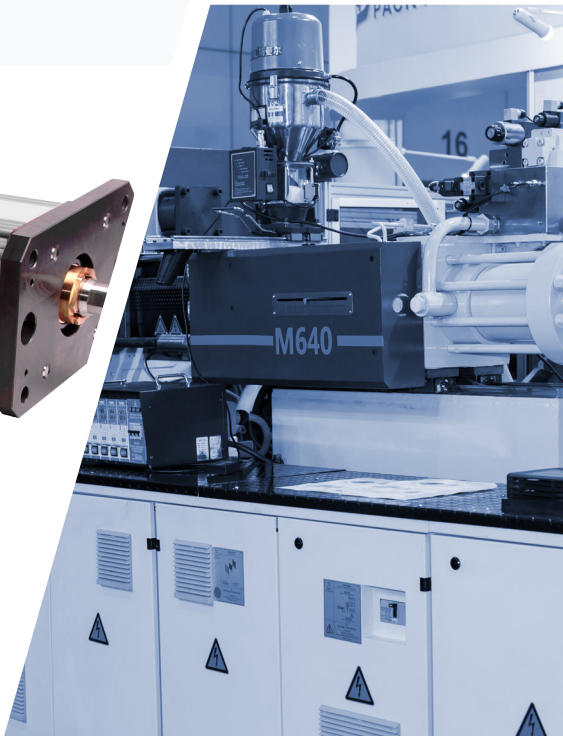
DIAKONT

ENGINEERED TO MOVE

DA Series

Electric Roller Screw Actuators with Integrated Motors



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DA Series Electromechanical Actuators (EMA)

The DA Series electromechanical actuators (EMAs) are equipped with an integrated motor and roller screw to provide superior performance in a compact space envelope. DA Series actuators are also outfitted with patented lubrication ports that support the actuator's only re-lubrication maintenance requirements without having to disassemble the unit or remove it from the customer's machinery.

Diakont is a full-cycle engineering, manufacturing, and service company that supplies motion control solutions that enhance the outstanding lifetime, safety, economy and efficiency of many industries. The DA Series actuators leverage Diakont's proven actuator designs to provide industry leading reliability, force and precision.

Key Features

- Continuous force: up to 22,300 N (5,013 lbf)
- Nominal backlash: 0.1 mm (0.004 in)
- Lead accuracy: 0.025 mm/300mm (0.001 in/ft)
- Speed: up to 833 mm/s (32.8 in/sec)
- Integrated motor and roller screw
- Lubrication ports for easy maintenance without disassembly

State-of-the-Art Solutions

Diakont EMA's incorporate state-of-the-art component designs to provide industry leading precision, power and reliability.

Advanced Roller Screw designs provide a high-performance method for converting rotary torque to linear motion. With more cumulative contact surface and a lack of backlash, Diakont's advanced roller screws significantly exceed competitor solutions in terms of higher reliability, lifetime, load capacity, tolerance to shock loads, absence of vibrations and efficiency output.

Permanent Magnet Synchronous Motor designs are the ultimate solution for providing high accuracy in high dynamic/force motion, while delivering exceptional reliability. The motor's rotating motion is transferred to the output shaft by a "direct drive" system.

Diakont DA Series Actuator Applications

	**Weld Guns**
	**Injection molding** Including hot runner systems
	**Presses** Servo press designs
	**Automation** Machine designs for filling, pressing and cutting
	**Steam Turbine** Power generation actuators and controls for fossil and nuclear plants
	**Machine Tools** Vertical axis and precision machining

Diakont's DA Series actuators are ideal for robotics, weld guns, machine tool positioning, semiconductor manufacturing, packaging machines, injection molding, and more.

DA67/99/140 EMA Specifications

Model	Cont force rating, N (lbf)	Max. velocity, mm/sec (in/sec)	Peak force, N (lbf)	Stroke, mm (in)	Thread lead, mm (in)	Motor type	Dynamic load, N (lbf)
DA67-210-75	723 (162)	833 (32.8)	1446 (325)	75 (2.9)	10 (0.4)	2 stack	7500 (1686)
DA67-210-150				150 (5.9)			
DA67-210-250				250 (9.8)			
DA67-210-300				300 (11.8)			
DA67-22-75	2670 (600)	208 (8.2)	5560 (1250)	75 (2.9)	2.5 (0.1)	2 stack	25270 (5681)
DA67-22-150				150 (5.9)			
DA67-22-250				250 (9.8)			
DA67-22-300				300 (11.8)			
DA99-12-150	9523 (2140)	125 (4.9)	19046 (4282)	150 (5.9)	2.5 (0.1)	1 stack	53600 (12050)
DA99-12-200				200 (7.9)			
DA99-12-300				300 (11.8)			
DA99-15-150	5172 (1162)	250 (9.8)	11000 (2473)	150 (5.9)	5 (0.2)	1 stack	56000 (12590)
DA99-15-200				200 (7.9)			
DA99-15-300				300 (11.8)			
DA99-W25-150	7400 (1664)	250 (9.8)	22000 (4946)	150 (5.9)	5 (0.2)	2 stack	56000 (12590)
DA99-W25-200				200 (7.9)			
DA99-W25-300				300 (11.8)			
DA99-W212-150	3300 (742)	625 (24.6)	8800 (1978)	150 (5.9)	12.5 (0.5)	2 stack	48200 (10836)
DA99-W212-210				210 (8.3)			
DA99-W212-310				310 (12.2)			
DA99-W212-400				400 (15.8)			
DA140-22-205	31170 (7007)	100 (3.9)	60000 (13489)	205 (8.1)	2.5 (0.1)	2 stack	114000 (25628)
DA140-25-220	22300 (5013)	200 (7.9)	44600 (10026)	220 (8.7)	5 (0.2)	2 stack	98000 (22030)
DA140-25-280				280 (11.0)			
DA140-25-350				350 (13.8)			
DA140-212-220	8900 (2001)	500 (19.7)	20422 (4591)	220 (8.7)	12.5 (0.5)	2 stack	68000 (15287)
DA140-212-280				280 (11.0)			
DA140-212-350				350 (13.8)			

DA Series EMA Advantages

Best in Class Lifetime Reliability

Diakont DA Series actuators provide superior service life as a result of using robust components such as roller screws (up to 10 times longer than ball-screw). With a greater number of contact points than ball-screw solutions, roller screws provide increased load capacity and rigidity. Diakont design and manufacturing technologies are specially optimized to increase Roller Screw lifetime, due to the optimized geometry of the roller-screws and hardening technology used in the manufacturing process. Diakont offers complete turnkey EMA solutions as well as individual components for your specified needs.

Compact Design

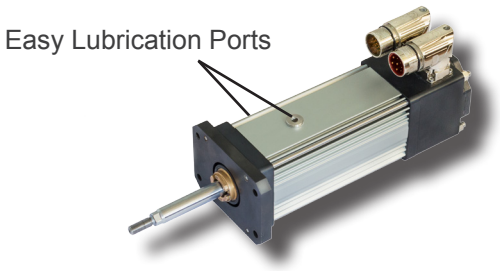
Diakont EMAs are equipped with inverted roller screws, which require much less space than equivalent ball-screw or hydraulic solutions. This compact design allows end users to easily replace hydraulic or pneumatic actuators with Diakont EMAs. The EMA is also compatible with most servo drives.

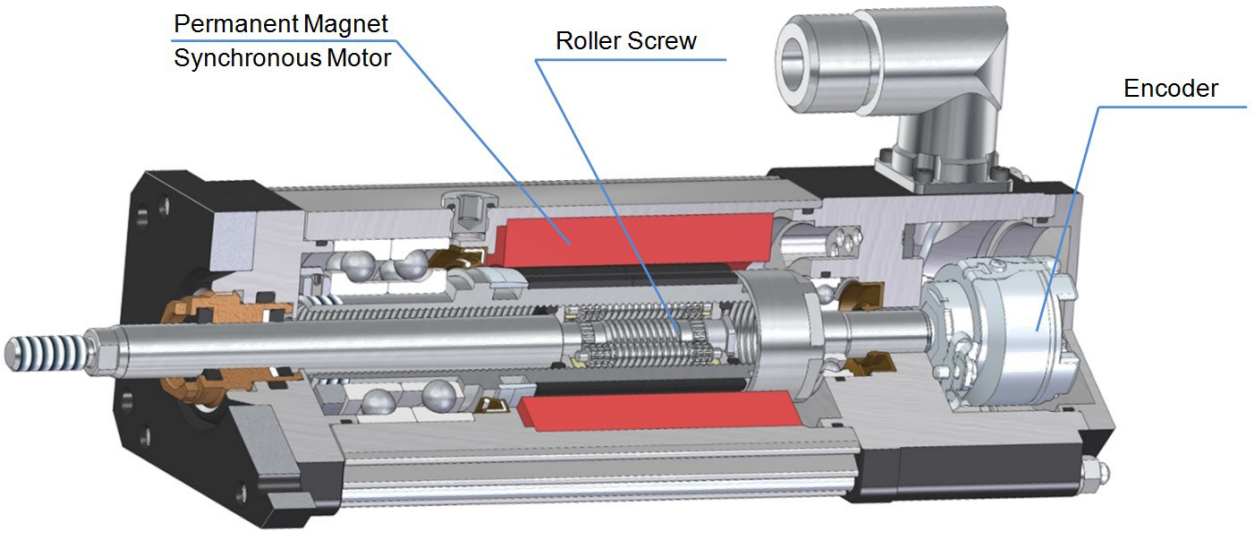
High Accuracy

Diakont DA Series actuators deliver lead accuracy of 0.025 mm/m (0.0003 in/ft) along with a nominal backlash of 0.1 mm (0.004 in) - zero backlash options available upon request. The integration of advanced roller screws, which provide significantly higher positioning accuracy over competitor solutions (due to the precisely machined threads), result in high overall accuracy.

Easy Maintenance

Relubrication is the only maintenance the EMA needs. Diakont EMAs are equipped with easily accessible patented lubrication ports to facilitate scheduled maintenance, without requiring disassembly, recalibration, or removal from the customer's machinery.





Electrical Specifications

DA67 Electrical Specifications

Standard	230 VAC	400 VAC	480 VAC
Rated motor torque	1.53 Nm (13.54 lbf-in)	1.53 Nm (13.54 lbf-in)	1.50 Nm (13.28 lbf-in)
Speed @ Bus Voltage	5000 RPM	5000 RPM	5000 RPM
Power	0.80 kW	0.80 kW	0.78 kW
Insulated thermal endurance class	180 (H)	180 (H)	180 (H)
Thermal switch temperature	130°C (266°F)	130°C (266°F)	130°C (266°F)
Continuous current, A	3.1	1.56	1.26
Peak current, A	6.2	3.2	2.56

DA99 Electrical Specifications

Standard	230 VAC		400 VAC	
	1 Stack	2 Stack	1 Stack	2 Stack
Rated motor torque	5.3 Nm (46.9 lbf-in)	7.9 Nm (69.9 lbf-in)	5.3 Nm (46.9 lbf-in)	7.9 Nm (69.9 lbf-in)
Speed @ Bus Voltage	3000 RPM	3000 RPM	3000 RPM	3000 RPM
Power	1.66 kW	2.9 kW	1.66 kW	2.9 kW
Insulated thermal endurance class	180 (H)	180 (H)	180 (H)	180 (H)
Thermal switch temperature	130°C (266°F)	130°C (266°F)	130°C (266°F)	130°C (266°F)
Continuous current, A	5.7	10.8	3.4	5.3
Peak current, A	11.4	21.6	6.8	10.6

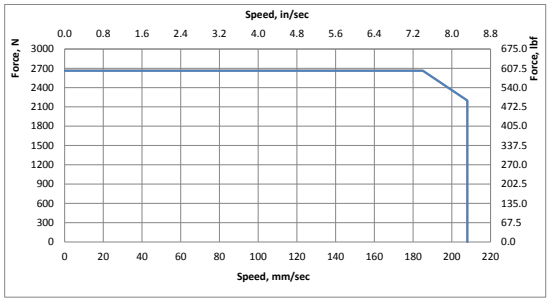
DA140 Electrical Specifications

Standard	230 VAC	400 VAC
Rated motor torque	20.1 Nm (177.9 lbf-in)	20.1 Nm (177.9 lbf-in)
Speed @ Bus Voltage	2400 RPM	2400 RPM
Power	5.6 kW	5.6 kW
Insulated thermal endurance class	180 (H)	180 (H)
Thermal switch temperature	130°C (266°F)	130°C (266°F)
Continuous current, A	20.0	11.6
Peak current, A	40.0	23.2

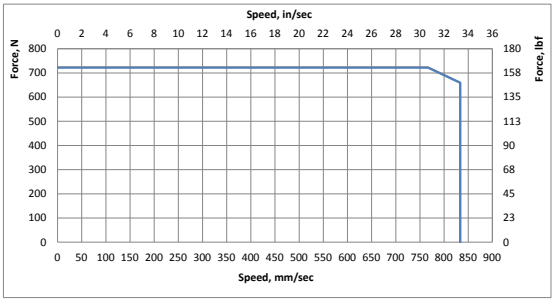
Performance Diagrams

Diakont DA67, DA99, and DA140 Series EMAs utilize permanent magnet synchronous motors to provide rated force throughout the entire range of velocities, even at maximum rod speed.

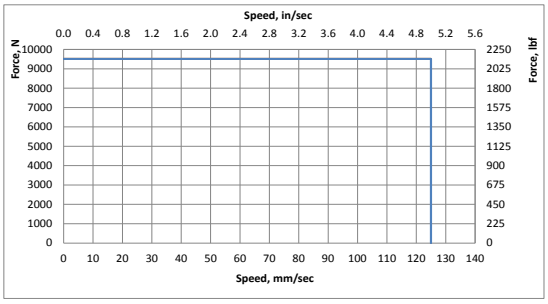
DA67-22



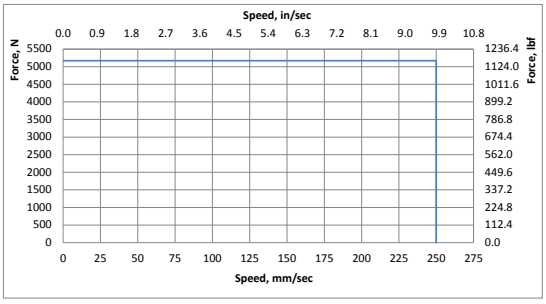
DA67-210



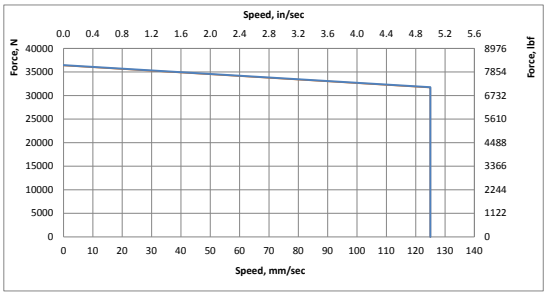
DA99-12



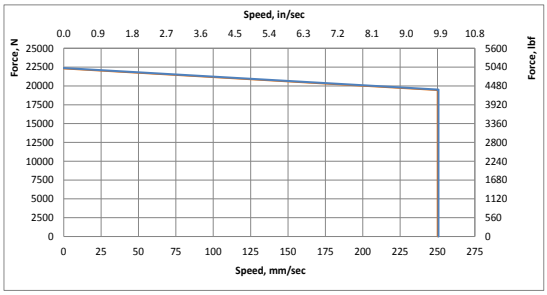
DA99-15



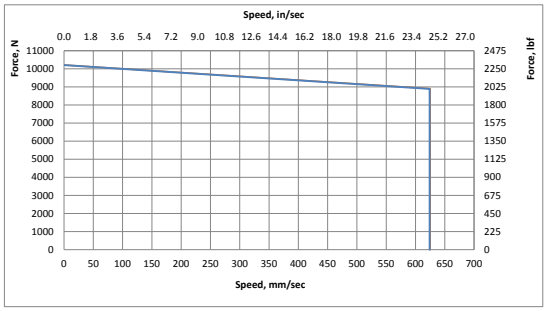
DA140-22



DA140-25

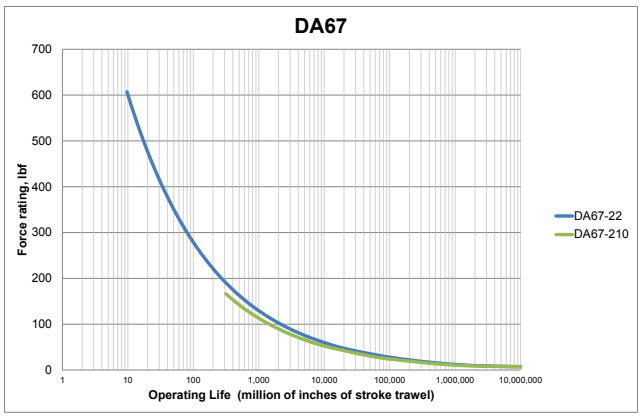


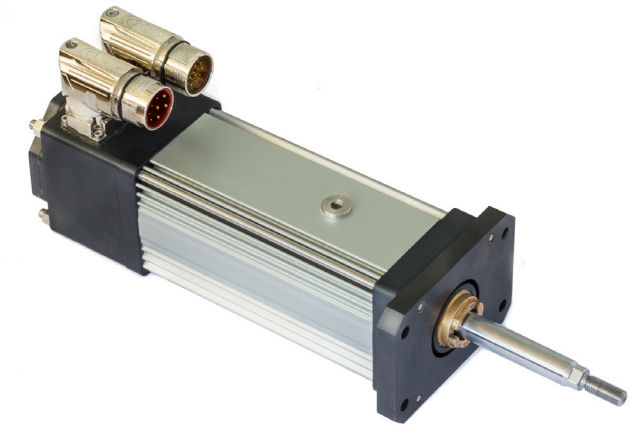
DA140-212



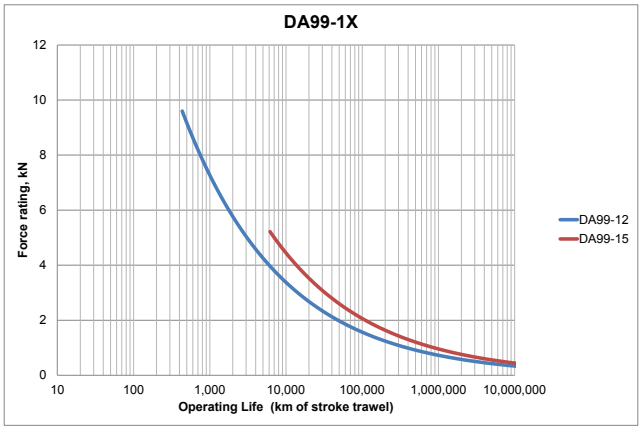
Operating Life

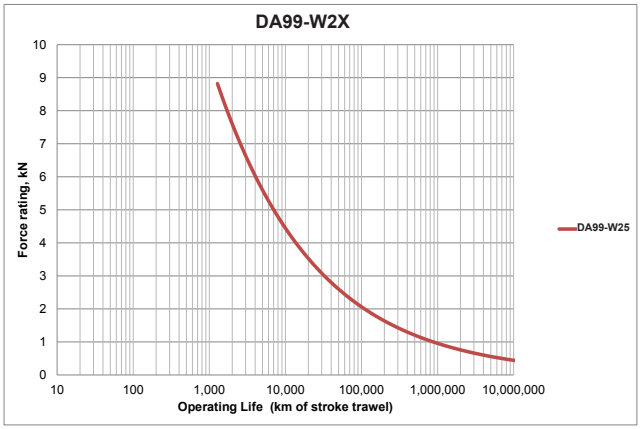
DA67 Operating Life



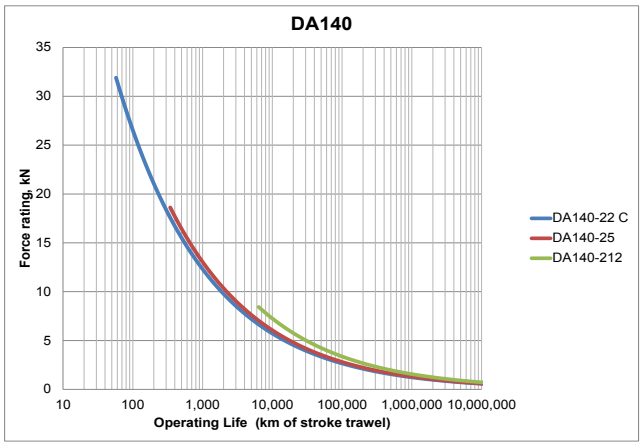


DA99 Operating Life





DA140 Operating Life



Environmental Performance

Diakont DA Series EMAs are constructed from ruggedized components designed to operate reliably in harsh environmental conditions. Aside from operating in temperature extremes, Diakont EMAs are also built to withstand the shock and vibration associated with the most demanding applications. Diakont DA Series can be offered with higher protection levels (IP66) or higher temperature ratings (-55ºC to +150ºC ~ -67ºF to +302ºF).

Environment temperature	-15º to +40ºC (+5º to +104ºF)
Relative degree of humidity	90% at +25ºC (+77ºF)
Protection level	IP65
Vibration	2g, 1-10 Hz
Shockproof	3g, 11 ms
Explosion proof	Optional

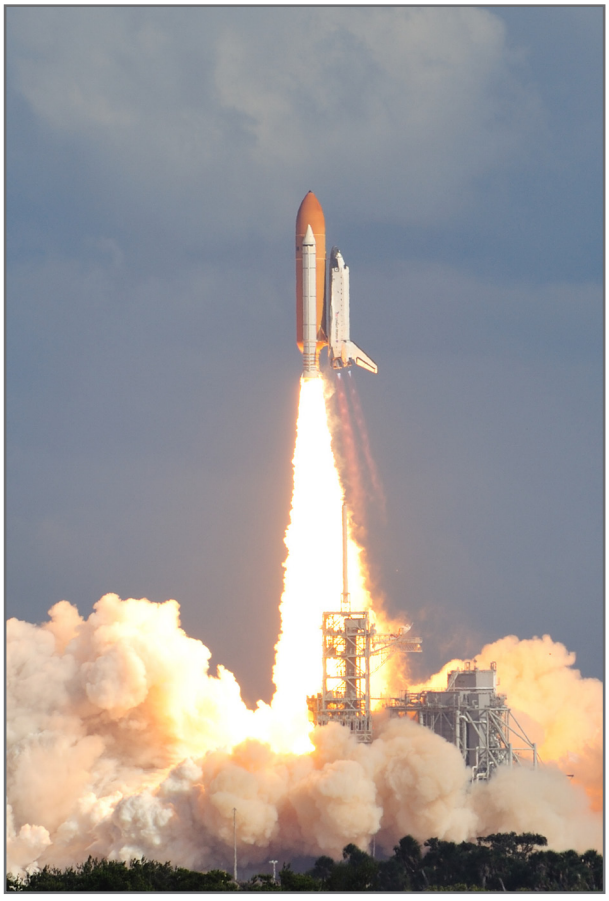
Shock and Vibration Tolerance

Standard Diakont EMAs have high shock and vibration-proof characteristics, achieved through the use of:

- Backlash-free roller screws (with pre-load)
- Vibration-proof, shockproof sensors
- Solid stator without any moving parts

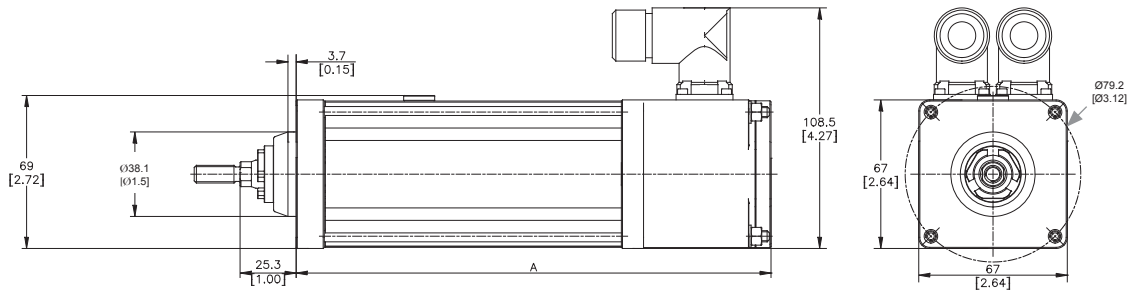
Temperature Tolerance

The EMA can be made in temperature-proof by using a heat-resistant resolver, motor magnets and a special composite designed to operate over a wide temperature range.



DA67 - Specifications

DA67 Dimensions



See the physical specifications table below for length of “A”

DA67 Physical Specifications

The following weight specifications are based on EMAs without front flange mounting.

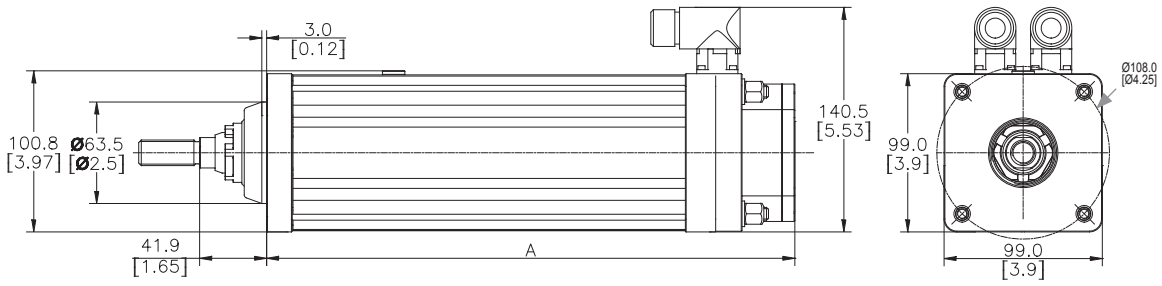
Stroke	75 mm	150 mm	250 mm	300 mm
Length of “A”	214.2 mm (8.4”)	289.2 mm (11.4”)	389.2 mm (15.3”)	439.2 mm (17.3”)
Weight	3.3 kg (7.3 lb)	4.1 kg (9.0 lb)	5.0 kg (11.2 lb)	5.5 kg (11.9 lb)

DA67 Functional Specifications

DA67 Specifications	Standard	Optional
Stroke, mm (in)	75 (2.9), 150 (5.9), 250 (9.8), 300 (11.8)	Based on customer requirements
Voltage	230-480 VAC	
Power	0.5-0.8 kW	
Primary feedback	Incremental encoder or resolver	Absolute encoder (Hiperface)
Lead accuracy, mm/300mm (in/ft)	0.025 (0.001)	
Nominal backlash, mm (in)	0.1 (0.004)	Zero-backlash

DA99 - Specifications

DA99 Dimensions



See the physical specifications table below for length of “A”

DA99 Physical Specifications

The following weight specifications are based on EMAs without front flange mounting.

Model length	Stroke		
	150 mm	200 mm	300 mm
DA99 1 stack	330 mm (13.0”)	380.0 mm (15.0”)	480.0 mm (18.9”)
DA99 2 stack*	320.0 mm (12.6”)	370.0 mm (14.6”)	470.0 mm (18.5”)

Model weight (excluding front flange)	Stroke		
	150 mm	200 mm	300 mm
DA99-12	10.8 kg (23.8 lb)	11.9 kg (26.2 lb)	14.0 kg (30.9 lb)
DA99-15	10.8 kg (23.8 lb)	11.9 kg (26.2 lb)	14.0 kg (30.9 lb)
DA99-25*	10.6 kg (23.4 lb)	11.7 kg (25.8 lb)	13.8 kg (30.4 lb)

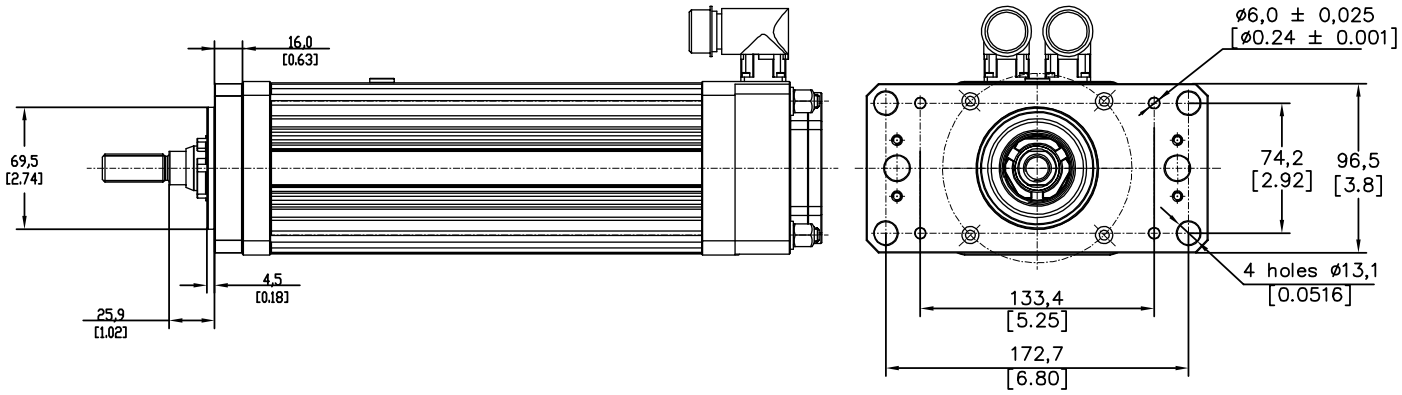
*The size and weight parameters listed for these variants do not include relubrication ports

DA99 Functional Specifications

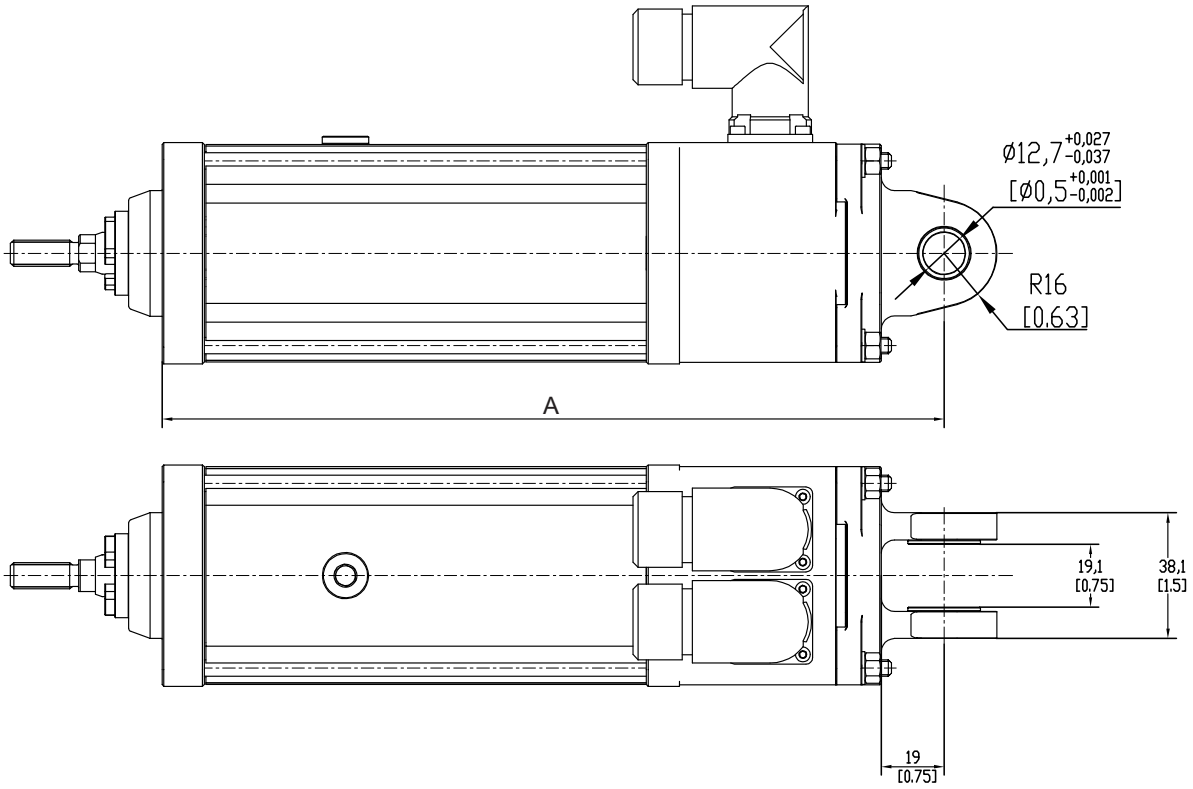
DA99 Specifications	Standard	Optional
Stroke, mm (in)	150 (5.9), 200 (7.9), 300 (11.8)	Up to 450 (17.7)
Voltage	230-400 VAC	Based on customer requirements
Power	1.7-2.9 kW	
Primary feedback	Incremental encoder or resolver	Absolute encoder (Hiperface)
Lead accuracy, in/ft (mm/300mm)	0.001 (0.025)	
Nominal backlash, mm (in)	0.1 (0.004)	Zero-backlash

DA67 Mounting Options

Front Flange Mounting



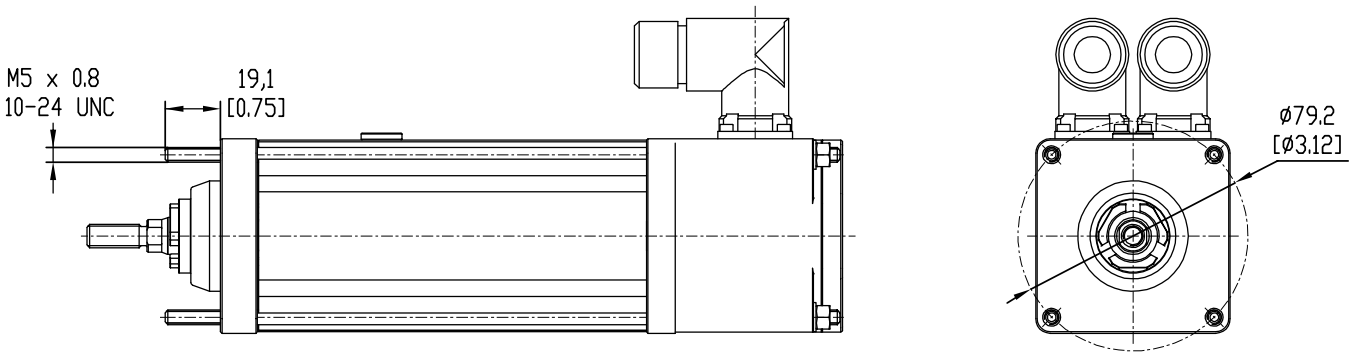
Rear Clevis Mount



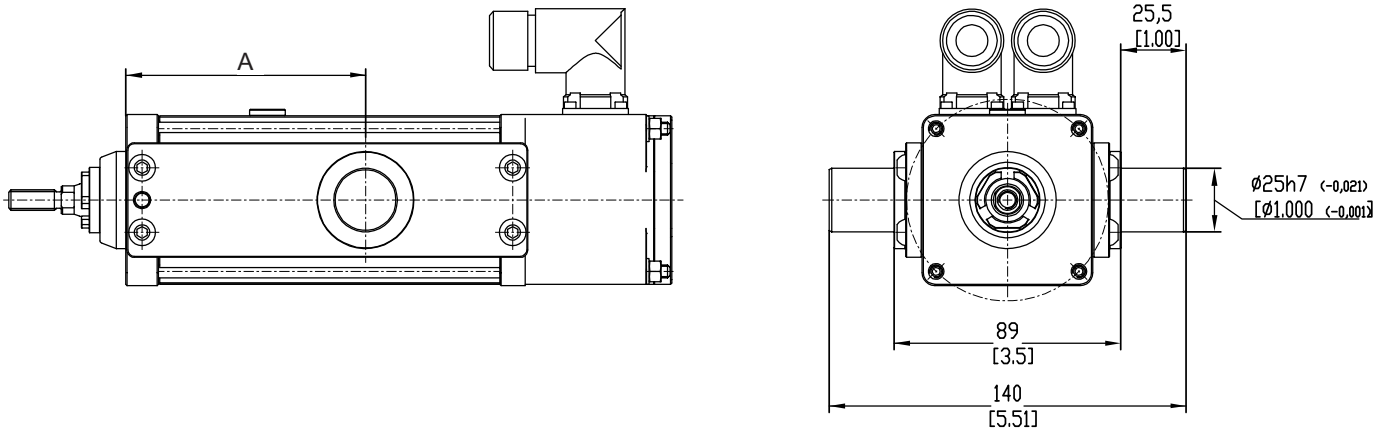
Length	Stroke, mm (in)			
	75	150	250	300
A	237.0 [9.33]	312.0 [12.28]	412.0 [16.22]	462.0 [18.19]

DA67 Mounting Options

Extended Tie-Rod Mounting



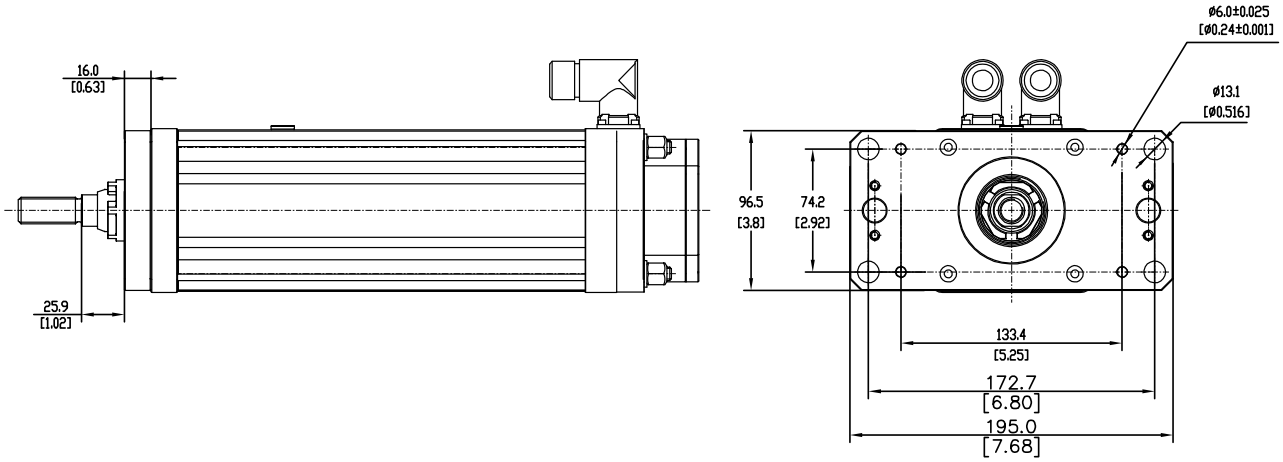
Trunnion Mount



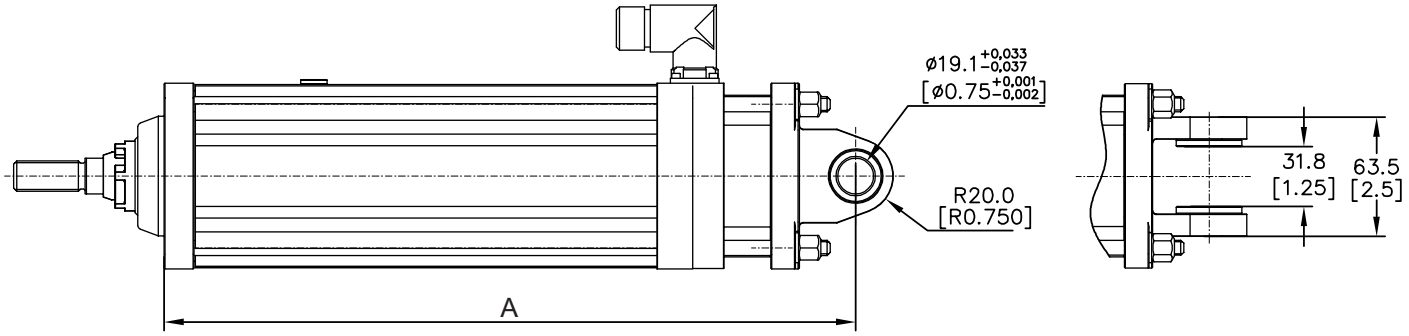
Length	Stroke, mm (in)			
	75	150	250	300
A	94.0 [3.70]	133.0 [5.24]	185.0 [7.28]	210.0 [8.27]

DA99 Mounting Options

Front Flange Mounting



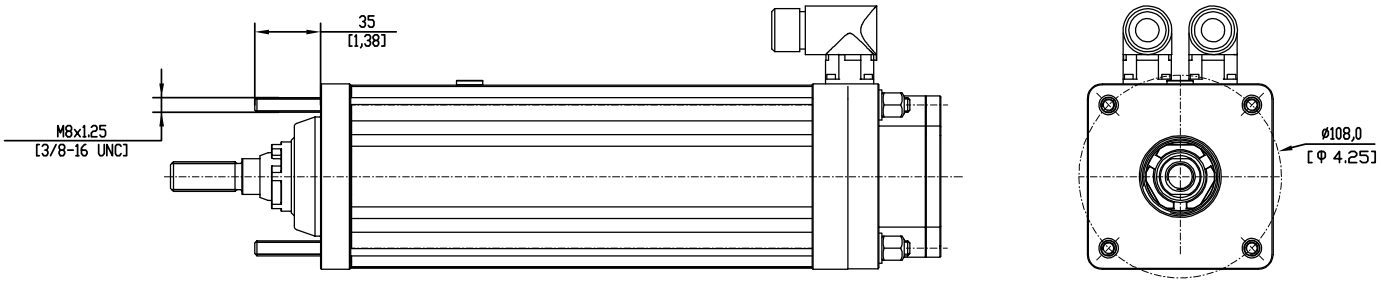
Rear Clevis Mounting



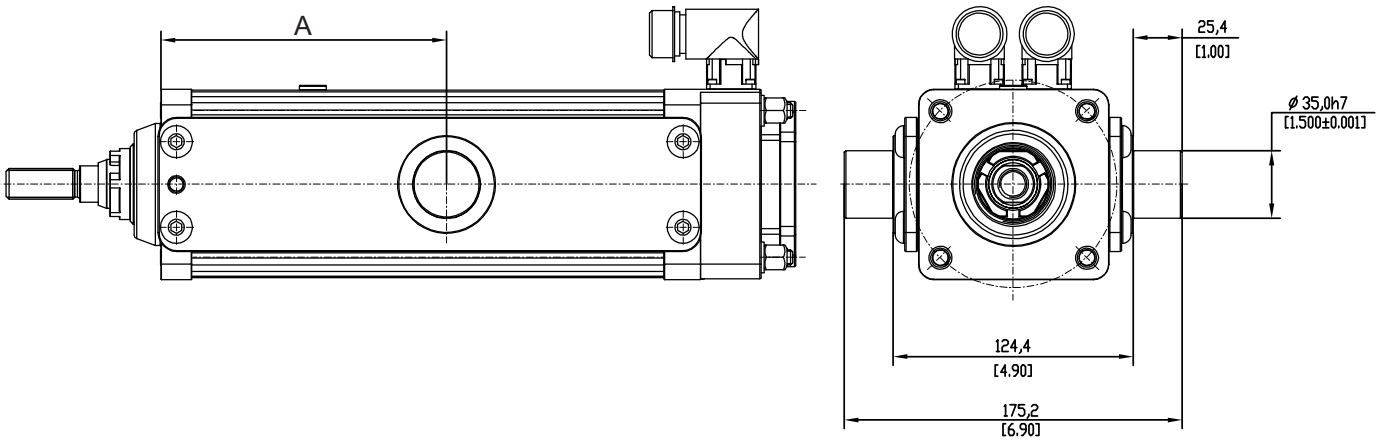
Length	Stroke, mm (in)		
	150	200	300
A	367 [14.5]	417 [16.4]	517 [20.4]

DA99 Mounting Options

Extended Tie-Rod Mounting



Trunnion Mounting



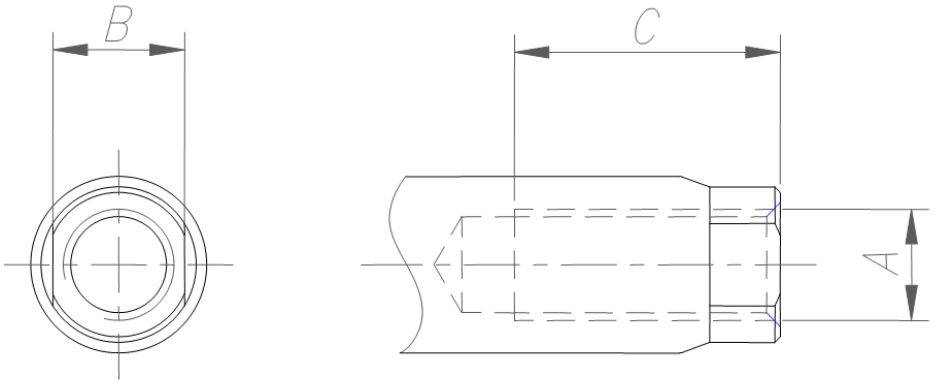
Length	Stroke, mm (in)		
	150	200	300
A	148 [5.8]	198 [7.8]	298 [11.7]

DA140 Mounting

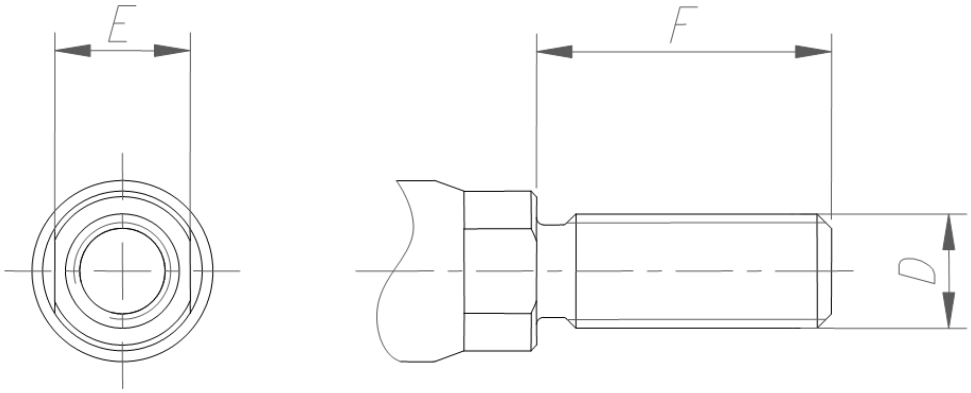
DA140 diagrams and mounting options provided upon request.

Rod Ends

Type E1



Type E2

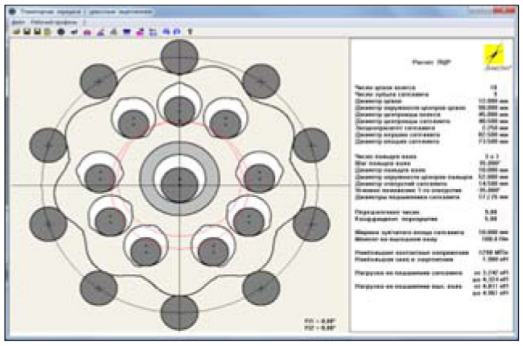


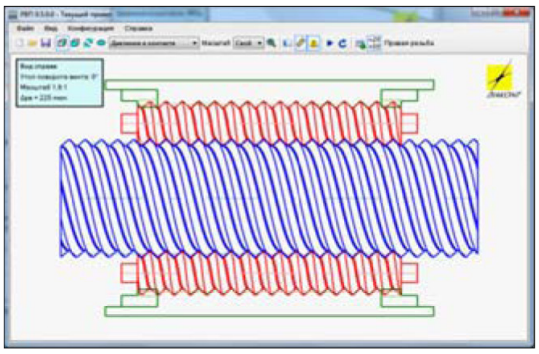
EMA model	Sizes					
	A, mm	B, mm	C, mm	D, mm	E, mm	F, mm
DA67	M8x1	9.5 (0.37”)	19.1 (0.75”)	M8x1	9.5 (0.37”)	24 (0.94”)
DA99	M16x1.5	19.1 (0.75”)	25.4 (1.00”)	M16x1.5	19.1 (0.75”)	38.1 (1.50”)

Design and Development

Diakont offers a broad range of standard actuators to suit most requirements. We also realize that often special application parameters dictate special actuator configurations and modifications. Diakont actuators are designed with this in mind, as many of our products can be readily customized to suit specific requirements. Additionally, Diakont development teams, comprised of mechanical, electrical and application design engineers, handle every aspect of the development process from design to prototype to test and manufacture.

Diakont utilizes cutting edge technology for the design and development of electromechanical actuators and subassemblies. Diakont also created a specialized computer-aided design software for performing calculations and modeling planetary-lantern gears, roller screws, and synchronous motors. This advanced program helps development teams design actuators to exact specifications of power, accuracy, and space constraints.





DA Series EMA Ordering Guide

Model: DA67−22−300−230−S1−SC−F−ME−ABCL2PRST1

Sizes:

67	67 mm (2.6 in)
99	99 mm (3.9 in)
140	140 mm (5.5 in)

Motor type:

1	1 Stack
2	2 Stack

Thread lead/transmission ratio:

2	2.5 mm/rev (0.1 in/rev)
5	5 mm/rev (0.2 in/rev)
10	10 mm/rev (0.4 in/rev) DA67 only
12	12.5mm/rev (0.5 in/rev)

Rod stroke:

75	75 mm (2.95 in) DA67 only
150	150 mm (5.91 in)
200	200 mm (7.87 in) DA99 only
220	220 mm (8.7 in)
280	280 mm (11.0 in)
300	300 mm (11.8 in)
350	350 mm (13.8 in)

Supply Voltage:

230	230 V
400	400 V
480	480 V

Feedback type*:

S1	Sick Stegmann SKM36 absolute encoder
S2	Heidenhain EQN 1125 absolute encoder
S3	Sick Stegmann SRM50 absolute encoder
S4	Heidenhain EQN 1325 absolute encoder
H1	Sick Stegmann CKS36 incremental encoder
H2	Sick Stegmann CFS50 incremental encoder
L1	LTN RE-15-1-A14-06 resolver
F1	Fanuc absolute encoder

Options:

X	No options (select if no options req'd)
A	Anti-rotation device
B	Brake
C	Oil cooling
P	Preloaded roller screw
R	Rear manual drive (available with L1 sensor)
S	Side manual drive
T1	Protective corrugated tube
T2	High-temperature protective corrugated tube
U	Load cell sensor
V	Vibration proof

Rod end:

MA	External inch thread
ME	External metric thread
FA	Internal inch thread
FE	Internal metric thread
BJ	Spherical ball joint (spherical eye)
FJ	Fork joint

Mounting options:

F	Front flange
C	Clevis (not available with F1 sensor)
E	Extended tie-rods
T	Trunnion

(list extends each time after EMA with a new mounting is developed)

Connectors:

SC	Standard M23
FL	Flying leads

*Not all ordering options are available for each model.
Contact a local Diakont representative for more information

ENGINEERED TO MOVE

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