



Winter 2013 Newsletter

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Upcoming Events

- Feb 26th, 2013 **Member Meeting @ McMaster University**
"Electrical Transients: Causes, effects and solutions.
Presented by: Tim Dakers, Total Protection Solutions"
- March 19th, 2013 **AIST Northern Chapter Annual Fair,**
Hamilton Convention Center.
- April 3, 2013 **ISA Hamilton Section Expo**
Royal Botanical Gardens, Burlington, ON.
- April 8, 9th, 2013 OPCEA conference, Toronto.
- May 24th, 2013 **ISA Hamilton Section Golf Tournament.**
- May 28th, 2013 **Annual General Meeting**

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1. Greetings from ISA Hamilton

In this Winter Edition, we look back at what has been a successful fall season. Our member meetings in October and November were well attended, and we have almost finalized all of our speakers for the coming months. The fall session was finished off a relaxing Christmas social at Jerry's house as a thank you to the many volunteers who make the ISA Hamilton Section possible.

Our relationship with McMaster University continues to grow. Students in the McMaster Bachelor of Technology (B.Tech.) program have recently formed a new ISA McMaster Student Section – details to follow in our Spring Edition newsletter.

We encourage you to mark Wednesday, April 3 on your calendar for our upcoming ISA Hamilton Expo, which will again be held at Burlington's Royal Botanical Gardens. At the Expo you will have the opportunity to learn about new products and services from the many fine companies in our local area. We also have five excellent speakers, plus a keynote speaker, lined up to complete the event.

Our golf tournament is also just around the corner and will be taking place on Friday, May 24. If you have not

already signed up your foursome, please visit our website at www.isahamilton.com for more information.

Please enjoy our Winter 2013 newsletter, and we thank you for continuing to be a member of the International Society of Automation.

2. Getting Involved with the ISA

Terrence G. Ives, ISA President



The advent of a new year is the ideal time to take a fresh look at all the different ways ISA members can get involved in ISA sections and divisions.

As someone who has been highly engaged for many years in my local (Philadelphia) ISA section, and has had the honor of serving the Society in various leadership positions, I'm very aware of the personal and professional rewards that come with active ISA membership involvement.

In so many ways, ISA provides its members with immeasurable opportunities to receive—in knowledge, skills, problem solving, leadership development, and friendship—and to give back—through collaboration,

mentorship, volunteerism, sponsorship, and student scholarships.

ISA Section Involvement (e.g., ISA Hamilton)

Given their geographically based structure, ISA sections offer a convenient way for members to take part in ISA initiatives and events. Here are just a few ways you can get involved and contribute at the section level:

- Team up with other ISA members to explore common professional interests.
- Invite guest speakers to section meetings, creating an environment of learning and discovery.
- Arrange section tours of local plants and facilities.
- Develop new networking, social and recreational events.
- Speak at local middle schools and high schools to generate student interest in automation careers.
- Encourage local students to attend section events, participate in the [FIRST® Robotics Competition](#), and become [ISA student members](#).
- Fund scholarships for local college and university students who demonstrate potential and interest in pursuing automation and control careers. Take a minute to review all the current [ISA sections](#) who sponsor scholarship programs. Join them.

If you have not yet connected with your local section, visit www.isa.org, click on [My ISA](#) from the left-hand tool bar, and click on sections.

ISA Division Involvement

As an ISA member, you should take full advantage of your two free technical division memberships: one from the [Automation and Technology Department](#) and one from the [Industries and Sciences Department](#). And why stop at just two? Additional memberships cost only \$10 US each.

Division memberships enable automation professionals the opportunity to:

- Attend, help plan, and conduct technical division symposia and events.
- Stay up to date on current technical trends and news by reading division newsletters and web sites.

- Write, review, or present technical papers for ISA publications.
- Network with colleagues across the globe.
- Explore professional development and gain leadership skills.
- Develop workshops and short courses for division members.
- Exchange ideas and insights through email discussions.

To get specific details on how you can get the most out of ISA division memberships, contact: Steve Allison, the Automation and Technology Department Vice President, at steve.allison@emergingmeasurements.com; and John Campbell, the Industries and Sciences Department Vice President, at campbjr@msn.com.

ISA also offers three Technical Interest Groups (TIGs) for members interested in exploring certain technical fields in greater detail. At this time, ISA features three TIGs: the [Textiles TIG](#), the [Glass and Ceramics TIG](#) and [Leak Detection and Repair TIG](#). For more information on these groups, and to learn how to develop a new TIG, contact Rodney Jones, ISA Technical Divisions, Sections and Symposia at rjones@isa.org.

Working together to improve our careers and our profession. Making the world a better, more innovative, and safer place. Helping pave the way for the automation professionals of tomorrow. That's ISA. And that's why I encourage you to make the most of your ISA membership.

Join me and your fellow members in making 2013 a great year for the Society!

SAVE THE DATE

**ISA Hamilton 13th
Annual Golf
Tournament**

Friday, May 24, 2013



Technical Article

3. Basic Motion Control

Introduction to Servo Systems

By Glen Taylor, eWerks Inc.

Unlike a DC motor that has a mechanical commutator to deliver current to the appropriate windings, the typical brushless servomotor uses an encoder to sense the position of a permanent magnet rotor in relation to the motor's windings. A drive or controller maintains the correct relationship between the magnetic vector in the windings and the rotor position to produce the required torque.

Operating Efficiencies

Brushless servo motors are designed with windings in the stator (outer portion of the motor) and permanent magnets fixed to the rotor. Fins on the motor housing act as a heat sink for the windings. The reduced rotor inertia and lack of a mechanical commutator provide higher speed and acceleration capacity. When compared to a dc motor, the improved efficiency results in higher power ratings for a similar size.

Selecting a Motor

After reviewing the installation requirements examine the speed vs. torque curves in the motor specification. Servomotors have relatively flat curves (Stepper motors have a significant ramp where the torque sharply drops off as the speed increases). If the application involves maintaining a constant position, adding an encoder will close the control loop allowing continuous adjustment of the motor torque. It should be noted that the appropriate electronics might become more expensive than a comparable micro stepping or dc motor control solution.

Why Use a Servomotor?

- Greater Precision - closed loop control
- Highest torque at high speeds
- Brushless construction means no maintenance
- Efficient operation

Typical Servo Motor Control Components

- 1) Encoder
- 2) Amplifier / Drive
- 3) Controller

1) Encoder: The encoder is a position sensor that tells the controller where the shaft is and how fast it is moving. Some servo motors come with built-in encoders. Situations

where an encoder is mounted after a belt drive may cause problems. It is often recommended to use two encoders - one directly on the back of the motor and a second encoder on the 'load'.

2) Amplifier / Drive: In a rotary motor, torque is directly proportional to current. By controlling the current, a servo drive can control the amount of torque produced by the motor. In a linear motor current is proportional to force - the amplifier is directly controlling the amount of force generated.

3) Controller: When a disturbance causes the motor to move off position, the encoder detects this change and creates an error signal. The controller converts this signal into a commanded current driving the motor back to its original position. If the controller wants to move the motor to a new position, it uses a preprogrammed acceleration, deceleration, and speed profile to create the desired motion.

Linear Brushless Servo Motors

Most direct drive linear motors have their windings in a thrust block surrounding a cylindrical rod. Permanent magnets normally found in the rotor are built into this rod. Hall sensors are used for commutation.

A linear incremental encoder provides the closed loop position feedback. Since a rotary to linear conversion is not required, mechanical problems such as backlash and lead error are eliminated.

About the Author:

Glen C. Taylor is the owner of eWerks Inc. for over 25 years (www.ewerksinc.com). He has been involved in the design and manufacture of industrial electronics. His blog is available at www.ThingsThatGoBlink.com. Glen holds a Master of Science degree (with distinction) in Electronic Product Development from the University of Bolton in the UK, a CID certification in circuit board design from IPC Designers Council, and is an authorized Microchip Design Partner. He is also a senior member of IEEE and the ISA.

About the ISA Hamilton Section

The ISA Hamilton Section is the local section of the International Society of Automation for the Hamilton, Burlington, Guelph and Golden-Horseshoe areas of Southern Ontario, Canada. ISA Hamilton Section holds regular meetings, sponsors a variety of educational endeavors, produces an annual exhibition, encourages an open exchange of career opportunities, and promotes the goals & objectives of ISA.

4. Making the Most of your ISA Membership: *InTech* magazine

By Graham Nasby

This article is part of a series of articles about taking advantage of the resources and opportunities that come with your ISA membership.

One of the major benefits of the International Society of Automation's (ISA) membership is ISA's flagship magazine, *InTech*. Published 6 times a year, *InTech* is a peer-reviewed and trustworthy source, providing timely information about recent technical developments, trends in our industry, and details about the sector as a whole.

InTech explores and reports on the entire gamut of the automation field. It has thought-provoking and authoritative coverage of automation technologies, applications, and strategies. As a well-respected member magazine, *InTech* draws on the resources and credibility that come from tens of thousands of dedicated professionals in all fields of automation—ISA members who regularly contribute on-the-scene, expert editorial content. *InTech* takes the form of a 60- to 80-page full-color glossy magazine and is distributed worldwide to ISA's 30,000 members.

The magazine enjoys a much larger distribution than just ISA members, however. Total print distribution is approximately 60,000 per issue. The online edition of *InTech* also garners an additional 40,000 views per issue, not including content that is broadcast at www.automation.com as part of ISA's relationship with that automation news portal. The online version of *InTech* can be found at www.isa.org/InTech.

What goes into an *InTech* issue? The following list describes the typical main sections that can be found in *InTech*:

Cover Story: What are the leading-edge trends, technologies, and applications facing the automation profession today? In each issue, *InTech's* cover story takes an in-depth look at which technologies manufacturers are using today and will use tomorrow.

Process Automation: These feature stories cover systems that control continuous production processes in various industries, as well as equipment that measures the variables of a process, directs the process according to control signals from the process computer system, and provides appropriate signal transformation.

Factory Automation: These features focus on the discrete manufacturing process that involves the assembly of component parts to construct products that are measured in units, such as airplanes, household items, and computer systems.

System Integration: As engineering departments suffer from the slash and burn of the past decade or so, integrators are becoming more visible and important to manufacturers. They truly are key decision makers in selecting which product line the manufacturer uses. Features covered here speak to the technologies and tools needed to be successful.

Automation IT: Engineering and information technology are in the process of blending skills and their technical expertise. Features in this section tell us about how engineering departments and their colleagues from IT are able to work together, speak the same language, and tackle tough issues on the plant floor.

In addition the above main sections, *InTech* also includes a number of regular "departments" which consist of columns, updates and news briefs that are included in every issue. These departments include:

Automation Update: Leading and bleeding edge technologies that will soon hit the industry

Automation by the Numbers: A quick snapshot of industry events through numbers

Executive Corner: Industry leaders sound off

Automation Basics: Covering basic automation process control parameters and technologies

Channel Chat: News and developments from system integrators

Government News: Rules and regulations impacting the industry

Workforce Development: Industry career development and workforce challenges

Standards: Breaking news about developing standards throughout the industry

Talk to Me: Thoughts and analysis from the *InTech* editor

Letters: Letters to the Editor from readers



Young Innovators: Talking shop with the next generation of automation professionals

Association News: ISA members learn more about their association

Product Spotlight: Product spotlights focusing on specific areas and other new products in industry

Products and Resources: New product releases

The Final Say: Views from leaders in the automation profession

From its beginnings in the 1960s, *InTech* magazine continues to be the flagship technical publication for the International Society of Automation. As a major benefit, it helps us keep up to date on industry trends, new automation techniques, and major developments in our industry, as well as giving us regular columns for the leaders in our field. As an ISA member, the next time *InTech* arrives in the mail be sure to take a look through the excellent information provided by this important member benefit.

NEXT ISSUE: ISA's e-Newsletters

About the Author:

Graham Nasby is the VP & President-elect of the ISA Hamilton Section and a voting member of the ISA18 alarm management standards committee. He is also the general symposium chair for the upcoming 2013 ISA Water/Wastewater and Automatic Controls Symposium, which takes place August 6-8, 2013 in Orlando, Florida, USA.

The author wishes to thank Susan Colwell, publisher of InTech, for her assistance with writing this article.

5. Member Meetings: Call for Speakers

As a service to its members, the ISA Hamilton section holds monthly membership meetings. The meetings consist of dinner and a speaker. The meetings generally start at 6:00pm, followed by a 45 minute seminar that begins at 6:30pm.

We are current seeking technical speakers for our 2013-2014 members meetings. Please contact us for more information.

SAVE THE DATE

ISA Hamilton EXPO 2013

Instrumentation & Process Technology Exhibition & Conference

Wednesday, April 3, 2013

**9:00 AM to 5:00 PM
FREE ADMISSION**

Trade Show, Seminars, and Exhibits

Royal Botanical Gardens

680 Plains Road West.
Burlington, Ontario

6. New book on Automation Careers

The ISA has published a new book designed to help the next generation of automation engineers steer clear of common career obstacles and reach their professional objectives.

101 Tips for a Successful Automation Career by Gregory K. McMillan and P. Hunter Vegas consolidates career planning recommendations, guidance on technical issues and challenges, interpersonal and workplace advice, and philosophical observations.

“Through our combined 70 years of experience in management, instrumentation, electrical design, modeling and control, Hunter and I have installed hundreds of millions of dollars’ worth of equipment and managed thousands of projects,” says McMillan, a highly acclaimed automation professional and ISA Life Achievement Award recipient. “Along with our many successes have come some hard lessons learned. We wrote this book to share what works and what doesn’t in order to guide and assist younger automation engineers in their professional journeys.”

Written in an inviting, easy-to-read style, the book is aimed at automation engineers involved in controls systems and instrumentation, and engineering students approaching graduation.

“The book is an interesting mix of facts, advice and useful tips gleaned from our many years in the automation field,” remarks Vegas, senior project leader at Avid Solutions, an industrial process control system integrator based in Winston-Salem, N.C. “It’s not your typical technical resource. It provides a great deal of useful information that is simply not available anywhere else. It’s like gaining all the insights and perspectives of a life-long career in automation without experiencing the gray hair.”

Examples of topics addressed include:

- Planning a career in automation
- Surviving a control system start ups
- Avoiding technical and interpersonal pitfalls
- Dealing with bosses, vendors and co-workers
- Becoming the “go to” person

“We hope that by reading this book, you’ll avoid the errors that we and others have made, and you’ll be better prepared to navigate your way to a long and successful automation career,” Vegas adds.

In his automation career, Vegas has engineered and installed fieldbus systems across a variety of industries; designed robotics and automated gauging systems for Babcock and Wilcox, Naval Nuclear Fuel Division; developed next-generation manufacturing equipment for Bristol Myers Squibb; and held numerous instrumentation, engineering and production management positions at Cytec Industries.

He received a bachelor of science degree in electrical engineering at Tulane University, and a master’s degree in business administration from Wake Forest University.

McMillan is a widely honored automation professional and author. He received the ISA “Kermit Fischer Environmental” Award for pH control in 1991, and the *Control* magazine “Engineer of the Year” Award for the Process Industry in 1994. In 2001, McMillan was inducted into the *Control* “Process Automation Hall of Fame”; in 2003, he was honored by *InTech* magazine as one of the most influential innovators in automation; and in 2010, he received the ISA Life Achievement Award.

He is the author of numerous books on process control, including *Essentials of Modern Measurements and Final Elements for the Process Industry* and *Advanced Temperature Measurement and Control*. He has been the monthly “Control Talk” columnist for *Control* magazine since 2002.

8. ISA Hamilton Section Contacts

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