

Can-Stack Stepper Motor Linear Actuators



G4 19000 Series



G4 25000 Series



G4 37000 Series



15000 Series

- ✓ Can Stack馬達相較Hybrid馬達成本較低，適用大量需求的應用
- ✓ 整體體積較小，適用於儀器類應用
- ✓ 大尺寸的花鍵設計，提升馬達的堅固性及耐用性
- ✓ 外觀圓型設計，方便手持
- ✓ 不需外部傳動機件，馬達可直接完成直線動作
- ✓ 控制及配線方式簡單，與傳統旋轉步進相同

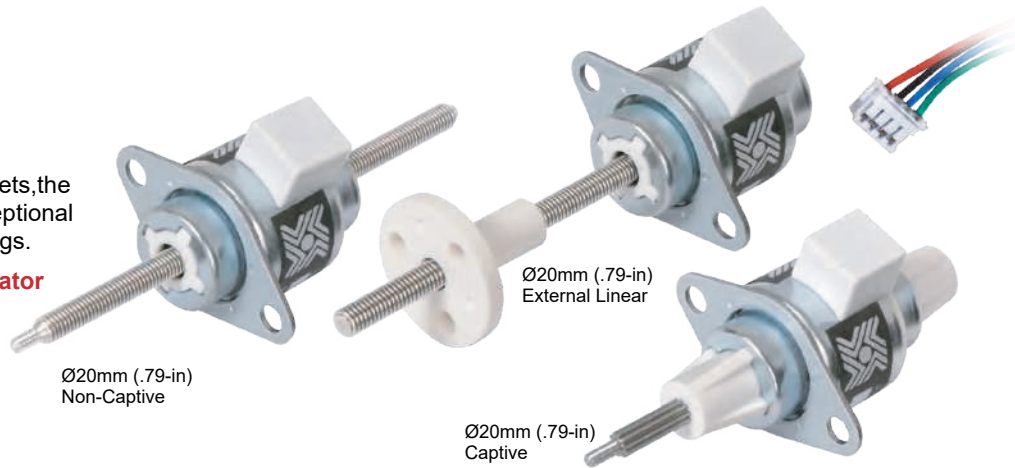
G4 19000 Series Ø 20 mm (.79-in) Can-Stack Stepper Motor Linear Actuators

Utilizing high energy rare earth (neodymium) magnets, the G4 Series linear actuators consistently deliver exceptional performance. All units are built with dual ball bearings.

The highest force of any similar size linear actuator stepper motor

Multiple versions available

- Captive
- Non-Captive
- External Linear



Specifications

| Ø 20 mm (.79-in) Motor | | | | |
|------------------------|------------------|---------|---------|---------|
| Part No. | Captive | 1944 | 1954 | |
| | Non-Captive | 1934 | 1984 | |
| | External Linear* | E1944 | E1954 | |
| Wiring | | Bipolar | | |
| Step angle | 7.5° | | 15° | |
| Winding Voltage | 5 VDC | 12 VDC | 5 VDC | 12 VDC |
| Current (RMS)/phase | 350 mA | 160 mA | 338 mA | 140 mA |
| Resistance/phase | 14.0 Ω | 74.5 Ω | 14.8 Ω | 85.5 Ω |
| Inductance/phase | 6.24 mH | 31.2 mH | 6.84 mH | 37.8 mH |
| Power Consumption | 3.38 W | | | |
| Insulation Class | Class B | | | |
| Weight | 1.24 oz (35 g) | | | |
| Insulation Resistance | 20 MΩ | | | |

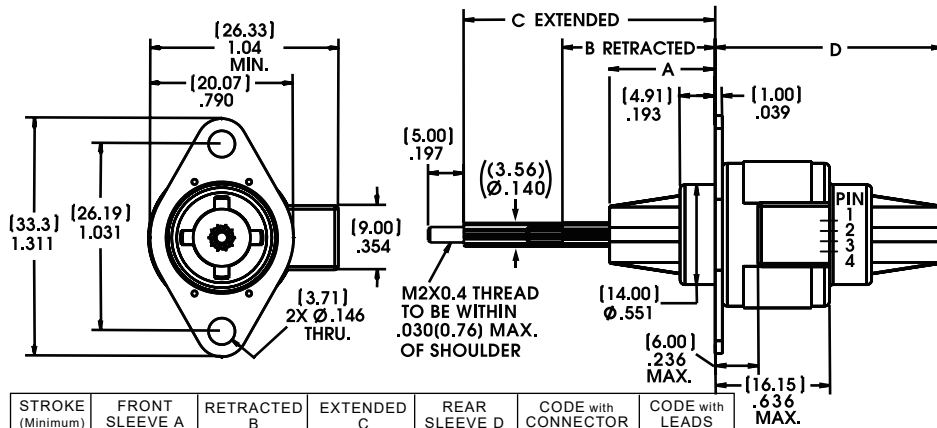
| step | Linear Travel | | Order Code I.D. |
|------------|---------------|--------|-----------------|
| | mm/step | mm/rev | |
| 7.5° Angle | 0.013 | 0.6240 | 3 |
| | 0.0254 | 1.2192 | 1 |
| | 0.051 | 2.4480 | 2 |
| 15° Angle | 0.0254 | 0.6096 | 1 |
| | 0.051 | 1.2240 | 2 |
| | 0.102 | 2.4480 | 4 |

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted. Standard motors are Class B rated for maximum temperature of 130° C (266° F).

*Part numbering information on page 4.

Captive Lead Screw

Dimensions = (mm) inches

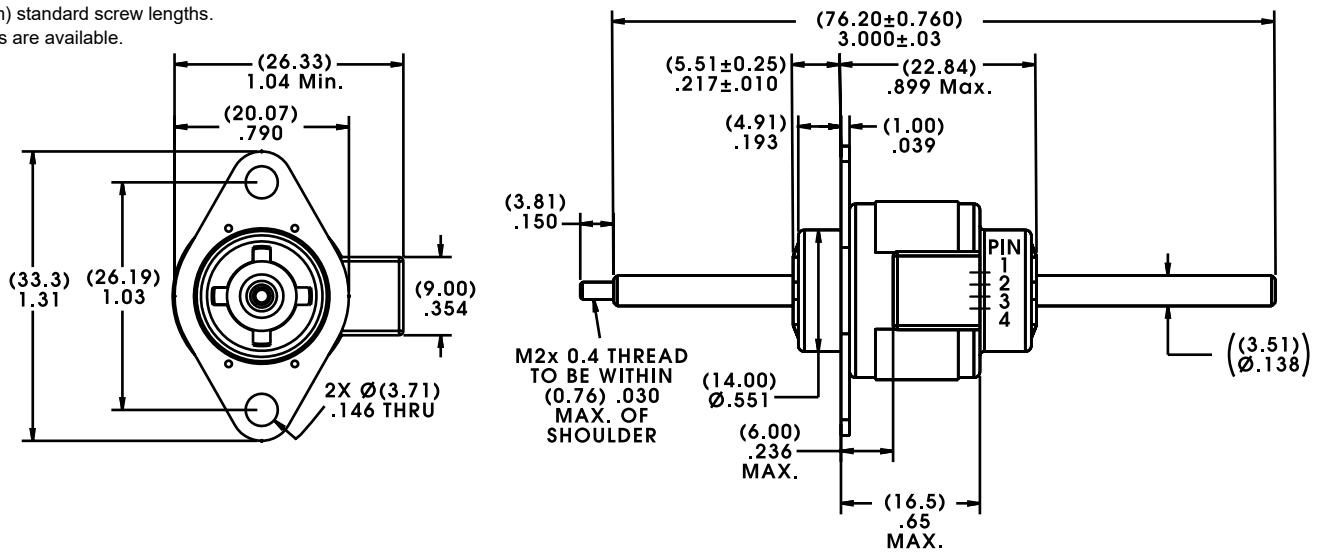


| STROKE (Minimum) | FRONT SLEEVE A | RETRACTED B | EXTENDED C | REAR SLEEVE D | CODE with CONNECTOR | CODE with LEADS |
|------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------|-----------------|
| (13 mm) .512 | (14.75±0.25) .581±.010 | (21.37±0.64) .841±.025 | (35.17±0.38) 1.385±.015 | (32.08 Max.) 1.263 Max. | - 905 | - 1005 |
| (18 mm) .708 | (20.05±0.25) .789±.010 | (26.67±0.64) 1.050±.025 | (45.77±0.38) 1.802±.015 | (37.38 Max.) 1.472 Max. | - 907 | - 1007 |
| (25 mm) .984 | (27.05±0.25) 1.065±.010 | (33.67±0.64) 1.325±.025 | (59.77±0.38) 2.353±.015 | (44.38 Max.) 1.747 Max. | - 910 | - 1010 |
| (31 mm) 1.22 | (33.05±0.25) 1.301±.010 | (39.67±0.64) 1.562±.025 | (71.77±0.38) 2.826±.015 | (50.78 Max.) 2.000 Max. | - 912 | - 1012 |

Non-Captive Lead Screw

Dimensions = (mm) inches

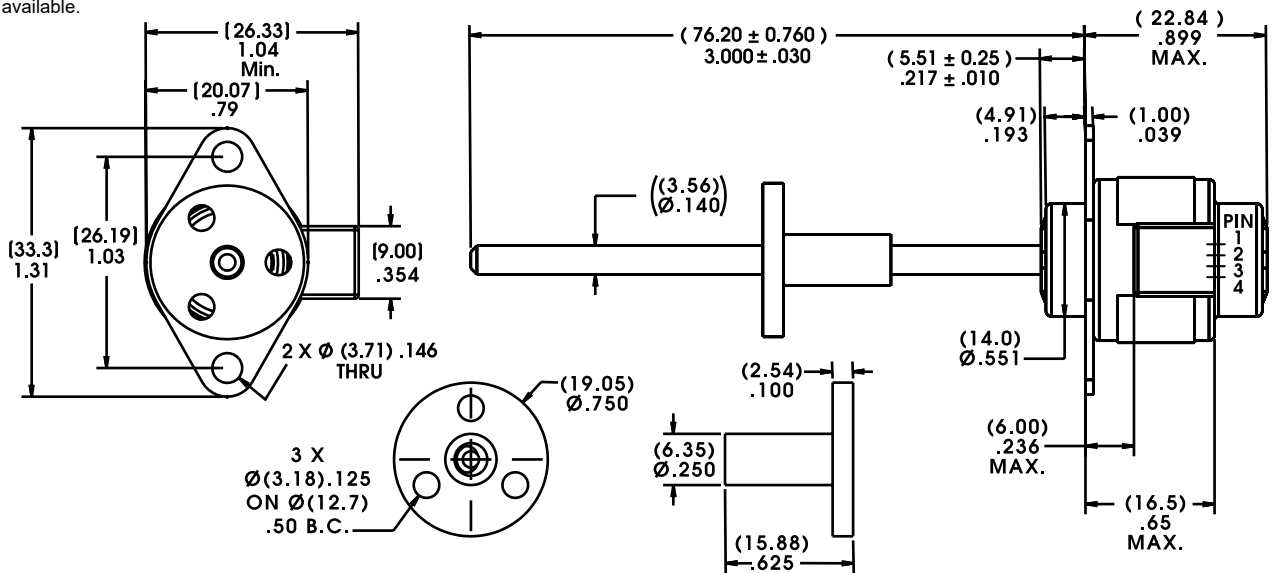
Up to 6.3-in (160 mm) standard screw lengths.
Longer screw lengths are available.



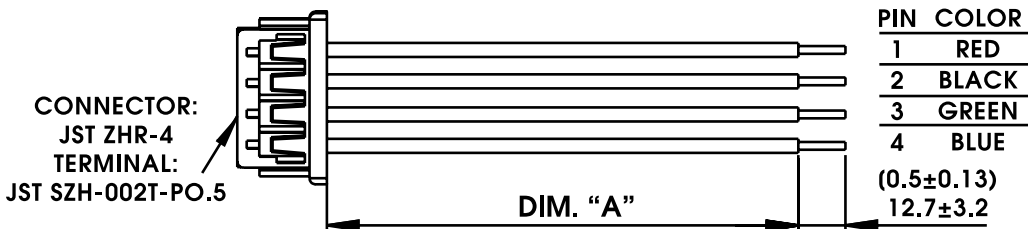
External Linear

Dimensions = (mm) inches

Up to 6.3-in (160 mm) standard screw lengths.
Longer screw lengths are available.



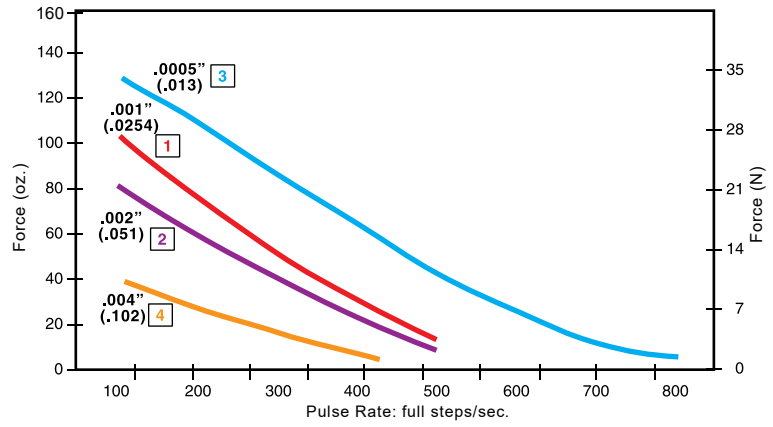
Connector



| Part Number | Dimension "A" |
|-------------|-------------------------|
| 56-1318-4 | (24 ± 0.39) 610 ± 10 mm |
| 56-1318-3 | (18 ± 0.39) 450 ± 10 mm |
| 56-1318-2 | (12 ± 0.39) 305 ± 10 mm |
| 56-1318-1 | (6 ± 0.39) 150 ± 10 mm |

FORCE vs. PULSE RATE

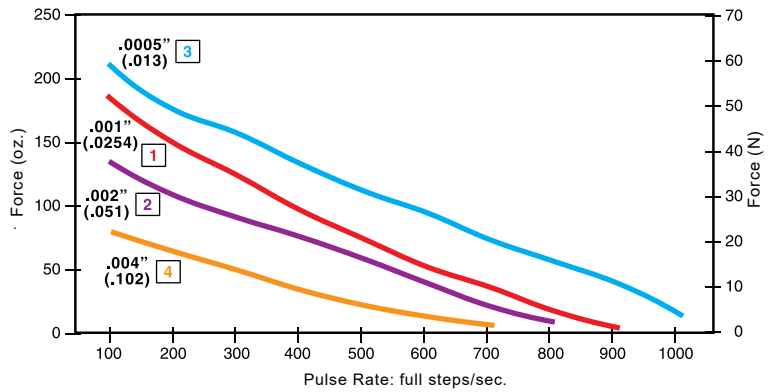
- L/R Drive
- Bipolar
- 100% Duty Cycle



FORCE vs. PULSE RATE

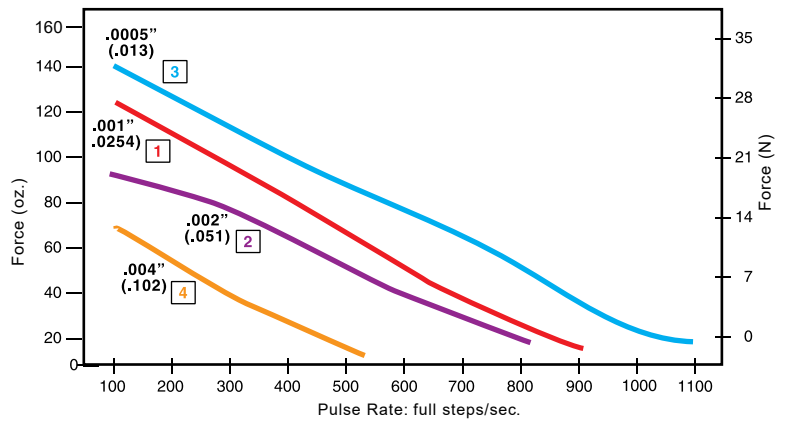
- L/R Drive
- Bipolar
- 25% Duty Cycle

Obtained by a special winding or by running a standard motor at double the rated current.



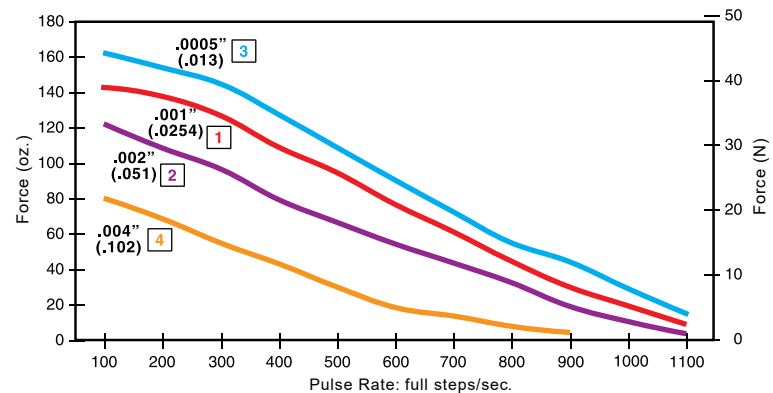
FORCE vs. PULSE RATE

- Chopper Drive
- Bipolar
- 100% Duty Cycle



FORCE vs. PULSE RATE

- Chopper Drive
- Bipolar
- 25% Duty Cycle



NOTE: All chopper drive curves were created with a 5 volt motor and a 40 volt power supply.

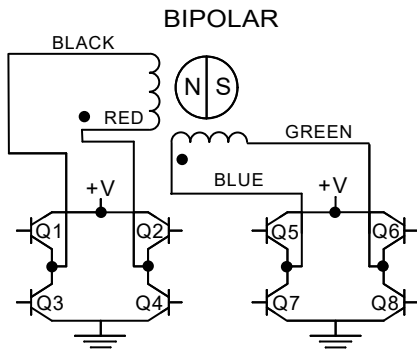
Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

Identifying the Can-Stack Number Codes when Ordering

| E | 19 | 5 | 4 | 2 | 05 | 1005 |
|---|---|--|---|---|---|--|
| Prefix (include only when using the following) E = External K = External with 40° thread form P = Proximity Sensor S = Home Position Switch | Series Number Designation 19 = 19000 (Series numbers represent approximate diameters of motor body) | Style 3 = 7.5° Non-Captive 4 = 7.5° Captive or External (use "E" or "K" Prefix for External version) 5 = 15° Captive or External (use "E" or "K" Prefix for External version) 8 = 15° Non-Captive | Coils 4 = Bipolar (4 wire) | Code ID Resolution Travel/Step 1 = .001-in (.0254) 2 = .002-in (.051) 3 = .0005-in (.013) 4 = .004-in (.102) | Voltage 05 = 5 VDC 12 = 12 VDC Custom V available | Suffix Stroke Example: -1005 = captive 13mm stroke with leads -XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part. |

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance call our Engineering Team at 203 756 7441.

Can-Stacks: Wiring



Can-Stacks: Stepping Sequence

| | Bipolar | Q2-Q3 | Q1-Q4 | Q6-Q7 | Q5-Q8 | |
|-------------|---------|-------|-------|-------|-------|---------------|
| EXTEND CW ↓ | Step | | | | | RETRACT CCW ↑ |
| | 1 | ON | OFF | ON | OFF | |
| | 2 | OFF | ON | ON | OFF | |
| | 3 | OFF | ON | OFF | ON | |
| | 4 | ON | OFF | OFF | ON | |
| 1 | ON | OFF | ON | OFF | | |

Note: Half stepping is accomplished by inserting an off state between transitioning phases.

TFE Coated Lead Screws for applications that require a permanent, dry lubricant

Ideal for applications where conventional oils and greases cannot be used for lead screw lubrication.

Non-lubricated TFE Coated Lead Screw provides improved performance in both life and thrust as compared to a “dry” stainless steel lead screw. TFE can be applied to a wide variety of lead screw pitches. Available captive, non-captive and external linear.

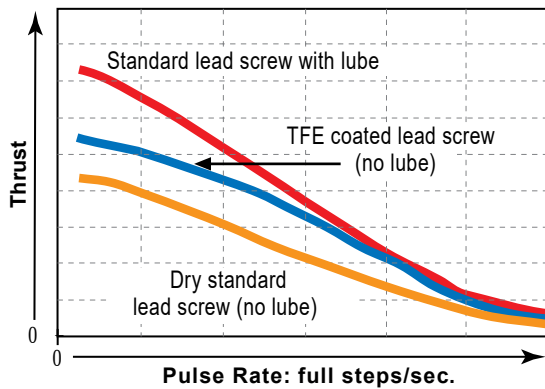
Typical applications: where contamination from grease or lubricants must be avoided; silicon wafer handling, clean rooms, medical equipment or laboratory instrumentation.



G4 19000 Series Captive

Lead Screw Comparison: FORCE vs. PULSE RATE

– L/R Drive – 100% Duty Cycle

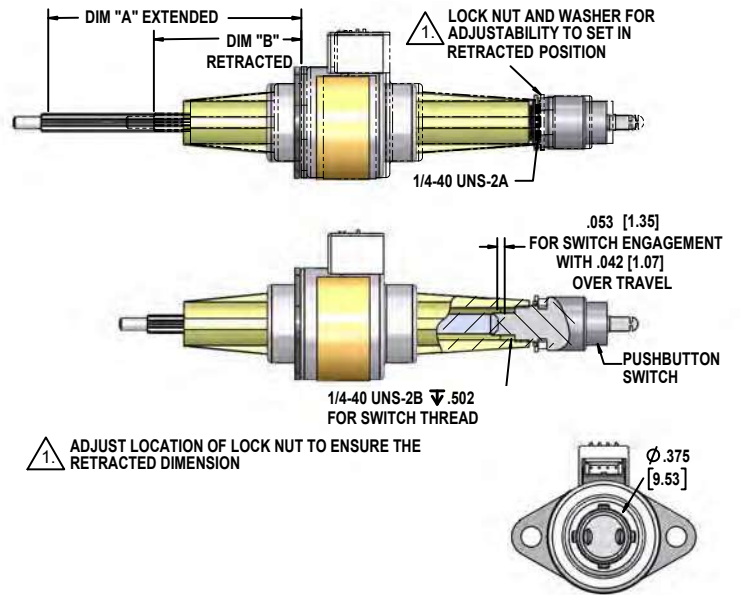


Home Position Switch monitors movements more precisely for greater control and improved quality control

Miniature electronic home position switch capable of monitoring the home positions of linear actuators. The switch mounts on the rear sleeve of captive linear motors and allows the user to identify start, stop or home positions. Depending on your preference, contacts can be normally open or normally closed. The contact closure is repeatable to within one step position, identifying linear movements as low as 0.0005-in (0.0013 cm) per step. Multiple contact switches are also available.

Activation force of 10 oz (2.78 N) required therefore may not be appropriate for smaller can-stack actuators.

When ordering motors with the home position switch, the part number should be preceded by an “S”.



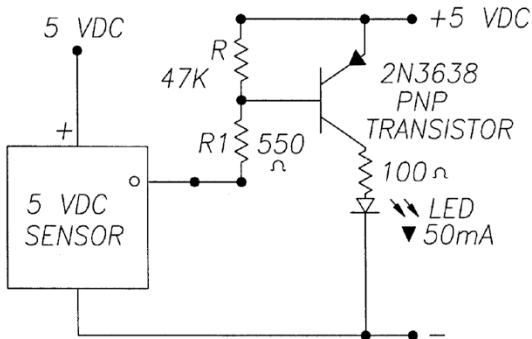
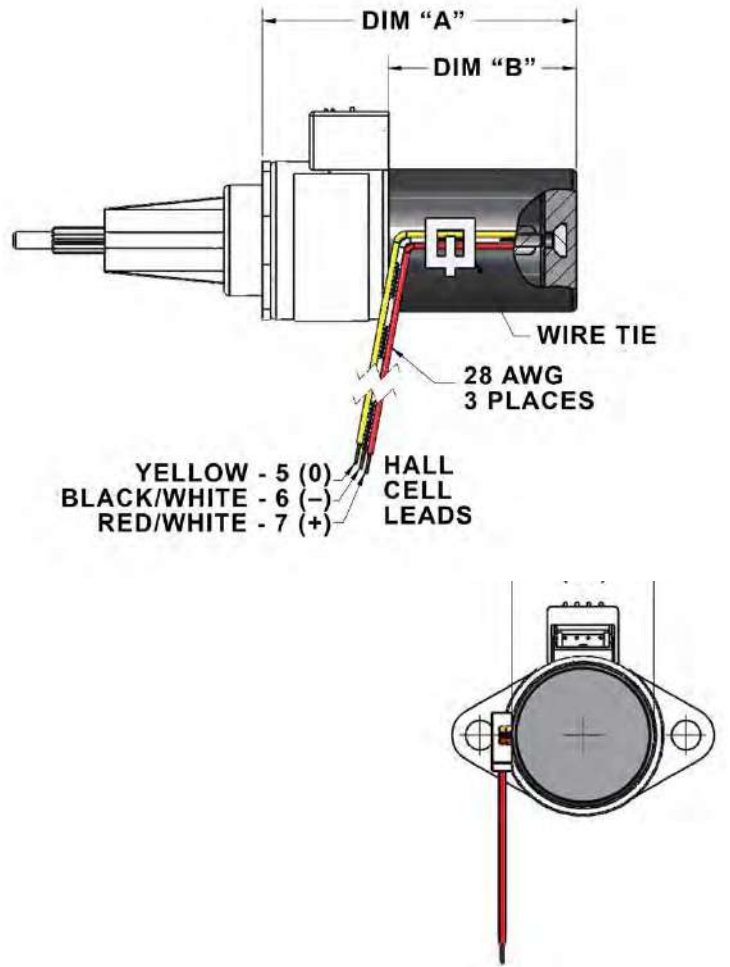
| Specifications | |
|----------------------------|--|
| Contact Ratings (Standard) | 1.00 AMP @ 120 VAC 1.00 AMP @ 28 VDC |
| Operating Temperature | -30°C to +55°C (-22°F to 131°F) |
| Electrical Life | < 20 milliohms typ. initial at 2 - 4 V DC, 100 mA Tested to 60,000 make-and-break cycles at full load |
| Schematic | <p>Multiple contact options available.</p> |

| Stroke inches (mm) | Dim "A" Extended inches (mm) | Dim "B" Retracted inches (mm) |
|--------------------|------------------------------|-------------------------------|
| .512 (13) | 1.385 (35.17) | .841 (21.37) |
| .708 (18) | 1.802 (45.77) | 1.050 (26.67) |
| .984 (25) | 2.353 (59.77) | 1.325 (33.67) |
| 1.22 (31) | N/A Contact Customer Service | |

End of Stroke Proximity Sensor incorporates a hall effect device, activated by a rare earth magnet embedded in the end of the internal screw

Compact profile of the sensor allows for installation in limited space applications. Virtually unlimited cycle life. Special cabling and connectors available.

| Specifications | |
|-----------------------------------|---|
| Supply Voltage (VDC) | 3.8 min. to 24 max. |
| Current Consumption | 10 mA max. |
| Output Voltage (operated) | 0.15 typ., 0.40 max. Sinking 20 mA max. |
| Output Current | 20 mA max. |
| Output Leakage Current (released) | 10µA max. @ Vout = 24 VDC; Vcc = 24 VDC |
| Output Switching Time | Rise, 10 to 90% .05 µs typ., 1.5 µs max. @ Vcc = 12 V, RL = 1.6 KOhm |
| | Fall, 90 to 10% .15 µs typ., 1.5 µs max. @ CL = 20 pF |
| Temperature | - 40 to +150°C |



NOTE: Sensor is category 2 ESD sensitive per DOD-STD-1686A. Assembly operations should be performed at workstations with conductive tops and operators grounded.

| Stroke inches (mm) | Dim "A" Extended inches (mm) | Dim "B" Retracted inches (mm) |
|--------------------|------------------------------|-------------------------------|
| .512 (13) | 1.360 (34.55) | .73 (18.55) |
| .708 (18) | 1.569 (39.85) | .94 (23.85) |
| .984 (25) | 1.844 (46.85) | 1.21 (30.85) |
| 1.22 (31) | 2.081 (52.85) | 1.45 (36.85) |

The sensor has virtually unlimited cycle life. Special cabling and connectors can also be provided.

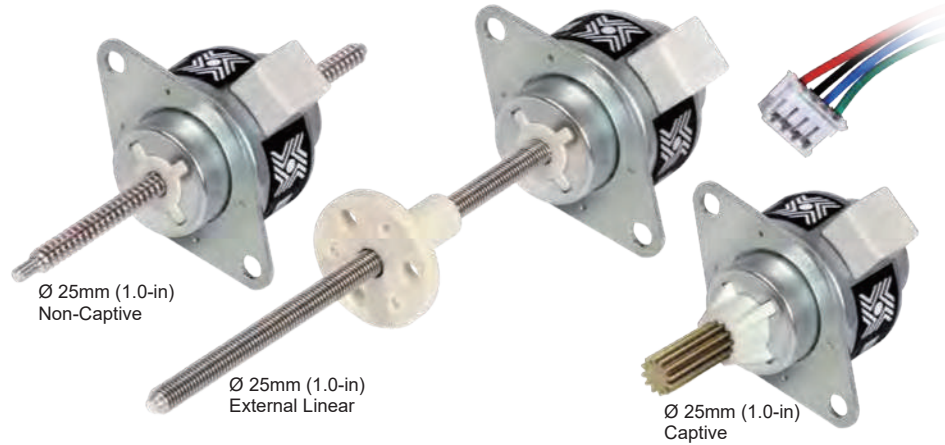
G4 25000 Series Ø 25 mm (1.0-in) Can-Stack Stepper Motor Linear Actuators

High durability and exceptional performance.
All units are built with dual ball bearings.

Generates higher force than other competitors

Multiple versions available

- Captive
- Non-Captive
- External Linear



Specifications

| Ø 25 mm (1.0-in) Motor | | | | |
|------------------------|-----------------------|---------|---------|--------|
| Part No. | Captive | 2544 | 2554 | |
| | Non-Captive | 2534 | 2584 | |
| | External Linear* | E2544 | E2554 | |
| Wiring | | Bipolar | | |
| Step angle | 7.5° | | 15° | |
| Winding Voltage | 5 VDC | 12 VDC | 5 VDC | 12 VDC |
| Current (RMS)/phase | 385 mA | 160 mA | 385 mA | 160 mA |
| Resistance/phase | 13 Ω | 72 Ω | 13 Ω | 72 Ω |
| Inductance/phase | 10.8 mH | 60 mH | 8.08 mH | 48 mH |
| Power Consumption | 3.85 W | | | |
| Rotor Inertia | 1.07 gcm ² | | | |
| Insulation Class | Class B | | | |
| Weight | 1.74 oz (49 g) | | | |
| Insulation Resistance | 20 MΩ | | | |

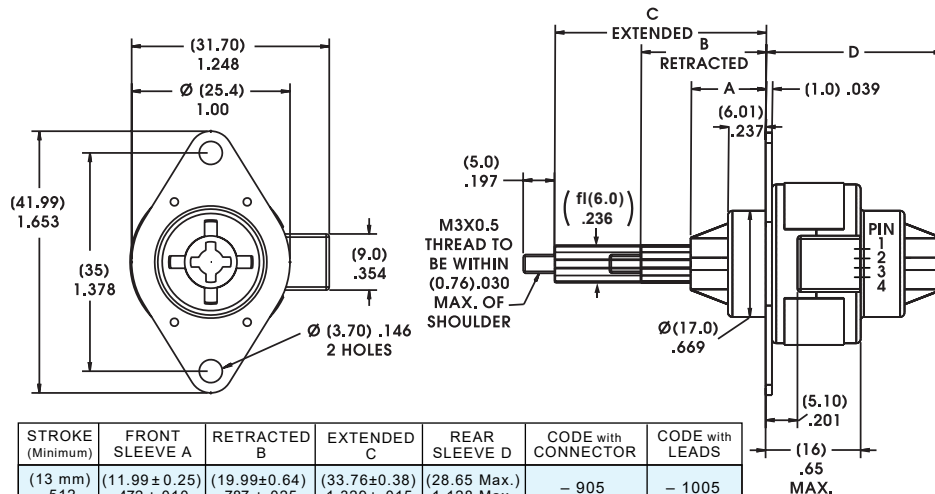
| step | Linear Travel | Lead | Order Code I.D. |
|------------|---------------|--------|-----------------|
| | mm/step | mm/rev | |
| 7.5° Angle | 0.013 | 0.6240 | 3 |
| | 0.0254 | 1.2192 | 1 |
| | 0.051 | 2.4480 | 2 |
| 15° Angle | 0.0254 | 0.6096 | 1 |
| | 0.051 | 1.2240 | 2 |
| | 0.102 | 2.4480 | 4 |

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted. Standard motors are Class B rated for maximum temperature of 130° C (266° F).

*Part numbering information on page 4.

Captive Lead Screw

Dimensions = (mm) inches

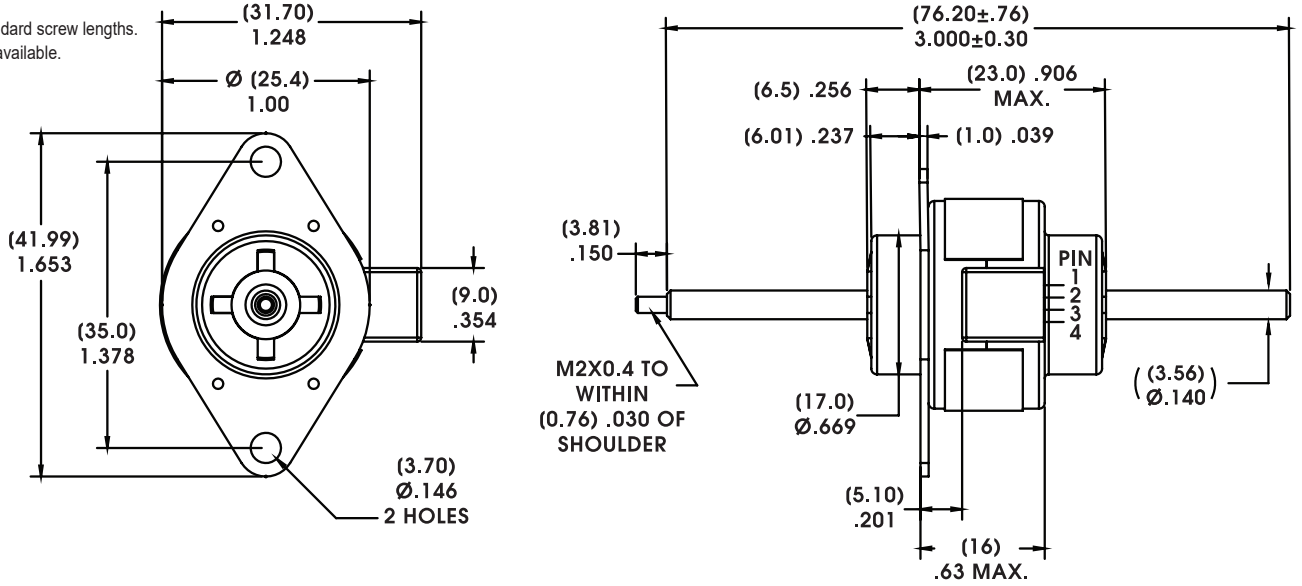


| STROKE (Minimum) | FRONT SLEEVE A | RETRACTED B | EXTENDED C | REAR SLEEVE D | CODE with CONNECTOR | CODE with LEADS |
|------------------|------------------------------|------------------------------|------------------------------|-------------------------|---------------------|-----------------|
| (13 mm) .512 | (11.99 ± 0.25) .472 ± 0.010 | (19.99 ± 0.64) .787 ± 0.025 | (33.76 ± 0.38) 1.329 ± 0.015 | (28.65 Max.) 1.128 Max. | - 905 | - 1005 |
| (18 mm) .708 | (17.28 ± 0.25) .680 ± 0.010 | (25.25 ± 0.64) .994 ± 0.025 | (44.27 ± 0.38) 1.743 ± 0.015 | (33.94 Max.) 1.336 Max. | - 907 | - 1007 |
| (25 mm) .984 | (24.26 ± 0.25) .955 ± 0.010 | (32.23 ± 0.64) 1.269 ± 0.025 | (58.24 ± 0.38) 2.293 ± 0.015 | (40.92 Max.) 1.611 Max. | - 910 | - 1010 |
| (31 mm) 1.22 | (30.25 ± 0.25) 1.191 ± 0.010 | (38.23 ± 0.64) 1.505 ± 0.025 | (70.23 ± 0.38) 2.765 ± 0.015 | (46.91 Max.) 1.847 Max. | - 912 | - 1012 |

Non-Captive Lead Screw

Dimensions = (mm) inches

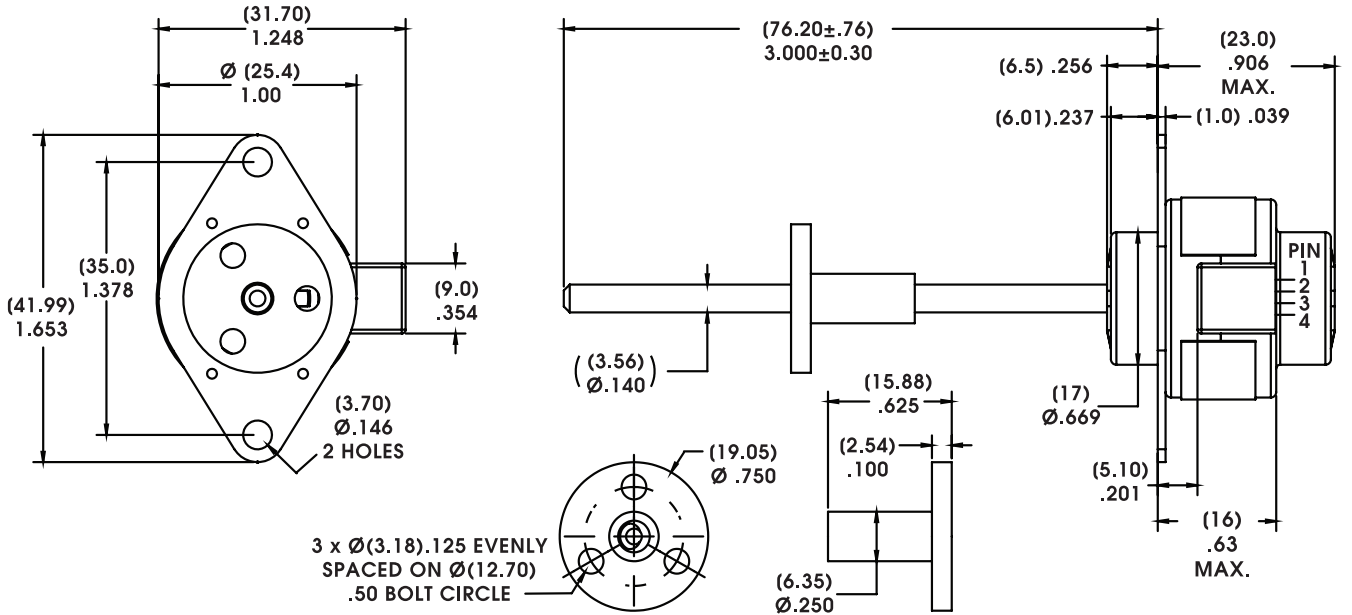
Up to 6.3-in (160 mm) standard screw lengths.
Longer screw lengths are available.



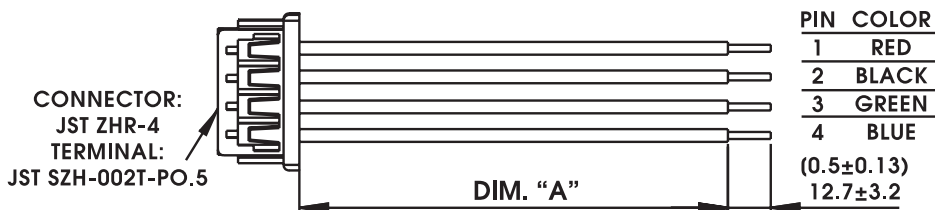
External Linear

Dimensions = (mm) inches

Up to 6.3-in (160 mm) standard screw lengths.
Longer screw lengths are available.



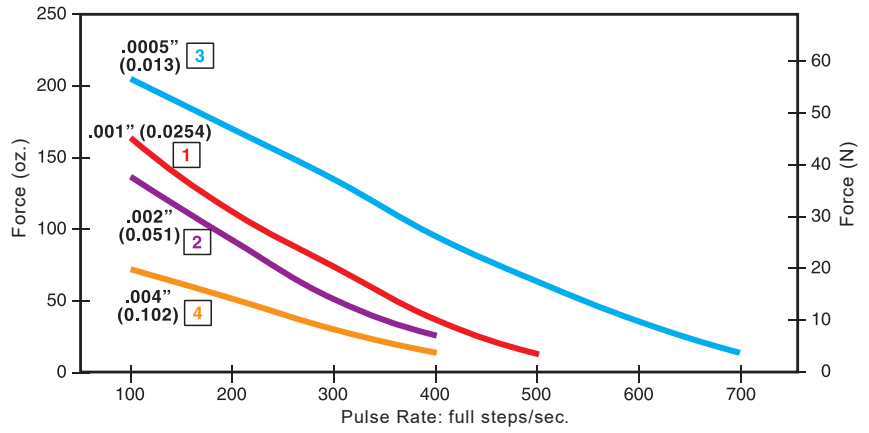
Connector



| Part Number | Dimension "A" |
|-------------|-----------------------|
| 56-1318-4 | (24 ±0.39) 610 ±10 mm |
| 56-1318-3 | (18 ±0.39) 450 ±10 mm |
| 56-1318-2 | (12 ±0.39) 305 ±10 mm |
| 56-1318-1 | (6 ±0.39) 150 ±10 mm |

FORCE vs. PULSE RATE

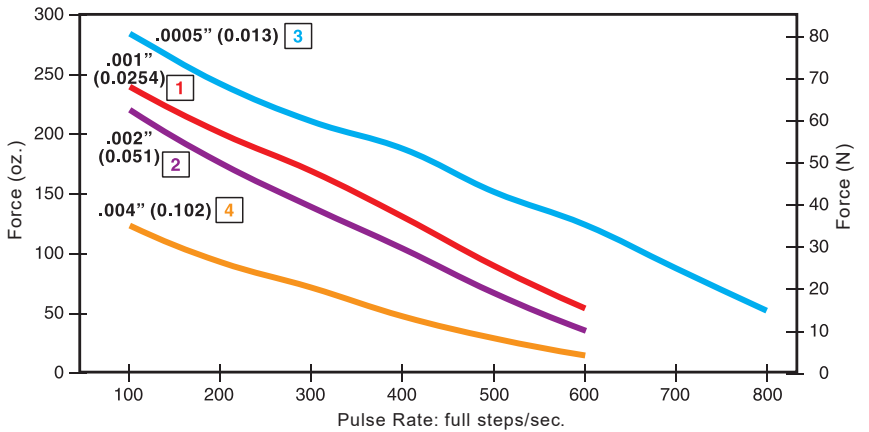
- L/R Drive
- Bipolar
- 100% Duty Cycle



FORCE vs. PULSE RATE

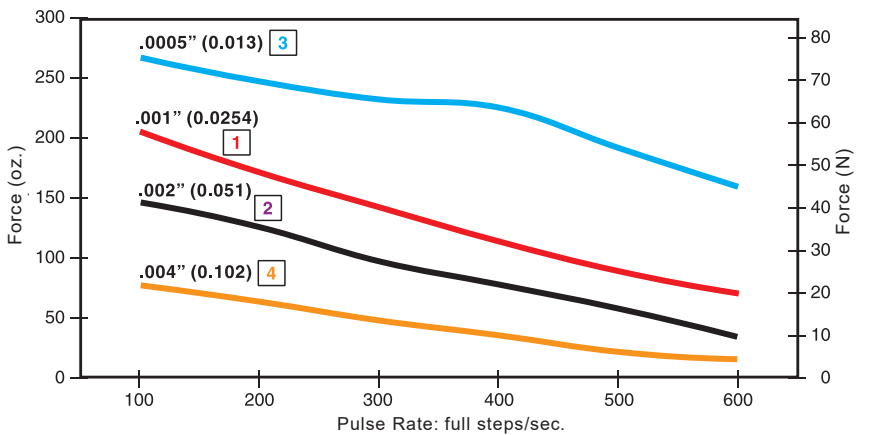
- L/R Drive
- Bipolar
- 25% Duty Cycle

Obtained by a special winding or by running a standard motor at double the rated current.



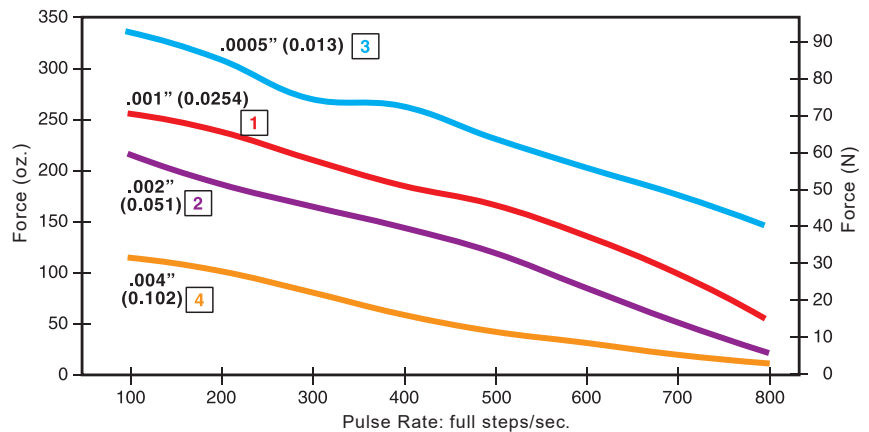
FORCE vs. PULSE RATE

- Chopper Drive
- Bipolar
- 100% Duty Cycle



FORCE vs. PULSE RATE

- Chopper Drive
- Bipolar
- 25% Duty Cycle



NOTE: All chopper drive curves were created with a 5 volt motor and a 40 volt power supply.

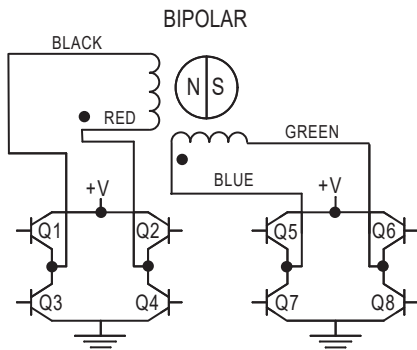
Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

Identifying the Can-Stack Number Codes when Ordering

| E | 25 | 5 | 4 | 4 | 12 | 1010 |
|---|---|--|---|---|---|--|
| Prefix (include only when using the following) E = External K = External with 40° thread form P = Proximity Sensor S = Home Position Switch | Series Number Designation 25 = 25000 (Series numbers represent approximate diameters of motor body) | Style 3 = 7.5° Non-Captive 4 = 7.5° Captive or External (use "E" or "K" Prefix for External version) 5 = 15° Captive or External (use "E" or "K" Prefix for External version) 8 = 15° Non-Captive | Coils 4 = Bipolar (4 wire) | Code ID Resolution Travel/Step 1 = .001-in (.0254) 2 = .002-in (.051) 3 = .0005-in (.013) 4 = .004-in (.102) | Voltage 05 = 5 VDC 12 = 12 VDC Custom V available | Suffix Stroke Example: -1010 = captive 25mm stroke with leads -XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part. |

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance call our Engineering Team at 203 756 7441.

Can-Stacks: Wiring



Can-Stacks: Stepping Sequence

| Bipolar | Q2-Q3 | Q1-Q4 | Q6-Q7 | Q5-Q8 |
|---------|-------|-------|-------|-------|
| Step | | | | |
| 1 | ON | OFF | ON | OFF |
| 2 | OFF | ON | ON | OFF |
| 3 | OFF | ON | OFF | ON |
| 4 | ON | OFF | OFF | ON |
| 1 | ON | OFF | ON | OFF |

Note: Half stepping is accomplished by inserting an off state between transitioning phases.

EXTEND CW ↓

RETRACT CCW ↑

TFE Coated Lead Screws for applications that require a permanent, dry lubricant

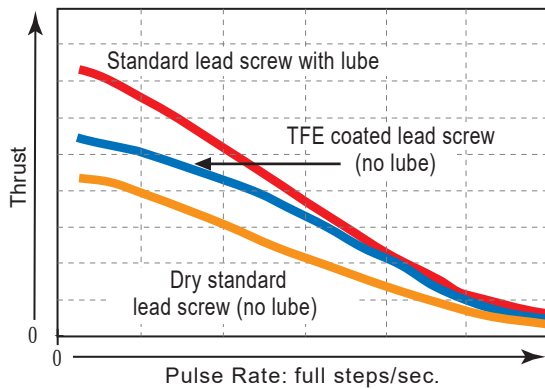
Ideal for applications where conventional oils and greases cannot be used for lead screw lubrication.

Non-lubricated TFE Coated Lead Screw provides improved performance in both life and thrust as compared to a “dry” stainless steel lead screw. TFE can be applied to a wide variety of lead screw pitches. Available captive, non-captive and external linear.

Typical applications: where contamination from grease or lubricants must be avoided; silicon wafer handling, clean rooms, medical equipment or laboratory instrumentation.

Lead Screw Comparison: FORCE vs. PULSE RATE

– L/R Drive – 100% Duty Cycle

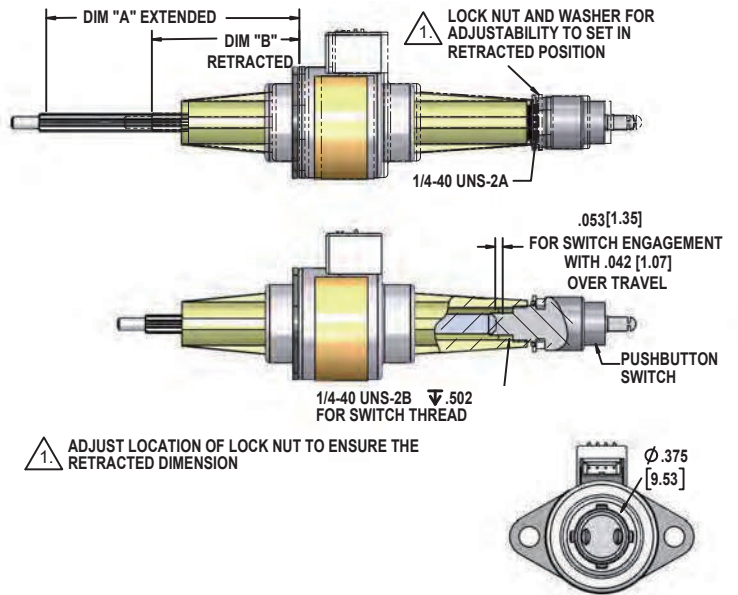


Home Position Switch monitors movements more precisely for greater control and improved quality control

Miniature electronic home position switch capable of monitoring the home positions of linear actuators. The switch mounts on the rear sleeve of captive linear motors and allows the user to identify start, stop or home positions. Depending on your preference, contacts can be normally open or normally closed. The contact closure is repeatable to within one step position, identifying linear movements as low as 0.0005-in (0.0013 cm) per step. Multiple contact switches are also available.

Activation force of 10 oz (2.78 N) required therefore may not be appropriate for smaller can-stack actuators.

When ordering motors with the home position switch, the part number should be preceded by an “S”.



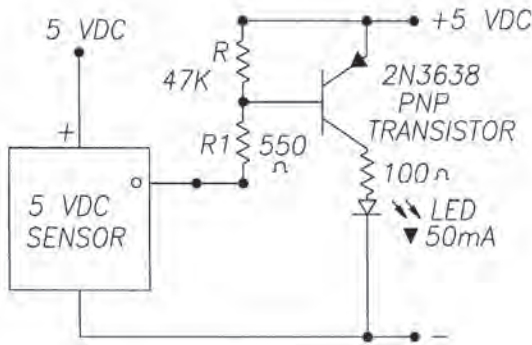
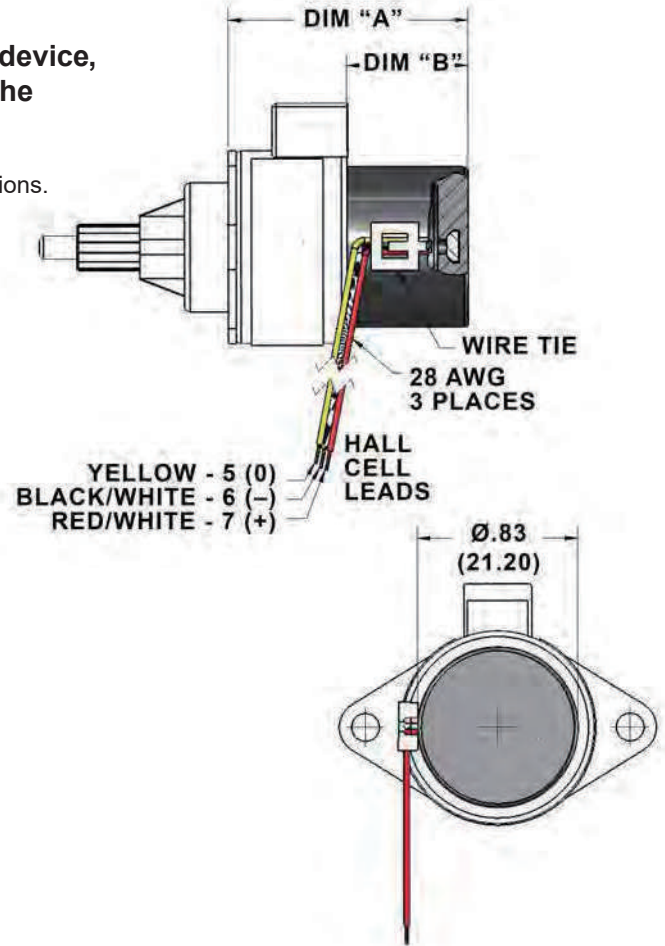
| Specifications | |
|----------------------------|---|
| Contact Ratings (Standard) | 1.00 AMP @ 120 VAC 1.00 AMP @ 28 VDC |
| Operating Temperature | -30°C to +55°C (-22°F to 131°F) |
| Electrical Life | < 20 millionths typ. initial at 2 - 4 V DC, 100 mA Tested to 60,000 make-and-break cycles at full load |
| Schematic | Multiple contact options available. |

| Stroke inches (mm) | Dim "A" Extended inches (mm) | Dim "B" Retracted inches (mm) |
|--------------------|------------------------------|-------------------------------|
| .512 (13) | 1.329 (33.76) | .787 (19.99) |
| .708 (18) | 1.743 (44.27) | .994 (25.25) |
| .984 (25) | 2.293 (58.24) | 1.269 (32.23) |
| 1.22 (31) | 2.765 (70.23) | 1.505 (38.23) |

End of Stroke Proximity Sensor incorporates a hall effect device, activated by a rare earth magnet embedded in the end of the internal screw

Compact profile of the sensor allows for installation in limited space applications. Virtually unlimited cycle life. Special cabling and connectors available.

| Specifications | |
|-----------------------------------|---|
| Supply Voltage (VDC) | 3.8 min. to 24 max. |
| Current Consumption | 10 mA max. |
| Output Voltage (operated) | 0.15 typ., 0.40 max. Sinking 20 mA max. |
| Output Current | 20 mA max. |
| Output Leakage Current (released) | 10µA max. @ Vout = 24 VDC; Vcc = 24 VDC |
| Output Switching Time | Rise, 10 to 90% .05 µs typ., 1.5 µs max. @ Vcc = 12 V, RL = 1.6 KOhm |
| | Fall, 90 to 10% .15 µs typ., 1.5 µs max. @ CL = 20 pF |
| Temperature | - 40 to +150°C |



| Stroke inches (mm) | Dim "A" Extended inches (mm) | Dim "B" Retracted inches (mm) |
|--------------------|------------------------------|-------------------------------|
| .512 (13) | 1.248 (31.71) | .632 (16.05) |
| .708 (18) | 1.449 (36.81) | .833 (21.15) |
| .984 (25) | 1.723 (43.76) | 1.106 (28.10) |
| 1.22 (31) | 1.959 (49.76) | 1.343 (34.10) |

NOTE: Sensor is category 2 ESD sensitive per DOD-STD-1686A. Assembly operations should be performed at workstations with conductive tops and operators grounded.

The sensor has virtually unlimited cycle life. Special cabling and connectors can also be provided.

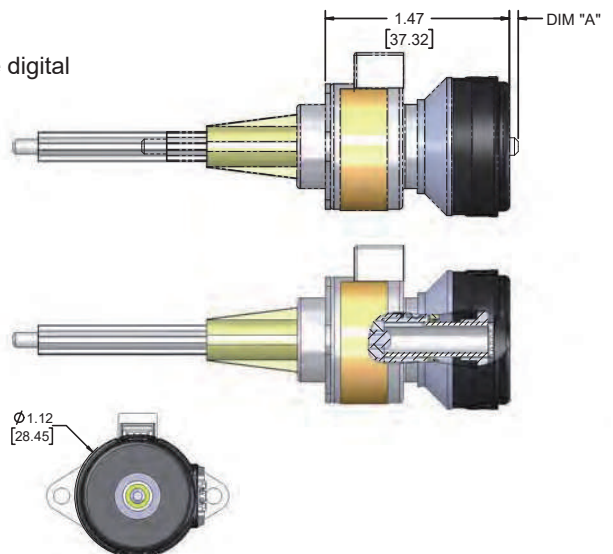
G4 25000 Series E8T Encoder

G4 25000 Series E8T Transmissive Optical Encoder is designed to provide the digital quadrature encoder feedback for high volume, compact space applications.

- Resolutions from 180 to 720
- Single-ended / Differential
- Frequency response to 100 kHz
- Low power consumption, 5V @ 30 mA max
- High retention polarized connector

Assembly Options:

- Differential line driver with complementary outputs
- Detachable cable
- Through-hole cover



| Stroke inches (mm) | Dim "A" Extended inches (mm) |
|--------------------|------------------------------|
| .512 (13) | N/A |
| .708 (18) | N/A |
| .984 (25) | .071 (1.80) |
| 1.22 (31) | .307 (7.80) |

G4 37000 Series Ø 36 mm (1.4-in) Can-Stack Stepper Motor Linear Actuators

Outstanding durability and high performance. The G4 Series features high energy neodymium magnets and dual ball bearings.

Exceptionally high linear force-to-size ratio, ideal for precision motion

Multiple versions available

- Captive
- Non-Captive
- External Linear



Specifications

| Ø 36 mm (1.4-in) Motor | | | | | |
|------------------------|-----------------|----------------------|--------|----------|--------|
| Part No. | Captive | 3744 † | | 3754 † | |
| | Non-Captive | 3734 † | | 3784 † | |
| | External Linear | E3744 † | | E3754 † | |
| Wiring | | Bipolar | | | |
| Step angle | | 7.5° | | 15° | |
| Winding Voltage | | 5 VDC | 12 VDC | 5 VDC | 12 VDC |
| Current (RMS)/phase | | 561 mA | 230 mA | 561 mA | 230 mA |
| Resistance/phase | | 8.9Ω | 52Ω | 8.9Ω | 52Ω |
| Inductance/phase | | 11.6 mH | 65 mH | 8.5 mH | 46 mH |
| Power Consumption | | 5.6 W | | | |
| Rotor Inertia | | 8.5 gcm ² | | | |
| Insulation Class | | Class B | | | |
| Weight | | 4.2 oz (120 g) | | | |
| Insulation Resistance | | 20 MΩ | | | |

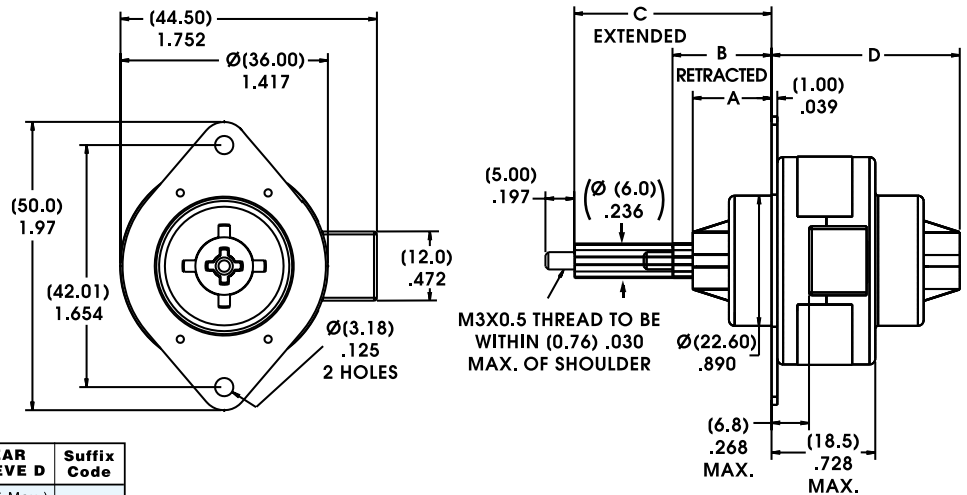
| step | Linear Travel | | Order Code I.D. |
|------------|---------------|-------------|-----------------|
| | mm/step | Lead mm/rev | |
| 7.5° Angle | 0.013 | 0.6240 | 3 |
| | 0.0254 | 1.2192 | 1 |
| | 0.051 | 2.4480 | 2 |
| 15° Angle | 0.0254 | 0.6096 | 1 |
| | 0.051 | 1.2240 | 2 |
| | 0.102 | 2.4480 | 4 |

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted. Standard motors are Class B rated for maximum temperature of 130° C (266° F).

†Part numbering information on page 4.

Captive Lead Screw

Dimensions = (mm) inches

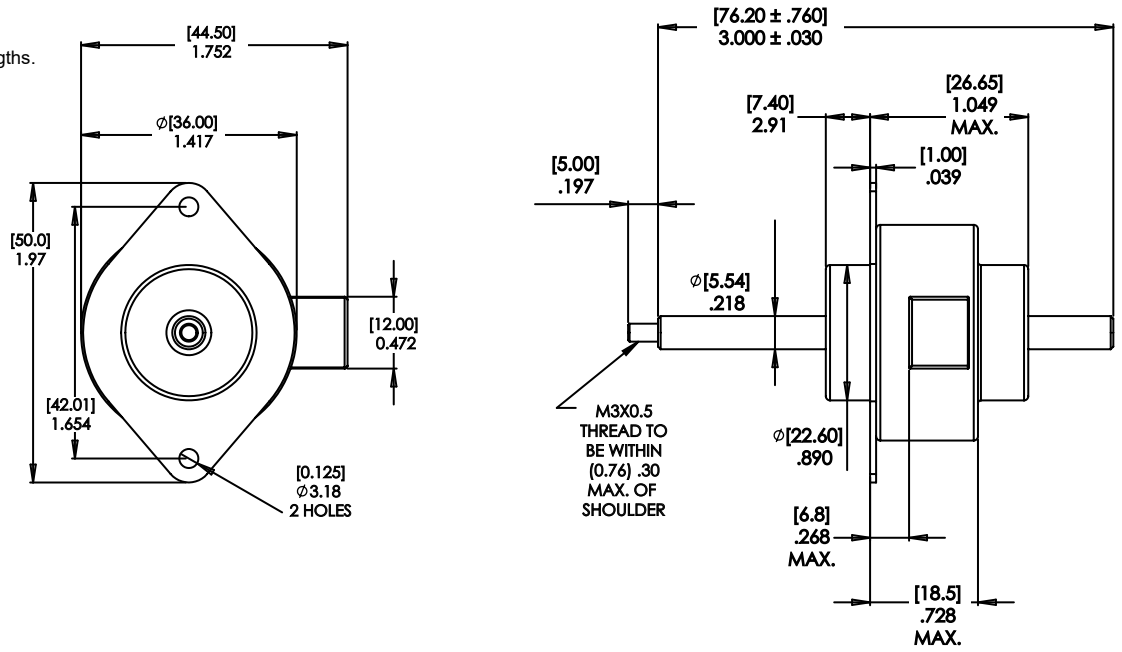


| STROKE (Minimum) | FRONT SLEEVE A | RETRACTED B | EXTENDED C | REAR SLEEVE D | Suffix Code |
|--------------------|----------------------------|----------------------------|----------------------------|----------------------------|-------------|
| (16.0 mm) 0.631 | (13.67±0.25) .538±.010 | (17.19±0.64) .677±.025 | (34.24±0.38) 1.348±.015 | (33.85 Max.) 1.333 Max. | - 905 |
| (25.4 mm) 1.00 | (26.37±0.25) 1.038±.010 | (29.89±0.64) 1.177±.025 | (56.94±0.38) 2.348±.015 | (46.55 Max.) 1.833 Max. | - 910 |
| (38.1 mm) 1.50 | (39.07±0.25) 1.538±.010 | (42.59±0.64) 1.677±.025 | (85.04±0.38) 3.348±.015 | (59.25 Max.) 2.333 Max. | - 915 |

Non-Captive Lead Screw

Dimensions = (mm) inches

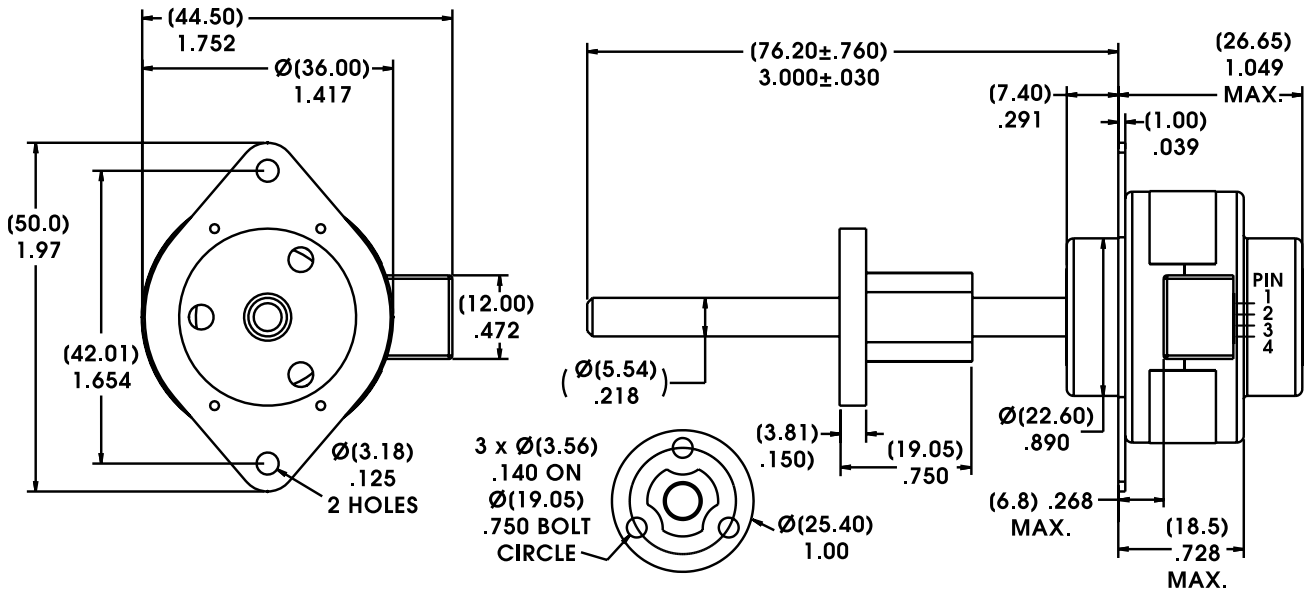
Up to 6.3-in (160 mm) standard screw lengths.
Longer screw lengths are available.



External Linear

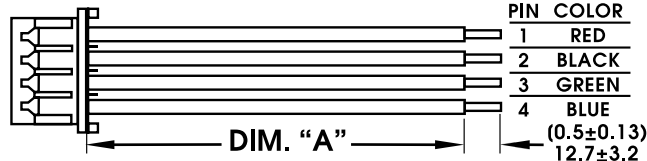
Dimensions = (mm) inches

Up to 6.3-in (160 mm) standard screw lengths.
Longer screw lengths are available.



Connector

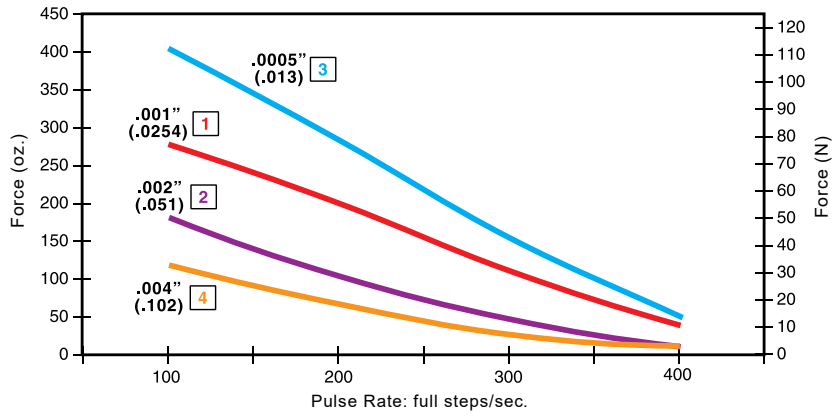
CONNECTOR:
JST PHR-4
TERMINAL: JST
SPH-002T-PO.5S



| Part Number | Dimension "A" |
|-------------|-------------------------------------|
| 56-1436-1 | (6.0 \pm 0.39) 152 \pm 10 mm |
| 56-1436-2 | (12 \pm 0.39) 305 \pm 10 mm |

FORCE vs. PULSE RATE

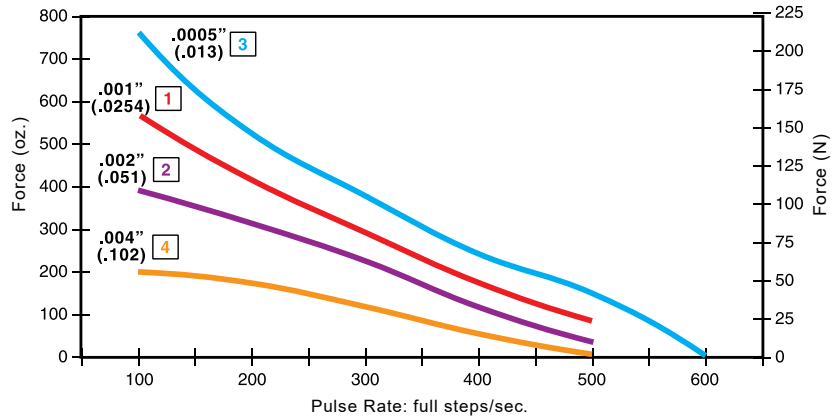
- L/R Drive
- Bipolar
- 100% Duty Cycle



FORCE vs. PULSE RATE

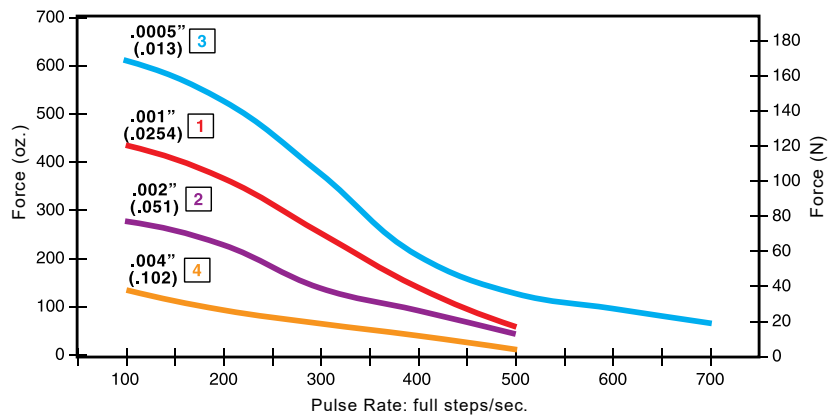
- L/R Drive
- Bipolar
- 25% Duty Cycle

Obtained by a special winding or by running a standard motor at double the rated current.



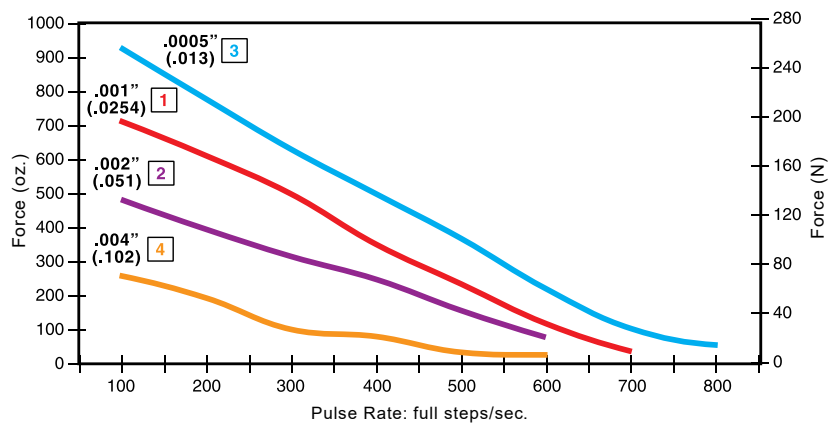
FORCE vs. PULSE RATE

- Chopper Drive
- Bipolar
- 100% Duty Cycle



FORCE vs. PULSE RATE

- Chopper Drive
- Bipolar
- 25% Duty Cycle



NOTE: All chopper drive curves were created with a 5 volt motor and a 40 volt power supply.

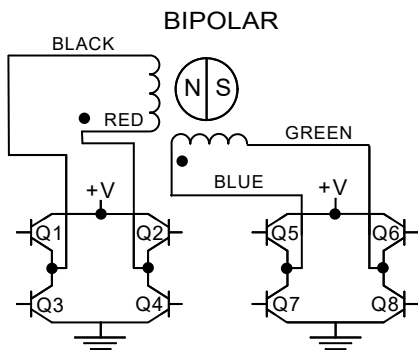
Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

Identifying the Can-Stack Number Codes when Ordering

| E | 37 | 4 | 4 | 2 | 05 | 1015 |
|---|---|--|---|---|---|---|
| Prefix (include only when using the following) E = External K = External with 40° thread form P = Proximity Sensor S = Home Position Switch | Series Number Designation 37 = 37000 (Series numbers represent approximate diameters of motor body) | Style 3 = 7.5° Non-Captive 4 = 7.5° Captive or External (use "E" or "K" Prefix for External version) 5 = 15° Captive or External (use "E" or "K" Prefix for External version) 8 = 15° Non-Captive | Coils 4 = Bipolar (4 wire) | Code ID Resolution Travel/Step 1 = .001-in (.0254) 2 = .002-in (.051) 3 = .0005-in (.013) 4 = .004-in (.102) | Voltage 05 = 5 VDC 12 = 12 VDC Custom V available | Suffix Stroke Example: -1015 = captive 38.1mm stroke with leads -XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part. |

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance call our Engineering Team at 203 756 7441.

Can-Stacks: **Wiring**



Can-Stacks: **Stepping Sequence**

| Bipolar | Q2-Q3 | Q1-Q4 | Q6-Q7 | Q5-Q8 |
|---------|-------|-------|-------|-------|
| Step | | | | |
| 1 | ON | OFF | ON | OFF |
| 2 | OFF | ON | ON | OFF |
| 3 | OFF | ON | OFF | ON |
| 4 | ON | OFF | OFF | ON |
| 1 | ON | OFF | ON | OFF |

EXTEND CW ↓ ↑ RETRACT CCW

Note: Half stepping is accomplished by inserting an off state between transitioning phases.

TFE Coated Lead Screws for applications that require a permanent, dry lubricant

Ideal for applications where conventional oils and greases cannot be used for lead screw lubrication.

Non-lubricated TFE Coated Lead Screw provides improved performance in both life and thrust as compared to a “dry” stainless steel lead screw. TFE can be applied to a wide variety of lead screw pitches. Available captive, non-captive and external linear.

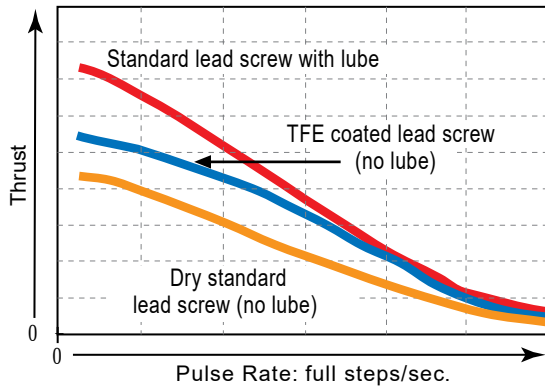
Typical applications: where contamination from grease or lubricants must be avoided; silicon wafer handling, clean rooms, medical equipment or laboratory instrumentation.



G4 37000 Series, External Linear

Lead Screw Comparison: FORCE vs. PULSE RATE

– L/R Drive – 100% Duty Cycle

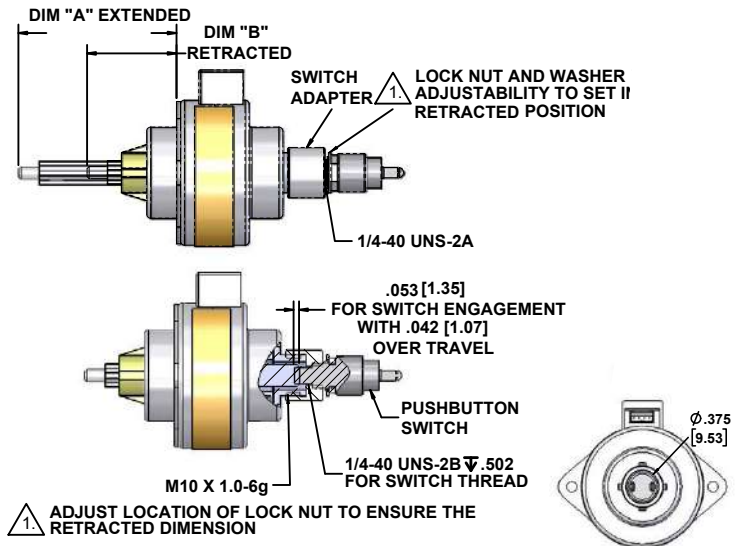


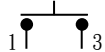
Home Position Switch monitors movements more precisely for greater control and improved quality control

Miniature electronic home position switch capable of monitoring the home positions of linear actuators. The switch mounts on the rear sleeve of captive linear motors and allows the user to identify start, stop or home positions. Depending on your preference, contacts can be normally open or normally closed. The contact closure is repeatable to within one step position, identifying linear movements as low as 0.0005-in (0.0013 cm) per step. Multiple contact switches are also available.

Activation force of 10 oz (2.78 N) required therefore may not be appropriate for smaller can-stack actuators.

When ordering motors with the home position switch, the part number should be preceded by an “S”.



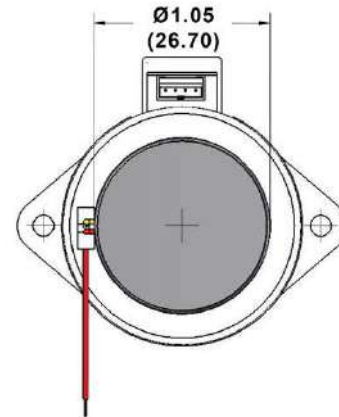
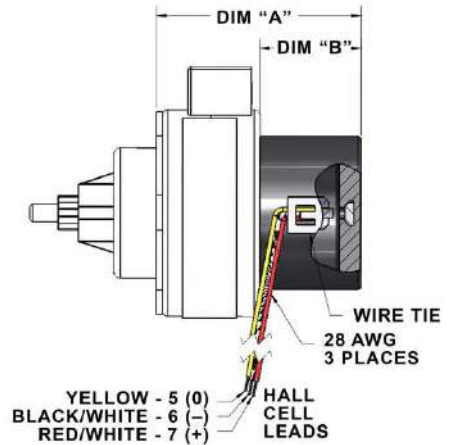
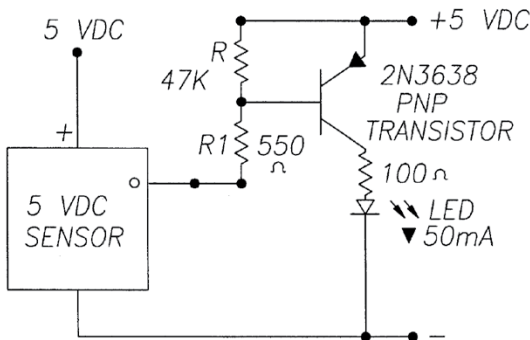
| Specifications | |
|----------------------------|--|
| Contact Ratings (Standard) | 1.00 AMP @ 120 VAC 1.00 AMP @ 28 VDC |
| Operating Temperature | -30°C to +55°C (-22°F to 131°F) |
| Electrical Life | < 20 milliohms typ. initial at 2 - 4 V DC, 100 mA Tested to 60,000 make-and-break cycles at full load |
| Schematic |  Multiple contact options available. |

| Stroke inches (mm) | Dim "A" Extended inches (mm) | Dim "B" Retracted inches (mm) |
|-----------------------|---------------------------------|----------------------------------|
| .512 (13) | 1.329 (33.76) | .787 (19.99) |
| .708 (18) | 1.743 (44.27) | .994 (25.25) |
| .984 (25) | 2.293 (58.24) | 1.269 (32.23) |
| 1.22 (31) | 2.765 (70.23) | 1.505 (38.23) |

End of Stroke Proximity Sensor incorporates a hall effect device, activated by a rare earth magnet embedded in the end of the internal screw

Compact profile of the sensor allows for installation in limited space applications. Virtually unlimited cycle life. Special cabling and connectors available.

| Specifications | |
|-----------------------------------|---|
| Supply Voltage (VDC) | 3.8 min. to 24 max. |
| Current Consumption | 10 mA max. |
| Output Voltage (operated) | 0.15 typ., 0.40 max. Sinking 20 mA max. |
| Output Current | 20 mA max. |
| Output Leakage Current (released) | 10µA max. @ Vout = 24 VDC; Vcc = 24 VDC |
| Output Switching Time | Rise, 10 to 90% .05 µs typ., 1.5 µs max. @ Vcc = 12 V, RL = 1.6 KOhm |
| | Fall, 90 to 10% .15 µs typ., 1.5 µs max. @ CL = 20 pF |
| Temperature | - 40 to +150°C |



| Stroke inches (mm) | Dim "A" inches (mm) | Dim "B" inches (mm) |
|--------------------|---------------------|---------------------|
| .631 (16) | 1.404 (35.65) | .695 (17.65) |
| 1.00 (25.4) | 1.906 (48.41) | 1.197 (30.41) |
| 1.50 (38.1) | 2.409 (61.18) | 1.700 (43.18) |

The sensor has virtually unlimited cycle life. Special cabling and connectors can also be provided.

NOTE: Sensor is category 2 ESD sensitive per DOD-STD-1686A. Assembly operations should be performed at workstations with conductive tops and operators grounded.

G4 37000 Series E8T Encoder

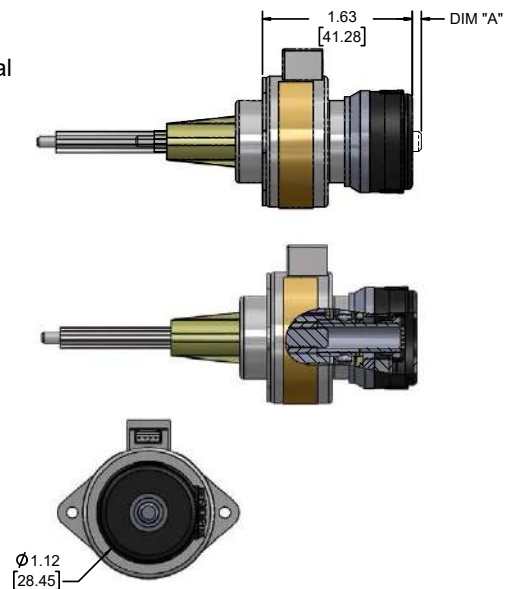
G4 37000 Series E8T Transmissive Optical Encoder is designed to provide the digital quadrature encoder feedback for high volume, compact space applications.

- Resolutions from 180 to 720
- Single-ended / Differential
- Frequency response to 100 kHz
- Low power consumption, 5 V @ 30 mA max
- High retention polarized connector

Assembly Options:

- Differential line driver with complementary outputs
- Detachable cable
- Through-hole cover

| Stroke inches (mm) | Dim "A" Extended inches (mm) |
|--------------------|------------------------------|
| .631 (16) | N/A |
| 1.00 (25.4) | .098 (2.50) |
| 1.50 (38.1) | .598 (15.20) |



15000 Series Ø 15 mm (.59-in) Can-Stack Stepper Motor Linear Actuators

Delivering force of up to 8 lbs (35N) without compromising long life or cost. Lightweight models can also be micro-stepped for even finer resolution. Bi-directional travel motor.

The world's smallest commercial linear stepper motor

Multiple versions available

- Captive
- External Linear
- External Linear with ZBMR Nut



Specifications

| Ø 15 mm (.59-in) Motor | | | |
|------------------------|-----------------------------|------------------|---------|
| Part No. | Captive | LC1574 - - - - † | |
| | External Linear | LE1574 - - - - † | |
| Wiring | Bipolar | | |
| Step angle | 18° | | |
| Winding Voltage | 4 VDC | 5 VDC | 12 VDC |
| Current (RMS)/phase | 0.2 A | 0.16 A | 0.07 A |
| Resistance/phase | 20Ω | 31Ω | 180Ω |
| Inductance/phase | 5.6 mH | 8.7 mH | 48.8 mH |
| Power Consumption | 1.6 W | | |
| Rotor Inertia | 0.09 gcm ² | | |
| Insulation Class | Class B (Class F available) | | |
| Weight | 1 oz (28 g) | | |
| Insulation Resistance | 20 MΩ | | |
| Stroke | 0.5-in. (12.7 mm) | | |

†Part numbering information below.

| Linear Travel | | Lead | Order Code I.D. |
|---------------|---------|--------|-----------------|
| Step | mm/step | mm/rev | |
| 18° Angle | 0.020 | 0.4000 | W |
| | 0.025 | 0.5000 | AQ |
| | 0.050 | 1.0000 | BH |
| | 0.100 | 2.0000 | DC |

*Values truncated

| Available Standard Connectors for Series 15000 | | | | |
|--|-------|-------|-------|-------|
| Connector | PIN | | | |
| | 1 | 2 | 3 | 4 |
| JST PHR-4 | Red | White | Green | Black |
| Molex 51021-0400 | Black | Green | White | Red |

| Available Flying Leads | |
|------------------------|--|
| Length | Order Code I.D. Suffix (add to end on I.D.) |
| 12 inches (304.8 mm) | -999 |

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted. Standard motors are Class B rated for maximum temperature of 130° C (266° F).

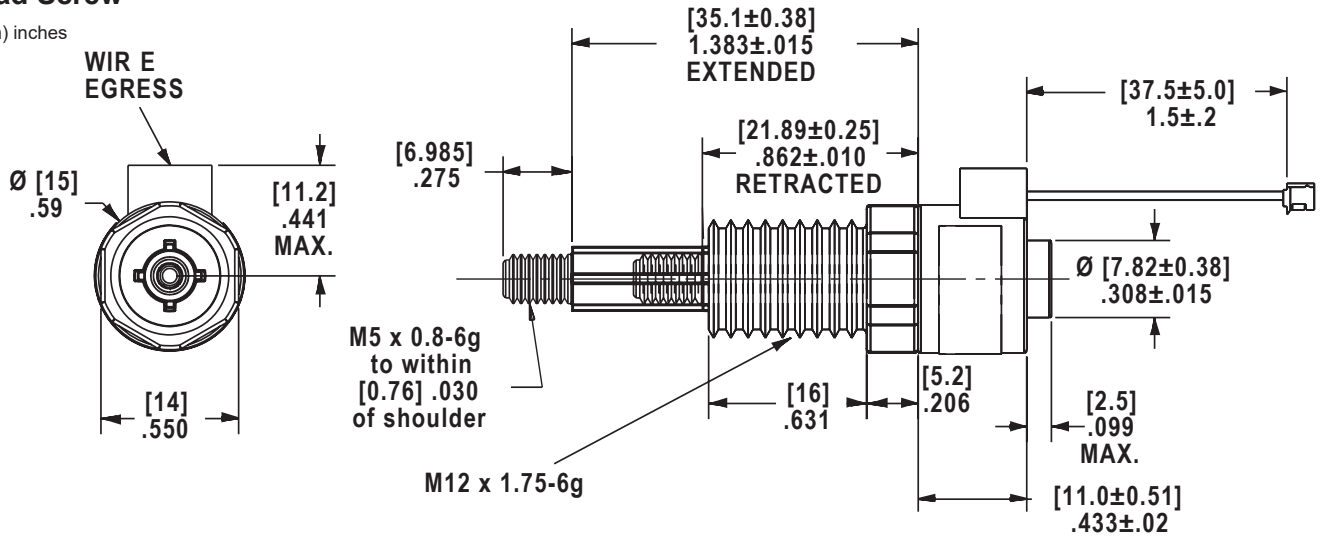
Identifying the Can-Stack Number Codes when Ordering

| LC | 15 | 7 | 4 | W | 04 | 999 |
|------------------------------------|--|--------------------|-------------------------|--|--|---|
| Prefix | Series Number Designation | Style | Coils | Code ID Resolution Travel/Step | Voltage | Suffix Stroke |
| LC= Captive LE= External Linear | 15 = 15000 (Series numbers represent approximate diameters of motor body) | 7 = 18° Captive | 4 = Bipolar (4 wire) | W= .00079-in (.02) AQ= .00098-in (.025) BH= .00197-in (.05) DC= .00394-in (.10) | 04= 4 VDC 05= 5 VDC 12= 12 VDC Custom V available | Example: -999 = 12-in leads -XXX = Proprietary suffix assigned to a specific customer application. The identifier can apply to either a standard or custom part. |

NOTE: Dashes must be included in Part Number (-) as shown above. For assistance call our Engineering Team at 203 756 7441.

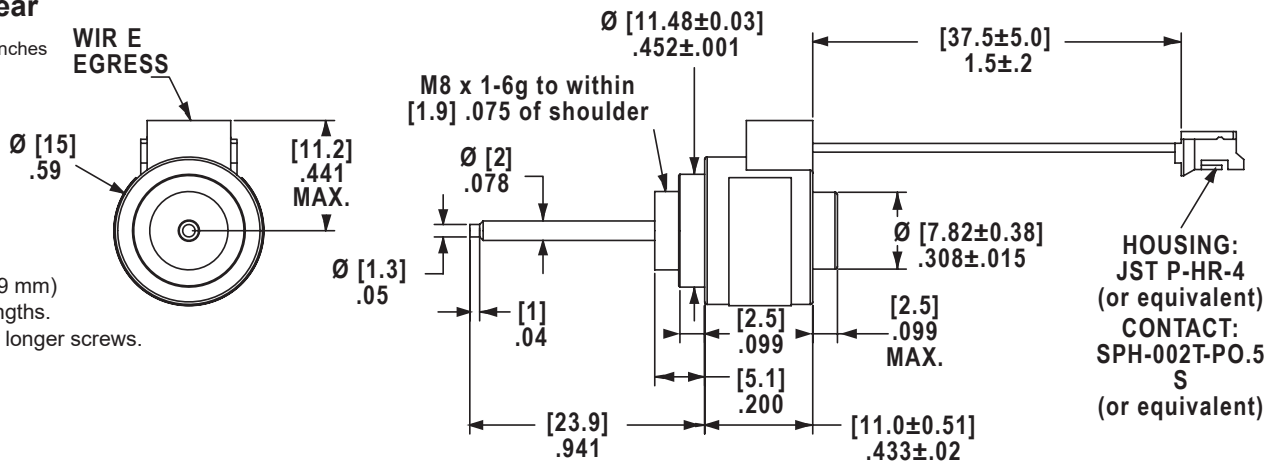
Captive Lead Screw

Dimensions = (mm) inches



External Linear

Dimensions = (mm) inches



Up to 2.36-in (59.9 mm) standard screw lengths. Consult factory for longer screws.

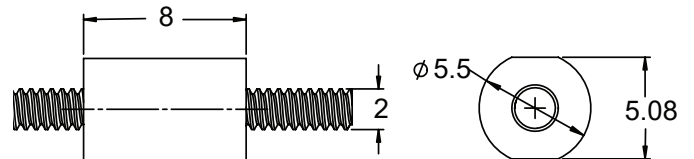
MICRO Series

Dimensions = (mm) inches

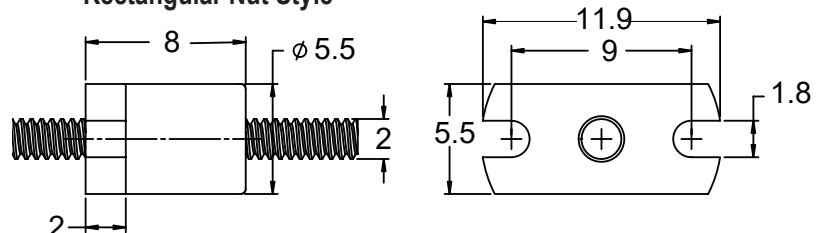
Standard nut styles. Consult the factory for custom solutions.

| MICRO Series Nut Styles | | | |
|-------------------------|--------------------|-----------------------|------------------------|
| Part No. | BFW Nut Style | Dynamic Load lbs (Kg) | Drag Torque oz-in (NM) |
| BFWB | Barrel Mount | 10 (4.5) | Free Wheeling |
| BFWR | Rectangular Flange | | |

Barrel Nut Style

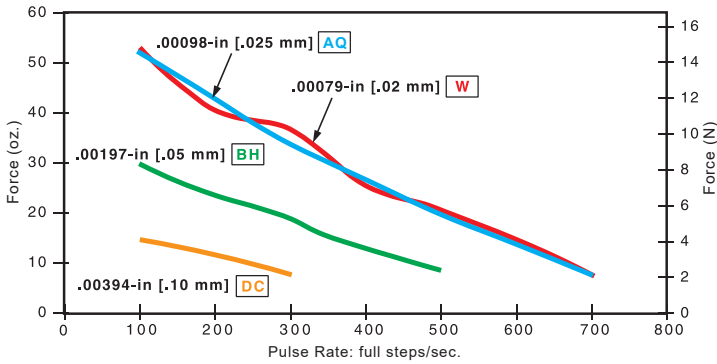


Rectangular Nut Style



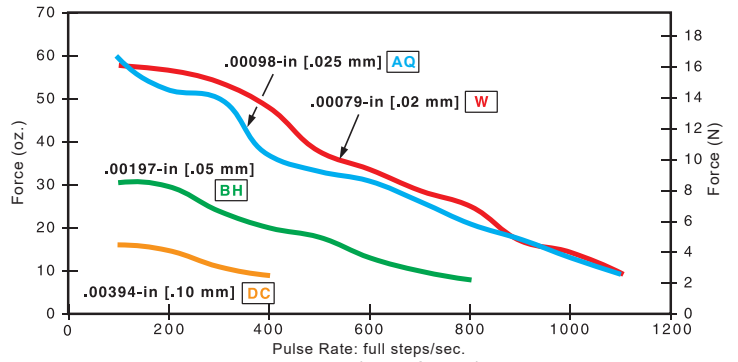
FORCE vs. PULSE RATE

- L/R Drive - Bipolar - 100% Duty Cycle



FORCE vs. PULSE RATE

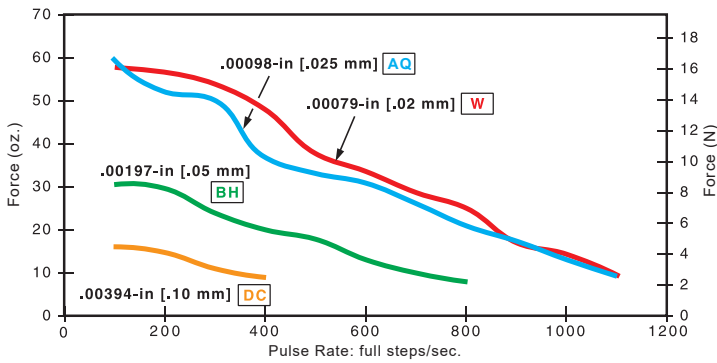
- L/R Drive - Bipolar - 25% Duty Cycle



Obtained by a special winding or by running a standard motor at double the rated current.

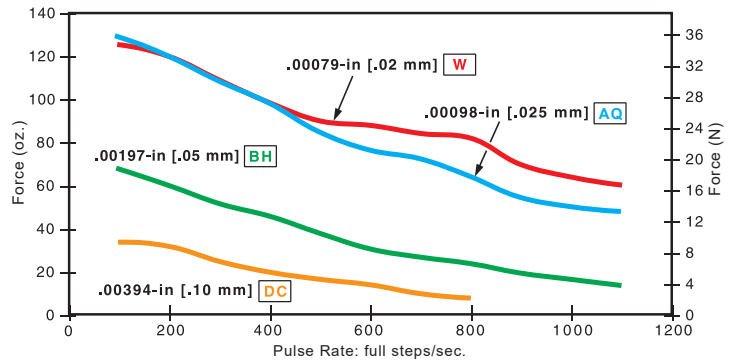
FORCE vs. PULSE RATE

- Chopper Drive - Bipolar - 100% Duty Cycle



FORCE vs. PULSE RATE

- Chopper Drive - Bipolar - 25% Duty Cycle

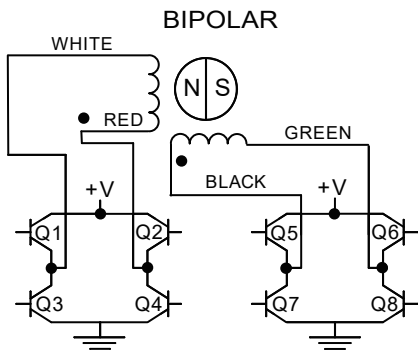


NOTE: All chopper drive curves were created with a 5 volt motor and a 40 volt power supply.

Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

15000 Series - Can-Stack Stepper Motor Linear Actuators Wiring & Stepping Sequence

Can-Stacks: Wiring



Can-Stacks: Stepping Sequence

| | Bipolar | Q2-Q3 | Q1-Q4 | Q6-Q7 | Q5-Q8 |
|---------------|---------|-------|-------|-------|-------|
| EXTEND CW ↓ | Step | | | | |
| | 1 | ON | OFF | ON | OFF |
| | 2 | OFF | ON | ON | OFF |
| | 3 | OFF | ON | OFF | ON |
| | 4 | ON | OFF | OFF | ON |
| ↑ RETRACT CCW | 1 | ON | OFF | ON | OFF |

Note: Half stepping is accomplished by inserting an off state between transitioning phases.