Your guide to practical products, technologies and applications

Automation
NOTEBOOK ™

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Issue 14

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What Motor Users Need to Know

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For those who prefer to speak with us in person, please call 1-800-633-0405 x1845. Thanks for your interest, and we look forward to hearing from you.

Editor's Note

They say, "Time flies when you're having fun." That could not be truer than now for us at AutomationDirect. So far this year, we have added almost 1,000 new parts to our product offering. We've even added space to our warehouse to help accommodate our latest product addition, NITRA pneumatics components.

As we move into the summer season, our product managers are evaluating extensions to current product lines, as well as new products to add to our lineup. We continually look for ways to remain your one stop industrial control product provider. As you know, we are not just an online superstore. We also provide free award-winning technical support from our offices in Cumming, Georgia, tutorial videos at: **learn.automationdirect.com**, informative product seminars at: **automationtalk.com**, and Automation NOTEBOOK.

In this issue, we have information regarding several new products and product line extensions. We also have user solutions articles describing how others use our products. You'll find tons of information packed in these pages. Of course, you'll enjoy the Break Room section.

Now, turn the page, sit back, and enjoy…

TJ Johns
Coordinating Editor
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New Product Focus

what's new

AutomationDirect Adds Pneumatic Tubing & Fittings

Prices for nylon tubing start at $10 for 100 feet.

A variety of NITRA push-to-connect fittings are also available, including straight, elbow, tee and wye styles. Fitting bodies are made of a strong thermoplastic with stainless steel gripping claws, and are designed to withstand working pressures of -29.5" Hg to 150 psi and a working temperature range of 32° to 140°F. Threaded components are made of nickel-plated brass and have pre-applied Teflon thread sealant. The bodies of threaded elbow and tee fittings can be rotated after installation, allowing for variations in piping direction. Prices for fittings start at $4.00 for a five-pack.

NITRA pneumatic push-to-connect flow control valves are designed to provide accurate airflow regulation for precise motion control of pneumatic cylinders. The flow control bodies are made of strong thermoplastic and have stainless steel tube gripping claws and are available in meter-in, meter-out, and in-line configurations. Prices for NITRA flow control valves start at $7.75 for a two-pack.

The complete line of NITRA pneumatic tubing and connectors can be seen by visiting:
www.automationdirect.com/ pneumatic-parts

A utomationDirect now offers NITRA™ pneumatic tubing and fittings for use in compressed air applications.

NITRA tubing is available in polyurethane and nylon styles, in inch and metric sizes from 5/32 inch or4mm up to1/2 inch or 12mm; tubing is available in 100 and 500-foot packages. Polyurethane tubing is available in black, blue and clear, and has a hardness specification of Shore A 98. The tubing offers superior kink resistance and is strong and flexible. Its tight outside diameter tolerance makes is ideal for use with NITRA push-to-connect fittings. Prices for polyurethane tubing start at $10.25 for 100 feet.

NITRA Nylon 12 tubing carries a hardness specification of Shore D 70. Nylon tubing is designed for applications requiring higher working pressures and better heat/chemical resistance. Available in black, blue and natural, this strong, yet lightweight tubing has a low moisture absorption rate so it will remain flexible with a longer life than other nylon tubing.

"There was a time when we expected nothing of our children but obedience, as opposed to the present, when we expect everything of them but obedience."
– Anatole Broyard

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TUBING starting at **$10.00 u.s.** 100 ft. package Nylon

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NYLON and POLYURETHANE TUBING

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- Made in USA

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- Three colors - black, blue and natural
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- High working pressure and temperature
- Chemical resistant

Polyurethane
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- Shore A 98 hardness
- Strong, flexible and kink resistant

AutomationDirect now offers a wide line of pneumatic tubing and fittings

FITTINGS starting at **$4.00 u.s.** for 5-pack

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CHECK OUT OUR PRICES

Pneumatics	AutomationDirect NITRA	VS.	McMaster-Carr	Grainger	MSC
Union Tee fitting, 1/4" OD tube	$1.60 [1] UT14		$4.16 [2] 5111K51	$2.59 [4] M20600400	
90-degree elbow, 1/4" OD x 1/8" NPT	$1.20 [1] ME14-18N		$2.73 [2] 5111K21	$1.79 [4] M24470418	
Polyurethane tubing, 6mm OD, black, 100 ft.	$18.50 PU6MBLK100		$25.00 [3] 50315K242	---	$50.16 HUM-6-BLK-0100-P
Nylon tubing, 1/4" OD, black, 100 ft.	$16.75 N14BLK100		$43.00 [3] 5097T411	---	$66.66 NB-4-035-0100-P

1) Sold in 5-pack, price shown is per each   2) Price per each, up to 9   3) Sold by foot, price shown for 100 feet   4) Sold in 10-pack, price shown is per each

All prices are U.S. published prices. Many other part numbers are available from all vendors. Automationdirect prices are April 2009 prices. McMaster-Carr prices are from www.mcmaster.com 4/21/2009. Grainger prices are from www.grainger.com 4/20/2009. MSC prices are from www.mscdirect.com 4/20/2009. Prices subject to change without notice.

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Remote Access feature added to C-*more*™operator interface

A new remote access and control feature has been added to the **C-*more*** operator touch panel line, allowing authorized users to connect a PC to the **C-*more*** panel from anywhere via an Internet Web browser. The feature resides in the panel and requires no option modules. Since applications can be downloaded from the **C-*more*** panel through a PC's Web browser, authorized users can access and control the panel remotely without purchasing or downloading additional software packages.

The remote access feature contains multilevel logon security allowing up to three user accounts. Each account can be configured in one of three password-protected access levels: View Only, View and allow Screen Change only, and Full Control. Each account is tag supported, giving the local operator the ability to enable or disable remote access accounts if required. Once accounts are created, authorized users can remotely control and monitor real-time screen operations, and troubleshoot and test **C-*more*** project applications. Users can also view, zoom, print and save screen captures of active screens.

The new feature can be used on any **C-*more*** panel equipped with an Ethernet port and firmware version 2.4 or later. **C-*more*** programming software version 2.4 or later is also required.

For complete details on **C-*more's*** remote access and control feature, visit **http://c-more.automationdirect.com**

Cable ties and tools added to Wire Management offering

A complete family of cable ties, mounts and installation tools has been added to our product line. Standard cable ties, available in white and black, are resistant to oils, grease, solvents and petroleum products and are available in lengths ranging from 4 to 32 inches. Black nylon lashing ties, in 9 to 40-inch lengths, are also resistant to oils, grease, solvents and petroleum products. Releasable ties, with an easy-release tab for removing, repositioning or reuse, are available in 6 to 12-inch lengths. Mounting head ties, in 4 to 12-inch lengths, feature a one-piece mounting head and cable tie, eliminating separate mounting accessories. UV-resistant ties are designed for outdoor installations requiring high tensile strength and high locking system resistance. These ties are resistant to oils, grease, atmospheric agents and salt and are available in 7 to 14-inch lengths. All ties are sold in 100-piece packages; 1,000-piece packs are available for the most popular styles. Identification cable ties are available in one, two, or three-leg options, from 4 to 12 inches long. Adhesive and screw-mount cable tie mounts as well as cable tie installation tools are also available.

To view the full line of cable tie products, visit:
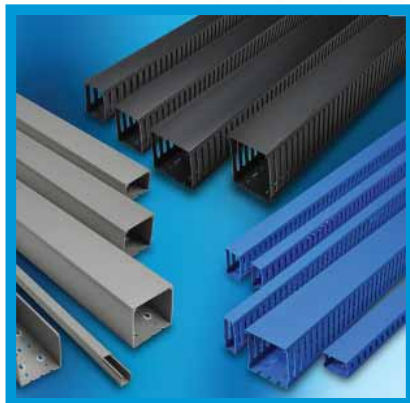**www.automationdirect.com/cable-ties**

Photoelectric sensor line expands

AutomationDirect has added several models to its 18mm photoelectric sensor line. The NPN and PNP diffuse sensors offered feature one normally-open and one normally-closed output and have a sensing range up to 600mm. Also added are through-beam emitter and receivers in up to six-meter sensing ranges. The photoelectric sensors are available in axial and right angle optics, and offer embedded or quick-disconnect cable exits. Prices start at $33. See the full line of photoelectric sensors at **www.automationdirect.com/photoelectric**

Solid and colored wire duct now available

The T1 series slotted wire duct line now includes black and blue for specialized wiring identification. Blue wiring duct is typically used to indicate the wiring to intrinsically safe components in a control panel. Black wire duct is typically used for network cabling systems, fiber cable racks, patch panels and telecommunication closets. T1 series wire duct, in 2-meter lengths, comes with a non-slip flush cover. Also now available is solid wall (non-slotted) wire duct in sizes from 1/2 x 2/3 inch to 4 x 4 inch, all in 2-meter lengths. All wire

duct is available in multi-piece packages and single pieces. Learn more at **www.automationdirect.com/wire_duct**

ProSense™Temperature Sensors now available

The ProSense line of process sensors now includes temperature switches, temperature transmitters and RTD temperature probes. The TSD25 series switches offer dual output setpoints over an operating temperature range of -4 to 284°F. With 4-20mA analog outputs, the TTD25 series of transmitters provides a compact temperature monitoring system over temperature ranges from 0 to 100°C or 0 to 300°F. The four-wire, 100 ohm platinum RTD probes are made of durable 316 stainless steel and measure temperatures ranging from -40 to 302°F. The 10 mm diameter probes are available in lengths from 160 mm to 560 mm. Thermowells and fittings are also available. Temperature switches are $89.00, transmitters

$125.00, and RTD probes start at $29.00. Visit **www.automationdirect.com/temp-sensors**

The ProSense line of pressure sensors and switches has been extended to widen the sensing ranges available. The series now includes pressure switches with adjustable setpoints from 0 to 5,800 psi, as well as transmitters for vacuum and pressure with ranges from 0-15 to 0-3000 psi with output options of 4 to 20mA or 0 to 10 Volts. Transmitters with a measuring range of 0 to 100 inches of water column have also been added. ProSense pressure sensors start at $89. See the ProSense pressure line at **www.automationdirect.com/pressure-sensors**

New line of 22mm Pilot Device s

A full line of 22mm plastic pilot devices is now available. The devices, including pushbuttons, selector switches and joysticks, are made with fiberglass reinforced thermoplastic. Illuminated and non-illuminated pushbuttons are available in six colors and come with either one normally-open or one normally-closed contact block. Illuminated and non-illuminated selector switches are available in two and three-position as well as key operated versions. Joysticks come in either two-position or four-position versions. Two-position joysticks come with two normally open contacts while four-position models have four normally open contacts. All

22mm plastic pilot devices are UL listed, CSA certified, RoHS and CE compliant. Prices for a complete pilot device start at $4.75. See the plastic pilot devices at:
www.automationdirect.com/22mm-plastic

Encapsulated transformers added to Hammond control transformers line

AutomationDirect's line of Hammond control power transformers has expanded to include the HPS Fortress series of encapsulated commercial potted transformers. The single phase units are available in 0.50kVA up to 5kVA. All units are encapsulated with electrical grade silica sand and resin compounds to protect the core and coils by sealing out moisture and airborne contaminants and eliminates corrosion and deterioration. The NEMA 3R enclosure meets or exceeds NEMA and ANSI standards for indoor and outdoor applications, making them ideal for applications such as shopping centers, schools, sports complexes, office buildings and lighting. This series is UL and CSA listed as well as CE marked. The Fortress series encapsulated transformers are backed with a 10-year limited warranty. Prices start at $91.

The HPS Imperator line has been extended to include the MGJ and MLI series step-down control transformers. The 600V class, machine tool rated industrial units range from 50VA up to

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500 VA and are backed with a limited lifetime warranty. Prices for the new step-down transformers start at $31.

To see the full line of control power transformers, visit:
http://www.automationdirect.com/ power-transformers

IronHorse™line now includes Hollow Shaft Gearboxes

The IronHorse worm gearbox line now includes hollow shaft models in four frame sizes, and six gear ratios from 5:1 to 60:1. Constructed of cast iron one-piece housings, hollow shaft worm gearboxes feature a C-flange input. Designed to change drive direction by 90 degrees, hollow shaft gearboxes are used when space is at a premium, such as for conveyors, or to simplify mechanical design. IronHorse gearboxes are mountable in any direction, except motor pointing up. Prices start at $169; the full line, available for same-day shipping, is backed by a one-year warranty. See the full line of IronHorse gearboxes at:
www.automationdirect.com/ worm-gearboxes

New wire strippers and crimpers

AutomationDirect has added to its line of wire stripping and crimping tools. The new self-adjusting cut-and-strip tool features the widest stripping capacity of any tool of its type, cutting flexible wire up to 8AWG and solid wire up to 16 AWG. Easily interchangeable stripping cassettes, color coded by blade type, are available for stripping a wide range of most modern insulation types, from PVC to PTFE. Replacement blade and jaw inserts are available. The cut and strip tool is priced at $65.25.

A new cable stripping tool removes insulation from copper and fiber optic audiovisual, data transmission, instrumentation, signal, and telephone cables up to 11mm and insulation up to 1 mm. Its precise, nine-position blade height adjustment wheel provides for fine adjustability and repeatability. Replacement blades are also available. The cable stripping tool is priced at $20.25.

Also available is a professional ratchet crimp tool with interchangeable die sets for most types of mechanical, electrical and electronic connectors. Die sets can be changed easily without using any tools.

See the full line of AutomationDirect wire management tools at:
www.automationdirect.com/tools

More NEMA Premium Efficiency Motors

The Marathon line of motors now includes 1 to 10 HP Marathon NEMA premium efficiency XRI® inverter duty motors. These TEFC motors meet or exceed NEMA Premium efficiencies for optimized motor system efficiency, reduced electrical power consumption and improved system reliability. These motors join our Marathon Blue Chip XRI motors to offer a NEMA Premium solution for 1 to 100HP. When used on high cycle or long run time applications, NEMA Premium efficiency motors offer substantial energy savings. These inverter duty motors with rolled steel construction and C-face rigid base mounting, utilize ball bearings and are electrically reversible. They are UL recognized, CSA certified, and have a three year warranty. NEMA Premium Efficiency XRI motors start at $310. A wide variety of other Marathon AC variable speed inverter and vector duty motors ranging from ¼ hp to 100 hp is also available. See the full line of Marathon NEMA premium efficiency motors at:
www.automationdirect.com/ marathon-motors

SureStep Motion Control Line Expands

AutomationDirect has expanded the line of SureStep motion control products to include additional drives, motors and power supplies.

Two new Advanced Programmable SureStep Drives offer more functionali-

ty and higher current capability. Software-selectable resolution up to 51,200 steps per revolution provide smoother, more accurate motion and power capability up to 10A per phase. These new drives accept step and direction, CW/CCW pulse inputs, A/B quadrature inputs, 12 bit analog input (analog velocity mode); other features include a discrete speed command (oscillator mode), a joystick mode, and a built-in indexer. The built-in indexer can use serial communications to configure and execute motion profiles on the fly. The drives come with a serial cable for setup and programming and the SureStep Pro Software, also available as a free download. Programmable SureStep drives start at $199.

Stepping motors in standard NEMA sizes (17, 23, & 34) now include bi-polar models with output torques ranging from 61 oz-in. to 1291 oz-in. The motors feature a pigtail cable with locking connector for easy hook-up and 200 steps per revolution. The stepping motors are CE compliant and prices start at $17.

Three additional linear power supplies are now offered for SureStep drives and motors. These unregulated linear power supplies offer full load outputs of 32, 48 and 70 VDC and have a built-in 5V 0.5A output for logic supply with electronic overload protection. The power supplies feature screw terminal connections, Power-On LED indicators for motor supply and logic power, and have fast acting fuses on both input and output. The new unregulated power supplies start at $119.

See the complete line of SureStep motion products at:
**www.automationdirect.com/
stepper-systems**

Five reasons to try AutomationDirect

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Our prices are well below the list price of more traditional automation companies because, with our direct business model and focus on efficiency, AUTOMATIONDIRECT has the lowest overhead in the industry. We pass the savings on to you by offering high-quality products at low prices.

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Cover Story

NEMA Premium Efficiency Motors

New Standards in Motor Efficiency: What Motor Users Need to Know

By Kitt Butler,
Advanced Energy

New legislation, namely the Energy Independence and Security Act (EISA) of 2007, aims to increase production of renewable energy; increase efficiency of products, buildings and vehicles; and promote research and deployment of greenhouse gas capture and storage. The eventual goal is to move the United States toward greater autonomy in acquiring resources to meet its energy needs. The one page of the law that focuses on motor efficiency will significantly impact motor design and selection for machinery designers. Motors manufactured after December 19, 2010 must comply with the new rules defined in EISA, but that's an issue for OEMs. How will this legislation affect the end-user?

First, let's understand the new regulations, which will result in a significant jump in motor efficiency. For instance, a 5.0 hp, 4-pole TEFC induction motor required a minimum efficiency of 87.5% under the old legislation, which mainly applied to three-phase general-purpose induction motors; it now requires 89.5% under the new regulations. Under the old act, the energy efficiency levels for induction motors were known as EPAct levels. The new regulation re-classifies them as Subtype I, so these motors, manufactured alone or as part of another piece of equipment, will be required to have nominal full-load efficiencies that meet the levels defined in NEMA MG-1 (2006) Table 12-12; also known as NEMA Premium® efficiency.

A completely new category of motors was created under the new EISA law regulating efficiency for motor designs that have not been covered under any previous legislation. These motors are called out as Subtype II category and defined as motors incorporating design elements of general purpose motors (subtype I) but are configured as U-frame motors, Design C motors, close-coupled pump motors, footless motors, vertical solid shaft normal thrust motors that are tested in a horizontal configuration, eight-pole motors (900 rpm), and polyphase motors with less than 600 volts. Subtype II motors between 1 and 200 hp as well as NEMA Design B motors with horsepower ratings above 200 hp and not greater than 500 hp, and fire pump motors are all required to have nominal full-load efficiencies as defined in NEMA MG-1 (2006) Table 12-11, also recognized as EPAct efficiency levels.

In addition to these new laws for polyphase motors, small motors in two-digit frame series (including single-phase) are being discussed at a series of public meetings held by the Department of Energy (DOE) throughout 2009. These discussions with motor manufacturers, energy efficiency advocates and other interested parties are expected to establish minimum efficiency standards for small motors (two digit frame series motors) for the first time.

NEW VS. OLD

HP	FULL-LOAD EFFICIENCIES FOR NEMA PREMIUM™ EFFICIENCY ELECTRIC MOTORS RATED 600 VOLTS OR LESS (RANDOM WOUND) [EISA 2007]			FULL-LOAD EFFICIENCIES OF ENERGY EFFICIENT MOTORS [EPACT '92]		
	Enclosed Motors			*Enclosed Motors*		
	2 Pole	4 Pole	6 Pole	2 Pole	4 Pole	6 Pole
	Nominal Efficiency (%)			*Nominal Efficiency (%)*		
1.0	77.0	85.5	82.5	75.5	82.5	80.0
1.5	84.0	86.5	87.5	82.5	84.0	85.5
2.0	85.5	86.5	88.5	84.0	84.0	86.5
3.0	86.5	89.5	89.5	85.5	87.5	87.5
5.0	88.5	89.5	89.5	87.5	87.5	87.5
7.5	89.5	91.7	91.0	88.5	89.5	89.5
10	90.2	91.7	91.0	89.5	89.5	89.5
15	91.0	92.4	91.7	90.2	91.0	90.2
20	91.0	93.0	91.7	90.2	91.0	90.2
25	91.7	93.6	93.0	91.0	92.4	91.7
30	91.7	93.6	93.0	91.0	92.4	91.7
40	92.4	94.1	94.1	91.7	93.0	93.0
50	93.0	94.5	94.1	92.4	93.0	93.0
60	93.6	95.0	94.5	93.0	93.6	93.6
75	93.6	95.4	94.5	93.0	94.1	93.6
100	94.1	95.4	95.0	93.6	94.5	94.1
125	95.0	95.4	95.0	94.5	94.5	94.1
150	95.0	95.8	95.8	94.5	95.0	95.0
200	95.4	96.2	95.8	95.0	95.0	95.0
250	95.8	96.2	95.8	95.4	95.0	95.0
300	95.8	96.2	95.8	95.4	95.4	95.0
350	95.8	96.2	95.8	95.4	95.4	95.0
400	95.8	96.2	95.8	95.4	95.4	---
450	95.8	96.2	95.8	95.4	95.4	---
500	95.8	96.2	95.4	95.4	96.8	---

The DOE is proposing test procedures for measuring the efficiency of small electric motors, including both single-phase and polyphase, and to update the industry references and clarify the scope of coverage for the DOE's existing test procedure for electric motors. (For more information on the progress of that initiative, visit http://www.tinyurl.com/sm-elec-motors

Prior to this legislation, from an OEM designer's point of view, motor choice focused primarily, in descending order, on price, size, noise-level and weight. However, a recent survey has shown that those OEMs' customers believed availability, reliability and price were the top three issues. Until the EISA legislation, neither the OEMs nor their customers considered efficiency important enough to factor into a machine's overall design. Now, rising energy costs and the new legislation are moving efficiency to the top of everyone's checklist.

End-users will not have to replace machinery currently in use, but if they want to replace a motor in an existing machine, they may have to call the OEM, which will supply them with a motor that meets the most current regulations. The same expectations of fit and form will need to be met—the new motor may match the performance of the one the end-user just took off his machine, and even be more efficient, but it may not have the exact same dimensions. This may require some "engineering on-the-fly" to make it fit. To make a significant impact, the new regulations must affect all motors covered by the legislation, not just a small percentage.

Depending on the application, it may be more cost-efficient to replace the equipment itself rather than just the motor. This is more likely to occur in machinery run by smaller motors, as opposed to simply replacing the component motor, because form and fit will pose a greater challenge in more compact equipment. With larger motors, this is not so much of an issue—speeds may change and the new motor may require some different control schemes, but the frame sizes will likely remain the same.

From an end-user perspective, pricing will be impacted by the new regulations. There are more active materials (copper and steel) in these new motors, and it's safe to presume the OEMs will pass this cost along to their customers. Because of this, more than ever, end-users need to carefully evaluate their options in the repair-versus-replace decision-making process.

Advanced Energy helped pioneer the theories of Motor Management (MM) for end users with its first publication of the HorsePower Bulletin for the DOE in 1991 (http://www.advancedenergy.org/md/knowledge_library/resources/Horsepower%20Bulletin.pdf). This document is a useful guide to any facility wishing to implement motor management. Electric motors convert approximately 70% of all electric energy delivered to a manufacturing facility into mechanical energy. The purchase price for an average motor makes up approximately 3% of the total lifecycle cost to own and operate. Energy costs make up the rest. Managing motors could pay big dividends in reducing energy costs and increasing process reliability.

Motor Management (MM) refers to understanding, tracking and making planned decisions regarding any motor population. MM theories have not changed since that first HorsePower Bulletin in 1990, and there are now many tools offered by manufacturers, government, and energy efficiency advocates that address them. At its core, motor management allows for making good, planned decisions in advance of motor failure to determine if a motor should be replaced or repaired, and having an action plan in place that facilitates that decision.

At the heart of the process is making the repair versus replace decision BEFORE a motor fails.

This is typically done through motor surveys. Advanced Energy offers a survey that allows anyone to collect nameplate data from a motor and send it to the Advanced Energy team, who processes that data and provides a calculation of how much could potentially be saved by upgrading to a higher efficiency motor. (http://www.advancedenergy.org/md/knowledge_library/resources/motor_survey_how-to_guide.pdf) When repair is the proper choice, making certain your repair vendors can maintain efficiency is critical to long-lasting performance and keeping energy costs low. Advanced Energy can help here too by certifying your motor repair vendors through the Proven Efficiency Verification Program. (http://tinyurl.com/d2fgfa).

When evaluating a motor application, it is important to not only consider purchase price, but other factors including total life cycle cost, energy costs, ROI, etc. Factors that maximize return on investment in a motor in terms of efficiency include how many hours per year the motor runs and the cost of energy at your location. The average motor easily consumes 50 to 60 times its initial purchase price in electricity costs in a typical 10-year lifetime. Most importantly, the capital cost of the new motor represents approximately two to three percent of its lifecycle cost. In many instances it is better to negotiate for the most efficient motor you can purchase, because as much as 98 percent of the true cost is going to be the energy you put into that motor in its 10-year life expectancy.

Another way to maximize ROI is to inventory motors in terms of which ones operate the most hours and are critical to the process, and replace those motors first. Switching out a motor may provide great efficiency savings, but if that motor is not particularly critical to the operation or runs less than 4,000 hours per year, the savings might not be significant enough to justify replacement. Focus first on motors that

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would impact overall productivity and revenue if they experienced any downtime. Some motors don't cost the company as much as others when they fail and those should be a secondary concern when surveying motors for greater efficiency.

Approximately four out of five motors that fail are repaired rather than replaced, and Advanced Energy's research has shown that as little as 12 percent of motor users consider energy efficiency in making the decision between replace and repair. Perhaps these new regulations will raise awareness of the issue and help more motor users put a Motor Management plan into action. Not only can it result in increased productivity and energy efficiency, but it can also result in lower operating and maintenance costs.

NEMA Premium Purchase Decisions

At the time of publication, new legislation has been proposed which could significantly impact the purchasing decisions for NEMA Premium motors. NEMA reports that a provision passed by the Senate Energy Committee could allow stimulus money to offer rebates of $25.00/HP for NEMA Premium motors purchased and $5/HP credit for each non-NEMA Premium motor that is crushed. Details on the "crush for credit" program can be seen at **http://tinyurl.com/curhsl**

Advanced Energy and AutomationDirect

Advanced Energy is a leading provider of testing and consulting services in the motor and drives industry. An independent source for accurate and unbiased information, the non-profit helps organizations make decisions that will impact their reputation and financial future. Advanced Energy's motors and drives services are applied across a wide range of industries including motor users, OEMs, motor manufacturers, distributors and importers, and governments.

AutomationDirect approached Advanced Energy for assistance in selecting a supplier for a line of general-purpose AC motors. Joe Kimbrell, the Drives, Motors and Motion Control product manager at AutomationDirect, had already selected several possible suppliers for evaluation.

Advanced Energy took several steps to collect accurate information. First, a series of motor build-and-inspection analyses (for more information see http://tinyurl.com/cvb9pf) were performed on motors from each of the potential suppliers. Inspections were done on a statistical sample of motors throughout the range of motor sizes and types AutomationDirect wished to add to its portfolio of products. This effort narrowed the field down to one supplier and resulted in the introduction of the IronHorse line of motors from AutomationDirect. Extensive motor and drive testing was then performed to validate inverter ratings for this new product line.

"At AutomationDirect, we are in the business of helping our customers apply their product," said Joe Kimbrell, AutomationDirect. "We needed unbiased expert evaluation of motor design and manufacture, so we turned to Advanced Energy to help us determine the best quality motors for our customers' needs."

ELECTRICITY COSTS - Which Motor is the best investment for you? (@ $0.12/kWh)

	EPACT '92						EISA 2007						
HP	Hrs/Yr the motor runs	IronHorse Part Number	IronHorse Efficiency (%)	IronHorse Cost (U.S.$)	Annual Electricity Cost (U.S.$)	HP	Hrs/Yr the motor runs	Marathon Part Number	Marathon Efficiency (%)	Marathon Cost (U.S.$)	Annual Electricity Cost (U.S.$)	Annual Savings	ROI (years)
5	8760	MTC-005-3BD18	87.5	$216	$4,481	5	8760	E2013	89.5	$525	$4,381	$100	3.1
5	4160	MTC-005-3BD18	87.5	$216	$2,128	5	4160	E2013	89.5	$525	$2,080	$48	6.5
50	8760	MTC-050-3BD18	93.0	$1,199	$42,161	50	8760	E210	94.5	$2,727	$41,492	$669	2.3
50	4160	MTC-050-3BD18	93.0	$1,199	$20,022	50	4160	E210	94.5	$2,727	$19,704	$318	4.8
100	8760	MTC-100-3BD18	94.5	$1,975	$82,984	100	8760	E213	95.4	$6,199	$82,201	$783	5.4
100	4160	MTC-100-3BD18	94.5	$1,975	$39,408	100	4160	E213	95.4	$6,199	$39,036	$372	11.4

Product Management Corner

New C-more Feature

C-*more* Remote Access and Control

By Greg Philbrook,
Product Manager, HMI

The AutomationDirect HMI product team has released a new Remote Access and Control feature in version 2.4 of the C-*more* operator interface panels. This feature is a direct result of numerous customer requests.

C-*more* users wanted a way to remotely access the C-*more* panel to obtain real time access and control. Our primary objective was to add Remote Access ability without requiring customers to purchase more hardware components or software utilities; we accomplished this by making this feature available for all C-*more* panels that support Ethernet. Current panel owners who want remote access may simply upgrade their firmware and software for free from our software download Web page.

With this feature enabled in the C-*more* panel, a Remote user can fully operate and monitor the local HMI system. This may reduce the need for the user to be onsite to view or operate the C-*more* panel. We also added the ability for the HMI project to be configured so the local operator can enable or disable control at any time by using assigned tags on one of the project screens. Some benefits to the Remote Access are that it allows the ability to remotely:

- Control the screen operations of the C-*more* Panel as if touching the panel itself
- Monitor real time screen operations of the panel

project and connect the panel to a network. (Available only for models with Ethernet ports; this feature requires only software and firmware version 2.4 or later to function.)

Web Browser Based

The Remote Access application can be downloaded from the C-*more* panel through a PC's Web browser; authorized users can access and control the panel remotely without purchasing or downloading additional software packages. *(See Figure 1)*

Figure 1

- Troubleshoot and test the C-*more* project application which allows system integrators to support end users
- View, zoom, print and save screen captures of active screens

The C-*more* Remote Access feature eliminates having to connect to the PLC and gather data with expensive software packages.

The following are just some of the features that make the C-*more* Remote Access tool unique from others in the market.

Premium feature at no cost

The C-*more* Remote Access feature resides in the panel and requires no additional option modules. Simply configure the network settings in the panel

Multilevel Logon Security

Three Remote Access user accounts can be configured with unique user names and passwords and stored in the panel project which allows for multiple levels of access. Each account allows up to five remote users to be connected simultaneously. Users have the ability to remotely monitor, change screens, or have full control of the C-*more* panel. These accounts are defined as follows:

View Only (Default for Account #1 when the remote access has been enabled)

This permission level gives the remote user the ability to only view the screen that is active on the panel (view the screen that a local operator is

14

Touch your panel from anywhere

Remote access & control for C-more HMI

The most practical touch panel now performs Remote Access and Control!

With a Web browser on any PC, remote users can operate and monitor a local C-more HMI system from anywhere on the Internet or on a local network.

PREMIUM FEATURE AT NO COST!

No Additional Hardware required

The C-more Remote Access feature resides in all panels with Ethernet support, and requires no option modules. **Access real-time data or initiate an action on a control system from anywhere, any time.** *(This feature requires software and firmware version 2.4 or later*, and an Ethernet-enabled C-more panel to function.)*

WEB BROWSER BASED

Since applications can be downloaded from the C-more panel through a PC's Web browser, authorized users can access and control the panel remotely without purchasing or downloading additional software packages.**

AUTHORIZED USERS HAVE THE ABILITY TO REMOTELY:

- Monitor and control screen operations of the C-more panel as if touching the panel itself
- Test and troubleshoot the C-more project
- View, zoom, print and save screen captures of active screens

CONVENIENT YET SECURE

Multilevel Logon Security

Three Remote Access user accounts can be configured and stored in the panel project. Each account allows up to five remote users to be connected simultaneously.

Multilevel Access Control

Each account can be configured in one of the following levels of access:
- View Only
- View and allow Screen Change only
- Full Control

www.automationdirect.com

For complete information or to order online, visit:
www.automationdirect.com/c-more

1-800-633-0405

C-more touch panel line-up:

6-inch STN grayscale	6-inch STN 256 colors	6-inch TFT 65,538 colors	8-inch TFT	10-inch TFT	12-inch TFT	15-inch TFT
$395	$595	$795	$995	$1,595	$1,895	$2,295

* Software and firmware versions 2.4 or later are downloadable for authorized customers from www.automationdirect.com
** Supports Windows XP and Vista operating systems only

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Product Managment Corner

New C-more Feature continued

Continued from, p. 14

viewing). This can be utilized for users that are not authorized to change screens or control objects. This permission level will not interfere with the

users to have screen change abilities. This mode can affect the local operator if the remote user is changing screens while the local operator is using the panel.

Local Notification and Control

We also built in some components that give better control and notification capabilities for the remote access feature to the local operators. Each remote access account has two tags associated with it. These tags can be used to enable or disable each remote access account and notify the local user when a remote access account is active.

Because these two tags can be programmed into the **C-more** panel project, the programmer can make use of all the objects and advanced email, logging, alarm event, and scheduling features the panel has built in.

Figure 2

local operations of the panel. This mode could be used by managers who want to monitor machine operations without interfering with the local operator or automatic processes. *(See Figure 2)*

[Note: If viewing screens is all that is required for a particular application, check out the **C-more** Web Server function. It's a separate feature from the Remote Access and Control covered in this article, which allows remote users to capture "screen shots" of ANY screen in the **C-more** panel on demand. These screen shots are, however, static – so if the goal is to monitor the current screen as is changes dynamically, this **C-more** Remote Access and Control feature is the method of choice.]

View and Screen Change

This permission level gives the remote user the ability to view and activate the "Screen Change" objects that are located on the active screen. This permission does not allow the remote user to activate other objects on the screen. If there are no "Screen Change" objects on the active screen, then the remote user will not be able to change the screen. Screen Change button placement will need to be considered when the screens are created in the **C-more** project if the programmer wants remote

Full Control

This permission option gives the remote user the ability to view and control all screen based objects as if at the local site. Remember, if the **C-more** panel is controlling an application that could cause damage or serious injury to local operators or machinery being controlled by the panel, you will need to limit access to those authorized to view

Figure 3

or control the remote application. This mode can affect the local operator if the remote user is changing screens, operation status or values while the local operator is using the panel.

Although each account supports up to five users at a time, consideration should be given to how this could affect the operations of the application that the **C-more** panel is controlling, as well as the effects on the panel's performance. For safety reasons, it is highly recommended that for applications where that panel controls moving equipment, only one remote user is allowed to connect to the accounts that allow screen change or full control of the panel.

Scheduling

The programmer can automatically choose when the remote access accounts can be active by using PLC logic or the Event Manager in the **C-more** project. Either method can disable or enable the remote access based on time or an event.

For instance, during maintenance or production times you may not want remote users interfering with the local operator. The Event Manager can automatically activate or deactivate any of the remote access accounts without operator assistance.

Remote Access Control Screen

The programmer can create a screen that contains a switch object and an indicator object for each account. Using the password settings for the objects or assigning passwords for the screen adds even more secure control over the remote access activation if needed.

Alarm Message

If an alarm is assigned to the notification tag of an account, the

C-*more* system alarm banner will continue to display the alarm message. An example would be text such as "Remote Access Account 1 Active- Full Control". This gives local operators notice that a remote user is connected.

Pop up Message

Using the Event Manager, a pop up message window will alert the operator that a remote user is online. This window will appear and require the users to acknowledge that the remote access account is active. This is mainly a method to make local users aware of other users that may be online with the panel. The pop-up message can be customized to tell the users any message the programmer wants to relay.

Log Remote User Access

The Event Manager can also be used to log the remote access accounts by monitoring the associated tags. This could create a time and date stamp every time a remote user logs in and can be helpful for maintaining records. *(See Figure 3)*

Send an Email

The Event Manager can also send an email if the **C**-*more* panel is configured to use a mail server. This could notify anyone who needs to be aware that the Remote Access feature is active or has been active.

Other Features

The Remote Access Console Software Client that runs on the PC allows users to view the **C**-*more* panel projects in real time. The Console window can also be resized to fit your PC screen and the screen resolution will automatically adjust to the size of the window. There is also a screen capture tool which allows remote users to select a screen, and save the screen capture as a JPG file. The JPG file can be used for historical reports or training manuals for operators.

These and other new features are more proof that **C**-*more* customers continue to receive added value on their initial investment. You can learn more about the **C**-*more* panel at: **www.c-morehmi.com**

"I think it would be a good idea."

– Mahatma Gandhi (1869 - 1948) when asked what he thought of Western civilization

---

"A banker is a fellow who lends you his umbrella when the sun is shining, but wants it back the minute it begins to rain."

– Mark Twain (1835 - 1910)

Student Spotlight
The Future of Technology

The Future of Technology
Science/Technology
Student Spotlight

Who: Diyan Zagarov
From: Bulgaria
Attending College:
Lanier Technical College,
North Georgia

Diyan Zagarov grew up in Bulgaria. Growing up, Diyan thought of himself as the adventurous type and often felt the desire to travel and see the world. However, he grew up under the shadow of the Soviet Union, so for a long time traveling outside of his native Bulgaria was very difficult.

As a teenager, Diyan joined the Bulgarian Air Force. Because of his high academic ability and aptitude for engi-neering, the Bulgarian Air Force sent him to college. After five years of intense study, Zagarov earned a bache-lor's degree in Avionics with a specializa-tion in electrical engineering. In all, Zagarov spent 15 years in the Bulgarian Air Force performing maintenance and repair on Russian MIG fighter jets and Czech L-29 and L-39 training jets.

After the fall of the Soviet Union in 1991, the Bulgarian government moved more towards socialism and was then recognized by most Western European nations. As a result, travel became a possibility for Diyan. He entered a gov-ernment-sponsored lottery, and by the luck of the draw, won an opportunity to live and work in the United States. Although it was a very difficult decision, Diyan decided that the opportunity was too good to pass up. So, he moved with his family to Lawrenceville, Georgia.

Diyan now works at Rock-Tenn, a paperboard and corrugated packaging manufacturing company with a location in Norcross, Georgia. The managers at the facility soon saw that Diyan had exceptional technical ability. Diyan rec-ognized, however, that he lacked train-ing on the plant's automation equip-ment, especially with PLCs. The best place to receive this type of training in Northeast Georgia is Lanier Technical College. So, Diyan enrolled in the school's Industrial Systems program to learn how to program, network, and maintain PLCs.

With all of his previous experience, Diyan was a quick study. To add to his bachelor's degree in Electrical Engineering, he acquired a certificate from Lanier Technical College in Programmable Logic Controllers. Skills gained at Lanier Tech using industry-standard equipment and processes have already proven to be valuable. Using this training, Diyan has designed a sys-tem that automates a critical filtration process at Rock-Tenn.

Automating the separation of water from wasted ink is an important step in printing processes. At Rock Tenn's plant, an air assisted manual filter press was used for this purpose. Compressing the chemically separated ink and water through filters was the only automated step performed by a *Direct*LOGIC DL05 PLC. The operator started the filling process manually, and upon com-pletion, he performed a "blow down" drying cycle. After this, he opened the press, cleaned the filters, closed the press, and started the process again.

While attending the PLC program-ming class, Diyan created a program to automate the entire filter press opera-tion, until the press opens for cleaning. The operators need only clean the filters and restart the process. Diyan developed the program and has integrated a C-*more* panel to allow the operator to control and monitor the press operation. The PC, PLC, and the C-*more* panel were networked using the STRIDE 5-port Ethernet switch. Based on the cost of a DL06, a switch, and a C-*more* panel, it was estimated that a $25,000 per year savings has been achieved by eliminating the need to employ an operator to manually control the press operation. Troubleshooting and repair time have also been greatly reduced.

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Tech Brief
electrical wiring

Fuses or Circuit Breakers- Which should you use?

By Brian S. Elliott

For most of us who work in the electrical design field, the question of circuit protection is omnipresent in our day-to-day efforts. There are a myriad of circuit protection technologies available that address phenomenon such as high voltage transients, inductive kick-back, capacitive coupling, high inrush currents and ground faults, just to name a few. However, the most common circuit protection devices guard against over-current situations. As most of us already know, over-current protection is typically achieved by incorporating either a fuse or a circuit breaker within the primary power feed. The biggest question that faces most electrical designers is which one of these devices to select for any given situation. More often than not, our selection of either fuses or circuit breakers is based on past experience and personal preference. In the context of any given industry, past experience is usually a good guide for this selection process. However, when changing projects or moving to a new job, what may be comfortable to you, may not be appropriate for the new application.

Let's face it, fuses and circuit breakers do pretty much the same thing; they protect the circuit from over-current situations. So what criteria do we use to select one or the other? The recurring argument that I have heard in favor of circuit breakers is that they are easier to reset after a failure situation has occurred. Although this is true, I've never really bought into this argument because, ideally, if the circuit is designed and used properly, the breaker should never trip. If you're dealing with a breaker which trips on a regular basis, this should be taken as a clear indication that there is something seriously wrong with the circuit. In these situations, the convenience of resetting the breaker only serves to postpone the inevitable correction or re-design of the circuit. On the other side of the fence, the usual argument in favor of fuses is that they are dirt cheap. This particular argument does carry some merit, in that a properly designed circuit won't blow fuses, and therefore, the one-time cost of a fuse and holder is considerably less expensive than its breaker counterpart. However, if a circuit blows fuses on a regular basis, the accumulated replacement costs associated with labor and down time can make a fuse set considerably more expensive over the long run. Additionally, if a fuse set is specified as an integral part of a power disconnect, then the cost is comparable to the equivalent circuit breaker arrangement.

It should come as no surprise that both fuses and circuit breakers have their pros and cons. Circuit breakers certainly have some very favorable attributes. In most cases they can double as a power disconnect (*see figure 1*), which provides a great deal of convenience to any equipment that may require regular service. For these applications, breakers are even available with lock-out/tag-out facilities. Another attractive attribute of breakers is that they are inherently safe. The electrical connections are typically located behind a protective panel, which completely eliminates any possibility of electrocution. This feature is quite valuable, especially in those situations when non-electrical personnel are required to service the equipment. A third feature is that they usually provide a visual indicator when they have tripped. This feature can save a lot of diagnostic time if you're the type of person who frequently forgets to check the fuses, and as it turns out, I'm one of those guys.

For many professionals, fuse sets also have a number of desirable attributes. As mentioned previously, they are particularly inexpensive when compared to their breaker counterparts. They're simple, quite easy to install and, in most cases, a fused disconnect, as shown in
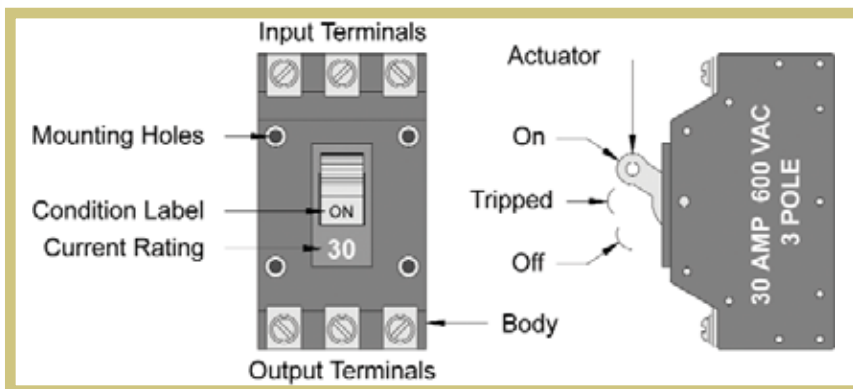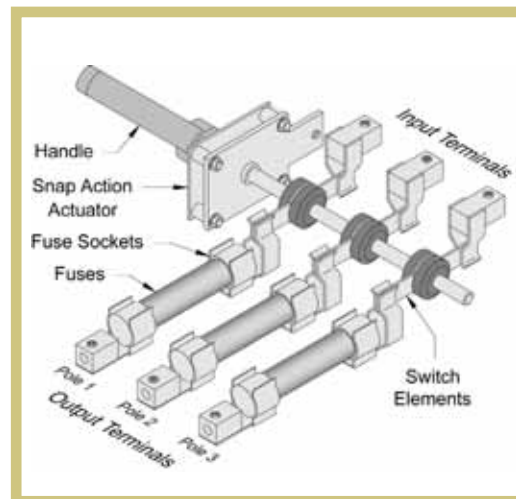

Figure 1

Figure 2

figure 2, is quickly attached to a utility panel with just a few bolts. Wires are usually connected with integral screw-type terminal blocks. In addition to their mechanical simplicity, the electrical flexibility that fuses provide can be a considerable asset, especially when working with unique circuits. In most new designs, the circuit's current requirements can be closely estimated, however, various unanticipated situations may arise that might blow the fuse that was originally specified. In these cases, the selected fuse can be quickly changed for another unit that is better suited for the application. A good example of this is a machine that has a high power-up (surge) current. The original fuse specified may be quite adequate for the run current, but may blow each time the circuit is energized. A fuse set allows the technician to quickly correct the situation at the minimal cost of a few new fuses. The original fuses are simply replaced with time delay, or slow-blow, units carrying the same current rating and the problem is instantaneously corrected. A situation like this isn't so easy to correct if you originally installed a |circuit breaker. In that case, the breaker must be removed and replaced with an entirely new unit with a rating appropriate to the conditions. The costs associated with a change like this are reflective of a new breaker and the labor to remove the old unit and replace it with the new one.

A significant disadvantage of fuse sets is their exposed electrical connections. In the case of larger, snap-in fuses, the socket clips are exposed and in close proximity to the opposite side(s) of the circuit. When the enclosure housing the fuse set is opened, these sockets expose the technician to a live circuit. Many power disconnects with integral fuse sets are specifically designed to eliminate this hazard when turned off. It is always rec-

ommended that a special set of insulated fuse pullers, as shown in **figure 3**, are used when changing larger fuses. However, in a pinch, the average t echnician will be under a lot of pressure to get the equipment operational. If they don't have ready access to a fuse puller, they may resort to using more unsafe methods to dislodge a fuse and snap in a new one. There is simply no future in these improper practices, which will ultimately lead to an electrocution incident.

When it comes to flexibility within the design, fuses are typically considered a little friendlier than circuit breakers. Fuse sets are readily available as integral components in many power disconnects. These pre-packaged assemblies are particularly popular with both electricians and electrical designers. Despite the fact that circuit breakers are gaining popularity as power disconnects, fused units are still more prevalent throughout industry.

That's not to say that breakers don't offer the same level of flexibility. Circuit breaker disconnects have the distinct advantage of being about half the size of their fused counterpart, which means that they are easier to install on a densely populated utility panel. This, coupled with their inherent safety, means that more and more electrical designers are specifying circuit breaker disconnects for point-of-use applications.

Chances are the power distribution panels in homes and offices are equipped exclusively with circuit breakers. As it turns out, breakers are particularly suited to power distribution applications. In these cases the branch circuits may have a wide variation of loads connected to them at any given time. Therefore, statistically speaking, it's possible, and even probable, that a branch circuit will be periodically exposed to an overload condition that will trip the breaker. In these situations, the simplicity of a circuit breaker becomes apparent. By simply addressing the over-current situation and resetting the breaker, the branch circuit is back on-line. In addition, circuit breakers provide a much more compact and logical layout when setting up the power

distribution center in most industrial environments.

The overwhelming availability of both fuses and circuit breakers on the market is a clear indication that neither represents a significant advantage in all circumstances. For any given project, the selection to use either a circuit breaker or a fuse set will ultimately remain the decision of the electrical designer. In most instances, considerations such as purchase price, manufacturing costs, service requirements and space constraints will play a larger role in the selection process than the actual electrical characteristics of the circuit. It seems the best advice that anyone could offer for this topic is to thoroughly educate yourself in both technologies and practice diligence when applying either.
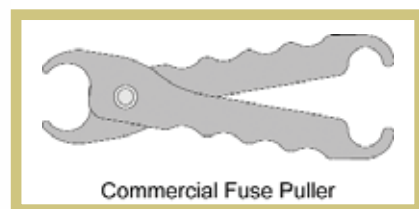

Commercial Fuse Puller

Figure 3

Brian S. Elliott Bio

Brian S. Elliott is the Chief of Engineering for Air Options, Inc. in Houston, Texas. He is the author of the Compressed Air Operations Manual and Electromechanical Devices & Components, both published by the McGraw Hill Book Co. He is a regular contributor to several industrial publications, including the Automation NOTEBOOK.
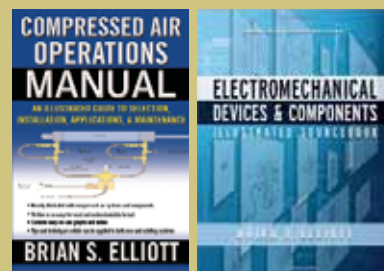
User Solutions
Metcam

Automating the Bottom Line

By David Sanders, Facility Manager
By Bob Cheek, Quality Manager

Metcam is a manufacturing company located in Alpharetta, Georgia, just north of Atlanta. Founded in 1989, the company specializes in custom sheet metal fabrication serving a diverse industry base including commercial HVAC, healthcare, electronics, automotive, food service and air filtration.

Metcam provides many value-added services such as metal finishing, custom coatings, electronic assembly, packaging and direct shipping. The company's Quality Management System is ISO registered and has received numerous awards from world-class customers and professional organizations for quality, service, and delivery.

The "War Room" at Metcam, or "Production Control," is a large central area with offices around the perimeter. The walls are scattered with white boards, schedules, literature boxes filled with the day's routers, calendars, bulletin boards, and of course the plant SCADA monitor. The SCADA monitor

is a Samsung 22" display connected via VGA-Ethernet converters to the Automation Server running Windows XP, KEPDirect, and Lookout Direct.
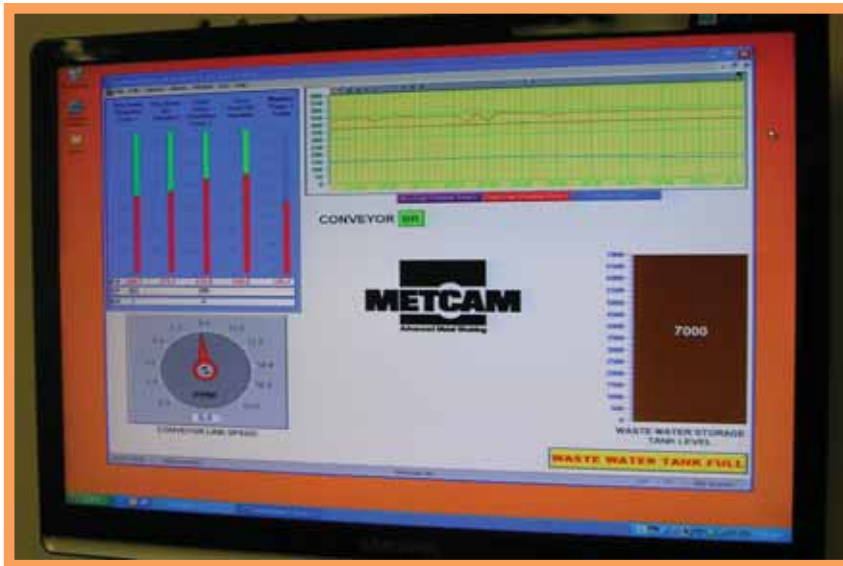
Metcam has not been immune to "growing pains" throughout the years. The company has brought together some of the best talent to provide a comprehensive manufacturing solution. Like many innovative companies Metcam is continually looking for ways to improve processes. Brainstorming sessions are common; whether it's two employees or an entire department, everyone focuses on process improvement. Problems are considered opportu-

nities to excel; opportunities which keep Metcam out front and ahead of the competition.

A few years ago, the company was presented with an excellent opportunity to substantially increase sales. In order to support this increase, it was necessary to improve many areas very quickly. Plans were developed which focused on areas where the largest returns would be recognized.

Metcam began using Automation Direct's products some years ago. The very first product purchased was a SOLO temperature controller. The controller was purchased at a fraction of the cost of a replacement controller and worked well; later the system was decommissioned and replaced with a PLC controlled loop. Another project where AutomationDirect products were used exclusively was a level and pump control system. The system was a simple hard-wired relay control with 22mm pushbuttons and pilot lights. This system is still in use today, five years later, with zero failures. It is slated to be replaced when the washer is upgraded in 2010 when it will be controlled by a *Direct*LOGIC 260 PLC.

The area with the most potential for improvement was the finishing department. The finishing line includes a five-stage industrial parts washer,

"bells and whistles". Also, scalability was an important requirement for the new system. The ability to easily integrate the finishing system with new systems added in the future was paramount. In the end, a scalable automation system was specified, allowing for continued growth and expansion.

There were many options available for integration. After reviewing these options, the best bang for the buck turned out to be just up the road in

multiple powder coating booths, and drying and curing ovens. The existing system had been in place since the company's inception. Although it had been well maintained, it was not adequate to meet the new demands. Management decided to upgrade the system by providing additional mechanisms for improving quality, utilizing in-house resources to minimize cost.

Finishing systems have many parameters which are crucial to the process. Parts must be thoroughly cleaned, dried, coated and adequately cured. In the past, these processes were controlled by discrete components. Pump and fan motors ran at full speed operated by NEMA style starters. Self-contained process controllers with built-in loops controlled temperatures. Control panel fronts were filled with

30mm pilot lights and pushbuttons. Flame safety relays were tucked away inside enclosures with no feedback to the operator. Conveyor line speed was at operator discretion with no velocity feedback.

Many ideas were discussed during the development phase. Personnel developed a wish list based upon past experience. They agreed that certain items were an absolute necessity, while others were more for convenience or

Cumming, Georgia. AutomationDirect not only sells quality products, they also provide excellent service. Quality and price aside, service is paramount. In-house integration of a critical process can be a risky venture and is not recommended without having dedicated support from the supplier. In the end, the decision was easy based upon quality, cost and delivery, not to

Continued, p. 26>>

User Solutions

Metcam

mention selection. Having a one-stop shop for everything from Programmable Logic Controllers to wire proved invaluable.

The finishing department project involved integration of a control system with SCADA capability. The first phase required increasing the capacity of the existing cure and dry ovens. The two ovens operate independently of each other with their own heat source. Each oven is a direct fired natural gas convection type.

After mapping the I/O points, a DL260 programmable logic controller was selected as the main processor. Discrete inputs and outputs handle basic operator functions and feedback. Analog I/O includes temperature monitoring as well as actuator control for the main gas valve to control heat. All temperature sensors are Automation Direct's J-type thermocouple FTC-1 signal conditioners. The use of signal conditioners reduced rack space and simplified wiring, by eliminating long thermocouple wire runs back to the control system.

A **C-*more*** 15" industrial touch screen was selected for the HMI. All functions, with the exception of power on/off and E-stop, are controlled through the **C-*more*** panel. The flexibility of **C-*more*** allowed development of maintenance screens depicting actual photos of the machine with component and switch locations, providing feedback to the operators and maintenance personnel. A switch or input status can be checked by bringing up the maintenance screen; not only is the status of the switch displayed, the operator can also determine the physical location of the switch on screen. The flexibility of the **C-*more*** system is tremendous and allows for continued expansion and improvement.

The final component of the first phase was a SCADA system. KEPDirect was selected as the OPC server and Lookout Direct as the SCADA client. The system was up and running within a day, reporting information back to the facilities manager's office and the display in production control. Everyone can see at any time what is happening in the finishing department.

At the conclusion of the first phase, Metcam realized a savings of 35-40% for project integration. This was achieved with AutomationDirect products and in-house design and integration. The system has been in commission and operating without failure for 14 months. AutomationDirect products are very dependable, reliable, and economical. Metcam looks forward to continued success and partnering with AutomationDirect to help maintain the bottom line.

"The reason grandparents and grandchildren get along so well is that they have a common enemy. "

– Sam Levenson (1911 - 1980)

"When I was a kid my parents moved a lot, but I always found them. "

– Rodney Dangerfield (1921 - 2004)

"Never continue in a job you don't enjoy. If you're happy in what you're doing, you'll like yourself, you'll have inner peace. And if you have that, along with physical health, you will have had more success than you could possibly have imagined."

– Johnny Carson (1925 - 2005)

Automation Talk
webinars

Taking Web Seminars to the Next Level, Part 2

By Shane Crider
AutomationDirect,
Digital A/V Media Specialist

Since the last edition of Notebook, we have been working hard to provide a stream of bi-weekly live seminars on AutomationTalk. Tom Elavsky and I have become the main presenters, but to keep the topics interesting with new faces, we have recruited show guests from other teams here at AutomationDirect, such as our Business Development and Tech Support teams.

So far, we have created and hosted six live show topics with many more new ones in the lineup. We originally didn't plan on repeating any topics for months to come, but with enthusiastic requests from our customers, we have re-scheduled a few shows that were "big hits". Even though we record and post all of our live shows, customers have requested that we run topics such as our new CLICK PLCs and *Direct*SOFT software topics as live events again. Our viewers get more out of the live shows since they have the ability to ask questions, allowing us to tailor each show a little differently based on our audience.

Tom and I have diligently worked to keep AutomationTalk up and running. Even though it is stressful at times, we know we have one of the best jobs here at AutomationDirect. We have a blast putting this stuff together; although it can be stressful right up until we go "Live." Once the show starts, we kick back, get in the groove and try to show customers what Automation-Direct is all about. One of the toughest aspects of putting on a live show is staying within the 40-minute timeframe. We find that we could talk for hours about our products, application examples or give live demonstrations, but we have to move on because we realize that, like us, our viewers have jobs to complete as well.

So far, our new system and Web site are working great for our customers. We have more ideas which will improve the site and allow us to present better shows to our customers. Our viewing audiences have provided valuable feedback and love the new format. Attendance has surpassed our expectations, especially since we no longer invite guests the way we did in the old Webinars. Customer sign ups are now generated from our new AutomationTalk Web site, our e-newsletters, and from articles in magazines.

If you haven't had a chance to attend one of our live AutomationTalk shows, we encourage you to sign up for one today; or if your schedule is hectic, take advantage of watching one of the many pre-recorded shows. If you get a chance, drop us a line and let us know how you like the format and what you would like to see in future shows. You can sign up for upcoming shows and view pre-recorded shows at:
www.automationtalk.com

Live Webinar Schedule

June 17, 2009 2:00 ET
AC Drives

July 08, 2009 2:00 ET
AC Motors

July 22, 2009 2:00 ET
Wiring Solutions

August 5, 2009 2:00 ET
ADC PLCs

Visit **www.automationtalk.com** to register for a live seminar or view a pre-recorded one.

"It is amazing how quickly the kids learn to drive a car, yet are unable to understand the lawnmower, snowblower or vacuum cleaner."

– Ben Bergor

"A positive attitude may not solve all your problems, but it will annoy enough people to make it worth the effort."

– Herm Albright (1876 - 1944)

FYI

C-more Remote Access Feature FAQs

C-*more* Remote FAQ

By Greg Philbrook
HMI and Communications Product Manager,
AutomationDirect

Can I use the Remote Access feature if the C-more panel is inside a Firewall? Yes. In order to access **C**-*more* inside a firewall/router remotely, either a VPN connection must be used or "Port forwarding" must be set up in the router to allow the **C**-*more* Web server and Remote Access application to get through. When a TCP/IP message is sent to a router, it reads both the destination IP address (public IP address) in the message and the destination port number.

If the destination IP address is the correct address for the router, the router then looks at the port number to determine whether it should allow this message and where to route this message. This is done by configuring a "Port forwarding" table within the router configuration.

The router will change the destination IP address of the message to the local IP address specified by the "Port Forwarding" table. In order to access the Remote Access application in **C**-*more*, you have to connect to the Web server first, so two port numbers will need to be specified in the Port Forwarding table for each **C**-*more* panel that needs to be accessed.

The first port number is the Web server port number. By default, this number is 80. When using a Web browser, such as Internet Explorer, port 80 is implied without having to type this manually. If a number other than port 80 is needed, this can be accomplished by simply adding :<port num> after the IP address. An example URL for the image shown below would be:
http://10.16.23.146:80

The second port number required is the Remote Access port number. The default for this application is 11102.
Router Setup: *(See Figure 1)*

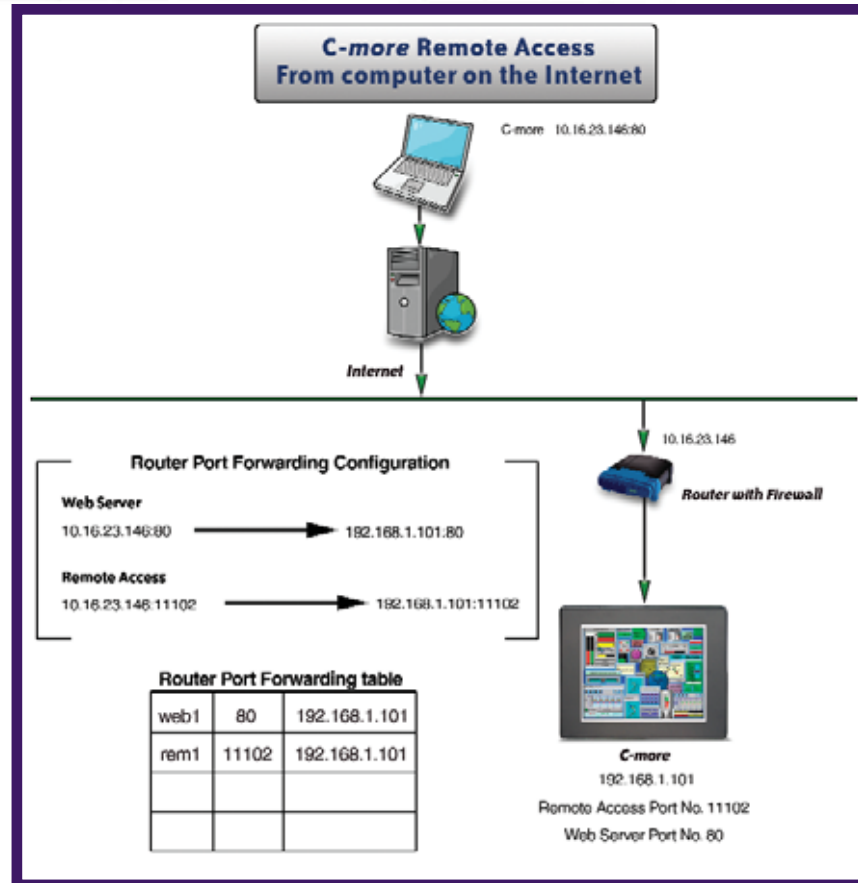Once the user has chosen to run the Remote Access application from the

Figure 1

C-*more* Web server, the application will then communicate to the router with the specified Remote Access port number.

In order to access an additional **C**-*more* panel on the same router using the same public IP address, use a different Web server port number and Remote Access port number for each panel. *(See Figure 2)*

How do users access the Remote Panel that has been configured for Remote Access?

A user can open Internet Explorer or any Internet browser software and type in the panel's IP address. Various scenarios and memory configurations are listed here:

No Firewall/Router: If there is no Firewall or Router between your PC and the **C**-*more* panel then type in: http://<panel IP address>:<Web server port number>

For example:
http://192.168.1.101:80

With Firewall/Router: If there is a Firewall or Router between your PC and the **C**-*more* panel then type in: http://<firewall or router IP address>:<Web server port number>

For example:
http://10.16.23.146:80

The Web server port number is found in the Touch Panel Network window on the Web Server Tab. The port number default is 80. If the web server port number has not been changed from the default, "80" is implied in the browser and does not need to be appended to the IP Address. This will open the **C**-*more* panel default HTML pages that are located in the **C**-*more* panel memory. These HTML pages can be edited, however make certain the links remain intact. *(See Figure 3)*
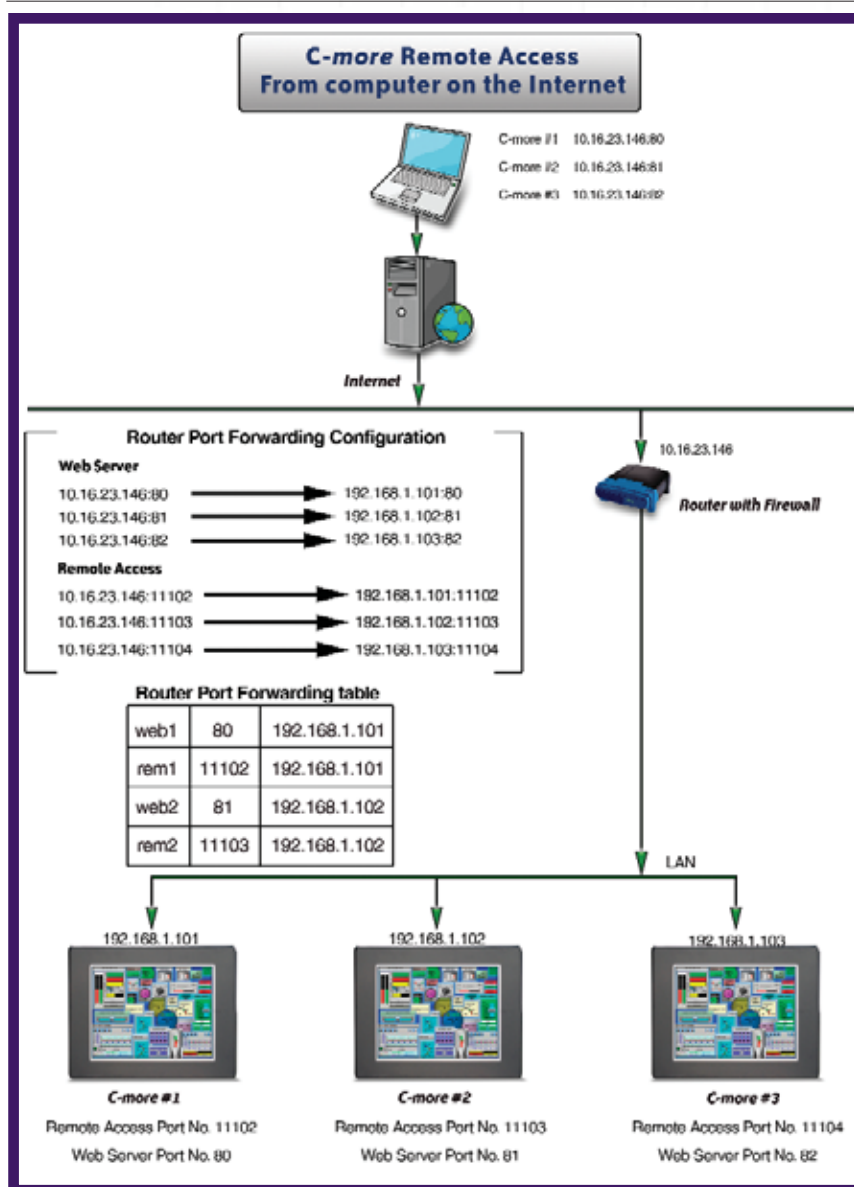
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**C-more Remote Access
From computer on the Internet**

C-more #1 10.16.23.146:80
C-more #2 10.16.23.146:81
C-more #3 10.16.23.146:82

Internet

Router Port Forwarding Configuration

Web Server
10.16.23.146:80 → 192.168.1.101:80
10.16.23.146:81 → 192.168.1.102:81
10.16.23.146:82 → 192.168.1.103:82

Remote Access
10.16.23.146:11102 → 192.168.1.101:11102
10.16.23.146:11103 → 192.168.1.102:11103
10.16.23.146:11104 → 192.168.1.103:11104

10.16.23.146

Router with Firewall

Router Port Forwarding table

web1	80	192.168.1.101
rem1	11102	192.168.1.101
web2	81	192.168.1.102
rem2	11103	192.168.1.102

LAN

192.168.1.101 | 192.168.1.102 | 192.168.1.103

C-more #1
Remote Access Port No. 11102
Web Server Port No. 80

C-more #2
Remote Access Port No. 11103
Web Server Port No. 81

C-more #3
Remote Access Port No. 11104
Web Server Port No. 82

Figure 2

Memory considerations: Remote Access memory is consumed only when the remote access feature is enabled in the project and loaded to the panel. The Remote Access feature consumes memory based on the LCD resolution:

Memory considerations		
Panel Type	**Resolution**	**Remote Access Memory Usage**
6" Mono	320 x 240	300 KB
6" Color and 8" Color	640 x 480	1,200 KB
10" Color and 12" Color	800 x 600	1,875 KB
15" Color	1024 x 768	3,072 KB
15" Color (VGA Mode)	640 x 480	1,200 KB

Do all C-more Panels have Compact Flash slots?

No. Only **C-more** full featured panels come with a built-in CF1 slot. –R models do not have the CF1 slot and do not support the Expansion unit required for the CF2 slot.

What is the difference between using CF1 and CF2 memory slots?

CF1 is the internal Compact Flash expansion slot on the top of the **C-more** panel.

CF2 is the optional Compact Flash expansion slot usable when the EA-CF-IF and EA-EXP-OPT modules are installed.

CF1 can reduce the overall runtime project memory requirements. If CF1 memory is inserted at the time of project transfer, the runtime project will be loaded to the CF1 instead of the Internal Flash Memory. The runtime project cannot be sent to CF2 during project transfer.

When CF1 memory is installed, and a runtime project is transferred, the fonts and recipe sheets do not count as part of the project memory limitations, 10MB (6 – 10 in.) and 40 MB (12 and 15 in.).

CF1 can be used for Backup, Restore and Data Logging only if the project is transferred to Internal Flash. CF2 can be used for Backup/Restore of Projects, Logs and Recipes anytime as well as for Data Logging.

CF1 memory can be difficult to remove when the panel is installed and should not be removed while panel is powered. CF2 memory is easily hot swappable.

Do all C-more panels support standard USB memory?

Yes. The **C-more** panel will work with most brands of USB pen drives, provided they meet the following criteria:

1) They must fully comply with USB standards – nonstandard chips or files will not work.
2) They must be formatted in the FAT16 or FAT32 method – no other format method works, i.e. NTFS or WINFAT
3) They must not include extra partitions.
4) They must comply with the USB standards which allow recognition by USB 1.1 devices.
5) They must not include U3 systems designed to autoboot files on the drive.

▼AUTOMATIONDIRECT®
FYI

C-more Remote Access Feature FAQs continued

Continued from, p. 29

In some cases, formatting the pen drive from your PC before use will allow it to work with the **C-*more*** panel, but if the device does not meet the above specifications, it will not work.

Even when these specifications are met, there is no guarantee that a device will work properly. The device should always be tested. (The SanDisk USB memory sold by AutomationDirect has been tested and works well.)

How is using a USB memory device different from using CF1 or CF2?

The USB memory is used in the same way as CF2. It can be used for Backup/Restore of Projects, Logs and Recipes anytime as well as for Data Logging. The runtime project cannot be loaded to the USB memory.

USB memory write speeds are slower than CompactFlash, so data logging is more reliable with CompactFlash.

The EA-AC power adapter can protect the CompactFlash in case of a power glitch; a USB memory device may be damaged and data may be lost.

Does C-more use Industry Standard CompactFlash?

Yes, if formatted to FAT or FAT32.

What is the difference between a backup of a project and the project transferred from the C-more Software to the panel?

The project transferred to the panel, either to Internal Flash or CF1, is a "runtime" file. The panel can load this file directly to its internal volatile memory for execution. This file contains only the runtime project. The file extension is EAP.

The file created by "Backup" on the System Screen or "Load to External Memory Device" in the **C-*more*** Software is not a runtime executable. It must be "restored" to the panel using the System Screen to create a Runtime executable. This file contains the runtime project, latest panel operating system, the latest firmware available with the software and recipe sheets used by the project. The file extension is EAS.

Figure 3

Using CF1 as Project Memory

If CF1 memory is to remain in the panel, it should be used for Project, Font and Recipe Sheet Memory only, so that it does not have to be removed. If it is also used for Data Logging, follow the procedure below for retrieving the data files.

To retrieve log files from one memory device using a different memory device:

This procedure copies all log files from all memory devices to the target device. In this case, the Target Device is USB.

1) In your project, add pushbuttons using the following tags:
 SYS COPY LOGTOUSB
 SYS USB EJECT
2) Add indicators using the following tags:
 SYS USB READYTOUSE
 SYS USB WRITESTATUS
3) Insert the USB device formatted to FAT16 or FAT32.
4) Wait for the USB Ready to Use Indicator to activate.
5) Select the Copy Log to USB push button; you should see the Write Status Indicator blink.
6) When the Write Status indicator stops blinking, select the USB Eject Pushbutton
7) When the Ready to Use indicator turns off, remove the USB which now contains the Log files.

This procedure can also be used to copy files to the CF1 and CF2 using system tags SYS COPYLOGCF1, SYS COPYLOGCF2.

GENERAL NOTES

Compact Flash is generally faster than USB memory.

Almost all current PCs have USB ports; few have CF interfaces.

There are inexpensive USB extension cables that can be used to make the USB memory more easily accessible. We have not seen them for CF memory.

USB or CF memory can be used for project transfers (provided the memory is inserted into the PC and the PC recognizes it.)

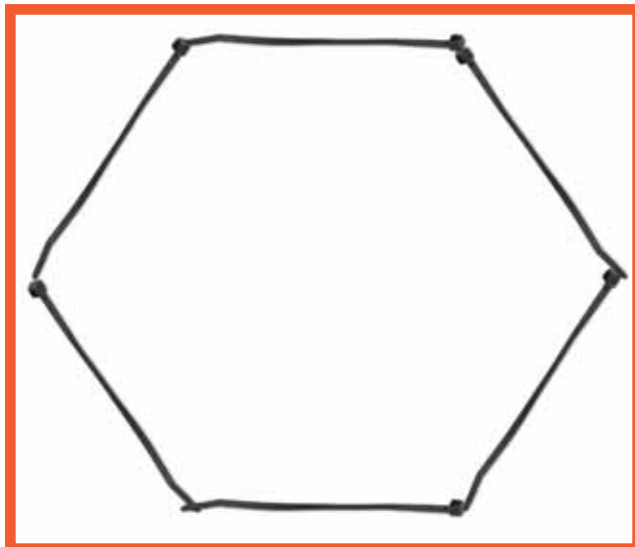**30**

The Break Room
Brainteasers & Humor

If you need some cable ties – check here:
http://www.automationdirect.com/cable-ties

Jokes

Complaining

A customer was bothering the waiter in a restaurant. First, he asked that the air conditioning be turned up because he was too hot, then he asked it be turned down cause he was too cold, and so on for about half an hour. Surprisingly, the waiter was very patient, he walked back and forth and never once got angry. So finally, a second customer asked him why he didn't throw out the pest. "Oh, I really don't care or mind," said the waiter with a smile. "We don't even have an air conditioner."

New Math

The math teacher saw that little Johnny wasn't paying attention in class. She called on him and said, "Johnny! what are 4, 2, 28 and 44?" Little Johnny quickly replied, "NBC, CBS, HBO and the Cartoon Network!"

Job Competition

Two bright young engineers applied for the same position at a computer company. Since they had identical qualifications, the company asked the two applicants to take a ten-question test. At the conclusion of the test, one of the applicants was called into the manager's office. "I have graded the test, and you both scored nine correct answers and got one answer wrong. Thank you for your interest, but we've decided to give the job to the other applicant." "And why would you choose him if we both got nine questions correct?" asked the rejected applicant. "We have based our decision not on the correct answers, but on the question you missed," said the Department manager. "And just how would one incorrect answer be better than the other?" the rejected applicant inquired. "Simple," said the Department manager, "The other gentleman answered Question #5, 'I don't know.' Your answer to Question #5 was, 'Neither do I.'"

BrainTeasers

1.) Chain Bane

Two pieces of chain were left over after a new piece of AutomationDirect's automation equipment was installed in the factory. The links were circular, uniform in size and shape and made from ½ inch thick metal. One piece was exactly 3 feet long, the other 22" in length. *The longer piece had 6 more links than the shorter, how many links were in each piece of chain?*

2.) Drop Me a Letter

Can you think of a nine English letter word that continues to be a valid word as you remove letters one by one, all the way down to a single letter? There are several ;-)

3.) Hex Vex

Shown below are 6 cable ties forming a regular hexagon. *Can you add three cable-ties, and arrange all nine to form another six-sided figure?* No stacking or loose ends allowed.

Please visit **www.automationnotebook.com** to find the answers to these puzzles.

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