MAXFORCE

PRE-ENGINEERED ELECTRIC LINEAR ACTUATION SOLUTION

SIZE 3

THE ELECTRO-MECHANICAL SOLUTION FOR HIGH PERFORMANCE ACTUATION

WHAT MOVES YOUR WORLD
Moog MaxForce Pre-Engineered Electric Actuation Solutions provide an electro-mechanical alternative to traditional hydraulic actuation. Combining an electro-mechanical servoactuator, a servodrive and integrated software, this high performance solution delivers world-class motion control to a wide array of linear applications, ensuring high speed and high force in today's most demanding industrial environments.
An Integrated System Designed To Achieve Maximum Machine Performance

PERFORMANCE
- Long lasting performance and reliability with integrated design and reduced part count
- Pre-engineered system - servoactuator, servodrive, software - allows for easy set-up and installation

PRECISION
- Ensures more accurate precision motion control
- Low inertia servomotors for higher acceleration
- Lower audible noise compared to hydraulic installation

EFFICIENCY
- Reduces maintenance and operating costs
- Match unique machine designs with a full range of options, sizes and configurations
- Reduces energy consumption
- Eliminates oil leaks

COMMISSIONING SOFTWARE
- Components optimized to work together
  - The MaxForce Pre-Engineered Electric Linear Actuation Solution is an actuation package that employs Moog's innovative brushless servomotor and ball-screw technology, a state-of-the-art servodrive and user-friendly commissioning software. All of the components are optimized to work together to provide the highest level of performance and accuracy.
  - It features genuine Moog components so you can rest assured that you're getting the world-class performance today’s design engineers have come to trust.
  - User-friendly software helps the user reduce system setup time. The commissioning software saves time at system start up by automatically uploading preset system tuning parameters from the absolute encoder. The software also ensures error-free start up by implementing preset safety limits for speed, force and stroke length.

Engineered in advance
- Moog’s depth of motion control expertise provides you with a flexible solution unique to your machine needs. Moog has engineered the majority of the work in advance so that with minimal effort the system can be easily implemented into your application.

World-class components for high performance
- The MaxForce Pre-Engineered Electric Linear Actuation Solution features genuine Moog components so you can rest assured that you’re getting the world-class performance today’s design engineers have come to trust.

User-friendly software
- Moog’s intuitive commissioning software helps the user reduce system setup time.
  - The Servodrive is programmed in user-friendly engineering units eliminating the need for the conversion from RPM to rod speed, from servomotor current to force and from encoder counts to position. This information is preprogrammed into the servoactuator encoder for automatic upload.
  - There is also a Control Panel function and Fault History which allows ease of setup and troubleshooting. Various levels of intelligence and communication options are available.
**SERVOMOTOR PERFORMANCE 300 VOLT**

<table>
<thead>
<tr>
<th>Servo-</th>
<th>Servo-</th>
<th>Gear</th>
<th>Screw</th>
<th>Cont.</th>
<th>Peak</th>
<th>Brake</th>
<th>Max.</th>
<th>Max.</th>
<th>Dynamic</th>
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<tbody>
<tr>
<td>motor</td>
<td>motor</td>
<td>Ratio</td>
<td>Load</td>
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<td>Speed</td>
<td>Linear</td>
<td>Load</td>
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<td>kN</td>
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<td>mm/sec</td>
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<td>Rating</td>
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**SERVOACTUATOR PERFORMANCE**

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<thead>
<tr>
<th>Nominal Backlash</th>
<th>Maximum Backlash</th>
<th>Lead Accuracy</th>
<th>Resolution</th>
<th>Maximum Static Load</th>
<th>Screw Diameter</th>
<th>Environmental Rating</th>
<th>Stroke range</th>
<th>Standard Strokes</th>
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<td>mm (in)</td>
<td>mm (in)</td>
<td>mm/300mm (in/ft)</td>
<td>mm (in)</td>
<td>kN (lb)</td>
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<td>mm (in)</td>
<td>mm (in)</td>
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<tr>
<td>0.002 (0.000787)</td>
<td>0.02 (0.000787)</td>
<td>0.023 (0.00906)</td>
<td>0.00001 (0.0000039)</td>
<td>23 (5170.86)</td>
<td>25 (0.98)</td>
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<td>75-1500 (13.9-59)</td>
<td>100, 200, 300, 400, 500, 750, 1000, 1500 (3.9, 7.8, 11.8, 15.7, 19.6, 29.5, 39.3, 59)</td>
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<table>
<thead>
<tr>
<th>Servoactuator Mass add/unit stroke</th>
<th>kg/mm (lb/in)</th>
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<tbody>
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<td>0.013 (0.728)</td>
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</table>

**DEFINITIONS**

**Continuous Stall Force:**
Force produced by the servoactuator at the continuous servomotor torque and at zero speed. Continuous force declines as servomotor speed increases. Consult performance curves for force rating at higher speeds. Continuous servomotor torque is limited by temperature and thus, the continuous force will be reduced with ambient temperatures above 25°C.

**Peak Stall Force:** Force produced by the servoactuator at the peak servomotor torque and at zero speed. Peak force declines as servomotor speed increases. Consult performance curves for force rating at higher speeds. Peak force can be held only for short durations (typically less than 1 minute) after which a cool down period at less than the continuous rating is required.

**Brake Holding Force:** Maximum force that the optional brake will hold stationary. Brake should not be used to stop a moving servoactuator as damage to the brake will result.

**Maximum Static Load:** Mechanical load limit of the servoactuator components. This is a limitation of the structural components of the servoactuator.

**Dynamic Load Rating:** The load at which the estimated life of a ball screw or bearing will be 1 million revolutions.

**Maximum Speed:** The maximum linear speed for the servoactuator. The available force at maximum speed is significantly less than the Stall Forces. Consult the Performance curves for Force/Speed relationship.

**Accuracy:** The ability of a positioning system to move exactly to a commanded position.

**Repeatability:** The ability of a positioning system to return to the same point from the same direction with the same load.

**Resolution:** The smallest positioning increment possible.

**Lead Accuracy:** The maximum deviation from nominal load over specified interval.

**Maximum Linear Inertia:** This is the maximum load mass that can be connected to the servoactuator. This mass results in 10:1 inertia match to servomotor with 1000 mm stroke. Increasing stroke length will reduce this value while reducing stroke will increase this value. For exact inertia matching, refer to MaxForce sizing software.

**Servoactuator Base Mass:** This is the mass of the servoactuator with 0° stroke. To get total servoactuator mass multiply stroke X servoactuator mass adder and get to servoactuator base mass.
1:1 GEAR RATIO 300 VOLT

**Servomotor Stack Number -6**

![Graph 1: Continuous Force and Peak Force vs. Linear Speed for Servomotor Stack Number -6](image)

**Servomotor Stack Number -8**

![Graph 2: Continuous Force and Peak Force vs. Linear Speed for Servomotor Stack Number -8](image)
PERFORMANCE CURVES: 300 VOLT

1:1.19 GEAR RATIO 300 VOLT

Servomotor Stack Number -6

-883-671-xxxxGxxxxA
1:1.19 gear ratio, 325 VDC 5 mm Lead

-883-671-xxxxGxxxxB
1:1.19 gear ratio, 325 VDC 10 mm Lead

-883-671-xxxxGxxxxD
1:1.19 gear ratio, 325 VDC 20 mm Lead

Servomotor Stack Number -8

-883-871-xxxxGxxxxA
1:1.19 gear ratio, 325 VDC 5 mm Lead

-883-871-xxxxGxxxxB
1:1.19 gear ratio, 325 VDC 10 mm Lead

-883-871-xxxxGxxxxD
1:1.19 gear ratio, 325 VDC 20 mm Lead

Continuous Force
Peak Force
PERFORMANCE CURVES 300 VOLT

1:1.39 GEAR RATIO 300 VOLT

**Servomotor Stack Number -6**

-883-691-xxxxGxxxA
1:1.39 gear ratio, 325 VDC 5 mm Lead

**Servomotor Stack Number -8**

-883-891-xxxxGxxxA
1:1.39 gear ratio, 325 VDC 5 mm Lead

**Servomotor Stack Number -6**

-883-691-xxxxGxxxB
1:1.39 gear ratio, 325 VDC 10 mm Lead

**Servomotor Stack Number -8**

-883-891-xxxxGxxxB
1:1.39 gear ratio, 325 VDC 10 mm Lead

**Servomotor Stack Number -6**

-883-691-xxxxGxxxD
1:1.39 gear ratio, 325 VDC 20 mm Lead

**Servomotor Stack Number -8**

-883-891-xxxxGxxxD
1:1.39 gear ratio, 325 VDC 20 mm Lead

Continuous Force  
Peak Force
### SERVOMOTOR PERFORMANCE 600 VOLT

<table>
<thead>
<tr>
<th>Servo-motor Stack Number</th>
<th>Rotor Inertia kg(\cdot)cm(^2) (lb(\cdot)in(^2))</th>
<th>Brake Inertia kg(\cdot)cm(^2) (lb(\cdot)in(^2))</th>
<th>Continuous Stall Torque Nm (in-lb)</th>
<th>Peak Stall Torque Nm (in-lb)</th>
<th>Nominal Speed RPM</th>
<th>Holding Torque Nm (in-lb)</th>
<th>Continuous Current Arms</th>
<th>Peak Current Arms</th>
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<tbody>
<tr>
<td>-6</td>
<td>0.62 (0.00055)</td>
<td>0.18 (0.00016)</td>
<td>2.50 (22.1)</td>
<td>8.30 (73.5)</td>
<td>4800.0</td>
<td>4.50 (39.8)</td>
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<tr>
<td>-8</td>
<td>0.97 (0.00086)</td>
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### SERVOACTUATOR PERFORMANCE

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<tr>
<th>Number</th>
<th>Servoactuator Base Mass kg (lb)</th>
<th>Gear Ratio: 1:</th>
<th>Screw Lead: mm</th>
<th>Cont. Stall Force kN (lb)</th>
<th>Peak Stall Force kN (lb)</th>
<th>Max. Speed mm/sec (in/sec)</th>
<th>Max. Linear Inertia kg (lb)</th>
<th>Dynamic Load Rating (lb)</th>
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<tr>
<td>inline</td>
<td>9.03 (19.9)</td>
<td>5</td>
<td>2.70 (60.6)</td>
<td>8.91 (200.3)</td>
<td>4.99 (112.2)</td>
<td>400 (15.7)</td>
<td>304 (67.1)</td>
<td>16.4 (387)</td>
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<tr>
<td></td>
<td></td>
<td>10</td>
<td>1.35 (363)</td>
<td>4.49 (100.1)</td>
<td>2.49 (561)</td>
<td>400 (15.7)</td>
<td>197 (42.2)</td>
<td>18.2 (4092)</td>
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<td>20</td>
<td>0.67 (152)</td>
<td>1.35 (301)</td>
<td>0.66 (150)</td>
<td>400 (15.7)</td>
<td>176 (387)</td>
<td>18.2 (4092)</td>
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<tr>
<td>foldback</td>
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<td>5</td>
<td>2.70 (60.6)</td>
<td>8.91 (200.3)</td>
<td>4.99 (112.2)</td>
<td>400 (15.7)</td>
<td>200 (444)</td>
<td>19.4 (4092)</td>
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<tr>
<td></td>
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<td>10</td>
<td>1.35 (363)</td>
<td>4.49 (100.1)</td>
<td>2.49 (561)</td>
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<td>197 (42.2)</td>
<td>20 (4092)</td>
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<td></td>
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<td>20</td>
<td>0.67 (152)</td>
<td>1.35 (301)</td>
<td>0.66 (150)</td>
<td>400 (15.7)</td>
<td>176 (387)</td>
<td>20 (4092)</td>
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<tr>
<td>inline</td>
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<td>5</td>
<td>4.07 (89.5)</td>
<td>11.90 (267.5)</td>
<td>4.99 (112.2)</td>
<td>400 (15.7)</td>
<td>801 (1765)</td>
<td>16.4 (387)</td>
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<td>7.13 (165.2)</td>
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<td>16.4 (387)</td>
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<td>16.4 (387)</td>
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<tr>
<td>foldback</td>
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<td>4.07 (89.5)</td>
<td>11.90 (267.5)</td>
<td>4.99 (112.2)</td>
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<td>801 (1765)</td>
<td>16.4 (387)</td>
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<td>2.04 (45.6)</td>
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<td>4.99 (112.2)</td>
<td>781 (1743)</td>
<td>16.4 (387)</td>
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</tbody>
</table>

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PERFORMANCE CURVES 600 VOLT

1:1 GEAR RATIO 600 VOLT

Servomotor Stack Number -6

-883-613-xxxxGxxxA
-883-653-xxxxGxxxA
1:1.0 gear ratio, 565 VDC 5 mm Lead

-883-653-xxxxGxxxB
-883-613-xxxxGxxxB
1:1.0 gear ratio, 565 VDC 10 mm Lead

-883-653-xxxxGxxxD
-883-613-xxxxGxxxD
1:1.0 gear ratio, 565 VDC 20 mm Lead

Servomotor Stack Number -8

-883-813-xxxxGxxxA
-883-853-xxxxGxxxA
1:1.0 gear ratio, 565 VDC 5 mm Lead

-883-853-xxxxGxxxB
-883-813-xxxxGxxxB
1:1.0 gear ratio, 565 VDC 10 mm Lead

-883-853-xxxxGxxxD
-883-813-xxxxGxxxD
1:1.0 gear ratio, 565 VDC 20 mm Lead

Continuous Force
Peak Force
1:1.19 GEAR RATIO 600 VOLT

**PERFORMANCE CURVES: 600 VOLT**

**SIZE 3**

**Servomotor Stack Number -6**

-883-673-xxxxGxxxA
1:1.19 gear ratio, 565 VDC 5 mm Lead

**Servomotor Stack Number -8**

-883-673-xxxxGxxxA
1:1.19 gear ratio, 565 VDC 5 mm Lead

**Servomotor Stack Number -8**

-883-673-xxxxGxxxB
1:1.19 gear ratio, 565 VDC 10 mm Lead

**Servomotor Stack Number -8**

-883-673-xxxxGxxxD
1:1.19 gear ratio, 565 VDC 20 mm Lead

---

**Continuous Force**

**Peak Force**
1:1.39 GEAR RATIO 600 VOLT

---

**Servomotor Stack Number -6**

- **-883-693-xxxxGxxxA**
  1:1.39 gear ratio, 565 VDC 5 mm Lead

---

**Servomotor Stack Number -8**

- **-883-893-xxxxGxxxA**
  1:1.39 gear ratio, 565 VDC 5 mm Lead

---

**Servomotor Stack Number -6**

- **-883-693-xxxxGxxxB**
  1:1.39 gear ratio, 565 VDC 10 mm Lead

---

**Servomotor Stack Number -8**

- **-883-893-xxxxGxxxB**
  1:1.39 gear ratio, 565 VDC 10 mm Lead

---

**Servomotor Stack Number -6**

- **-883-693-xxxxGxxxD**
  1:1.39 gear ratio, 565 VDC 20 mm Lead

---

**Servomotor Stack Number -8**

- **-883-893-xxxxGxxxD**
  1:1.39 gear ratio, 565 VDC 20 mm Lead

---

**Continuous Force**

**Peak Force**
DIMENSIONAL DRAWINGS

INLINE SERVOACTUATOR

<table>
<thead>
<tr>
<th>X</th>
<th>Y mm (in)</th>
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<tr>
<td>Servomotor</td>
<td>Stack Number</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
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<td>70 (2.756)</td>
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<tr>
<td>- 8</td>
<td>70 (2.756)</td>
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Dimensions mm (in)

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<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
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<th>N</th>
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<td>129</td>
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<td>95</td>
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<td>(2.95)</td>
<td>(2.95)</td>
<td>(2.95)</td>
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<td>(3.74)</td>
<td>(2.95)</td>
<td>(2.17)</td>
<td>(0.47)</td>
<td>(0.96)</td>
</tr>
</tbody>
</table>

AA  BB  CC  DD  EE
| 36  | 48  | M20x1.5 | 20  | 9   |
| (1.42)| (1.89)| female  | (0.79)| (0.35)|

FOLDBACK SERVOACTUATOR

Dimensions mm (in)

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
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<td>38.5</td>
<td>168</td>
<td>192</td>
<td>92</td>
<td>75</td>
<td>75</td>
<td>99</td>
<td>129</td>
<td>120</td>
<td>95</td>
<td>75</td>
<td>55</td>
<td>12</td>
<td>108</td>
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<tr>
<td>(9.53)</td>
<td>(1.38)</td>
<td>(1.52)</td>
<td>(6.61)</td>
<td>(7.56)</td>
<td>(3.62)</td>
<td>(2.95)</td>
<td>(2.95)</td>
<td>(3.90)</td>
<td>(5.08)</td>
<td>(4.72)</td>
<td>(3.74)</td>
<td>(2.95)</td>
<td>(2.17)</td>
<td>(0.47)</td>
<td>(4.25)</td>
</tr>
</tbody>
</table>

R  S  T  U  V  W  Z  AA  BB  CC  DD  EE  FF
| 55  | 75  | 40  | 20  | 29  | 43  | 90  | 36  | 48  | M20x1.5 | 20  | 9   | 14   |
| (2.17)| (2.95)| (1.57)| (0.79)| (1.41)| (1.69)| (1.42)| (1.89)| female| (0.79)| (0.35)| (0.55)|

Moog | MaxForce Pre-Engineered Electric Linear Actuation Solution Size 3 | 08/07
ENCODER HOUSING GROUNDING IS ELECTRICALLY CONNECTED TO THE MOTOR HOUSING VIA THE STATOR COUPLING. THE GND (0 V) CONNECTED TO SUPPLY VOLTAGE HAS NO CONNECTION TO THE ENCODER HOUSING.

ELECTRICAL SCHEMATIC WITH ENCODER

(CODE: 1 OR 3)

2 CABLES (XXX = LENGTH IN METERS)
ENCODER: CA65132-001-XXX
POWER:
300V: C22294-001-XXX
600V: CA15987-001-XXX

6 ENERGIZE BRAKE TO RUN
ROD END KITS

ROD END KIT, MALE END OPTION
(CODE: 0)

ROD END KIT, CLEVIS END OPTION
(CODE: 3)

ROD END KIT, SPHERICAL BEARING OPTION
(USED WITH INTERNAL ANTI-ROTATION)
(CODE: 6)

ROD EYE KIT, SPADE END OPTION
(CODE: 4)
ORDERING INFORMATION

BOXCAR MODEL NUMBER EXAMPLE

Model Series Designator: -883

Basic Size

<table>
<thead>
<tr>
<th>Size</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>-883</td>
</tr>
</tbody>
</table>

Motor Stack Length

| 6    | Size 3 |
| 8    | Size 3 |

Basic Form

| 1    | Inline |
| 5    | Foldback 1:1 ratio |
| 7    | Foldback 1:1.19 ratio |
| 9    | Foldback 1:1.39 ratio |

Motor Specific

| 1    | 300 volt |
| 3    | 600 volt |

Motor Stack Length

- Lead
  - A: 5 mm
  - B: 10 mm
  - D: 20 mm

- Brake
  - -: No brake Foldback
  - D: No brake Inline
  - 2: Large brake

- Rod End Style
  - 0: Threaded Male
  - 1: Threaded Female
  - 3: Clevis
  - 4: Rod Eye (Spade)
  - 6: Spherical Bearing

- Mounting Style
  - 0: Front Flange
  - 1: Trunnion
  - 3: Rear Clevis
  - 4: Rear Spade
  - 5: Rear Flange
  - 3, 4, 5: for Foldback Only

- Lubrication
  - G: Grease

Stroke in mm

| 100 | 200 | 300 | 400 | 500 | 750 | 1000 | 1500 | custom |
**FIELDBUS**

High-speed interfaces provide a fully digital link for receiving motion commands, providing feedback of status and initializing controller parameters.

**Supported Fieldbuses include:**
DeviceNet, Ethernet IP, and 16 bit Analog with Encoder Repeat.

**Servomotor Feedback Supported:**
Stegmann Absolute Encoders, Encoder Simulated Output

<table>
<thead>
<tr>
<th>TECHNICAL DATA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>3-phase, 65 Vac to 510 Vac, 1 phase, 103 to 243 VAC</td>
</tr>
<tr>
<td>Auxiliary power supply</td>
<td>24 Vdc, 2A</td>
</tr>
<tr>
<td>PWM Frequency</td>
<td>10 kHz</td>
</tr>
<tr>
<td>Position control loop Frequency</td>
<td>8 kHz</td>
</tr>
<tr>
<td>Speed control loop frequency</td>
<td>8 kHz</td>
</tr>
<tr>
<td>Continuous / peak output current</td>
<td>8A/22A with 3-phase supply; 6A/6A with single phase supply</td>
</tr>
<tr>
<td><strong>Certifications include</strong></td>
<td>UL, CE, ODVA</td>
</tr>
<tr>
<td><strong>Environmental data</strong></td>
<td></td>
</tr>
<tr>
<td>Operating ambient temperature</td>
<td>0 to 40°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-25 to +55°C</td>
</tr>
<tr>
<td>Thermal Protection</td>
<td>70°C to de-rating the servodrive</td>
</tr>
<tr>
<td>Ingress Protection</td>
<td>IP20</td>
</tr>
<tr>
<td><strong>Protection</strong></td>
<td></td>
</tr>
<tr>
<td>Servomotor and servodrive over temperature</td>
<td></td>
</tr>
<tr>
<td>Out of tolerance power supply detection</td>
<td></td>
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<tr>
<td>Encoder/Resolver missing signal detection</td>
<td></td>
</tr>
<tr>
<td>Output Open/Short circuit detection</td>
<td></td>
</tr>
<tr>
<td>PT limiting</td>
<td></td>
</tr>
<tr>
<td>Thermal foldback</td>
<td></td>
</tr>
</tbody>
</table>

**Digital I/O**

- Hardware enable input for process control
- Servomotor Brake Control Output
- Servodrive Ready Output
- Additional 7 programmable inputs and 3 programmable outputs allowing for custom servodrive functionality and monitoring

<table>
<thead>
<tr>
<th>FieldBus Ordering Codes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No FieldBus</td>
<td>G362-R08-00-A-902A</td>
</tr>
<tr>
<td>DeviceNet</td>
<td>G362-R08-40-A-902A</td>
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<tr>
<td>Ethernet IP</td>
<td>G362-R08-90-A-902A</td>
</tr>
<tr>
<td>16 Bit analog with encoder +/- 10v, 0-20mA</td>
<td>G362-R08-70-A-902A</td>
</tr>
</tbody>
</table>
SIZE 3

CONNECTIONS SIZE A

J1   RS232 COMMUNICATIONS
J2A  DIGITAL INPUTS
J2B  DIGITAL OUTPUTS
J2C  SERVODRIVE READY
J2D  SERVOMOTOR BRAKE
J4   ENCODER

DIMENSIONS

Dimensions in mm
TAKE A CLOSER LOOK

Solutions for MaxForce pre-engineered electro-mechanical actuation for high performance applications are readily available by calling +1 716 652 2000 or emailing us at info.usa@moog.com

For more information, visit our Web site or locate the distributor nearest you at www.moog.com/industrial/distributorlocator.