TECHNICAL NEWS

Motion Control Designed For The OEM

Industrial Indexing Systems, Inc

For over three decades, electronic motion control has been a well-accepted technology in the machine tool industry. The need for precise, repeatable performance and higher production speeds quickly justified the cost of a programmable motion controller with servomotors.

After reaching a level of technical sophistication, value, and marketing acceptance, today's systems allow the OEM designer to use this technology without the uneasy feeling of operating on the outer edge of development

❖ ***Integration of motion control***

Integrating modern motion control into OEM products improves the quality of the items produced by these machines and increases market acceptance. OEM machines using motion control create parts more precisely and repeatably while making the production process more flexible and user-friendly. Throughput increases, diagnostic abilities are enhanced to reduce skilled labor costs to maintain the machine, translating into higher sales and satisfied customers.

❖ ***Increased reliability and cost***

The maturing of motion control technology has attracted many established OEM companies to invest in it and apply it to their products. This market expansion has raised the bar for all motion control suppliers and has increased industry-wide reliability and cost-effectiveness. And the explosion of software-driven products of all types has noticeably enhanced the acceptance of motion control integrated into OEM products. OEMs can meet customers' needs without proposing custom designs by offering machines and systems whose abilities and functional configurations are changeable through software control. As a result, these standard products can be manufactured in larger quantities, lowering prices and raising quality.

❖ ***Strengths of electronic motion control***

Although anything that moves in an OEM machine is a candidate for conversion to electronic motion control, not every opportunity can be cost-justified. The OEM engineer must recognize where to apply this technology. This process begins by knowing the strengths of motion control when used to overcome a weakness, fixing a trouble spot in the OEM equipment, or offering an improved functionality to increase sales potential.

~ Motion profiles with controlled acceleration and deceleration are precise, smooth, and repeatable.

~ The shape of the motion control trajectory is very flexible, ranging from traditional linear segments to S-curve minimum jerk profiles to complex profiles.

~ The trajectory of motion will change on the fly based on process stimuli. A motion control system can follow or synchronize other equipment not driven by another motion control system. Many motion axis

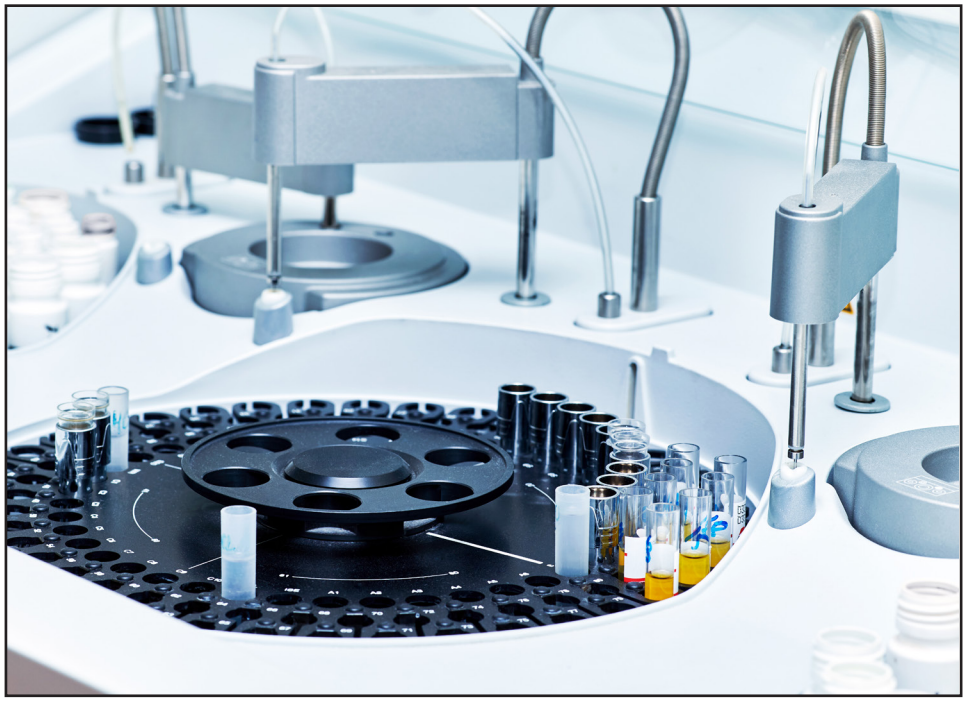
can be precisely synchronized, one to another, or all to a single master. The phase relationship between synchronized axes can be easily changed, similar to a mechanical differential.

~ Complex synchronized motion - electronic cams - can be changed at set up or on the fly, resulting in much greater flexibility than steel cams. The programmer chooses the Master axis or Slave axis at startup or on the fly. Since the motion control system knows each axis's precise location, high-speed registration traps the position's location when

a sensor trips. The registered part uses the difference to realign the product to its proper place. Process data such as torque or force can be monitored and selectively limited to allow the system to stall on a jam-up when running against a hard stop or the zero acting as a clamp during motion or at rest. There's more than motion control available from programmable motion controllers. Modern motion control systems designed around microprocessors and other computer-based technology can handle many more tasks than motion control. One of electric motion control's strengths is software control of master-slave functions.

Additional functions typically include:

- I/O sequencing
- Analog I/O
- Programmable limit switch functions
- Operator interface
- Communications links to PLCs and host computers
- Gathering process control data for ISO-9000 conformance or SPC
- PID loops for process control
- Local and remote diagnostics
- Increased machine throughput



❖ ***Electronic motion control systems increase machine throughput***

To increase machine throughput, use an electronic motion control system. Using an air cylinder or clutch brake to provide movement results in uncontrolled acceleration and deceleration if machine speed increases. At some point, these wild motions cause unacceptable vibration and wear. With electronic motion control, acceleration and deceleration rates are precise, allowing the top speed to increase. Making the motion profile proportional to machine speed replaces the clutch and eliminates wear surfaces.

Another technique is to eliminate start-stop motions. Why bring a piece to rest to work on it when a motion control system can synchronize the part while it's moving? A simple example is a machine that cuts a web into sheets. In a purely mechanical design, the web is indexed, stopped, cut with a stationery knife, and reindexed to start the process again. But it can be modified using motion control to cut the web to a precise length with a rotary knife while the web is moving, often at a very high speed.

Many processes like die-cutting, embossing, and cutoff require that printed matter be lined up or registered with the next operation. These processes will challenge a mechanical system because the changing phase relationships among the various moving parts slow the process considerably. In an electronic motion control system, a sensor uses the position of a mark on the material to adjust the downstream processes to align with that mark. This ability to phase adjust on the fly can be extended using software filters to smooth the adjustments in sophisticated ways. The speed of adjustment can be precise and fast. And interestingly, it is often more limited by the sensor than the motion control system.

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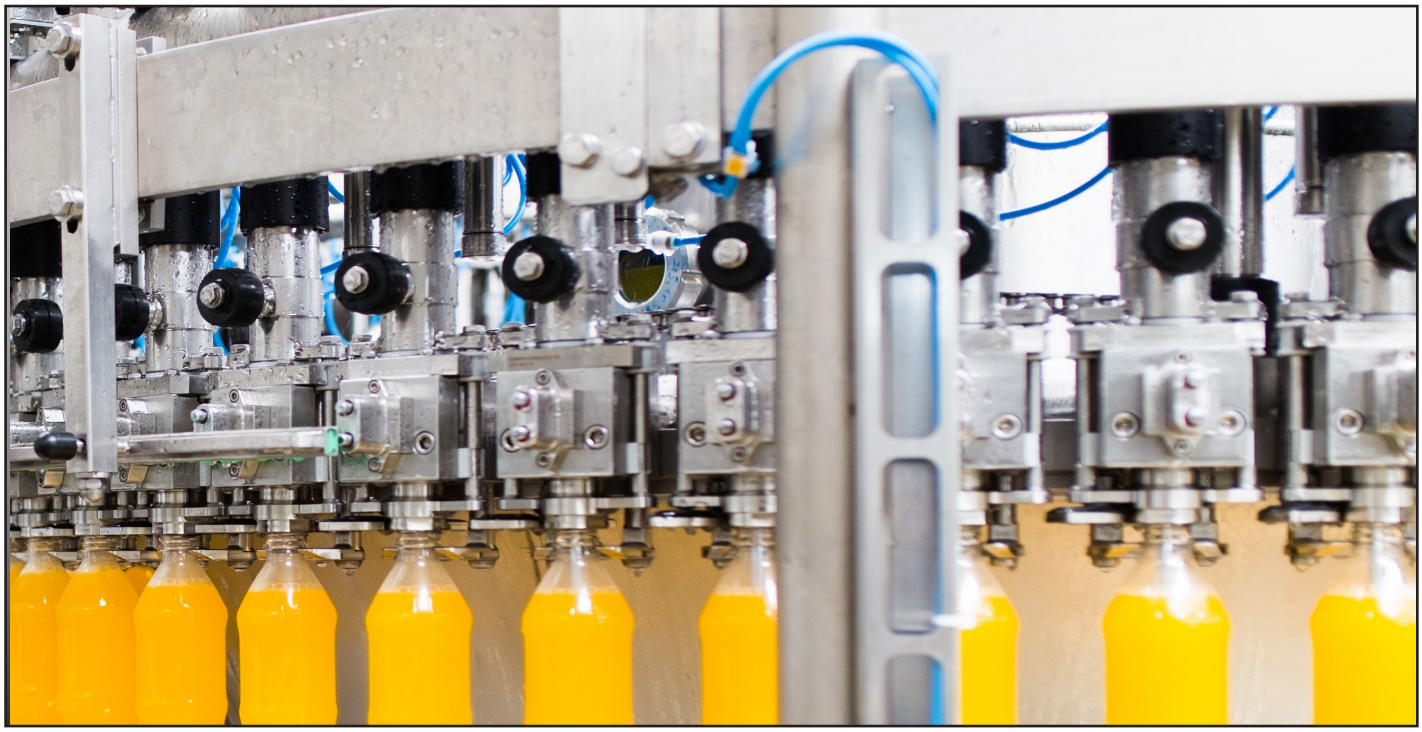

❖ ***Applications abound***

Use a motion control system if your machine uses a mechanical cam, differential phase shifter, or gears to produce synchronized motion to a lineshaft. And your automated system will be much more flexible. Applications requiring glue on complex shapes, routing, or sewing can take advantage of motion control's ability to go directly from CAD to motion control. A perfect example is the bedding industry, where motion control allows an artist to design a comforter sewing pattern without cutting expensive, long lead time metal cams. Winders are also a good application for motion control, along with machines that notch, punch, index, rotate, etc. Packaging and handling equipment are also strong candidates.

❖ ***Is motion control for you?***

Electronic motion control has come of age in the last few years. Once only considered for machine tools and other very high-end applications, it's seriously examined for nearly all OEM machines whenever designs are revised or planning new models. Component costs are steadily decreasing due to standardization and growing volume. Capabilities and quality - already very high - are increasing as well. Most motion control suppliers offer application assistance, training, and software engineering to support their products - and yours. Many local distributors and systems integrators are bringing motion control products into their lines to make local help available.

The electronic motion control marketplace is experiencing explosive growth in both sales volume and breadth of product offerings. There is no reason to wait to apply this easy-to-use technology to your OEM machines. Choose your motion control supplier carefully, then go for it. Your customers - and your bottom line - will thank you for it.

Call us today at (585) 924-9181 to discuss how we can help with your application needs

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The IIS Team

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Headquarters in Victor NY

Our location houses all critical departments: Applications Engineering, R&D, Production, Warehouse, Panel Shop, Quality Control, Sales, Marketing, and Customer Support. Having everything under one roof speeds communications and provides better service to our customers.

Check out our IIS InMotion Blog for the Servo Motion Control Professional ~ https://www.iis-servo.com/blog/

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