



## Win a Free California Get-Away Weekend!

### Compumotor Application Story Contest

It's simple and easy. Just complete a short entry form, briefly describe your Compumotor motion control application and include a picture of your machine/process. That's it! Any application can win. We'll select a winner during each issue and publish the winning entry in this publication.

#### Here's how it works:

- 1 Complete an *Official Compumotor Application Story Contest Entry Form* and return it to Compumotor. Get the form and detailed instructions by calling our new faxback system—(707) 586-8586

or call Compumotor's Marketing Communications Department at 707-584-2439.

- 2 Entrants must provide a completed form *and photo* of the application/machine. Entries for this issue must be postmarked by April 30, 1998. All entries shall become property of Compumotor. Compumotor ATCs are not eligible.

#### Here's what we're looking for:

- ☛ A complete and accurate description of your application and process
- ☛ A good, clear photo of your machine

The winner will receive a California Get-Away Weekend compliments of Compumotor.

#### The grand prize includes the following:

- ☆ Two round-trip airline tickets to San Francisco (or vicinity)!
- ☆ Accommodations for two nights at a Rohnert Park, CA inn or hotel (45 miles north of San Francisco).
- ☆ A tour of Compumotor's manufacturing plant (lunch included) and a chance to meet the engineers who designed your product(s)!
- ☆ A Compumotor Gift Pack (\$100 value)
- ☆ A free California Bay Area vacation!

First-place and second-place runner-up winners will receive Compumotor Gift Packs and a voucher for a free Compu-School (technical training seminar—\$1,000 value). Compu-School is conducted at Compumotor. Runners-up pay for airfare and accommodations.

**To get an official entry form, call our new faxback system. Request document #2222.**



Compumotor

# Making Moves

AN UPDATE OF AUTOMATION TRENDS

VOL. 4 NO. 1  
FEBRUARY 1998

**NEW! Step Motors for CE Compliant Systems**  
— see pages 2 & 3

**New Literature & Software from Parker Automation**  
— see page 6



A Look Into 1998... and *Beyond*  
The Parker Perspective: Views from Automation Groups GMs

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Compumotor Division  
5500 Business Park Drive  
Rohnert Park, CA 94928

READER RESPONSE

#### Please send me the circled items from page 6:

- 1 Compumotor Step & Servo System Catalog
- 2 Compumotor OEM750 and OEM750X Brochure
- 3 Compumotor SM Series Brushless Servo Motors
- 4 Daedal Positioning Systems and Components Catalog
- 5 Daedal 404XR Series Linear Positioning Tables Brochure
- 6 AAD ET Series Stepper and Servo Linear Actuator Catalog
- 7 AAD ParFrame Structural Extrusion Catalog
- 8 AAD ER Series Stepper and Servo Rodless Actuator Catalog
- 9 Daedal Modular Automation Systems Catalog
- 10 Compumotor Motor Sizing and Selection Software
- 11 AAD StructSURE 3-D AutoCAD 13 Plug-in Software

Please fill out the information below if your label is incorrect or to add a friend to our mailing list.

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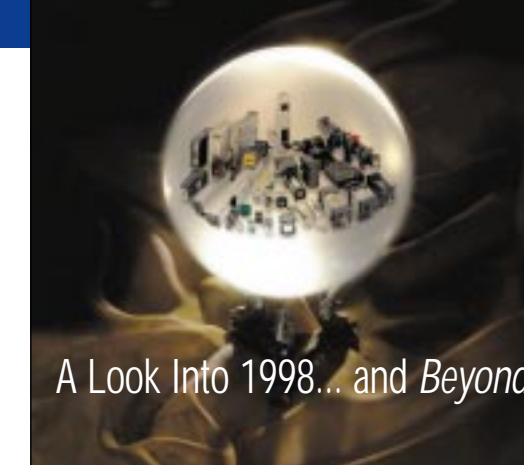
For faster response, simply fax this page back to Compumotor 707/584-2446 — Attn: Newsletter Fulfillment, or mail it back to the address above.



Parker Makes the Grade in a Milk Testing Application

# Parker's Automation Divisions Assess Industry Trends... ...And Set A Course For Success

**A**s the leader in electronic motion control systems and components, Parker Hannifin is in a unique position to assess the current state of the industry and forecast its future. The general managers of Parker's North American Automation Group divisions were recently asked to evaluate their markets and describe how their respective organizations are positioned to meet the challenges of the new year and set the standards for process automation in the next millennium.



A Look Into 1998... and Beyond

## The Current State of The Industry

## Trends & Challenges In the Industry

## 1998 Division Goals & Vision

### Automation Actuator Division

#### Jeff Cullman—GM

- Joined Parker 1978
- Product Sales Manager (Hydraulic Valves) 1982
- Product Sales Manager (Electrohydraulics) 1982
- Application Engineering Manager 1989
- Business Unit Manager (Electrohydraulics) 1993
- Manufacturing Manager (AAD) 1996
- General Manager (AAD) 1997



Significant growth opportunities will continue in 1998 and beyond for electromechanical automation. In many dinner conversations we hear about "the good ol' days." In our opinion these are "the good ol' days." Now is the time to make money in this industry.

We feel that the industry is still very much in the growth phase of the product life cycle providing excellent opportunity. We need to remain fast, aggressive and flexible to take advantage of developing markets and technologies. Parker is uniquely situated to do this with its combination of technically superior channel of independent technology distributors, controls expertise at Compumotor and Digiplan, and mechanical backbone of AAD, Daedal, and Hauser divisions. We can leverage each other's strengths to deliver an optimal solution to the customer.

Connectivity, both mechanical and electrical, is the largest issue that needs to be solved to take advantage of the various motion technologies. The ability to quickly configure and operate a motion system is where the real battle will be won or lost. Design and operating software, open architectures and mechanical modularity will be paramount to the growth of the industry providing the best of class solution to the customer. Those manufacturers who make their products work and interface easily with other elements in the motion system will significantly reduce the user's cost of the technology. Consumers of the technology will flow to the highest value, not lowest costs.

At AAD, we will continue to develop extensions of the ET/ER electric cylinder products towards the medium performance applications. This includes brushed DC motor drives and additional bearing technologies. We will support our products with computer software for design and sales efficiency. Our Structure design tool for Parframe and our pending release of ParCAD drawing generation tools for Electric Cylinder products are just two examples. Parframe products will be expanded as well. We have added 50 new items to our Parframe arsenal this year alone. Pneumatically, we will also introduce products that fit these same growth markets such as grippers and vacuum products. Our challenge is to correctly identify products and features and develop them rapidly to meet market demands. We are prepared to continue the successful process that has led to our successful past product developments. As we grow we will maintain the historical success factors of speed and flexibility.

### Compumotor Division

#### Roy Glassett—GM

- 16 years of experience in semiconductors and computer peripherals prior to joining Compumotor
- Joined Parker 1986 (Compumotor Division) VP of Operations
- Division General Manager (Compumotor Division) 1991



The industry's biggest issue is the growing overlap between machine control and motion control. Machine control is the control of the entire machine including the motion, I/O, operator interface, safety mechanisms, and communication to a higher level of control, if applicable. Motion control is the precise control and coordination of all the motion devices on a machine. These concepts were previously mutually exclusive and complementary. Traditionally, PLCs controlled the machine. When the motion was complex, a special motion controller was used. As processing components are enhanced and refined, the overlap between machine and motion control will grow. Machine builders, will have several options for control ranging from traditional PLC, a full PC solution with PLC emulation software, or softPLC. SoftPLCs allow you to use standard PC hardware with a variety of I/O and other options. The emergence of a softPLC market will change the motion controls you need. Compumotor is committed to working with softPLC companies to keep our products compatible and viable.

The market's greatest challenge is the definition of the "motion BUS". The emergence of high-speed serial communication will remove many application constraints. For example, the highest performance motion controllers currently reside in PC buses to take advantage of the ISA bus' high speed. However, new bus technology like USB or Firewire, at speeds exceeding 100 Mbaud, will change the foundation of your system. These communication rates will obviate the need and constraint of the ISA bus and allow more flexibility in machine design. This speed will also allow a universal hardware platform to operate any of the field bus software protocols. The motion BUS will revolutionize the way motion products are used. The potential benefits of the motion BUS are so great, that there are no less than eight developing protocols. Over time, you will decide which protocol will emerge as the standard. We expect this process to take many years, but the trend is clear. The choices you make will set the course for the next generation of products.

Since motion control products increase factory efficiency, Compumotor measures its success by our customer's improvements in productivity. Compumotor is committed to designing and building the highest quality products in the motion control industry. We are investing in the resources (tools and people) required to consistently deliver quality products. This emphasis on quality maximizes customer "up-time". A goal of Parker Automation is to provide its customers with complete system solutions. Compumotor will continue to design innovative motion controllers, amplifiers, and motors for a wide variety of motion control applications. Our designs emphasize plug-and-play components that minimize set-up time, front-end software tools to simplify programming, and connectivity features that provide flexible integration into each customer's overall control scheme. Finally, Compumotor will continue to work with your local ATC (authorized Parker distributor) to deliver the industry's finest customer service and technical support, as well as the shortest leadtimes.

### Daedal Division

#### Steve Myers—GM

- Joined Parker 1980
- Product Sales Manager (Cylinder Division) 19nn
- Manufacturing Manager (Cylinder Division) 19nn
- Plant Manager (Cylinder Division) 19nn
- Business Unit Manager (Cylinder Division) 19nn
- Division General Manager, (Daedal Division) 19nn



Changing global economies and corporate philosophies, are causing increasing numbers of positioning product users to shift from component level products, to application specific products. They are seeking products which meet their needs completely and can be supplied quickly. Re-engineering, for example, has left many companies with diminished resources. They increasingly rely on their suppliers to provide fully engineered and manufactured solutions. However, since budget constraints will always remain paramount, totally custom engineered solutions will often prove too costly. The vast majority of these companies will turn to service oriented suppliers who offer "time-proven" standard line products and have the ability (and willingness) to modify and integrate those products into *drop-in - ready-to-run* solutions in the shortest amount of time. Manufacturers like Parker's Automation Group, who have the breadth of product, engineering expertise, and manufacturing agility to accomplish this, will be the suppliers of choice in the positioning and motion control markets.

The markets of the positioning control industry will increasingly demand *easy to apply* solutions for their needs. Customers will insist that standard products be versatile, durable, and easily obtainable. Targeted on these attributes, product advancements will be realized as new technologies continue to emerge. Linear motors, for example, will play an increasing role - even a dominant role in the table industry as performance increases and prices decrease. This is not unlike the advancement of servo motor systems over step motors as the preferred drive for linear tables.

Daedal will be very aggressive in 1998, establishing new industry benchmarks for quality, product delivery lead-times, and delivery performance. We will remain focused on improvement in two key areas of customer service: responsiveness and product reliability. To this end, we will continue to make significant capital investments for improvements in both process throughput and product quality. New engineering stations, CNC machining centers, and ergonomic assembly stations have been added to compress the order conversion cycle. The addition of new laser interferometers, which demonstrate the very latest metrological technology, will improve quality assurance. Major investment in both hardware and software will greatly improve the electronic transfer of information - both to and from customers. Daedal tables have been used successfully around the world for over twenty five years. They have been the tables of choice because they offer "worry-free" reliability and they meet the needs of the customer—exactly. Our plan is to continue our program of improvement... to make the best, better.

The challenge for this industry is to successfully address changing customer expectations. Their needs must be correctly identified and fulfilled. Parker's network of distributors (ATCs) employ the most qualified engineers, who possess true insight into the real needs of their customer as well as unrivaled knowledge of motion control products & technology. This, combined with the breadth, strength and versatility of Parker Automation Group's electro-mechanical product lines, explains why Parker will continue to successfully answer the challenge.

# New Step Motors Offer Complete CE Compliant Systems

Compumotor understands the importance of CE in the global marketplace. All motion control systems sold and implemented in Europe must bear the CE Mark. Each system component is required to comply with specific CE Directives to constitute a CE compliant system. Compumotor recently introduced stepper motors that meet the CE Low Voltage Directive (LVD) EN60034-1. The addition of these motors and Compumotor's C10 LVD/EMC/UL Cable Kit enables Compumotor to offer fully EMC compliant systems.

Compumotor offers two series of motors, the O (Octagonal) Series for size 23 frame motors and the R (Round) Series for size 34 and 42 frame motors. These motors meet the CE Low Voltage Directive (LVD) EN60034-1. Compumotor's C10 LVD/EMC/UL Cable Kit allows the user to obtain EMC compliance.

## CE Motor Compatibility

The following products will run O and R Series Motors:

- PDS Series Ministepping Systems
- PD-E Series Ministepping Systems
- ZETA Series Microstepping Systems
- OEM750 Series Microstepping Systems

All of these products are UL recognized and meet the CE Low Voltage Directive. The ZETA4-240 was also designed to meet the CE Electromagnetic (EMC) Directive (89/336/EEC).



## CE/UL Status

The O and R Series motors comply with industry standards/guidelines listed below.

Certification	O Series	R Series <sup>1</sup>
UL Recognized	Work in progress	Yes (UL1004, UL1449)
CE (LVD)	Yes (EN60034-1)	Yes (EN60034-1)
CE (LVD & EMC)	Yes w/C10 type cable & following "Motors with Non-removable Cabling" from the EMC Installation Guidelines	Yes w/C10 Cable Kit
IP Rating	IP23	Never tested—(believed to be IP23) <sup>2</sup>

<sup>1</sup> Pertains to NPS option.

<sup>2</sup> For IP65: Customers must request through Custom Products a single-ended, NPS construction motor with front shaft seal and use a liquid tight bushing or fitting at the NPS thread (e.g., EMC gland in C10 cable kit)

## Size 23 Frame Motors

Compumotor recommends End Bell/Terminal Board Construction for easy EMC installation.

Buss Voltage	CE/UL Status		
	CE (LVD)	CE (LVD & EMC)	UL Recognition
<75VDC	O Series, A Winding	1. Use an LVD motor, an LVD/EMC cable, and follow "Motors with Non-removable Cabling" from the EMC Installation Guidelines. 2. Use Size 23 End Bell Motor and EMC Cable Kit (available through Compumotor's Custom Products Group).	No option at this time. O Series is pending Call Compumotor for availability.
170VDC	O Series, B Winding	Same as above	Same as above
340VDC	Work in progress	Work in progress	Work in progress

## Size 34 & 42 Frame Motors

Compumotor recommends End Bell/Terminal Board Construction (NPS) for EMC.

Buss Voltage	CE/UL Status		
	CE (LVD)	CE (LVD & EMC)	UL Recognition
<75VDC	R Series, B Winding using Parallel connection—LVD not required for voltages below 75VDC	R Series, B Winding, NPS Construction, C10 cable kit Using Parallel connection	R Series, B Winding, NPS Construction, P10 cable option or C10 cable kit using Parallel connection
170VDC	R Series, B Winding	R Series, B Winding, NPS Construction, C10 cable kit	R Series, B Winding NPS Construction, S10, P10 cable options or C10 cable kit
340VDC	R Series, C Winding	R Series, C Winding, NPS Construction, C10 cable kit	R Series, C Winding, NPS Construction, S10, P10 cable options or C10 cable kit

# Parker Makes the Grade in Milk Testing Application

For the past ten years, a milk producer's main laboratory has procured and implemented computerized test equipment to perform various required tests for ensuring milk quality. The pioneer was the Combi-Foss test equipment, which in combination with an advanced material handling system, can analyze milk fat, protein, lactose and leukocytes (it can also analyze more than 1,200 individual samples on a daily basis). Computer systems have also been integrated with the bar-code scanner and tester to consolidate the test results database into one file. These enhanced automations have met regulatory standards since their inception.

The test procedures require that all sample vials, after being warmed, must be shaken 7-8 times with fixed distance movement—ensuring that the milk in each vial achieves even distribution within the liquid. It was a laborious but very necessary task to prepare samples before components testing. This activity can create physical fatigue, potential job-related injury and inconsistency for the long hours of daily operation. Manual vial shaking has been rendered obsolete since the innovative Combi-Foss machine was commissioned to agitate milk sample vials. The complete application is equipped with Compumotor's TQ10X servo drive/controller, SM Series servo motors and motion programs generated with X-ware. The lab technician no longer performs this process manually and is free to perform other tasks.

The new application provides quality preparation of samples under consistent and reliable test conditions. Because the improved material handling and renovated agitation devices are keeping up with the test cycle, a greater number of sample vials can be streamlined through the existing volume. In normal operation, one lab technician is capable of handling the entire work station at a leisurely working pace. The work environment is improved tremendously. In particular, the installation of the low-noise agitator provides ergonomically sound operation and reduced job-related stress, monotony and physical fatigue. The optimum productivity of this operation has now been achieved.



## Runner-Up Winners

1st Runner-Up: *Louis Meharg, Ph.D.* Business: Medical Research  
Application: Finger-Trainer-Dexterity Machine For Stroke Research  
Parker Products Used: PDX Drive/Indexer

2nd Runner-Up: *Roger Blake Suddath* Business: Control Valve Manufacturer  
Application: "HAWCS" Automated Welding System With Torch Oscillation Controller  
Parker Products Used: A Series Drives (2) and PC-23 Controller Board



**Compumotor's Product Training Schedule**  
Expert Instruction By Product Specialists

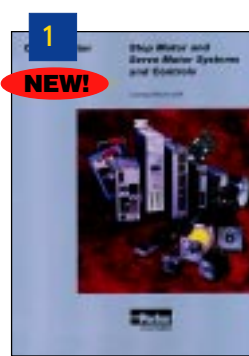


Shorten the development time and improve the integrity and capability of your motion control application by attending a Compu-Course at Compumotor's facility in Northern California. Our hands-on, application-oriented training is conducted by Compumotor engineers. More than 100 designers, engineers, and users have benefitted from this unique training opportunity in the past year. Compumotor's trainers offer an invaluable experience and a wealth of motion control knowledge. Start your application development at a Compu-Course—you'll leave with solutions.

<p><b>CC-1: 6000 Series &amp; Motion Architect (Stepper)</b></p> <p>Designed for users of stepper controllers from the 6000 Series family. This five-day course is held on the following dates: June 1-4, 1998 Nov. 2-5, 1998</p>	<p><b>CC-2: 6000 Series &amp; Motion Architect (Servo)</b></p> <p>Designed for users of servo controllers from the 6000 Series family. CC-2 is a four-day course to be conducted on the following dates: March 23-26, 1998 May 4-7, 1998 June 22-25, 1998</p>	<p><b>CC-3: SX &amp; ZX Training (Servo &amp; Stepper)</b></p> <p>CC-3 is a four-day course designed for SX and ZX users (applicable to Model 500 and most other X-language products, too). It will be held: April 6-9, 1998 Sept. 21-24, 1998</p>	<p><b>CC-4: Model 4000 Training (Stepper)</b></p> <p>CC-4 is suitable for novice and experienced Model 4000 Controller users. May 18-21, 1998</p>	<p><b>CC-5: ZETA6104 Training (Stepper)</b></p> <p><b>NEW!</b> This 4-day course is designed for users of the new ZETA6104 Microstepping Drive/Indexer. March 9-12, 1998 Dec. 7-10, 1998</p>
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**F**ind out more about the innovative solutions and unrivalled support available from Parker Hannifin's Automaton Divisions. We would be happy to send you any of the items described below. Simply circle the appropriate numbers on the reply section on the back page and fax it back to us.



### 1 NEW! Compumotor Step Motor & Servo Motor Systems and Controls Catalog

384-page catalog covers Compumotor's motion control products. AC brushless servo systems, step and microstep systems, linear step motor systems, controls, encoders, application development software and more are described. A detailed engineering section with application examples is also included. **COMPAX Servo controller has been added.**



### 2 Compumotor OEM750 and OEM750X Brochure

The OEM750/750X is Compumotor's new microstepping drive/indexer product for high-volume applications (replaces OEM350 and OEM650 Series). This 12-page brochure provides detailed specs, drive and motor dimensions, and speed/torque curves.



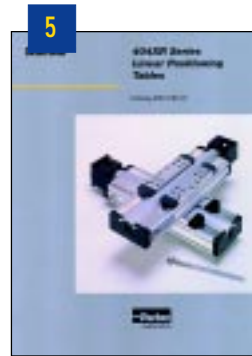
### 3 Compumotor SM Series Brushless Servo Motors

This 8-page brochure contains specs, dimensions, performance curves and more. **This brochure is now delivered with several new flyers on the NeoMetric Series (bridged construction servos), SM160 & SM230 Servo Motors (slotless design), and DC Brushless Servo Amplifiers (trapezoidal).**



### 4 Daedal's Positioning Systems and Components Catalog

This in-depth guide to linear and rotary positioning products and technology has been revamped to make information gathering and product selection easier than ever. New specification charts, selection guides, and technical tutorials make this catalog invaluable for positioning and motion control.



### 5 Daedal 404XR Series Linear Positioning Tables Brochure

This brochure gives all the details on Daedal's 404XR Series linear positioning tables. Features include: a high strength aluminum body, square rail linear bearings, high efficiency ball screw drives, stiff drive screw shaft bearings, and convenient mounting slots. This highly adaptable series of linear positioners offers unmatched capabilities, qualities, flexibility, and value.



### 6 AAD's ET Series Stepper & Servo Driven Linear Actuator Catalog

The ET Series Electric Cylinder combines proven performance in a unique, modular design. This catalog makes actuator sizing and selection simple.



### 7 NEW! AAD's ParFrame Structural Extrusion Catalog

This catalog includes the latest extrusion profiles and more than a dozen of the newest accessories. Illustrations inside show numerous guarding and framework solutions.



### 8 AAD's ER Series Stepper & Servo Driven Rodless Actuator Catalog

The ER Series rodless linear actuator catalog provides all of the information necessary to size and select a complete programmable system. The ER Series is ready to mount to stepper and servo motors as well as gearbox reducers.



### 9 Daedal Modular Automation Systems Catalog

The HLE line of high-speed positioners is combined with Parker actuators, structures, motors and drives for modular construction of multi-axis automation systems.



### 10 Motor Sizing & Selection Software (Version 2.7)

This software helps calculate load inertias and required torques. The data you enter is used to produce a variety of machine transmissions and reductions, including leadscrews, gears, belts, and pulleys. This software graphs the results and allows you to select the proper motor from a comprehensive database of more than 200 motors. **Now includes SM Series Servo Motors with the TQ and APEX Drives.**



### 11 STRUCTSURE 3-D AutoCAD 13 Plug-In Software

This unparalleled Windows-style software is quick for the beginning CAD operator and greatly increases productivity for the expert. Its intuitive style draws, labels, and creates bills of material including machining operations for even the most complex design.



### Cable Issues

There are various cable issues associated with CE (LVD/EMC) and UL standards. The following table addresses the primary safety and noise issues related to each standard.

CE (LVD) Cable Issues	CE (LVD & EMC) Cable Issues	UL Recognition Cable Issues
(1) Gauge wire to meet current, voltage, highpot rating, etc. (2) Insulation to meet voltage, temperature and material specifications, etc. (3) Protective Earth For complete LVD cable issues, see 72/23/EEC and 93/68/EEC published by the European Economic Community (EEC) and ZETA4-240 User Guide.	(1) Braided shield (2) 360° connector (EMC gland) (3) Motor connections For complete EMC cable issues, see 89/336/EEC published by the European Economic Community (EEC) and the ZETA4-240 User Guide.	(1) Gage wire to meet current, voltage, highpot rating, etc. (2) Insulation to meet voltage, temperature and material specifications, etc. For complete UL information, see UL508 covering industrial control equipment, UL 1004 construction, and UL1446 insulation class safety standards.

### How To Order CE Motors

#### Size 23 Frame

Series O (Octagonal)	Type S=Standard	Frame Size 2=Size 23 (2.5")	No. of Rotor Stacks H=Half stacks 1=1 stack 2=2 stacks	Winding Type A=75VDC winding (Gray painted motors) B=170VDC winding (Black painted motors)	Shaft S=Single D=Double	Shaft Modification N=Standard (smooth)	Motor Construction/ Hookup FLY=Regular construction with flying (8) leads L10= Regular construction with 10' LVD cable (call for availability)	Encoder Option Blank=No feedback HJ=512 ppr single-ended kit encoder w/12' flying leads (only available on A winding) RE=1000 ppr differential kit encoder w/ line driver & 13' braided shield cable (call for availability) RC=1000 ppr differential kit encoder w/ line driver & 10' braided shield cable (call for availability)
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Motors with the A winding (75VDC) are recommended for use with the OEM750 Series. Motors with the B winding (170VDC) are recommended for use with the ZETA4/6104, ZETA4-240 (@120VAC), PD Series, etc.

#### Size 34 Frame

Series R (Round)	Type S=Standard	Frame Size 3=Size 34 (3.38")	No. of Rotor Stacks 1=1 stack 2=2 stacks 3=3 stacks	Winding Type B=170VDC winding (Black painted motors) C=340VDC winding (Yellow painted motors)	Shaft S=Single D=Double	Shaft Modification N=Standard (smooth)	Motor Construction/ Hookup NPS=End bell/terminal board via 1/2" NPS Pipe thread P10=CE (LVD)/UL, 10' cable option for NPS construction, wired @ motor in Parallel. S10=CE (LVD)/UL, 10' cable option for NPS construction, wired @ motor in Series.	Encoder Option Blank=No feedback EC=1000 ppr differential encoder with line driver and 10' cable (-E Series). Call for availability.
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Motors with the B winding (170VDC) are recommended for use with the ZETA4/6104, ZETA4-240 (@120VAC), PD Series, etc. Motors with the C winding (340VDC) are recommended for use with the ZETA4-240 (@240VAC).

#### Size 42 Frame

Series R (Round)	Type S=Standard E=Enhanced	Frame Size 4=Size 42 (4.33")	No. of Rotor Stacks 2=2 stacks 3=3 stacks	Winding Type B=170VDC winding (Black painted motors) C=340VDC winding (Yellow painted motors)	Shaft S=Single D=Double	Shaft Modification K=Straight Key	Motor Construction/ Hookup NPS=End bell/terminal board via 1/2" NPS Pipe thread P10=CE (LVD)/UL, 10' cable option for NPS construction, wired @ motor in Parallel. S10=CE (LVD)/UL, 10' cable option for NPS construction, wired @ motor in Series.	Encoder Option Blank=No feedback EC=1000 ppr differential encoder with line driver and 10' cable (-E Series). Call for availability.
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Motors with the B winding (170VDC) are recommended for use with the ZETA4/6104, ZETA4-240 (@120VAC), PD Series, etc. Motors with the C winding (340VDC) are recommended for use with the ZETA4-240 (@240VAC).

### R Series C10 CE Cable Accessory

Compumotor offers a CE (LVD & EMC)/UL Step motor cable kit for use with its 34 and 42 Frame CE Motors (R Series). This cable kit includes a 10' CE (LVD & EMC)/UL cable, EMC gland (360° shielded connector), R-clamp, screws, and assembly instructions. Longer lengths of this cable can be ordered through Compumotor's Custom Products Group. This accessory is sold separately.

