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SPECIAL SECTION

MATERIAL HANDLING

A red mobile weighing system, labeled 'iForks-32 Mobile Weighing System', is shown on a wooden pallet in a warehouse setting. The system consists of a red frame with yellow and black striped safety markings and a weighing scale.


p. 12

LEADERS
IN MANUFACTURING

These 14 powerhouse companies are forging the innovative path we need to keep manufacturing strong.

p. 15



A green 355 E telehandler from SENNEBORG is shown in a construction or industrial setting. It has a large, articulated body and a telescopic boom.

Multitalented Telehandler

Offering a 360-deg. panoramic view from the multicab, the 355 E telehandler from SENNEBORG ensures users have a complete, unobstructed view of their working environment for improved accuracy and efficiency.


p. 14

A person is standing in a virtual environment, interacting with a large, transparent digital screen that displays a 3D model of a factory or manufacturing process. The screen is labeled 'DIGITAL MANUFACTURING'.

Safe and Virtual Training

Fastem's Digital Manufacturing solutions provide a cost-effective way to demonstrate and educate employees on factory automation technology, without requiring a physical automation system.

p. 44

A person is wearing a white exoskeleton device on their shoulder and arm, working on a car wheel. The device is designed to provide support and reduce fatigue during overhead work.

Reduce Worker Fatigue

At just 3.9 lb., the Ottobock's Paexo Shoulder is the lightest exoskeleton of its kind and can be worn comfortably for more than 8 hours while providing relief for the shoulders and arms during overhead work.

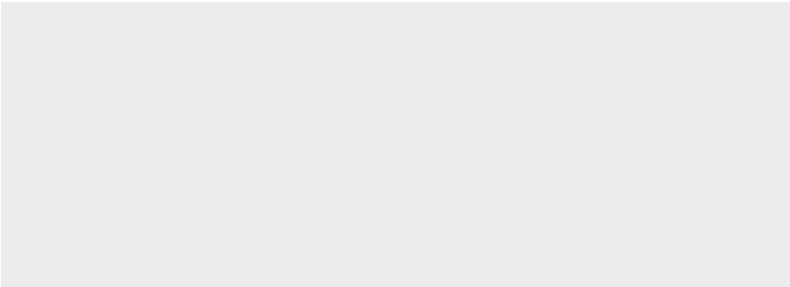
p. 52

A close-up view of a machine with a sensor attached. The sensor is labeled 'vZ' and is measuring the machine's performance. The machine is a complex, industrial device with various components and a large wheel.

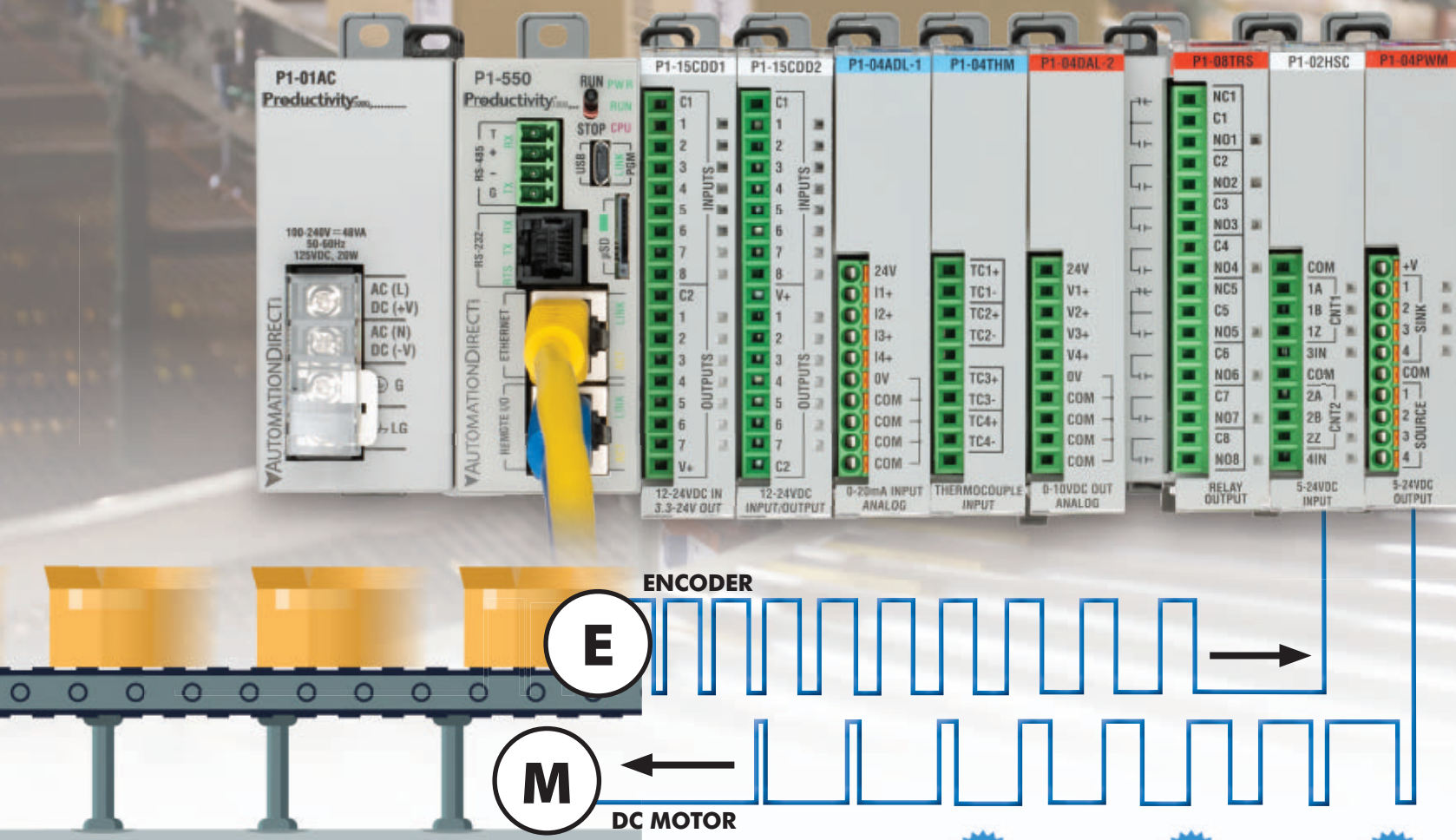
Monitor Machines Easily

Providing manufacturers with operational and technical insights, VocalZoom's Autonomous Sensors measure 3D, motion, and vibrations of any surface to monitor the real-time health and performance of machines.

p. 59



Low-cost pulsed I/O that won't miss a beat.



Productivity¹⁰⁰⁰.....

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FEATURES

12-13

Special
Section:
Material
Handling



SPECIAL ON-THE-JOB COVERAGE:

53

Communication
Equipment



54

Packaging



55

Power Tools



PRODUCT SPOTLIGHTS



p. 14

FREEDOM portable measuring arms from LK Metrology provide portability and compactness suited for line-side measuring and inspection.



p. 44

EXAIR's Threaded Line Vac Air Operated Conveyors convert ordinary pipe into a powerful conveying system for parts, scrap, trim, and other bulk materials.



p. 52

New Pig's PIG Water Absorbent Mat Pads pull in large volumes of water, instantly soaking up small pools and puddles of water from any type of spill.



p. 58

Featuring smart monitoring and remote control, Edwards Vacuum's EIRi series of liquid ring pumps provide reliability and low maintenance to offer the best solution when it comes to pumping wet gases or particulates.

Smart
Manufacturing 2

Editor's Choice 3

New Sources 4

FREE Catalogs
& Apps 5

Behind
the Scenes 6-7

Leaders 15-43

NED's Product
Express 56-57

Product Guide 58

Ad Index 58

From the Editor 59

Checklist 60

9 Years

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Handheld Group

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Pocket-Sized Powerhouse



Offering the same industry-leading form factor and ultra-rugged design as Janam's XT2+, the XT3 mobile computer delivers more features and greater performance to enable a fully connected and productive mobile workforce. Featuring Android 9 with Google Mobile Services, the XT3 is upgradeable to future versions of Android and has earned Google's AER certification. Weighing less than 10 oz. and featuring smartphone styling, the XT3 is small, light, and ergonomically designed for all day, everyday use.

Janam Technologies LLC

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Tablet Offers Flexibility and Toughness



For peak efficiency in a do-anything rugged tablet, the Android-powered MJ-100 tablet features a rugged construction, an efficient Rockchip CPU, and plenty of available features and options. Equipped

with multi-carrier 4G LTE, it functions as an excellent classic mobile device. Fear no scratch, drop, or impact, with ultra-durable LCD protection construction. It is fully MIL-STD-810G Standard compliant, able to sustain drops of up to 4 ft, heavy shocks and vibration, impacts, static discharge, and more.

Estone Technology

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Portable Technology Solutions, LLC

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Webalo transforms existing enterprise and industrial applications into real-time, actionable, task-oriented, persona-based applications, where each user has just the information they need on their device to help them get their job done. Webalo automatically generates and personalizes apps from enterprise data sources as well as

industrial data sources. It enables frontline workers to simplify and improve their daily activities through real-time access to actionable analytics, alerts, and notifications, as well as desktop through managed workflows.

Webalo, Inc.

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WiFi Thermostat Offers Remote Control with Mobile Devices



Warm Tiles ColorTouch thermostats are designed to control floor warming systems easily and economically, including a WiFi-enabled version that gives consumers remote access to their system from a mobile device or web browser. The thermostat model allows users to remotely program their floor's temperature to set their floor warming preferences at any time. A downloadable mobile application lets users monitor and precisely control any Warm Tiles floor warming system from a smartphone, tablet or on a PC via the Warm Tiles web portal.

Emerson Automation Solutions

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Smart Fasteners Provide Traceability

Documenting every anchor, screw, and bolt installed by hand can be time consuming and inefficient. Tracefast technology provides specifiers and contractors with an easy-to-use, more productive solution. A data matrix code makes every fastener uniquely identifiable and traceable. Simply use the Hilti Connect App, scan the code with your smart phone, and view installed fastener details. Tracefast leverages IoT and provides a new level of control and digital access to relevant setting instructions, training and inspection documents, and certifications.

Hilti Inc.

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Clamp Meter Targets Solar Installations

The CM65 True RMS 600A Solar Clamp Meter is a rugged AC/DC clamp meter designed to tackle the challenges of solar installation, maintenance, and troubleshooting professionals. The meter is fitted with FLIR Tools Mobile app connectivity and solar industry-specific MC4 test leads to make measurements on solar panel equipment safer, more accurate, and easier to perform. With True RMS for alternating current or voltage measurement, low impedance mode to clear ghost voltages, and +/-1.5% accuracy, the CM65 provides installers accurate testing capabilities to get the job done right the first time.

FLIR Systems, Inc.

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Modular Industrial Panels

RXi industrial display and panel PC products offer a modular design enabling users to select the right configuration based on application needs. In addition, the vivid and responsive displays improve an operator's capabilities to make better decisions.

Emerson Industrial Automation

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Enabling professionals to add light to any hat, the Cap Visor Light is a powerful, lightweight light that easily mounts onto a hat visor. Its contoured metal clip secures it in place while the front bezel pivots to shine the bright light where it's needed most.

Klein Tools

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Ergonomic Electrical Gloves

Voltgard V-GRIPS Leather Protector Gloves feature a coating that covers the palm, index finger, and thumb for an unsurpassed grip that won't slip. The gloves feature a gunn cut pattern for long-lasting wear and a leather strap to secure the gloves to the workers' hands.

Saf-T-Gard International, Inc.

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Prevent Slippery Floors

ProClean FLOOR DEFENSE, a unique dual-purpose, quat-containing floor treatment and detergent, helps to prevent slippery floors and assist in cleaning. Available in a convenient powder form, it also helps control odors from food product falls during production.

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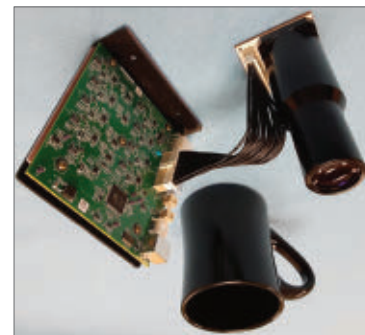
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ADISRA, LLC

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Designing for Manufacturing

In Designing for Manufacturability, technical experts highlight the challenges facing the design for manufacture (DFM) phase, where engineers begin refining a prototype to be suitable for mass replication.

Mouser Electronics, Inc.

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Leak Detection Catalog

This catalog features information on wireless metering equipment for submetering, water leak detection & alarming, thermostat control, and reporting solutions.

H2O Degree

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Understand OSHA Violations

This guide analyzes the top 10 OSHA violations from 2019 and offers insight into understanding violations and learning how to avoid making the same costly mistakes.

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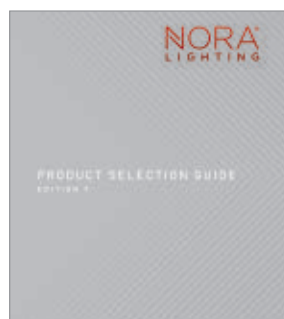


Automotive Air Tools

Dynabrade Nitro Series tools are high-quality, purpose-built tools designed to provide automotive technicians with a range of entry level, quality air tools.

Dynabrade

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Lighting Selection Guide

Nora's Product Selection Guide features more than 1,500 fixtures and accessories for architectural, commercial, residential, retail, hospitality, healthcare, and institutional applications.

Nora Lighting

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Fluid Power Replacement

This brochure analyzes 3 different technologies—pneumatic, hydraulic, and electromechanical—and discusses the pros and cons of each.

Ewellix

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Electrical Safety and Testing

This product catalog provides detailed information about Vitrek's electrical safety and test equipment including hipot and ground bond testers, power analyzers, high voltage meters, and more.

Vitrek

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Bearing Interchange Guide

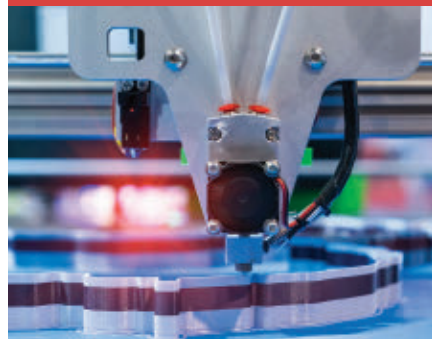
The Timken bearing interchange lists manufacturers' part numbers, manufacturer name, and the corresponding Timken part number for easy cross-reference of bearings.

The Timken Company

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The E-Commerce Tipping Point: Graduating to High Volume, Automated Packaging

SYSTEMS TECHNOLOGY INC.

PARCELPACK

COMPANY PRODUCT

A range of automated packaging equipment options enables cost-effective, speedy fulfillment even during peak periods.

By Del Williams

With the rapid growth in e-commerce, online retailers that are already fulfilling a significant volume of orders annually may reach a tipping point where they must eliminate manual aspects of the packing and fulfillment process and transition to a higher speed, automated packaging operation.

Although the tipping point for any online retailer varies, companies processing several hundred thousand orders a year often find themselves in this position. Symptoms of growing pains include orders that sit in bins for days before leaving the warehouse, high manual labor costs, and even high packing material costs.

Staffing up to meet peak holiday season demands can be even more of a challenge—particularly when 50% to 80% of annual sales are made between Black Friday and Christmas. During this time, most e-retailers run extra shifts and hire large quantities of people that must be trained for the 30 to 60 days they will work. But even this approach can lead to slow order fulfillment—a detriment when competing with the Amazons of the world that promise one day and same-day delivery.

Fortunately, there is packaging equipment that provides the functionality and options to cost-effectively scale up from manual to semi-automated to full automation as growth continues. In many cases, this is the same type of equipment used in the largest fulfillment centers by major online retailers.

FragranceNet.com—a fast-growing online retailer of discounted brand name fragrances, skincare, makeup, haircare, aromatherapy, and candles—hit the tipping point regarding automating packaging several years ago. The company, which doubled its sales annually for years, has shipped over 30 million packages and sold more than \$1 billion in beauty products since 1997.

“I come from a corporate background [at a Fortune 50 company] where if we had a 2% sales increase, we flew to South Beach for a party,” says Hector Dilan, FragranceNet’s Director of Warehouse Operations for the past six years. “But our e-commerce sales have doubled here every year since the day I was hired.”

Unfortunately, with such growth comes growing pains. Too often the partially automated fulfillment process left many bins of picked items waiting to be processed. The problem was exacerbated each year from Black Friday through Christmas when FragranceNet generated more than half of its annual income.

“Peak season shopping can result in up to ten times the normal sales volume for many days in a row, which strains fulfillment capabilities,” explains Dilan. “In just five weeks during the holidays, the company’s fulfillment operations recently had to work 16-hour days, seven days a week to meet the demand.”

The company had been employing a conventional packaging system that included manual labor. This involved having a checker manually place the product in a box, adhere a shipping label, and put it on a conveyor. Another team would add void fill to protect the product and the box would be sealed with tape.

“With the conventional packaging system, we were paying people to make boxes, fill them, tape them up, and put on labels,” says Dilan. “We needed a system that was faster and more automated.”

Graduating to High-Volume Automated Packaging Equipment

Given the rapid growth of e-commerce and dramatic spikes in order volume during the holidays, in 2015 FragranceNet felt driven to invest in new automated packaging lines. The conventional packaging lane would still be used for larger items and gift sets that are often sold in higher volumes during the holidays.

For its solution, FragranceNet.com turned to a compact, automated parcel packaging machine, called ParcelPack by Systems Technology Inc. (STI), a manufacturer of automated packaging systems which have equipment installed at other fast-growing online retailers including Amazon, Shutterfly, and District Photo. The equipment can be used to package up to 20 orders per minute and can reduce labor up to 50% or more with ROI typically in 10 to 24 months.

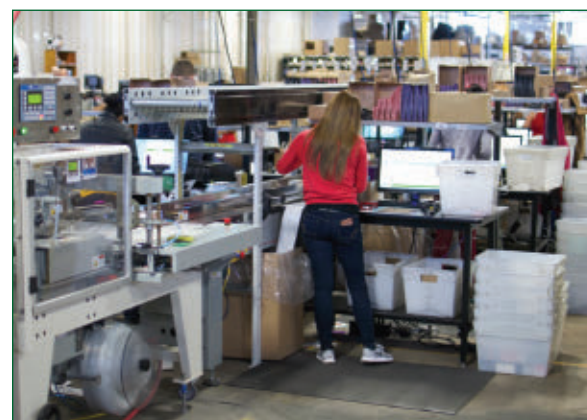
In conjunction with the automated packaging system, the online retailer also uses a patented STI product called SecurePack, which protectively holds the contents of the shipment in place on an economical corrugate base pad using shrink or stretch film, without the use of void fill. With this design, the “tabs” on the base pad interlock into the die-cut slots of an economical shipping carton to securely hold the base pad in place. Contents may be totally random in size and shape and may be any combination of products.

“There is no need to manually put items in a box because the box gets formed around the pad, and there is no need for void fill because we shrink wrap the items to the pad. So, the process helps us process our high-volume orders very quickly,” says Barbara Porter, FragranceNet.com’s Chief Technology Officer.

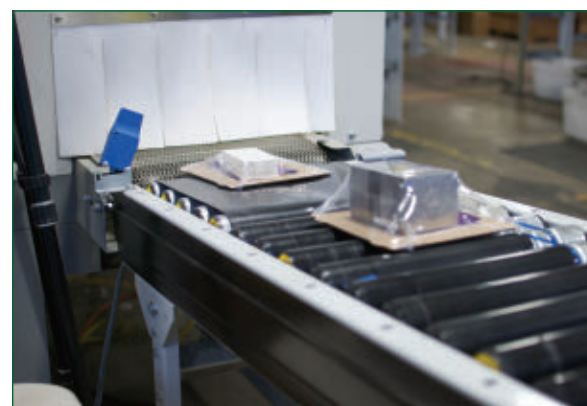
FragranceNet chose to implement STI’s automated packaging systems using two carton sizes. During most of the year, leading up to the holidays, most sales are single items or several smaller items in a single package. So, FragranceNet decided to use a small packaging size as well as a larger one. If needed, however, each line can be changed to adjust packaging size in as little as 10 minutes.

The picking system recognizes which lane should be used, small or large, based on the item(s) in the order, and considers whether the item might be sensitive to the heat in the shrink wrap process.

At each automated lane, up to eight checkers can scan and place items for the order on the corrugated pad. The pad is then conveyed through the shrink wrap heat tunnel and the box is formed around it using the ParcelPack equipment. The shipping label is printed and applied automatically and adhered to the top of the box, then the order and the shipping label are verified they match.



FragranceNet.com turned to ParcelPack™ by Systems Technology Inc. (STI), which can be used to package up to 20 orders per minute and can reduce labor up to 50% or more with ROI typically in 10-24 months. (photo: Systems Technology Inc.)



System Technology Inc.’s SecurePack. (photo: Systems Technology Inc.)

“Speed was certainly what attracted us to STI’s automated process,” says Porter. “We had to figure out how to solve the holiday backlog, which usually peaks for us on Cyber Monday every year.”

She notes that the packaging automation helps to streamline the fulfillment process not only during the holidays but also throughout the year.

“Today, with Amazon shipping items out the same day, waiting two days to see order tracking is unacceptable,” says Porter. “So, our packaging line automation was needed to streamline the process to get shipments out faster.”

With the packaging automation supplementing its traditional packaging lines, Porter says that the product is getting fulfilled and shipped much faster so that FragranceNet.com is well-positioned for continued growth and volume, even during the upcoming 2020 holiday season.

For more, visit: NewEquipment.com/21123102

How Air Castors Benefit the Manufacturing Industry

Cost effectiveness, safety, and time management among the main benefits of using air casters.

By John Massenburg, President and CEO of AeroGo Inc.

Manufacturers are always looking for ways to save time and money to gain a competitive edge. One of the simplest, yet most impactful, ways to do this in manufacturing is by using air casters.

An air caster system uses compressed air to lift and float heavy machines and tooling, even allowing them to be turned 360-deg. within their own footprint. The technology can be likened to a puck floating on an air hockey table—the equipment literally floats on a bed of compressed air and floats off the floor. It's this low friction flotation that makes it possible for one person to effortlessly move up to over 2,200 kilos of equipment.

Downtime is the death of productivity, and when a manufacturing line is held up to remove a part or reconfigure the line, lots of money is being lost. The flexibility of movement with an air caster system is unparalleled. If a problem is found with something on the assembly line and you need to move it via a crane or forklift, operations will cease, a certified operator must be found and then the equipment must be maneuvered into place. With an air caster system the problem piece can be removed quickly by anyone on the line. This can save hours of time and thousands of dollars.

Since air casters eliminate the need for a conveyor belt or rail system, and work alongside or sometimes replace cranes and forklifts, a plant is able to optimize its floor space. With commonly used solutions, extra space around the line is needed for maneuverability, which ultimately results in wasted space. An air caster system requires no extra space to maneuver. Equipment with air casters can be turned 360-deg. within their own footprint, optimizing the workspace and improving the productivity of the plant.

For manufacturers that make calibrated equipment, the inherent suspension of an air caster system ensures that there is no vibration when something needs to be moved.

Equipment like cranes, forklifts and anything on wheeled casters causes a lot of wear and tear on the flooring of the

plant. That type of damage is eliminated with an air caster system. In some plants, like the Agie Charmilles plant in Illinois that had recently installed a million dollar epoxy floor, the idea of having it damaged immediately by equipment was naturally not appealing.

"Prior to us going with air casters we were using forklifts to move machines in and out of this room, but we didn't want to scratch it up using forklifts and walkies. So we needed to go with a different system. Thankfully someone recommended air casters," said Jesus Ledesma Jr., the plant's facilities manager.

Because most plant floors aren't perfectly flat, moving equipment, especially on wheels and casters can be precarious. Air casters are able to compensate for small floor undulations and in the case of larger gaps an overlay can be laid.

For employees, air caster's biggest benefit is the safety of the system. A person's feet can't get stuck under the load and, because nothing is ever suspended in the air the way it is with a crane or forklift, risk is greatly reduced.

An air caster system is easy to use, requiring no formal certification to operate the system.

"How effective was air casters at solving our problem? We don't have to use forklifts anymore. It's especially effective because it doesn't take many people to move machines around. It's very safe. It's very fast. And it doesn't disturb other people in the room," said Ledesma.

Despite all the benefits of an air caster system, the cost to implement it is far less expensive than the alternatives. For example a 100T air cushion system might cost approximately 135,961 euros versus more than 900,000 euros for a crane.

With the lower cost of acquisition, coupled with the benefits and cost savings throughout the lifetime of the product, an air caster system is a smart solution for any manufacturer of heavy equipment.

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INVASION OF THE MOBILE ROBOTS

OSHA estimates that forklift accidents result in at least 100 workers deaths and 95,000 injured every year. By replacing forklifts in manufacturing, new automation technology can significantly reduce warehouse risks to keep these workers safe and productive.

By Jonathan Wilkins

The manufacturing industry has seen an increase in automated robot technology. According to a recent report by Interact Analysis, the value of the mobile robot market will rise to \$7 billion by 2022.

The technology giant Amazon is one of the larger multinational businesses to have invested heavily in robots. Amazon's robotic roll-out started in 2012, and it has spent \$775 million on Autonomous Mobile Robots (AMRs) to carry products across its facilities. The robots are equipped with sensors for navigation and to avoid risks of collision.

This has resulted in an uplift in productivity, and Amazon today continues to install robots in its warehouses. It currently has more than 200,000 AMRs working alongside human workers. Customers are demanding quicker turn-arounds—especially if they've paid more money for faster delivery—and automation is a cheaper, safer and more effective way for Amazon to fulfill these demands.

AMRs can certainly increase efficiency in warehouse environments. But, perhaps more importantly, there are additional levels of safety that robots can bring for workers. The

fact remains that, in the U.S., the rate of fatal injuries among warehouse workers is higher than the national average for all other industries.

AVOIDING RISKS

Risks may account for there being a higher shortage of skilled forklift drivers than ever before. Companies require workers to have more technical and analytical skills to operate the vehicle, but finding job-ready new recruits has proven to be an issue for manufacturers. This makes training essential.



The technology giant Amazon is one of the larger multinational businesses to have invested heavily in robots. Amazon's robotic roll-out started in 2012, and it has spent \$775 million on Autonomous Mobile Robots (AMRs) to carry products across its facilities. The robots are equipped with sensors for navigation and to avoid risks of collision.

However, the training is not straightforward and can prove expensive and time-consuming; especially with the many health and safety regulations that companies must abide by. To be awarded their certification, candidates must undergo extensive training for skills like awareness and decision making, which are critical when maneuvering a forklift. Such recruitment procedures are costly for businesses, and many manufacturers are turning to automation as a result.

AMR OPTIONS

There are many kinds of AMR that companies can consider installing in manufacturing or warehousing facilities. For example, the Freight 500, assembled by Fetch Robotics, is an affordable option that has proven to be a massive hit in the industry.

But how do humans work around them? The Freight 1500 has lidar sensors and a forward-looking red, green, blue, and depth (RGB-D) camera that enhances conventional images with depth information. There are also LED lights that prevent robots from bumping into each other—and into human co-workers!

In addition, the machine comes in different sizes in order to be equipped to carry a variety of products that weigh anything from 500 to 1500 kg. This helps boost productivity and save on inventory space.

Based on the success of AMRs like The Freight 1500, next year will see the first self-driving lift truck enter the market, the OTTO OMEGA. A game-changer in the market, the self-driving truck is designed for all industrial applications and to help reduce materials handling costs, increase output and improve safety in warehouses.

The human-like OTTO OMEGA autonomously picks up and drops off products, receives and puts away items, delivers parts, transports trash, and works with workers to manage complex loading. What's more, the self-driving truck can learn skills over time by capturing sensor data. This data can then be sent to an engineer, to program new and improved behavioral patterns for the robot.

American warehouse workers walk from between 10 to 20 miles a day picking and placing products, according to *Vox* magazine's *Recode* technology supplement. Despite the capability of AMRs to replace labor-consuming jobs, it's clear that these machines still require much-needed human co-operation.

While the threat of automation to workers' jobs remains an ongoing concern, few can argue with the role AMRs can play in reducing risks of injury. Regardless of the stage manufacturers are at in automating their warehouses, it's crucial to consult an experienced obsolete parts supplier. **NED**





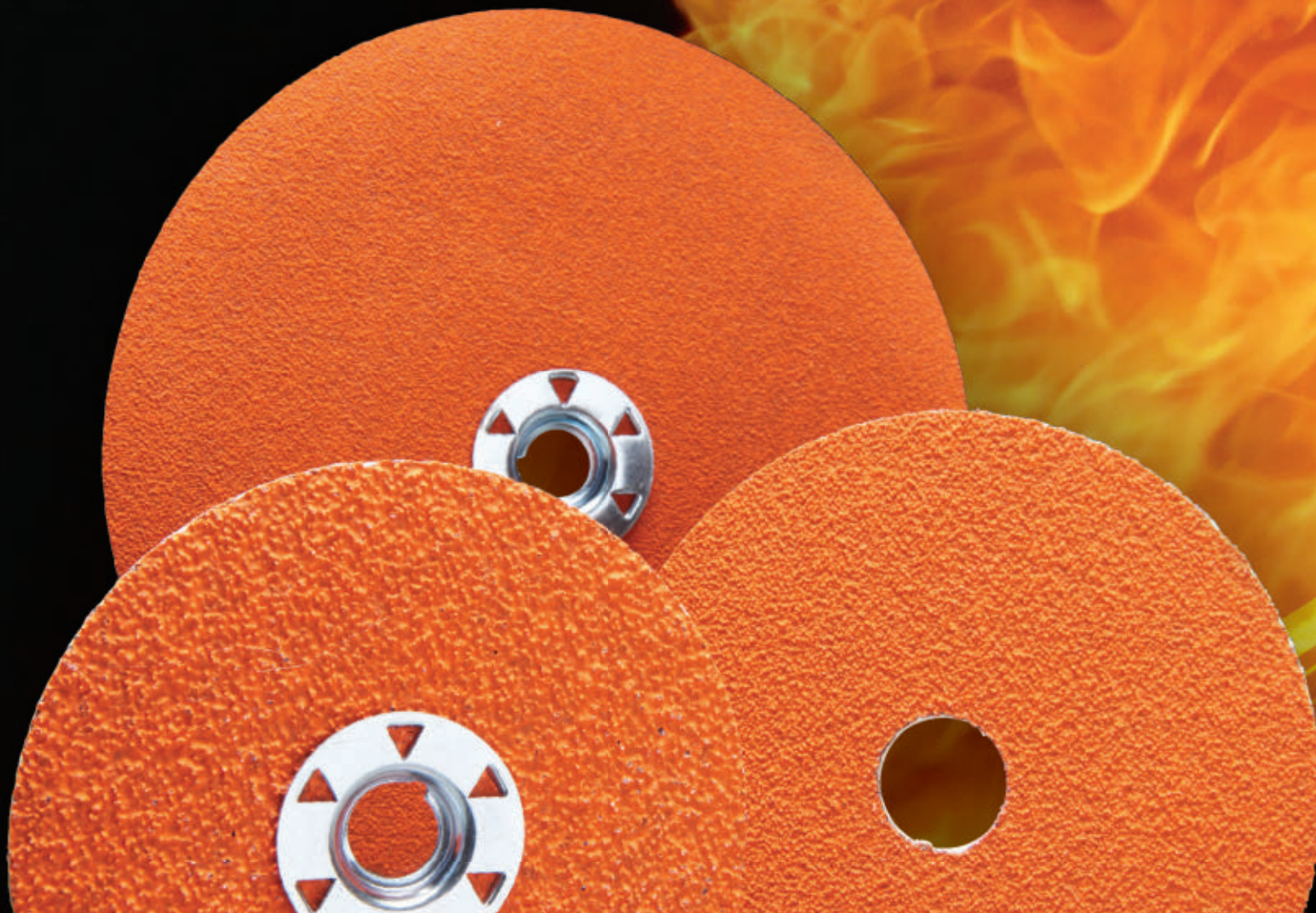
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MATERIAL HANDLING



AUTOMATED PALLETIZING

miniPAL—a mobile palletizer powered by the UR10e cobot arm—offers a footprint of 11 x 13 ft. and can palletize at two pallet locations for optimized operation. The miniPAL's compact design includes a lifting column for tall loads, dual stacking locations for continuous load building, built-in fork pockets for easy mobility, an area scanner for additional safety, and intuitive pattern-building software.

The design includes two safety mats and two area scanners that detect when people enter the work envelope, allowing the system to meet even higher speeds when not in collaborative mode. The system plugs into 110V AC wall power, can be set up in less than a day, and delivers an average payback between 8 to 10 months, depending on application and industry.

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REDUCE COSTS WITH ROBOTIC PALLETIZER

The 700 series robotic palletizers are designed to deliver the flexibility of manual palletizing with reduced costs and liability as these machines automatically accumulate and stack cases, trays, bags or shrink-wrapped multipacks in multiple configurations and pallet loads. Packagers can achieve efficient and reliable pallet forming while using less floor space, and ship secure, well-formed pallet loads that protect products throughout distribution.

Standard systems include a high payload robot and product handling devices for single or dual infeed and pallet building, product transport and staging conveyors, high visibility guarding, Allen Bradley controls, and programming for product requirements. Additional pallet patterns are easily programmed by the end user and uploaded at the operator panel for a seamless transition to new products or packs. The pallet programming software automatically sets the most efficient arm movement to maximize palletizing speed and a variety of end-of-arm tools are available to accommodate all product types.

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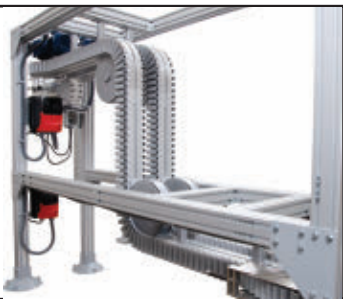
Flextrac Series plastic chain conveyors feature a modular design capable of infinite configurations to handle the challenges and space constraints of a modern factory.

Each conveyor is designed from building blocks including straight sections, horizontal curves, and vertical bends that combine to create an overall system customized to the customer's exact needs. They can be built on an aluminum frame or a stainless-steel frame capable of operating in washdown environments

in food and beverage packaging. The conveyors are capable of loads up to 850 lb. and speeds up to 160 ft /min.

With multiple options for elevation changes, Flextrac Series conveyors can save space by taking advantage of unused vertical real estate in factory environments. In addition to traditional point-to-point system designs, Flextrac Series Conveyors can be configured into Alpine Conveyor Systems for accumulation and cooling/drying applications or Gripper Elevator Systems for elevating/lowering product to another level or de-pucking operations.

QC CONVEYORS
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SELF-ERECTING OVERHEAD CRANE

Available up to a 20,000-lb. capacity, the Self-Erecting Overhead Crane is a double or single girder gantry crane that transforms into a full-featured, ready-to-use overhead crane at the push of a button—requiring no tools, skilled personnel, or auxiliary equipment in the set-up process.

It's design, with many features, such as omni-directional mobility or just x-y axis for indoor or outdoor use on flat surfaces, gives the user flexibility of multitasking in unusual environments or circumstances.

The foldable, self-erecting gantry crane is an ideal tool where heavy duty lifting, mobility, and expediency of prompt deployment are essential and critical.

AIR TECHNICAL INDUSTRIES

www.nedinfo.com/76473-30



BLUETOOTH FORKLIFT SCALE

The next generation of iForks, iForks-32, is a Bluetooth enabled forklift scale that offers a 58-mm fork height and no external components on the fork shank, eliminating any cumbersome cabling.

The 3200 weight indicator offers functional improvements including automatic tilt compensation to correct weight errors that occur when the mast tilts and the forks are not in a horizontal position. It also automatically logs tip loads and overload events.

Bluetooth 4.0 is a standard feature on the 3200, providing connectivity to tablets and smartphones. The RAVAS WeightsApp is available from Google Play and the App store, acting as a remote display and remote control for the scale, but also allows you to download data from the 3200 instrument and send it off via email.

RAVAS

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EFFICIENT PALLET LEVELER

The P3 Operator Controlled Load Leveler increases productivity and improves worker safety in manual pallet loading and unloading operations. The unit can be raised or lowered at the touch of button to position the top layer of boxes at the most comfortable, easy-to-access height. It is ideal for precise load positioning or when load weights, pallet sizes or product dimensions vary greatly and frequently.

With an integrated turntable, users are able to spin the load to allow loading/unloading from the same spot with no need to reach across or walk around the pallet. The unit's base is fitted with fork pockets which provide exceptional stability—no lagging required—and allow it to be easily moved to a different location with a forklift or stacker.

Offering 2,000 or 4,000 lb. capacities, the units operate on standard 115V power and can be raised or lowered from 9-1/2 to 27 3/4-in.

PRESTO ECOA LIFTS

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HIGH-SPEED CASTERS

Designed to transport heavy loads safely up to 10 mph, Spinfinity XC Casters and Renegade Wheels reliably transport load requirement ranges from 1,500 to 17,500 lb.

The caster's mounting plate and inner raceways are forged steel formed from one piece and the raceways are precision CNC-machined for a superior surface for high-speed conditions. The casters offer larger axles and double stacked, precision ball bearings in the wheels to accommodate the higher speeds.

Developed to pair with the Spinfinity XC Caster rigs, Renegade Wheels offer three different polyurethane compounds and two different rubber compounds to cover many types of industrial environments. The ultra-thick, press-on wheels are constructed with massive 1045 steel cores. Wheel diameters range from 9 up to 36 in. and load capacities span 1,500 to 34,000 lb.

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FROM THE COVER

Telehandler Offers Unbeatable View

provides a 360-deg. panoramic view



The solid and sturdy multi-talent for use in recycling plants, wood chip loading, and many other applications, the 355 E telehandler sets standards in performance, view, and service life while offering an impressively large number of options for many purposes.

One of the best features of the telehandler is the all-round view due to the elevating Multicab. The cab height can be continuously adjusted to an eye height of 4.2 m at the touch of a button, giving the driver an unobstructed view of the working environment. None of the machine components obstruct the view—an unbeatable advantage which enables the driver to see into every walking floor trailer or container so the material can be loaded accurately.

With its particularly robust construction and high-quality components, the 355 E is designed for the challenges of continuous operation. All of its components are optimized for uncompromising durability. One of its features is the Z kinematics of the boom head—a familiar feature of wheel loaders. This greatly increases the breakaway torques in scooping operation, making the machine a reliable powerhouse in recycling and biogas applications.

Along with the adjustable steering column, three steering modes, and a hydraulic quick-change mechanism, the machine also features a differential lock on the rear axle. With a multitude of options, the 355 E can also be customized for different application requirements.

SENNEBOGEN LLC.

MORE ONLINE: nedinfo.com/76473-34

Portable Measuring Arms

allow completely wireless touch probing for maximum flexibility



A range of 24 portable measuring arms called **FREEDOM** provide portability and compactness that is especially well suited for line-side measuring and inspection in factories. There is a 6-axis model for touch probing and a 7-axis version for multi-sensor metrology including laser scanning. Both are available in two accuracy levels and the four products come in six sizes with a reach of up to 5 m. Carbon fiber tubular construction ensures stability under challenging conditions. Infinite rotation and a proprietary counterbalance make manual movements light, which promotes ease of use even when trying to access awkward areas of a component. Wi-Fi connectivity and battery power allow completely portable wireless touch probing for maximum flexibility.

LK Metrology

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Dual-Channel Waveform Generator

builds waveforms point-by-point

Using unique SiFi II technology to generate the arbitrary waveforms point by point, the DG2000 Series Two-Channel 16-bit Function/Arbitrary Waveform Generators ensure that the jitter specification for all the output waveforms is as low as 200 ps. Features include helpful function buttons, a 4.3-in. TFT color touch screen, rack-mount capability, and network connectivity.

Saelig Company Inc.

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Ergonomic Welding Gun Line

provides 100% duty cycle

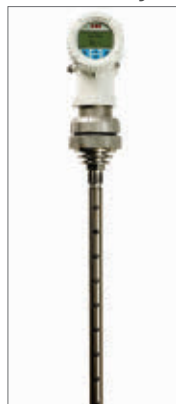
Featuring high performance and optimal comfort, the **Magnum PRO Curve HDE** welding gun line delivers the highest duty cycle in its class and maximizes the operator's comfort with a new ergonomic design. The Magnum PRO Curve HDE is easy to use with a 360-deg. rotatable gooseneck, allowing better positioning into a comfortable spot for any welding job.

Lincoln Electric

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Smart Guided Wave Radar

automatically detects false signals



The LWT300 series of guided wave radars includes the powerful LevelExpert algorithm, automatically differentiating between the actual measured level and false signals. Operators simply need to enter installation data and basic process conditions and LevelExpert does the rest. It cuts through the noise and automatically reports the right level, eliminating baseline mapping and echo selection. And because they are taken automatically, there is no longer any need for multiple manual adjustments by the operator.

ABB

MORE ONLINE: nedinfo.com/76473-38

IIoT-Ready Controller for Motion Control

provides direct cloud connectivity



The Modicon M262 controller is IIoT-ready for logic and motion applications, offering intuitive, scalable, and reliable machine integration into Industry 4.0 environments. The controller embeds cybersecurity features and encryption protocols to provide direct cloud connectivity and digital services thanks to its two ready-to-work and independent embedded Ethernet ports. The M262 simplifies machine architecture and fieldbus wiring. With Machine Assistant (webserver technology), no software is required for device discovery, commissioning, and diagnostics.

Schneider Electric

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Open-Control Platform for Developers

is IIoT-ready and connects to common IoT platforms
PLCnext Technology combines the advantages of traditional IEC 61131 programming with the flexibility of open-source languages like Linux. Users can directly access the core of the product via Linux, giving them the freedom to leverage the open-source community or develop their own applications on an industrially hardened control platform.

Phoenix Contact

MORE ONLINE: nedinfo.com/76473-40

LEADERSⁱⁿ Manufacturing

In this edition of NED's semi-annual **LEADERS IN MANUFACTURING** series, we highlight **14 POWERHOUSE LEADERS** who are forging the innovative path we need to keep manufacturing strong.

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VIBRATION CONTROL

Isolate unwanted vibrations

This ACE product group includes innovative solutions to provide customers with the best assistance in isolation technology and vibration isolation. These machine elements are also distinguished by their light design and wide variety. The product range extends from extremely low frequency isolating pneumatic leveling mounts to ready-to-install rubber-metal isolators and damping pads. With this portfolio, ACE is capable of offering you customized vibration isolation for almost any application.

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Protection for all machine designs under any condition

This ACE product group provides emergency braking to safely slow down moving loads and reduce damaging forces. Although the safety shock absorbers, TUBUS elastomer bumpers, and clamping elements differ so much in design, every single ACE component provides the best protection for your machine. They demonstrate their main advantages in Safety Products emergency stop situations and, based on the protection they provide, are very cost-effective. Furthermore, they can all be easily integrated into existing designs and largely work independent of energy supplies.

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We offer a wide range of options to solve your motion and vibration challenges. Each product undergoes rigorous lab testing to ensure products are capable of meeting the most demanding conditions. Products are regularly evaluated for endurance, cycle life, and material strength.

ACE specializes in custom engineering services, including working together with product engineers to prototype and develop patented components exclusive to your needs.

ENGINEERING TOOLS & RESOURCES

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The state-of-the-art headquarters facility near Atlanta is designed throughout for maximum performance. Orders for in-stock items can be taken as late as 6pm. EST and be shipped for next-day delivery. The majority of products are stocked for same-day shipping and two-day transit is free on orders over \$49 within the U.S., Canada and Puerto Rico. Some exclusions apply.

The company provides online tutorial videos through their webstore at www.automationdirect.com as well as their YouTube channel. A Customer Forum provides peer support on technical and application questions.

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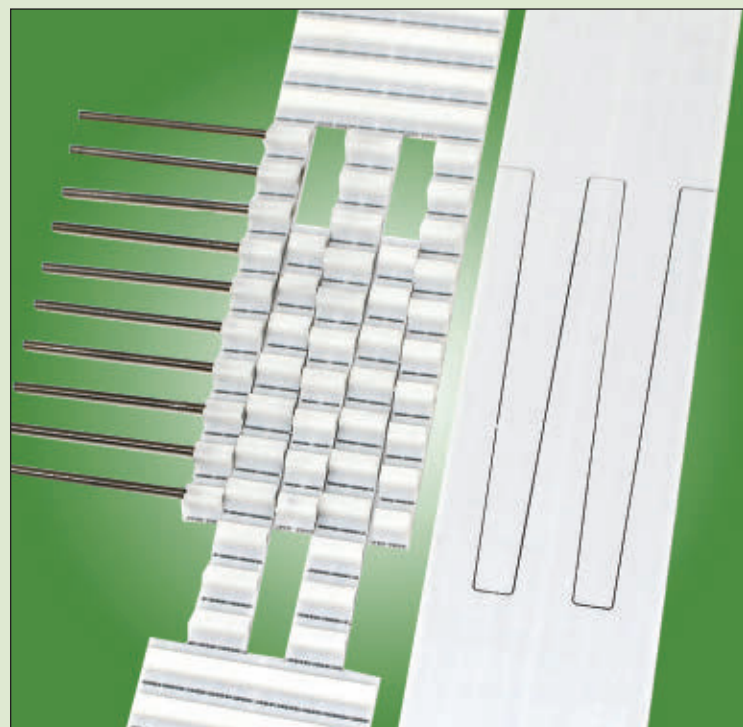
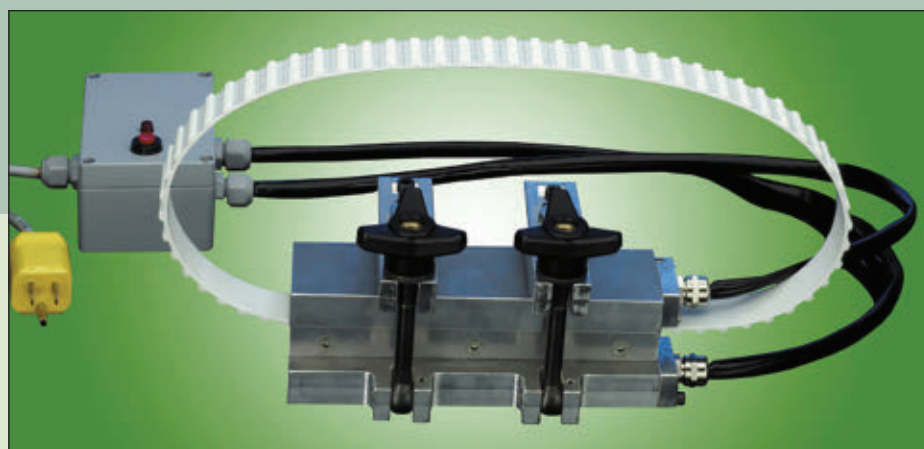
TIMING BELT SOLUTIONS THAT SAVE TIME AND INCREASE PRODUCTIVITY

BRECOflex CO., L.L.C. understands the need for time and cost saving solutions in the field. Any time machinery goes down, even for routine maintenance, it can affect the bottom line. Fortunately, there are several timing belt solutions that are designed for quick field installation. In most cases, belt replacement will take less than one hour. In addition to their convenience, all field connections mesh with BRECOflex pulleys and drive components.

PinLock Timing Belts—feature precise waterjet cut fingers that are connected with threaded pins that are screwed through the belt. The PinLock comes in 6 pin and 10 pin configurations depending on the belt type and required tensile strength. Because the pins are threaded through the belt, leaving the belt back undisturbed, it is the ideal choice for belts requiring backings.

Connecting Kit—make quick field attachments with connecting kits consisting of pre-cut finger-spliced belts with tooth inserts, plates and screws. Connecting kits are made for several T and AT pitch belts in widths of 32, 50, 75, and 100 mm. For belts requiring profiles, BRECOflex recommends the **ATN® Convertible Timing Belt System** which offers the dual advantage of the field connecting kit combined with screw-on profiles that you can attach and reconfigure as needed for your conveying application.

Field Welder—for the most seamless field connection, opt for the field welder, which is a compact, self-contained heat press that welds belts on-site while on the machine. The process takes approximately 30-45 minutes depending on the size of the belt and yields a finished product with the same tensile strength as a factory supplied spliced and welded belt. The field welder works with interchangeable plates available in all BRECOflex CO., L.L.C. belt sizes and pitches.



ABOUT BRECOflex CO., L.L.C.

BRECOflex CO., L.L.C. was founded in 1989 in Eatontown, NJ, as a manufacturer of high precision timing belts and drive components. The company holds patents for several products as well as production methods. Exclusive timing belt solutions include ARC Power® self-tracking belts with continuous tooth engagement, ATN® Convertible Timing Belt System for use with interchangeable profiles, and *move*-series which offers up to 75% more stiffness and 30% higher transmittable force than standard polyurethane timing belts.

As a single source supplier, BRECOflex CO., L.L.C. manufactures stock and custom pulleys for all belt types with the fastest lead time in the industry. Other drive components such as clamps, tensioners, and tension meters are also sold from their NJ facility.

For more information, visit www.brecoflex.com.

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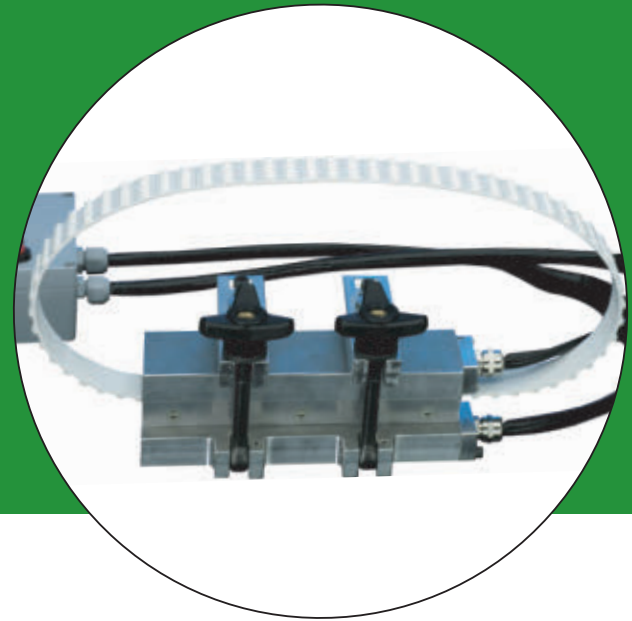
PinLock

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Works great with all types of belt backings



Connecting Kit

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Field Welder

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The Clippard name has long been associated with high quality standards. True craftsmanship used in the manufacturing of the Minimatic® line is not limited by a numbers standard. Customers have long recognized the partnership they have with the Clippard organization, and have grown to appreciate the high standards self-imposed in the manufacturer and testing of products. Excellence in design, materials and workmanship is the Clippard difference that assures your satisfaction.



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For over 75 years Clippard has been manufacturing and providing products and solutions to design engineers and manufacturers in a wide variety of industries including drug dispensing, laboratory equipment, medical devices, material handling, analytical, chemical analysis, sampling, life science/biotech, genetic research, gas chromatography, spectrometry, DNA synthesizing, blood analyzing, printing, diagnostic equipment, fermentation, packaging, water treatment and more.

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Utilizing the industry's most robust miniature linear actuator, the **ECLIPSE** leads the industry in performance and durability making it ideal for critical applications for liquid and gas delivery, medical, analytical and industrial automation. clippard.com



Precision Regulators Provide Excellent Accuracy & Repeatability

The DR-2 regulators are robust devices that provide precise repeatability, sensitivity and stability in a small, sleek package where zero air consumption is required. clippard.com



Take Control with Cordis

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The future of proportional control has arrived—and it's digital. The **Clippard Cordis** is a revolutionary microcontroller primed for escape velocity from a proportional control market that has grown stagnant.

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Precise, Linear Digital Pressure Control

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SIMPLIFY YOUR WORK AND GAIN NEW EFFICIENCY WITH COAST LIGHTING SOLUTIONS

A century of innovation

At COAST, practical comes first. That's why for the last 100 years we've developed technologies that solve real problems—from our early days working with fisherman on the Oregon Coast to our groundbreaking advances in LED optical technology for the modern worker. In our eyes, there is no higher bar than meeting the lighting needs of the men and women who design and build the essentials of everyday life.

Manufacturing professionals turn to COAST to put the right light on the job—from inspecting critical welds, to repairing equipment on the line, to tightening fasteners inside crowded compartments. COAST lighting comes in a wide range of formats, output modes, and beam-shaping options to get the job done faster and easier. With a century of quality at our back, we're always looking forward—to help you light the way.

Shape light to your needs

Time is critical on the manufacturing line—because process efficiency directly affects productivity and profit. COAST's state-of-the-art beam-shaping technologies enable fast focusing so that dim conditions never slow you down. With both Slide Focus and Twist Focus options, our multi-mode beams not only feature variable light intensities but deliver both piercing spot beams and ultra-clear flood beams with seamless transitions between. See near, see far—using COAST lights to focus on the details of any job.

Engineered for workplace performance, there's a COAST light for every situation. COAST handheld flashlights featuring Beam Lock technology allow you to dial in and lock the beam shape exactly as you need for ultra-specific lighting on repetitive tasks, while our headlamps keep your hands free and shine light right on the target. COAST portable work lights offer a variety of positioning systems—magnetic bases, clips, and stands—to provide you ultimate control with your focusing beam.

Pick your power source

Bring adaptive lighting power to fixed processes and quality-critical jobs. With units coming steadily down the manufacturing line, COAST's Dual Power technology provides you in-the-moment flexibility to use either alkaline batteries or rechargeable batteries—for a more convenient and cost-efficient way to guarantee you are never without your light. Avoid hang-ups and delays on routine processes by keeping a secondary power source ready at all times.

Designed to deliver pro-grade power for long durations, COAST rechargeable lights are the manufacturing professional's answer for the demands of everyday work. Start your shift with power, and end your shift with power—COAST Dual Power lights provide a bright path from beginning to end and eliminate a risk variable from the day.



COAST lights for the manufacturing industry include (left to right) the FL75R, HX5R, G32 and the PS400S.

Lifetime Warranty

All COAST lights are designed to the highest specifications and are built from the most cutting-edge, durable materials. As a manufacturer with a 100-year heritage, we not only believe in pushing the boundaries of innovation but know a thing or two about the kind of quality and assurance that solves problems and builds trust. Manufacturing professionals depend on the workmanship of our products to withstand constant use in the toughest environments.

We warranty all COAST flashlights, headlamps, and work lights for the life of the original purchaser—because COAST is Trusted Tough.

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BETTER LIGHTS. IMPROVED EFFICIENCY.

See your way to smarter work. COAST lights simplify job-site processes while increasing workplace safety.



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COAST'S FAMILY OF HANDS-FREE WORK LIGHTS.
Light anywhere you need it.

FLASHLIGHTS



HX5R

MULTI-PURPOSE WORK LIGHTS



PS400S

HEADLAMPS



FL75R



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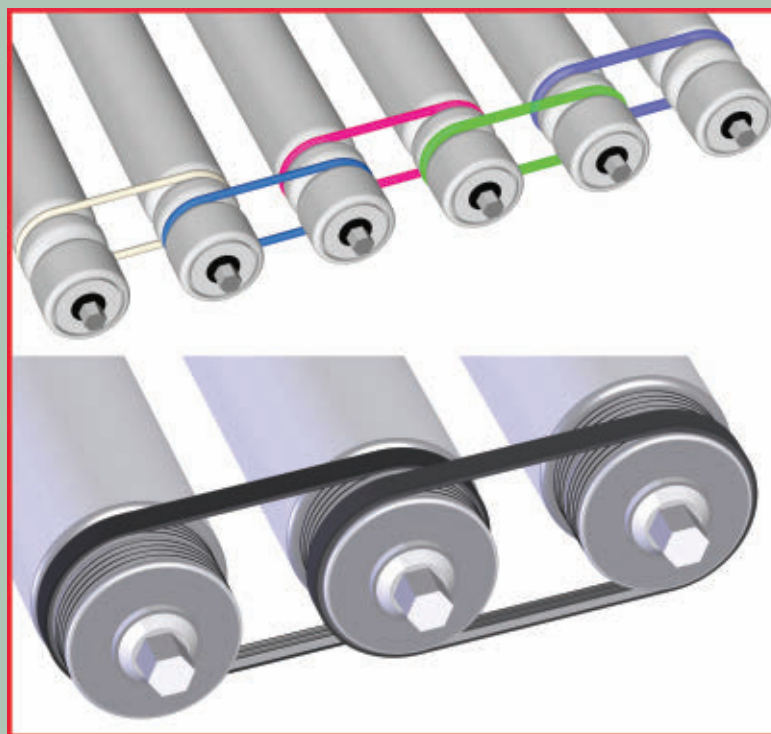
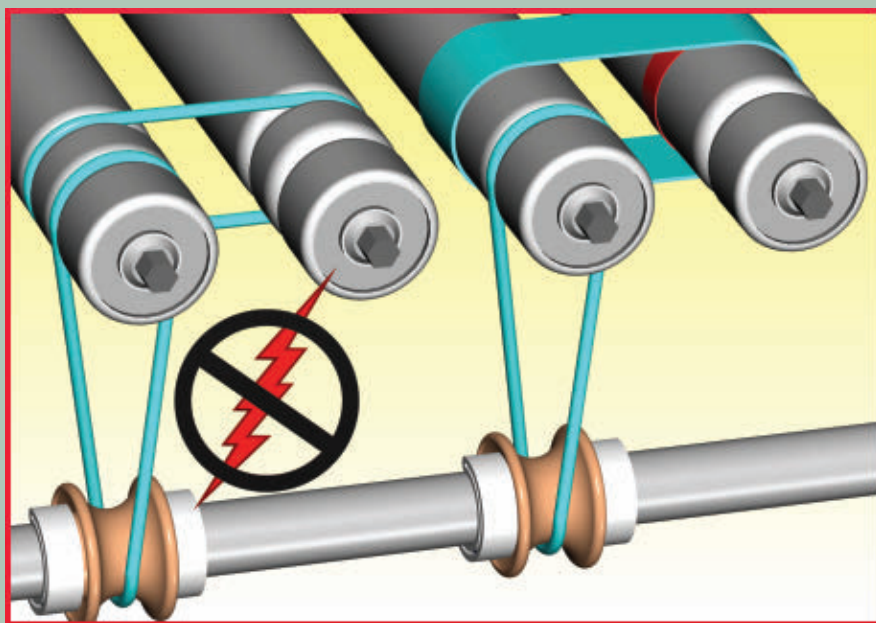
DURA-BELT

Dura-Belt

DURA-BELT, INC.
 3119 Scioto Darby Exec. Ct.
 Hilliard, OH 43026
 (P) (614) 777-0295
 (F) (614) 777-9448
www.durabelt.com

Many of the products you use everyday have been conveyed at one time or another on rollers powered by Dura-Belt's belts. Everything from food, beverages, medicine, hardware, tools, household goods, appliances, electronics, jewelry, clothing, magazines, books, lubricants – anything packaged in boxes – has likely been transported on belts that we manufacture. Our belts are used world-wide in virtually every first-world country on earth, including China. Forty percent of our production is exported.

Our company was formed in Ohio in 1987 to sell urethane belting to distributors, installers, and OEMs. In 1991 the company was purchased by Jim Hammond, the "Belt Doctor", a physicist who worked at Jet Propulsion Labs and was Director of Technology at Atlantic Richfield Corp (ARCO). Mr. Hammond's goal was to bring high technology to the relatively low tech belting business, including a quality control system that was a forerunner of ISO 9000. Within a year the company's name was changed to Dura-Belt to reflect the development of a proprietary Super-Strong welding process that made our belt splices virtually unbreakable.



In 1994 Dura-Belt introduced the "World's Longest Belt Warranty". To the best of our knowledge, it still remains as the longest belt warranty for elastic urethane belting in the world -- ten full years or the life of the belt, whichever is longer.

Over the years Dura-Belt has developed many new products, including a proprietary color process for coloring belts after being spliced, anti-snap flat belts, anti vibration belts, Long-Life HT (High Tension) belts made from Cyclothane-B, extremely powerful HEHT (Highly Elastic High Tension) belts that move heavy loads on up to 19 rollers zones, the patented Speedy Belt Installer and metal detectable elastic food-grade belts. It also added to its product list idler and drive pulleys, plus Poly-V® roller end-cap inserts and Hutchinson's ConvyXonic® Poly-V belts that can "move mountains at high speeds". The company regularly introduces new products, most of which are inspired by its customers with whom it works closely.

Dura-Belt owns a state-of-the-art plant in Hilliard, Ohio that was built in 2012 and designed especially to manufacture urethane belting and other accessory products for conveyors. It has a sales office in Poland.

When running three shifts with the equivalent of 50 employees, Dura-Belt's robots have the production capacity to produce approximately 90,000 O-ring belts per day.

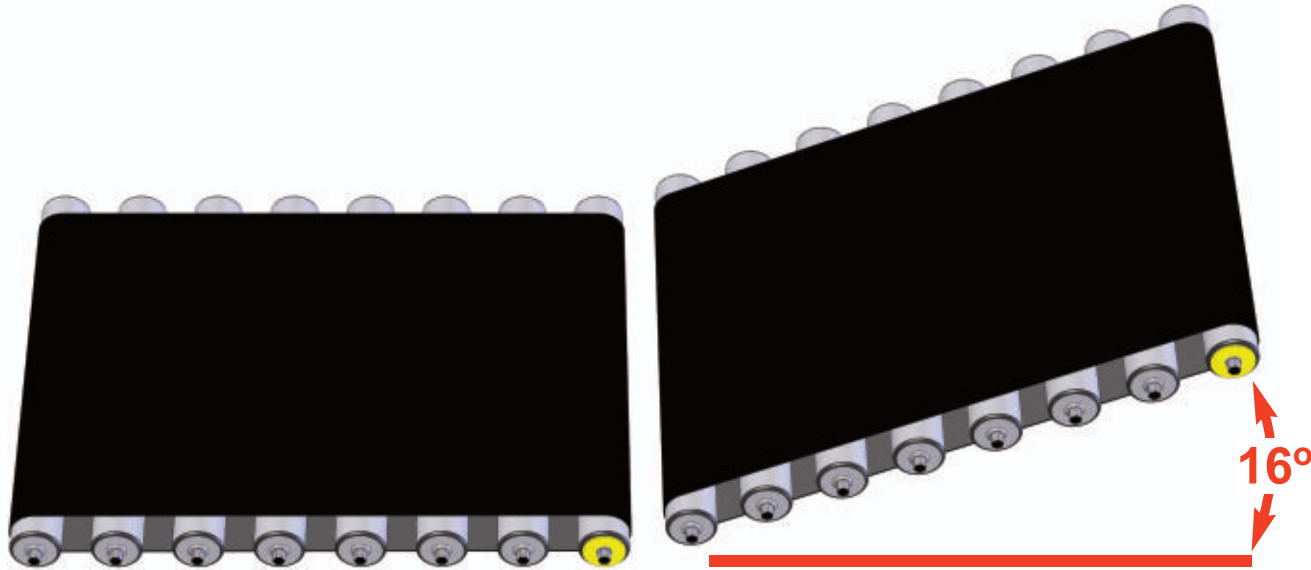
Dura-Belt's mission is to manufacture innovative, high-quality products and sell them world wide at a fair profit, while providing free technical help from the "Belt Doctor", plus the fastest, friendliest service in a healthy, happy environment.



New products

Dura-Belt

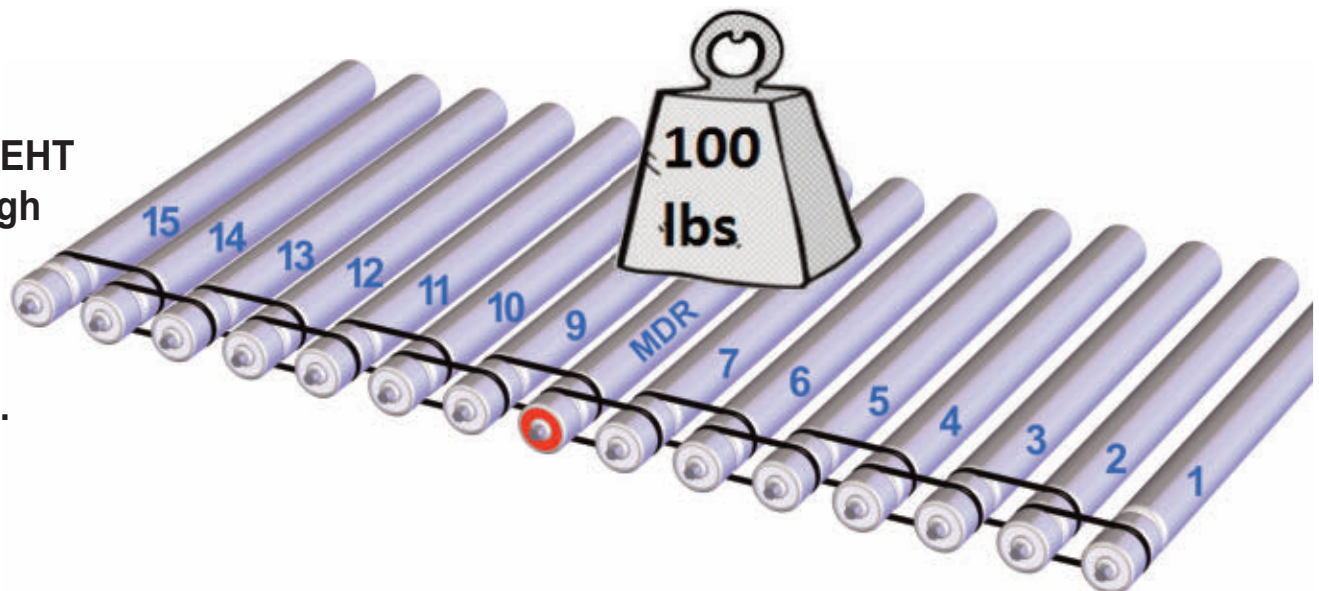
ProMat S115



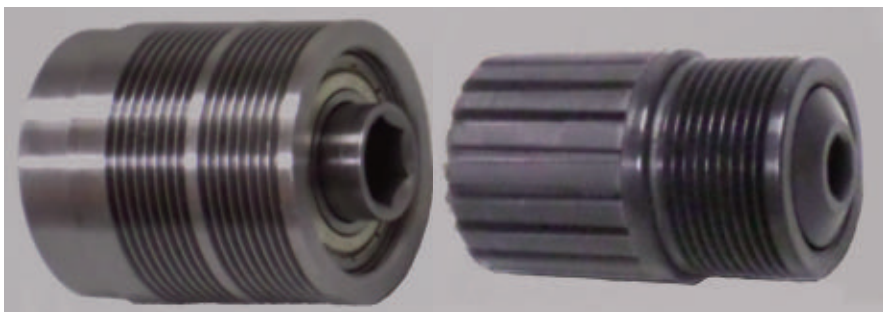
Our stretchy flat belt's new surface shuns dust and has higher coefficient of friction. Moves 60 lb. boxes on inclines/declines up to 16° -- 33% higher than old version. Last year over 17 miles were installed in

major distribution centers. Needs no expensive v-guides or tensioners. Probably the world's most economical flat belt. 10 year warranty on splice. Fast delivery.

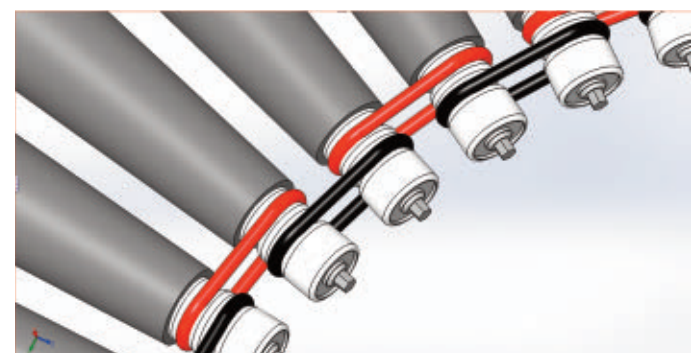
Slightly thinner HEHT (Highly Elastic High Tension) black belts fit deeper in grooves, but still move 100 lbs.



New lower Price



Poly-V endcaps quietly move 5,000 lb. pallets on 2.5" rollers and heavy 500 lb. boxes on 1.9" rollers at high speeds with long-life poly-v belts -- unlike noisy, greasy, dirty chains.



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- Lower cost-per-label compared to competing printers
- Prints large batches using 45-meter (147’) bulk roll tape

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Super Air Knife Replaces Noisy Blowers

EXAIR's **Super Air Knife™** delivers a uniform, high volume, high velocity sheet of air for blowoff, cooling, and drying applications. The Super Air Knife offers a more efficient way to clean, dry, or cool parts, webs, or conveyors. Energy use is 1/3 that of typical blowoffs, comparable to a blower without the costly downtime and maintenance. Noisy blowoffs become a whisper when replaced with the compact Super Air Knife. Even at high pressures of 80 PSIG, the sound level is quiet at 69 dBA for most applications. Air knives are CE compliant and available in one piece construction up to 108 in. (2,743 mm). Special lengths and materials are available to fit existing machines and environments. Learn more about Super Air Knives at exair.co/61_sak_prf



Highly Efficient Air Nozzles

EXAIR's **engineered air nozzles** are the most efficient air nozzles available and can help optimize compressed air efficiency, especially when replacing homemade or commercial air nozzles. Air Nozzles produce outlet flows up to 25 times the compressed air consumption using a small amount of compressed air as the power source. Return on investment for EXAIR's engineered air nozzles is generally weeks, not months or years. Less compressed air means less noise. The typical noise reduction is 10 dBA. An enormous range of nozzles are available from a tiny M4 x 0.5 thread to a large 1-1/4 NPT produce a gentle puff or a massive blast of air. Learn more about Super Air Nozzles at exair.co/61_an_prf

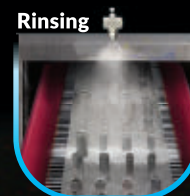
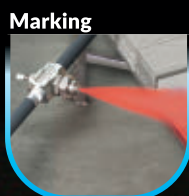
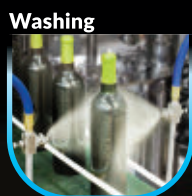
EXAIR Corporation manufactures Intelligent Compressed Air® products that provide innovative ways to blowoff, dry, cool, vacuum, convey, lift, and eliminate static electricity. Since 1983, EXAIR products have been engineered to improve the overall efficiency of a wide range of industrial processes. Their staff of qualified application engineers is familiar with a wide variety of manufacturing processes and offer help to individuals trying to find the best solution to their problems.

With the world's largest selection of engineered, intelligent compressed air products, we offer the widest variety of material and sizes to match your requirements. Download 3D models, CAD drawings, and installation manuals from our website's knowledge base. Design compressed air conservation and safety into your coating, cooling, conveying, cleaning, and more applications with EXAIR.

EXAIR products are made in Cincinnati, OH, and can be modified (special lengths, materials, and sizes) to suit specific application requirements. All of the catalog products have a 30-Day Unconditional Guarantee and ship from stock.

CHOOSE

Your Liquid Spray Solution from EXAIR's Award Winning Atomizing Nozzles



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Air Atomizing Spray Nozzles

EXAIR has a large selection of **Air Atomizing Spray Nozzles** available in stock. EXAIR's atomizing spray nozzles atomize fluids (most commonly water) in a range of spray patterns for a variety of uses. They combine liquid and compressed air to create a mist of atomized liquid that can be easily adjusted to meet the needs of your application. All models use stainless steel construction for durability and corrosion resistance.

EXAIR's Patented **No Drip Air Atomizing Spray Nozzles** have the added benefit of positively stopping liquid flow when the compressed air is shut off. Post spray can cause big problems, ruining finishes and wasting liquids. No Drip Spray Nozzles are ideal where liquid conservation and product finish are priorities.

Advantages

- Fully adjustable
- Maximizes liquid dispersion
- Minimizes liquid consumption
- Many liquid flow rates within each spray pattern
- Compact
- Versatile
- Minimizes air consumption
- Fine atomization

Nozzle Families

Internal Mix and No Drip Internal Mix:

Internal mix nozzles mix the liquid and air inside the air cap and produce the finest atomization. Internal mix nozzles can be used on liquids with a viscosity up to 300 cP. Both air and liquid sides are pressure fed. **1/8 NPT, 1/4 NPT and 1/2 NPT sizes available.**

External Mix and No Drip External Mix:

External mix nozzles have the highest flow rates and allow the air and liquid flows to be adjusted independently. These nozzles are best where precise liquid flow is needed. External mix nozzles can be used on liquids with a viscosity above 300 cP. Both air and liquid sides are pressure fed. **1/8 NPT, 1/4 NPT and 1/2 NPT sizes available.**

Siphon Fed and No Drip Siphon Fed:

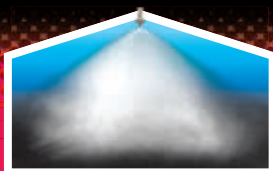
Siphon fed nozzles require no liquid pressure and can be used with gravity fed liquids or lift liquids from a siphon height as much as 36 inches (91cm). Siphon fed nozzles can be used on liquids with a viscosity up to 200 cP. **1/8 NPT, 1/4 NPT and 1/2 NPT sizes available.**



Narrow Angle Round Spray Pattern



Wide Angle Round Spray Pattern



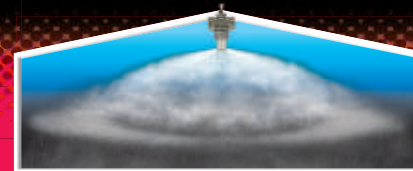
Narrow Angle Flat Fan Spray Pattern



Flat Fan Spray Pattern



360° Hollow Circular Spray Pattern



90° Right Angle Spray Pattern



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Ergonomic Casters & Accessories to Outsmart Back Pain

Hamilton Caster offers a lineup of ergonomic casters, wheels, and related accessories. The new running gear is designed to satisfy high standards established by leading ergonomists and safety managers in today's manufacturing environments. The new *ergo caster series* is a marriage of Hamilton's best rolling and quietest polyurethane wheels mounted in Hamilton's newest Spinfinity maintenance-free kingpinless casters. Hamilton Caster is the only manufacturer to publish extensive ergonomic data for its most popular industrial wheels on its website. The chart data details the startup and maintain forces plus load distribution (lbs. per sq. in.) and footprint (sq. in.) for the specific wheel.



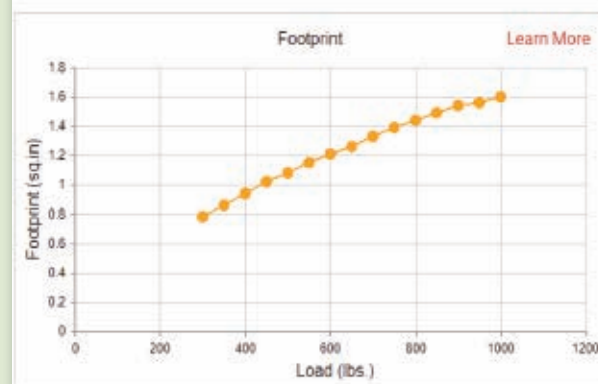
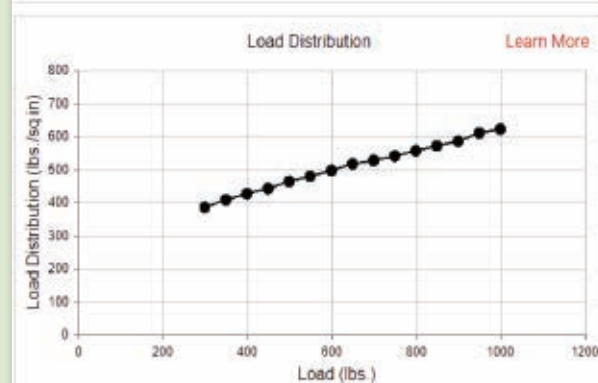
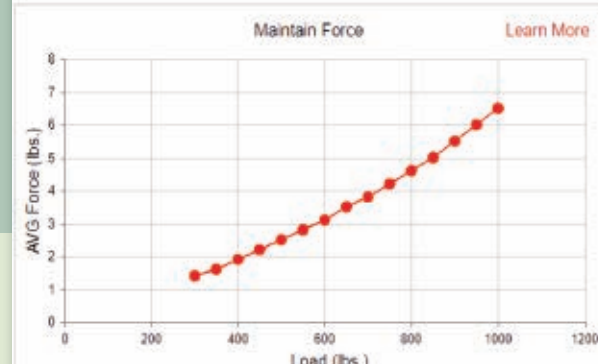
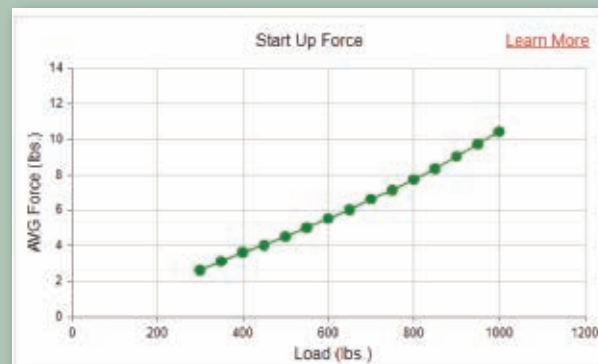
Building the Colossus | 200-Ton Toting Casters

One of Hamilton's highlights the last few years was the opportunity to design and build four 100,000-pound capacity casters for a federal contractor. Fully assembled, each caster towers 52 inches above the factory floor and weighs more than 8,000 pounds. Together, they represent Hamilton's highest payload capacity ever: 200 tons. Each Colossus caster was designed with a spring-loaded suspension system to absorb shock. The swivel construction consisted of 32-in.

and 18-in. dia. raceways flame hardened to 55-60 HRC with a total of (96) 1.5-in. dia. bearing balls. Each caster also featured an eight position swivel lock for directional control, a huge 7-in. dia. oscillating axle to accommodate uneven surfaces, and a foot-operated braking system. The massive payload required 36 in. diameter by 20 in. wide extreme duty press-on tires with 4.5-in. dia. tapered roller bearings. Hamilton's Cart and Trailer division designed and fabricated the integrated towing system weighing over 4,500 lbs. for the two front casters.

Hamilton Caster Announces Major Expansion

Hamilton Caster is excited to announce a major \$6.5 million-dollar plant expansion adjacent to our existing manufacturing facility. The new 65,000 square foot, state-of-the-art facility will offer much needed manufacturing space as well as office space. Hamilton Caster has been adding employees throughout 2019 to meet production needs in advance of the new space. The new building will become Hamilton Caster's new corporate offices and feature climate-control in both office and manufacturing spaces, tilt-up concrete walls, and a world class material handling system. The new facility will house fiber lasers, robotic welders, CNC-Machines, and a state-of-the-art powder paint system.





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With a heritage that extends back to 1919, Kaeser Compressors is an industry leader in industrial compressed air and vacuum equipment. Our broad product line includes all compressed air system equipment including fluid injected and oil-free rotary screw air compressors, dryers of all types, filters, storage, piping, and system controls. Kaeser also offers blowers, vacuum pumps, and portable screw compressors. We are dedicated to the design and manufacture of air system products that represent continuing advances in innovation, quality, and performance.

With more than 6,600 employees worldwide, Kaeser continues to invest heavily into a cutting-edge research and development team committed to building industry-leading products. Innovation is our lifeblood.

Beyond supplying great products, Kaeser excellence extends to evaluating each customer's application and providing the most effective, reliable, and energy efficient compressed air solution. Our service network provides expert design, installation, maintenance, repair, and system audits. Our goal is to supply solutions that exceed all expectations and provide extraordinary value.

Kaeser has performed tens of thousands of air system analyses and has the expertise to deliver compressed air, blower, and vacuum solutions for your applications that will increase uptime and productivity while noticeably reducing power costs.

Using our comprehensive Air Demand Analysis (ADA) program, our engineers build a complete air demand profile to give a clear picture of the system's compressed air requirements. With this system data, we can simulate power requirements of different system scenarios using our Kaeser Energy Saving System (KESS) in order to build the most energy efficient and reliable system possible.

Kaeser's custom engineered systems are yet one more way we show our innovative spirit and deliver lasting value to our customers. We are not intimidated by demanding applications. Our commitment to designing the best engineered solutions results in compressed air systems that remain reliable even in the toughest of applications in the harshest of environments.

Our turnkey, all-weather Custom Engineered Solutions are compressed air packages that integrate our high quality compressed air systems with rugged, weather-proof containers or skids. Remote operations are supported by our revolutionary Sigma Air Manager 4.0, which controls air production and offers a variety of industrial communications interfaces for seamless integration into the IIoT.

Our commitment to quality has made us the compressed air choice for all manufacturing process industries, and it's why we are known as the air systems specialist.

Kaeser Compressors is committed to providing our customers with engineering excellence, the highest in manufacturing quality, and cutting edge solutions. Prompt and dependable customer service and engineering support are backed by extensive training and our ISO 9001:2015 quality assurance and ISO 14001:2015 environmental compliance program.

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LEADER PROFILE

MAIN MANUFACTURING PRODUCTS, INC.



MAIN MANUFACTURING PRODUCTS INC.

(P) (800) 521-7912 • (F) (810) 953-1385
info@mainmfg.com • www.mainmfg.com

SALES
(P) (810) 953-1380



ANY TIME THAT YOU GET INTO A TOUGH PIPING SITUATION – CALL ON MAIN.

MAIN has been a leader in manufacturing and distribution of standard and custom hydraulic flanges and components for the last 60 years.

OUR MISSION IS TO:

1. Provide quality hydraulic flanges at the time they are needed for an affordable price.
2. Provide flanges that conform to international standards as well as U.S. standards
3. Provide custom flanges quickly—generally within 4 to 5 days.
4. Be at the forefront of standards work at both the national (SAE and NFPA) and international (ISO) level.

What this means to our customers is that they are dealing with a company that is **QUICK, INFORMED, and DEPENDABLE**, getting them the correct high quality part on time.

QUICK comes from MAIN's \$5 million finished goods inventory, which includes over 6000 different items. MAIN manufactures flanges to SAE, ISO, DIN, JIS, and other international mounting patterns. MAIN has flanges to many different company mounting patterns as well. Metric flanges; metric, SAE, British, and ISO threads; imperial and metric pipe and tube, are all stocked, in reducing sizes as well.

Another aspect of quickness is MAIN's inventory of 150 tons of MRR special quality carbon steel and 50 tons of stainless-steel raw material and MAIN's manufacturing agility (state of the art machines and tooling allowing setup changes for some machines in as little as 10 minutes). This means that the special crosses, double elbows, flange pad adapters, gauge port adapters, and drilled manifold are done quickly. Turnaround on specials is generally days, not weeks. The MRR special quality steel means that the steel is verified to a higher quality than most machine shops can get from the steel service centers. Parts can be shipped with full material certification from U.S. sources. MAIN is a U.S. manufacturer of flanges although some of our stock material may be of foreign melt but U.S. rolling.

INFORMED comes from MAIN's staff of dedicated and experienced professionals. MAIN's engineers are active on SAE and NFPA committees and have served as the US Expert to ISO technical committees. MAIN's engineers have over 100 years total experience in hydraulic flanges and components.

DEPENDABLE comes from MAIN's 60 years of service to customers and its extensive quality control procedures assuring that the customer gets the right part right away.

MAIN's website, MAINmfg.com, provides a lot of good information on how to specify and measure hydraulic flanges and mountings. It also helps in specifying metric flanges. From the website you can download multiple catalogs and flyers and see a video about MAIN and hydraulic flanges.



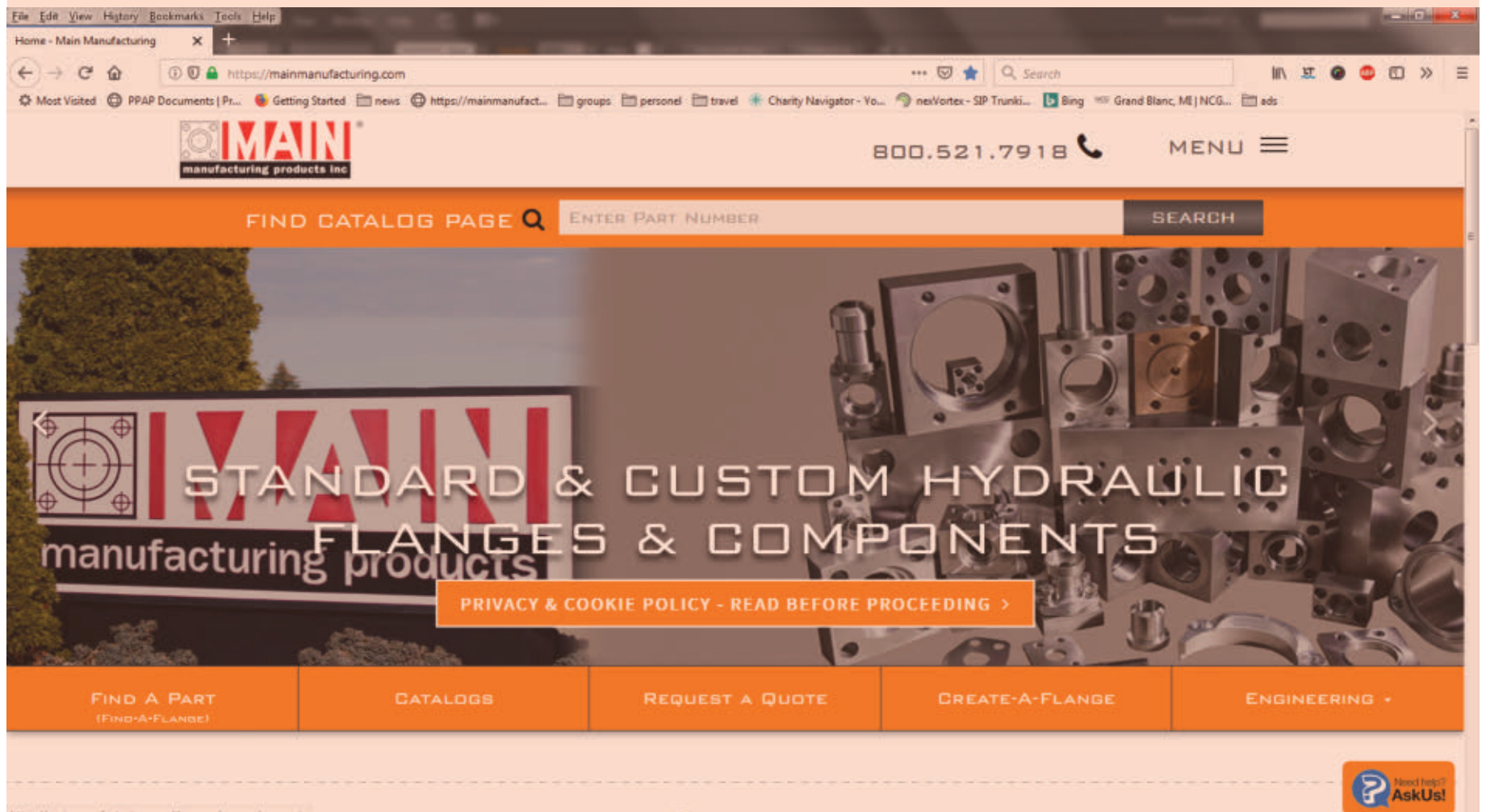
VISIT

MAIN Manufacturing Products

NEW website

Your source for

hydraulic flanges and components



LEADER PROFILE

POWER PUSHER

DIV. OF NU-STAR, INC.

POWER PUSHER®, a division of Nu-Star Inc., has specialized in pedestrian-operated, battery-powered, motorized tugs designed to meet safety and productivity initiatives while driving down maintenance and labor costs for over 50 years. These material handling tugs meet the diverse and challenging needs of our customers, pushing or pulling wheeled or semi-wheeled loads, mobilizing everything from carts, cars, trailers, rail cars and roll cages to airplanes and modular buildings.

Power Pusher® industrial electric tug devices are a safe, cost effective alternative to large expensive ride-on material handling equipment such as forklift trucks and tractors. The compact, walk behind units enable a single person to safely move 500 to 250,000+ lbs. with total control and maximum visibility. Each unit is designed to assist in company compliance with OSHA health and safety guidelines that limit the amount of manual pushing and pulling performed by a single person.

Requiring no license, little maintenance, and utilizing less space than large, bulky equipment, Power Pusher delivers powerful, cost-effective material handling solutions. Power Pusher reduces the manpower and time necessary to move large loads, resulting in significant gains in shop floor productivity, with most users experiencing a total return on investment in a mere 12 to 18 months after purchase.



IF IT ROLLS...WE CAN MOVE IT.

Visit www.powerpusher.com or www.rollingstockmover.com



POWER PUSHER
DIV. OF NU-STAR, INC.

1425 Stagecoach Road
Shakopee, MN 55379
(Phone) (952) 445-8295
(Toll Free) (800) 800-9274
www.powerpusher.com
www.rollingstockmover.com



We offer a variety of industrial ergonomic material handling tugs capable of moving up to 125 tons, including the Power Pusher®, Hazardous Duty Power Pusher®, Super Power Pusher™, Power Tug™, E-750 Electric Wheelbarrow™, MFC-100™, and more.

Our **POWER PUSHER RAIL MOVER™** line of heavy-duty industrial electric tugs enable a single person to safely move 45 to 225 tons. The flexible movers perform on and off the rails. Remote control operation is available as infrared, or radio controlled for easy maneuvering. Powered connect/disconnect to rail cars via remote control. More information at www.rollingstockmover.com.

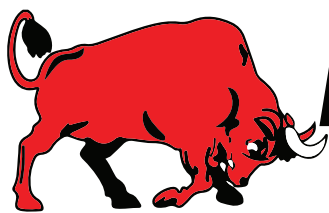
We understand that not all material handling needs are the same and that not all solutions fit every application. Our engineers are constantly working with our customers and will work with you to develop the perfect custom solution to solve your specific needs and challenges. The first stage of this process is for us to understand as much as possible about your needs and application. Then using the latest 3D design software, our engineers roll up their sleeves and work closely with you to develop a custom solution that's just right for you. Then we manufacture to order.

Nu-Star Inc. is a global manufacturer of engineered solutions for material handling needs, with facilities in the U.S. and UK. The company operates out of Shakopee, Minnesota. Years of experience as a leading innovator, designer and manufacturer in the industry has given us the competitive edge in providing reliable and cost-effective load-moving solutions that deliver tangible productivity and safety benefits in a wide variety of applications.

Need More Muscle? Pull or push up to 5,000 lbs.

Now your workers can pull or push their own weight and several coworkers too with Power Tug™

- Dramatically increase employee productivity and safety.
- Fingertip digital control for speed and acceleration/deceleration.
- 24-Volt DC power with onboard charger.
- Automatic braking and emergency reverse.
- Comply with Health & Safety Guidelines limiting pushing/pulling by a single person.



PowerPusher®

If It Rolls... We Can Move It.™



www.powerpusher.com • 800.800.9274

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Visit www.nedinfo.com/76473-515

LEADER PROFILE

RACO INTERNATIONAL, LP



RACO INTERNATIONAL, LP
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 Bethel Park, PA 15102
 (P) (412) 835-5744
 (F) (412) 835-0338
raco@racointernational.com
www.racointernational.com

RACO INTERNATIONAL, LP is a leading global manufacturing company that produces both linear and rotary electromechanical actuator systems.

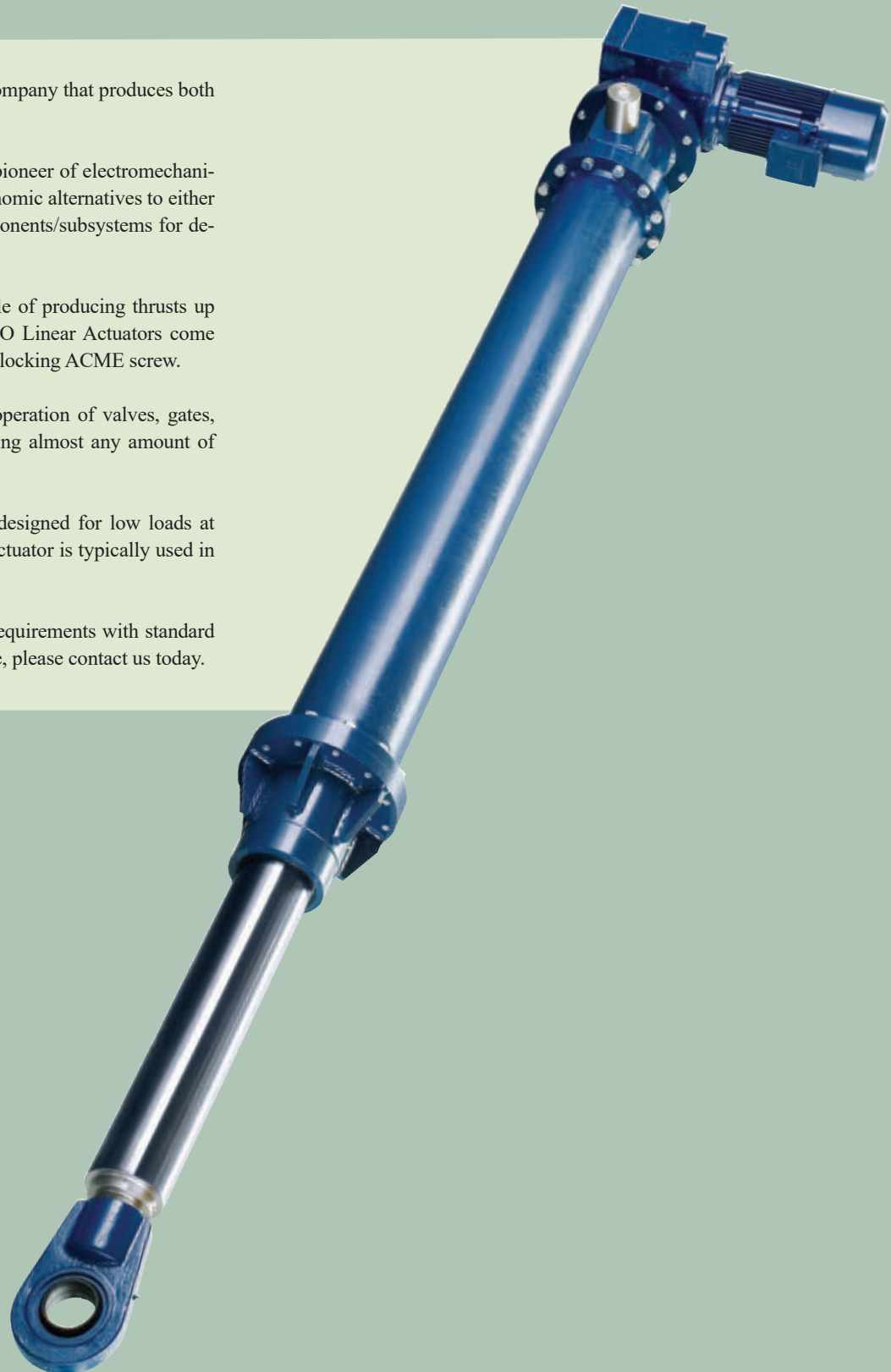
Founded over 60 years ago, RACO International, LP is the true pioneer of electromechanical actuators, offering dependable, environmentally safe, and economic alternatives to either hydraulic or pneumatic systems. RACO actuators are ideal components/subsystems for demanding applications in the harshest of environments.

Our fully customizable Linear Actuators (MA-Series) are capable of producing thrusts up to 225,000 lb while offering stroke lengths up to 20 feet. RACO Linear Actuators come equipped with either a high precision Ballscrew or a reliable, self-locking ACME screw.

Our multi-turn Rotary Actuators are designed to automate the operation of valves, gates, dampers, louvers and other positioning applications while offering almost any amount of torque required.

Additionally, our Belt Drive Linear Actuators (LM-Series) are designed for low loads at high speeds and long travel capabilities. The Belt Drive Linear Actuator is typically used in automation processes.

We are dedicated to satisfying our customers' most demanding requirements with standard and custom designs. For more details about our entire product line, please contact us today.



The True Pioneer of Electric Actuators

RACO International, LP

RACO Electric Actuators provide a reliable solution for all of your linear and rotary motion needs. A variety of design configurations provide a multitude of thrust and speed ratings. RACO Electric Actuators are designed to be robust with virtually no maintenance while also being economical to operate and friendly to the environment.

RACO LM-Series

The RACO LM-Series is designed for high speeds and long travel (stroke) with capabilities that are frequently found in today's automation processes.

The LM can be used as a single axis system or can be combined to form a multiple axis system.



RACO MA-Series

The modular design of RACO ACME and Ballscrew Electric Actuators allow for a variety of design configurations while offering a Linear Thrust range from 70lbs to 225,000lbs, Linear Rod Speeds from 0.2"/sec to 30"/sec and Linear Travel (stroke) up to 20 ft.



RACO Rotary-Series

The Rotary Actuator is designed to automate the operation of valves, gates, dampers, louvers and other positioning applications requiring partial or multi-turn rotational movement.



RACO International, LP

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Web: www.racointernational.com

Contact Email: raco@racointernational.com

Visit www.nedinfo.com/76473-516

Low Maintenance • Environmentally Friendly • Precise & Reliable

LEADER PROFILE

SCHMERSAL



SCHMERSAL
THE DNA OF SAFETY

SCHMERSAL USA

15 Skyline Drive
Hawthorne, NY 10532

(P) (914) 347-4775

(F) (914) 347-1567

salesusa@schmersal.com

www.schmersal.com

Machine safety is a complex topic. Companies are increasingly calling on qualified safety specialists for their specific know-how to guide them in making the appropriate decisions for their safety needs. For the Schmersal group, machine safety is part of our DNA: Over 70 years of technical knowledge and industry experience allows us to combine the building blocks of safety-rated components with control systems and software for customized and comprehensive safety systems. Through the years Schmersal has grown from a small family business based in Wuppertal, Germany, producing industrial position switches to a global leader in the world of machine safety, with branch offices in 22 countries and 2,000+ employees.

As a leading solution provider in the areas in which we operate, we strive to be recognized as an innovative global leader in safety technology and engineered services. Following the mission of the Schmersal Group, our goal is to provide our global and local markets with safe, reliable, and innovative solutions oriented towards ensuring the safety of man and machine. We are developing sustainable and long term alliances that benefit our customers and the Schmersal Group by continuously improving our processes through technology and market experience. This statement has been the guiding principle for the company, motivating us to be at the forefront of product innovations for the ever advancing machine safety industry.

Machine safety has changed over the years and Schmersal products have evolved to meet not only the demand but also the local and international requirements. We have embraced new technology, such as the patented Pulse Echo and enhanced RFID devices with Serial Diagnostic capabilities for the most stringent safety needs. We also designed IP69K rated products for extreme wash down applications to meet requirements such as the food modernization act. We take pride in our ability to develop new ideas into proven technology to stay ahead of the innovation curve and to meet the changes in industry applications for machine safeguarding.

As machine safety becomes more connected to machine automation, Schmersal is at the forefront of connectivity, industrial networking, and communications. SFB safety field boxes allow for series connection and free interlinking of up to eight safety switchgear devices, via plug and play connectors, to PROFINET or PROFIsafe fieldbus. Electronic devices with Serial Diagnostic capabilities can be integrated into popular fieldbus systems via SD Gateways. Our PROTECT PSC1 is a programmable, modular safety controller which includes the development of custom applications and their integration into higher-order control systems. And we've partnered with AS-I to provide safety components with integrated AS-Interface for easy installation into their system. These four installation systems are available for optimal personal safety and process safety in complex machine plants.

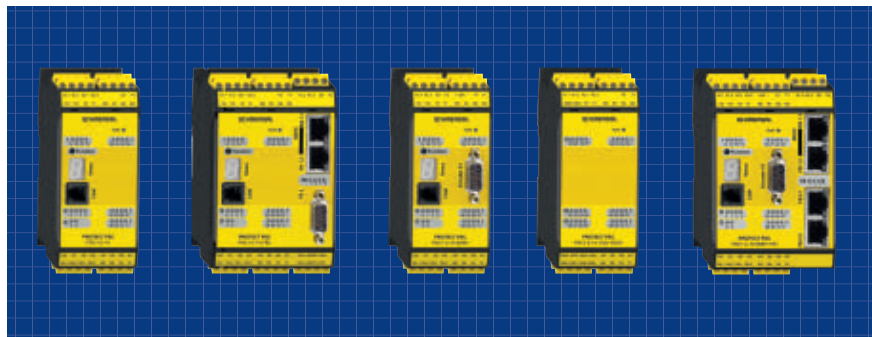
Through decades of experience our safety focus has given us the experience to become knowledge leaders in machine safety automation, which has led to the Tec.nicum Engineering Services Group. At tec.nicum, we offer customers a product and manufacturer-neutral consultation on all the latest statutory guidelines and assist them in designing their machines and workplaces to be safer places. The Functional Safety Engineers at Schmersal tec.nicum are certified by TÜV Rheinland and have hands-on practical expertise in the field of safety technology thanks to many years of experience from working with machine builders, facility engineers, and with various associations and institutions. They can perform risk analysis, stop time measurements, and provide documentation and validation of safety systems. Client specific education sessions are designed to give customers tailored training for their specific needs. Sessions include general machine safety, safety circuits & wiring, risk assessment, and others.





SCHMERSAL

Programmable Safety Controller PROTECT PSC1



- Modular structure for application flexibility
- Expansion up to 272 inputs/outputs
- Ethernet SDDC (Safe Device to Device Communication)
- Safe drive monitoring for up to 12 axes
- Universal communication interface for all common field bus systems

The DNA of Safety.

Machine safety is a complex topic. Companies are increasingly calling on qualified safety specialists for their specific know-how to guide them in making the appropriate decisions for their safety needs. For Schmersal, machine safety is part of our DNA: Over 70 years of technical knowledge and industry experience allows us to combine the building blocks of safety-rated components with control systems and software for customized and comprehensive safety systems.

Schmersal provides solutions for reliable safety signal processing based on safety control modules and safety controllers with an array of visualization and diagnostic possibilities. The new PROTECT PSC1 is a programmable, modular safety controller which includes the development of custom applications and their integration into higher-order control systems. The PROTECT PSC1 system consists of a reliable, compact freely programmable safety controller and dependable extension modules; fitted with a universal communications interface to allow data exchange across different fieldbus systems with higher level controllers. In developing the new PROTECT PSC1, we have taken a big step forward in the field of control technology and its unique features clearly set this control system apart from other solutions.

Visit www.nedinfo.com/76473-517

www.schmersalusa.com | 888-496-5143 | salesusa@schmersal.com

FROM THE COVER

Teach Employees with Virtual Solutions

trains staff in a safe and interactive environment



Enabling manufacturing enterprises to benefit from its advanced **Digital Manufacturing (DM)** solutions for factory automation, Fastem's DM allows companies to do training and testing before ramp-up and simulation during production.

Thanks to DM solutions, no physical automation system is needed to simulate, educate, or introduce a factory automation system to employees. DM offers a cost-effective way to demonstrate and educate new factory automation technology.

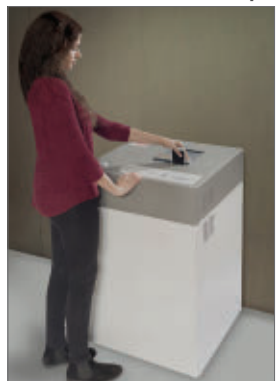
The DM offering consists of three options: Virtual MMS (Manufacturing Management Software), Virtual FMS (Flexible Manufacturing System), and Virtual AMC (Agile Manufacturing Cell). Each of these solutions includes access to the software and 24/7 customer support. The Virtual FMS and AMC options include a visual components model, a 3D simulation software for manufacturing applications, including layout planning, production simulation, offline programming, and PLC verification, which functions as the manufacturing hardware of the system. All three products can be used as a local installation, and virtual MMS can also be used as a cloud-based installation.

Fastems LLC

MORE ONLINE: nedinfo.com/76473-41

Compact Multimedia Shredder

can shred 100 mobile phones an hour



The FlashEx is a rugged, durable shredder that quickly, easily, and safely destroys a wide variety of electronic media. Because of its compact size, quiet operation, and 120V power requirement, it can be used anywhere. Items that can be easily destroyed include SSDs, cell phones, smartphones, mini tablets, USB sticks as well as CDs/DVDs, floppy disks, credit cards, and ID badges.

Intimus International

MORE ONLINE: nedinfo.com/76473-45



Large Air Conveyors for Corrosive Environments

provide infinite control of the conveying rate

Type 303 Stainless Steel 2-1/2 NPT Threaded Line Vac Air Operated Conveyors convert ordinary pipe into a powerful conveying system for parts, scrap, trim, and other bulk materials. They are ideal for food, chemical, and pharmaceutical processes or areas likely to be wet and corrosive as their features include chemical and corrosion resistance, performance in higher temperatures, long service life, and low maintenance. Their larger size makes them perfect for conveying bigger parts and large volumes of material over long distances. Threaded Line Vac Conveyors eject a small amount of compressed air to produce a vacuum on one end with high output flows on the other, providing an instantaneous response and infinite control of the conveying rate. Applications include scrap trim removal, material conveying, part transfer, fiber tensioning, and filling operations.

EXAIR Corporation

MORE ONLINE: nedinfo.com/76473-42

Blade Series Triples Cutting Performance

are highly resistant to breakage



3X Power Bi-Metal Reciprocating Saw Blades feature teeth that cut more efficiently, enabling users to make up to three times the number of cuts than conventional blades, and are engineered for

use on corded and cordless saws. Starrett 3X Power blades are also highly resistant to breakage and feature a reinforced shank. The line includes blades for cutting wood, metal, multiple materials, and heavy-duty cutting.

The L.S. Starrett Company

MORE ONLINE: nedinfo.com/76473-43

Cryogenic Valves for Extreme Temps

operate at temperatures from -452 to 300 °F



Ideal for use in ultra-cold cryogenic storage tanks, transportation trailers, and vacuum jacketed and non-jacketed piping systems, The 5000 Series of cryogenic valves feature bellow and non-bellow sealed designs, redundant packaging seals, and all stainless-steel construction.

The valves offer high performance, low heat leak, and worry-free performance with the least maintenance of any LHe valve used today.

CIRCOR International, Inc.

MORE ONLINE: nedinfo.com/76473-46



Advanced Airfoil Impellers

deliver airflows to 200,000 cfm

Designed with the latest computer aided technology, ELTA Axial Airfoil Impellers incorporate an advanced airfoil blade design that is exceptionally quiet and efficient. Integrating innovative pressure cast aluminum hubs and adjustable pitch blades, the impellers deliver an impressive array of airflow performance, delivering airflows to 200,000 cfm.

Continental Fan Manufacturing Inc.

MORE ONLINE: nedinfo.com/76473-44



Dry Run Resistant Material for Pumps

dampens vibrations for tighter clearances

WR650, a next-generation PFA composite with superior dry run characteristics is a replacement for metallic wear parts in centrifugal pumps. Reinforced with a 3D carbon-fiber architecture, WR650 can sustain 2.5X higher dry wear conditions before showing degradation when compared to traditional PFA-based material.

Greene Tweed

MORE ONLINE: nedinfo.com/76473-47

Bags for Sensitive Electronics

keep components in new condition



VpCI-125 makes electronics packaging effortless by combining vapor-phase corrosion protection with ESD protection. Releasing vapor phase corrosion inhibitors, it forms a monomolecular protective layer on metal substrates within the package and does not interfere with the physical or chemical properties of electronic components.

Cortec Corporation

MORE ONLINE: nedinfo.com/76473-48

Digital DC Drive

removes the need for an encoder



The 153D-PB Digital Pot DC Drive comes in a standard NEMA 4X/IP67 enclosure with an integrated digital potentiometer. Speeds can be adjusted in increments as small as 0.1% and digital circuitry ensures repeatability with every use.

Dart Controls

MORE ONLINE: nedinfo.com/76473-49

Couplings for Constant Speed

eliminate radial vibration



Ensuring constant phase accuracy and speed, Schmidt Offset Couplings are available in sizes with a range of parallel misalignment capacity with shaft displacements of 0.156 to 17.29 in. and torque capacities from 55 to 459,000 in.-lb. Providing space savings, they eliminate radial vibration from one end of the offset coupling to the other end.

Zero-Max, Inc.

MORE ONLINE: nedinfo.com/76473-50

CAN WE DELIVER J1939 CAN-READY PANEL ALARMS?



The industry leader in audioalarm technology is now CAN-Ready! Use our audibles on your existing J1939 CAN network to emit LOUD alerts in a small panel-mount design.

- Optional manual volume control
- 10 discrete digital volume levels
- Many available tone-types/sounds
- Arbitrary address capable
- Tamper-proof front-mount design
- Corrosion-resistant sound diaphragm
- Manufactured in USA
- Waterproof design (IP 68 and NEMA 4X seal)



For more information,
1-888-Floyd-Bell
or
www.FloydBell.com



Floyd Bell Inc
SOUND SOLUTIONS

www.nedinfo.com/76473-308

One-Step Wire Stripper

removes up to 1-in. of insulation in a single motion



WS-822 Wire Stripper and Cutter features precision machined stripping holes to ensure clean insulation removal without nicking conductors. The stripping blades are made of high durability SK5 steel and easily strips 8-20 AWG solid wire and 8-22 AWG stranded wire, able to remove up to 1-in. of insulation in a one-step operation.

Jonard Tools

MORE ONLINE: nedinfo.com/76473-51

Small Connector Delivers High-Temp Performance

maintains high electrical conductivity



Combining a space-saving design with high heat resistance up to 125°C, the 2 mm pitch ZE05 Series connector maintains high electrical conductivity even in severe heat environments. A double spring, three-point contact design with minimal clearance ensures a consistent, highly reliable connection in high vibration conditions.

Hirose Electric Co., Ltd.

MORE ONLINE: nedinfo.com/76473-52

High-Resolution Digital Indicators

allow for three choices of data output



MarCator 1086R and 1087R digital indicators provide easy operation, a large display, powerful application features, and simple transmission of measurements with their wired or integrated wireless system. The indicators offer six different resolutions, ranging from 0.00001 to 0.0005 in. Standard features include a rotating display, a reference system that remembers the zero location for fast turn on and use, three-year battery life, IP42 protection, and MarConnect Data output controlled by MarCom software. MarCom software makes data acquisition simple; users can take a measurement and send data directly into Microsoft Excel or via a keyboard code into any Windows program.

Mahr Inc.

MORE ONLINE: nedinfo.com/76473-53

AI-Based Image Processing Camera

trains neural networks without AI expertise



IDS NXT ocean is an all-in-one solution that makes it particularly easy for users to get started with AI-based image processing. From camera hardware including a self-developed AI core to intuitive training software for creating individual artificial neural networks and support, everything comes from a single source. Users only need their application expertise and sample images to create a neural network. With the help of the IDS NXT lighthouse cloud software, even users without prior knowledge of artificial intelligence or camera programming can train an AI classifier with their own image data.

IDS Inc.

MORE ONLINE: nedinfo.com/76473-54

Videoscope for Remote Visual Inspection

has a depth view of 10 to 80 mm



Featuring one megapixel resolution and six models in three viewing styles—front, side, and dual front-side view—the TVSH-35 HD Series video borescopes are designed for on-site inspections or maintenance and repair on a wide range of transportation equipment. They feature a mechanized joystick that uses input to control the camera articulation and ensure smooth, accurate control of the 4-way articulating tip, with im-

mediate response to the joystick inputs. This allows the camera tip to be steered through narrow bores, channels, and complex curves.

Titan Tool Supply, Inc.

MORE ONLINE: nedinfo.com/76473-55

Extremely Fast Drill/Tapping Center

provides rigid tap speeds up to 6,000 rpm



With rapid traverse speeds up to 60 m/min in all axes and acceleration of 1.2 g, the Tongtai VTX series of drilling and tapping centers are fast, affordable solutions for high-precision, high-volume machining applications. The machines' compact footprint conserves shop floor space and a fixed column/moving table with Meehanite cast-iron frames and roller-type linear slideways provides rigidity and

fast, precise movement. A Mitsubishi M80A control is standard and is suitable for applications ranging from production to high-speed machining.

Absolute Machine Tools, Inc.

MORE ONLINE: nedinfo.com/76473-56

Capacitive Discharge Power Supplies

feature fully controllable dual pulse output



CD-A series of capacitive discharge power supplies feature dual pulse output control, internal pulse monitoring, optional polarity switching, and are automation capable. They are ideal for battery tab welding, interconnects, honeycomb tacking,

and fine wire to pad applications. The units offer consistent welding output for repeatable process results, with ultrafast rise time for conductive material welding.

Amada Miyachi America, Inc.

MORE ONLINE: nedinfo.com/76473-57

Take Care of Multiple Dumpsters with Mobile Compactor

reduces waste volume up to 80%



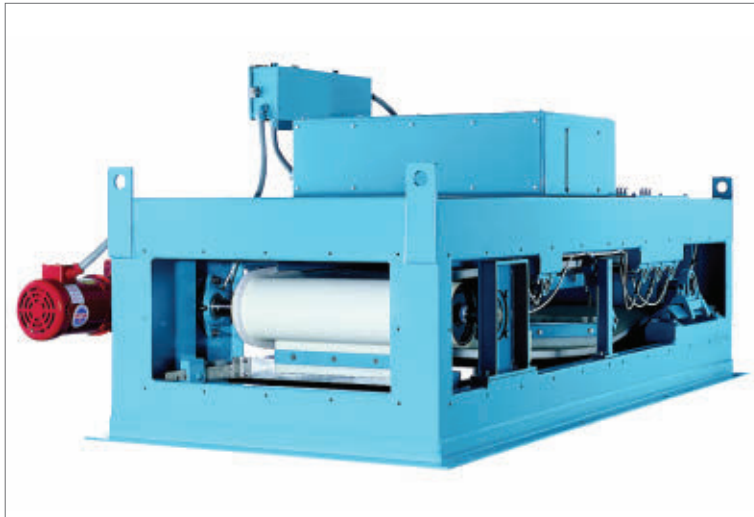
ROPAX Mobile Compactors employ a rolling drum with sharp metal teeth to crush, macerate, tear, rip, and compress waste in large open top containers/dumpsters. Its high compaction rate means containers need to be replaced/emptied less frequently, resulting in less downtime, improved worker productivity, and reduced waste hauling and disposal charges. The ROPAX Mobile is extremely maneuverable and is narrower than the containers it services, allowing it to operate in congested or confined spaces. For operator comfort and safety, the cab is fully enclosed with available climate control.

Epax Systems, Inc.

MORE ONLINE: nedinfo.com/76473-58

Weigher/Feeder for Closed-Loop Operations

accurately weighs or totalizes flow of dry materials



The Model 260(WF), operating as a weigher and/or totalizer, continuously weighs material passing across the belt while producing an output signal directly proportional to the weight of product flow. Belt speed is constant and the rate of flow is not controlled, only weighed, by the weigher's multiprocessor controller. The controller, which continuously monitors and totalizes the flow of material, displays the rate at which product is flowing, and produces a precise proportional-to-weight output signal that can be used for various process functions.

Acrison, Inc.

MORE ONLINE: nedinfo.com/76473-103

Customizable Inlet Traps

protect fluid from being contaminated



MV PosiTrap Vacuum Inlet Traps are made of stainless steel and come in 4 and 8-in. diameters for pumps up to 25 and 50 CFM, and are positively sealed at both ends to protect vacuum pump fluid from being contaminated

and to prevent oil back-streaming. Available with a variety of special-purpose filter elements for heavy particulates, volatile organics, acids, particulate water vapor, and more, these traps can be manufactured with various types of ports and flange sizes to OEM specifications.

Mass-Vac, Inc.

MORE ONLINE: nedinfo.com/76473-104

Pass-Through Parts Washer

provides continuous cleaning



The Renegade I-Series Model 2416 WRD Pass-Through Parts Washer delivers continuous cleaning of parts transported through wash, rinse, and dry stages via inline conveyor operation. The variable speed conveyor can be configured with acetal plastic, flat-wire belt, cart transport or plastic roller. The wash stage compartment contains spray manifolds with

strategically-placed nozzles to deliver high-pressure force and high-temperature cleaning. The dry stage compartment contains a powerful air blower to remove residual water from even hard to reach cavities.

Service Line, Inc.

MORE ONLINE: nedinfo.com/76473-105

Flood Barrier Protects Against Water Ingress

can be stacked or interlocked for larger areas



Marine-grade aluminum shields slip into the inside or outside of pre-installed brackets and tighten in place when needed to ensure an easily secured fit. The brackets and shields have closed-cell rubber seals on the sides and bottom of the shields for watertight compression. The shields are stackable for added height and feature interlocking posts to extend the width for large openings.

Legacy Manufacturing, LLC

MORE ONLINE: nedinfo.com/76473-106

Economical Drilling Unit

operates at pressures up to 110 psi



EconoMaster line of drilling units are ideal for multiple materials such as light metal, wood, composite, plastic, and foam. Features include low power and air consumption, an adjustable motor housing, an adjustable total stroke up to 4 in., a hydraulic feed control cylinder, a J33 taper spindle end, a 0-1/2-in. drill chuck, electric front and rear position limit switches, a belt tensioner, and a chrome-plated quill.

Suhner Industrial Products Corp.

MORE ONLINE: nedinfo.com/76473-107

One-Man Hole Digger

offers the power to dig holes up to 8 in. in diameter



Ideal for both contractors and homeowners, 242H one-man hole digger features a Power-GRIP operator handle for maximum control, strength, and balance, while dampening vibrations. It also reduces body fatigue to increase operator comfort, productivity, and jobsite safety. Able to dig holes up to 8 in. in diameter in a variety of ground conditions, the 242H includes a precise spur-gear transmission and all-metal centrifugal clutch to deliver long service life and high return on investment. It offers 1.3 HP with a maximum digging torque of 51 ft-lb.

General Equipment Company

MORE ONLINE: nedinfo.com/76473-108

Oil-Free Scroll Compressor
features a multiplex design for part-load efficiency



W-Series of oil-free scroll rotary air compressors generate Class 0 oil-free air quality and answers today's growing demands for whisper-quiet operation. Scroll compressors meet a broad spectrum of oil-free needs for commercial applications that require contamination-free air, low maintenance, and a smaller footprint. The scroll compressors have a simple tip seal design with no metal-to-metal contact eliminating metal friction and the need for lubrication while maintaining sealing performance and saving energy.

Ingersoll Rand
MORE ONLINE: nedinfo.com/76473-59

Medical Component Processing Machine
generates surface finishes as fine as Ra 0.05 µm



For medical component milling, the HSM 200U LP brings speed, efficiency, and precision to the machining of small, highly complex components. The HSM generates part surface finishes as fine as Ra 0.05 µm thanks to linear motor technology in its main machine axes and optimized direct-drive motors for the B and C axes. The machine's powerful 50,000 rpm, 11.4-hp Step-Tec spindle further contributes to precise part details and excellent surface finishes.

GF Machining Solutions
MORE ONLINE: nedinfo.com/76473-60

Hi-Vis Clamps Aid FOD Prevention
easily adjust to uneven surfaces



Typically used in a variety of clamping applications, the Kant-Twist's cantilever design and free-floating jaws offer several advantages over standard C-clamps by eliminating the typical distorting and twisting of work-pieces when clamping and easily adjusting to uneven surfaces. The bright orange and yellow models offer high visibility, making them easy to spot and difficult to leave behind. The Hi-Vis line is especially suited for use in FOD control areas, where forgotten tools can cause major equipment damage and hazardous conditions.

Industrial Magnetics, Inc.
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U LINE

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Heavy Gauge Straighteners

offer a bridge load of 1,200,000 lb.



Designed for processing steel up to 0.50-in. thick, heavy gauge straighteners are well suited for manufacturers of frames, wheels, and other heavy vehicle components. With a bridge load of 1,200,000 lb., these machines process coiled steel at widths up to 78 in. and thicknesses up to 0.50 in., while running at speeds up to 150 FPM.

Automatic Feed Company

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Long-Lasting Gearmotors

offers precise torque and speed control



Ideal for environments requiring maintenance-free operation and accurate control over a wide speed range, Brushless DC Gearmotors feature 12-48VDC motors with a wide power range of 50, 100, 200, and 400 W versions. Highly efficient with quiet helical and hypoid gearing, the motors are extremely configurable with several shaft configurations and custom options.

Brother Gearmotors

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Controlled Return Hose Reels

retracts hose at average walking speed



The REELSAFE Series RS7000, an expansion of the rugged design that set the industry standard, pays out like a traditional reel, though is specifically engineered to retract the hose at an average walking speed. The centrifugal clutch, integral to the reel base, greatly decelerates the hose retraction speed by up to 83% vs. a Series 7000 reel.

Reelcraft Industries

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At Southworth we believe in the competitive advantages gained through factory automation. We also realize that, for many reasons, not every enterprise is ready to fully automate yet. But that doesn't mean you can't take steps to improve your processes.

If you have employees manually loading and unloading pallets, we can show you how a small investment in a PalletPal[®] Level Loader can make the job faster, safer, and easier. These inexpensive devices position pallets at a comfortable height, eliminating the productivity robbing bending, reaching, and stretching required for manual loading and unloading. Most units have turntable tops to allow users to stay in one spot throughout the process.

With over a dozen models to choose from, there is sure to be a PalletPal Level Loader for your application.

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Compact Machining Center

is configured for entry level operators



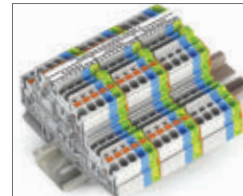
Palmgren's Vertical Machining Center is a 7 x 24.5-in. center that is ideal for production lines, short runs, one-offs, and prototyping. Designed to fit into small spaces, the machining center's rigid construction means improved accuracy and repeatability. The Siemens control, with its simple to use and easily intuitive interface, is configured for entry level operators.

Palmgren

MORE ONLINE: nedinfo.com/76473-65

Terminal Block Makes Wiring Tasks Simpler

reduces cabinet space by 50%



The TOPJOB S 2202 series introduces a double-deck push-button terminal block with 15-deg. vertical conductor entry. The dual row jumper slots feature a jumper retention spring to make wiring tasks simpler. This series uses WAGO's intuitive orange push-buttons ensuring operation integrity and also includes terminals for through, internally commoned and ground connection.

WAGO

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Phase System Protects Delicate Materials

safeguards particle size and shape



Pulse-Line PTA PL pneumatic conveying system automatically forms dry, bulk materials into separate, pulsed slugs for highly gentle transfer at low gas velocities. Integrating self-regulating activator groups, the Pulse-Line conveys pressure-sensitive granulates, sprayed granules, plastic pellets, non-compressible powders, and other fragile materials up to 1,500 ft in mass flow while maintaining the proper length of the pulsed slugs and safeguarding the particle size and shape.

Gericke USA, Inc.

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Aggressive Environment Enclosures

have a temperature limit from -40 to +125 °C



W-TYPE series industrial enclosures for aggressive environments are specially designed for industrial applications operating in where corrosive external agents are present such as saltwater sprays. According to UNI EN ISO 9227, the RoHS 2 compliant chromate conversion coating used on the enclosures has improved 50% more corrosion resistance against the salt spray than the previous version. On the top of the coating, RAL 9005 jet black thermosetting epoxy powder coating is applied to provide more resistance against corrosive chemicals than standard enclosure series.

Mencom Corporation

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Flexible Battery-Powered Dispensers

feature a trigger lock that prevents accidental material discharge

COX ElectraFlow dispensers with Bosch Professional 18V battery-power provide precision dispensing in a wide range of adhesive and sealant applications. The ElectraFlow Dual Ultra is ideal for dispensing two-component adhesives in a 1:1 ratio, while ElectraFlow Plus provides an advanced tool for operations that require one-component cartridges. Both products feature cordless technology offering extended runtime and service life as well as convenience for users on-site.

Sulzer Mixpac

MORE ONLINE: nedinfo.com/76473-69

Double Clamshell Continuous Processor

provides 360-deg. access for easy cleaning



Continuous Processors feature an optional, double clamshell barrel design that allows 360-deg. access to the entire paddle and screw assembly to promote thorough cleaning,

confident visual inspection, and easy adjustments to the configuration. Eliminating the need for cumbersome cranes and hoists often used to raise the barrel, the double clamshell design enables the barrel top, bottom or both, to be easily opened at the push of a button.

Readco Kurimoto, LLC

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Multi-Parameter Mass Flow Controller

stores up to 20 custom gas mixes

DPC differential pressure/mass flow controllers are now available with maximum flow ranges up to 1,000 L/min of gases. The controllers simultaneously display Mass Flow, Volumetric Flow, Pressure, and Temperature. Multi-Gas functionality support provides for 90 different gases and gas mixes. The User Defined Mixture feature allows users to create and store up to 20 custom gas mixes with up to 5 different gases each.

Aalborg Instruments

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Rugged and Simplified Telehandler

achieves a maximum load capacity of 12,000 lb. Traverse T1246X telehandler has a lift height of 46 ft, 6 in., which exactly matches its landing height. The traversing boom provides up to 70 in. of horizontal boom transfer, allowing for a maximum forward reach of 35 ft, 10 in. Built for use on rough terrain, the unit offers full-time 4-wheel-drive with limited-slip front axle differential.

Pettibone/Traverse Lift, LLC

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Respirator Cleaning Wipes

will not harm sensitive rubber masks



Respirator Cleaning Wipes Pocket Paks include 20 large 5 x 8-in. wipes that contain 70% Isopropyl Alcohol and are for use on rubber respirator masks and other personal safety equipment.

Alcohol Free Pads contain Benzalkonium Chloride and will not harm even the most sensitive rubber masks. Both wipes come in packs of 20 that can be conveniently stored in your pocket for individual use or in your locker.

Allegro Industries

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5-Axis Bridge-Type Machining Center

reduces the need for multiple set-ups



Loaded with features for efficiently manufacturing complex parts, the MB 450U is able to perform full five-axis precision machining of challenging parts due to the FANUC 31i-MB5 control. The FANUC 31i-MB5 Simultaneous 5-Axis control has a

15-in. color display and includes a range of powerful standard features and offers collision detection with a 3D interference check and a Fast Package III with tool center point control.

Methods Machine Tools, Inc.

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Universal Device Positioning System

mounts to virtually any surface



The Universal Positioning System consists of a robust group of mounting components and shafting that lets users easily move, tilt, swivel, and lock devices in place. Designed for attaching cameras, tools, and other devices, there are 25+ standard components to select from which are easy to configure. The

positioner includes a base that can mount to virtually any surface and accepts 0.5, 0.75, and 1-in. shafts that fit stepped and straight-through couplings which can be inserted 90-deg. or parallel.

Stafford Manufacturing Corp.

MORE ONLINE: nedinfo.com/76473-75

Explosion-Proof Battery Charger

extends battery life with advanced algorithm



The BC-6964 Battery Charger is designed for hazardous location applications requiring Class I Div II equipment. The charger accepts 3-phase 60 Hz AC input and generates 24 VDC 50A nominal output and provides seamless transition from a voltage

source to current limit operation for optimum battery charging. It can be factory programmed to support multiple battery stack configurations, ranging from 12V@100A up to 72V@20A charging power.

Applied Power Systems, Inc.

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Pocket Oiler for Small Spaces

prevents rust and acts as a cleaning agent

Tufoil Lubit-8 Pockit Oiler is easy to use anywhere. The pocket oiler offers a hypodermic needle similar to the .25 fl. oz. Pen Oiler for those hard to reach applications. Applications include precision bearings, door locks and hinges, power tools, window hardware, squeaky chairs, and much more.

Fluoramics, Inc.

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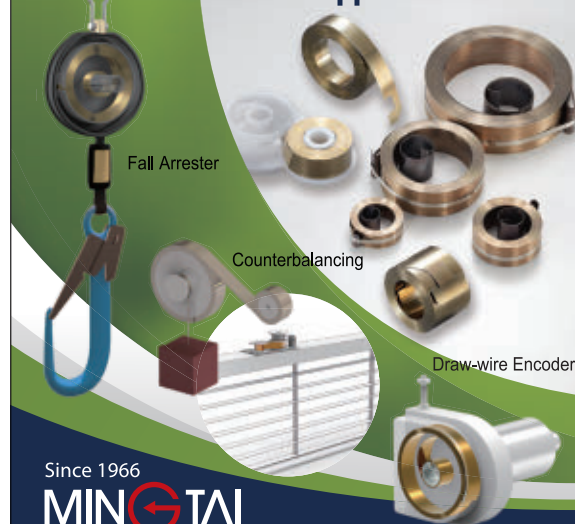
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FROM THE COVER

Exoskeleton Reduces Overhead Fatigue

can be worn comfortably for more than eight hours



Relieving strain on shoulder joints and upper arms, the Paexo Shoulder is a passive exoskeleton that supports people who carry out physically demanding tasks with their arms raised on a daily basis.

At just 3.9 lb., the exoskeleton is the lightest of its kind and can be worn comfortably for more than eight hours while providing noticeable relief for the shoulders and arms during overhead work.

Paexo Shoulder is worn close to the body, similar to a backpack. It transfers weight from the arms to the hips with the help of its supporting structures. Thanks to its biomechanical design, the exoskeleton offers users full freedom of movement at work: You can walk, sit, and pick up objects comfortably.

After a familiarization phase, it takes under 20 seconds to put on and take off the Paexo Shoulder. Thanks to quick and easy handling, the exoskeleton can be taken off between uses, for example when on breaks or when rotating workstations.

Ottobock SE & Co. KGaA

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Vertical Storage Cart

easily sorts multiple lengths of material



The A-frame kitting cart with dividers helps long and slender parts to be presented and stored vertically for the manufacturers to sort multiple length products for quick visual identification and retrieval. Three sets of pins keep the components separated for protection and easy selection by an associate.

Creform Corporation

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Water Absorbent Mat Pads

wick nearly one quart of water on contact
PIG Water Absorbent Mat Pads instantly soak up small pools and puddles of water caused by weather events, system breakdowns, spills, condensation, container overflows, and more. The mats pull in large volumes of water to help prevent equipment and structure damage as well as slip and fall injuries. Each high capacity mat pad is specially treated to instantly wick nearly one quart of water on contact. A tough, spunbond top layer holds the mat together so it won't rip or fall apart when picking up, handling or disposing of the mat—even when its fully saturated. Available as pads, in a dispenser box, or in a perforated roll, the mats can be wrung and reused during a single water spill clean-up and then disposed of.

New Pig Corporation

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Phthalate-Free Tubing

conforms to FDA standards

Handling a variety of chemicals, gases, and liquids, Clearflo 70 PVC tubing does not contain leachable phthalates such as DEHP (Di-2-ethylhexyl phthalate) or BPA (bisphenol A). It offers smooth surfaces for outstanding flow along with light-weight flexibility.

NewAge Industries, Inc.

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Flexible Magnetic Encoder

consistently checks measurement quality



The BML absolute magnetic encoder in the SGA series stands out in any application where high absolute accuracy of position and end-of-travel is required. Comprehensive diagnostic functions ensure reliable operation and more efficient maintenance. With

its Drive-Clq interface the Balluff measuring system can be perfectly integrated into Siemens controller environments. Since the system works magnetically, it is insensitive to temperature change, dirt or wear.

BALLUFF GmbH

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Dryer Removes Moisture and Contaminants

has removable front panel for easy maintenance



Providing easy installation and low maintenance, the High Temperature Refrigerated Dryer (HTRD) reduces water and harmful contaminants to extend tool and equipment life and improve product quality. Designed to remove water from your air lines, these dryers help extend tool life and eliminate flaws in paint or finishes. All HTRD models feature a precool/reheater, chiller, demister, and drain trap.

Kaeser Compressors, Inc.

MORE ONLINE: nedinfo.com/76473-83

Heavy-Duty Granulators

deliver extreme throughput capacity



SMS Series granulators are heavy-duty knife granulators for high throughput capacities. Eight models are available with throughputs from 440 to 17,600 lb/hr. A removable deflection wedge introduces

a third bed knife that improves the granulator's ability to efficiently process heavy lumps, thick-walled pipes, thick sheets, and other dense items.

Herbold Meckesheim USA

MORE ONLINE: nedinfo.com/76473-84



Compact 5G Test Solution

The compact CMPQ, a fully integrated 5G production test solution, is based on a radio communication tester and a shielding solution, providing accurate and reliable measurement results under radiated conditions. Designed especially for 5G NR non-signaling tests in FR2, the customizable CMPQ can be used at any time in the product life cycle. The tester combines vector signal analyzer and ARB generator functionality to generate and analyze IF frequencies from 6 to 20 GHz directly at the output. The solution consists of the CMP200 radio communication tester, the CMPHEAD30 remote radio heads, and the CMQ200 shielding cube.

Rohde & Schwarz USA, Inc.

MORE ONLINE: nedinfo.com/76473-85

Rugged Mobile Computer



MEMOR 10 is part of a family of rugged Android PDA that offer a slim and compact design while delivering the latest 2D bar code imaging technology for high-performance scanning. MEMOR 10 combines the durability and the performance of a traditional rugged enterprise device with the styling of a smartphone and adds the user-friendly experience of Android 8.1 (Oreo) with Google Mobile Services (GMS). MEMOR 10 delivers state of the art Wi-Fi and the latest LTE advanced communications, making it a solid choice for the most popular scanning-enabled applications in Retail, Healthcare, Transportation & Logistics, and Manufacturing.

Datalogic USA, Inc.

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Hazardous 2-Way Radio

The F3201DEX series operates in both analog and IDAS digital modes and can be used with any existing analog two-way radio. The lone worker function detects when the radio is not operated for a preset period and a beep sounds requiring the user to push a button. If no button is pushed within the preset time, an emergency signal automatically transmits and alerts co-workers or dispatcher. The man down function sends an emergency signal if left in a horizontal position.

Icom America Inc.

MORE ONLINE: nedinfo.com/76473-87

Safe Intercom Communication



Tufftalk is an earmuff Bluetooth communication and intercom headset designed specifically to meet the communication and connectivity needs of industrial applications. It sports a 1.4 km working Bluetooth range and offers up to 15 hours of uninterrupted intercom communication between up to four headsets. The earmuffs protect users from harmful noise with an audio attenuation of 24dB. The ambient mode allows users to amplify external sounds, generating greater awareness of surroundings.

Lemos International Co. Inc.

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Intelligibly Clear Loudspeaker

Designed with the latest technology in line array speaker systems, the HyperSpike LineWave loudspeaker is optimized to deliver intelligible alerts for reverberant spaces. The speaker is ready to be installed in indoor or outdoor applications and can be configured to operate in 70V distributed audio or 16/8/4 Ohm direct drive applications.

USSi

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The Quantum XTW is a versatile paper void fill system created for high volume operations, yet is compact enough to support decentralized pack stations. Its magazine holds up to 6 bundles of fanfold paper, creating over 14 cubic meters of consistent void-fill packaging, so packers can spend their time packing. The Quantum XTW loads in seconds, ready to dispense high volumes of sustainable paper void fill. Perfect to fill gaps inside-the-box and reduce dimensional weight for shipping.

Pregis LLC

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Meat Industry Flow Wrapper

ULMA FS-400 flow wrapper produces cost-effective packaging for raw food products that often vary in both size and shape. It offers customers a flexible approach to modernizing their packaging operations, including an optional dual-film capability for stretch shrink film and barrier shrink film.

Harpak-ULMA

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Semi-Automatic Wraparound Labeler



A fully FDA-compliant labeler in a compact footprint, the HERMA 211 HC wrap-around labeler is great for smaller-batch manufacturing. Capable of applying approximately 30 labels per

minute, the labeler can handle webs as wide as 80 mm, and products ranging in diameter from 10 to 120 mm. The machine's construction makes it suited to continuous operation, even under the most stringent labeling requirements.

HERMA US Inc.

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Wraparound Case Packer

Elematic 2001 is a high-speed case packer with a small footprint and more flexibility. The format range is versatile and covers the cases from simple one-piece wraparound cases to shelf-ready two-piece cases.

Bosch Packaging Technology

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Tabletop Marking Unit



FlyMarker mini STATION is an all-in-one unit that features a capacitive touch-screen for ease of programming directly on the unit. Its large marking window and adjustable force settings deliver permanent dot peen marks on materials ranging from plastics to

hardened steel. The unit automatically adjusts to round or uneven surfaces by up to 5 mm height differential. A wide variety of part heights can be accommodated through the STATION's "rocker arm" handle design.

Rocklin Manufacturing Co.

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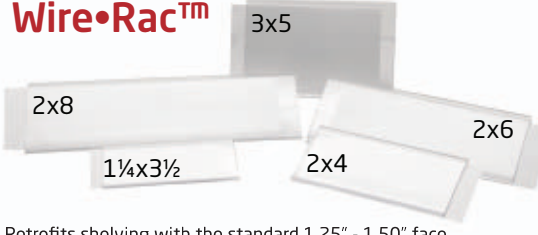
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Mini Angle Sanding Kits



Norton Mini Angle Sanders are small and compact, designed to get into hard-to-reach areas, and powerful enough to finish jobs fast and efficiently. The sanders feature a double-bearing spindle, reducing vibrations and resulting in longer use and finer finishes. A speed regulator gives users exceptional control over power and precision and an ergonomic and streamlined non-slip grip offers better tool handling as well as reduced operator fatigue.

Saint-Gobain Abrasives

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Dual-Trigger Bandsaw

Cutting faster than its corded counterparts, the M18 FUEL Deep Cut Dual-Trigger Band Saw is optimized for the trades and has the largest cut-capacity on the market—keeping users safe without slowing them down.

Milwaukee Tool

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Wall-to-Wall Drain Cleaning

Designed to clean 3 to 6-in. diameter drain lines up to 125 ft, the K9-306 clears blockages with astonishing speed, while the ability to inspect with a camera simultaneously maximizes efficiency and lets you complete two jobs at once.

RIDGID

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Underwater Hydraulic Tool

A versatile, multi-function, hand-held tool, the BHT-2000 Brocoda Hydraulic Tool, can be used for grinding, polishing, cutting, drilling, and cleaning. It is designed for use both underwater and topside.

Broco Rankin

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Variable Speed Reciprocating Saw

Featuring 3,600 strokes per minute and a 19 mm stroke length for fast cutting applications, the 18V Reciprocating Saw provides a robust bladeclamp for demolition applications. Compatible with AEG PROLITHIUMION technology, it features overload protection for maximum durability.

AEG

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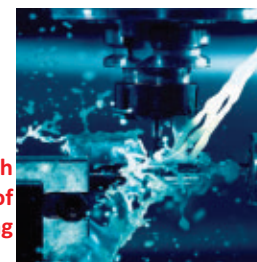
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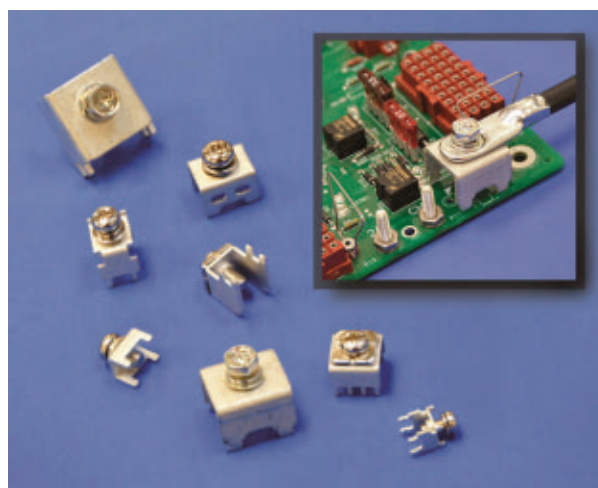
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Modeling & Software
3D Scanners14

ADHESIVES & FASTENING

Adhesives/Sealants/
Lubricants
Adhesives.....57
Dispensers/Applicators.....50
Finishes/Coatings10
Lubricants.....51, BC

Assembly / Fastening

Clamps.....48
Fasteners.....2
Hardware.....36, 37
Joining.....36, 37, 45
Trims & Seals.....50
Washers.....51

AUTOMATION

Automation Systems
Packaging6

Robots

Mobile8, 9
Palletizers12

Sensors

Alarms45
Detectors3
Sensors.....14, 59

CONTROLS & INSTRUMENTATION

Actuators40, 41
Controllers..IFC, 18, 19, 42, 43
Data Acquisition.....7
Indicators46
Inspection Equipment.....46
Measurement Equipment...14
Meters3, 56
Regulators22, 23
Scales.....13
Test Equipment.....3, 14, 56

ELECTRICAL & ELECTRONICS

Electrical
Battery Chargers.....51
Enclosures50
Laser Equipment57
Meters3
Reels49
Wiring.....45

Electronics

Connectors45, 49, 57

FACILITY/ OPERATIONS

Facility Maintenance
Air Handling & Cleaning.....56

Cleaning & Maintenance.....3, 46, 56
Construction
Equipment.....14, 47, 51
Flooring.....3
Sanitary Supplies51
Vehicles.....14, 46, 51
Workstations51

HVAC

Other.....2

Lighting

Fixtures.....5
Flashlights3, 24, 25
LED.....24, 25

HYDRAULICS & PNEUMATICS

Actuators40, 41
Fittings.....36, 37
Nozzles30, 31
Rotary Devices.....44
Trims & Seals.....50
Valves.....44

LITERATURE

Catalogs5

MACHINE TOOLS & METAL WORKING

Machine Tools & Equipment
CNC46, 48, 49, 50
Drills47
Finishing Equipment.....10
Grinding Equipment.....10, 55

Metal Working

Welding Equipment.....14, 46

MATERIAL HANDLING & PACKAGING

Barcode / Labeling
Camera / Vision
Systems46
Labeling.....28, 29, 54
Printers.....29

Conveyors

Belt1, 26, 27
Chain Driven.....12
Components.....1, 26, 27
Pneumatic.....44

Lift Trucks

Casters
& Wheels.....7, 13, 32, 33
Excavators14
Pallet Trucks.....5, 12, 13
Scissor Lifts1, 55
Towers38, 39

Lifting / Positioning Equipment

Chains & Fittings56

Cranes.....1, 13, 51
Grabs.....56
Lift Tables1, 49, 51, 55

Packaging

Bagging45
Case Packers54
Filling54
Labeling.....28, 29, 54
Marking54
Pallets12, 13
Printers.....29
Shipping54
Weighing13, 47

Storage

Automated Storage/Retrieval
Bins & Baskets48
Carts.....48, 52, 53
Racks.....48

MATERIALS & CHEMICALS

Abrasives
Abrasive Locking Discs.....1

Other

Composites.....44
Fabricated Materials.....3

Removers & Solvents

Rust Removers4

Inhibitors

Corrosion Inhibitors.....4

MOTION CONTROL

Bearings5
Belts1, 20, 21
Controllers14
Drives.....18, 19, 45
Motors18, 19, 49
Shock & Vibration
Control.....16, 17
Trims & Seals.....50

PROCESS EQUIPMENT

Air Compressors.....34, 35, 48, 52
Alarms45
Pressure &
Temp Indicators.....22, 23
Process
Controllers.....IFC, 42, 43
Process
Equipment.....44, 47, 50, 52
Pumps.....58
Valves.....22, 23, 44
Spraying Equipment.....30, 31

SAFETY

Electrical
Test Equipment.....5, 14

Emergency Response

Emergency
Communications7, 53
Spill Control.....52

Ergonomics

Exoskeleton.....52
Lifting Devices3
Tools.....51
Workstations51

Fall Protection

Guard Rail Systems.....4
Safety Barriers.....4, 47, 57

Fire Protection

Detectors & Alarms.....3

Hand & Arm Protection

Gloves3

Machine & Tool

Light Curtains42

Signs & Warning Devices

Lockout/Tagout.....56

SOFTWARE & COMPUTERS

Computer Peripherals
& Accessories
Displays3, 4

Software

Application Development
& Deployment4
Internet of Things14
Training.....44

Mobile Devices

Apps2
Communication
Equipment.....53
Radios53
Smartphones2, 53
Tablets2
Wearables52

TOOLS

Cutting Tools

Saw Blades.....44
Saws55

Hand Tools

Wrenches56

Power Tools

Electric Tools.....55
Pneumatic Tools.....5, 55
Safety Tools.....1

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AD INDEX

EPSON LABELWORKS.....	28-29
EXAIR CORPORATION	30-31
FLOYD BELL INC.....	45
HAMACO INDUSTRIES CORP.....	55
HAMILTON CASTER & MFG CO.....	32-33
HI-TEC EQUIPMENT CO.....	57
IMADA	56
KAESER COMPRESSORS INC.	34-35
KANO LABORATORIES INC.	4
LUBRIPLATE LUBRICANTS CO.	BC
M&T 2020 SHOW	IBC
MAGNATAG PRODUCTS	51
MAIN MFG PRODUCTS.....	36-37
MASTER BOND INC.	57
MING TAI INDUSTRIAL CO. LTD	51
NORTHERN SAFETY CO.....	1
NORTON/SAINT-GOBAIN ABRASIVES	10-11
NU STAR INCORPORATED.....	38-39
PATLITE (USA) CORP.....	7
PFLOW INDUSTRIES INC.....	5
PRESTO ECOA LIFTS	3
RACO INTERNATIONAL, L.P.	40-41
ROYAL PRODUCTS	56
SCHMERSAL INC.....	42-43
SOUTHWORTH PRODUCTS CORP.....	49
TOYOTA MATERIAL HANDLING, USA, INC.	12-13
TRIM-LOK INC.	50
ULINE	48
VI-CAS MANUFACTURING	56

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FROM THE COVER

Autonomous Sensors Do it All

combine a sensor and data processor into one unit



Combining contactless, high-resolution vibration sensor technology with built-in data processing and wireless communications, **Autonomous Sensors** offer low-cost and fast deployment of a wide range of monitoring applications for IIoT environments, providing manufacturers with crucial operational and technical insights.

The laser sensors measure 3D, motion, and vibrations of any surface to enable industrial manufacturers to monitor the real-time health and performance of engines, turbines, pumps, and more. Their compact and contactless form enables the sensors to work on hot, wet, and moving surfaces, and they even continue to analyze mechanical health through glass.

The sensors also include built-in real-time data processing and decentralized data logic powered by Ucontrol's uPC platform, offering a standalone solution for edge processing and data analytics. The system can connect to a computer in the manufacturer's production line or to an internal or external cloud.

VocalZoom

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Metal Shrinker + Stretcher Combo

switches operations without having to change tooling



Commonly used in autobody work, shrinker/stretchers make curves in sheet metal by compressing/shrinking or expanding/stretching your workpiece. With one dedicated shrinker and one dedicated stretcher, users can mount both tools to a workbench and switch between operations without having to change out dies.

Grizzly Industrial

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FROM THE EDITOR

Innovation is KING

I've said it before and I'll say it again: Innovation is the lifeblood of NED. It is why we exist and it's why we've continued to exist for over 80 years now—because manufacturing keeps progressing, because demands keep increasing, because technologies and materials and capabilities keep evolving. Regardless of the circumstances or the economic peaks and valleys or the perpetual crises we face, the engineers and workers behind the industry keep improving and keep innovating.



Over the years, NED has become the showcase for the outcome of this work—from the incremental innovations that move us a step ahead to the disruptive breakthroughs that vault the industry miles forward, our job is to capture and publish each piece of this momentum so you can put them to work.

This perspective on the industry is critical, particularly now. News today is full of dire predictions—the skills gap will widen, plants will shutter, manufacturing will decline. And, lately, that these global flu fears will strike their heaviest blow to manufacturing and the international supply chains that holds it together.

All of these are valid concerns, all of them real threats to the industry and in need of real solutions. But I'm not worried.

If nothing else, seeing this magazine come to life every month and seeing all of these new products and implementations and R&D highlights go online every day has taught me the firm resilience of this industry. For every problem we face, there are gangs of experts across the world competing to find a solution. It is a one-way march that has never let up—manufacturing will always succeed because manufacturers always innovate.

It's not always a smooth ride, sure, but the direction is always secure.

In this sense, I am particularly proud to publish this issue today. In a world of uncertainty and worry, we've collected a massive book here, telling the story of 14 powerful manufacturing leaders whose certainty and innovative progress provide a clear light to lead us through. And around these, we've highlighted 108 new products that showcase progress on everything from bolts and spill containment to mobile robots and IoT wizardry.

It's the kind of issue that helps me sleep better at night with faith restored that innovation, above all else, will carry us through. I hope it provides the same comfort to you.

Stay healthy out there.

T.

Travis Hessman
Editor-in-Chief

When in Doubt, DON'T THROW IT OUT

Take a look at the four factors responsible for the retrofit trend.

By Richard Beeson

What do you do if you need to upgrade your operations, but it might place a huge dent in the budget? In 2008, ArcelorMittal found itself faced with this exact situation.

The mining and metals conglomerate launched an ambitious plan to upgrade a 1940s era iron ore complex in Nova Scotia by increasing annual production from 16 million tons to 26 to 30 million tons. Soon after, iron prices skyrocketed, which placed massive pressure on budgets. To top it off, the company realized the port couldn't be easily retrofitted to fit newer, larger ships: it was dug directly out of bedrock.

Instead of letting this stop them, ArcelorMittal moved forward with what you could call "Extreme Makeover: The Industrial Edition" focusing on ways to increase production rather than concentrate on new capital investments or construction projects. They did this by synchronizing mining, grinding, and logistics activities to see if it could squeeze more efficient production out of existing operations.

By 2015, the Mines Canada facility was producing 10 million more tons a year, the equivalent of \$120 million in annual revenue. In one year alone, production increased from 23 to 26 million tons by fine-tuning process steps—accomplishing that same 13 increase through capital could have cost up to \$75 million, according to Michel Plorde, Director of Systems.

ArcelorMittal isn't the only industrial company with a story like this one. Paper manufacturers like Verso and Fortress are modifying paper mills from the 1960s and turning them into facilities for specialized packaging and materials. Pasta makers, chemical reactors and other pieces of equipment (that are likely older than the median age of people reading this article) are getting solid-state drives and WiFi modules grafted onto their side.

There are four factors largely responsible for the retrofit trend:

1

Moore's Law and its economic impact are still alive and well. Processors, sensors, and other hardware continue to dramatically, steadily decline in price while increasing in performance. This has paved the way for better uptime and predictive maintenance. The pitch bearing—a set of bearing that angle wind turbine blades to maximize output—is often the cause of failures and shutdowns. Without the ability to detect cues, just waiting until it fails can lead to repair costs of \$150,000 or more. Monitoring ongoing performance and predicting failures, Semptra Energy estimates costs associated with downtime and repairs by 90%. Orsted uses similar techniques to halve the number of boat trips necessary to service its offshore wind turbines, saving 20 million Euros a year.

2

(and the most important)

Retrofitting equipment can save customers money and simultaneously serve as a revenue driver for manufacturers to use new technologies that attach aftermarket value-added services to new or previously-existing equipment.

For example, Caterpillar's CAT Connect services save one shipping company \$1.5 million per ship each year by sending data on fuel consumption and recommendations on operational improvements. Customers save money while Caterpillar and its dealers increase their revenue.



3

The financial sector has more power than it had years ago. Nobody wants to invest money in new capital unless they have to. Retrofitting old equipment with software delivers more rapid ROI than new equipment does.

4

It's simple—old equipment still works well! The average age of a transformer on the U.S. electrical grid is now 40+ years old. Tens of thousands of transformers are scattered across the U.S., ranging from \$2 to \$7 million. It'd be difficult to find any piece of equipment inside a data center that is 40 years old, let alone a full data center that old.

Itaipu operates the world's largest renewable power facility in the world, with a hydroelectric dam that produced 103 terawatts in 2016—and is several decades old. To prolong its life, Itaipu invested in sensor systems that detect potential mechanical and structural issues early in their lifecycle, as well as systems for improving output.

We're seeing interesting results on smaller scales too. J.D. Irving didn't want to replace a saw that cut 60-ft-long spools of paper into 6-in. rolls of toilet paper, but it also wanted to begin collecting data from the 1970s era system. With a wireless gateway and other technology, it developed a relatively quick, and inexpensive, bypass.

Not every situation requires, or makes sense to, retrofit equipment. There is a solid percentage gain in energy efficiency in homes and buildings over the past decade have come because new equipment is substantially better. Although turning old into new doesn't solve every problem, it's often the best place to start.

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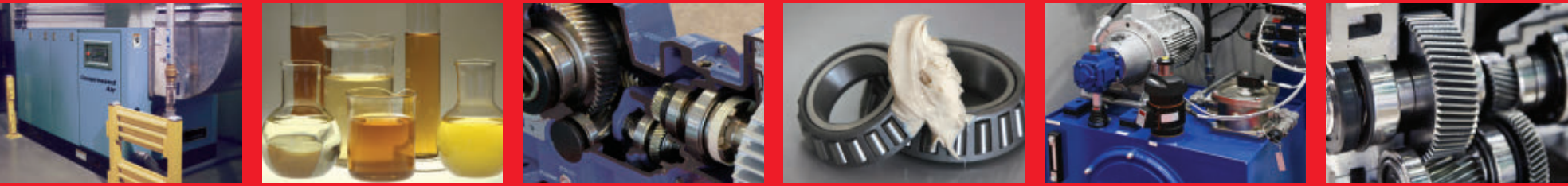
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