

# **ServoWeld** Actuators SWA & SWB MODELS



#### 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.

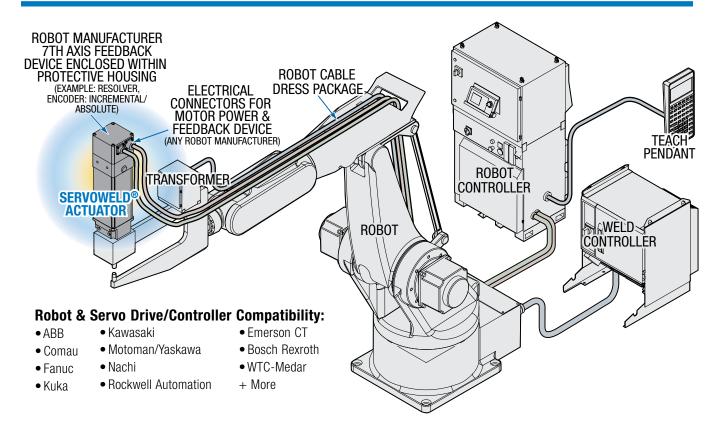
#### **Superior Integrated Servo Motor Actuators**

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.

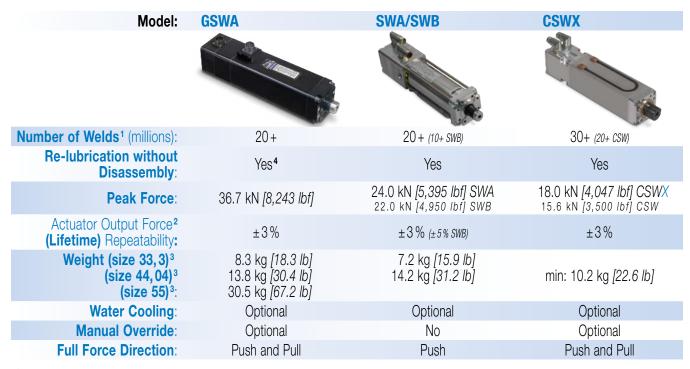
| NUMBER<br>OF WELDS/<br>PRODUCT LIFE | Tolomatic's superior roller screw design has the <u>highest dynamic load rating for more welds</u> than any competitive technology (other roller screws, ball screw, pneumatic).                                                                                                                                         |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FORCE REPEATABILITY                 | Skewed winding designed for welding minimizes motor cogging and <b>provides industry best actuator force repeatability:</b> • ±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 <b>most energy efficient solution on the market.</b>                                                                                                                     |
| WELDS/<br>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 <b>more welds per minute than any competitive technology</b> (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 <b>industry leading light weight designs.</b>                                                                                        |
| LIFETIME COST                       | By building the longest lasting, most efficient and highest weld per minute actuators on the market, Tolomatic actuators provide the <b>lowest total cost per spot weld.</b>                                                                                                                                             |



## Typical Robotic ServoWeld Installation



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



<sup>&</sup>lt;sup>1</sup> 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.



<sup>&</sup>lt;sup>2</sup> At weld force <sup>3</sup> Weight varies with choice of feedback device and mounting options

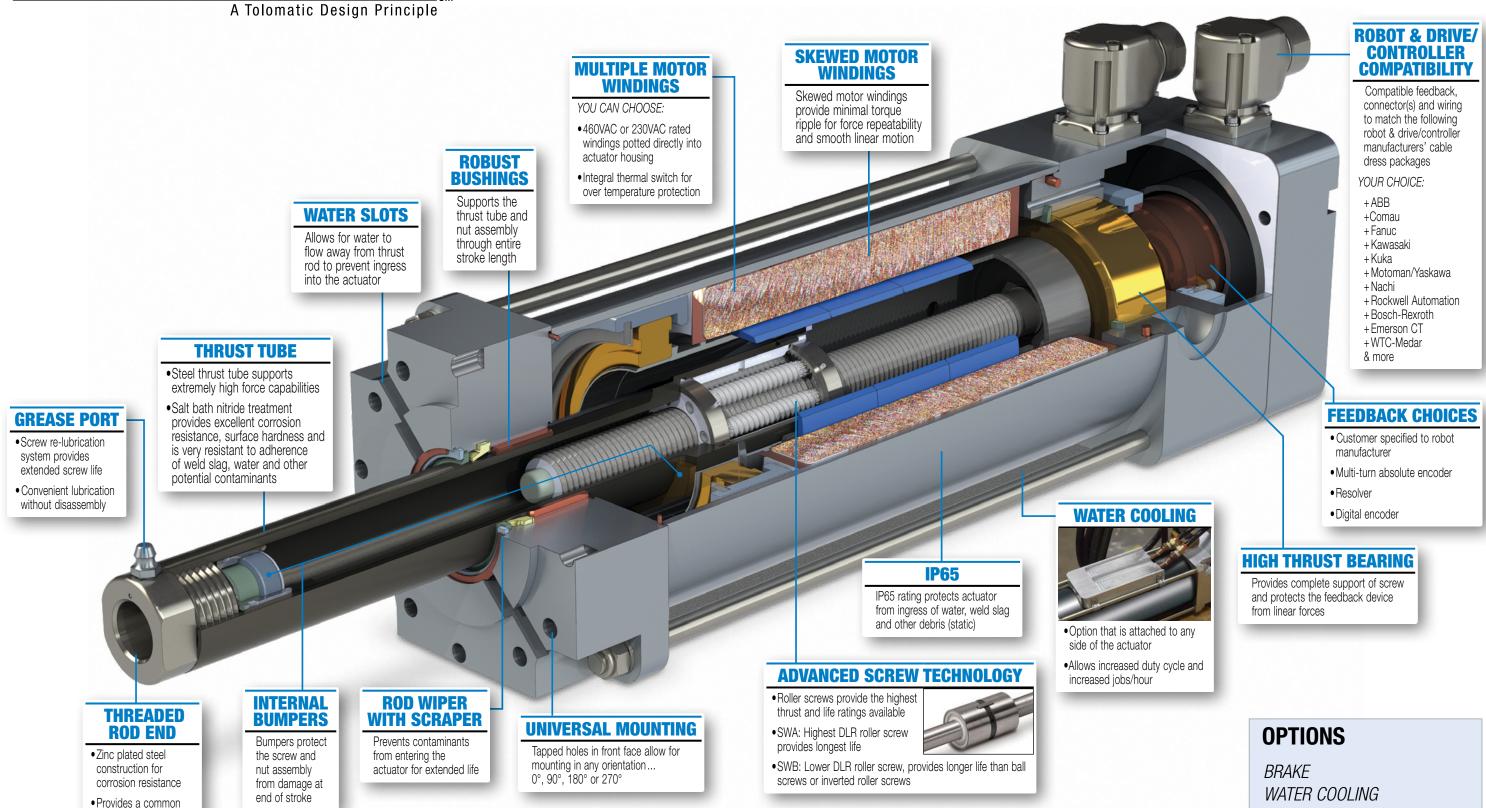
<sup>&</sup>lt;sup>4</sup> Some exceptions, see GSWA user manual

## **SWA & SWB INTEGRATED MOTOR ACTUATOR**

SWA/B 4

## **ENDURANCE TECHNOLOGY**

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





interface to multiple rod end options





REAR TRUNNION MOUNTING

SWA/B 5

**Tolomatic...MAXIMUM DURABILITY** 

## **ServoWeld SWA & SWB - Integrated Motor Actuator**

**Table 1: Performance & Mechanical Specifications:** 

|                          | SERIES SWA3 or SWB3 |              |         |        |             | SWA3 or SWB3 SWA4 or SWB4 |                    |            |          |        |         |         |         |         |  |
|--------------------------|---------------------|--------------|---------|--------|-------------|---------------------------|--------------------|------------|----------|--------|---------|---------|---------|---------|--|
| FRAME                    | mm                  |              | 90.0    |        |             |                           |                    |            | 110.0    |        |         |         |         |         |  |
| SIZE                     | in                  |              | 3.54    |        |             | 4.33                      |                    |            |          |        |         |         |         |         |  |
| MOTOR W                  | INDING              |              | A3 / B3 |        | A2 /        | B2                        |                    | A3         | / B3     |        |         | A4      | / B4    |         |  |
| NUT/                     | SCREW               | RN04         | RN05    | RN10   | RN05        | RN10                      | RN04               | RN05       | RN05XR   | RN10   | RN04    | RN05    | RN05XR  | RN10    |  |
| § SCREW<br>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                     | 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    |  |
| FORCE                    | lbf                 | 2500         | 2500    | 1306   | 3261/2882   | 1630/1441                 | 4000               | 3300       | 4958     | 2500   | 4000    | 3300    | 5395    | 4000    |  |
| MAX.                     | mm/sec              | 234          | 292     | 584    | 292         | 584                       | 234                | 292        | 292      | 584    | 234     | 292     | 292     | 584     |  |
| VELOCITY                 | 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<br>SCREW<br>DLR      | 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    |  |
| (DYNAMIC<br>LOAD RATING) | lbf                 | 9240         | 12050   | 10611  | 16479       | 17175                     | 15107              | 16479      | 20624    | 17175  | 15107   | 16479   | 20624   | 17175   |  |
| SWB<br>SCREW<br>DLR      | kN                  | 24.25        | 31.63   | 27.85  | 43.25       | 45.07                     | 39.65              | 43.25      | _        | 45.07  | 39.65   | 43.25   | _       | 45.07   |  |
| (DYNAMIC<br>LOAD RATING) | lbf                 | 5452         | 7110    | 6260   | 9723        | 10133                     | 8913               | 9723       | _        | 10133  | 8913    | 9723    | _       | 10133   |  |
| 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   |  |
| WEIGHT*                  | 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    |  |
| CTDOVE                   | mm                  | 150          | 150     | 150    | 150         | 150                       | 150                | 150        | 150      | 150    | 150     | 150     | 150     | 150     |  |
| STROKE                   | in                  | 6            | 6       | 6      | 6           | 6                         | 6                  | 6          | 6        | 6      | 6       | 6       | 6       | 6       |  |
| BASE                     | kg-cm <sup>2</sup>  | 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 |  |
| INERTIA                  | 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<br>TEMP **       | °C                  |              |         |        |             |                           | С                  | to 50      |          |        |         |         |         |         |  |
| RANGE                    | °F                  | °F 32 to 122 |         |        |             |                           |                    |            |          |        |         |         |         |         |  |
| IP RATING                |                     |              |         |        |             | Stan                      | dard IP6           | s (static) |          |        |         |         |         |         |  |
| AGENCY<br>LISTINGS       |                     |              |         |        |             | C€                        | ւ <mark>Մ</mark> և |            | 1P<br>65 |        |         |         |         |         |  |

<sup>\*</sup>Weight varies per feedback device or mounting option. See table below for details.

Table 2: Weight Adder **FEEDBACK OPTION** Water Rear Cooling **Trunnion** K1\*\*\* W1 F1 A1 0.3 0.59 1.03 kg 0.36 0.10 0.77 1.27 SW<sub>3</sub> 0.80 0.22 0.65 1.70 1.30 2.80 2.26 0.52 0.24 0.3 0.48 0.64 1.34 0.72 kg SW\_4 0.52 0.65 2.96 1.59 1.15 1.05 1.41



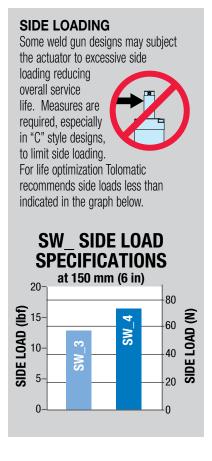
<sup>\*\*</sup>From 0-10°C (32-50°F), additional startup procedure may be required for optimal performance. See user manual for details. §NOTE: Screw/Lead Accuracy: 0.023 mm/300 mm; 0.0009 in/ft

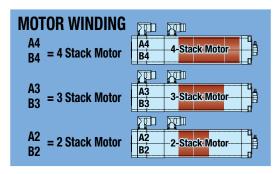
<sup>\*\*\*</sup>Weight adder for K1 option includes weight of brake

## **ServoWeld SWA & SWB - Integrated Motor Actuator**

**Table 3: Motor Specifications:** 

|                                               | SW                           | _3                           | _3 SW_4 |      |      |       |      |       |      |       |
|-----------------------------------------------|------------------------------|------------------------------|---------|------|------|-------|------|-------|------|-------|
|                                               | MOTOR V                      | А3                           | В3      | A2   | B2   | А3    | В3   | A4    | B4   |       |
| TORQUE CONSTANT (K <sub>1</sub> )  N-m/A Peak |                              |                              | 0.62    | 1.21 | 0.52 | 0.90  | 0.61 | 1.20  | 0.64 | 1.29  |
| TORQUE CON                                    | ISTANT (Nt)                  | in-lb/A<br>Peak              | 5.5     | 10.7 | 4.6  | 8.0   | 5.4  | 10.6  | 5.7  | 11.4  |
| VOLTAGE CON                                   | STANT (K <sub>e</sub> )      | V/Krpm<br>Peak               | 79.8    | 154  | 66.1 | 107.2 | 78.1 | 153.1 | 81.1 | 162.3 |
|                                               | No Water                     | N-m                          | 4.4     | 4.3  | 5.5  | 4.9   | 8.4  | 8.5   | 14.6 | 14.6  |
| CONTINUOUS                                    | Cooling                      | in-lb                        | 39      | 38   | 48.8 | 43.0  | 74   | 75    | 129  | 129   |
| STALL TORQUE                                  | With Water                   | N-m                          | 8.8     | 8.6  | 11.0 | 9.7   | 16.7 | 17.0  | 20.8 | 20.8  |
|                                               | Cooling                      | in-lb                        | 78      | 76   | 97.6 | 86    | 148  | 150   | 184  | 184   |
| CONTINUOUS                                    | No Water<br>Cooling          | $A_{\scriptscriptstyle RMS}$ | 5       | 2.5  | 7.5  | 3.8   | 9.7  | 5.0   | 16   | 8     |
| STALL CURRENT                                 | With Water<br>Cooling        | $A_{\scriptscriptstyle RMS}$ | 10.0    | 5.0  | 15.0 | 7.6   | 19.4 | 10.0  | 23   | 12    |
| DE                                            | AK TORQUE                    | N-m                          | 13.2    | 12.9 | 16.5 | 14.6  | 25.1 | 25.4  | 43.7 | 43.7  |
| PE                                            | AK TUNQUE                    | in-lb                        | 117     | 114  | 146  | 129   | 222  | 225   | 387  | 387   |
| PEA                                           | K CURRENT                    | $A_{RMS}$                    | 15      | 7.5  | 22.5 | 11.4  | 29.1 | 15.0  | 48   | 24    |
| R                                             | ESISTANCE                    | 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                                            | NO. OF POLES                 |                              |         |      |      | 8     | 3    |       |      |       |
| BL                                            | $V_{\scriptscriptstyle RMS}$ | 230                          | 460     | 230  | 460  | 230   | 460  | 230   | 460  |       |
| SPEED                                         | @ RATED V                    | RPM                          | 3,500   |      |      |       |      |       |      |       |





**Table 4: Brake Specifications:** 

|                   | SERIES             | SW_3  | SW_4  |
|-------------------|--------------------|-------|-------|
| ROTOR             | gm-cm <sup>2</sup> | 73    | 239   |
| INERTIA           | oz-in²             | 0.400 | 1.307 |
| CURRENT           | Amp                | 0.43  | 0.67  |
| HOLDING           | N-m                | 4.0   | 10.0  |
| TORQUE            | in-lb              | 35    | 89    |
| ENGAGE<br>TIME    | mSec               | 40    | 25    |
| DISENGAGE<br>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.

Brake w

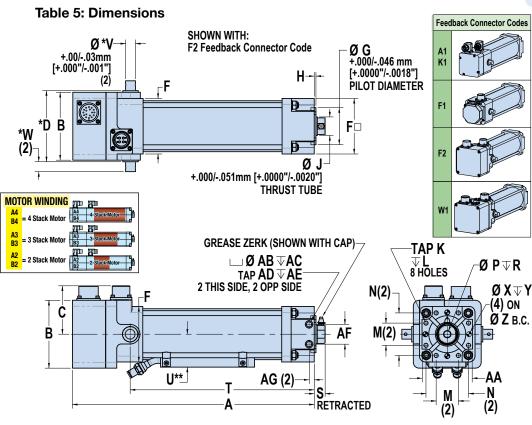
NOTE: The optional Spring-Applied / Electronically-Released Brake requires 24V power.



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

## **SWA & SWB Dimensions**





|     | SW_3       | SW_4        |  |  |  |  |
|-----|------------|-------------|--|--|--|--|
| F   | 90.0       | 110.0       |  |  |  |  |
| G   | 60.000     | 64.500      |  |  |  |  |
| Н   | 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        |  |  |  |  |
| ٧*  | 15.98      | 20.0        |  |  |  |  |
| W*  | 16.0       | 20.1        |  |  |  |  |
| X   | _          | 8.052/8.026 |  |  |  |  |
| Y   | ı          | 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

|                  |                         |     | SW_3         |           |           |              |           |              | SW_4      |           |              |           |  |
|------------------|-------------------------|-----|--------------|-----------|-----------|--------------|-----------|--------------|-----------|-----------|--------------|-----------|--|
| Motor<br>Winding | Feedb                   | ack | 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                | A   | 373.9        | 375.5     | **        | 377.7        | 401.6     | 427.1        | 433.9     | **        | 422.2        | 453.5     |  |
| A,B 4            | w/o Brake               | A   | ı            | ı         | -         | _            | _         | 410.7        | 403.2     | 425.8     | **           | 447.1     |  |
| A,B 4            | w/ Brake                |     | -            | -         | _         | _            | _         | 434.9        | 441.7     | **        | 423.3        | 461.3     |  |
|                  |                         | В   | 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     |  |
|                  | ck Connector<br>de/Type | r   | A1<br>SWIVEL | F1<br>BOX | F2<br>BOX | K1<br>SWIVEL | W1<br>BOX | A1<br>SWIVEL | F1<br>BOX | F2<br>BOX | K1<br>SWIVEL | W1<br>BOX |  |

| *for Trunnion Option | **Contact | Tolomatic for | additional info | ormation | Dimensions is | n millimeters |
|----------------------|-----------|---------------|-----------------|----------|---------------|---------------|
|----------------------|-----------|---------------|-----------------|----------|---------------|---------------|

|                  |                          |     |              |           | SW_3      |              |           |              |           | SW_4      |              |           |
|------------------|--------------------------|-----|--------------|-----------|-----------|--------------|-----------|--------------|-----------|-----------|--------------|-----------|
| Motor<br>Winding | Feedb                    | ack | 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                | Α   | _            | _         | _         | _            | _         | 16.17        | 15.8 7    | 16.76     | **           | 17.60     |
| A,B 4            | w/ Brake                 |     | -            | ı         | _         | _            | ı         | 17.12        | 17.39     | **        | 16.67        | 18.16     |
|                  |                          | В   | 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      |
|                  | ack Connecto<br>ode/Type | r   | A1<br>SWIVEL | F1<br>BOX | F2<br>BOX | K1<br>SWIVEL | W1<br>BOX | A1<br>SWIVEL | F1<br>BOX | F2<br>BOX | K1<br>SWIVEL | W1<br>BOX |

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

|     | SW_3       | SW_4          |
|-----|------------|---------------|
| F   | 3.54       | 4.33          |
| G   | 2.3622     | 2.5394        |
| Н   | 0.11       | 0.13          |
| J   | 1.1864     | 1.3750        |
| K   | M8 x 1.25  | M8 x 1.25     |
| L   | 0.63       | 0.51          |
| М   | 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          |
| ٧*  | 0.629      | 0.787         |
| W*  | 0.63       | 0.79          |
| X   | I          | 0.3170/0.3160 |
| Y   | -          | 0.50          |
| Z   | ı          | 3.346         |
| AA  | -          | 3.701/3.699   |
| AB  | ı          | 0.476/0.474   |
| AC  | _          | 0.236         |
| AD  | -          | M10 x 1.5     |
| AE  | -          | 0.630         |
| AF  | _          | 1.969         |
| AG  | - 1        | 0.591         |

\*for Trunnion Option \*\*for Water Cooling Option 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 consist 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** verses **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 ingression 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)

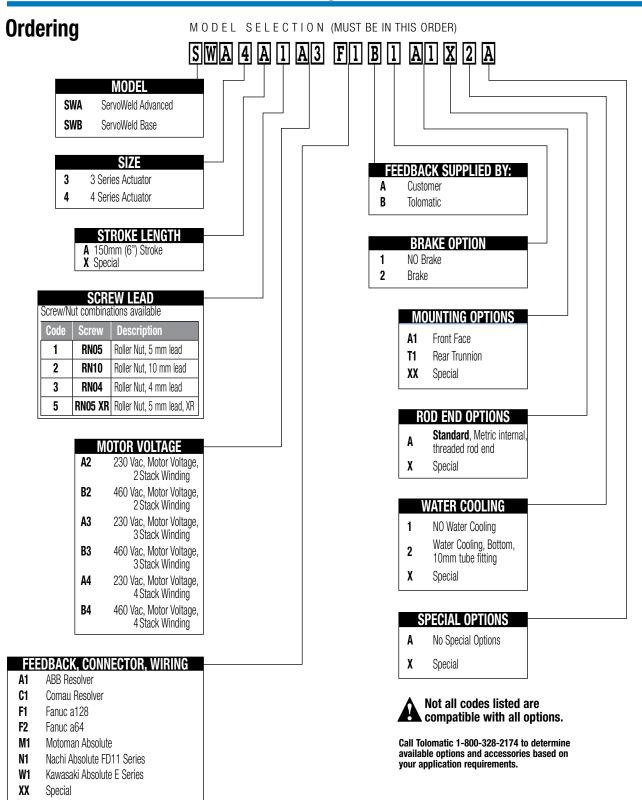
ROBOT MANUFACTURER SERVO FILE: Robot manufacturer servo parameter files for operation of ServoWeld are available only from the robot manufacturer. Each robot manufacturer creates 3rd party motor servo parameter files, validates operation of ServoWeld via their 7th axis, and maintains servo motor parameter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





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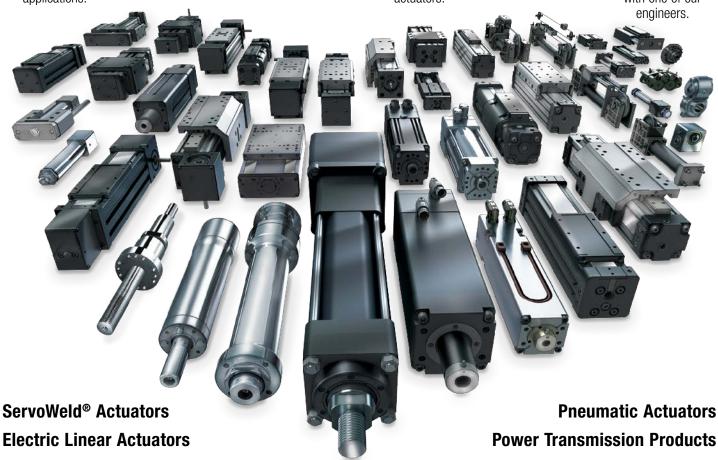
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