FOCUS ON FILAMATIC®
Solutions FOR THE LIQUID PACKAGING INDUSTRY

Vol 1, No. 7

May 2004

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Servomotor Technology: Capping a Revolution in the Packaging Industry

Servomotor technology is one of the building blocks being used to transform the packaging industry. Mechanical systems and processes are being replaced by electronic technologies. Try to imagine a purely mechanical packaging system in your facility now. The changeovers would seem to take forever. The breakdowns would be quota killers. The frequent manual adjustments would be a nuisance. Concern as to whether or not you were running within specifications would be constant. Face it, all of us have come to depend on the efficiency and reliability that servomotors, and other forms of electronic technology, brings to packaging systems and processes.

When servomotor technology was still in its infancy, National Instrument Company engineers recognized its potential for the packaging industry. Fifteen years ago, they developed and manufactured filling systems linking the readily adjusted motion control of a servomotor and the fill volume repeatability inherent in a piston pump. Suddenly, the fill volume of a piston pump system could be adjusted with the push of a button instead of a labor-intensive mechanical process. Servomotor technology had arrived in the packaging industry and the liquid filling process took an exponential leap forward.

The technical staff at NIC's headquarters in Baltimore, MD began addressing the possibility of adapting servomotors, and their digital controls, to our monobloc and capping systems. The results have been significant. Today, virtually all of the functions found in our monobloc and capping systems are servomotor controlled, bringing operational precision and efficiencies to the various packaging processes that are unsurpassed in the industry.

Here are four of the more interesting and unusual capping solutions, incorporating servomotor technology, provided by NIC within the past decade:

Servo Capping Solution #1

Promotion

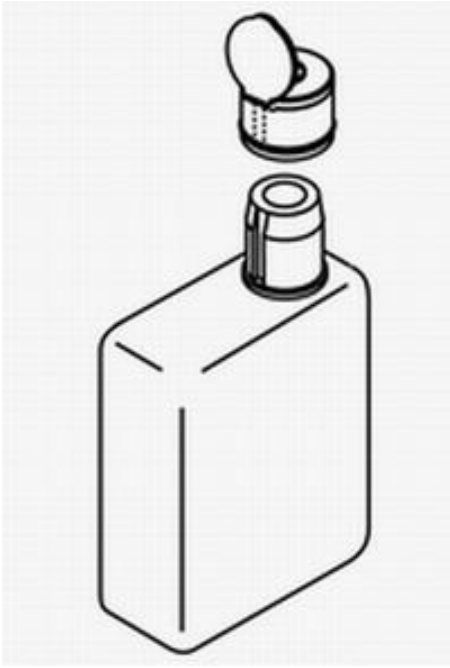
- **FAQs**

www.filamatic.com Website Update

Don't forget to check out our multimedia, interactive, www.filamatic.com website. Navigation tools, including pull-down menus and key word searching, allow visitors to readily access company and product line information organized by equipment/machinery type and customer industry. The website is continually updated with new information regarding NIC's diversified line of FILAMATIC® packaging machinery.

The most recent additions to our website's content include:

- Specification information, in English and Spanish, for our heavy-duty,



Container description: Rectangular cross-section with a neck opening offset toward one end, the container's neck is formed with a groove in its external surface.

Cap description: Snap-on cap with a hinged top and an internal alignment boss (see dotted lines in the cap image) designed to mate with the groove formed in the neck of the container.

Production rate: 100 containers/ minute.

Key elements of the application: In a continuous-motion rotary capping system, a round cap with an internal alignment boss is oriented and snapped onto a container's offset neck so the boss mates with a groove formed in the surface of the neck. Alignment of the boss and groove must be accurate to within ±1.5° for the cap to be successfully applied to the container.

Brief description of the servo solution: ***Click here for VIDEO***

The asymmetric containers are held in a known orientation by the indexing system as they pass through the capping system. The caps are sorted and fed cavity-down. No attempt is made in the feed chute to establish a consistent orientation of the cap's alignment boss. The caps are then picked out of the end of the feed chute by a transfer mechanism. While the cap is being held by the transfer mechanism, a vision system "looks" at the cap to be check its radial orientation -- the position of the alignment boss. Data reporting the cap's position in the transfer mechanism is forwarded to the servomotor-controlled chuck assembly. The servomotor then rotates the chuck to pick up the cap from the transfer mechanism and align the boss in the cap with the groove on the container's neck before the snap cap is applied to the container.

Servo Capping Solution #2

semi-automatic filling solutions including a link to a video clip of their operation

- Spanish-language version of our Filling Unit Application Guide
- A news release and specifications for our vial traying systems
- Information on our CUBITAINER® Filling and Capping Systems

Coming attractions include:

- Testimonials
- A webpage showing our Customer Care statement
- Video of our molten products filling systems
- Additional Spanish-language content

Container description: Oval cross-section with a centered neck opening and continuous threads.

Cap description: Continuous-thread (CT) cap with a rectangular cross-section and 15 mm. threads centered within the cap's rectangular cross-section.

Production rate: 80 containers/minute.

Key elements of the application: In a double-index, intermittent-motion monobloc system, the major axis of a rectangular CT cap is aligned with the major axis of an oval container after approximately 1.5 revolutions of the cap's threads on the container's threads. The alignment of the major axis of the cap must be accurate to within 5° of the major axis of the container. (NOTE: Caps utilized in applications requiring a similar form of cap-container alignment typically incorporate a ¼-turn design.)

Brief description of the servo solution: *Click here for VIDEO*

The oval containers are held in a known orientation by the indexing system as they pass through the monobloc system. The oval turret pockets, conforming to the shape and dimensions of the container body, provide the precise orientation of the container's major axis that is required for the cap alignment process. The caps are sorted and fed, cavity-down, into a cap track/nest assembly from which they are transferred to the necks of the containers by a pick and place mechanism. As the mechanism places the caps on the containers, the caps are rotated to engage, or pre-start, the threads of the caps on the threads of the containers. At the cap tightening/alignment station, servomotor-controlled chucks initially rotate the caps until a minimum application torque value is reached. The capping process is then completed by rotating the cap to achieve the required cap-to-container major axis alignment. Using the servomotor to control the capping chuck allows the monobloc to carefully control the amount of torque applied to the cap and the number of revolutions the cap makes as it is applied to the container.

Servo Capping Solution #3

Container description: Rectangular cross-section with rounded corners and a neck opening offset toward one end. The containers are positioned within a cardboard case during the capping process.

Cap description: Continuous-thread (CT) cap in the form of a measuring cup with 67 mm. threads requiring an application torque of 45 in-lbs.

Production rate: 60 containers/minute.

Key elements of the application: In a continuous-motion, multi-function, in-case packaging system, CT caps are applied, two-at-a-time, to containers positioned within a cardboard case by multiple capping systems.

The "Press Releases" and "Newsletters" webpages, accessed via the "About Us" menu found on our homepage, are noteworthy. The former provides a listing of and access to all press releases, typically new product information, issued by NIC after October 2002. The latter allows a website visitor to access all previous editions of NIC's "FOCUS on FILAMATIC" eNewsletter.

Each of the capping systems possesses a pair of traveling capping spindles. Alignment of the threads in the cap with the threads on the neck of the container must be accurate to within ±0.03" for the cap to be successfully applied to the container.

Brief description of the servo solution:
Click here for VIDEO

Each case of containers is held in a known position by the servomotor-controlled indexing system as it passes through the capping system. The caps are sorted and fed cavity-down onto a positioning plate where they are picked-up by servomotor-controlled chuck assemblies mounted on a servomotor-controlled walking beam mechanism. The various servomotors allow the motion of the walking beam mechanism to precisely match that of the indexing system while the application of the caps to the containers proceeds. Neck location mechanisms assist with the cap application process by grabbing the neck of each container just long enough to allow the threads of the cap to start to engage the threads on the container. Once the threads are fully engaged, the location mechanisms open to provide sufficient clearance to allow the cap to be completely applied to the container.

To achieve the 60 cpm production rate, two capping systems are positioned in series such that each case containing four containers completes the capping process by receiving two caps from each system (i.e. receiving caps on either the leading or trailing pair of containers in the case). Each servomotor-controlled capping system provides the ability to detect "no-cap-in-chuck", improperly torqued cap, and cocked/cross-threaded cap conditions.

A Reminder that Our Search for the Oldest FILAMATIC® Filler Still in Use Continues

National Instrument Company is offering the chance to win one of two $100.00 gift certificates when you assist us in identifying the oldest FILAMATIC® filler still in

Servo Capping Solution #4

Container description: Round or square cross-section with a neck that has a NALGENE® sealing surface at its opening.

Cap description: Continuous-thread (CT) NALGENE® cap with 38 mm. threads requiring an application torque of 25-33 in-lbs. (approximately 50% higher than that for a typical 38 mm. cap) to engage the sealing ring located on the cap's top, internal surface with the sealing surface at the neck opening of the container.

use. One gift certificate will be awarded to the individual in possession of the oldest FILAMATIC® filler still in use while the second will be awarded via a random drawing among all entries. Click here to see the full contest details as shown in last month's FOCUS on FILAMATIC®. We will be accepting entries until 5:00 PM EST on June 25, 2004. Click here to access an e-mail form set up to assist you in submitting the requested information.

Production rate: 40 containers/minute.

Key elements of the application: In an intermittent-motion capping system, CT NALGENE® caps are applied to NALGENE® containers with greater-than-normal application torques and torque-and-hold functionality. The goal is to create a leak-proof seal between a sealing ring located inside the top of the cap and a sealing surface at the container's neck opening.

Brief description of the servo solution: ***Click here for VIDEO***

The containers are held in positioned by a two-station gripper mechanism during the cap application process. The caps are sorted and fed cavity-down into a track/nest assembly. They are then loaded into the chuck assemblies from the nest assembly. The rotation of each chuck assembly -- the torque application process -- is controlled by a servomotor. Using servomotors to operate the capping chucks allows the system to carefully control the higher amount of application torque required by the NALGENE® caps. Once the required application torque has been achieved, each servomotor provides the torque-and-hold functionality required to form the leak-proof NALGENE® seal between the cap's sealing ring and the container's sealing surface. Each servomotor-controlled capping chuck also provides for the detection of improperly or insufficiently torqued caps.

For additional information regarding any of the applications described above, or any other liquid filling or capping application that would benefit from the use of servomotor technology, contact a member of our technical sales group via telephone at (800) 526-1301, or via e-mail by clicking here.

Spare Parts Promotion

Contact Mary or Belen in our customer service department, (800) 526-1301 ext. 258, and mention the four-character alphanumeric code "WCC0", and you will receive a 10% discount, or a 5% additional discount, on bench-top filling systems (i.e. FILAMATIC® Model AB, AB-5, AB-8, DAB-5, or DAB-8 units) and spare parts ordered directly from NIC on or before June 9, 2004. A

FILAMATIC® Servo-operated Vial Traying Systems optimize dependability, flexibility, and efficiency

10% discount will be applied to line items that do not otherwise qualify for any of NIC's standard quantity discounts. A 5% additional discount will be applied to those line items that do qualify for a quantity discount (i.e. four or more filling units and/or nozzles, six or more glass syringes used with FU-0 or FU-50 filling units, and 50 or more filling unit wear components). Maximum discount amount per customer account, during the term of this offer, is $500.00.

When pharmaceutical production involves product lyophilization, manufacturers are discovering that NIC's use of servomotor technology and tool-less changeovers serves up a vial traying system that is dependable, flexible, and highly efficient.

At the heart of each FILAMATIC® traying system is a microprocessor that controls a star-wheel infeed indexer, a two-axis pusher bar mechanism equipped with front and back container stabilizers, and two tray stations mounted on a reciprocating tray support deck. Multiple servomotors create a new level of precision motion control for the pusher bar mechanism and the tray support deck.

The microprocessor-based control system is designed to be highly user-friendly and includes a sophisticated operator interface that provides access to a menu of pre-programmed operating parameters such as tray size and vials per row/column. The star-wheel infeed indexer counts the vials as they enter the pusher bar mechanism and allows an operator to create either a staggered (nested) or unstaggered (non-nested) tray loading pattern. The pusher bar mechanism's front and back container stabilizers eliminate vial tipping and spillage. The reciprocating tray support deck makes it easy to monitor and remove the vials during a production run.

Additional features of FILAMATIC® vial traying systems include:

- A sensor to detect an absence of vials at the infeed indexer
- A sensor to detect the presence of a tray at the loading station
- Sanitary stainless steel construction suitable for all pharmaceutical installations
- Adjustable legs that accommodate an infeed conveyor height of 36"±1"
- No mechanical adjustments, and only a single change part, are required for system set-up/changeover

For the full text of the news release, click here.

FAQs

Q: What is the typical turnaround time for the repair of a semi-automatic/ bench-top filler?

A: One week.

Q: What is the process for identifying and ordering a replacement pump post

DIGIFIL® Update: New Trademark Registrations Highlight Product Line Brand Recognition Efforts

The U.S. Patent and Trademark Office recently registered five trademarks associated with National Instrument Company's newest FILAMATIC® filling systems, namely DIGIFIL®, DOCKAFIL®, AUTOFILSET®, AUTOFILCHEK®, and CLEANAMATIC®. These trademarks will be featured in sales and marketing materials associated with our DIGIFIL® product line to enhance brand recognition.

assembly?

A: Two key dimensions are required to identify the required replacement pump post assembly. These include (1) the size of the pump post's mounting threads (either 5/8"-11 or 3/4"-10), and (2) the length of the pump post's hexagonal body. Once these dimensions have been determined, the replacement pump post assembly's part number can be identified.

Q: Is there a recommended hydraulic fluid for use in my FILAMATIC® filling system's bottom-up cylinder reservoir?

A: Yes, we recommend using Castrol Blue Hydraulic Plus-10 weight fluid.

Q: We are currently using a model DAB-32-2 semi-automatic filler for our liquid products. Can this semi-automatic unit be modified, or upgraded, to a fully automatic filling system to provide increased production as our business

FILAMATIC® DIGIFIL® Filling Systems offer the widest range of liquid metering systems in the industry. They are designed for a variety of filling applications and product types, including those containing particulate matter. DIGIFIL® metering systems include Piston Pumps (below), Lobe Pumps (above, left), and Flowmeters (above, right). Also available, but not shown, are Gear Pumps, Peristaltic Pumps, and Time-Pressure Systems. These metering systems can deliver fill volumes from less than one milliliter up to five gallons. Three standard frame sizes accommodate up to twelve metering systems for production rates of ten to more than 200 cpm.

Our DIGIFIL® filling systems are available in DOCKAFIL® dockable trolley and traditional or non-dockable configurations. In a DOCKAFIL® configuration, the metering systems are mounted on a portable trolley that may be "docked" with a base frame during a production run and "undocked" for system changeover and/or clean-up using a CLEANAMATIC® cleaning system.

Interchangeable trolleys reduce the changeover time between production runs to as little as five minutes and facilitate the implementation of CLEANAMATIC® Remote Clean-In-Place (RCIP) processes. In a traditional DIGIFIL® system configuration, the liquid metering systems are mounted directly on the base frame and may be cleaned using a portable CLEANAMATIC® cleaning system.

A DIGIFIL® control system that includes AUTOFILSET® fill volume and operating parameter adjustment using a touch screen and digitally controlled, menu-driven programming makes tool-less set-ups and changeovers quicker and easier than ever before. The optional AUTOFILCHEK® fill weight compensation feature automatically adjusts fill weights if they fall outside the preset range.

The FILAMATIC® DIGIFIL® product line features stainless steel construction and includes systems equipped with explosion-resistant controls to accommodate hazardous materials. The explosion-resistant controls are designed to meet NFPA Class 1, Division 1, Groups C and D requirements. Comprehensive GAMP, FAT, IQ, OQ, and materials of construction validation documentation are also available.

Click here for more information on our DIGIFIL® Automatic Inline Solutions.

grows?

A: Yes, a semi-automatic model DAB-32-2 unit can be upgraded to a fully automatic model SYN-32-2 or SYN-32-4 system. However, given the rather involved nature of the conversion process, including the addition of a conveyor and other container handling systems and the upgrade of the control system, the semi-automatic machine must be returned to our factory in Baltimore, MD.

Q: What periodic checks can I perform to ensure that my FILAMATIC® bench-top filler continues to operate accurately and reliably?

A: The following assessments should be completed annually.
The pump post and volume control bushings (found in the bearing sleeve housing assembly) should be checked for excessive wear. Any gap between the ID of a bushing and the underlying pump post or bearing sleeve that is more than 0.002" (allowing the bushing to be moved up/ down or side-to-side) will

affect the filling accuracy of the system. When a gap of more than 0.002" is found, the bearing sleeve housing assembly needs to be replaced.

The operation of volume control(s) should be thoroughly evaluated. With all of the filling units removed from the filler, loosen the eccentric post nut on the volume control assembly. Then, turn the adjustment knob to cycle the volume control through its entire range of motion. If it binds at any point, the lead screw assembly may be rusted and some penetrating oil may be required to free it. However, because the threads in the lead screw assembly are very fine, be careful not to apply too much torque while trying to free the assembly. If the lead screw assembly is bent or stripped, replacement will be required.

The drive system should be checked for excessive wear. With the power off, manually rotate the volume control(s) clockwise/counterclockwise to determine the degree of free play present in the drive gears. It should not be excessive, only a few degrees of motion at most. The drive gears will need to be replaced if the free play

has become excessive.

FAQs appearing in previous editions of this eNewsletter may be reviewed by clicking here.

If you enjoy reading this

eNewsletter, and have a friend or colleague that you believe might also benefit from it, click here to refer them to us so that we may forward future issues of "FOCUS on FILAMATIC" to them. Please type their email address(es) in the body of the provided email form. Anyone may sign up for a free, privacy-protected subscription by clicking here. Please provide Name, Title, Company, Email Address and any other information you feel is relevent in the body of the provided email form.

Do you have any comments or suggestions regarding this eNewsletter or a specific feature of FOCUS on FILAMATIC? Please forward any comments or suggestions to Mark Bennett, or call 1-800-526-1301 extension 219.

National Instrument Company
4119 Fordleigh Road - Baltimore, MD 21215 - USA
(410) 764-0900 / 1-800-526-1301