

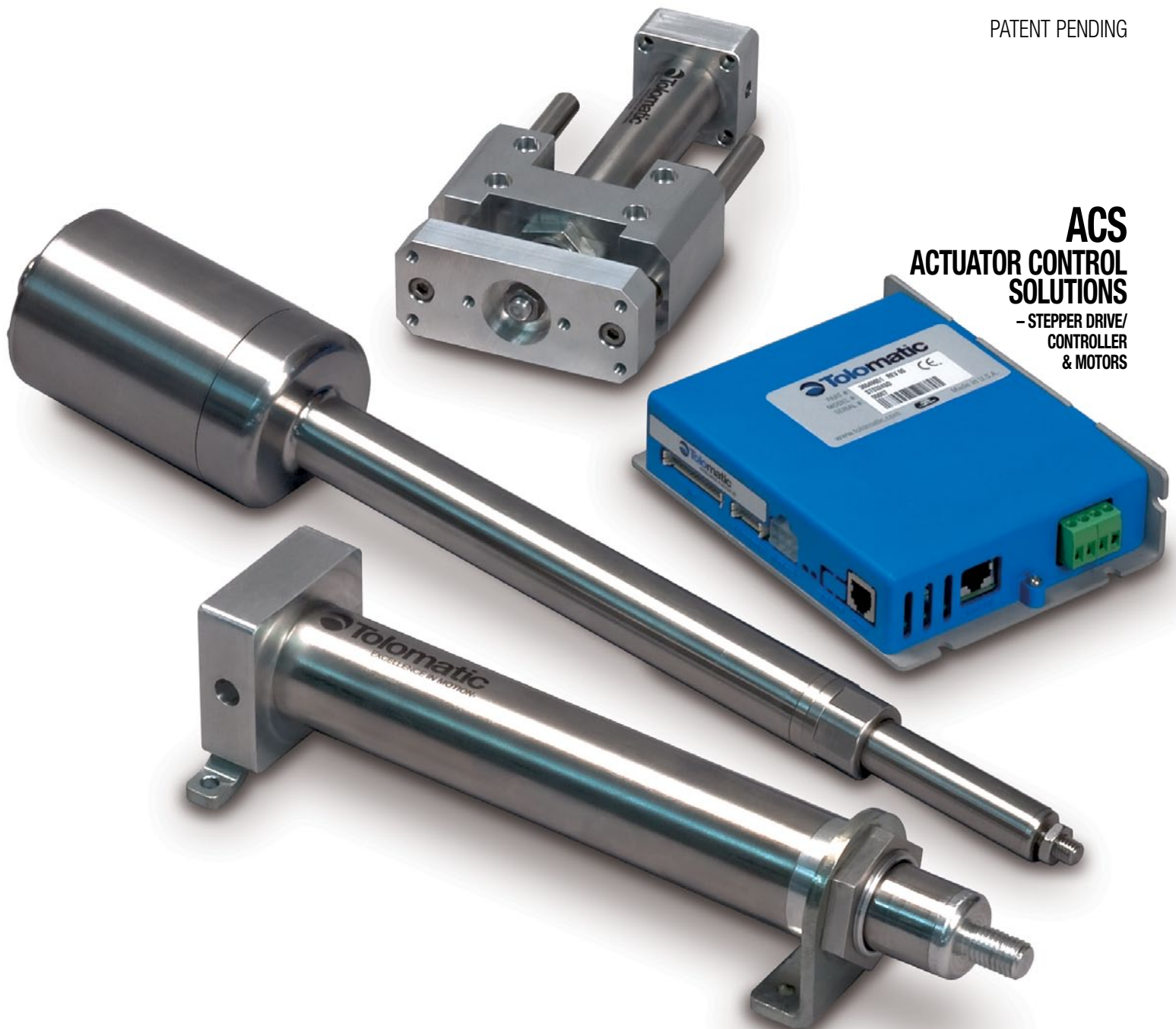
# ERD ELECTRIC ROD-STYLE ACTUATOR

**ENDURANCE TECHNOLOGY<sup>SM</sup>**

PATENT PENDING

**ACS  
ACTUATOR CONTROL  
SOLUTIONS**

– STEPPER DRIVE/  
CONTROLLER  
& MOTORS



**LINEAR SOLUTIONS MADE EASY**

# ERD – Electric Rod-Style Actuator

## WHAT IS THE ERD?

The ERD is an economical rod-style electric actuator designed as an alternate to pneumatic cylinders and an option for automating manual processes. Combined with Tolomatic's ACS stepper drive/controller, an extremely easy-to-use and cost effective actuator control solution is created. The ERD, with two different stainless steel options, is the industry's first ever cataloged all stainless-steel electric actuator family intended for washdown environments.



4 sizes, GD2 Guide Option



Actuator Control Solutions,  
Drive & Motor Options



**First Ever** Catalog All Stainless-  
Steel Electric Actuators

## TOLOMATIC'S ELECTRIC ROD-STYLE ACTUATORS

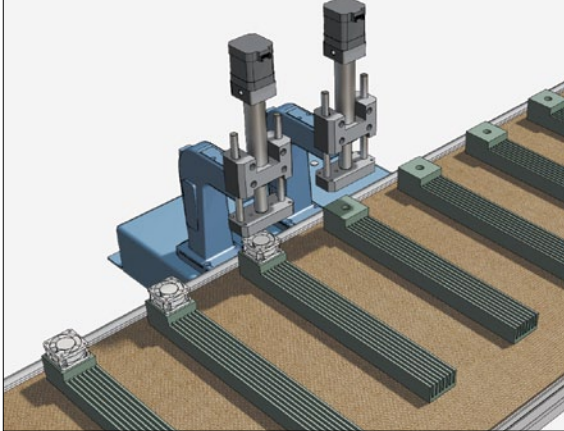


|                                                                                                                    | <b>ERD</b>                                                                          | <b>ICR SmartActuator®</b>                                                           | <b>RSA</b>                                                                          | <b>GSA</b>                                                                            | <b>IMA</b>                                                                            |
|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                                                                                    |  |  |  |  |  |
|                                                                                                                    | <b>Rod-Style Actuator</b>                                                           | <b>Integrated Control Rod-Style Actuator</b>                                        | <b>Rod-Style Actuator</b>                                                           | <b>Guided Rod-Style Actuator</b>                                                      | <b>Integrated Motor Rod-Style Actuator</b>                                            |
| <b>Thrust</b> up to:                                                                                               | 500 lbf<br>[2224 N]                                                                 | 720 lbf<br>[3202.7 N]                                                               | 7,000 lbf<br>[31,138 N]                                                             | 2,700 lbf<br>[12,010 N]                                                               | 3,300 lbf<br>[14,679 N]                                                               |
| <b>Speed</b> up to:                                                                                                | 40 in/sec<br>[1016 mm/sec]                                                          | 25 in/sec<br>[635 mm/sec]                                                           | 123 in/sec<br>[3,124 mm/sec]                                                        | 123 in/sec<br>[3,124 mm/sec]                                                          | 23 in/sec<br>[584 mm/sec]                                                             |
| <b>Stroke Length</b> up to:                                                                                        | 24 in<br>[609 mm]                                                                   | 24 in<br>[609 mm]                                                                   | 60 in<br>[1,524 mm]                                                                 | 36 in<br>[914 mm]                                                                     | 18 in<br>[457 mm]                                                                     |
| <b>Screw/Nut Type</b>                                                                                              | Solid & Ball                                                                        | Ball                                                                                | Solid, Ball & Roller                                                                | Solid & Ball                                                                          | Ball & Roller                                                                         |
| <i>For complete information see <a href="http://www.tolomatic.com">www.tolomatic.com</a> or literature number:</i> |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| <b>Literature Number:</b>                                                                                          | 2190-4000                                                                           | 2100-4000                                                                           | 3600-4609                                                                           | 3600-4609                                                                             | 2700-4000                                                                             |

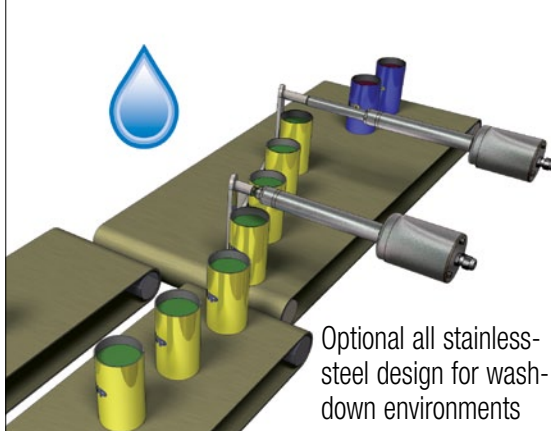
(Not all models deliver maximum values listed, i.e.: Maximum thrust may not be available with maximum speed)

# ERD – Applications

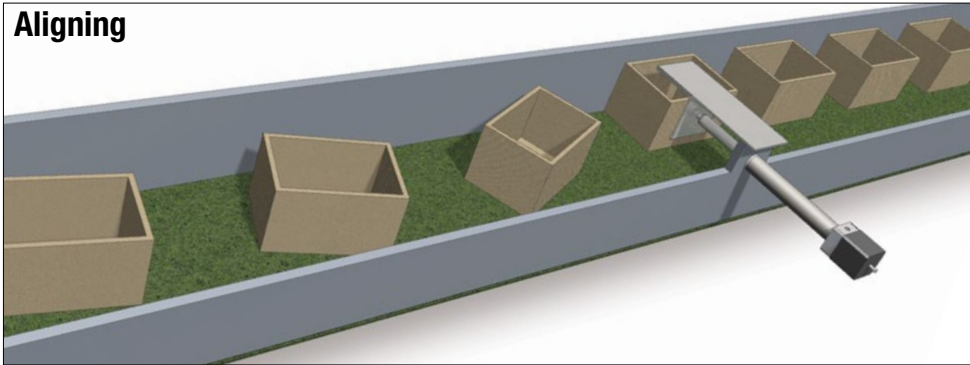
## Press Fit, Pick & Place, Assembly



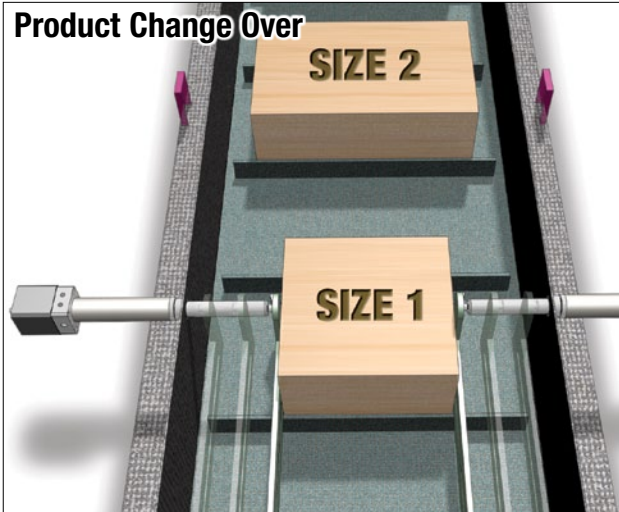
## Gating, Sorting, Diverting



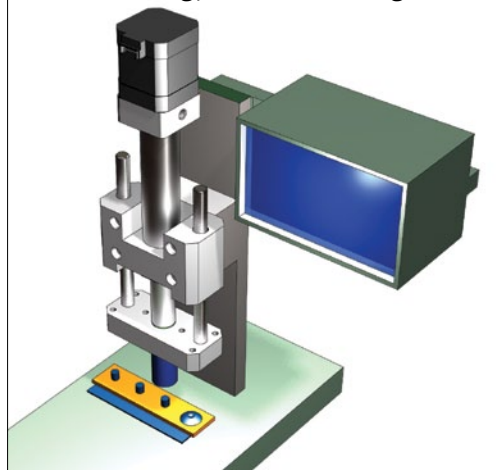
## Aligning



## Product Change Over



## Heat Staking, Sonic Welding



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## Other Applications:

- Aligning
- Animation
- Assembly
- Automatic tool changers
- Automotive
- Converting
- Conveyors
- Diverting
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- Formers
- Gating
- Heat staking
- Laser positioning
- Material handling systems
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- Plate positioning change
- Press fit
- Product changeover
- Product test simulations
- Robot manipulator arms
- Sonic welding
- Sorting
- Table positioning
- Tension control
- Test stands
- Volumetric pumps
- Web guidance
- Wire winding



# ERD – ELECTRIC ROD-STYLE ACTUATOR

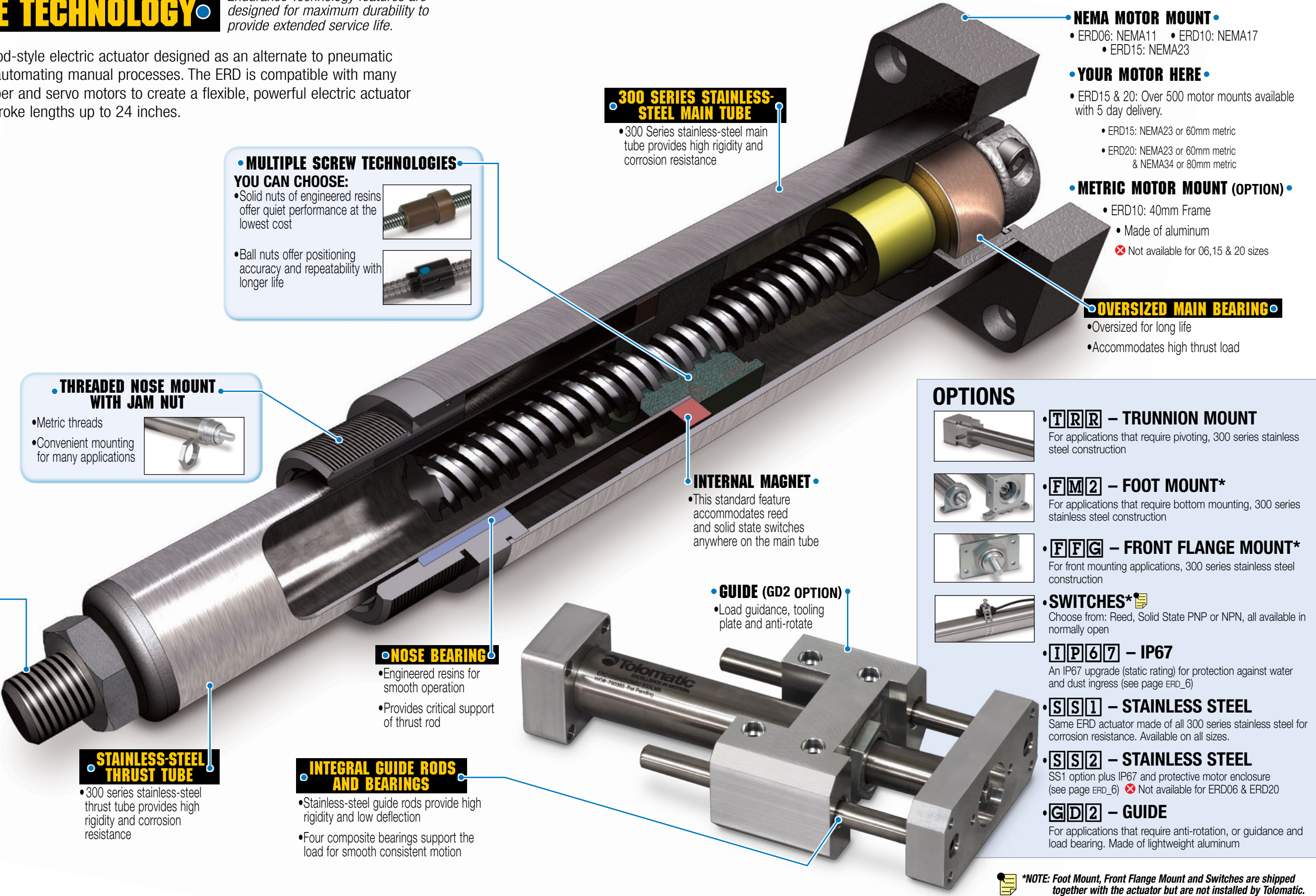
## ENDURANCE TECHNOLOGY<sup>SM</sup>

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

The ERD is an economical rod-style electric actuator designed as an alternate to pneumatic cylinders and an option for automating manual processes. The ERD is compatible with many NEMA & metric mount stepper and servo motors to create a flexible, powerful electric actuator solution. Built-to-order in stroke lengths up to 24 inches.

**5 DAYS  
BUILT-TO-ORDER**

PATENT PENDING





# ERD – ELECTRIC ROD-STYLE ACTUATOR

**SS2** ALL 300 SERIES STAINLESS STEEL, IP67, MOTOR PROTECTION

## ENDURANCE TECHNOLOGY<sup>SM</sup>

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

The all 300 series stainless-steel ERD has an IP67 rating (static) that includes a protective enclosure for the standard Tolomatic motor. Built-to-order in stroke lengths up to 24 inches.



PATENT PENDING

### MULTIPLE SCREW TECHNOLOGIES YOU CAN CHOOSE:

- Solid nuts of engineered resins offer quiet performance at the lowest cost
- Ball nuts offer positioning accuracy and repeatability with longer life



### ALL 300 SERIES STAINLESS STEEL CONSTRUCTION

- Corrosion resistant 300 series stainless steel is ideal for washdown environments

### VITON® SEALS

- For ingress protection and resistance to chemicals, water and dust
- Used throughout actuator

### MALE THREADED ROD END

- Standard metric threads
- Compatible with many commercially available metric rod end accessories

### NOSE BEARING

- Engineered resins for smooth operation
- Provides critical support of thrust rod

### MOTOR PROTECTION

- Motor enclosure made of 300 series stainless steel designed to protect motor with IP67 rating (static)

**\*NOTE:** Only Tolomatic motors are available with the SS2 option.

### FLEXIBLE CONNECTION

- Choice of cord grips or industry standard conduit threads



SS23  
1 or 2 cord grips determined if encoder is selected (polymide plastic)



SS21  
NPT 1/2" conduit thread &  
SS22  
M20x1.5 conduit thread

### OVERSIZED MAIN BEARING

- Oversized for long life
- Accommodates high thrust load

### INTERNAL MAGNET

- This standard feature accommodates reed and solid state switches anywhere on the main tube

## OPTIONS



### FM2 – FOOT MOUNT\*

For applications that require bottom mounting, 300 series stainless steel construction



### FFG – FRONT FLANGE MOUNT\*

For front mounting applications, 300 series stainless steel construction



### SWITCHES\*

Choose from: Reed, Solid State PNP or NPN, all available in normally open. (not corrosion resistant)

**\*NOTE:** Foot Mount, Front Flange Mount and Switches are shipped together with the actuator but are not installed by Tolomatic.

### IP67 (static rating)

| SOLIDS, FIRST DIGIT:  |                     |                                                                                                                                                                             |
|-----------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6                     | Dust tight          | No ingress of dust; complete protection against solid object intrusion                                                                                                      |
| LIQUIDS, SECOND DIGIT |                     |                                                                                                                                                                             |
| 7                     | Immersion up to 1 m | Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time (up to 1 m of submersion). |

(See page ERD\_11 for a complete definition of these IP codes)

# ACS – Actuator Control Solutions

## WHAT IS THE ACS?

The ACS is an extremely easy-to-use stepper drive & controller developed specifically to be used with electric actuators. Simply select the configured Tolomatic actuator in the software to automatically set-up most of the necessary parameters to create motion in the desired linear units (mm or inch).

## ACS DRIVE/CONTROLLER (3604-9651) CAPABILITIES:

- 4, 8, or 16 move command modes (absolute, incremental, jog or home with analog output echoing position of actuator from encoder) for infinite positioning capability
- Analog position mode (0-10 Vdc or 4-20 mA)
- Pneumatic mode replaces pneumatic valve logic for simple motion
- ModBus RTU over RS485 provides infinite positioning
- Adjustable motion profile parameters (velocity, accel/decel, force). Parameters are independently configurable for each move
- Ability to reduce holding current for energy savings
- End point correction
- Zone output based on position
- Force limiting capability
- Configurable digital I/O (24 Vdc Opto-Isolated)(NPN or PNP)
- Compatible with most 24 Vdc stepper motors

## ACS DRIVE/CONTROLLER (3604-9654, 3604-9655) ADDITIONAL CAPABILITIES:

- Ethernet mode provides infinite positioning using EtherNet/IP and Modbus TCP protocols
- Dual Ethernet ports with internal switch for daisy chaining
- Analog output for Analog Position Mode





# ACS – Actuator Control Solutions

## • DUAL ETHERNET PORTS (OPTION) •

- Internal switch for daisy chaining up to 255 ACS axes

### Protocols:

- EtherNet/IP
- Modbus TCP
- Ethernet TCP/IP

## • DIGITAL I/O •

- 8 Digital Inputs
- 4 Digital Outputs
- 24 Vdc Opto-Isolated
- NPN or PNP
- Configurable

## • ANALOG I/O •

- 0-10 Vdc or 4-20mA
- 1 Analog Input
- 1 Analog Output (Optional)

## • FEEDBACK •

- For Digital Encoder

## • MOTOR POWER •

- 24Vdc Stepper Motors

## • LED INDICATORS •

- Power & Fault indicators

## • RS232 COM PORT •

- Drive Configuration Port

## • DUAL PURPOSE HEAT SINK •

- Removes heat from drive for optimal performance
- Panel mounting

## POWER CONNECTION •

- 24Vdc

## • RS485 COM PORT •

- Modbus RTU



## EASY TO USE CONFIGURATION SOFTWARE

• Windows® compliant

| Label | Move Type  | Position (in) | Velocity (in/sec) | Accel (in/sec²) | Decel (in/sec²) | Force % |
|-------|------------|---------------|-------------------|-----------------|-----------------|---------|
| 1     | MOVE1      | Absolute      | 1.000             | 1.00            | 100.0           | 100.0   |
| 2     | MOVE2      | Absolute      | 2.000             | 2.00            | 90.0            | 90.0    |
| 3     | MOVE3      | Absolute      | 3.000             | 3.00            | 80.0            | 80.0    |
| 4     | MOVE4      | Absolute      | 4.000             | 4.00            | 70.0            | 70.0    |
| 5     | FASTJOGPOS | JogPos        | 0.250             | 1.00            | 100.0           | 100.0   |
| 6     | SLOWJOGPOS | JogPos        | 0.100             | 1.00            | 100.0           | 100.0   |
| 7     | FASTJOGNEG | JogNeg        | 0.250             | 1.00            | 100.0           | 100.0   |
| 8     | SLOWJOGNEG | JogNeg        | 0.100             | 1.00            | 100.0           | 100.0   |
| 9     | FASTJOGPOS | JogPos        | 0.000             | 4.00            | 100.0           | 100.0   |
| 10    | SLOWJOGPOS | JogPos        | 0.000             | 1.00            | 100.0           | 100.0   |
| 11    | FASTJOGNEG | JogNeg        | 0.000             | 4.00            | 100.0           | 100.0   |
| 12    | SLOWJOGNEG | JogNeg        | 0.000             | 1.00            | 100.0           | 100.0   |
| 13    | Absolute   | 1.500         | 1.00              | 110.0           | 110.0           | 70.0    |
| 14    | Absolute   | 2.500         | 2.00              | 120.0           | 120.0           | 80.0    |
| 15    | Absolute   | 3.500         | 3.00              | 130.0           | 130.0           | 90.0    |
| 16    | Absolute   | 4.500         | 4.00              | 140.0           | 140.0           | 70.0    |

# ERD – Electric Rod-Style Actuator

SIZE: ALL



## SPECIFICATIONS (US standard measurement)

| ERD SIZE | SCREW DIA. | MAXIMUM STROKE* | SCREW CODE | LEAD   | LEAD ACCURACY | BACKLASH | MAXIMUM THRUST | DYNAMIC LOAD RATING | INERTIA            |                    | WEIGHT |          | WEIGHT (GD2 adder) |          | WEIGHT (SS2 adder) |          |
|----------|------------|-----------------|------------|--------|---------------|----------|----------------|---------------------|--------------------|--------------------|--------|----------|--------------------|----------|--------------------|----------|
|          |            |                 |            |        |               |          |                |                     | Base               | Per Inch           | Base   | Per Inch | Base               | Per Inch | Base               | Per Inch |
|          | in         | in              |            | in/rev | in/ft         | in       | lbf            | lbf                 | lb-in <sup>2</sup> | lb-in <sup>2</sup> | lb     | lb       | lb                 | lb       | lb                 | lb       |
| 06       | 0.250      | 8               | SN02       | 0.500  | 0.005         | 0.007    | 20             | NA                  | 0.0018             | 0.0001             | 0.263  | 0.035    | 0.579              | 0.027    | –                  | –        |
|          |            |                 | SN04       | 0.250  |               |          |                |                     |                    |                    |        |          |                    |          |                    |          |
|          |            |                 | SN16       | 0.063  |               |          |                |                     |                    |                    |        |          |                    |          |                    |          |
| 10       | 0.375      | 10              | SN01       | 1.000  | 0.007         | 0.007    | 40             | NA                  | 0.0022             | 0.0006             | 0.411  | 0.069    | 1.028              | 0.061    | 2.280              | 0.069    |
|          |            |                 | SN02       | 0.500  |               |          |                |                     |                    |                    |        |          |                    |          |                    |          |
|          |            |                 | SN05       | 0.200  |               |          |                |                     |                    |                    |        |          |                    |          |                    |          |
|          |            |                 | BNM05      | 0.197  | 0.004         |          | 100            | 240                 | 0.0040             | 0.0014             | 0.607  | 0.087    |                    |          |                    | 0.087    |
| 15       | 0.500      | 12              | SN01       | 1.000  | 0.006         | 0.007    | 75             | NA                  | 0.0104             | 0.0017             | 1.079  | 0.126    | 2.297              | 0.095    | 5.771              | 0.126    |
|          |            |                 | SN02       | 0.500  | 0.005         |          |                |                     |                    |                    |        |          |                    |          |                    |          |
|          |            |                 | SN05       | 0.200  | 0.006         |          |                |                     |                    |                    |        |          |                    |          |                    |          |
|          | 0.630      | 24              | BNM05      | 0.197  | 0.004         | 0.005    | 200            | 450                 | 0.0178             | 0.0044             | 1.170  | 0.159    |                    |          |                    | 0.159    |
|          |            |                 | BNM10      | 0.394  |               |          |                | 400                 |                    |                    |        |          |                    |          |                    |          |
| 20       | 0.984      | 24              | BNM05      | 0.197  | 0.004         | 0.005    | 500            | 900                 | 0.0628             | 0.0263             | 7.575  | 0.325    | 6.455              | 0.256    | –                  | –        |
|          |            |                 | BNM10      | 0.394  |               |          |                |                     |                    |                    |        |          |                    |          |                    |          |

## SPECIFICATIONS (metric measurement)

| ERD SIZE | SCREW DIA. | MAXIMUM STROKE* | SCREW CODE | LEAD   | LEAD ACCURACY | BACKLASH | MAXIMUM THRUST | DYNAMIC LOAD RATING | INERTIA                              |                                      | WEIGHT |          | WEIGHT (GD2 adder) |          | WEIGHT (SS2 adder) |          |
|----------|------------|-----------------|------------|--------|---------------|----------|----------------|---------------------|--------------------------------------|--------------------------------------|--------|----------|--------------------|----------|--------------------|----------|
|          |            |                 |            |        |               |          |                |                     | Base                                 | Per 25mm                             | Base   | Per 25mm | Base               | Per 25mm | Base               | Per 25mm |
|          | mm         | mm              |            | mm/rev | mm/300mm      | mm       | N              | N                   | kg-m <sup>2</sup> x 10 <sup>-6</sup> | kg-m <sup>2</sup> x 10 <sup>-6</sup> | kg     | kg       | kg                 | kg       | kg                 | kg       |
| 06       | 6.35       | 203.2           | SN02       | 12.7   | 0.13          | 0.18     | 89             | NA                  | 0.53                                 | 0.03                                 | 0.119  | 0.016    | 0.263              | 0.012    | –                  | –        |
|          |            |                 | SN04       | 6.35   |               |          |                |                     |                                      |                                      |        |          |                    |          |                    |          |
|          |            |                 | SN16       | 1.60   |               |          |                |                     |                                      |                                      |        |          |                    |          |                    |          |
| 10       | 9.53       | 254.0           | SN01       | 25.4   | 0.18          | 0.13     | 188            | NA                  | 0.64                                 | 0.18                                 | 0.186  | 0.031    | 0.466              | 0.028    | 2.280              | 0.031    |
|          |            |                 | SN02       | 12.7   |               |          |                |                     |                                      |                                      |        |          |                    |          |                    |          |
|          |            |                 | SN05       | 5.08   |               |          |                |                     |                                      |                                      |        |          |                    |          |                    |          |
|          |            |                 | BNM05      | 5.00   | 0.87          |          | 445            | 1068                | 1.16                                 | 0.41                                 | 0.275  | 0.039    |                    |          |                    | 0.039    |
| 15       | 12.70      | 304.8           | SN01       | 25.4   | 0.15          | 0.18     | 334            | NA                  | 3.04                                 | 0.50                                 | 0.489  | 0.057    | 1.042              | 0.043    | 5.771              | 0.057    |
|          |            |                 | SN02       | 12.7   | 0.13          |          |                |                     |                                      |                                      |        |          |                    |          |                    |          |
|          |            |                 | SN05       | 5.08   | 0.15          |          |                |                     |                                      |                                      |        |          |                    |          |                    |          |
|          | 16.00      | 609.6           | BNM05      | 5.00   | 0.87          | 0.13     | 890            | 2002                | 5.18                                 | 1.28                                 | 0.531  | 0.072    |                    |          |                    | 0.072    |
|          |            |                 | BNM10      | 10.00  |               |          |                | 1779                |                                      |                                      |        |          |                    |          |                    |          |
| 20       | 25.00      | 609.6           | BNM05      | 5.00   | 0.87          | 0.13     | 2224           | 4003                | 18.38                                | 7.7                                  | 3.436  | 0.147    | 2.928              | 0.116    | –                  | –        |
|          |            |                 | BNM10      | 10.00  |               |          |                |                     |                                      |                                      |        |          |                    |          |                    |          |

|                   |                                    |
|-------------------|------------------------------------|
| Temperature range | 40° to 130° F<br>(4.4° to 54.4° C) |
| IP rating         | 40 (static)                        |

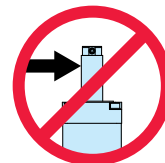
\*Longer stroke length modification available upon request.

## SIDE LOAD CONSIDERATIONS

The standard ERD rod-style actuator is not meant to be used in applications where side loading occurs. If side loading exists in the application consider the GD2 guided option.

Loads must be guided and supported. Loads should be aligned with the line of motion of the thrust rod.

Side loading will affect the life of the actuator.





# ERD – Electric Rod-Style Actuator

SIZE: **ALL**

## MOTOR SPECIFICATIONS

| Specifications  | NEMA 11                                       |                          | NEMA 17                  |                          | NEMA 23                  |                           |
|-----------------|-----------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|
| Motor Type      | Bipolar Stepper, 1.8° per Step                |                          |                          |                          |                          |                           |
| Encoder         | Differential; 500 line (2000 count post quad) |                          |                          |                          |                          |                           |
| Resistance      | 3.5 Ω                                         |                          | 2.4 Ω                    |                          | 1.5 Ω                    |                           |
| Inductance      | 2.3 mH                                        |                          | 4.5 mH                   |                          | 3.7 mH                   |                           |
| Rated Current   | 1 Arms                                        |                          | 1.5 Arms                 |                          | 2 Arms                   |                           |
| Maximum Torque  | 0.813 in-lbs                                  | 0.092 N-m                | 4.4 in-lbs               | 0.497 N-m                | 6.25 in-lbs              | 0.706 N-m                 |
| Maximum RPM     | 1500 RPM                                      |                          | 900 RPM                  |                          | 1050 RPM                 |                           |
| Degree per Step | 1.8°                                          |                          | 1.8°                     |                          | 1.8°                     |                           |
| Rotor Inertia   | 0.006 lb-in <sup>2</sup>                      | 17.588 g-cm <sup>2</sup> | 0.028 lb-in <sup>2</sup> | 81.939 g-cm <sup>2</sup> | 0.075 lb-in <sup>2</sup> | 219.481 g-cm <sup>2</sup> |

## ACS DRIVE/CONTROLLER SPECIFICATIONS

| DRIVE POWER              |          |
|--------------------------|----------|
| Current - Max            | 4A       |
| Voltage Nominal          | 20 - 28V |
| Over Voltage             | 30V      |
| Under Voltage            | 18V      |
| Absolute Maximum Voltage | 35V      |
| Logic Current Draw (24V) | 100 mA   |

| OPERATING CONDITIONS  |                        |
|-----------------------|------------------------|
| Ambient Temperature   | 77°F, 25°C Nominal     |
| Operating Temperature | 32 - 104°F, 0 - 40°C   |
| Storage Temperature   | 32-158°F, 0-70°C       |
| Humidity              | 0 - 90% non-condensing |

See ACS Hardware and Installation Guide #3604-4173 for more details.

### What Does IP67 mean?

The IP Code (or International Protection Rating) consists of the letters IP followed by two digits and an optional letter. As defined in international standard IEC 60529, it classifies the degrees of protection provided against the intrusion of solid objects (including body parts like hands and fingers), dust, accidental contact, and water in electrical enclosures.

| SOLIDS, FIRST DIGIT:                  |                     |                                                                                                                                                                             |
|---------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4                                     | >1 mm               | Most wires, screws, etc.                                                                                                                                                    |
| 6                                     | Dust tight          | No ingress of dust; complete protection against solid object intrusion                                                                                                      |
| LIQUIDS, SECOND DIGIT (static rating) |                     |                                                                                                                                                                             |
| 0                                     | Not protected       |                                                                                                                                                                             |
| 7                                     | Immersion up to 1 m | Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time (up to 1 m of submersion). |

**The first digit** indicates the level of protection that the enclosure provides against access to hazardous parts (e.g., electrical conductors, moving parts) and the ingress of solid foreign objects.

**The second digit** indicates the level of protection that the enclosure provides against harmful ingress of water.





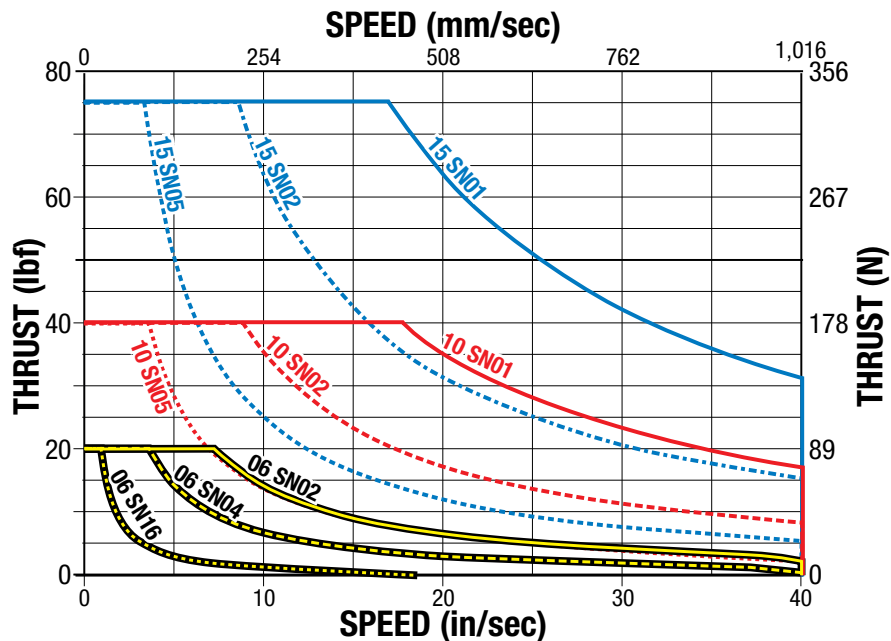
# ERD – Electric Rod-Style Actuator



SIZE: **ALL**

**PERFORMANCE**

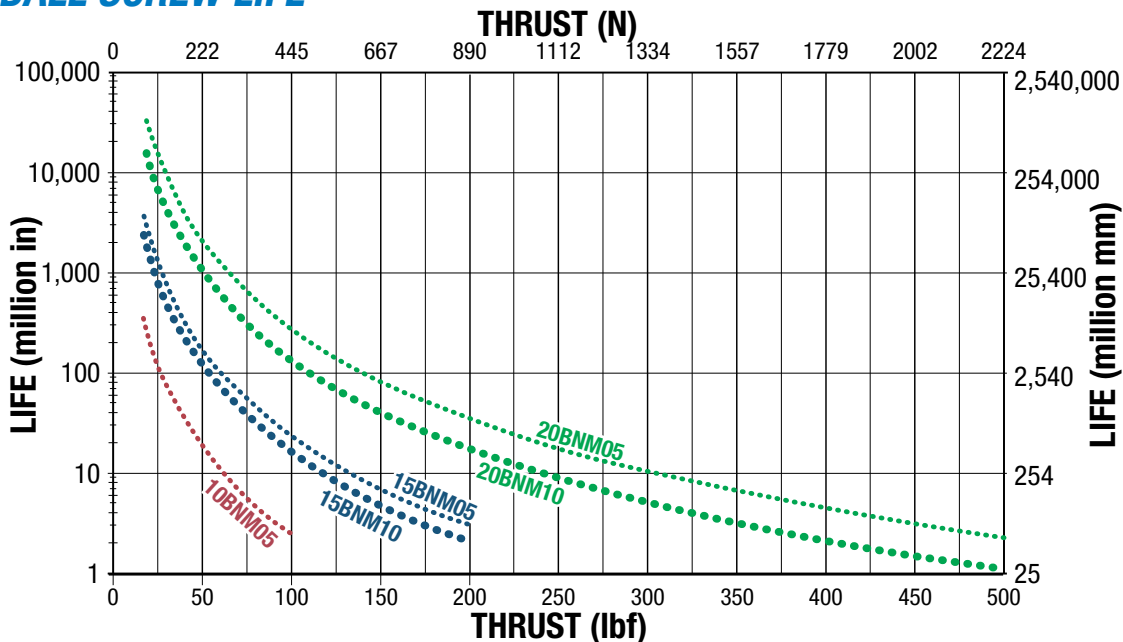
## PV LIMITS (Pressure Velocity of Acme Nut)



**PV LIMITS:** Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.

$$\left( \frac{\text{Thrust}}{(\text{Max. Thrust Rating})} \right) \times \left( \frac{\text{Speed}}{(\text{Max. Speed Rating})} \right) \leq 0.1$$

## BALL SCREW LIFE



**NOTE:** The  $L_{10}$  expected life of a ball screw linear actuator is expressed as the linear travel distance that 90% of properly maintained ball screw manufactured are expected to meet or exceed. This is not a guarantee and this graph should be used for estimation purposes only.

The underlying formula that defines this value is:

$$L_{10} = \left( \frac{C}{F} \right)^3 \cdot \ell =$$

Travel life in millions of inches, where:

$C$  = Dynamic load rating (lbf)  
 $F$  = Equivalent load (lbf)  
 $\ell$  = Screw lead (in/rev)

Use the "Equivalent Load" calculation below, when the load is not constant throughout the entire stroke. In cases where there is only minor variation in loading, use greatest load for life calculations.

$$P_e = \sqrt[3]{\frac{\% (P_1)^3 + \% (P_2)^3 + \% (P_3)^3 + \% (P_n)^3}{100}}$$

Where:

$P_e$  = Equivalent load (lbs)

$P_n$  = Each increment at different load (lbs)

$\%_n$  = Percentage of stroke at load increment

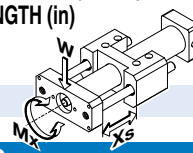
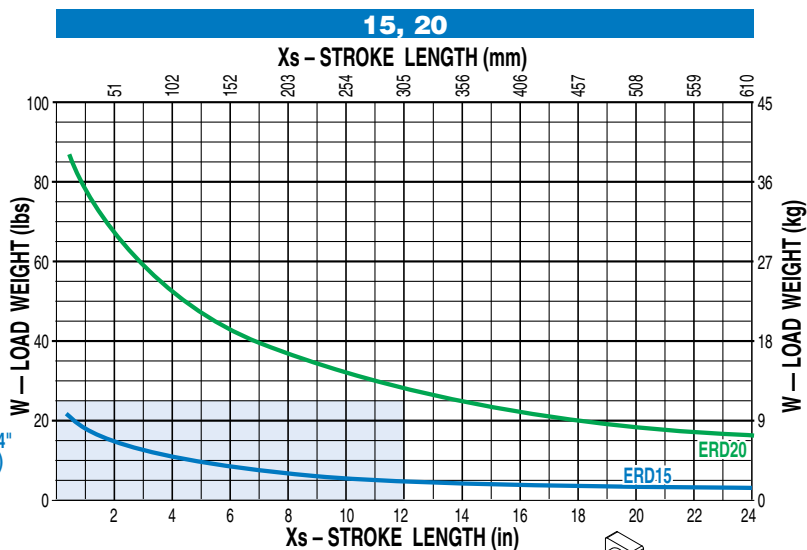
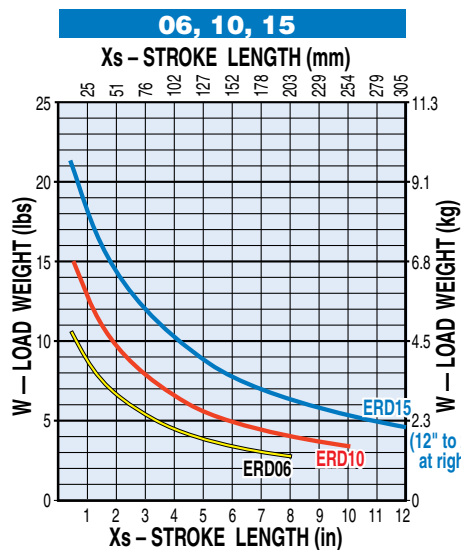
# ERD – Electric Rod-Style Actuator

OPTION: **GD2 – GUIDED ERD**

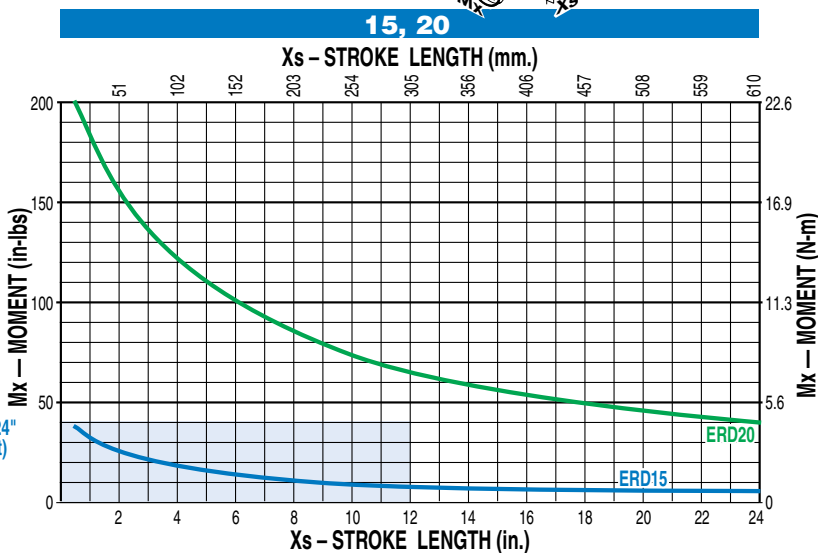
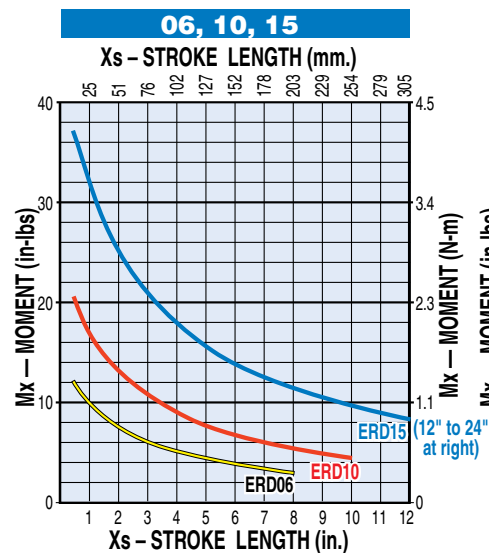
**PERFORMANCE**



## LOAD VS EXTENDED LENGTH



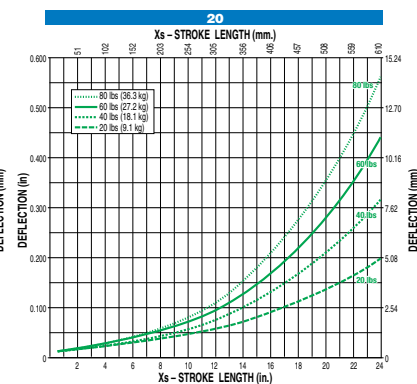
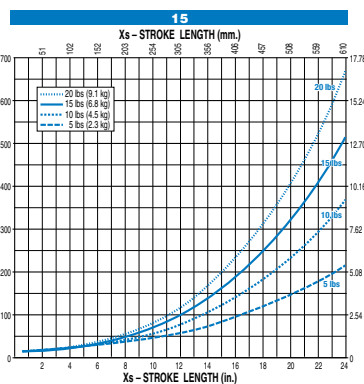
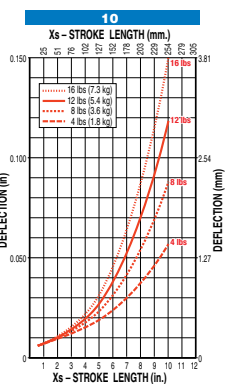
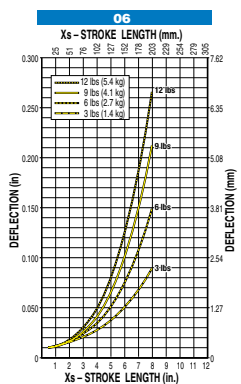
## BENDING MOMENTS



## GUIDE ROD DEFLECTION



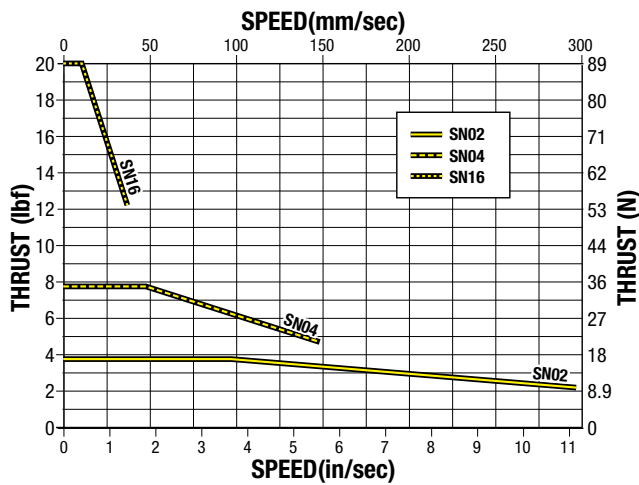
**NOTE:** Deflection is measured at the tooling plate.  
Excessive deflection may impact actuator life.  
Contact Tolomatic for assistance



# ERD – Electric Rod-Style Actuator

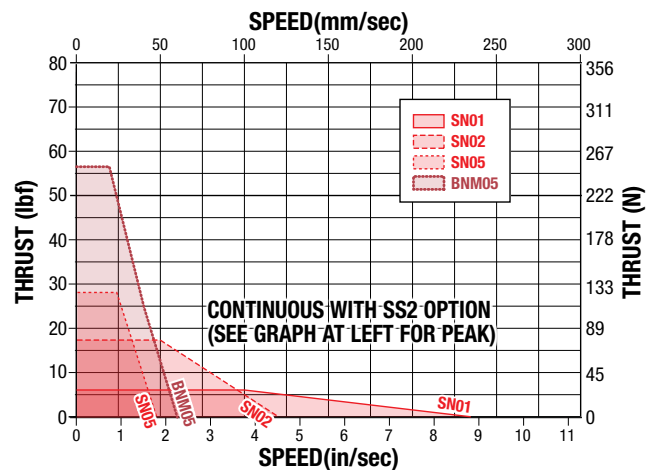
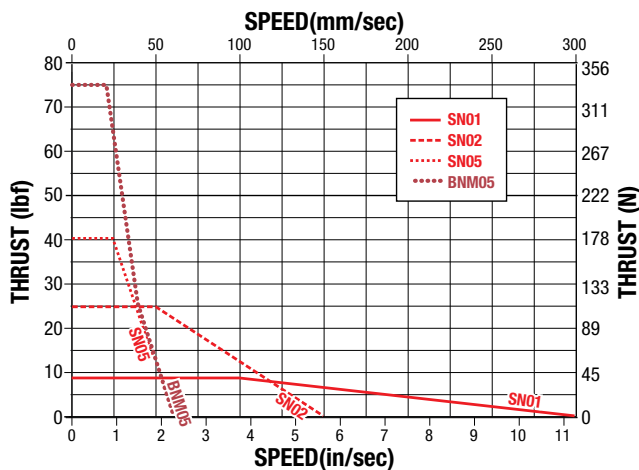
## PERFORMANCE DATA WITH ACS DRIVE/CONTROLLER

### SPEED vs THRUST - ERD06 ACTUATOR WITH NEMA11 MOTOR

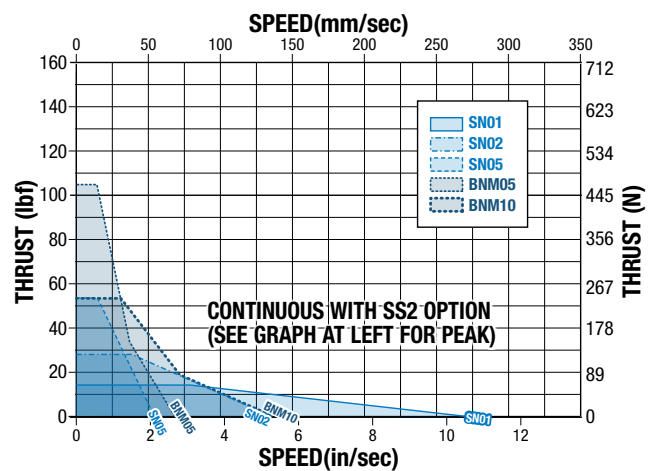
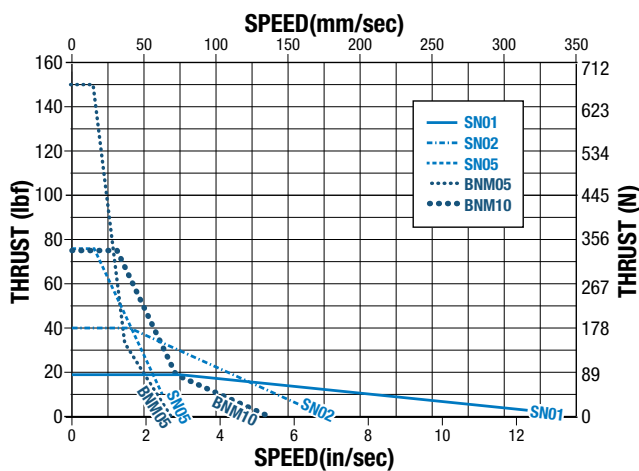


SS2 OPTION IS NOT AVAILABLE FOR THE 06 SIZE

### SPEED vs THRUST - ERD10 ACTUATOR WITH NEMA17 MOTOR



### SPEED vs THRUST - ERD15 ACTUATOR WITH NEMA23 MOTOR

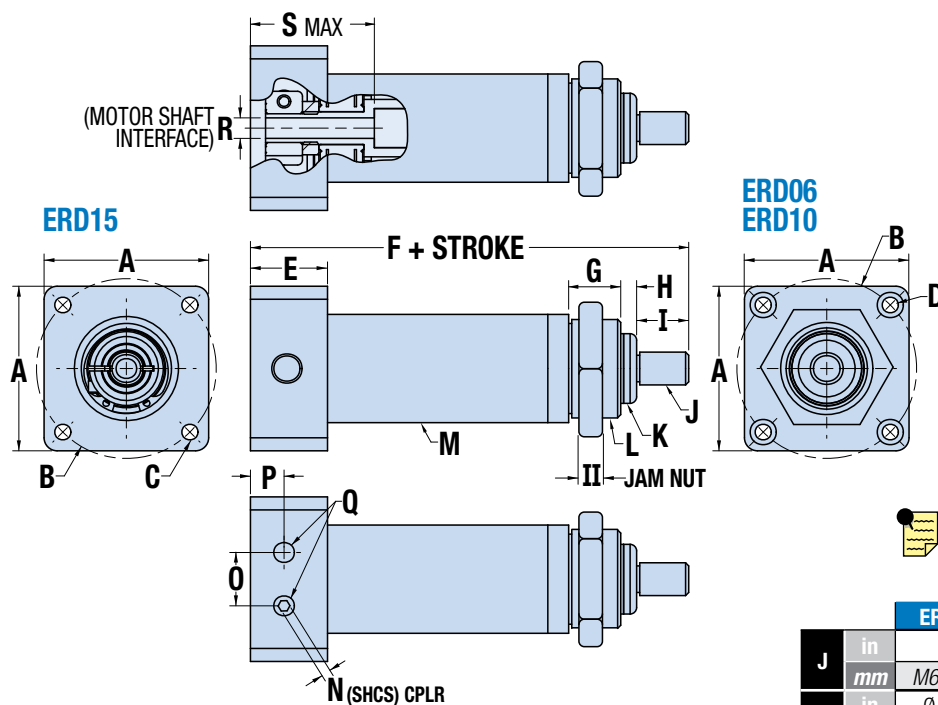




# ERD – Electric Rod-Style Actuator

**DIMENSIONS**  3D CAD available at [www.tolomatic.com](http://www.tolomatic.com)

## ACTUATOR

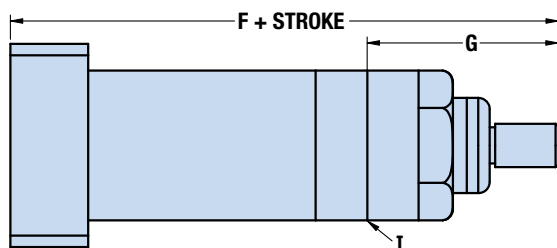


 \*This dimension is determined by motor choice. See page 27 for details of Your Motor Here (YM) motor mounting

|   |    | ERD06  | ERD10  | ERD15     | ERD20 |
|---|----|--------|--------|-----------|-------|
| A | in | 1.125  | 1.580  | 2.220*    | *     |
|   | mm | 28.58  | 40.13  | 56.39*    | *     |
| B | in | Ø1.287 | Ø1.725 | Ø2.625*   | *     |
|   | mm | Ø32.69 | Ø43.82 | Ø66.68*   | *     |
| C | in | -      | -      | -         | *     |
|   | mm | -      | -      | M4 x 0.7* | *     |
| D | in | Ø1.136 | Ø1.154 | -         | *     |
|   | mm | Ø3.45  | Ø3.91  | -         | *     |
| E | in | 1.400  | 0.740  | 0.850*    | *     |
|   | mm | 35.56  | 18.80  | 21.59*    | *     |
| F | in | 3.88   | 4.20   | 5.40*     | *     |
|   | mm | 98.5   | 106.7  | 137.2*    | *     |
| G | in | 0.500  | 0.500  | 0.600     | 0.750 |
|   | mm | 12.70  | 12.70  | 15.24     | 18.75 |
| H | in | 0.153  | 0.153  | 0.153     | 0.153 |
|   | mm | 3.89   | 3.89   | 3.89      | 3.89  |
| I | in | 0.375  | 0.500  | 0.750     | 0.750 |
|   | mm | 9.53   | 12.70  | 19.05     | 19.05 |

|    |    | ERD06                | ERD10                | ERD15                 | ERD20                 |
|----|----|----------------------|----------------------|-----------------------|-----------------------|
| J  | in | -                    | -                    | -                     | -                     |
|    | mm | M6 x 1.0             | M8 x 1.25            | M12 x 1.75            | M18 x 2.0             |
| K  | in | 0.443                | 0.686                | 0.1.041               | 1.323                 |
|    | mm | Ø11.25               | Ø17.42               | Ø26.40                | 33.60                 |
| L  | in | -                    | -                    | -                     | -                     |
|    | mm | M16 x 1.5            | M24 x 1.5            | M34 x 1.5             | M44 x 1.5             |
| II | in | 0.236                | 0.236                | 0.315                 | 0.315                 |
|    | mm | 6.00                 | 6.00                 | 8.00                  | 8.00                  |
| M  | in | 0.686                | 0.1.040              | 0.1.638               | 0.2.051               |
|    | mm | Ø17.42               | Ø26.42               | Ø41.61                | 52.20                 |
| N  | in | 0.098                | 0.098                | 0.098*                | *                     |
|    | mm | 2.50                 | 2.50                 | 2.50*                 | *                     |
| O  | in | 0.512                | 0.512                | 0.512                 | 0.920                 |
|    | mm | 13.00                | 13.00                | 13.00                 | 23.37                 |
| P  | in | 0.264                | 0.323                | 0.298*                | *                     |
|    | mm | 6.71                 | 8.20                 | 7.57*                 | *                     |
| Q  | in | (2) M4 x 0.7<br>±.10 | (2) M6 x 1.0<br>±.31 | (2) M6 x 1.0<br>±.50  | (2) M6 x 1.0<br>±.50  |
|    | mm | (2) M4 x 0.7<br>±2.5 | (2) M6 x 1.0<br>±7.9 | (2) M6 x 1.0<br>±12.7 | (2) M6 x 1.0<br>±12.7 |
| R  | in | Ø1.197               | Ø1.197               | Ø2.250*               | *                     |
|    | mm | Ø5.00                | Ø5.00                | Ø6.35*                | *                     |
| S  | in | 1.100                | 1.100                | 1.250*                | *                     |
|    | mm | 27.94                | 27.94                | 31.75*                | *                     |

## IP67 OPTION DIMENSIONS



### IP67 OPTION

|   |    | ERD06 | ERD10 | ERD15  | ERD20 |
|---|----|-------|-------|--------|-------|
| F | in | 4.59  | 4.79  | 6.00*  | *     |
|   | mm | 116.6 | 121.8 | 152.1* | *     |
| G | in | 1.744 | 1.739 | 2.088  | 2.853 |
|   | mm | 44.30 | 44.17 | 53.04  | 72.48 |
| I | in |       |       |        |       |
|   | mm |       |       |        |       |

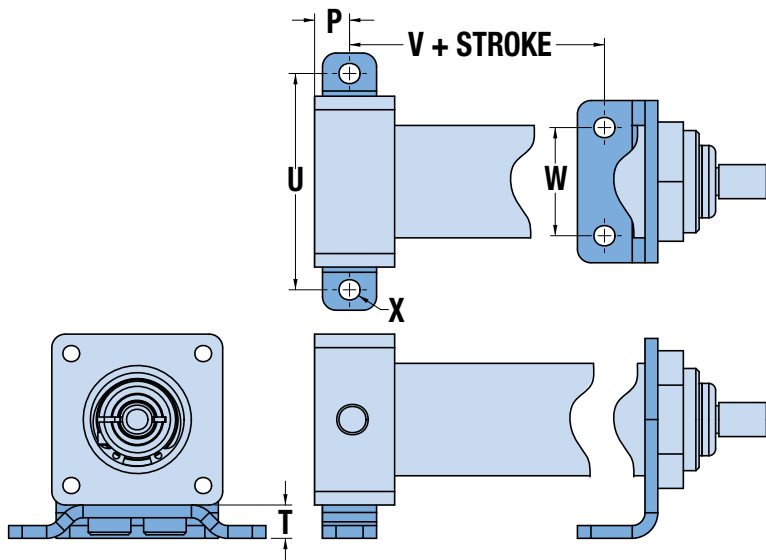
Surface for mounting options

IP67 (static rating) option replaces the Jam Nut (II in table above)

# ERD – Electric Rod-Style Actuator

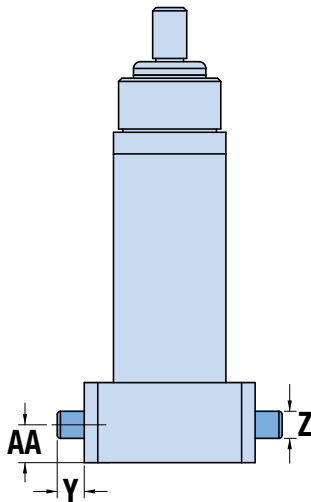
**DIMENSIONS**  3D CAD available at [www.tolomatic.com](http://www.tolomatic.com)

## FM2 - FOOT MOUNT



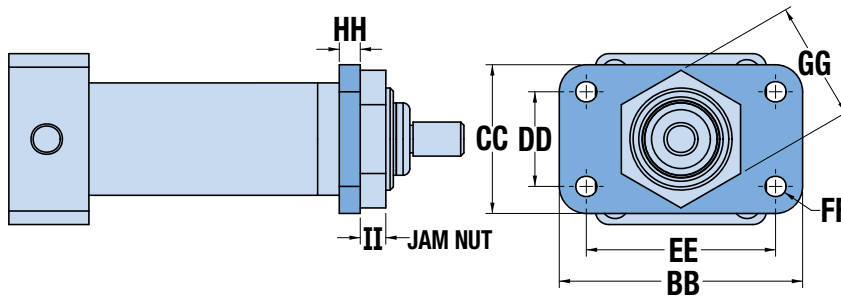
|    |    | ERD06           | ERD10           | ERD15           | ERD20             |
|----|----|-----------------|-----------------|-----------------|-------------------|
| P  | in | 0.264           | 0.323           | 0.298*          | *                 |
|    | mm | 6.71            | 8.20            | 7.57*           | *                 |
| T  | in | 0.259           | 0.308           | 0.406           | 0.569             |
|    | mm | 6.58            | 7.82            | 10.31           | 14.46             |
| U  | in | 1.750           | 2.00            | 2.600           | 3.250             |
|    | mm | 44.45           | 50.80           | 66.04           | 82.55             |
| V  | in | 2.270           | 2.357           | 3.165           | 3.200             |
|    | mm | 57.66           | 59.87           | 80.39           | 81.28             |
| W  | in | 0.625           | 1.00            | 1.250           | 1.25              |
|    | mm | 15.88           | 25.4            | 31.75           | 31.75             |
| X  | in | 0.154           | 0.194           | 0.221           | 0.281             |
|    | mm | Ø3.91           | Ø4.93           | Ø5.61           | Ø7.14             |
| Y  | in | 0.250           | 0.250           | 0.430           | 0.750             |
|    | mm | 6.35            | 6.35            | 10.92           | 19.05             |
| Z  | in | 0.1878 / 0.1876 | 0.2503 / 0.2501 | 0.3753 / 0.3751 | 0.6245 / 0.6240   |
|    | mm | Ø4.770 / Ø4.765 | Ø6.358 / Ø6.353 | Ø9.533 / Ø9.528 | Ø15.862 / Ø15.850 |
| AA | in | 1.221           | 0.350           | 0.425*          | *                 |
|    | mm | 31.01           | 8.89            | 10.80*          | *                 |
| BB | in | 1.750           | 2.250           | 2.500           | 3.500             |
|    | mm | 44.45           | 57.15           | 63.50           | 88.90             |
| CC | in | 1.000           | 1.375           | 1.750           | 2.250             |
|    | mm | 25.40           | 34.93           | 44.45           | 57.15             |
| DD | in | 0.500           | 0.875           | 1.250           | 1.750             |
|    | mm | 12.70           | 22.23           | 31.75           | 44.45             |
| EE | in | 1.250           | 1.750           | 2.000           | 3.000             |
|    | mm | 31.75           | 44.45           | 50.80           | 76.20             |
| FF | in | 0.154           | 0.194           | 0.221           | 0.281             |
|    | mm | Ø3.91           | Ø4.93           | Ø5.61           | Ø7.14             |
| GG | in | 0.709           | 1.102           | 1.575           | 1.890             |
|    | mm | 18.00           | 28.00           | 40.00           | 48.08             |
| HH | in | 0.194           | 0.194           | 0.194           | 0.194             |
|    | mm | 4.93            | 4.93            | 4.93            | 4.93              |
| II | in | 0.236           | 0.236           | 0.315           | 0.315             |
|    | mm | 6.00            | 6.00            | 8.00            | 8.00              |

## TRR - TRUNNION MOUNT



 \*This dimension is determined by motor choice. See page 27 for details of Your Motor Here (YM) motor mounting.

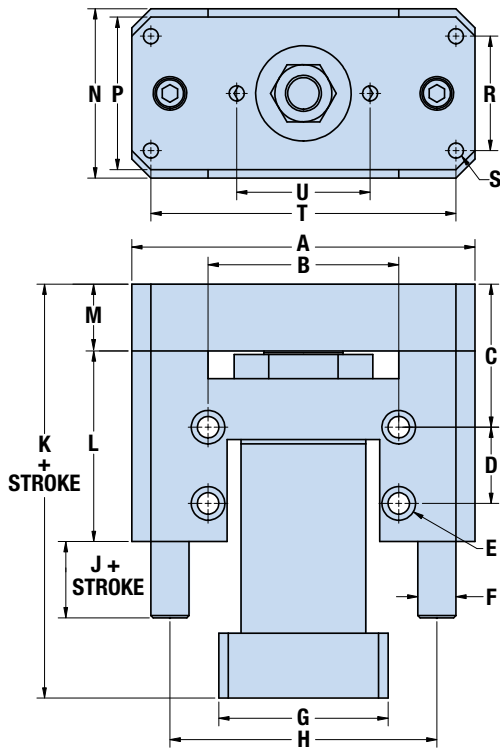
## FFG - FRONT FLANGE



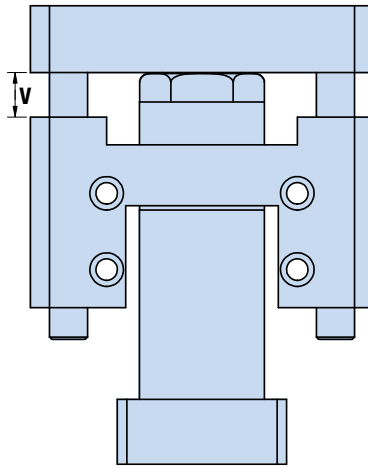
# ERD – Electric Rod-Style Actuator

**DIMENSIONS**  3D CAD available at [www.tolomatic.com](http://www.tolomatic.com)

## GD2 – GUIDED ERD



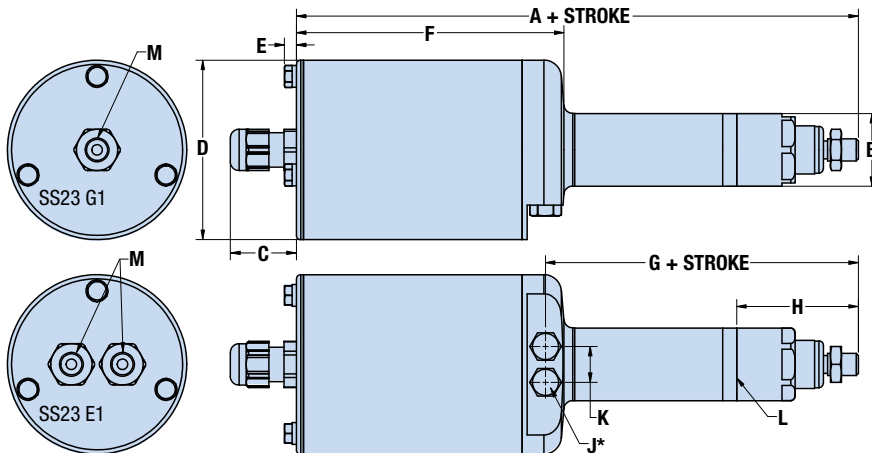
**GUIDED ERD WITH IP67 OPTION**  
ERD STROKE IS REDUCED BY DIMENSION "V"



|     |    | ERD06         | ERD10         | ERD15         | ERD20         |
|-----|----|---------------|---------------|---------------|---------------|
| A   | in | 3.000         | 3.500         | 4.500         | 5.900         |
|     | mm | 76.20         | 88.90         | 114.30        | 149.86        |
| B   | in | 1.625         | 2.000         | 2.500         | 3.250         |
|     | mm | 41.28         | 50.80         | 63.50         | 82.55         |
| C   | in | 1.125         | 1.250         | 1.875         | 2.500         |
|     | mm | 28.58         | 31.75         | 47.63         | 63.50         |
| D   | in | 1.000         | 1.000         | 1.000         | 2.00          |
|     | mm | 25.40         | 25.40         | 25.40         | 50.8          |
| E Ø | in | 0.194         | 0.221         | 0.281         | 0.344         |
|     |    | ⌊0.31 x 0.19⌋ | ⌊0.38 x 0.22⌋ | ⌊0.44 x 0.28⌋ | ⌊0.56 x 0.34⌋ |
|     | mm | 4.93          | 5.61          | 7.14          | 8.74          |
|     |    | ⌊7.9 x 4.8⌋   | ⌊9.7 x 5.6⌋   | ⌊11.2 x 7.1⌋  | ⌊13.5 x 8.6⌋  |
| F Ø | in | 0.250         | 0.375         | 0.500         | 0.750         |
|     | mm | 6.35          | 9.53          | 12.70         | 19.05         |
| G   | in | 1.125         | 1.580         | 2.220*        | *             |
|     | mm | 28.58         | 40.13         | 56.39*        | *             |
| H   | in | 2.250         | 2.750         | 3.500         | 4.625         |
|     | mm | 57.15         | 69.85         | 88.90         | 117.48        |
| J   | in | 1.000         | 1.000         | 1.000         | 1.500         |
|     | mm | 25.40         | 25.40         | 25.40         | 38.10         |
| K   | in | 3.910         | 4.244         | 5.428*        | *             |
|     | mm | 99.31         | 107.80        | 137.87*       | *             |
| L   | in | 2.000         | 2.000         | 2.500         | 5.000         |
|     | mm | 50.80         | 50.80         | 63.50         | 127.00        |
| M   | in | 0.500         | 0.625         | 0.875         | 1.000         |
|     | mm | 12.70         | 15.88         | 22.23         | 25.40         |
| N   | in | 1.125         | 1.580         | 2.220         | 2.400         |
|     | mm | 28.58         | 40.13         | 56.39         | 60.96         |
| P   | in | 1.000         | 1.500         | 2.000         | 2.300         |
|     | mm | 25.40         | 38.10         | 50.80         | 58.42         |
| R   | in | 0.625         | 1.000         | 1.500         | 1.500         |
|     | mm | 15.88         | 25.40         | 38.10         | 38.10         |
| S   | in | —             | —             | —             | —             |
|     | mm | M4x0.7        | M5x0.8        | M6x1.0        | M8x1.25       |
| T   | in | 2.625         | 3.000         | 4.000         | 5.000         |
|     | mm | 66.68         | 76.20         | 101.60        | 127.00        |
| U   | in | 1.000         | 1.375         | 1.750         | 2.250         |
|     | mm | 25.40         | 34.93         | 44.45         | 57.15         |
| V   | in | 0.716         | 0.587         | 0.585         | 1.200         |
|     | mm | 18.19         | 14.91         | 14.86         | 30.47         |

\*This dimension is determined by motor choice. See page 27 for details of Your Motor Here (YM) motor mounting.

## SS2 – STAINLESS-STEEL BODY WITH PROTECTIVE MOTOR COVER AND IP67 UPGRADE



|   |    | ERD10 | ERD15 |
|---|----|-------|-------|
| A | in | 8.03  | 9.33  |
|   | mm | 204.0 | 237.0 |
| B | in | 1.040 | 1.638 |
|   | mm | 26.42 | 41.61 |
| C | in | 0.945 | 0.945 |
|   | mm | 24.00 | 24.00 |
| D | in | 2.563 | 3.543 |
|   | mm | 65.10 | 89.99 |

|    |    | ERD10    | ERD15    |
|----|----|----------|----------|
| E  | in | 0.173    | 0.173    |
|    | mm | 4.39     | 4.39     |
| F  | in | 3.976    | 4.192    |
|    | mm | 100.99   | 106.48   |
| G  | in | 4.471    | 5.660    |
|    | mm | 113.56   | 143.76   |
| H  | in | 1.739    | 2.088    |
|    | mm | 44.17    | 53.04    |
| J* | in | —        | —        |
|    | mm | M6 x 1.0 | M6 x 1.0 |

✗ SS2 is not available for the 06 & 20 size

|   |                              | ERD10 | ERD15 |
|---|------------------------------|-------|-------|
| K | in                           | 0.512 | 0.512 |
|   | mm                           | 13.00 | 13.00 |
| L | Surface for mounting options |       |       |

| M | Encoder |       | Available cable exit options:      |
|---|---------|-------|------------------------------------|
|   | Code    | Code  |                                    |
|   | SS21    | G1,E1 |                                    |
|   | SS22    | G1,E1 |                                    |
|   | SS23    | G1    | 1 cord grip (motor, no encoder)    |
|   |         | E1    | 2 cord grips (motor, with encoder) |

\*Unit ships standard with hex bolts in these tapped holes  
NOTE: IP67 is a static rating





# ERD – Electric Rod-Style Actuator

**ALTERNATIVE MOTOR DIMENSIONS**  3D CAD available at [www.tolomatic.com](http://www.tolomatic.com)

## MOTOR DIMENSIONS – NEMA MOTOR MOUNT

The ERD actuator is designed to accommodate NEMA standard stepper and servo motors.

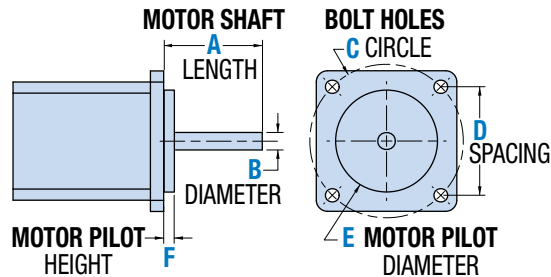
| ACTUATOR | SIZE   |
|----------|--------|
| ERD06    | NEMA11 |
| ERD10    | NEMA17 |
| ERD15    | NEMA23 |

The only limiting factors are the motor shaft diameter and length. NEMA standard motors from the companies in the table at right have been found to be compatible with the ERD actuator.  \*NOT a complete listing)

| ERD Compatible NEMA Motor Suppliers* |
|--------------------------------------|
| Anaheim Automation                   |
| Animatics                            |
| Applied Motion Products              |
| Automation Direct                    |
| Cool Muscle                          |
| Electrocraft                         |
| Fastech                              |
| IMS / Scheider Electric              |
| JVL                                  |
| LIN Engineering                      |
| Nippon Pulse Motor                   |
| Omega                                |
| Oriental Motor                       |
| Parker                               |
| Sanyo Denki                          |
| + Others                             |

 When any motor has been selected for use with the ERD actuator it is important to confirm the motor is compatible with the dimensions in the table below.

|             |             |               |   | ERD06 | ERD10 | ERD15 |       |       |
|-------------|-------------|---------------|---|-------|-------|-------|-------|-------|
| MOTOR SHAFT | LENGTH      | MIN.          | A | in    | 0.50  | 0.50  | 0.50  |       |
|             |             |               |   | mm    | 12.7  | 12.7  | 12.7  |       |
|             |             | MAX.          |   | in    | 1.100 | 1.100 | 1.250 |       |
|             |             |               |   | mm    | 27.94 | 27.94 | 31.75 |       |
| BOLT HOLE   | DIAMETER    |               | B | in    | 0.197 | 0.197 | 0.250 |       |
|             |             |               |   | mm    | 5.00  | 5.00  | 6.35  |       |
|             | CIRCLE      |               | C | in    | 1.287 | 1.725 | 2.625 |       |
|             |             |               |   | mm    | 33.69 | 43.82 | 66.68 |       |
|             | SPACING     |               | D | in    | 0.910 | 1.220 | 1.856 |       |
|             |             |               |   | mm    | 23.11 | 30.99 | 47.14 |       |
|             | MOTOR PILOT | DIAMETER MAX. |   | E     | in    | 0.980 | 0.980 | 1.550 |
|             |             |               |   |       | mm    | 24.90 | 24.90 | 39.37 |
| HEIGHT MAX. |             |               | F | in    | 0.090 | 0.130 | 0.130 |       |
|             |             |               |   | mm    | 2.29  | 3.30  | 3.30  |       |



## MOTOR DIMENSIONS – METRIC MOTOR MOUNT OPTION

The ERD actuator with metric motor mount option is designed to accommodate metric standard servo motors.

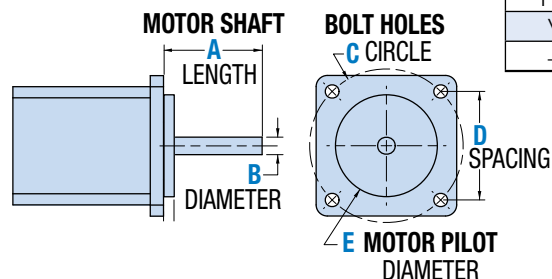
| ACTUATOR | SIZE |
|----------|------|
| ERD10    | 40mm |
| ERD15    | 60mm |

Metric motors from the companies in the table to the right have been found to be compatible with the ERD actuator with the metric motor mount option.  \*NOT a complete listing)

| ERD Compatible Metric Motor Suppliers* |
|----------------------------------------|
| Allen Bradley                          |
| Bosch Rexroth                          |
| Emerson                                |
| Lenze                                  |
| Mitsubishi                             |
| Omron                                  |
| Panasonic                              |
| Yaskawa                                |
| + Others                               |

 When any motor has been selected for use with the ERD actuator it is important to confirm the motor is compatible with the dimensions in the table below.

|             |          |      | ERD10        | ERD15                               |
|-------------|----------|------|--------------|-------------------------------------|
| MOTOR SHAFT | LENGTH   | A in | 0.98         | 1.18                                |
|             |          | mm   | 25.0         | 30.0                                |
|             | DIAMETER | B in | IEC1<br>Ø.31 | IEC1 IEC2 IEC3<br>Ø.43 Ø.47 Ø.55    |
|             |          | mm   | IEC1<br>Ø8.0 | IEC1 IEC2 IEC3<br>Ø11.0 Ø12.0 Ø14.0 |
| BOLT HOLE   | CIRCLE   | C in | 1.81         | 2.76                                |
|             |          | mm   | 46.0         | 70.0                                |
|             | SPACING  | D in | 1.28         | 1.95                                |
|             |          | mm   | 32.53        | 49.50                               |
| MOTOR PILOT | DIAMETER | E in | 1.18         | 1.97                                |
|             |          | mm   | 30.0         | 50.0                                |

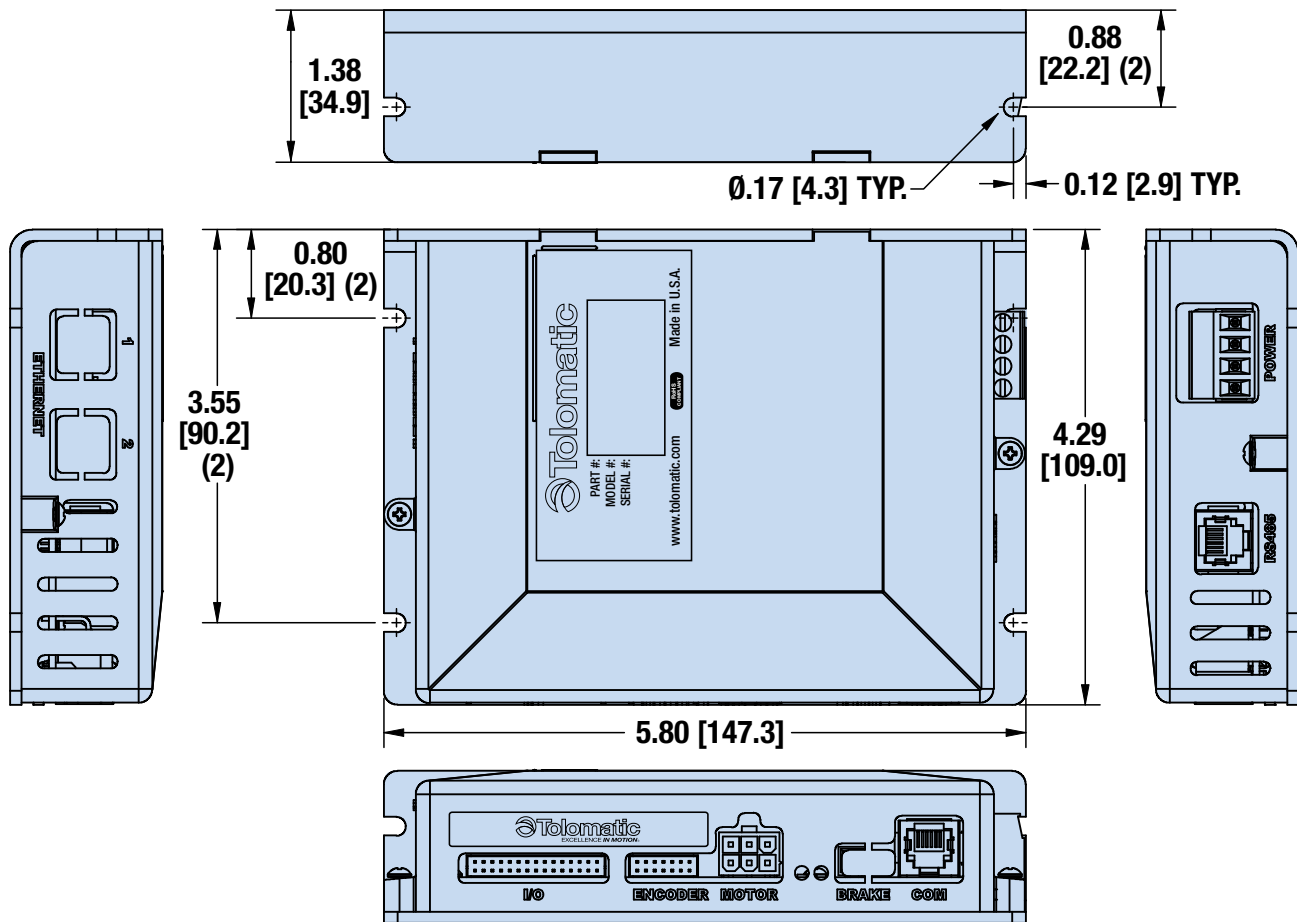


# ACS – Actuator Control Solutions



**DIMENSIONS**  3D CAD available at [www.tolomatic.com](http://www.tolomatic.com)

## ACS DRIVE/CONTROLLER (3604-9651) DIMENSIONS



# ERD – Electric Rod-Style Actuator

SIZE: **ALL**

## SWITCHES



ERD actuators offer a wide range of sensing choices. There are 6 switch choices: reed, solid state PNP (sourcing) or solid state NPN (sinking); normally open; with flying leads or quick-disconnect.

Commonly used for end-of-stroke positioning, these switches allow clamp-on installation anywhere along the entire actuator length. The internal magnet, located on the thrust tube, is a standard feature. Switches can be installed in the field at any time.

Switches are used to send digital signals to PLC (programmable logic controller), TTL, CMOS circuit or other controller device. Switches contain reverse polarity protection. Solid state QD cables are shielded; shield should be terminated at flying lead end.

All switches are CE rated, IP67 rated and are RoHS compliant. Switches feature bright red or green LED signal indicators.



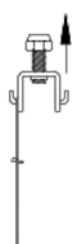
|             | Order Code | Part Number | Lead | Switching Logic              | Power LED                                                                           | Signal LED | Operating Voltage | **Power Rating (Watts) | Switching Current (mA max.) | Current Consumption | Voltage Drop | Leakage Current | Temp. Range                  | Shock / Vibration | IP Rating |
|-------------|------------|-------------|------|------------------------------|-------------------------------------------------------------------------------------|------------|-------------------|------------------------|-----------------------------|---------------------|--------------|-----------------|------------------------------|-------------------|-----------|
| REED        | <b>R Y</b> | 2190-9082   | 5m   | SPST Normally Open           | —                                                                                   | Red        | 5 - 240 AC/DC     | **10.0                 | 100mA                       | —                   | 3.0 V max.   | —               | 14 to 158°F<br>[-10 to 70°C] | 30 G / 9 G        | 67        |
|             | <b>R K</b> | 2190-9083   | QD*  |                              |    |            |                   |                        |                             |                     |              |                 |                              |                   |           |
| SOLID STATE | <b>T Y</b> | 2190-9088   | 5m   | PNP (Sourcing) Normally Open | —                                                                                   | Green      | 5 - 30 VDC        | **3.0                  | 200mA                       | 8 mA @ 24V          | 1.0 V max.   | 0.01 mA max.    |                              |                   |           |
|             | <b>T K</b> | 2190-9089   | QD*  |                              |  |            |                   |                        |                             |                     |              |                 |                              |                   |           |
|             | <b>K Y</b> | 2190-9090   | 5m   | NPN (Sinking) Normally Open  | —                                                                                   | Red        |                   |                        |                             |                     |              |                 |                              |                   |           |
|             | <b>K K</b> | 2190-9091   | QD*  |                              |  |            |                   |                        |                             |                     |              |                 |                              |                   |           |

\*QD = Quick-disconnect Enclosure classification IEC 529 IP67 (NEMA 6)

CABLES: Robotic grade, oil resistant polyurethane jacket, PVC insulation

**⚠ \*\*WARNING:** Do not exceed power rating (Watt = Voltage x Amperage). Permanent damage to sensor will occur.

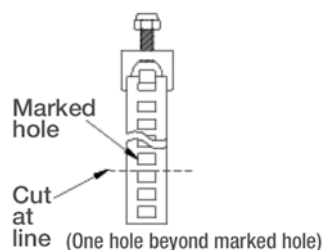
## SWITCH INSTALLATION - FIELD REPLACEMENT INSTRUCTIONS



**STEP 1:**  
Loosen screw and nut.



**STEP 2:**  
Place sensor and wrap the band around the ERD cylinder. Position the hook with the nearest hole on the band and mark the hole with a permanent marker.



**STEP 3:**  
Remove mounting assembly. Cut the band at the nearest edge of the next hole. (The one that's furthest away from the mounting head.)



**STEP 4:**  
Replace the sensor and mounting assembly. Wrap the band and put the chosen hole on the hook. Position the switch and tighten. Tighten nut for steadying.

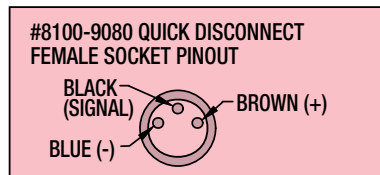
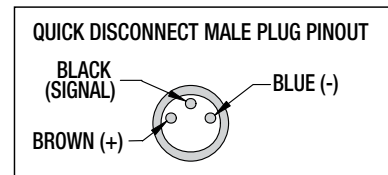
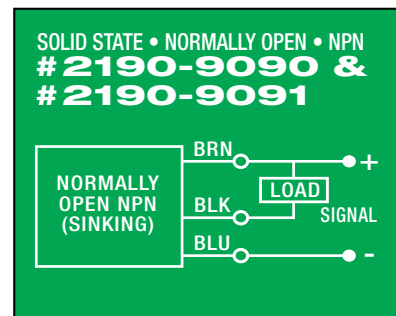
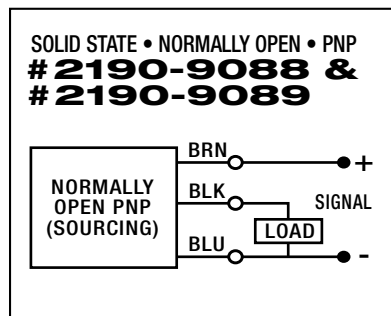
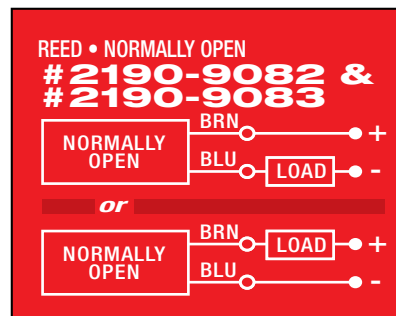


# ERD – Electric Rod-Style Actuator

SIZE: **ALL**

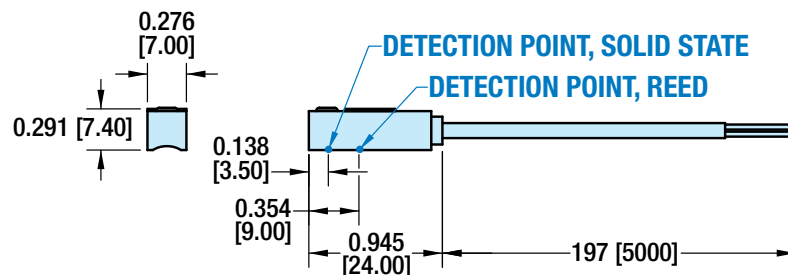
**SWITCHES**

## WIRING DIAGRAMS

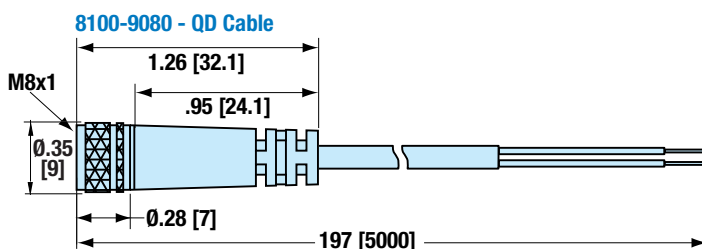
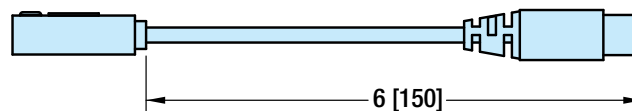


## SWITCH DIMENSIONS

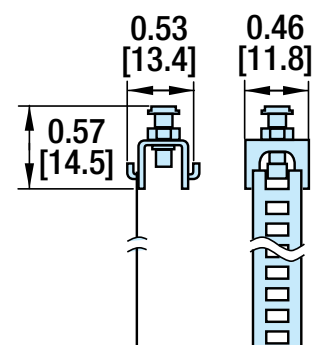
**- direct connect**



**- QD (Quick-disconnect) switch**



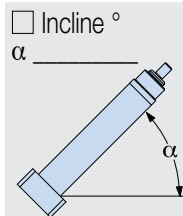
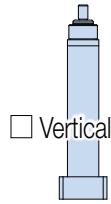
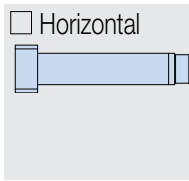
**SWITCH CLAMP**  
2190-1079



# APPLICATION DATA WORKSHEET

Fill in known data. Not all information is required for all applications

## ORIENTATION



☐ Load supported by actuator OR ☐ Load supported by other mechanism

## MOVE PROFILE

### EXTEND

Move Distance \_\_\_\_\_

☐ inch (US Standard) ☐ millimeters (Metric)

Move Time \_\_\_\_\_ sec

Max. Speed \_\_\_\_\_

☐ in/sec ☐ mm/sec

Dwell Time After Move \_\_\_\_\_ sec

### RETRACT

Move Distance \_\_\_\_\_

☐ inch ☐ millimeters

Move Time \_\_\_\_\_ sec

Max. Speed \_\_\_\_\_

☐ in/sec ☐ mm/sec

Dwell Time After Move \_\_\_\_\_ sec

## NO. OF CYCLES

☐ per minute ☐ per hour

## HOLD POSITION?

☐ Required

☐ Not Required

☐ After Move ☐ During Power Loss

NOTE: If load or force changes during cycle use the highest numbers for calculations

### EXTEND

#### LOAD

☐ lb. (U.S. Standard) ☐ kg. (Metric)

#### FORCE

☐ lb. (U.S. Standard) ☐ kg. (Metric)

### RETRACT

#### LOAD

☐ lb. (U.S. Standard) ☐ kg. (Metric)

#### FORCE

☐ lb. (U.S. Standard) ☐ kg. (Metric)

## STROKE LENGTH

☐ inch (US Standard)

☐ millimeters (Metric)

## PRECISION

Repeatability \_\_\_\_\_

☐ inch ☐ millimeters

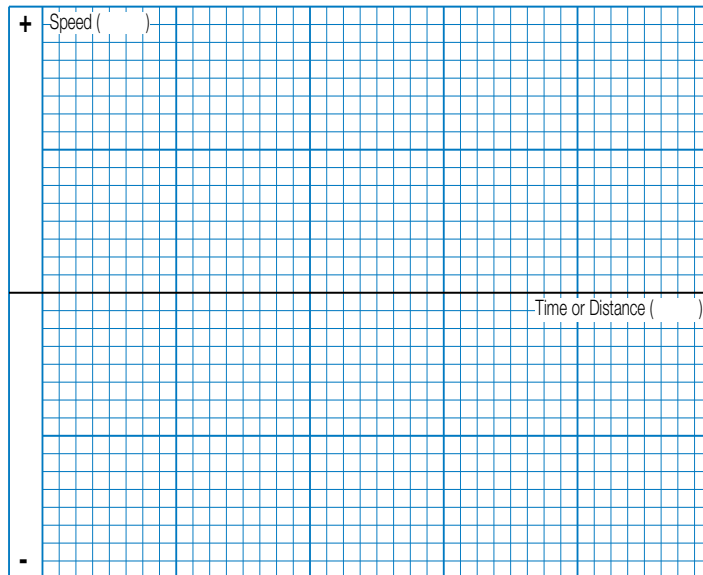
## OPERATING ENVIRONMENT

Temperature, Contamination, Water, etc.

**FREE - Windows® compatible software,**  
download at  
**www.tolomatic.com**

Or Call 1-800-328-2174 for  
Excellent Customer Service & Technical Support

## MOTION PROFILE



Graph your most demanding cycle, including accel/decel, velocity and dwell times. You may also want to indicate load variations and I/O changes during the cycle. Label axes with proper scale and units.

## CONTACT INFORMATION

Name, Phone, Email  
Co. Name, Etc.



**USE THE TOLOMATIC SIZING AND SELECTION SOFTWARE AVAILABLE ON-LINE AT [www.tolomatic.com](http://www.tolomatic.com) OR... CALL TOLOMATIC AT 1-800-328-2174.** We will provide any assistance needed to determine the proper actuator for the job.

**FAX 1-763-478-8080**

**EMAIL [help@tolomatic.com](mailto:help@tolomatic.com)**

# ERD – Electric Rod-Style Actuator

## Selection Guidelines



### 1 ESTABLISH MOTION PROFILE

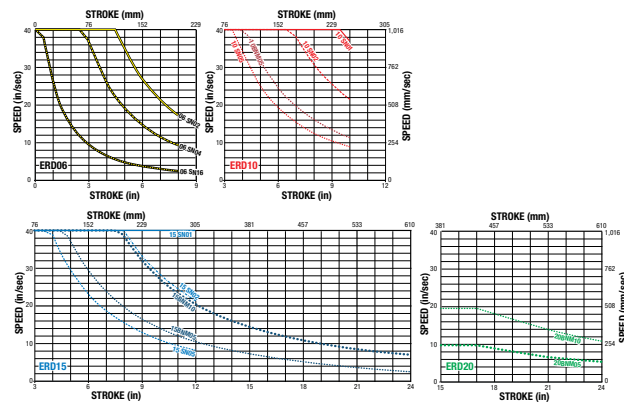
Using the application stroke length, desired cycle time, loads and forces, establish the motion profile details including linear velocity and thrust in each of its segments.

### 2 SELECT ACTUATOR SIZE AND SCREW TYPE

Based on the required velocities and thrust select a size and screw type and lead of the ERD actuator.

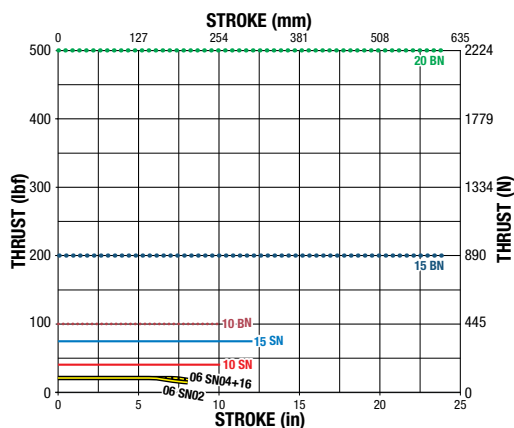
### 3 VERIFY CRITICAL SPEED OF THE SCREW

Verify that the application's peak linear velocity does not exceed the critical speed value for the size and lead of the screw selected.



### 4 VERIFY AXIAL BUCKLING STRENGTH OF THE SCREW

Verify that the peak thrust does not exceed the critical buckling force for the size of the screw selected.

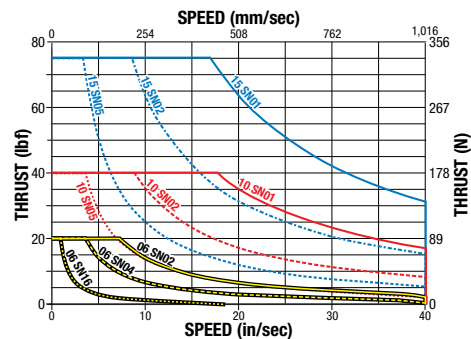


### 5 ESTABLISH TOTAL TORQUE REQUIREMENTS

Calculate total system inertia. The peak and RMS torque required from the motor to overcome internal friction, external forces and accelerate/decelerate the load.

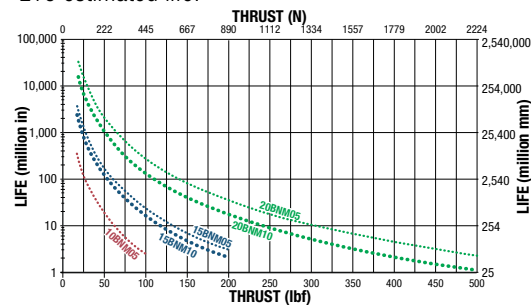
### 6 VERIFY PV VALUE (IF ACME)

Verify that the PV value does not exceed the PV value for the size of the screw selected.



### 7 CALCULATE LIFE (IF BALL SCREW)

Determine the practical load of the system to calculate the L10 estimated life.



### 8 DETERMINE IF LOAD GUIDANCE IS NEEDED

If application requires carrying a load, anti-rotate, a tooling plate or there is risk of side loading the rod, choose the guided option. (GD2)

### 9 DETERMINE IF INGRESS PROTECTION AGAINST DUST AND WATER IS NEEDED.

If actuator is in contact with dust particulate, water or washdown environment choose the IP67 option. (IP67)

### 10 DETERMINE IF ENVIRONMENT IS CORROSIVE OR WASH DOWN

If corrosion resistance is required, choose from two options of stainless steel components

- (SS1) ERD with all stainless steel components
- (SS2) ERD with all stainless steel components and protective motor enclosure.

### 11 SELECT MOUNTING AND SENSOR CHOICES

Mounting options include: (TRN) trunnion mount, (FFG) front flange mount, (FM2) foot mount. 6 sensor choices include: reed, solid state PNP or NPN, all in normally open, with flying leads or quick-disconnect couplers.

### 12 SELECT ACTUATOR CONTROL SOLUTION

Add an extremely easy to use drive and motor combination to power the actuator.

# ERD – Electric Rod-Style Actuator



## SERVICE PARTS ORDERING

### ERD ACTUATOR REPLACEMENT KITS

| Code | Description            | ERD SIZE            |                     |                     |                     |
|------|------------------------|---------------------|---------------------|---------------------|---------------------|
|      |                        | 06                  | 10                  | 15                  | 20                  |
| FFG  | Front Flange Mount Kit | 2190-1025           | 2191-1025           | 2192-1025           | 2193-1025           |
| FM2  | Foot Mount Kit         | 2190-9001           | 2191-9001           | 2192-9001           | 2193-9001           |
| TRR  | Trunnion Mount         | 1820-1003 (order 2) | 0610-1044 (order 2) | 6000-1785 (order 2) | 2193-1018 (order 2) |
| IP67 | *IP67 Kit              | 2190-9201           | 2191-9201           | 2192-9201           | 2193-9201           |

\* REPLACEMENT ONLY: If used on an actuator that was not originally built with the IP67 option the thrust rod will retract below the Cap/Seal and may damage the seal

|     |           |                                                |
|-----|-----------|------------------------------------------------|
| GD2 | Guide Kit | Order via configurator code: GD2ERD__SM__ . __ |
|-----|-----------|------------------------------------------------|

### ERD SWITCHES

To order switch kits use configuration code for switch preceded by SW and actuator code.

EXAMPLE: **SWERD15KK**

|     |          |      |             |
|-----|----------|------|-------------|
| KIT | ACTUATOR | SIZE | SWITCH CODE |
|-----|----------|------|-------------|

The example is for 3 Solid State NPN, Normally Open Switches with Quick-disconnect couplers. Each switch is complete with Bracket, Set Screw, Switch and mating QD cable.

| Code              | †Switch ONLY Part No. | Lead             | Normally | Sensor Type     |
|-------------------|-----------------------|------------------|----------|-----------------|
| <b>R</b> <b>Y</b> | 2190-9082             | 5m (197 in)      | Open     | Reed            |
| <b>R</b> <b>K</b> | 2190-9083††           | Quick-disconnect |          |                 |
| <b>T</b> <b>Y</b> | 2190-9088             | 5m (197 in)      | Open     | Solid State PNP |
| <b>T</b> <b>K</b> | 2190-9089††           | Quick-disconnect |          |                 |
| <b>K</b> <b>Y</b> | 2190-9090             | 5m (197 in)      | Open     | Solid State NPN |
| <b>K</b> <b>K</b> | 2190-9091††           | Quick-disconnect |          |                 |

†Also order clamp assembly #2190-1079

††Also order mating QD cable #8100-9080

*To order switch ONLY see part number in table*

### ACS DRIVE/CONTROLLER, CABLES & MOTOR REPLACEMENT PARTS

| Part No.  | Description                                                                                                         |
|-----------|---------------------------------------------------------------------------------------------------------------------|
| 3604-9651 | ACS Stepper Drive/Controller                                                                                        |
| 3604-9654 | ACS Stepper Drive/Controller, EtherNet/IP (Analog Output)                                                           |
| 3604-9655 | ACS Stepper Drive/Controller, Modbus TCP (Analog Output)                                                            |
| 3604-1766 | Motor Power Cable (3 m)                                                                                             |
| 3604-1767 | Motor Power Cable (5 m)                                                                                             |
| 3604-1768 | Encoder Cable (3 meter length)                                                                                      |
| 3604-1769 | Encoder Cable (5 meter length)                                                                                      |
| 3604-1770 | I/O Cable (3 meter length)                                                                                          |
| 3604-1771 | I/O Cable (5 meter length)                                                                                          |
| 2190-1304 | Input Power Connector                                                                                               |
| 3604-9044 | Starter Kit (includes RJ 12 cable; D-Sub to RJ converter; USB to RS232 Converter and Tolomatic Motion Interface CD) |
| 3604-9526 | Tolomatic Motion Interface CD                                                                                       |
| 3604-1795 | USB to RS232 Converter                                                                                              |
| 3604-9043 | RJ cable and D-Sub to RJ Converter Combo                                                                            |

| Code                 | Part No.  | Description                        |
|----------------------|-----------|------------------------------------|
| AMS1A1C1             | 3604-1779 | NEMA11 motor no encoder (ERD06)    |
| AMS1A1A1             | 3604-1780 | NEMA11 motor with encoder (ERD06)  |
| AMS1B1C1<br>AMS1B1G1 | 3604-1775 | NEMA17 motor no encoder (ERD10)    |
| AMS1B1A1<br>AMS1B1E1 | 3604-1776 | NEMA17 motor with encoder (ERD10)  |
| AMS1C1C1<br>AMS1C1G1 | 3604-1777 | NEMA23 motor, no encoder (ERD15)   |
| AMS1C1A1<br>AMS1C1E1 | 3604-1778 | NEMA23 motor, with encoder (ERD15) |



# ERD – Electric Rod-Style Actuator

## ERD ORDERING

### BASE MODEL

ERD 10 SN02 SM152-4 LMI

### OPTIONS

SS2 IP67 FFG KK2 AM S1 B1 E1

#### MODEL

ERD Rod-Style Actuator

#### SIZE

06 10 15 20

#### NUT/SCREW COMBINATIONS

| SIZE | CODE | TURNS/in<br>(TPI) |
|------|------|-------------------|
| 06   | SN   | 02, 04, 16        |
| 10   | SN   | 01, 02, 05        |
| 10   | BNM  | 05 mm lead        |
| 15   | SN   | 01, 02, 05        |
| 15   | BNM  | 05, 10 mm lead    |
| 20   | BNM  | 05, 10 mm lead    |

#### STROKE LENGTH

SM \_\_ Enter desired stroke length in millimeters (25.4mm = 1 inch)

| SIZE | MAXIMUM STROKE |    |
|------|----------------|----|
|      | ERD            |    |
|      | mm             | in |
| 06   | 203.2          | 8  |
| 10   | 254.0          | 10 |
| 15   | 609.6          | 24 |
| 20   | 609.6          | 24 |

Contact Tolomatic with requests for longer strokes

#### MOTOR MOUNTING

LMI In-line motor mount

#### METRIC MOTOR MOUNT OPTION

— 06 size (not available)  
**IEC1** 10 size (40mm B.C., 7mm shaft dia.)  
**IEC1** 15 size (60mm B.C., 11mm shaft dia.)  
**IEC2** 15 size (60mm B.C., 12mm shaft dia.)  
**IEC3** 15 size (60mm B.C., 14mm shaft dia.)  
*(see page ERD\_20)*

#### ACTUATOR GUIDE

**GD2** Guided unit with 2 guide shafts & tooling plate

#### ENVIRONMENTAL PROTECTION

**SS1** Stainless steel actuator  
**SS2\_\*** Stainless steel actuator with protective motor enclosure  
**SS21** NPT 1/2" conduit thread  
**SS22** M20x1.5 conduit thread  
**SS23** Cord grip(s), 1 or 2 grips determined by encoder choice  
**IP67** Ingress protection rating (static), dust protection, temporary immersion in water

**\*NOTE: Only Tolomatic motors are available with the SS2 option**  
**SS2 requires IP67 option**  
**\*SS2 is not available for the 06 & 20 size**  
**IEC is not available in stainless steel**  
**GD2 is always aluminum even when ordered with SS1**

#### ACTUATOR MOUNTING

**FFG\*\*** Front Flange Mount  
**TRR†** Trunnion Mounting, Rear  
**FM2\*\*** Foot Mount

**\*\*NOTE: Foot Mount, Front Flange Mount and Switches are shipped together with the actuator but are not installed by Tolomatic.**  
**†Rear trunnion is not available with SS2 option**

## MOTOR ORDERING

#### SWITCHES\*\*

| TYPE        | LOGIC | NORMALLY | QUICK-DISCONNECT | CODE      | QUANTITY                          | LEAD LENGTH                                                |
|-------------|-------|----------|------------------|-----------|-----------------------------------|------------------------------------------------------------|
| REED        | SPST  | Open     | No               | <b>RY</b> | After code enter quantity desired | 5 m (16.4 feet)<br>6 in (152mm) to QD connector w/ 5m lead |
|             |       |          | Yes              | <b>RK</b> |                                   |                                                            |
| SOLID STATE | PNP   | Open     | No               | <b>TY</b> |                                   |                                                            |
|             |       |          | Yes              | <b>TK</b> |                                   |                                                            |
|             | NPN   | Open     | No               | <b>KY</b> |                                   |                                                            |
|             |       |          | Yes              | <b>KK</b> |                                   |                                                            |

**\*\*NOTE: Foot Mount, Front Flange Mount and Switches are shipped together with the actuator but are not installed by Tolomatic.**

#### MOTOR ORDER CODE

**AM** Tolomatic Motor

**NOTE: Your Motor Here (YM) is available on ERD15 & ERD20 sizes for non-Tolomatic motors**

#### MOTOR TYPE

**S1** Stepper Motor

#### FRAME SIZE

**A1** 11 Frame Motor (ERD06)  
**B1** 17 Frame Motor (ERD10)  
**C1** 23 Frame Motor (ERD15)

**NOTE: Each ERD size has only one motor size choice**

#### MOTOR OPTIONS

**A1** Encoder  
**C1** No Encoder  
**E1** Encoder with SS2 option  
**G1** No Encoder SS2 option

## ACS DRIVE/CONTROLLER & CABLES ORDERING

| Item No. | Part No.  | Description                                                                                                         |
|----------|-----------|---------------------------------------------------------------------------------------------------------------------|
| 1.       | 3604-9651 | ACS Stepper Drive/Controller (Model ST0324SD)                                                                       |
|          | 3604-9654 | ACS Stepper Drive/Controller, EtherNet/IP (Analog Output)                                                           |
|          | 3604-9655 | ACS Stepper Drive/Controller, Modbus TCP (Analog Output)                                                            |
| 2.       | 3604-1766 | Motor Power Cable (3 m)                                                                                             |
|          | 3604-1767 | Motor Power Cable (5 m)                                                                                             |
| 3.       | 3604-1768 | Encoder Cable (3 meter length)                                                                                      |
|          | 3604-1769 | Encoder Cable (5 meter length)                                                                                      |
| 4.       | 3604-1770 | I/O Cable (3 meter length)                                                                                          |
|          | 3604-1771 | I/O Cable (5 meter length)                                                                                          |
| 5.       | 3604-9044 | Starter Kit (includes RJ 12 cable; D-Sub to RJ converter; USB to RS232 Converter and Tolomatic Motion Interface CD) |

**NOTE: All 5 items from table at left are recommended for complete ACS system. Order items 1-5 by part numbers**



**Not all codes listed are compatible with all options. Contact Tolomatic with any questions.**

# THE TOLOMATIC DIFFERENCE

What you expect from the industry leader:



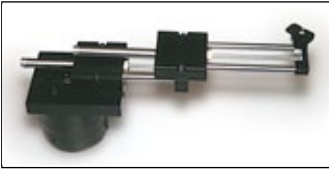
## EXCELLENT CUSTOMER SERVICE & TECHNICAL SUPPORT

Our people make the difference! Expect prompt, courteous replies to all of your application and product questions.



## INDUSTRY LEADING DELIVERIES

Standard catalog products are built to order and ready-to-ship in 5 days or less. Modified and custom products ship weeks ahead of the competition.



## INNOVATIVE PRODUCTS

From standard catalog products... to modified products... to completely unique custom products, Tolomatic designs and builds the best solutions for your challenging applications.



## SIZING & SELECTION SOFTWARE

Windows® compatible, downloadable from our website – FREE – the best tool of its kind on the market! Product selection has never been easier.

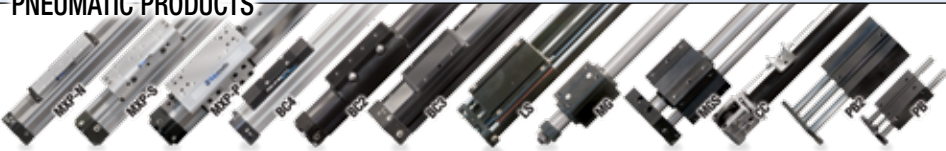


## 3D MODELS & 2D DRAWINGS AVAILABLE ON THE WEB

Easy to access CAD files are available in many popular formats.

## ALSO CONSIDER THESE OTHER TOLOMATIC PRODUCTS:

### PNEUMATIC PRODUCTS



*RODLESS CYLINDERS: Band Cylinders, Cable Cylinders, MAGNETICALLY COUPLED CYLINDERS/SLIDES; GUIDED ROD CYLINDER SLIDES*

"FOLDOUT" BROCHURE #9900-9075  
PRODUCTS BROCHURE #9900-4028

### ELECTRIC PRODUCTS



*ROD & GUIDED ROD STYLE ACTUATORS, HIGH THRUST ACTUATORS, SCREW & BELT DRIVE RODLESS ACTUATORS, MOTORS, DRIVES AND CONTROLLERS*

"FOLDOUT" BROCHURE #9900-9074  
PRODUCTS BROCHURE #9900-4016

### POWER TRANSMISSION PRODUCTS



*GEARBOXES: Float-A-Shaft®, Slide-Rite®; DISC CONE CLUTCH; CALIPER DISC BRAKES*

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