MAXFORCE
PRE-ENGINEERED ELECTRIC LINEAR ACTUATION SOLUTION
SIZE 5

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**
- **Windows™ Format**
- **Specifications**
- **I/O**
- **Motion**
- **Control Panel**

**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.

**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 commissioning software saves time at system start up by automatically uploading preset system tuning parameters off the absolute encoder. The software also ensures error-free start up by implementing preset safety limits for speed, force and stroke length.

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

<table>
<thead>
<tr>
<th>Servomotor Stack Number</th>
<th>Rotor Inertia kg<em>cm² (lb</em>ft²*in⁻²)</th>
<th>Brake Inertia kg<em>cm² (lb</em>ft²*in⁻²)</th>
<th>Continuous Stall Torque Nm (lb*ft/in)</th>
<th>Peak Stall Torque Nm (lb*ft/in)</th>
<th>RPM</th>
<th>Nominal Speed</th>
<th>Brake Holding Torque Nm (lb*ft/in)</th>
<th>Continuous Current Arms</th>
<th>Peak Current Arms</th>
</tr>
</thead>
<tbody>
<tr>
<td>-6</td>
<td>11.50 (0.01018)</td>
<td>3.60 (0.00319)</td>
<td>16.60 (146.9)</td>
<td>40.00 (354.0)</td>
<td>2700.0</td>
<td>30.00 (255.5)</td>
<td>12.9</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>-8</td>
<td>18.40 (0.01629)</td>
<td>3.60 (0.00319)</td>
<td>25.00 (221.3)</td>
<td>60.00 (531.1)</td>
<td>2200.0</td>
<td>30.00 (255.5)</td>
<td>14.8</td>
<td>43</td>
<td></td>
</tr>
</tbody>
</table>

## SERVOACTUATOR PERFORMANCE

<table>
<thead>
<tr>
<th>Number</th>
<th>Servo-actuator Form</th>
<th>Servo-actuator Base Mass kg (lb)</th>
<th>Gear Ratio</th>
<th>Screw Lead</th>
<th>Cont. Stall Force kN (lbf)</th>
<th>Peak Stall Force kN (lbf)</th>
<th>Brake Holding Force kN (lbf)</th>
<th>Max. Speed mm/sec (in/sec)</th>
<th>Max. Linear Inertia kg (lb)</th>
<th>Dynamic Load Rating kN (lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>inline</td>
<td>57.0 (125.5)</td>
<td>1</td>
<td>5</td>
<td>17.29 (3860)</td>
<td>40.89 (912)</td>
<td>33.26 (7478)</td>
<td>200 (7.9)</td>
<td>7656 (16874) (18884)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>1.55</td>
<td>6.72 (0.023)</td>
<td>3.52 (0.008)</td>
<td>3.52 (0.008)</td>
<td>3.52 (0.008)</td>
<td>3.52 (0.008)</td>
<td>3.52 (0.008)</td>
<td>3.52 (0.008)</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td>1.8</td>
<td>1.63</td>
<td>3.52 (0.008)</td>
<td>3.52 (0.008)</td>
<td>3.52 (0.008)</td>
<td>3.52 (0.008)</td>
<td>3.52 (0.008)</td>
<td>3.52 (0.008)</td>
</tr>
<tr>
<td>-6</td>
<td>Foldback</td>
<td>77.9 (171.3)</td>
<td>1</td>
<td>5</td>
<td>27.95 (6283)</td>
<td>65.35 (1465)</td>
<td>33.26 (7478)</td>
<td>183 (7.2)</td>
<td>18540 (46788) (19200)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>1.55</td>
<td>1.63</td>
<td>27.95 (6283)</td>
<td>65.35 (1465)</td>
<td>33.26 (7478)</td>
<td>183 (7.2)</td>
<td>18540 (46788) (19200)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td>1.8</td>
<td>1.63</td>
<td>27.95 (6283)</td>
<td>65.35 (1465)</td>
<td>33.26 (7478)</td>
<td>183 (7.2)</td>
<td>18540 (46788) (19200)</td>
<td></td>
</tr>
<tr>
<td>-8</td>
<td>foldback</td>
<td>82.4 (181.2)</td>
<td>1</td>
<td>5</td>
<td>27.95 (6283)</td>
<td>65.35 (1465)</td>
<td>33.26 (7478)</td>
<td>183 (7.2)</td>
<td>18540 (46788) (19200)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>1.55</td>
<td>1.63</td>
<td>27.95 (6283)</td>
<td>65.35 (1465)</td>
<td>33.26 (7478)</td>
<td>183 (7.2)</td>
<td>18540 (46788) (19200)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td>1.8</td>
<td>1.63</td>
<td>27.95 (6283)</td>
<td>65.35 (1465)</td>
<td>33.26 (7478)</td>
<td>183 (7.2)</td>
<td>18540 (46788) (19200)</td>
<td></td>
</tr>
</tbody>
</table>

## DEFINITIONS

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

**Peak Stall Force:**
- Maximum force produced by the actuator at zero speed. Peak forces decline as motor 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 optional brake will hold stationary. Brakes 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 lead 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 matching 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 add to servoactuator base mass.
1:1 GEAR RATIO 300 VOLT

Servomotor Stack Number -6

885-611-xxxxGxxxA
885-651-xxxxGxxxA
1:1.0 gear ratio, 325 VDC 5mm lead
Linear Speed (in/sec)

Servomotor Stack Number -8

885-811-xxxxGxxxA
885-851-xxxxGxxxA
1:1.0 gear ratio, 325 VDC 5mm lead
Linear Speed (in/sec)

Continuous Force

Peak Force

Moog | MaxForce™ Pre-Engineered Electric Linear Actuation Solution Size 5 | 01/08
PERFORMANCE CURVES: 300 VOLT

SIZE 5

1:1.55 GEAR RATIO 300 VOLT

Servomotor Stack Number -6

885-671-xxxxGxxxA
1:1.55 gear ratio, 325 VDC 5mm lead

Continuous Force
Peak Force

Servomotor Stack Number -8

885-871-xxxxGxxxA
1:1.55 gear ratio, 325 VDC 5mm lead

Continuous Force
Peak Force

885-671-xxxxGxxxB
1:1.55 gear ratio, 325 VDC 10mm lead

Continuous Force
Peak Force

885-871-xxxxGxxxB
1:1.55 gear ratio, 325 VDC 10mm lead

Continuous Force
Peak Force

885-671-xxxxGxxxD
1:1.55 gear ratio, 325 VDC 20mm lead

Continuous Force
Peak Force

885-871-xxxxGxxxD
1:1.55 gear ratio, 325 VDC 20mm lead

Continuous Force
Peak Force
1:1.8 GEAR RATIO 300 VOLT

Servomotor Stack Number -6

885-691-xxxxGxxxA
1:1.8 gear ratio, 325 VDC 5mm lead

Continuous Force  
Peak Force

Servomotor Stack Number -8

885-891-xxxxGxxxA
1:1.8 gear ratio, 325 VDC 5mm lead

Continuous Force  
Peak Force

885-691-xxxxGxxxB
1:1.8 gear ratio, 325 VDC 10mm lead

Continuous Force  
Peak Force

885-891-xxxxGxxxB
1:1.8 gear ratio, 325 VDC 10mm lead

Continuous Force  
Peak Force

885-691-xxxxGxxxD
1:1.8 gear ratio, 325 VDC 20mm lead

Continuous Force  
Peak Force

885-891-xxxxGxxxD
1:1.8 gear ratio, 325 VDC 20mm lead

Continuous Force  
Peak Force
The ability of a positioning system to move exactly to a commanded point. 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 lead 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 matching to servomotor with 1000 nm torque. 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 add to servoactuator base mass.
1:1 GEAR RATIO 600 VOLT

Servomotor Stack Number -6

Servomotor Stack Number -8

Continuous Force
Peak Force
1:1.8 GEAR RATIO 600 VOLT

**Servomotor Stack Number -6**

- **885-693-xxxxGxxxA**
  - 1:1.8 gear ratio, 565 VDC 5mm lead

**Servomotor Stack Number -8**

- **885-693-xxxxGxxxA**
  - 1:1.8 gear ratio, 565 VDC 5mm lead

**Servomotor Stack Number -6**

- **885-693-xxxxGxxxB**
  - 1:1.8 gear ratio, 565 VDC 10mm lead

**Servomotor Stack Number -8**

- **885-693-xxxxGxxxB**
  - 1:1.8 gear ratio, 565 VDC 10mm lead

**Servomotor Stack Number -6**

- **885-693-xxxxGxxxD**
  - 1:1.8 gear ratio, 565 VDC 20mm lead

**Servomotor Stack Number -8**

- **885-693-xxxxGxxxD**
  - 1:1.8 gear ratio, 565 VDC 20mm lead

---

Continuous Force

Peak Force
ENCODER HOUSING GROUNDING IS ELECTRICALLY CONNECTED TO THE MOTOR HOUSING VIA THE STATOR COUPLING. THE GND (O V) CONNECTED TO SUPPLY VOLTAGE HAS NO CONNECTION TO THE ENCODER HOUSING.

ELECTRICAL SCHEMATIC WITH ENCODER

(CODE: 1 OR 3)

CABLES (XXX = LENGTH IN METERS)
ENCODER: CA65132-001-XXX
POWER:
300V: CA28936-001-XXX
600V: CA28937-001-XXX

ENERGIZE BRAKE TO RUN
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

### TECHNICAL DATA

<table>
<thead>
<tr>
<th><strong>Electrical Characteristics</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>3-phase, 65 Vac to 510 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>20A/45A with 3-phase supply</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Certifications include</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>UL, CE, ODVA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Environmental data</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<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>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Protection</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Servomotor and servodrive over temperature</td>
<td></td>
</tr>
<tr>
<td>Out of tolerance power supply detection</td>
<td></td>
</tr>
<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>

### FIELD BUS

**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

### SIZE 4 MAXFORCE SERVODRIVE ORDERING CODES

<table>
<thead>
<tr>
<th>FieldBus Ordering Codes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No Fieldbus</td>
<td>G362-020-00-A-902A</td>
</tr>
<tr>
<td>DeviceNet</td>
<td>G362-020-40-A-902A</td>
</tr>
<tr>
<td>Ethernet IP</td>
<td>G362-020-90-A-902A</td>
</tr>
<tr>
<td>16 Bit analog with encoder repeat +/- 10v, 0-20mA</td>
<td>G362-020-70-A-902A</td>
</tr>
</tbody>
</table>
CONNECTIONS SIZE C

J1 RS232 COMMUNICATIONS
J2A DIGITAL INPUTS
J2B DIGITAL OUTPUTS
J2C DRIVE READY
J2D MOTOR BRAKE
J3 RESOLVER
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.

www.moog.com/industrial

©2008 Moog, Inc.
All trademarks as indicated herein are the property of Moog, Inc. and its subsidiaries.
All rights reserved.
MaxForcePE Size5 CDL723100108
TAW/PDF