

ServoWeldTM Actuators

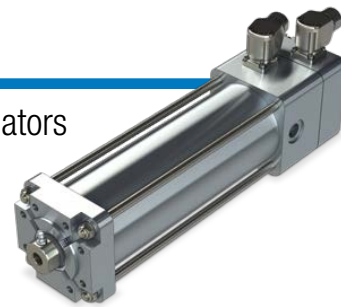
SWA & SWB MODELS



INTEGRAL MOTOR HIGH THRUST ACTUATOR

ServoWeld SWA & SWB

Tolomatic is the world's leading manufacturer of integrated servo actuators for resistance spot welding, used by the world's top weld gun OEM's and numerous global vehicle manufacturers.



Superior Integrated Servo Motor Actuators

Tolomatic's ServoWeld family of integrated servo actuators are designed for best-in-class performance with the factors that are most important for resistance spot welding gun applications.

NUMBER OF WELDS/ PRODUCT LIFE

Tolomatic's superior roller screw design has the **highest dynamic load rating for more welds** than any competitive technology (other roller screws, ball screw, pneumatic).

FORCE REPEATABILITY

Skewed winding designed for welding minimizes motor cogging and **provides industry best actuator force repeatability:** • $\pm 3\%$ Over the Lifetime of the Actuator

EFFICIENCY

All elements of actuator (winding, screw, rod scraper, bearings) are designed to optimize the efficiency of the actuator system and provide the **most energy efficient solution on the market.**

WELDS/ MINUTE

All elements of the actuator (winding, screw, rod scraper, bearings) are designed to last and run as cool as possible in welding applications, with the ability to add water cooling as an option. This means **more welds per minute than any competitive technology** (other roller screws, ball screw, pneumatic).

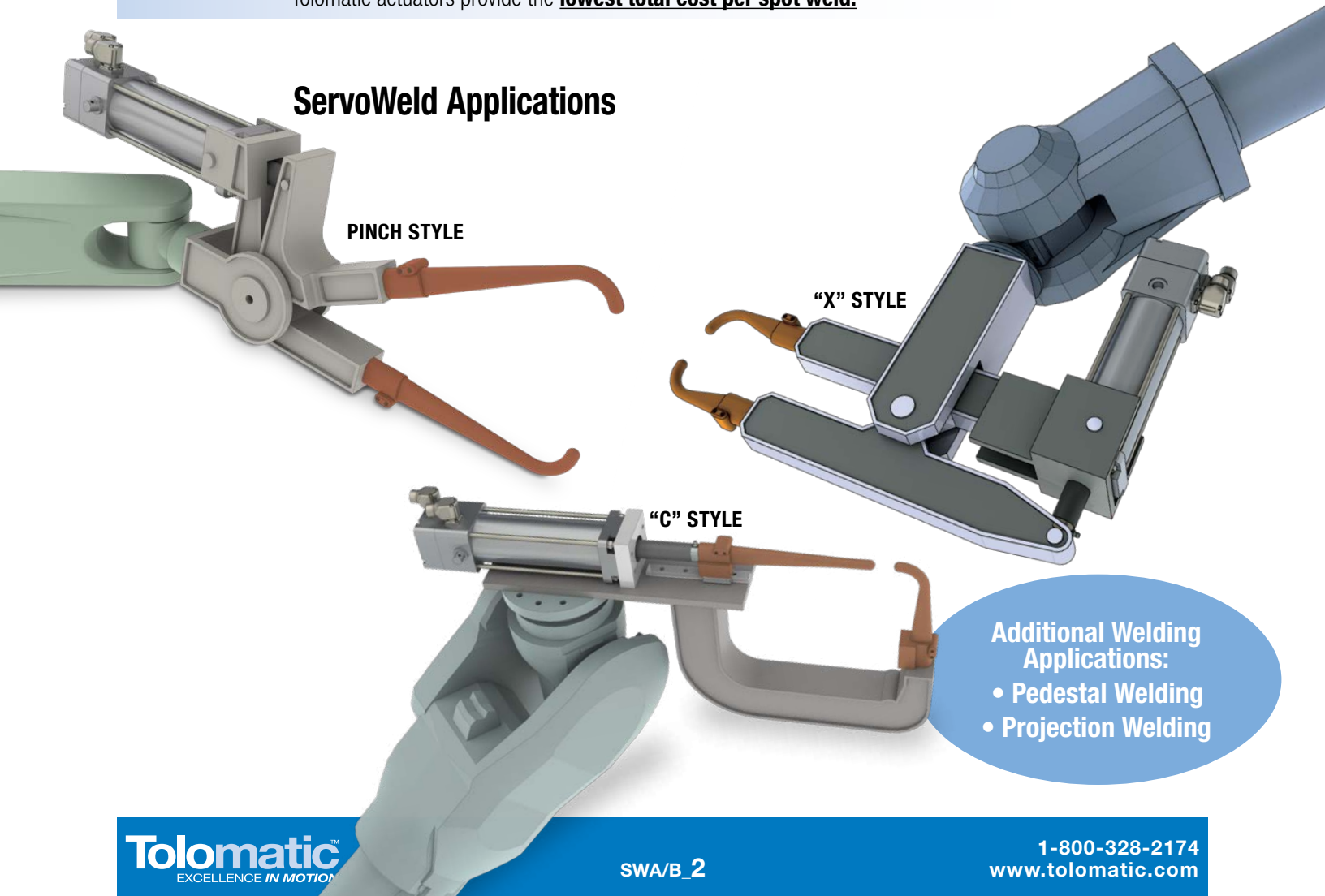
WEIGHT

Tolomatic integrated servo actuators minimize weight when designed into the weldgun. Additionally, Tolomatic can customize actuators for a specific weldgun applications to provide **industry leading light weight designs.**

LIFETIME COST

By building the longest lasting, most efficient and highest weld per minute actuators on the market, Tolomatic actuators provide the **lowest total cost per spot weld.**

ServoWeld Applications



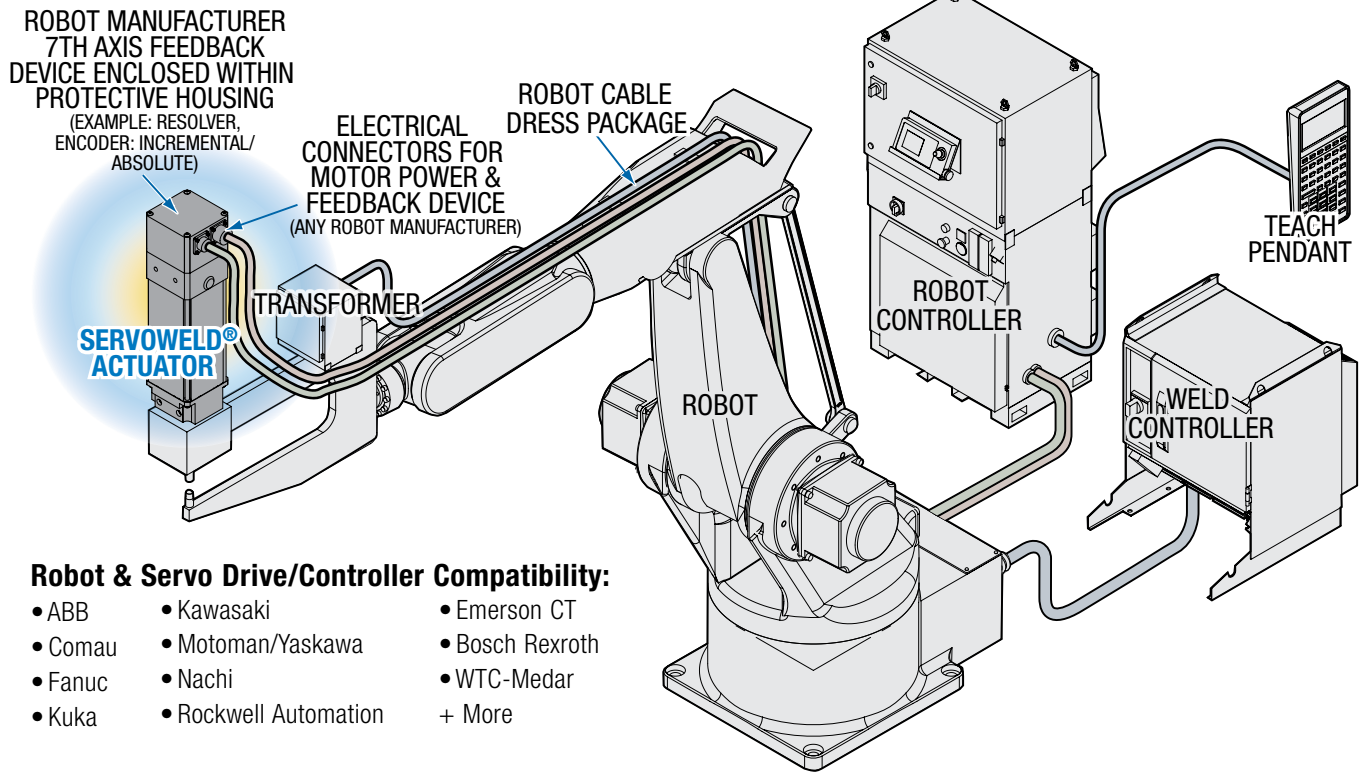
PINCH STYLE

"X" STYLE

"C" STYLE

- Additional Welding Applications:
- Pedestal Welding
 - Projection Welding

Typical Robotic ServoWeld Installation



Tolomatic Offers the Broadest, Most Capable Family of Integrated Servo Actuators for Resistance Spot Welding

| Model: | GSWA | SWA/SWB | CSWX |
|---|--|--|---|
| Number of Welds¹ (millions): | 20+ | 20+ (10+ SWB) | 30+ (20+ CSW) |
| Re-lubrication without Disassembly: | Yes ⁴ | Yes | Yes |
| Peak Force: | 36.7 kN [8,243 lbf] | 24.0 kN [5,395 lbf] SWA 22.0 kN [4,950 lbf] SWB | 18.0 kN [4,047 lbf] CSWX 15.6 kN [3,500 lbf] CSW |
| Actuator Output Force² (Lifetime) Repeatability: | ±3% | ±3% (±5% SWB) | ±3% |
| Weight (size 33,3)³ (size 44,04)³ (size 55)³: | 8.3 kg [18.3 lb] 13.8 kg [30.4 lb] 30.5 kg [67.2 lb] | 7.2 kg [15.9 lb] 14.2 kg [31.2 lb] | min: 10.2 kg [22.6 lb] |
| Water Cooling: | Optional | Optional | Optional |
| Manual Override: | Optional | No | Optional |
| Full Force Direction: | Push and Pull | Push | Push and Pull |

¹ Based on properly lubricated ServoWeld unit used as recommended in user manual. Weld schedule, tip force, environment and lubrication are factors in the total number of welds achievable with ServoWeld actuators.

² At weld force

³ Weight varies with choice of feedback device and mounting options

⁴ Some exceptions, see GSWA user manual

SWA & SWB INTEGRATED MOTOR ACTUATOR

ENDURANCE TECHNOLOGYSM

A Tolomatic Design Principle

Endurance Technology features are designed for maximum durability to provide extended service life.

MULTIPLE MOTOR WINDINGS

YOU CAN CHOOSE:

- 460VAC or 230VAC rated windings potted directly into actuator housing
- Integral thermal switch for over temperature protection

ROBUST BUSHINGS

Supports the thrust tube and nut assembly through entire stroke length

WATER SLOTS

Allows for water to flow away from thrust rod to prevent ingress into the actuator

THRUST TUBE

- Steel thrust tube supports extremely high force capabilities
- Salt bath nitride treatment provides excellent corrosion resistance, surface hardness and is very resistant to adherence of weld slag, water and other potential contaminants

GREASE PORT

- Screw re-lubrication system provides extended screw life
- Convenient lubrication without disassembly

THREADED ROD END

- Zinc plated steel construction for corrosion resistance
- Provides a common interface to multiple rod end options

INTERNAL BUMPERS

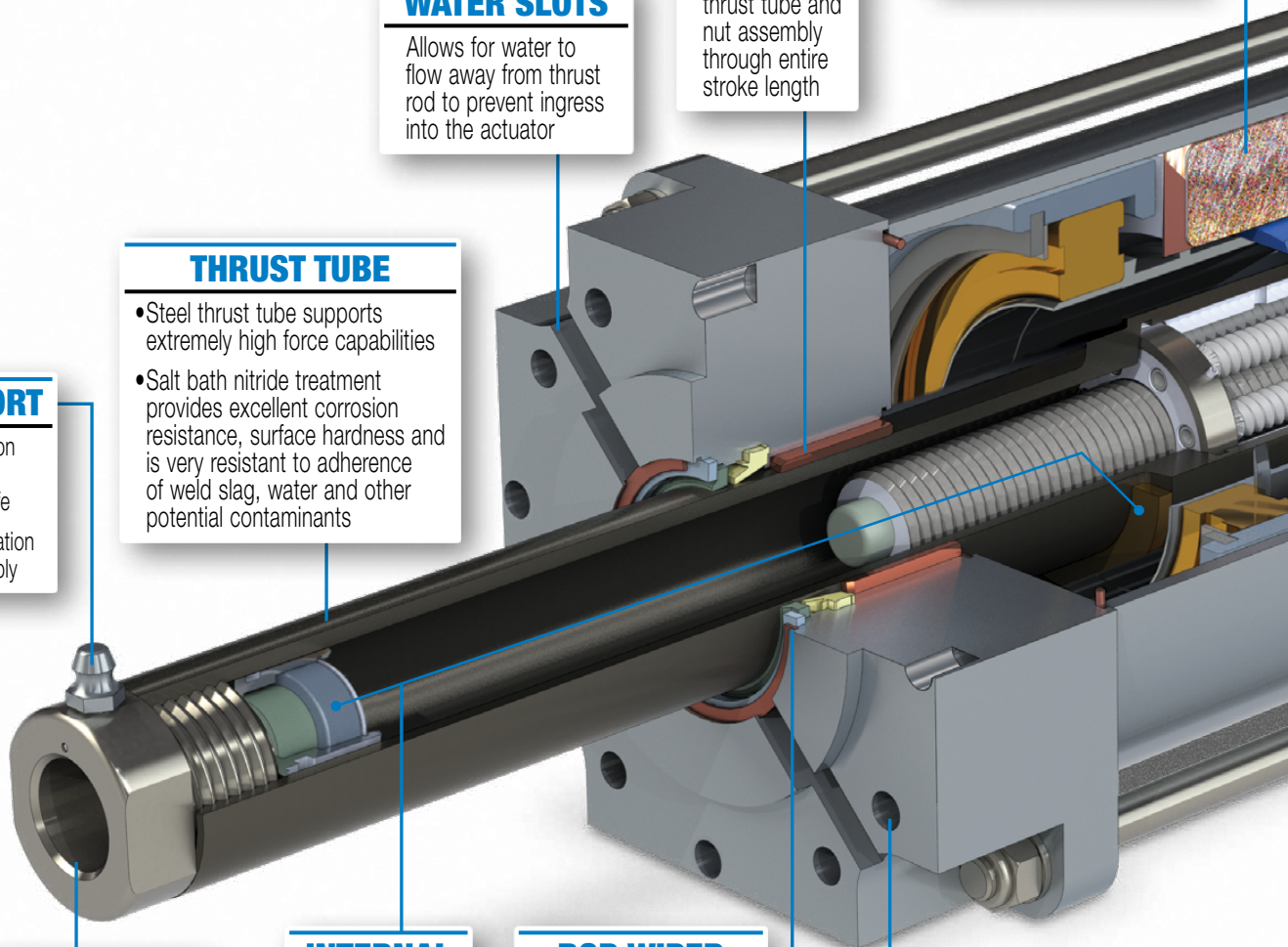
Bumpers protect the screw and nut assembly from damage at end of stroke

ROD WIPER WITH SCRAPER

Prevents contaminants from entering the actuator for extended life

UNIVERSAL MOUNTING

Tapped holes in front face allow for mounting in any orientation ... 0°, 90°, 180° or 270°



Tolomatic... MAXIMUM DURABILITY

EXCELLENCE IN MOTION

SKEWED MOTOR WINDINGS

Skewed motor windings provide minimal torque ripple for force repeatability and smooth linear motion

ROBOT & DRIVE/CONTROLLER COMPATIBILITY

Compatible feedback, connector(s) and wiring to match the following robot & drive/controller manufacturers' cable dress packages

YOUR CHOICE:

- + ABB
- + Comau
- + Fanuc
- + Kawasaki
- + Kuka
- + Motoman/Yaskawa
- + Nachi
- + Rockwell Automation
- + Bosch-Rexroth
- + Emerson CT
- + WTC-Medar
- & more

FEEDBACK CHOICES

- Customer specified to robot manufacturer
- Multi-turn absolute encoder
- Resolver
- Digital encoder

WATER COOLING



- Option that is attached to any side of the actuator
- Allows increased duty cycle and increased jobs/hour

HIGH THRUST BEARING

Provides complete support of screw and protects the feedback device from linear forces

IP65

IP65 rating protects actuator from ingress of water, weld slag and other debris (static)

ADVANCED SCREW TECHNOLOGY

- Roller screws provide the highest thrust and life ratings available
- SWA: Highest DLR roller screw provides longest life
- SWB: Lower DLR roller screw, provides longer life than ball screws or inverted roller screws






OPTIONS

BRAKE
WATER COOLING
REAR TRUNNION MOUNTING

ServoWeld SWA & SWB - Integrated Motor Actuator

Table 1: Performance & Mechanical Specifications:

| SERIES | | SWA3 or SWB3 | | | | SWA4 or SWB4 | | | | | | | | |
|--|--|--------------|--------|--------|-------------|--------------|---------|--------|--------|--------|---------|---------|---------|---------|
| FRAME SIZE | mm | 90.0 | | | | 110.0 | | | | | | | | |
| | in | 3.54 | | | | 4.33 | | | | | | | | |
| MOTOR WINDING | | A3 / B3 | | | A2 / B2 | | A3 / B3 | | | | A4 / B4 | | | |
| NUT/SCREW | | RN04 | RN05 | RN10 | RN05 | RN10 | RN04 | RN05 | RN05XR | RN10 | RN04 | RN05 | RN05XR | RN10 |
| § SCREW LEAD | mm | 4.0 | 5.0 | 10.0 | 5.0 | 10.0 | 4.0 | 5.0 | 5.0 | 10.0 | 4.0 | 5.0 | 5.0 | 10.0 |
| PEAK FORCE | kN | 11.1 | 11.1 | 5.8 | 14.5 / 12.8 | 7.3 / 6.4 | 17.8 | 14.7 | 22.1 | 11.1 | 17.8 | 14.7 | 24.0 | 17.8 |
| | lbf | 2500 | 2500 | 1306 | 3261/2882 | 1630/1441 | 4000 | 3300 | 4958 | 2500 | 4000 | 3300 | 5395 | 4000 |
| MAX. VELOCITY | mm/sec | 234 | 292 | 584 | 292 | 584 | 234 | 292 | 292 | 584 | 234 | 292 | 292 | 584 |
| | in/sec | 9.2 | 11.5 | 23.0 | 11.5 | 23.0 | 9.2 | 11.5 | 11.5 | 23.0 | 9.2 | 11.5 | 11.5 | 23.0 |
| SWA SCREW DLR (DYNAMIC LOAD RATING) | kN | 41.1 | 53.6 | 47.2 | 73.3 | 76.4 | 67.2 | 73.3 | 91.74 | 76.4 | 67.2 | 73.3 | 91.7 | 76.4 |
| | lbf | 9240 | 12050 | 10611 | 16479 | 17175 | 15107 | 16479 | 20624 | 17175 | 15107 | 16479 | 20624 | 17175 |
| SWB SCREW DLR (DYNAMIC LOAD RATING) | kN | 24.25 | 31.63 | 27.85 | 43.25 | 45.07 | 39.65 | 43.25 | - | 45.07 | 39.65 | 43.25 | - | 45.07 |
| | lbf | 5452 | 7110 | 6260 | 9723 | 10133 | 8913 | 9723 | - | 10133 | 8913 | 9723 | - | 10133 |
| NOMINAL BACK DRIVE FORCE | N | 436 | 347 | 173 | 405 | 205 | 507 | 405 | 405 | 205 | 507 | 405 | 405 | 205 |
| | lbf | 98 | 78 | 39 | 91 | 46 | 114 | 91 | 91 | 46 | 114 | 91 | 91 | 46 |
| WEIGHT* | kg | 7.80 | 7.80 | 7.80 | 11.25 | 11.25 | 12.29 | 12.29 | 12.29 | 12.29 | 14.16 | 14.16 | 14.16 | 14.16 |
| | lbf | 17.2 | 17.2 | 17.2 | 24.8 | 24.8 | 27.1 | 27.1 | 27.1 | 27.1 | 31.2 | 31.2 | 31.2 | 31.2 |
| STROKE | mm | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| | in | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| BASE INERTIA | kg-cm ² | 4.8997 | 4.8997 | 4.8997 | 8.1108 | 8.1108 | 9.7864 | 9.7864 | 9.7864 | 9.7864 | 11.4073 | 11.4073 | 11.4073 | 11.4073 |
| | lb-in | 1.6723 | 1.6723 | 1.6723 | 2.7716 | 2.7716 | 3.3442 | 3.3442 | 3.3442 | 3.3442 | 3.8966 | 3.8966 | 3.8966 | 3.8966 |
| AMBIENT TEMP ** RANGE | °C | 0 to 50 | | | | | | | | | | | | |
| | °F | 32 to 122 | | | | | | | | | | | | |
| IP RATING | Standard IP65 (static) | | | | | | | | | | | | | |
| AGENCY LISTINGS |    | | | | | | | | | | | | | |

*Weight varies per feedback device or mounting option. See table below for details.
 **From 0-10°C (32-50°F), additional startup procedure may be required for optimal performance. See user manual for details.
 §NOTE: Screw/Lead Accuracy: 0.023 mm/300 mm; 0.0009 in/ft

| | | Weight Adder | | | | | | |
|------|----|---------------|---------------|-----------------|------|------|-------|------|
| | | Water Cooling | Rear Trunnion | FEEDBACK OPTION | | | | |
| | | | | F1 | F2 | A1 | K1*** | W1 |
| SW_3 | kg | 0.36 | 0.10 | 0.3 | 0.77 | 0.59 | 1.27 | 1.03 |
| | lb | 0.80 | 0.22 | 0.65 | 1.70 | 1.30 | 2.80 | 2.26 |
| SW_4 | kg | 0.52 | 0.24 | 0.3 | 0.48 | 0.64 | 1.34 | 0.72 |
| | lb | 1.15 | 0.52 | 0.65 | 1.05 | 1.41 | 2.96 | 1.59 |

***Weight adder for K1 option includes weight of brake

ServoWeld SWA & SWB - Integrated Motor Actuator

Table 3: Motor Specifications:

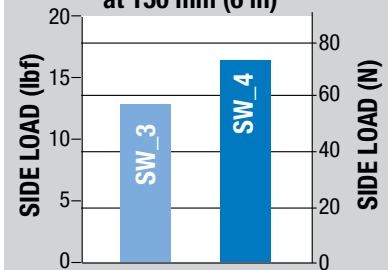
| SERIES | | SW_3 | | SW_4 | | | | | | |
|---------------------------------|--------------------|------------------|-------|------|------|-------|------|-------|------|-------|
| | | A3 | B3 | A2 | B2 | A3 | B3 | A4 | B4 | |
| TORQUE CONSTANT (Kt) | N-m/A Peak | 0.62 | 1.21 | 0.52 | 0.90 | 0.61 | 1.20 | 0.64 | 1.29 | |
| | in-lb/A Peak | 5.5 | 10.7 | 4.6 | 8.0 | 5.4 | 10.6 | 5.7 | 11.4 | |
| VOLTAGE CONSTANT (Ke) | | V/Krpm Peak | 79.8 | 154 | 66.1 | 107.2 | 78.1 | 153.1 | 81.1 | 162.3 |
| CONTINUOUS STALL TORQUE | No Water Cooling | N-m | 4.4 | 4.3 | 5.5 | 4.9 | 8.4 | 8.5 | 14.6 | 14.6 |
| | | in-lb | 39 | 38 | 48.8 | 43.0 | 74 | 75 | 129 | 129 |
| | With Water Cooling | N-m | 8.8 | 8.6 | 11.0 | 9.7 | 16.7 | 17.0 | 20.8 | 20.8 |
| | | in-lb | 78 | 76 | 97.6 | 86 | 148 | 150 | 184 | 184 |
| CONTINUOUS STALL CURRENT | No Water Cooling | A _{RMS} | 5 | 2.5 | 7.5 | 3.8 | 9.7 | 5.0 | 16 | 8 |
| | With Water Cooling | A _{RMS} | 10.0 | 5.0 | 15.0 | 7.6 | 19.4 | 10.0 | 23 | 12 |
| PEAK TORQUE | N-m | 13.2 | 12.9 | 16.5 | 14.6 | 25.1 | 25.4 | 43.7 | 43.7 | |
| | in-lb | 117 | 114 | 146 | 129 | 222 | 225 | 387 | 387 | |
| PEAK CURRENT | | A _{RMS} | 15 | 7.5 | 22.5 | 11.4 | 29.1 | 15.0 | 48 | 24 |
| RESISTANCE | | Ohms | 2.07 | 8.3 | 0.9 | 4.2 | 0.58 | 2.32 | 0.36 | 1.46 |
| INDUCTANCE | | mH | 3.8 | 15 | 3.65 | 15.7 | 2.75 | 11.5 | 2.04 | 8.9 |
| NO. OF POLES | | | 8 | | | | | | | |
| BUS VOLTAGE | | V _{RMS} | 230 | 460 | 230 | 460 | 230 | 460 | 230 | 460 |
| SPEED @ RATED V | | RPM | 3,500 | | | | | | | |

SIDE LOADING

Some weld gun designs may subject the actuator to excessive side loading reducing overall service life. Measures are required, especially in "C" style designs, to limit side loading. For life optimization Tolomatic recommends side loads less than indicated in the graph below.



SW_SIDE LOAD SPECIFICATIONS at 150 mm (6 in)



MOTOR WINDING

A4
B4 = 4 Stack Motor



A3
B3 = 3 Stack Motor



A2
B2 = 2 Stack Motor



Table 4: Brake Specifications:

| SERIES | | SW_3 | SW_4 | |
|-----------------------|--------------------|-------|-------|------|
| ROTOR INERTIA | gm-cm ² | 73 | 239 | |
| | oz-in ² | 0.400 | 1.307 | |
| CURRENT | | Amp | 0.43 | 0.67 |
| HOLDING TORQUE | N-m | 4.0 | 10.0 | |
| | in-lb | 35 | 89 | |
| ENGAGE TIME | | mSec | 40 | 25 |
| DISENGAGE TIME | | mSec | 50 | 50 |
| VOLTAGE | | Vdc | 24 | 24 |

BRAKE CONSIDERATIONS

In all vertical application an un-powered SWA will require a brake to maintain position. Tolomatic recommends that the nominal back drive force specification (listed in Table 1) be used for reference only. Back drive force is subject to change throughout the life of the actuator, due to mechanical break in, ambient temperature, and duty cycle variation.

A brake can be used with the actuator to keep it from backdriving, typically in vertical applications. A brake may be used for safety reasons or for energy savings allowing the actuator to hold position when un-powered.

NOTE: The optional Spring-Applied / Electronically-Released Brake requires 24V power.



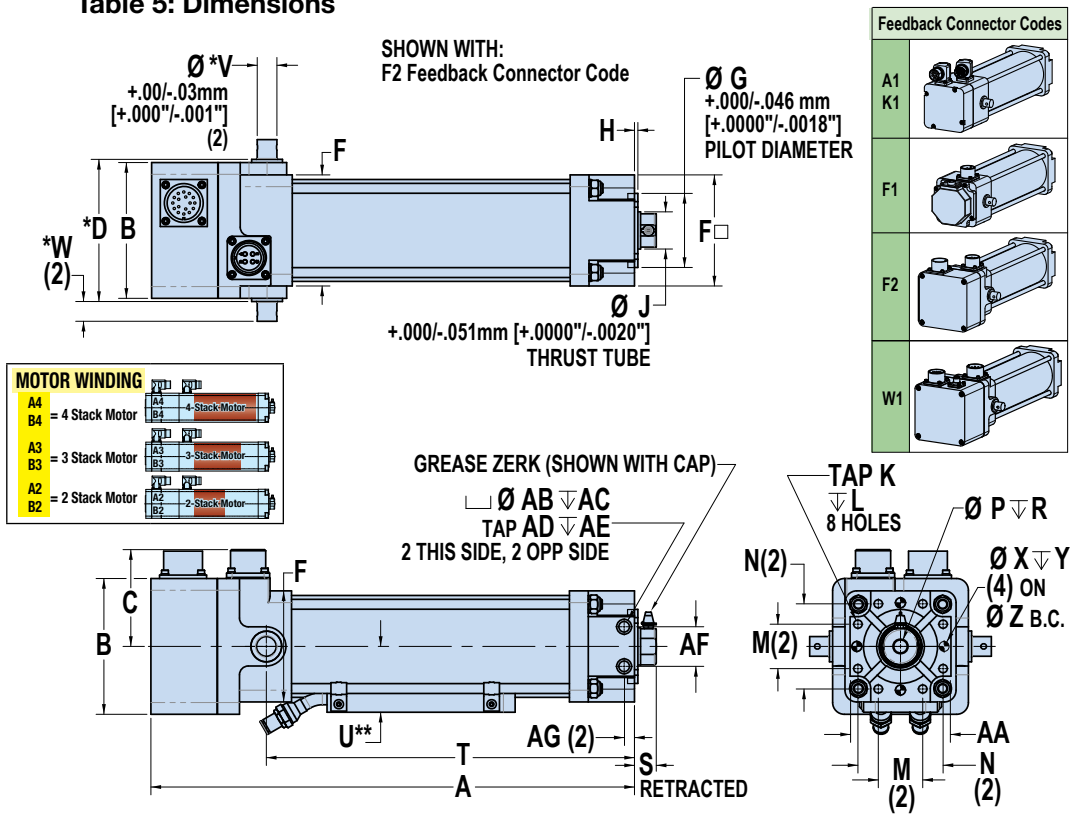
Brake will increase actuator length and weight, see Table 2 (K1).

SWA & SWB Dimensions



tolomatic.com/CAD
Download 3D CAD
Always use CAD solid model to determine critical dimensions

Table 5: Dimensions



| | SW_3 | SW_4 |
|-----|------------|-------------|
| F | 90.0 | 110.0 |
| G | 60.000 | 64.500 |
| H | 2.8 | 3.4 |
| J | 30.135 | 34.926 |
| K | M8 x 1.25 | M8 x 1.25 |
| L | 16.0 | 13.0 |
| M | 36.0 | 29.072 |
| N | 69.0 | 79.874 |
| P | M12 x 1.25 | M20 x 1.5 |
| R | 22.2 | 25.9 |
| S | 17.6 | 19.1 |
| T | 273.0 | 321.0 |
| U** | 53.3 | 66.7 |
| V* | 15.98 | 20.0 |
| W* | 16.0 | 20.1 |
| X | - | 8.052/8.026 |
| Y | - | 12.7 |
| Z | - | 85.00 |
| AA | - | 94.01/93.95 |
| AB | - | 12.09/12.04 |
| AC | - | 6.00 |
| AD | - | M10 x 1.5 |
| AE | - | 16.00 |
| AF | - | 50.00 |
| AG | - | 15.00 |

*for Trunnion Option
**for Water Cooling Option
Dimensions in millimeters

| Motor Winding | Feedback | SW_3 | | | | | SW_4 | | | | |
|-------------------------------------|-----------|-----------|--------|--------|-----------|--------|-----------|--------|--------|-----------|--------|
| | | A1 | F1 | F2 | K1 | W1 | A1 | F1 | F2 | K1 | W1 |
| A,B 2,3 | w/o Brake | 350.5 | 343.5 | 366.5 | ** | 387.3 | 402.9 | 395.4 | 418.0 | ** | 439.3 |
| A,B 2,3 | w/ Brake | 373.9 | 375.5 | ** | 377.7 | 401.6 | 427.1 | 433.9 | ** | 422.2 | 453.5 |
| A,B 4 | w/o Brake | - | - | - | - | - | 410.7 | 403.2 | 425.8 | ** | 447.1 |
| A,B 4 | w/ Brake | - | - | - | - | - | 434.9 | 441.7 | ** | 423.3 | 461.3 |
| B | | 90.0 | 90.0 | 110.0 | 90.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 |
| C | | 85.3 | 71.6 | 78.4 | 86.4 | 78.0 | 94.1 | 78.4 | 78.4 | 96.4 | 78.0 |
| D* | | 95.2 | 95.2 | 123.0 | 95.2 | 123.0 | 123.0 | 123.0 | 123.0 | 123.0 | 123.0 |
| Feedback Connector Code/Type | | A1 SWIVEL | F1 BOX | F2 BOX | K1 SWIVEL | W1 BOX | A1 SWIVEL | F1 BOX | F2 BOX | K1 SWIVEL | W1 BOX |

*for Trunnion Option **Contact Tolomatic for additional information Dimensions in millimeters

| | SW_3 | SW_4 |
|-----|------------|---------------|
| F | 3.54 | 4.33 |
| G | 2.3622 | 2.5394 |
| H | 0.11 | 0.13 |
| J | 1.1864 | 1.3750 |
| K | M8 x 1.25 | M8 x 1.25 |
| L | 0.63 | 0.51 |
| M | 1.42 | 1.1446 |
| N | 2.72 | 3.1446 |
| P | M12 x 1.25 | M20 x 1.5 |
| R | 0.88 | 1.02 |
| S | 0.69 | 0.75 |
| T | 10.75 | 12.64 |
| U** | 2.10 | 2.63 |
| V* | 0.629 | 0.787 |
| W* | 0.63 | 0.79 |
| X | - | 0.3170/0.3160 |
| Y | - | 0.50 |
| Z | - | 3.346 |
| AA | - | 3.701/3.699 |
| AB | - | 0.476/0.474 |
| AC | - | 0.236 |
| AD | - | M10 x 1.5 |
| AE | - | 0.630 |
| AF | - | 1.969 |
| AG | - | 0.591 |

*for Trunnion Option
**for Water Cooling Option
Dimensions in inches

| Motor Winding | Feedback | SW_3 | | | | | SW_4 | | | | |
|-------------------------------------|-----------|-----------|--------|--------|-----------|--------|-----------|--------|--------|-----------|--------|
| | | A1 | F1 | F2 | K1 | W1 | A1 | F1 | F2 | K1 | W1 |
| A,B 2,3 | w/o Brake | 13.80 | 13.52 | 14.43 | ** | 15.25 | 15.86 | 15.57 | 16.46 | ** | 17.29 |
| A,B 2,3 | w/ Brake | 14.72 | 14.78 | ** | 14.87 | 15.81 | 16.81 | 17.08 | ** | 16.62 | 17.85 |
| A,B 4 | w/o Brake | - | - | - | - | - | 16.17 | 15.87 | 16.76 | ** | 17.60 |
| A,B 4 | w/ Brake | - | - | - | - | - | 17.12 | 17.39 | ** | 16.67 | 18.16 |
| B | | 3.54 | 3.54 | 4.33 | 3.54 | 4.33 | 4.33 | 4.33 | 4.33 | 4.33 | 4.33 |
| C | | 3.36 | 2.82 | 3.09 | 3.40 | 3.07 | 3.71 | 3.09 | 3.09 | 3.80 | 3.07 |
| D* | | 3.75 | 3.75 | 4.84 | 3.75 | 4.84 | 4.84 | 4.84 | 4.84 | 4.84 | 4.84 |
| Feedback Connector Code/Type | | A1 SWIVEL | F1 BOX | F2 BOX | K1 SWIVEL | W1 BOX | A1 SWIVEL | F1 BOX | F2 BOX | K1 SWIVEL | W1 BOX |

*for Trunnion Option **Contact Tolomatic for additional information Dimensions in inches

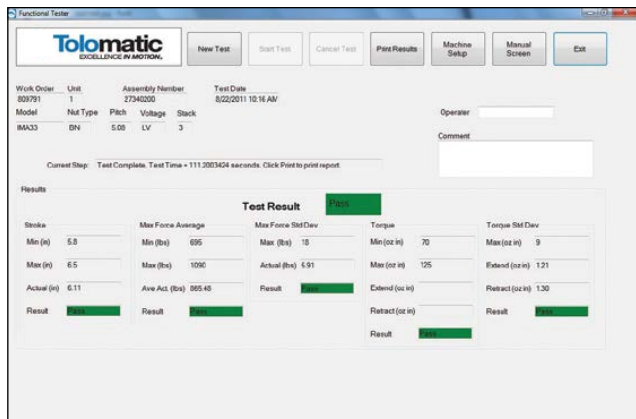
Complete Verification Testing is Performed on Every Actuator

EVERY SERVOWELD ACTUATOR HAS TO PASS RIGOROUS TESTING AT OUR FACTORY.

We verify the performance of each individual unit before delivery to ensure they conform to Tolomatic's high standard of performance.



Functional unit testing for hundreds of cycles quantifies stroke, length, torque under no load, input current vs force standard deviation.



Testing parameter results in progress for the Functional Test procedure.



Final system test ensures the feedback device is properly aligned with the ServoWeld motor poles.

1. High POT (High Potential/High Voltage Test)

This standard electric motor test procedure is a 3-part test that checks the insulation system of the assembly to verify proper armature and thermal wire insulation.

2. Electronic phasing of ServoWeld® and feedback device (Encoder, Resolver, Feedback Device)

Using a fixed current and a specially designed fixture the feedback device is physically and electronically aligned relative to the phasing of the Tolomatic motor.

3. Functional Testing

Performed with Tolomatic motion control components and dedicated data acquisition equipment. Operated for hundred of cycles, this test quantifies these parameters - stroke length, torque under no load, input current vs force average, input current vs force standard deviation - using an electronic load cell in conjunction with data acquisition equipment.

4. Tolomatic System Test

Using a single-axis control unit the test ensures that the feedback device is properly aligned with the poles of the Tolomatic motor.

ServoWeld Application Guidelines

SIDE LOADING: Weld gun designs may subject the actuator to excessive side loading, reducing overall service life. The GSWA33 and CSW(x) Guided actuators will accommodate side loading caused by the mass of the electrode, misaligned weld tips and tip skid. For other ServoWeld configurations additional measures are required to limit side loading, especially in “C” style gun designs. For maximum service life, external guiding is recommended to minimize side loading to the thrust rod and provide consistent weld gun alignment throughout the service life. Reference the side load capacity charts in the GSWA, SWA/SWB, and CSW(x) manuals and/or brochures.

THRUST ROD WIPER/SCRAPER: For maximum service life, measures should be taken to reduce/eliminate contamination, weld slag, and water in the thrust rod wiper/scraper interface area. Implementation of industrial thrust rod boot and/or deflective device can be effectively utilized in this area.

CABLES: Shielded power & feedback cables are recommended to minimize electrical noise/grounding issues. Electrical noise or inadequate grounding can corrupt the feedback device signal.

RSW SERVO SYSTEM CALIBRATION: RSW weld gun servo system consists of robot 7th axis amplifier, robot feedback device, robot RSW software, weld gun chassis, & ServoWeld.

For optimal RSW weld gun servo system performance the calibration process should include maximum weld tip force from the production weld schedule, tip dress force, and multiple weld tip forces in-between. Utilizing all the available robot manufacturer force table inputs will provide best RSW weld gun servo system performance. The same weld tip part contact speed should be used for both RSW weld gun servo system calibration and production weld schedule.

WELD TIP / PART CONTACT SPEED: Tolomatic testing confirms the highest ServoWeld repeatability (**INPUT**

CURRENT versus **OUTPUT FORCE**) at a weld tip part contact speed of 25mm/second or less. Speeds greater than 25mm/second can create “impact contribution” to the weld force. This impact contribution to the weld force deteriorates prior to completion of the weld cycle.

ROBOT CARRIED APPLICATIONS: Robot carried RSW gun applications have reduced exposure to water pooling/water ingress by virtue of the continuous robot movement and various RSW gun positions. In addition, in robot carried applications positioning of the RSW gun can be programmed as part of the weld cap change program/routine to eliminate ServoWeld exposure to water. (ServoWeld above weld caps)

ROBOT MANUFACTURER SERVO FILE: Robot manufacturer servo parameter files for operation of ServoWeld are available only from the robot manufacturer. Each robot manufacturer creates 3rd party motor servo parameter files, validates operation of ServoWeld via their 7th axis, and maintains servo motor parameter file for operation of ServoWeld.

TOOL CHANGER APPLICATIONS: Weld gun storage fixture in cell should position weld gun so movable electrode is not loading ServoWeld thrust rod - back driving the ServoWeld. Weld gun tips should be positioned to weld gun closed at low force prior to disconnect from robot/tool changer. Consider ServoWeld configured with integral brake option.

FIXED / PEDESTAL APPLICATIONS: One of the more challenging RSW applications is a pedestal RSW gun, ServoWeld mounted vertical – thrust rod up. Measures should be taken to reduce and/or eliminate the ServoWeld to water exposure, water pooling/spray in the access areas of the ServoWeld unit to maximize overall service life.

ServoWeld SWA & SWB Integrated Motor Actuators

Ordering

MODEL SELECTION (MUST BE IN THIS ORDER)

S W A 4 A 1 A 3 F 1 B 1 A 1 X 2 A

| MODEL | |
|------------|--------------------|
| SWA | ServoWeld Advanced |
| SWB | ServoWeld Base |

| SIZE | |
|----------|-------------------|
| 3 | 3 Series Actuator |
| 4 | 4 Series Actuator |

| STROKE LENGTH | |
|---------------|-------------------|
| A | 150mm (6") Stroke |
| X | Special |

| SCREW LEAD | | |
|----------------------------------|----------------|---------------------------|
| Screw/Nut combinations available | | |
| Code | Screw | Description |
| 1 | RN05 | Roller Nut, 5 mm lead |
| 2 | RN10 | Roller Nut, 10 mm lead |
| 3 | RN04 | Roller Nut, 4 mm lead |
| 5 | RN05 XR | Roller Nut, 5 mm lead, XR |

| MOTOR VOLTAGE | |
|---------------|---|
| A2 | 230 Vac, Motor Voltage, 2 Stack Winding |
| B2 | 460 Vac, Motor Voltage, 2 Stack Winding |
| A3 | 230 Vac, Motor Voltage, 3 Stack Winding |
| B3 | 460 Vac, Motor Voltage, 3 Stack Winding |
| A4 | 230 Vac, Motor Voltage, 4 Stack Winding |
| B4 | 460 Vac, Motor Voltage, 4 Stack Winding |

| FEEDBACK, CONNECTOR, WIRING | |
|-----------------------------|----------------------------|
| A1 | ABB Resolver |
| C1 | Comau Resolver |
| F1 | Fanuc a128 |
| F2 | Fanuc a64 |
| M1 | Motoman Absolute |
| N1 | Nachi Absolute FD11 Series |
| W1 | Kawasaki Absolute E Series |
| XX | Special |

| FEEDBACK SUPPLIED BY: | |
|-----------------------|-----------|
| A | Customer |
| B | Tolomatic |

| BRAKE OPTION | |
|--------------|----------|
| 1 | NO Brake |
| 2 | Brake |

| MOUNTING OPTIONS | |
|------------------|---------------|
| A1 | Front Face |
| T1 | Rear Trunnion |
| XX | Special |

| ROD END OPTIONS | |
|-----------------|---|
| A | Standard , Metric internal, threaded rod end |
| X | Special |

| WATER COOLING | |
|---------------|--|
| 1 | NO Water Cooling |
| 2 | Water Cooling, Bottom, 10mm tube fitting |
| X | Special |

| SPECIAL OPTIONS | |
|-----------------|--------------------|
| A | No Special Options |
| X | Special |

⚠ Not all codes listed are compatible with all options.

Call Tolomatic 1-800-328-2174 to determine available options and accessories based on your application requirements.

The Tolomatic Difference Expect More From the Industry Leader:



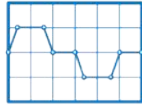
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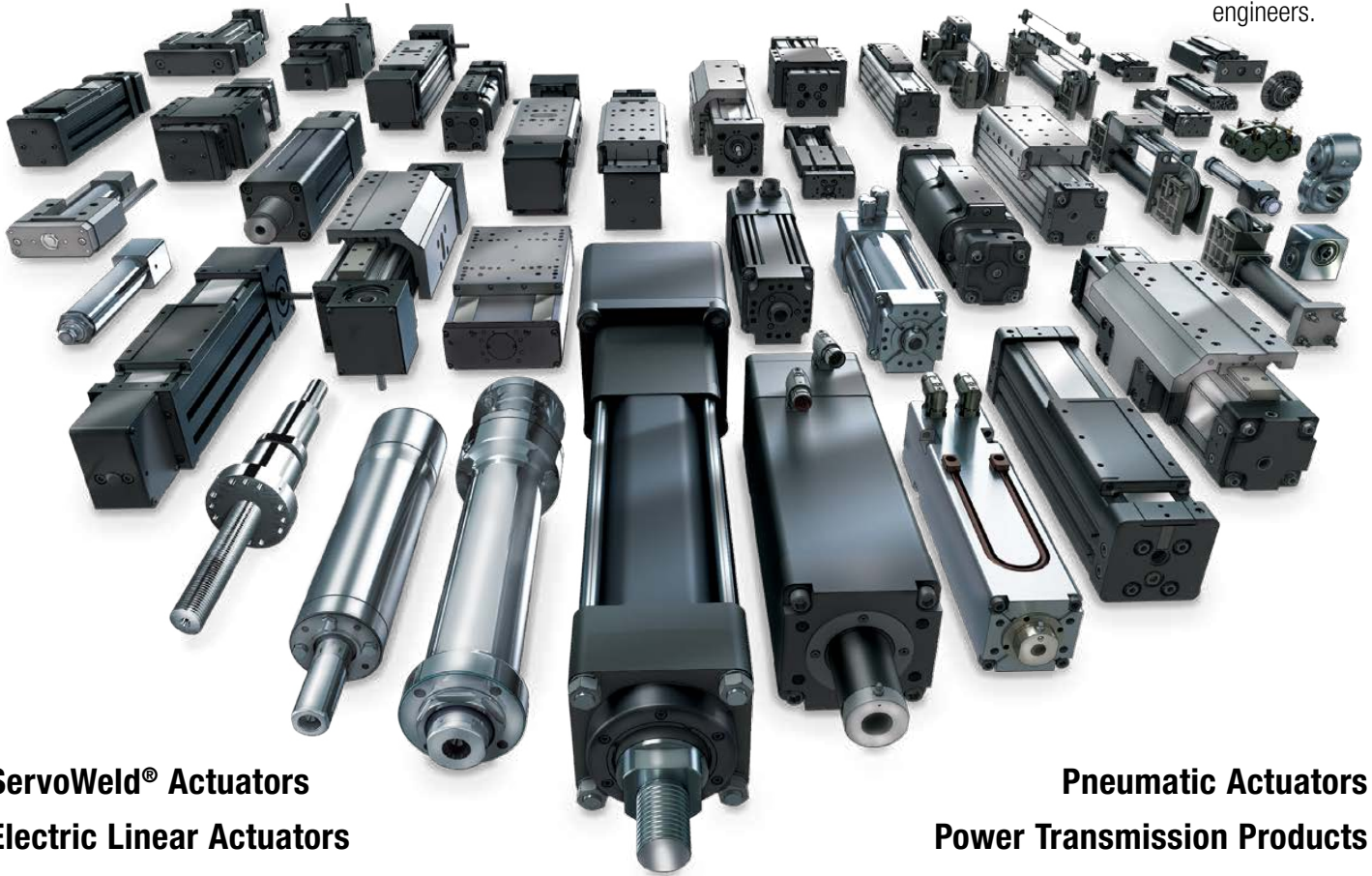
CAD LIBRARY

Download 2D or 3D CAD files for Tolomatic products.



TECHNICAL SUPPORT

Get a question answered or request a virtual design consultation with one of our engineers.



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Certified site: Hamel, MN

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