. Lengths of cable are then secured to anvils and weights are dropped onto each cable specimen. The cable is then examined for any surface damage. The cable passes the test after several samples are tested and most do not show any damage. As an example, UL

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Standard 1277 Tray Cable requires a one-pound weight be dropped from a height of three feet.

#### INDUSTRY STANDARDS

Industry standards allow a variety of cold temperature ratings for different cable types. Cold bend testing is required for most UL wire and cable standards. Cold impact testing is optional and is only used to determine if a cable can be marked with a lower temperature rating. CSA standards vary between specifying cold bend, cold impact, or both. It is important to check the applicable standard. Tables 1 and 2 (Page 57) contain the cold bend temperature rating, the cold impact test ratings (if applicable), and the required print legend markings for various UL and CSA standards.

#### INSTALLATION TEMPERATURES

Installation temperatures are the lowest temperature recommended for cable installation. This temperature is higher than the minimum cold temperature (minimum operating temperature) to compensate for the higher mechanical forces encountered during installation. The minimum installation temperature

is determined by increasing the cold temperature rating by 10°C to 20°C; although manufacturers' recommendations may vary. Manufacturers also recommend the following to decrease potential damage during cold weather installations:

- Store cable in a temperature-controlled warehouse for 24 hours immediately before the installation.
- Cables need to be handled with care and not dropped, kinked, or bent roughly.
- Pull cables slowly, use large sheaves and lubes suitable for cold temperatures.

Cold temperature installations are difficult and can cause cable stress and damage. Understanding the cables' cold bend and cold impact test results can help installers calculate the installation temperature to ensure a smoother installation.

*Continued on page 57*

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Celestica Recognizes KOA Corporation with 2013 Total Cost of Ownership Supplier Award

KOA Corporation announced it has been awarded a 2013 Total Cost of Ownership (TCOOTM) Supplier Award from Celestica, a global leader in the delivery of end-to-end product lifecycle solutions. The awards program recognizes suppliers that support Celestica's TCOO strategy and demonstrate excellence in quality, delivery, technology, service, pricing and flexibility.

"We are extremely pleased to receive this award," Mr. Shigeharu Shimizu, General Manager of KOA

Corporation, said. "Additionally, achieving this award represents the dedication of all KOA employees to our customers and their commitment to excellence."

This marks the eighth year of

Celestica's TCOO Supplier Awards program, which evaluates and recognizes the top performers in Celestica's global network of over 3,000 suppliers. Celestica's TCOO system is focused on evaluating supplier performance by measuring the total cost to produce, deliver and support products and services beyond the supplier invoice price. As such, it considers the following supplier attributes: quality, delivery, technology, service, pricing and flexibility."C

"Congratulations to KOA Corporation for being recognized as the winner of this year's Most Technically Compliant Award," said Paul Blom, Chief Procurement Officer, Celestica. "KOA Corporation is a two-time winner of this award and continues to demonstrate outstanding quality and service time, allowing Celestica to respond faster to end-market demands and drive speed and flexibility through the supply chain."

What Medical Device Companies Need to Consider in Selecting an EMS Company

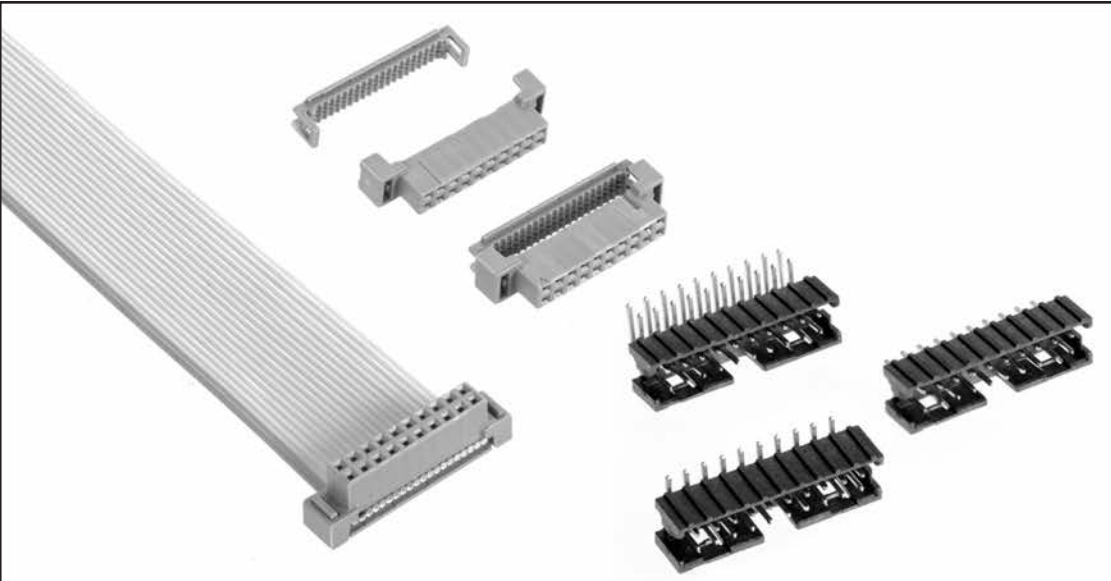
One of the most crucial decisions in taking a medical device from concept to market is the selection of an electronics manufacturing service. Making the right choice can be the difference between the smooth, on-time and on-budget delivery of a device, and a nightmare production process fraught with unforeseen complications and hidden costs. **Mo Oduy and David Bates** from Digicom Electronics lay out the key things to consider when selecting an EMS company.

**What Medical Device Companies Need to Consider in Selecting an EMS Company**

**W**hat makes a successful medical electronics manufacturing partnership, and what does a healthy EMS company need to keep in mind and consider during the selection process?

Over the years, we have made it our mission to help medical device companies (OEMs) understand and navigate the EMS selection process.

Several steps. Although each OEM's path to the new device varies, every one is different. This is why we believe a plan, whether the equipment and personnel, and even the design, is critical to the success of the project. The table lists 10 questions that are essential to answer for OEMs. Remember to report on all 10 points, to view and select carefully what you



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The Ribbon Cable Socket, 158 Series provides a reliable cable-to-board interface in multiple product configurations to make it applicable to many general-purpose electronics applications:

- Available unique adhesive cover for discrete wire capability and secure termination
- Optional friction latch system for increased retention force when used with the Shrouded Boardmount Headers, 159 Series
- Available in 3M's unique "sword package," which helps to streamline the termination process, can reduce unnecessary process steps and can also improve termination cycle time
- 30µ" and 15µ" gold contact interface versions

The Shrouded Boardmount Header, 159 Series provides a reliable cable-to-board interface in multiple configurations for design flexibility and offers several different product options:

- Very small PCB footprint helps conserve valuable board real estate
- Friction latching system for increased socket holding force when used with the 3M Ribbon Cable Socket 158 Series
- Available in straight and right angle thru-hole, and straight surface-mount configurations
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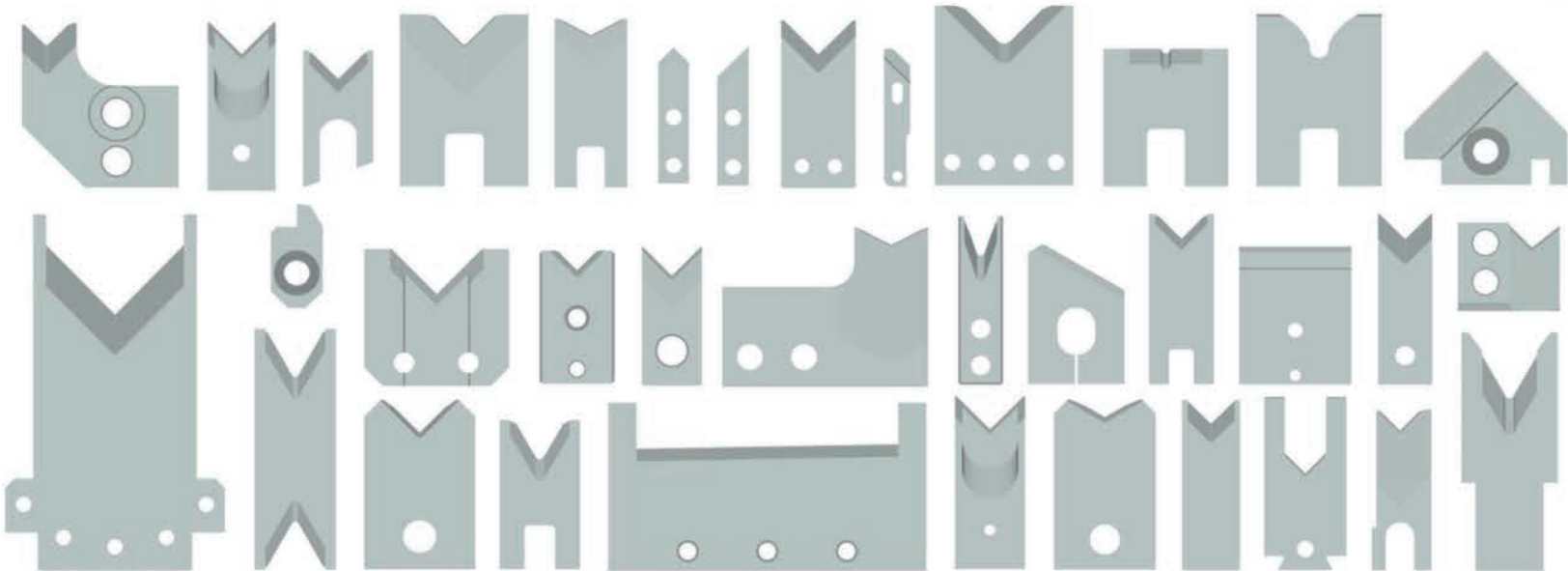
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## Mechtrix Equipment

Mechtrix has designed a number of unique machines to solve specific wire processing problems. These machines range in complexity from our patented center stripping machines to terminal paper winding machines. These machines include:

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| • Heavy Duty Benchtop Wire Stripping Machines | • Terminal Paper Winding Machines        |
| • Automatic Center Stripping Machines         | • Terminal Applicators                   |

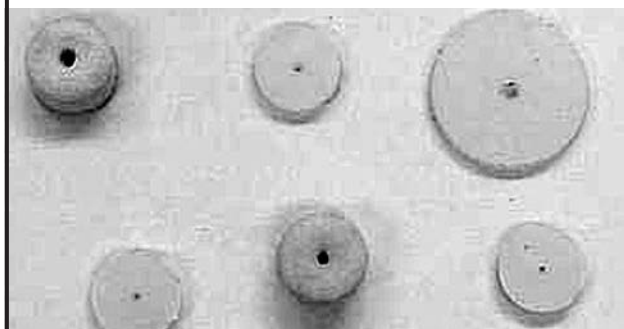




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## NEWS PLUGS continued



### BURNDY® Announces the Expansion of the YG-B Family of Connectors for Sturctural Steel or Bus Bar

BURNDY®, a leading manufacturer and provider of connector solutions to the industrial, energy, construction, telecommunication, petrochemical, data center, and transportation industries, announces the expansion of the YG-B line of connectors for structural steel or bus bar.

To provide a solution for requests to have a compression connector to accommodate thicker structural steel or bus bar, BURNDY added the YG916BTC26 to the existing family of YG-B connectors. The YG916BTC26

connector can accept between 1/2" to 9/16" thick structural steel or bus bar along with a tap conductor from 1/0 to 2/0 AWG stranded copper.

BURNDY® is The Grounding Superstore™, offering all 3 major methods for grounding; Compression, Mechanical, and Exothermic. The YG916BTC26 is another addition to The Grounding Superstore™.



BURNDY® YG916BTC26

Headquartered in Manchester, New Hampshire BURNDY has over 85

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.

For further information visit [www.BURNDY.com](http://www.BURNDY.com).

### MT (TAG) Low Fire Hazard Marker Tags

Thermosleeve is pleased to announce the MT (TAG) Low Fire Hazard Marker Tags.

MT (TAG) are made from zero halogen, radiation cross-linked and UV stabilized polyolefin that provide low smoke and low toxicity properties.

Primarily used for cable and wire-bundle identification where limited fire hazards characteristics are required.

MT (TAG) marker tag material provides good fluid, fuel and lubricant resistance and has excellent printing properties, remaining legible under aggressive exposure to elements such as cleaning solvents, fuel and oils. Meets ASM-DTL-23053/5 class 1 requirements as well as SAE AS811531 4.6.2 and MIL-STD-202 specs.

Thermosleeve USA is a leading manufacturer of heat shrinkable products with over 20-plus years' experience in the industry. Since 1988 our factory has grown to produce 30% of all the world's heat shrink tubing products, and 40% of all PTFE Tubing.

Thermosleeve USA manufactures and develops a very comprehensive range of heat shrinkable tubing in various colors and shrink ratios. All products are manufactured under TS16949 Quality System and ISO 14001 Environment System certifications and are produced to meet or exceed UL224/MIL approval requirements.

Thermosleeve USA products are widely used in the aerospace, automotive, communications, constructions, electrical, electronic, energy, military, oil and gas, and utility markets.

For further information visit [www.thermosleeve-usa.com](http://www.thermosleeve-usa.com)

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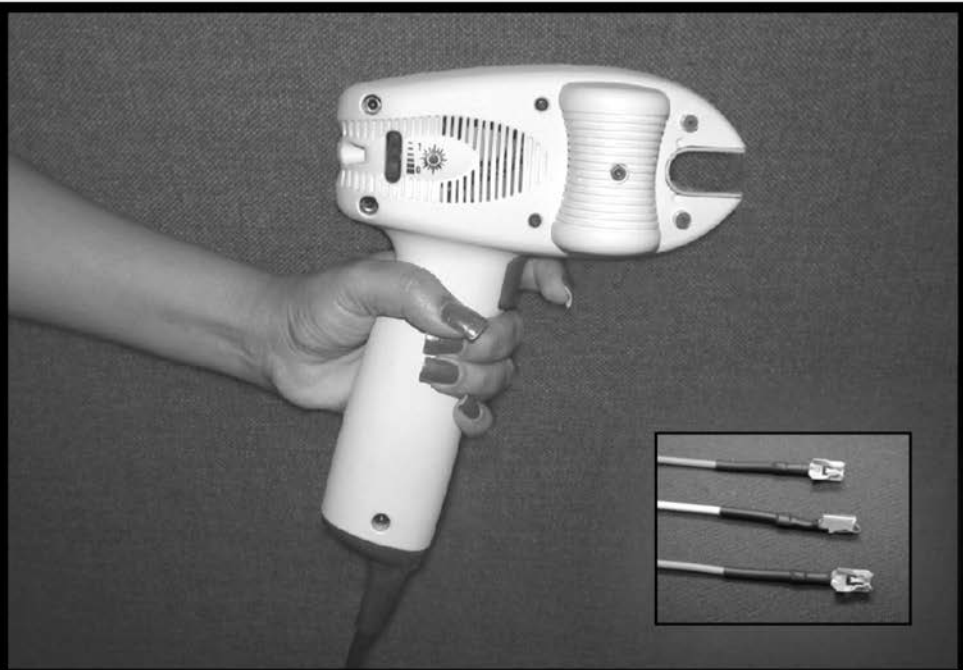
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Our Gun out-shrinks the competition  
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\*polyolefin, 5" length  
The Focus-Lite™ FLG3™ by Judco Manufacturing, Inc., is the solution to all your heat-shrink operations. You can say goodbye to the high labor cost, excessive heat, and inefficiencies of other methods. The Focus-Lite™ **reduces the time** necessary to shrink most types of heat shrink tubing. It also **improves the process** control and **overall quality** of your shrink operation. The FLG3™ can be used for **high volume** benchtop applications and is completely **portable and mobile** for board mounted harnesses and tight space assemblies.

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

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

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



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Global Aviation Technologies

Continued from page 39

makes instruments easier to read at night. The durable, scratch-resistant panel eliminates color or text fading.

The Tail Cone Overheat Protection System also is produced by GAT. The system has an additional exhaust fan near the auxiliary power unit at the back of a plane to reduce temperatures so avionics function better.

The engineering focus at GAT is due to Cottner's background in aviation, about which he became passionate while growing up in Wichita, known as the "Air Capital of the World." After graduating from high school in 1977, he worked eight years at Beechcraft, where his father was employed.

Cottner joined the 184th Tactical Fighter Group of the Air National Guard in 1982 and became a navigation and communication technician stationed at McConnell Air Force Base in Wichita. He moved to southern California in 1986 to work at McDonnell Douglas as a flight

test engineering technician and continued as a navigation and communication tech for the 163rd Reconnaissance Group at March AFB in Riverside County.

From October 1995 to April 2002 (when he started GAT), Cottner was employed by Bombardier Learjet in Wichita. He was a flight test technician, field service engineer and completions engineer. He also returned to McConnell AFB to do navigation and communication tech for the 931st Refueling Wing, which he did through 2005. He plans to receive his amateur pilot's license in 2015.

Cottner earned a business administration degree in 1997 from Friends University, Wichita. Candace was educated at Baker University in Baldwin City, Kan., and was involved in banking until joining GAT in late 2003 to handle business and administrative functions.

In addition to manufacturing and engineering, the third segment of GAT is aircraft maintenance. It is done in a



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Learjet 45 Tailcone Overheat Controller

hangar at Wichita Mid-Continent Airport on such brands as Hawker, Beechcraft, Learjet, King Air and Gulfstream.

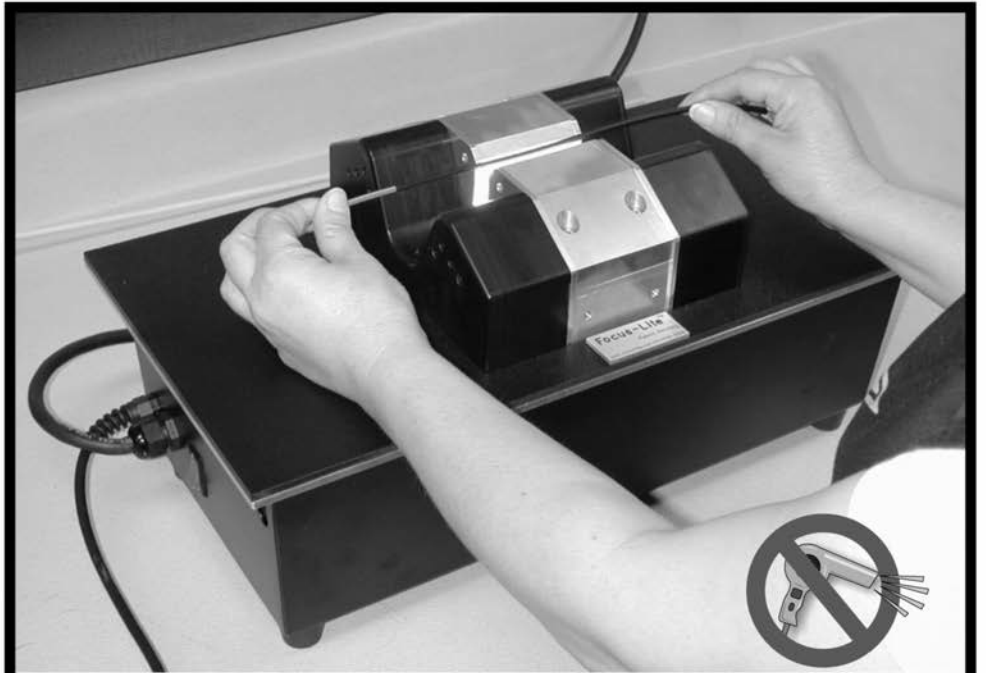
One target market is owners of the Hawker 4000, a super mid-size business jet no longer being made because Hawker Beechcraft went out of business. "The 4000 is a fantastic plane, and our strategy is that we can get those people who still fly them," Cottner said. "We started a LinkedIn group for 4000 flyers, and we're hoping they will bring the other planes they're flying to us."

Besides LinkedIn, GAT has Facebook presence and uses Constant Contact mass e-mail campaigns. Sales rep Leon Kadis is based in Cambridge, Mass., and makes calls on New England companies

that may become harness and kitting customers.

The staff in Wichita consists of 15 people, eight in administration and seven in production. The key staffers are Kim Herndon, data management group clerk; Jason Baig, director of supply chain; Connie Barney, purchaser; Karen Smith, production lead; Jerome Cottner, production manager (and Woody and Candace's son, who has been with GAT since 2012); Dave Gleason, quality assurance manager; Chris Bradley, quality control manager; Ian Morrison, engineering manager; and Kelly Lausch, director for product support.

*Continued on page 49*



## Save up to 80% of your labor cost on heat shrink operations

The Focus-Lite™ by Judco Manufacturing, Inc., is the solution to all your heat-shrink operations. You can say goodbye to the high labor cost, excessive heat, and inefficiencies of other methods. The Focus-Lite™ reduces the time necessary to shrink most types of heat shrink tubing. It also improves the process control and overall quality of your shrink operation. The Focus-Lite™ can be used for high volume bench top applications as well as low volume prototypes and laboratory applications.

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

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

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



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**Focus-Lite**  
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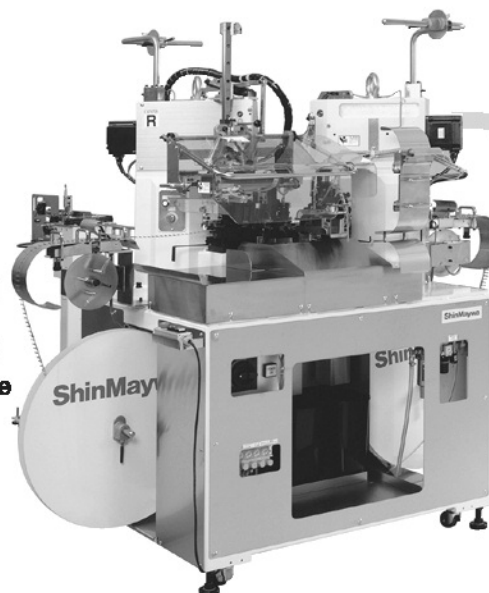
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Both twisting / tinning and crimping can be changeable with quick change (TR201SS). Lead-free and regular tinning can be handled with the tinning unit.



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# Mando Can Do.



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

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

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

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

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

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

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# Global Aviation Technologies

Continued from page 39

Leadership is provided by a committee of the Cottners and investor Matt Lillie, a principal in Physicians Development Group in Wichita. The firm operates facilities with skilled nursing, assisted living and memory care for older adults in the Wichita and Kansas City areas.

"He serves as an advisor," Cottner said. "He is a different set of eyes to bounce ideas off of. I'm a risk taker, and I go after everything. Candace is more conservative and keeps me grounded on things like cash flow. Our goal is to split off the maintenance vertical so it's adequately funded. We may be restructuring the ownership, so more people being a part of it is possible."

With the maintenance part of GAT growing, two maintenance technicians will be hired before the end of November. Next year two production employees, 1-2 engineers and more maintenance techs will be added.

All employee benefits are paid 100 percent. Cottner said the practice helps offset the company's inability to match the higher union wages at OEMs. A 401k program was started last year, and bonuses are based on company performance.

Financial statistics are shared with everyone on the staff. Cottner said income can be increased through product improvements. "We need innovative products, which can come from people building them," he said. "They see things from a different perspective. If they suggest a change and a product does well, we give back to them."

Besides the airport hangar for maintenance work, all GAT operations are in a 14,000 square-foot building that has been leased since 2011. Within two years a five-acre site will be purchased and a new 20,000 square-foot building constructed, a contrast from the first company location in a 2,000 square-foot space and the 7,000 square-foot space in 2004-11.

Sales are expected to reach \$2.5 million this year, down from a record \$5 million in 2012 when planes were built for special-missions work such as government surveillance, data acquisition and cell phone traffic monitoring. Cottner predicted \$4-5 million in 2015. The figure contrasts with \$100,000 in 2002 when GAT was founded.

To achieve the income level,



**GAT Harness Sub-Assemblies**

Cottner stated his international travel will increase, particularly to South and West Africa to try to gain more special-missions business. He

also will work on a program he initiated in which young people from Ghana will come to Wichita to learn about aviation at the airport and the National Center for Aviation Training.

Cottner also advocates returning manufacturing from overseas companies to U.S. firms. "We have work to do here for wages to be decent," he said. "Having production here is key. OEMs here have found quality issues and the high costs of rework and scrap exceeded the cost savings offshore."

For more information, call 316-425-0999, fax 316-425-0998, e-mail [woody@globalaviationtechnologies.com](mailto:woody@globalaviationtechnologies.com), visit [www.globalaviationtechnologies.com](http://www.globalaviationtechnologies.com) or write 1704 S. Baehr St., Wichita, KS 67209.

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**Mini (2 Post) Air  
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**Heavy Duty Slide  
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NEWS PLUGS continued

**Dynalab Test Systems Introduces Major Release 18**

Dynalab Test Systems has been committed to continuously updating its products and capabilities. With over 25 years of experience and over 30,000 testers sold, Dynalab offers products that reflect



Dynalab’s Major Release 18

the highest level of industry knowledge and experience. The company’s systems, software, and services are designed to help customers develop solutions for their testing needs quickly, reliably, and economically.

Dynalab’s release 18 includes several new features that increase accuracy and efficiency in programming. Specifically, the “Compare Connections” feature provides change control function when making program changes, therefore reducing the possibility of human error of accidentally deleting important data. Engineers may feel comfortable that they may audit their changes and undo a programming change if a mistake were made.

The NX Editor’s importing and exporting data functions have been enhanced to make programming even easier. The new “Export Connections Data” function will

export only the connections data to a spreadsheet. For multiple part numbers, a new tab is created for each part number for easier auditing and quality control.

Other functions include more control with programming functions, better reporting capability, enhanced relay testing and more.

For further information contact Dynalab Test Systems, Inc., 555 Lancaster Ave. Reynoldsburg, OH 43068. Visit [www.dynalab-inc.com](http://www.dynalab-inc.com).

**Portable Wiring Tool Kit Cuts Cable Jacket, Insulation and Strips Wire**

An upgraded tool kit with three essential hand tools that store in a handy trifold canvas pouch for all types of wire and cable preparation and repairs is being introduced by Xuron Corp. of Saco, Maine.

The Xuron® TK2300 Wire Harness Tool

Kit features the three tools used most for assembly and field service wiring applications all packed into a handy tri-fold canvas pouch that fits into a tool kit or pocket. Included is the Model 440 precision scissor for slitting coaxial cable jacketing and cutting foil insulation, Model 2175 Maxi-Shear™ flush cutter for wire up to 12 AWG, and the Model 501 thumb adjustable wire stripper-cutter for 10 to 26 AWG.

Suited for professionals who need to assemble, install, or repair wire and cable in a facility or in the field, each tool in the Xuron® TK2300 Wire Harness Tool Kit is ergonomically designed with soft rubber hand grips, no finger loops, a Light Touch™ return spring, and a non-glare black finish. The canvas pouch has pockets for each tool and a hook & loop closure.

For more information contact Xuron Corporation, 62 Industrial Park Rd. Saco, ME 04072-1840. Phone (207) 283-1401 or Fax (207) 283-0594. Visit [www.xuron.com](http://www.xuron.com)

**Fairview Unveils Complete Family of Low, Medium and High Power Attenuators**

Fairview Microwave, Inc. a supplier of on-demand microwave and RF products, announces the release of their new family of 25, 50 and 100 Watt attenuators with operating frequencies up to 18 GHz depending on the configuration.

There is a total of 236 new part numbers in this attenuator release from Fairview Microwave. Attenuation options include 3 dB, 6 dB, 10 dB, 20 dB, 30 dB, 40 dB, 50 dB and 60 dB models for most connector styles. These attenuators can be ordered with in-series connector configurations including SMA, TNC, Type-N and 7/16 DIN and come in each gender interface including male-male, male-female and female-female.

Fairview’s new RF attenuators have average power ratings of 25 Watts, 50 Watts or 100 Watts and a peak power rating of 500 Watts. The 25 Watt versions are bi-directional, while the 50 Watt and 100 Watt models are directional. These attenuators are constructed with black anodized aluminum heatsink bodies and are designed with large cooling fins which aid in heat dissipation at high temperatures. Common applications for these fixed attenuators include power limiting, impedance matching and signal leveling inside RF test systems.

Continued on page 52

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CROSS REFERENCE TABLE		
MIL-SPEC	COMP P/N	BAND STYLE
M85049/128-1	S3175-2	Standard, Welded, Flat
M85049/128-2	S3175-2C	Standard, Welded, Coiled
M85049/128-3	600-052	Standard, Stamped, Flat
M85049/128-4	600-052-1	Standard, Stamped, Coiled
M85049/128-5	S3175-3	Mini, Welded, Flat
M85049/128-6	S3175-3C	Mini, Welded, Coiled
M85049/128-7	600-057	Mini, Stamped, Flat
M85049/128-8	600-057-1	Mini, Stamped, Coiled

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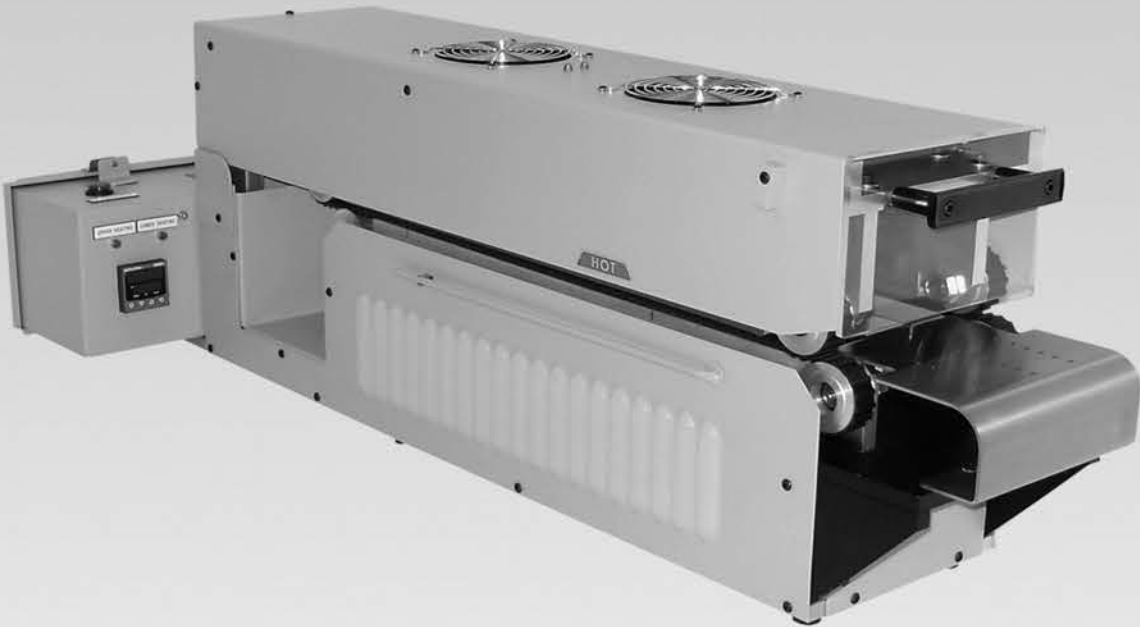
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# HEAT SHRINK APPLICATION TOOLING

## Belt Heater for Heat-Shrinkable Tubing Products

- Product Facts:**
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  - Continuous controlled process
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  - Heater operation and over-temperature alarm lights
  - Benchtop Design



## RAYCHEM MODEL 16B TABLETOP BELT HEATER

**Applications**  
The Model 16B is our smallest (tabletop) conveyor type processor which provides a controlled process for a wide variety of heat-shrinkable tubing products.

Double-sided timing belts on the top and bottom of the processing chamber draw the assemblies through a thermally controlled infrared heat zone and then through a fan-cooled cooling zone before depositing them into the unloading bin.

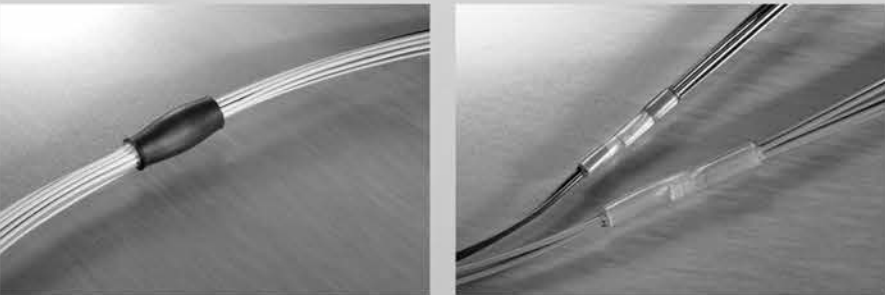
**Controlled Heating Zone**  
The Model 16B processor has two stamped foil heating elements that are manufactured to a strict wattage specification. Consistent temperatures (ambient to 650° C) are controlled by a thermocouple embedded into the upper heating element connected to a closedloop temperature controller. An alarm light illuminates whenever the actual heating element temperature varies from the set point temperature.

**Speed Control**  
The belt speed is selected using a 3-digit thumbwheel via a closed-loop motor controller and DC gear motor.

**Minimal Skill Requirements**  
There are clearly marked guides for aligning the assembly as well as the tubing or device. The operator only has to center the assembly then the tubing and slide it into the belts. The belts carry the assembly through the heating and cooling zone, depositing them into the bin.

Labor costs are reduced significantly because once an operator loads an assembly, that operator can begin preparing another assembly. The throughput rate is usually limited by the rate at which the operator can load assemblies into the process.

**Versatility**  
The processor is designed to process a broad range of heat-shrinkable products up to 19 mm [0.75"] in diameter and 90 mm [3.5"] in length. Heat output can be controlled to accommodate a wide variety of products and substrates.







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## **Fast Wire Harness Testing SYSTEMS**

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- **Test Wire Harnesses & Backplanes**
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- **Store Test Results**

**SERIES**  
**90**

More customers choose Cablesan Series 90 Continuity Analyzers with our unique TestRite software than any other continuity test system of its kind. Series 90 circuit analyzers provide exceptional speed, versatility, and accuracy in the testing of wire harnesses, backplanes, and other interconnects. Results are 200 times faster than hand buzzing and shorts are tested in the process. The testers provide resistance and capacitance measurements, diode testing, and guided harness assembly. You can locate wires by touch and verify terminations.

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



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# Innovative Electric Car to be Designed Using Cadonix Arcadia

Cadonix Ltd, the Cloud based automotive harness CAD specialist, today announced that Riversimple has adopted its Arcadia cloud based tools to develop the first road-going version of its innovative hydrogen fuel cell powered car.

David Rothera, Vehicle Electronic Engineer at Riversimple, said, “We’re designing a radically new car – which will be in market trials late next year. It emits nothing but a tiny amount of water and will do more than the equivalent of 200 mpg. The Arcadia tool is excellent in several respects, but what really stands

out is the enthusiasm and support of the Cadonix team. This will be key for us as we address the very specific challenges of creating a ground-breaking vehicle and delivering it on time.”

David Rothera cites the tight integration between the circuit design and the harness tools as a strong point for Cadonix Arcadia. “Cloud based design is new for us,” he said, “but even at this early stage we’ve come to appreciate the flexibility of being able to access the design from anywhere. Arcadia is a flexible and intuitive tool, which will be fully able to address the need to include



The yet to be unveiled production model of Riversimple's hydrogen cell car will be designed using Arcadia from Cadonix. This demonstrator model is currently on show at the Science Museum

a return path, and other issues specific to the design of this unusual vehicle.”

Andrew Armstrong, Managing Direc-

tor of Cadonix, commented, “Riversimple is developing a pioneering vehicle which may well set the tone for the automotive industry of the future. We are proud and delighted that they have chosen the Cadonix Arcadia environment for their hydrogen cell powered car. We look forward to working with them on this project.”

The Riversimple vehicle is a two seater local network electric car, powered by hydrogen fuel cells and with a body made from composite materials. R&D is led out of Wales by a hand-picked engineering team drawn from top automotive, aerospace and motor racing; design is led by Chris Reitz, former design chief for the Fiat 500, with his team at their studio in Barcelona. The team is aiming for ground-breaking fuel efficiency of more than 200 mpg, a range of 300 miles, 0-30mph in 5.5 seconds, and a cruising speed of 55 mph. The lightweight composite body is key to achieving this performance, but inevitably makes the electrical design more complex as it does not offer a return path.

Arcadia CAD is an easy to use, ground-breaking software tool offering schematic design, animated circuit simulation and analysis, electrical networking, harness design and full design rule checking for wire harness layout and manufacture. Using the integrated simulation capabilities, engineers can be assured that their design intent is carried through into the physical implementation. Arcadia interfaces with the most popular 3D MCAD and enterprise wide PLM and ERP tools, allowing projects to transition easily and smoothly into manufacture.

For further information please visit [www.cadonix.com](http://www.cadonix.com) or email [info@cadonix.com](mailto:info@cadonix.com).

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**NEWS PLUGS** continued

Continued from page 52

cable industry. Cable manufacturers are recognizing that outsourcing their braid work to Gladding saves labor, time, space, and man-power. Turn-around time is critical", explained Christakos, "and this additional equipment from Belgium gives us capacity to offer a one week turnaround, if needed."

The Eaton machinery has been installed in Gladding's main plant, a 100,000 square foot braiding facility in Chenango County, near Syracuse New York.

To learn more about this and other opportunities at Gladding visit their website, [www.gladdingbraid.com](http://www.gladdingbraid.com) or call 315-653-7211.

**New Heavy Duth Connector Series from Amphenol for Size 8 and Size 12 Power Contacts Offer Higher Power**

Amphenol Industrial Products Group, a global leader in interconnect systems, now offers a heavy duty connector series for size 8 and size 12 power contacts. The new ATHD series is a single pole, rugged, in-line connection system designed to replace splices as well as provide power wherever needed. Using Amphenol's exclusive Radsok technology, the connector can reach higher amperages than other connectors in its class.

Ideal for rugged, high vibration applications found in the heavy equipment and mining markets, these sealed, thermoplastic connectors are field installable and repairable, eliminating the need for costly, non-repairable splices. The connection systems also feature clip slots for a variety of harness mounting solutions.

The size 8 system is rated to 70 amps continuous with the Radsok terminals and has a contact retention of 156 N.

The size 12 system is rated to 35 amps continuous with the Radsok terminals and has a contact retention of 133 N.

The ATHD series is RoHS compliant and has an IP67 rating. Standard machined and stamped and formed contacts are also offered for both sizes with a variety of platings. The size 12 system has special stamped and formed contacts that will crimp to 16 gage cable where less amperage is

needed. Both the size 8 and size 12 power contacts can perform up to 100 mating cycles and have an operating temperature range of -55° C to 125° C. They each have an operating voltage of 1,000 VAC and dielectric withstanding voltage of 1,500 VAC. Insulation resistance for each connector is 1,000 M Ohm.

For more information visit [www.amphenol-industrial.com](http://www.amphenol-industrial.com).

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NEWS PLUGS continued



NPE2015 Program Will Take Plastics Startups ‘Our of the Garage’ and Into the International Spotlight

For plastics startup companies seeking an opportunity to show the industry what they have to offer, there could be no bet-

ter stage than NPE2015: The International Plastics Showcase.

SPI: The Plastics Industry Trade Association, which produces the triennial NPE, will provide such an opportunity in a new program called the NPE2015 Startup Garage. In partnership with the new-venture tracking firm Startup.Directory, SPI will provide twelve startups with prominently located exhibit stations at the show, which will take place March 23-27, 2015 in Orlando, Florida. The twelve will be selected by NPE2015 show management and Startup.Directory from among the companies responding to a call for applications now being issued by SPI at [www.npe.org/startup-garage-npe2015](http://www.npe.org/startup-garage-npe2015).

An online application form must be submitted by November 21, 2014. To be eligible, a company cannot have had any commercially available products or services prior to January 1, 2013 and must pro-

vide solutions to firms manufacturing plastics or using plastics as a material within their product.

The NPE2015 Startup Garage reflects the proliferation of new ventures in today’s rapidly evolving marketplace, according to Brad Williams, SPI’s director of trade show sales and marketing. “NPE represents the entire plastics supply chain, from suppliers to processors to brand owners and OEMs, including all of the leading established companies in the industry,” he said. “We have created the NPE2015 Startup Garage to ensure the inclusion of new ventures, whose innovative approaches will further the growth of our industry and benefit the companies in it.”

“The NPE2015 Startup Garage is an unprecedented opportunity for startup companies with connections to the plastics industry,” said Gerard Eldering, founder of Startup.Directory. “Participants will be meeting hundreds of potential buyers, investors, distributors and strategic partners, all in one location,”

For more information on the NPE2015 Startup Garage, contact Gerard Eldering of Startup.Directory at [Gerard@innovatetech.com](mailto:Gerard@innovatetech.com).

Startup.Directory is an online database of more than 2,500 tech startups from 300+ research institutions, including universities and technology incubators. The database is used by venture capitalists and other investors, university tech transfer professionals, business development managers, and trade association executives who want to find early-stage research spin-outs. It is published by InnovateTech Ventures, Inc., a venture creation firm focused on university technology commercialization. For more information, visit [www.startup.directory](http://www.startup.directory).



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WIRE & CABLE COLD TEMPERATURE RATINGS

Continued from page 41



	Standard	Standard Cable Types	Required Cold Bend Temperature Rating (°C)	Optional Cold Bend Temperature Ratings (°C)	*Required Cold Impact	Additional Cold Impact Temperature Ratings (°C)	Print Legend Cold Temperature Markings
UL	UL 13 Power-Limited Circuit Cables (3rd Edition, 2010)	CL3P, CL2P, CL3R, CL2R, CL3, CL2, PLTC	-20	-30, -40, -50, -60, -70	-	-	Required for cold bend temperatures lower than -20C
	UL 44 Thermoset Insulated Wire & Cable (18th Edition, 2014)	RHW, RHW-2, RHH, XHH, XHHW, XHHW-2, SIS	-25	-40	-	-40	Required if the cable pass -40C cold bend and impact testing
	UL 62 Flexible Cords and Cable (17th Edition, 2006)	SO, SOO, SOOW, SJ, SJO, SJO0, SJOW, SJOWW, STO, STW, SJTO, SJTOW, SJE0, SJEOW	*All types: -20 *	Any W Type: -40, -50, -60, -70	-	-	Required for "W" type cords when rated -50 °C, -60 °C, or -70 °C
	UL 83 Thermoplastic Insulated Wire & Cable (14th Edition, 2008)	THW, THW-2, THHW, THHN	-25	-40	-	-40	Required if the cable pass -40C cold bend and impact testing
	UL 444 Communication Cables (4th Edition, 2008)	CMP, CMR, CMX, CM	-20	-	CMX outdoor only, -10	-	Not required
	UL 758 Appliance Wiring Methods (3rd Edition, 2014)	UL Styles 1XXX, 2XXX, 3XXX, 4XXX	-10	-20, -30, -40, -50, -60, -70	-	-	Required for cold bend temperatures lower than -10C
	UL 1063 Machine Tool Wires (7th Edition, 2006)	MTW	-25	-40	-	-	Required if the cable pass -40C cold bend testing
	UL 1072 Medium Voltage Cables (4th Edition, 2007)	MV-90, MV-105	-35	-	-	-40	Required if the cable pass -40C cold impact testing
	UL Subject 1276 Welding Cable (1st Edition, 2005)	Welding Cable	-35	-	-	-	Not required
	UL 1277 Tray Cable (5th Edition, 2010)	TC, TC-ER	-25	-	-	-40	Required if the cable pass -40C cold impact testing
	UL 1424 Power-Limited Fire Alarm Circuits (3rd Edition, 2005)	FPLP, FPLR, FPL	-20	-30, -40, -50, -60, -70	-	-	Required for cold bend temperatures lower than -20C
	UL 1425 Non-Power-Limited Fire Alarm Circuits (2nd Edition)	NPLFP, NPLFR, NPLF	-20	-30, -40, -50, -60, -70	-	-	Required for cold bend temperatures lower than -20C
	UL 1569 Metal Clad Cables (3rd Edition, 2009)	MC	-25	-	-	-40	Required if the cable pass -40C cold impact testing

Table 1 UL Cold Temperature Ratings per Cold Bend and Cold Impact Testing

	Standard	Standard Cable Types	Required Cold Bend Temperature Rating (°C)	Optional Cold Bend Temperature Ratings (°C)	*Required Cold Impact	Additional Cold Impact Temperature Ratings (°C)	Print Legend Cold Temperature Markings
CSA	C22.2 No.38 Thermoset-insulated wires and cables (18th Edition, 2014)	RW75, RWU75, R90, RW90, RWU90	-25	-40	-	-40	Required if the cable pass -40C cold bend and impact testing
	C22.2 No. 51 Armoured cables (2009)	AC90, ACWU90, ACG90, ACGWU90	-	-	-25	-40	Required if cable passes cold impact testing
	C22.2 No. 75 Thermoplastic insulated wires and cables (14th Edition, 2008)	TW75, T90, TW, TWU	-25	-40	-	-40	Required if the cable pass -40C cold bend and impact testing
	C22.2 No. 96 Portable power cables (2013)	G, G-BGC, G-GC, PPC, SH, SHC-GC, SHD, SHD-BGC, SHD-PCG, VFD, Type W, etc	-40	-	-40	-	Required if the cable pass -40C or lower cold bend and/or cold impact testing
	C22.2 No. 210 Appliance Wiring Material Products (2005)	AWM I A/B	-15	-20, -30, -40, etc	-	-	Required for cold bend temperatures lower than -15C
	C22.2 No. 214 Communications Cables (4th Edition, 2008)	CMP, CMR, CMX, CMG	-20	-	-10	-	Not Required
	C22.2 No. 230-09 Tray Cables (2009)	TC, TC-ER	-	-	-25	-40	Required if the cable pass -40C cold impact testing
	C22.2 No. 239 Control and Instrumentation Cables (2009)	CIC, ACIC, SW-ACIC	-30	-40	-	-25, -40	Required if the cable passes cold bend or cold impact testing

Table 2 CSA Cold Temperature Ratings per Cold Bend and Cold Impact Testing



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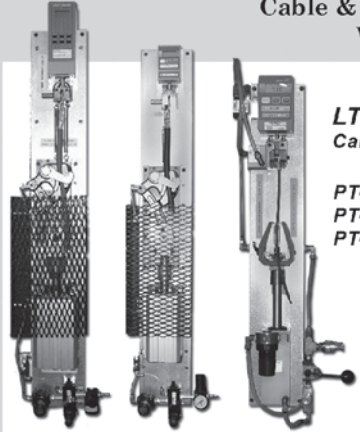
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NEWS PLUGS continued



Flexible PVC Elastomer Exhibits Outstanding Resistance to Cold for Wind-Turbine and Rugged Out-door and Industrial Cables

Teknor Apex Company has announced a new PVC elastomer for cable jacketing that withstands frigid outdoor and rugged industrial conditions while providing excellent flexibility and flame performance.

Flexalloy® 9614-73 elastomer is a 73 Shore A compound that is UV-stabilized and exhibits a brittle point of -65 °C or below. The elastomer provides flexibility, tensile strength, and oil resistance and is designed to pass the CSA's FT4 vertical flame test. Selected property data appear in the accompanying table. A complete data sheet is available at this link: [http://www2.teknorapex.com/extreme\\_cold\\_temperature\\_outdoor\\_pvc\\_elastomer](http://www2.teknorapex.com/extreme_cold_temperature_outdoor_pvc_elastomer).

Potential applications include cables for wind turbines, industrial automation, Ethernet networks, robots, controls, sensors, and other demanding uses requiring high flexibility.

“Flexalloy 9614-73 elastomer has a property profile that compares well with those of other soft, high-flexibility thermoplastic elastomers (TPEs) used in cables for low-temperature and industrial applications, yet it is more cost-effective,” said Michael Roberts, Industry Manager for the Vinyl Division of Teknor Apex. “It provides cold temperature endurance similar to that of thermoplastic polyurethane (TPU).”

For further information contact Teknor Apex, 505 Central Ave, Pawtucket, RI 02861. Phone (401) 725-8000 or Fax (401) 729-0166. E-mail: [vinyl@teknorapex.com](mailto:vinyl@teknorapex.com).

Properties of Flexalloy® 9614-73 PVC Elastomer


Typical Property	ASTM / UL Test	Value
Hardness, Shore A	D-2240	73
Specific gravity	D-792	1.29
Tensile strength, psi (MPa)	D-638	2,070 (14.27)
Elongation, %	D-638	425
Brittle point, °C	D-746	< -65
Max. continuous operating temperature, °C	UL-1581	105
Oil rating	UL-1277	4 days @ 100 °C

Source: Teknor Apex Company

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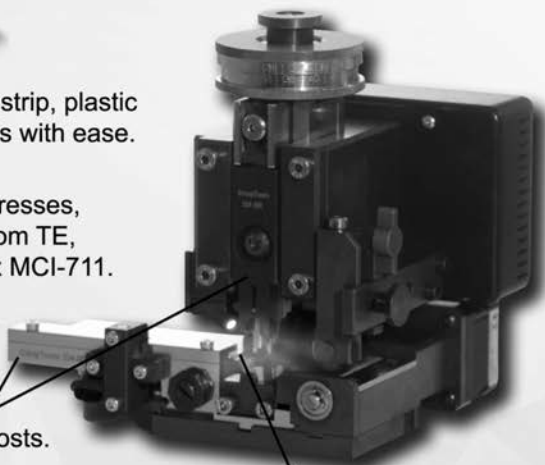
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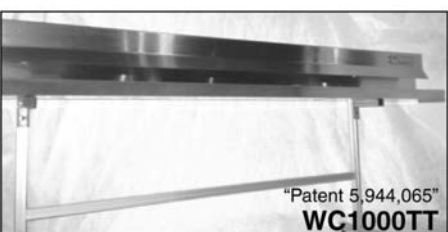
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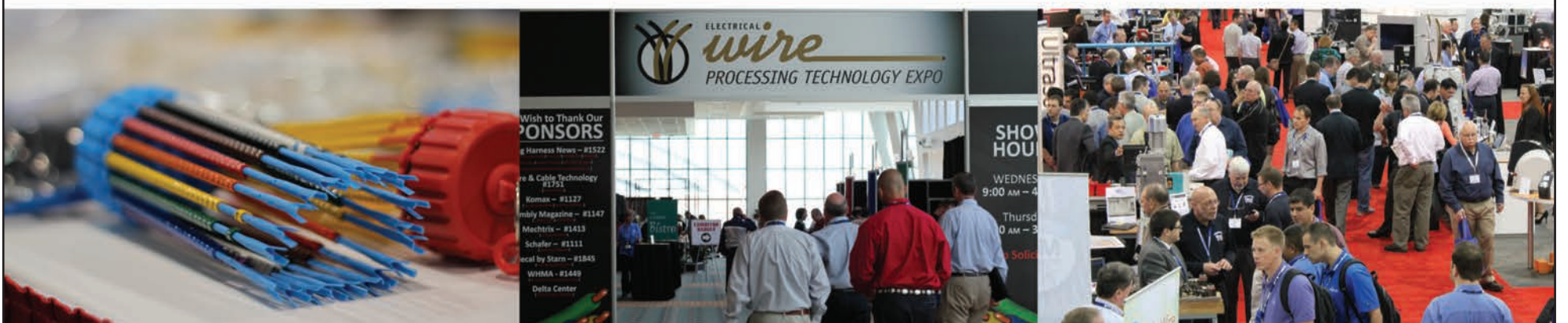
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The Electrical Wire Processing Technology Expo has grown into a comprehensive resource since its inception in 2001, attracting attendees from around the world to Milwaukee. There's no better opportunity for you to connect with prospective buyers, gain valuable exposure, increase name awareness and gather high quality leads. Join our impressive group of exhibitors for our biggest and best show ever!

- 1. In two days, you'll meet with more key buyers than you could in a month of cold calling.** Last year's attendance was over 2,700 people from 41 states and 28 countries.
- 2. This Expo attracts industry buyers** who normally do not attend other assembly and industry shows. You'll meet buyers including Presidents, CEOs, Purchasing Managers, Design and Plastic Engineers, Mold Makers, Plant Foremen, Job Shops and other industrial professionals.
- 3. No non-industry attendees.** All are here because of their interest in wire processing. Where else could you find so many customers coming together in one place at one time to visit your booth and see your products?
- 4. Promote your new technologies and services** while conducting business in a relaxed, friendly atmosphere. Free breakfast, free beverages and food breaks each day. And a Beer & Brat Welcome Party!
- 5. You'll reach even more customers** as the Electrical Manufacturing and Coil Winding Expo, Critical Power 2015 and Plant Comm World will co-locate with our Expo. One badge grants you access to all!
- 6. Setup is easy and costs less.** In some cases, This is one of the major reasons to exhibit here, according to Bil DeGrace, Vice President of Mechtrix Corporation in Menomonee Falls, Wisconsin.



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Artos Engineering Company.....	2	Fuses Unlimited.....	13	OES Technologies.....	39
Atlas Wire Corporation.....	28	Galaxy Wire & Cable.....	38	Odyssey Tool.....	49
Blue Valley Capital LLC.....	60	Gladding Braiding Machines.....	56	Pave Technology Co.....	30
Cablescan.....	53	Grayline.....	7	Phoenix Contact.....	31
CAMI Research, Inc.....	10, 35	Hamilton Products, Inc.....	52	Pro-Line .....	20
Carpenter Mfg. Co., Inc.....	38	Heilind Electronics .....	15, 42, 51, 54, 56	Riverside Electronics.....	30
Cirris Systems Corp.....	14	HellermannTyton.....	23	Schaefer Megomat USA Inc.....	34
Chief Supply Inc. ....	42	Hoffman Products.....	18	Schaefer Technologies LLC.....	4
Coastel Cable Tools .....	52	Imada, Inc .....	8	Schleuniger Inc .....	32-33
Cobra Braiding .....	5	Industrial Wire and Cable Corp.....	18	ShinMaywa .....	47
Commission Brokers Inc. ....	16	INSCO/Insulation Supply .....	6	Sonobond Ultrasonics .....	20
Compaero .....	50	Judco Manufacturing Inc.....	46-47	Spring Mills Manufacturing.....	27, 46
Composite & Wire Machinery, Inc.....	3	JWB Manufacturing, LLC.....	15	Stapla .....	12
Connector Microtooling Systems Inc.....	40	Kingsley Machines.....	24	Steinel.....	41
Crimptronix .....	58	Komax Wire .....	9,64	Strunk Connect.....	25
Curti Wire Processing.....	39	Lakes Precision Inc .....	5	Techflex.....	35
Daniels Manufacturing Corp.....	45	Lavanture Products Company.....	11	TE Connectivity .....	63
Delfingen Industry.....	18	Lone Star Industrial.....	7	Telsonic Solutions.....	22
Dixie Wire .....	13	LTL Tooling & Assembly .....	58	Thermosleeve USA. ....	44
DSG Canusa.....	8, 37	Mark-10.....	27	Thermtrol Corp.....	13
Dynalab Test Systems.....	55	Master Appliance Corp.....	7	TLC Electronics.....	21
East Penn Manufacturing Co, Inc.....	31	Mecalbi .....	46	Wago.....	29
ECC .....	25	Mecal by Starn.....	37	Waytek, Inc.....	21
EIC Wipers.....	44	Mechtrix Corporation.....	43	White Products Division.....	49
Electrical Wire Processing Tech Expo .....	61	Mello Company Inc., The .....	3	Wire Systems.....	58
Electronic Connector Corp .....	10, 52	Micro Plastics.....	26	Wiring Harness Mfg Assoc (WHMA).....	59
Eraser Company, The.....	22	Molex.....	19, 36		

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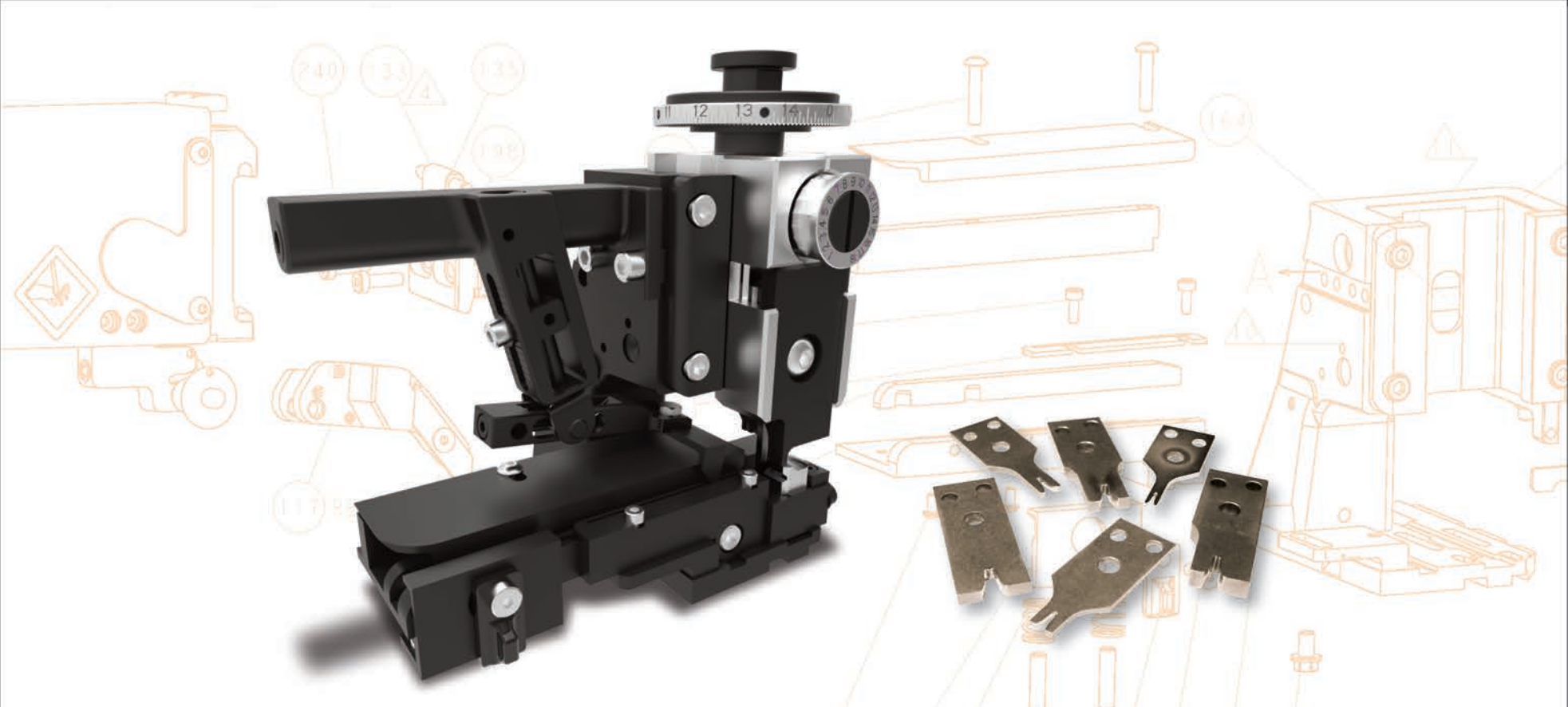
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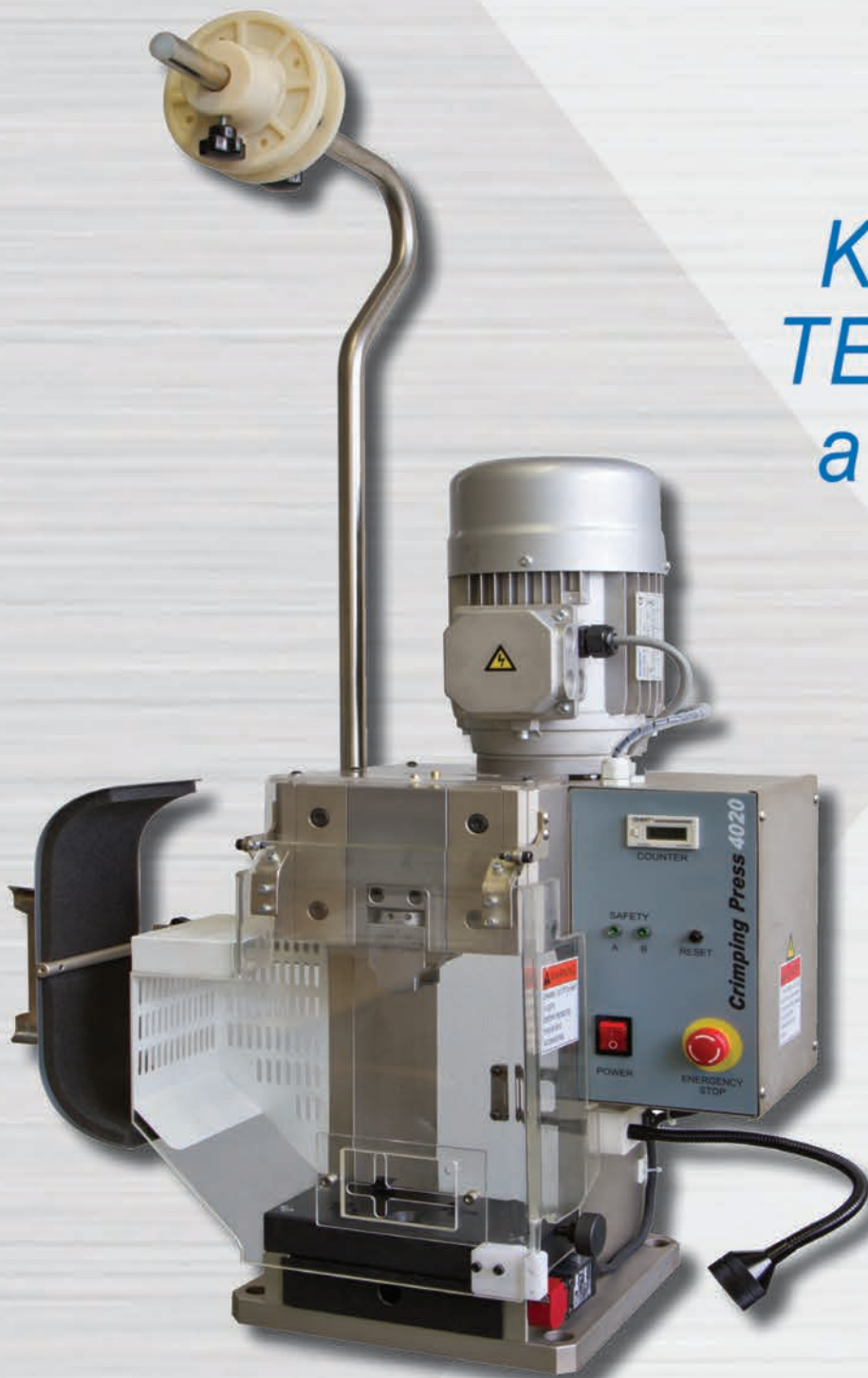
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